BANNISTER ELECTRIC LLC OF WEST MONROE

INJURY AND ILLNESS
PREVENTION PROGRAM

FOR THE STATE OF LOUISIANA

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TABLE OF CONTENTS

LOUISIANA FOREWORD

CORE CHAPTERS

Health and Safety Program 1-1
General Safety Rules 2-1
Training 3-1
Job Hazard Analysis 4-1
Emergency Response Planning 5-1
Accident Investigation 6-1
First Aid and Medical Services 7-1
Bloodborne Pathogens 8-1
Workplace Violence Prevention 9-1
Fire Protection and Prevention 10-1
Personal Protective Equipment 11-1
Hazard Communication 12-1
General Electrical Safety 13-1

ELECTED CHAPTERS

Abrasive Blasting 14-1
Air Compressors 15-1
Arc Flash – NFPA 70E 16-1
Cold Stress 17-1
Compressed Gas Cylinders 18-1
Concrete Cutting and Drilling 19-1
Confined Spaces 20-1
Cranes and Mobile Lifting Devices 21-1
Driver Safety 22-1
Drywall, Plastering and Insulation 23-1
Electrical Power Generation and Distribution 24-1
Elevating Work Platforms 25-1
Fall Protection 26-1
Forklifts 27-1
Hand and Power Tools 28-1
HAZWOPER 29-1
Hearing Conservation 30-1
Heat Illness Prevention 31-1
Ladder and Stair Safety 32-1
Load Securement 33-1
Lockout or Tagout 34-1
Machine Guarding 35-1
Silica Dust 36-1
Slings, Hoists and Rigging 37-1
Slips, Trips and Falls 38-1
Welding, Cutting and Brazing 39-1
Working Near Overhead Power Lines 40-1
Acknowledgement & Notes

SCOPE

This section of your manual provides you with information specific to Louisiana. The chapters that follow this foreword contain information that is aligned, at a minimum, to federal Occupational Safety and Health Administration (OSHA) standards. If an applicable OSHA standard does not exist, or is superseded by another regulatory agency or state-specific requirement, the most stringent standard available will be provided.

FEDERAL AND STATE REGULATIONS

OSHA governs Louisiana's safety and health regulations. However, this section of your manual contains reporting and other regulatory information that is specific to Louisiana.

STATE REQUIREMENTS

Louisiana law requires that all state departments, agencies, and businesses having 15 or more employees implement a written safety management program to protect employees from injury.

Implementing a workplace safety management program may result in a reduction of workers' compensation insurance premiums.

A written safety management plan should include information on the following topics at a minimum:

- Policy statement
- Responsibilities
- Job Hazard Analysis
- Accident Investigation
- Safety meetings
- Safety rules
- Training
- Recordkeeping
- Emergency preparedness

LABOR POSTERS

In addition to the posters required by federal agencies, Louisiana requires the following posters to be prominently displayed in the workplace.

- Minor Labor Law
- Age Discrimination
- National Guard
- Notice of Compliance to Employees
- Notice to Workers (U.I. benefits)
- Out-of-State Motor Vehicles
- Earned Income Credit
- Sickle Cell Trait
- Timely Payment of Wages

- Equal Opportunity for All
- Genetic Information and Privacy
- Independent Contractor or Employee?

Your business may be required to post additional mandatory federal postings. To determine additional requirements, go to www.dol.gov/elaws/posters.htm.

REPORTING

Companies and employees should use the following contacts when:

- Reporting unsafe workplaces – Federal OSHA
- Reporting injuries or accidents – Federal OSHA
- Filing for workers' compensation – Louisiana Workers' Compensation Corporation
- Reporting acts of discrimination – Commission on Human Rights, or the Equal Employment Opportunity Commission

INJURIES OR ACCIDENTS

Louisiana private employers must report any work-related amputation, loss of an eye, or in-patient hospitalization of any employee, within 24 hours of the incident, and any fatal accident to the nearest federal OSHA Area Office within 8 hours.

To report a private sector fatality to federal OSHA during normal business hours (8:30 a.m. – 4:30 p.m.), call the nearest OSHA office. At all other times contact the federal OSHA Hotline:

- 1-800-321-OSHA (6742)
- TTY 1-877-889-5627

When reporting a health or safety hazard in the workplace, you will need to have as much information as possible regarding the nature of the accident, equipment involved, affected workers, and time.

DISCRIMINATION PROTECTION

In the state of Louisiana, it is against the law for an employer to refuse to hire, to discharge, to promote or demote, or to discriminate in matters of compensation or the terms, conditions, or privileges of employment against a qualified disabled person or any person otherwise qualified because of:

- Race
- Color
- National Origin
- Religion
- Sex (including pregnancy, childbirth, and related medical conditions)
- Sickle cell trait
- Disability (physical, mental)
- Age (40 and older)
- Citizenship status
- Genetic information

Employees who believe that have been subjected to discriminatory practices based on any status in the list above can file a complaint with the **Commission on Human Rights** at: (225) 342-6969

Workers can also contact the Equal Employment Opportunity Commission (EEOC), which is the federal agency that regulates workplace discrimination.

EEOC: 1(800) 669-4000

UNSAFE WORKPLACE

If you are an employee or employee representative, and believe you or another employee are/is exposed to a condition that is immediately dangerous to life or health, you should first attempt to resolve the matter with the employer. If that is not possible, you may file a complaint with OSHA by mail, phone, fax, or online.

For Health Hazards

- Do any employees have injuries or symptoms that they believe are caused by the hazardous condition or substance?
- Have any employees been treated by a doctor for an injury, illness, or disease related to the hazardous condition or substance? What was it?

For Safety Hazards

- How many employees work at the site and how many are exposed to the hazard?
- How and when are workers exposed?
- What work is performed in the unsafe or unhealthful area?
- What type of equipment is used? Is it in good condition?
- What materials and/or chemicals are used?
- Have employees been informed or trained regarding hazardous conditions?
- What processes and/or operations are involved?
- What kinds of work are done nearby?
- How often and for how long do employees work at the task that leads to their exposure?
- How long (to your knowledge) has the condition existed?
- Have any attempts been made to correct the problem?
- On what shifts does the hazard exist?
- Has anyone been injured or made ill because of this problem?
- Have there been any "near-miss" incidents?

Filing by Fax or Mail

To file a complaint by fax or mail, complete the form near the end of this foreword, and send it to the nearest OSHA office. Written complaints that are signed by a worker or representative and submitted to the closest OSHA Area Office are more likely to result in onsite OSHA inspections. Please include your name, address, and telephone number so that OSHA can contact you to follow up. The information you provide is confidential.

Filing by Phone

Contact the nearest OSHA Regional or Area office, or call 1-800-321-OSHA.

Filing Online

To file an online compliant, go to www.OSHA.gov and complete the OSHA 7 form.

DISCRIMINATION

Workers who believe they have been punished or discriminated against for exercising their rights under the OSH Act have the right to file a complaint against their employer. However, employees must file a complaint with OSHA **within 30 days of the alleged reprisal**.

No particular form is required to report the discrimination. You may call or send a letter to the OSHA Area Office nearest you, use the Whistleblower Complaint form attached near the end of this foreword, or file online at www.OSHA.gov using the Online Whistleblower Complaint Form.

REFUSAL TO PERFORM UNSAFE WORK

Louisiana employees who refuse to perform work in conditions where there is an imminent danger to life or health may be protected under state and federal laws. OSHA recommends that employees first address the issue with their employer before taking action.

Refusing to perform work is recognized favorably for the employee only when it is done in good faith, in an imminently dangerous workplace where there is not enough time to contact OSHA, and when the employee remains readily available to perform other assigned tasks. Employees who simply walk off the job will not be protected.

OSHA Offices

OSHA offices are established in 10 geographical regions, with area offices located in most states. The addresses and phone numbers of the offices for Louisiana are listed below.

Regional Office 525 Griffin Street, Suite 602 Dallas, Texas 75202 (972) 850-4145 (972) 850-4149 FAX (972) 850-4150 FSO FAX	**Baton Rouge Area Office** 9100 Bluebonnet Centre Blvd., Ste. 201 Baton Rouge, LA 70809 Phone (225) 298-5458 Fax: (225) 298-5457

WORKERS' COMPENSATION

Employees in Louisiana can file for workers' compensation if they suffer a work-related injury or illness. In order to file a claim, workers need to notify Bannister Electric LLC of West Monroe of the injury or illness within twenty (20) days, or when symptoms of work-related illness become apparent.

Bannister Electric LLC of West Monroe in turn must notify their insurance carrier within one (1) hour of having been notified of the injury or illness by filing a First Notice of Injury report (FROI) with the insurer. File even if you do not have all of the necessary information.

Please note that claims may only be filed through your insurance carrier. The Louisiana Workers' Compensation Corporation does not accept claims.

If you have any questions about filing a workers' compensation claim, contact the commission.

Louisiana Workers' Compensation Corporation

2237 South Acadian Thruway

Baton Rouge, LA 70808

(225) 924-7788

A copy of his form is attached at the end of this foreword.

TRAINING

OSHA requires employers to train employees before they perform any task that may endanger their health or safety. Employees must be deemed competent to perform all work tasks, or they will work under the supervision of a competent worker.

Employers must perform a job hazard analysis to establish the presence and degree of onsite safety hazards, and to effectively mitigate or handle them. This investigation will include:

- The tasks to be performed
- The equipment to be used and/or operated
- The work environment and atmosphere
- The health and safety risks involved with the work

An onsite, competent professional may conduct training, or the company may choose to hire trainers from an approved third-party source.

The training must at least:

- Determine the level of competence required by workers who perform hazardous tasks, and evaluate the competence of workers who perform them
- Ensure employees who are not competent to complete a hazardous task are reassigned or trained appropriately
- Ensure training is updated to reflect changes in equipment, processes, environment, and employee responsibilities

ATTACHMENTS

- OSHA Safety and Health Complaint form (OSHA7)
- Employer's First Report of Injury Form

Notes:

Effective July 28 2017, the OSHA Whistleblower Complaint form has been revised, and must be completed online. Once completed the form can be sent electronically or printed and mailed to the nearest OSHA office.

The forms listed above are available online as either downloadable or fillable forms at the websites listed below.

- http://www.laworks.net/Downloads/Downloads_OWC.asp

https://www.osha.gov/whistleblower/WBComplaint.html

U. S. Department of Labor
Occupational Safety and Health Administration

Notice of Alleged Safety or Health Hazards

For the General Public:

This form is provided for the assistance of any complainant and is not intended to constitute the exclusive means by which a complaint may be registered with the U.S. Department of Labor.

Sec 8(f)(1) of the Williams-Steiger Occupational Safety and Health Act, 29 U.S.C. 651, provides as follows: Any employees or representative of employees who believe that a violation of a safety or health standard exists that threatens physical harm, or that an imminent danger exists, may request an inspection by giving notice to the Secretary or his authorized representative of such violation or danger. Any such notice shall be reduced to writing, shall set forth with reasonable particularity the grounds for the notice, and shall be signed by the employee or representative of employees, and a copy shall be provided the employer or his agent no later than at the time of inspection, except that, upon request of the person giving such notice, his name and the names of individual employees referred to therein shall not appear in such copy or on any record published, released, or made available pursuant to subsection (g) of this section. If upon receipt of such notification the Secretary determines there are reasonable grounds to believe that such violation or danger exists, he shall make a special inspection in accordance with the provisions of this section as soon as practicable to determine if such violation or danger exists. If the Secretary determines there are no reasonable grounds to believe that a violation or danger exists, he shall notify the employees or representative of the employees in writing of such determination.

NOTE: Section 11(c) of the Act provides explicit protection for employees exercising their rights, including making safety and health complaints.

For Federal Employees:

This report format is provided to assist Federal employees or authorized representatives in registering a report of unsafe or unhealthful working conditions with the U.S. Department of Labor.

The Secretary of Labor may conduct unannounced inspection of agency workplaces when deemed necessary if an agency does not have occupational safety and health committees established in accordance with Subpart F, 29 CFR 1960; or in response to the reports of unsafe or unhealthful working conditions upon request of such agency committees under Sec. 1-3, Executive Order 12196; or in the case of a report of imminent danger when such a committee has not responded to the report as required in Sec. 1-201(h).

INSTRUCTIONS:

Open the form and complete the front page as accurately and completely as possible. Describe each hazard you think exists in as much detail as you can. If the hazards described in your complaint are not all in the same area, please identify where each hazard can be found at the worksite. If there is any particular evidence that supports your suspicion that a hazard exists (for instance, a recent accident or physical symptoms of employees at your site) include the information in your description. If you need more space than is provided on the form, continue on any other sheet of paper.

After you have completed the form, return it to your local OSHA office.

NOTE: It is unlawful to make any false statement, representation or certification in any document filed pursuant to the Occupational Safety and Health Act of 1970. Violations can be punished by a fine of not more than $10,000. or by imprisonment of not more than six months, or by both. (Section 17(g))

Public reporting burden for this voluntary collection of information is estimated to vary from 15 to 25 minutes per response with an average of 17 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An Agency may not conduct or sponsor, and persons are not required to respond to the collection of information unless it displays a valid OMB Control Number. Send comment regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to the Directorate of Enforcement Programs, Department of Labor, Room N-3119, 200 Constitution Ave., NW, Washington, DC; 20210.

OMB Approval# 1218-0064; Expires: 08-31-2017

Do not send the completed form to this Office.

U. S. Department of Labor
Occupational Safety and Health Administration

Notice of Alleged Safety or Health Hazards

			Complaint Number	
Establishment Name				
Site Address				
	Site Phone		Site FAX	
Mailing Address				
	Mail Phone		Mail FAX	
Management Official			Telephone	
Type of Business				

HAZARD DESCRIPTION/LOCATION. Describe briefly the hazard(s) which you believe exist. Include the approximate number of employees exposed to or threatened by each hazard. Specify the particular building or worksite where the alleged violation exists.

Has this condition been brought to the attention of:	☐ Employer ☐ Other Government Agency(specify)
Please Indicate Your Desire:	☐ Do NOT reveal my name to my Employer ☐ My name may be revealed to the Employer
The Undersigned believes that a violation of an Occupational Safety or Health standard exists which is a job safety or health hazard at the establishment named on this form.	(Mark "X" in ONE box) ☐ Former Employee ☐ Current Employee ☐ Federal Safety and Health Committee ☐ Representative of Employees ☐ Other (specify) _____

Complainant Name		Telephone	
Address(Street, City, State, Zip)			
Signature		Date	

If you are an authorized representative of employees affected by this complaint, please state the name of the organization that you represent and your title:

Organization Name: Your Title:

EMPLOYER'S INSTRUCTIONS

DO NOT ENTER DATA IN SHADED FIELDS

DATES:

Enter all dates in MM/DD/YY format.

INDUSTRY CODE:

This is the code which represents the nature of the employer's business, which is contained in the Standard Industrial Classification Manual or the North American Industry Classification System, published by the Federal Office of Management and Budget.

CARRIER:

The licensed business entity issuing a contract of insurance and assuming financial responsibility on behalf of the employer of the claimant.

CLAIMS ADMINISTRATOR:

Enter the name of the carrier, third party administrator, state fund, or self-insured responsible for administering the claim.

AGENT NAME & CODE NUMBER:

Enter the name of your insurance agent and his/her code number if known. This information can be found on your insurance policy.

OCCUPATION/JOB TITLE:

This is the primary occupation of the claimant at the time of the accident or exposure.

EMPLOYMENT STATUS:

Indicate the employee's work status. The valid choices are:

Full-Time	On Strike	Unknown	Volunteer
Part-Time	Disabled	Apprenticeship Full-Time	Seasonal
Not Employed	Retired	Apprenticeship Part-Time	Piece Worker

DATE DISABILITY BEGAN:

The first day on which the claimant originally lost time from work due to the occupation injury or disease or as otherwise designated by statute.

CONTACT NAME/PHONE NUMBER:

Enter the name of the individual at the employer's premises to be contacted for additional information.

TYPE OF INJURY/ILLNESS:

Briefly describe the nature of the injury or illness, (eg. Lacerations to the forearm).

PART OF BODY AFFECTED:

Indicate the part of body affected by the injury/illness, (eg. Right forearm, lower back).

DEPARTMENT OR LOCATION WHERE ACCIDENT OR ILLNESS EXPOSURE OCCURRED: (eg. Maintenance Department or Client's office at 452 Monroe St., Washington, DC 26210)

If the accident or illness exposure did not occur on the employer's premises, enter address or location. Be specific.

EMPLOYER'S INSTRUCTIONS – cont'd

ALL EQUIPMENT, MATERIAL OR CHEMICALS EMPLOYEE WAS USING WHEN ACCIDENT OR ILLNESS EXPOSURE OCCURRED:

(eg. Acetylene cutting torch, metal plate)

List all of the equipment, materials, and/or chemicals the employee was using, applying, handling or operating when the injury or illness occurred. Be specific, for example: decorator's scaffolding, electric sander, paintbrush, and paint.

Enter "NA" for not applicable if no equipment, materials, or chemicals were being used. NOTE: The items listed do not have to be directly involved in the employee's injury or illness.

SPECIFIC ACTIVITY THE EMPLOYEE WAS ENGAGED IN WHEN THE ACCIDENT OR ILLNESS EXPOSURE OCCURRED:

(eg. Cutting metal plate for flooring)

Describe the specific activity the employee was engaged in when the accident or illness exposure occurred, such as sanding ceiling woodwork in preparation for painting.

WORK PROCESS THE EMPLOYEE WAS ENGAGED IN WHEN ACCIDENT OR ILLNESS EXPOSURE OCCURRED:

Describe the work process the employee was engaged in when the accident or illness exposure occurred, such as building maintenance. Enter "NA" for not applicable if employee was not engaged in a work process (eg. walking along a hallway).

HOW INJURY OR ILLNESS/ABNORMAL HEALTH CONDITION OCCURRED. DESCRIBE THE SEQUENCE OF EVENTS AND INCLUDE ANY OBJECTS OR SUBSTANCES THAT DIRECTLY INJURED THE EMPLOYEE OR MADE THE EMPLOYEE ILL:

(Worker stepped back to inspect work and slipped on some scrap metal. As worker fell, worker brushed against the hot metal.)

Describe how the injury or illness/abnormal health condition occurred. Include the sequence of events and name any objects or substance that directly injured the employee or made the employee ill. For example: Worker stepped to the edge of the scaffolding to inspect work, lost balance and fell six feet to the floor. The worker's right wrist was broken in the fall.

DATE RETURN(ED) TO WORK:

Enter the date following to most recent disability period on which the employee returned to work.

Please provide the information listed below in the shaded areas of the form following these instructions.

REQUIRED FORM 1 DATA

1. EMPLOYER NAME AND ADDRESS: Providing the name and address shown on the policy is helpful, but do not hesitate to include a DBA if it's appropriate. And, if it is a national employer, you will have an opportunity to, in box 5 (Employer's Location Address if Different) give us the local name and physical address of the employer.

2. EMPLOYER FEIN: Double check this for accuracy.

3. CARRIER/ADMINISTRATOR CLAIM NUMBER: Provide the claim number assigned by the Carrier or TPA actually handling this claim.

4. JURISDICTION: This is required only on EDI submission of your Form 1. For all claims other than by EDI submissions, we will accept it and enter it as an AR claim, unless some other state code is entered here, at which time we will reject your Form 1 filing.

5. EMPLOYER'S LOCATION ADDRESS (IF DIFFERENT): We require a physical location for where in injury/illness occurred. If you provide in Employer Name and Address (box 1) a P.O. Box, or if the injury/illness occurred at a location separate from the address listed in Employer Name and Address, you are required to provide this data, making sure it is a physical address.

6. CARRIER (NAME & ADDRESS): Provide the Carrier Name and Address as it is registered with the Arkansas Workers' Compensation Commission.

7. POLICY PERIOD: While self-insureds do not have a policy expiration date, if self-insurance is not marked in box 8, and this data is not provided, this Form 1 will be rejected.

Everyone else provide us the policy period for the policy in effect on the date of injury/illness.

8. SELF-INSURANCE: If a self-insured fails to properly identify themselves as self-insured, we will reject the Form 1 without a policy period.

9. CLAIMS ADMINISTRATOR (NAME & ADDRESS): Provide this information, in this block, even if the previously identified Carrier is handling the claim. We want the name and address in which the adjuster handling this claim is housed.

10. POLICY/SELF-INSURED NUMBER: Provide us the policy number which existed on the date of the injury/illness.

11. EMPLOYEE NAME: Double check the spelling. Provide at minimum the legal last and first names (unless the claimant's given name is "Bubba", do not send in a Form 1 indicating that his name is "Bubba").

12. DATE OF BIRTH: An accurate date of birth is required. Several have filed their Form 1 with dates that meet the format standard required to make it through the EDI screening, sometimes entering something such as 01/01/1901. If the date of birth is obviously fabricated, we will reject your Form 1.

13. SOCIAL SECURITY NUMBER: The full 9-digit Social Security Number is required on the Form 1.

14. DATE HIRED: This information is required only in Death cases. If, after filing your Form 1, the claimant dies, file an Amended Form 1 (clearly write "Amended" on the top of the Form and circle any data that is being added or changed), reporting the Date of Death and Date Hired.

15. SEX: This means gender: Male or Female. The Form 1 has a little box for Unknown, but we will not accept your Form 1 if you enter Unknown.

16. OCCUPATION/JOB TITLE: Please enter the primary occupation of the claimant at the time of his/her accident/incident/exposure.

17. EMPLOYMENT STATUS: The valid choices for Employment Status are:

Full-Time	On Strike	Volunteer	Seasonal
Part-Time	Disabled	Apprenticeship Full-Time	Piece Worker
Not Employed	Retired	Apprenticeship Part-Time	

18. DATE OF INJURY/ILLNESS: This is an absolute requirement, and is used on virtually all of the AWCC Forms that you will file on this claim. Please be sure that you're accurate on this date, as any form(s) that come in after your Form 1 with a different date of injury/illness are liable to be rejected.

19. LAST WORK DATE: It is not necessary that this be a complete work day. If an employee is injured and has to leave work, that day is his/her last work date. Without this date, we will reject your Form 1.

20. DATE EMPLOYER NOTIFIED: This is required only to the point that if you don't provide it for us, I will provide it on your behalf. If you leave this blank, I will not reject your Form 1, but I will use the Date of Injury/Illness as the Date Employer Notified.

21. DATE DISABILITY BEGAN: This is required only to the point that if you don't provide it for us, I will enter it on your behalf. If you leave this blank, I will not reject your Form 1, but our system is set up to default to the day after the Date of Injury/Illness as the Date Disability Began, if you don't give us a different date.

22. TYPE OF INJURY/ILLNESS: Ladies and gentlemen, following this instruction sheet, you will find the complete listing of injury/illnesses and the code for each.

23. PART OF BODY AFFECTED: Ladies and gentlemen, following this instruction sheet, you will find the complete listing of body parts and the code for each body part.

24. HOW INJURY OR ILLNESS OCCURRED: A short narrative, please. We want more than "tripped" or "crushed his finger". What we would like is more "carrying a box, stepped on a loose pipe, fell, dropping the box on his foot, breaking his foot".

25. IF FATAL, DATE OF DEATH: If this claim is a Death claim, we require the date of death to be reported on the Form 1. Additionally, you must report the Date of Hire (box 14).

If the claim did not begin as a Death claim, but becomes one, you are required to file an Amended Form 1 (clearly write "Amended" on the top of the Form and circle any data that is being added or changed), reporting the Date of Death and Date of Hire.

Too, when a Fatality occurs, you are required to file a Form D within 30-days of the Date of Death.

26. PREPARER'S NAME AND TITLE: We require the name and title of the adjuster handling this particular claim. So many have the employer's staff person who actually filled out the Form 1 to put their name and title here, but doing this is incorrect!

The proper place for the name and phone number of the employer's staff person who may actually fill out this Form 1 is the "Contact Name/Phone Number" box immediately below box number 18, in the Occurrence/Treatment section.

While we require the name and title of the adjuster handling this particular claim, we will not reject your Form 1 submission, even though the employer's staff person's name and title are written in here, IF you print your information on the bottom of the Form.

27. PHONE NUMBER: Similar to the note above, we want the phone number of the adjuster handling this claim. We do not ask for the phone number of the employer's staff person filling out this form, as we will never be contacting them. We do, however, want to be able to quickly contact you, so we require your direct phone number, or your main office phone number and your extension.

FINAL NOTE: "UNKNOWN" is never an acceptable entry on a Form 1. If it's a required data element, find the answer before submitting the Form 1. If it's not a required data element, and you don't know the answer, don't put anything in that box.

FORM 1, TYPE OF INJURY/ILLNESS AND CODES (Box 22 on Form 1)

Code	Type of Injury/Illness
01	NO PHYSICAL INJURY
02	AMPUTATION
53	SYNCOPE (SWOONING, FAINTING)
54	ASPHYXIATION
55	VASCULAR LOSS
58	VISION LOSS
59	ALL OTHER
60	DUST DISEASE NOC
61	ASBESTOSIS
62	BLACK LUNG
63	BYSSINOSIS
64	SILICOSIS
65	RESPIRATORY DISORDERS (GASES,FUMES,ETC.)
66	POISONING - CHEMICAL
67	POISONING - METAL
68	DERMATITIS
69	MENTAL DISORDER
70	RADIATION
71	ALL OTHER OCCUPATIONAL DISEASE
72	LOSS OF HEARING
73	CONTAGIOUS DISEASE
74	CANCER
75	AIDS
76	VDT-RELATED DISEASE
77	MENTAL STRESS
78	CARPAL TUNNEL SYNDROME
79	HEPATITIS C

Code	Type of Injury/Illness
80	ALL OTHER CUMULATIVE INJURIES
90	MULTIPLE PHYSICAL INJURIES
91	MULTIPLE INJURIES
03	ANGINA PECTORIS (CHEST PAIN)
04	BURN
07	CONCUSSION
10	CONTUSION
13	CRUSHING
16	DISLOCATION
19	ELECTRIC SHOCK
22	ENUCLEATION (REMOVE TUMOR)
25	FOREIGN BODY
28	FRACTURE
30	FREEZING
31	HEARING LOSS (TRAUMATIC ONLY)
32	HEAT PROSTRATION
34	HERNIA
36	INFECTION
37	INFLAMMATION
40	LACERATION
41	MYOCARDIAL INFARCTION (HEART ATTACK)
42	POISONING GENERAL
43	PUNCTURE
46	RUPTURE
47	SEVERANCE
49	SPRAIN
52	STRAIN

FORM 1, BODY PART AFFECTED AND CODES (Box 23 on Form 1)

Code	Body Part
00	UNDEFINED
10	MULTIPLE HEAD INJURY
38	SHOULDER(S)
39	WRIST(S) & HAND(S)
40	MULTIPLE TRUNK INJURY
41	UPPER BACK AREA (THORACIC AREA)
42	LOW BACK AREA INC:LUMBAR & LUMBO-SACRAL
43	DISC (TRUNK AREA)
44	CHEST INC: RIBS,STERNUM,AND SOFT TISSUE
45	SACRUM AND COCCYX
46	PELVIS
47	SPINAL CORD
48	INTERNAL ORGANS
49	HEART
50	MULTIPLE LOWER EXTREMITIES INJURY
51	HIP
52	THIGH
53	KNEE
54	LOWER LEG
55	ANKLE
56	FOOT
57	TOE(S)
58	GREAT TOE
60	LUNGS
61	ABDOMEN (INCLUDING GROIN)
62	BUTTOCKS
63	LUMBAR AND/OR SACRAL VERTEBRA
64	ARTIFICIAL APPLIANCE
65	UNKNOWN - INSUFFICIENT INFORMATION

Code	Body Part
66	NO PHYSICAL INJURY
90	MULTIPLE BODY PARTS INJURY
91	MULT SYSTEMS AND MULT BODY SYSTEMS
99	UNSPEC
11	SKULL
12	BRAIN
13	EAR(S)
14	EYE(S)
15	NOSE
16	TEETH
17	MOUTH
18	OTHER FACIAL SOFT TISSUE
19	FACIAL BONES
20	MULTIPLE NECK INJURY
21	VERTEBRAE
22	DISC (NECK AREA)
23	SPINAL CORD
24	LARYNX
25	SOFT TISSUE
26	TRACHEA
30	MULTIPLE UPPER EXTREMITIES
31	UPPER ARM (INC: CLAVICLE AND SCAPULA)
32	ELBOW
33	LOWER ARM
34	WRIST
35	HAND
36	FINGER(S)
37	THUMB

WORKERS COMPENSATION - FIRST REPORT OF INJURY OR ILLNESS

EMPLOYER (NAME &ADDRESS INCL. ZIP)

CARRIER/ADMINISTRATOR CLAIM NUMBER

REPORT PURPOSE CODE

JURISDICTION

JURISDICTION CLAIM NUMBER

INSURED REPORT NUMBER

EMPLOYER LOCATION ADDRESS (IF DIFFERENT)

LOCATION #

SIC CODE

EMPLOYER FEIN

PHONE #

CARRIER/CLAIMS ADMINISTRATOR

CARRIER (NAME, ADDRESS, & PHONE NO.)

PMA Insurance Group

POLICY PERIOD

TO

CHECK IF APPROPRIATE

☐ SELF INSURANCE

CLAIMS ADMINISTRATOR (NAME, ADDRESS, & PHONE NO.)

PMA Insurance Group

CARRIER FEIN

POLICY/SELF-INSURED NUMBER

ADMINISTRATOR FEIN

AGENT NAME & CODE NUMBER

EMPLOYEE/WAGE

NAME (LAST, FIRST, MIDDLE)

DATE OF BIRTH

SOCIAL SECURITY NUMBER

DATE HIRED

STATE OF HIRE

ADDRESS (INCL. ZIP)

SEX

☐ MALE
☐ FEMALE
☐ UNKNOWN

MARITAL STATUS

☐ UNMARRIED SINGLE/DIVORCE
☐ MARRIED
☐ SEPARATED
☐ UNKNOWN

OCCUPATION/JOB TITLE

EMPLOYMENT STATUS

PHONE

OF DEPENDENTS

NCCI CLASS CODE

RATE

PER: ☐ DAY ☐ MONTH ☐ WEEK ☐ HOUR

AVG WEEKLY WAGES

DAYS WORKED/WEEK

FULL PAY FOR DAY OF INJURY? ☐ YES ☐ NO

DID SALARY CONTINUE? ☐ YES ☐ NO

OCCURRENCE/TREATMENT

TIME EMPLOYEE BEGAN WORK ☐ AM ☐ PM

DATE OF INJURY/ILLNESS

TIME OF OCCURRENCE ☐ AM ☐ PM

LAST WORK DATE

DATE EMPLOYER NOTIFIED

DATE DISABILITY BEGAN

CONTACT NAME/PHONE NUMBER

TYPE OF INJURY/ILLNESS

PART OF BODY AFFECTED

DID INJURY/ILLNESSEXPOSURE OCCUR ON EMPLOYER'S PREMISES? ☐ YES ☐ NO

TYPE OF INJURY/ILLNESS CODE

PART OF BODY AFFECTED CODE

DEPARTMENT OR LOCATION WHERE ACCIDENT OR ILLNESS EXPOSURE OCCURRED

ALL EQUIPMENT, MATERIALS, OR CHEMICALS EMPLOYEE WAS USING WHEN ACCIDENT OR ILLNESS EXPOSURE OCCURRED

SPECIFIC ACTIVITY THE EMPLOYEE WAS ENGAGED IN WHEN THE ACCIDENT OR ILLNESS EXPOSURE OCCURRED

WORK PROCESS THE EMPLOYEE WAS ENGAGED IN WHEN ACCIDENT OR ILLNESS EXPOSURE OCCURRED

HOW INJURY OR ILLNESS/ABNORMAL HEALTH CONDITION OCCURRED. DESCRIBE THE SEQUENCE OF EVENTS AND INCLUDE ANY OBJECTS OR SUBSTANCES THAT DIRECTLY INJURED THE EMPLOYEE OR MADE THE EMPLOYEE ILL

CAUSE OF INJURY CODE

DATE RETURN(ED) TO WORK

IF FATAL, GIVE DATE OF DEATH

WERE SAFEGUARDS OR SAFTY EQUIPMENT PROVIDED? ☐ YES ☐ NO

WERE THEY USED? ☐ YES ☐ NO

PHYSICIAN/HEALTH CARE PROVIDER(NAME & ADDRESS)

HOSPITAL (NAME & ADDRESS)

INITIAL TREATMENT

☐ NO MEDICAL TREATMENT
☐ MINOR: BY EMPLOYER
☐ MINOR CLINIC/HOSP
☐ EMERGENCY CARE
☐ HOSPITALIZED >24 HRS
☐ FUTURE MAJOR MEDICAL/ LOST TIME ANTICIPATED

WITNESS (NAME & PHONE #)

DATE ADMINISTRATOR NOTIFIED

DATE PREPARED

PREPARER'S NAME & TITLE

PHONE NUMBER

Form IA-1

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Applicable in Alaska
A person who willfully makes a false or misleading statement or representation for the purpose of obtaining or denying a benefit or payment is guilty of theft by deception.
Applicable in Arkansas
Any person or entity who willfully and knowingly makes any material false statement or representation for the purpose of obtaining any benefit or payment, or for the purpose of defeating or wrongfully decreasing any claim for benefit or payment or obtaining or avoiding worker's compensation coverage or avoiding payment of the proper insurance premium (or who aids and abets for either said purpose), under this chapter shall be guilty of a Class D. felony.
Applicable in California
Any person who makes or causes to be made any knowingly false or fraudulent material statement or material representation for the purpose of obtaining or denying worker's compensation benefits or payments is guilty of a felony.
Applicable in Connecticut
This form must be completed in its entirety. Any person who intentionally misrepresents or intentionally fails to disclose any material fact related to a claimed injury may be guilty of a felony.
Applicable in Delaware and Oklahoma
Any person who, knowingly and with intent to injure, defraud, or deceive any Insurer, files a statement of claim containing any false, incomplete or misleading information is guilty of a felony. The lack of such a statement shall not constitute a defense against prosecution under this section. * Delaware Statutes Regulation: Del #C Section 913(B)
Applicable in Florida
Any person who, knowingly and with intent to injure, defraud or deceive any employer or employee, insurance company of self-insured program, files any statement of claim containing any false or misleading information is guilty of a felony of the third degree.
Applicable in Idaho
Any person who, knowingly and with the intent to injure, Defraud, or Deceive any Insurance Company, Files a Statement of Claim Containing any False, Incomplete or Misleading information is Guilty of a Felony.
Applicable in Indiana
A person who, knowingly and with intent to defraud an insurer files a statement of claim containing any false, incomplete, or misleading information commits a felony.
Applicable in Kentucky and New York
Any person who, knowingly and with intent to defraud any insurance company or other person files a statement of claim containing any materially false information, or conceals for the purpose of misleading, information concerning any fact material thereto, commits a fraudulent insurance act, which is a crime. In New York, such person shall also be subject to a civil penalty not to exceed five thousand dollars and the stated value of the claim for each such violation.
Applicable in Michigan
Any person who, knowingly and with intent to injure or defraud any insurer submits a claim containing any false, incomplete, or misleading information shall, upon conviction, be subject to imprisonment for up to one year for a misdemeanor conviction or up to ten years for a felony conviction and payment of a fine of up to $5,000.00.
Applicable in Minnesota
A person who files a claim with intent to defraud or helps commit a fraud against an insurer is guilty of a crime.
Applicable in Nevada
Pursuant to NRS 686A.291, any person who knowingly and willfully files a statement of claim that contains any false, incomplete or misleading information concerning a material fact is guilty of a felony.
Applicable in New Hampshire
Any person who, with purpose to injure, defraud or deceive any insurance company, files a statement of claim containing any false, incomplete or misleading information is subject to prosecution and punishment for insurance fraud, as provided in RSA 638:20.

Applicable in New Jersey
Any person who, knowingly files a statement of claim containing any false or misleading information is subject to criminal and civil penalties.

Applicable in Ohio
Any person who, with intent to defraud or knowing that he is facilitating a fraud against an insurer, submits an application or files a claim containing a false or deceptive statement is guilty of insurance fraud.

Applicable in Pennsylvania
Any person who, knowingly and with intent to injure or defraud any insurer files a claim containing any false, incomplete or misleading information shall, upon conviction, be subject to imprisonment for up to seven years or payment of a fine of up to $50,000.00.

Applicable in Utah
Any person who, knowingly presents false or fraudulent underwriting information, files or causes to be filed a false or fraudulent claim for disability compensation or medical benefits, or submits a false or fraudulent report or billing for health care fees or other professional services is guilty of a crime and may be subject to fines and confinement in state prison.

EMPLOYEE SIGNATURE:_____

POLICY

The safety and health of employees is the first consideration in operating any business. Without question, it is the responsibility of every employee at all levels in the hierarchy.

Bannister Electric LLC of West Monroe will comply with all laws and prevent workplace injuries and illnesses. To do this, we must be aware of conditions that can result in injury or illness in every work area. No employees will be required to work at a job they know is unsafe or unhealthy. Companywide cooperation in detecting hazards and controlling them is a condition of employment. Employees will inform their supervisor immediately of any hazardous situation beyond their ability or authority to correct.

Preventing workplace injuries and illnesses takes precedence over operating productivity when necessary. To the greatest degree possible, management will provide safeguards for personal safety and health, in keeping with the highest standards.

We strive to maintain an occupational injury and illness prevention program (IIPP) that conforms to industry best practices for organizations of this type. To be successful, such a program must embody proper attitudes toward injury and illness prevention on the part of both supervisors and employees. It also requires cooperation in all safety and health matters, not only between supervisor and employee, but also among coworkers.

Our objective is an (IIPP) that reduces the number of work place incidences to an absolute minimum, not merely in keeping with, but surpassing the best experience of operations similar to ours. Our goal is zero accidents and injuries.

Safety and Health Program Components

Our (IIPP) includes the following:

- Communicating with employees about safety issues and workplace hazards through a range of avenues including a safety training program and meetings to exchange ideas about workplace safety and health among employees
- Providing and maintaining mechanical, physical and administrative safeguards to control risks presented by workplace hazards to the maximum possible extent
- Conducting a program of safety and health inspections to find and eliminate unsafe working conditions or practices, to control health hazards, and to comply with safety and health regulations and standards
- Providing necessary personal protective equipment (PPE) and instructions for proper use and care
- Developing and enforcing safety and health rules and requiring employees to cooperate with these rules as a condition of employment
- Investigating promptly and thoroughly every accident, safety incident, and near miss to determine root causes and make appropriate changes to remedy those causes
- Creating a culture of safety that encourages employees to identify workplace hazards, recommend changes to reduce the risks they pose and work for a safer workplace
- Periodic review of all elements of our IIPP to maintain its accuracy

We recognize the responsibilities for occupational safety and health are shared: Bannister Electric LLC of West Monroe will see that all employees are properly instructed and supervised in safe operation of machinery, tools, equipment, processes, and practices while at work.

Bannister Electric LLC of West Monroe accepts responsibility for the leadership, effectiveness and improvement of the injury and illness prevention program and for providing the required safeguards to ensure safe work conditions.

Supervisors are responsible for encouraging proper attitudes toward safety and health and for ensuring that workers perform operations with the utmost regard for the safety and health of all personnel.

Employees are responsible for wholehearted, genuine implementation of all aspects of the (IIPP), including compliance with all rules and regulations, and for continuously following best safety and health practices while performing their duties.

Requirements in multiple chapters may apply to the same job, and some health and safety procedures will be addressed at different levels of focus. Where a circumstance is addressed by different requirements throughout this manual, then all requirements apply and when a conflict occurs, the more specific one must be followed.

PROGRAM GOALS

The goal of Bannister Electric LLC of West Monroe is to continue operating a profitable business while protecting employees from injuries or illness. This can be achieved by delegating responsibility and accountability to all involved in this company's operation.

- Responsibility: Having to answer for activities and results
- Accountability: The actions taken by management to ensure the performance of responsibilities

To reach our goal of a safe workplace, everyone needs to take responsibility and be accountable.

Owner Name	Owner Signature	Date

Our designated safety professional is responsible for the implementation and enforcement of safety rules.

FOLLOWING SAFETY RULES

Bannister Electric LLC of West Monroe employees will follow all Safety and Health Program rules, provide first aid up to their level of training and promptly report unsafe conditions or practices that can't be immediately remedied to a supervisor. Not following safety policies and procedures can affect co-workers and the public, and may result in disciplinary action up to and including termination.

If employees are unsure of the safe method to do a job, they must STOP and ask a supervisor.

Employees have the authority to stop work to address a hazard.

DISCIPLINARY ACTION

Employees will be disciplined for infractions of safety rules and unsafe work practices that are observed, not just those that result in an injury. Care will be taken to ensure discipline does not discriminate. Consistency in the enforcement of safety rules will be exercised at all times. While safety rules will be enforced rigorously, no one will be punished for reporting unsafe work practices or for reporting illness or injury. In any disciplinary action, discipline is given to the employee only for violation of safe work policy, not because they were injured or filed a workers' compensation claim.

Discipline for safety violations will be administered in a manner consistent with Bannister Electric LLC of West Monroe's system of progressive discipline.

As in all disciplinary actions, each situation is to be carefully evaluated and investigated. The steps taken in the disciplinary process, up to and including termination, will depend on the severity of the violation, employee history and overall consideration for the well-being of the company, its employees and its customers.

Each department or supervisor may have additional safety rules and policies specific to operations. In following these rules, employees are expected to exercise sound judgment and work in a manner to ensure the safety of themselves and coworkers.

SAFETY INCENTIVE PROGRAMS

Although strict adherence to safety policies and procedures is required of all employees, Bannister Electric LLC of West Monroe may periodically provide recognition of safety-conscious employees and acknowledge safety-conscious work habits through a safety incentive program. Safety incentive programs must not discourage reporting of injuries and illnesses.

TRAINING AND SAFETY COMMUNICATION

OSHA requires employers to train employees in the safe methods of performing their job. Bannister Electric LLC of West Monroe is committed to instructing all employees in safe, healthy work practices. Awareness of potential hazards and knowledge of how to control them is critical to maintaining a safe, healthy work environment and preventing injuries. Bannister Electric LLC of West Monroe will provide training to each employee on general safety issues and safety procedures specific to that employee's work assignment.

Training provides the following benefits:

- Makes employees aware of job hazards
- Teaches employees to perform jobs safely
- Promotes two-way communication
- Fulfills legal requirements
- Encourages safety suggestions
- Creates additional interest in the safety program

Bannister Electric LLC of West Monroe will only use training material appropriate in content and vocabulary to the educational level, literacy and language of employees, and will offer retraining as needed to ensure safe practices.

Training Program

Actual demonstration of proper task performance will be used whenever possible to instruct new workers. Workers must provide evidence of topic mastery before training is complete. Trainers will rely on the following safe training techniques: tell them how, show them how, have them tell you how, and have them show you how.

Training topics will reflect the hazards of the workplace and may include the following: employee's safety responsibilities; general safety rules; IIPP contents; safe job procedures; mandatory and optional PPE.

New Employees

Every new employee will be given instruction by their supervisor or appropriate member of management in the general safety requirements of their job. New employees will not begin a job until they have demonstrated or otherwise confirmed awareness of safe practices for their tasks and general workplace safety rules and guidelines. A copy of the general safety rules will be provided to each new employee, and each new employee will be given access to any element of the safety program that pertains to the work he or she will be expected to do.

Documentation of Training

All employee safety training will be documented. Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

Retraining

Employees observed performing unsafe acts or not following safe work procedures will be retrained by their supervisor or an appropriate safety trainer. A safety contact report may be completed by the supervisor to document the training. If multiple employees are involved, additional safety meetings will be held.

SAFETY COMMUNICATION

Bannister Electric LLC of West Monroe will advise employees of changes relating to the safety program. Employee safety communication procedures are designed to develop and maintain employee involvement and interest in workplace safety and health. These activities help ensure effective communication between management and employees on safety-related issues and nurture a culture of safety.

The following are some of the safety communication methods that may be used:

- Frequent accident prevention instructions and periodic practice drills
- Distribution of articles, memos, payroll stuffers and other communication concerning workplace safety and health
- Regular safety meetings with employees that encourage participation and open, two-way communication
- Employee bulletin boards or other displays discussing safety issues, accidents, and general safety suggestions
- New employee safety orientation and training

Safety Suggestion Program

Bannister Electric LLC of West Monroe encourages all employees to become involved in the development and implementation of the safety and health program. Management will request opinions and comments from workers at all levels and respond to them respectfully and appropriately.

All employee-initiated safety related suggestions will be channeled to the appropriate authority by supervisors, either verbally or in writing. Unresolved issues may be relayed to Dolphus Bannister, the safety coordinator.

Bannister Electric LLC of West Monroe will not discriminate against any employee that raises a safety concern, files a complaint, causes a regulatory action to be brought, or testifies against the employer. There will be a system where employees may share safety or health concerns anonymously.

Rules

The following rules are a selection of safety practices to help prevent work-related injury and illness. It is not comprehensive; employees are expected to adhere to any safe work practice necessary to complete their job safely.

Drug- and Alcohol-Impaired Workers

Bannister Electric LLC of West Monroe encourages employees to discuss personal and interpersonal problems with their supervisor. Supervisors will handle all such contacts with appropriate confidentiality and refer employees who may benefit from outside assistance to appropriate resources.

No employee may work while fatigue, illness, prescription drugs or over-the-counter drugs impair his or her ability or alertness.

No one known to be under the influence of alcohol or drugs will be allowed on the job while in that condition.

Notify a supervisor of any coworker demonstrating signs of impairment that may present a safety or health hazard.

GENERAL SAFETY

- Take time to do every job safely
- Refrain from horseplay, scuffling, pranks, and similar acts that may have an adverse influence on the safety and well-being of employees
- Walk - don't run - in the workplace
- Smoke, eat and store personal items only in designated areas. Smoking is not allowed in any indoor place of employment
- Maintain awareness of potential hazards when walking about the workplace
- Use tools only for their intended purpose, and always use the right tool for the job
- Listen to instructions. If you don't understand them, ask before starting work
- Inspect all safeguards before beginning work. Ensure proper functioning of protective devices and report any known deficiencies immediately
- Only operate equipment you can have been trained on
- Refrain from handling or tampering with equipment, machinery or lines outside the scope of your duties
- Report all injuries to the appropriate supervisor so arrangements can be made for medical or first-aid treatment and appropriate reporting may be completed
- Ensure clothing and footwear is appropriate to the hazards of the job. If you are unsure, ask your supervisor
- Wear approved protective equipment in work areas that demand such equipment
- Heed signs, posters, hazard bulletins, and tags posted on company premises
- Only enter hazardous areas after they are made safe to enter

Bannister Electric LLC of West Monroe strictly prohibits possession of firearms, weapons, illegal drugs or alcoholic beverages on Bannister Electric LLC of West Monroe property, customer property or other locations while on the job.

Housekeeping

- Keep all exits, fire doors, aisles, and areas around fire extinguishers, first aid kits, emergency equipment, electrical panels, and traffic lanes clear
- Keep tools, materials or other objects off the floor to prevent trips and falls. Remove waste from the work area promptly
- Keep work areas clean and free of debris, electrical cords, and other hazards; immediately clean spilled liquids
- Keep stairways, passageways, exits, and sidewalks clean and clear of obstructions
- Bend or cap sharp wires or protruding nails must be bent or capped
- Place tools and equipment so they will not fall from elevated areas
- Only use approved cleaning agents

Fire Prevention

- Firefighting equipment will be inspected on a regular basis
- Discharged, damaged or missing equipment must be reported immediately to a supervisor. Tampering with fire equipment is prohibited
- Take precautions to prevent fires, particularly from oily waste, rags, gasoline, flammable liquids, acetylene torches, improperly installed electrical equipment and trash
- Access to fire extinguishers must be kept clear at all times. Make note of the location of firefighting equipment in your work area
- In case of fire, employees will consider the safety of themselves and other individuals before saving property
- Never use gasoline or flammable solvents to clean
- Smoking is prohibited within 20 feet of flammable substances

Lifting and Material Handling

- Think before lifting
- Find a better way. If at all possible, use mechanical help from a pushcart or hand truck
- If the load is heavy or awkward to lift alone, get help. Team lifting cuts the load in half and reduces likelihood of injury
- Break the load down into smaller lifts if possible. It is better to make two or more light trips than one heavy trip
- If possible, bring the load up between the knees and waist before lifting
- Do not lift on slippery surfaces
- Test the load before doing the lift; determine how heavy it is by giving it a shove
- Ensure a good handhold on the load before attempting to lift
- Keep the load close. Walk as closely as possible to the load
- Do not jerk the load or speed up. Lift the load in a smooth and controlled manner
- Do not lift in an awkward position or twist while lifting (especially with a heavy load). Turn and take a step
- Avoid long forward reaches and bending your back. Use a step stool or platform if necessary
- Make sure you have plenty of room to lift and to set down the object
- If you are lifting an object above your head, get a ladder or step stool

Personal Protective Equipment (PPE)

- Use the correct PPE for any job assignment that requires it. If you do not know, ask
- PPE will be maintained in good condition and cleaned regularly
- PPE will be stored properly when not in use to protect it from damage
- Damaged or broken PPE must be returned for replacement
- PPE may not hamper or restrict freedom of movement due to improper fit
- Eye protection must be worn when working with hazardous materials or chemicals

Ladder Safety

- Keep portable stairways, ladders, and step stools in good condition and use them only in a safe manner
- Inspect the ladder before using it. If it is broken, remove it from service
- Use the proper ladder for the job
- Do not use “A” frame self-supporting ladders as straight ladders
- Make sure the ladder is tall enough to reach the work area
- Do not use metal ladders for electrical work
- Avoid temporary ladders. Always use a commercially made ladder of the proper length and strength for the work being performed
- Keep ladder rungs must be kept free of grease, oil, mud, or other slippery substances
- Do not place ladders in passageways, doorways, or any location where they might be hit or jarred, unless protected by barricades or guards
- Place ladders only on hard, level surfaces. Make sure ladder feet are not placed on sandy, slippery or sloping surfaces. Clean or sweep the area where the ladder feet will be and make sure the rubber feet are in good shape
- Arrange work so you can face the ladder and use both hands while climbing. Do not carry tools or equipment in your hands while climbing. If tools or equipment cannot be safely stored on your person, as with a belt or vest, climb the ladder, and then hoist them with a line or hoisting device
- Secure portable ladders in place and at a pitch so the leveling indicator is in alignment or the distance from the wall to the base of the ladder is at least 1’ away from the wall for every 4’ of ladder height
- Tie-off straight ladders at the top of the ladder to prevent slipping
- Be aware of objects below you; move or cover sharp objects in case you fall
- Do not stand on or work from the second rung from the top or above
- Do not reach too far from the ladder, and keep your center of gravity as close to the center of the ladder as possible
- Ensure extension ladders extend at least 36" above the level being accessed
- On all ladders, do not step on cross bracing not intended to be used for climbing
- Do not use a ladder as a brace, workbench or for any other purpose than climbing

Electrical Safety

- Only trained, qualified, and authorized employees may work on or repair electrical equipment
- Report exposed wires and damaged electrical equipment or wires immediately
- Extension and temporary power cords must be appropriate to the task and grounded, and only used only as a last resort. Frayed or defective cords will not be used
- Never overload an outlet or circuit. Use approved power strips and extension cords in accordance with company policy and best safety practices
- All energized equipment and installations will be de-energized before work. If the equipment or installation must be energized, special precautions will be taken to protect against the hazards of electric shock

- All equipment will be locked out to protect against accidental or inadvertent operation when such operation could cause injury to personnel. Do not attempt to operate any switch, valve, or other energy-isolating device bearing a lock
- Safety grounds will always be used where there is a danger of shock from back feeding or other hazards
- Suitable attire and personal protective equipment (PPE) must be worn at all times while working on electrical equipment
- Always exercise caution when energizing electrical equipment or installations. Take steps to protect against arc flash and exploding equipment in the event of a fault
- All power tools will be grounded or double insulated. Tools with defective cords or wiring will not be used
- Don't wear metal jewelry around energized circuits
- Suitable temporary barriers or barricades will be installed when access to opened enclosures containing exposed energized equipment is not under the control of an authorized person
- Enclosures or tight-fitting covers must protect electrical installations from accidental contact.
- Metal measuring tapes, fish tapes, ropes or other metal devices are prohibited where they may contact energized parts of equipment or circuits

Company Vehicles

- Only authorized employees are permitted to operate Bannister Electric LLC of West Monroe vehicles
- Company vehicles are to be used for Bannister Electric LLC of West Monroe business only. Personal, off duty and family use is prohibited
- Drive defensively and obey all traffic and highway laws
- Always wear a seat belt, whether driver or passenger
- Report accidents to a supervisor as soon as possible, and obtain a police report
- Lock vehicles and remove keys from unattended vehicles
- Inspect the vehicle before operation and report any defects or operating problems to the appropriate supervisor so repairs can be made
- Smoking is prohibited while inside the vehicle and during vehicle refueling
- If your driver's license is revoked or expired, immediately notify your supervisor and do not drive. If you receive a moving violation or any citation that may affect your eligibility to drive a company vehicle, inform your supervisor immediately

Hazardous Materials and Chemicals

- Ask a supervisor about any unfamiliar material, chemical or substance
- Read GHS warning labels and pay close attention to the pictographs and signs
- Read the Safety Data Sheets (SDS) before using any chemicals. SDS contain a wealth of safety information and are available to employees at their request
- Hazardous materials will be handled in accordance with the SDS and label. If protective equipment is required, use it
- Store all hazardous materials in suitable containers that are properly labeled
- Use chemicals that produce fumes or vapors only in well-ventilated areas

- Wear eye protection when working with hazardous materials or chemicals
- Mixing of chemicals is prohibited at all times, unless required by the label. Before you mix, review all SDS
- Practice appropriate hygiene after handling hazardous substances and follow special instructions from authorized sources. Wash hands thoroughly after handling chemicals and before eating or smoking, even if wearing protective gloves. Never use solvents for hand cleaning
- Where the eyes or body of any person may be exposed to injurious corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use
- Air under Pressure (Compressed Air)
- Air pressure at the discharge end of a portable air blow gun or portable air hose must be less than 30 pounds per square inch gauge when dead-ended
- When air under pressure is used to remove chips and dust, a chip guard, such as a fixed or removable shield, safely located, will be provided to protect an employee in an adjacent area
- The employee using air under pressure will be provided with and use appropriate PPE to the extent necessary to protect against hazards created by the operation
- Air under pressure, used in a manner that could cause injury, must not be used for cleaning clothes while being worn
- Air under pressure must not be directly applied to any part of the body. This could cause a serious or fatal injury (embolism) if air penetrates the skin/enters the body
- Air under pressure must not be used to move flammable dust in an area containing open flames or spark-producing equipment
- Air under pressure must not be used to remove toxic dusts in an employee environment
- Polyvinyl chloride (PVC) piping must not be used for the transportation and distribution of compressed air or other compressed gases in an above-ground installation
- An employee must be protected by guards or location when pressure tests are being performed on materials or equipment where rupture or failure would create a hazard

Accident Prevention Signage and Tags

An employer must provide, install and maintain signs and tags where an employee might be, or would likely be, injured or harmed if not alerted to an existing or potential hazard.

Signage must be unobscured, displayed in a well-lit area, and legible from a distance that provides sufficient time or warning for an employee to take appropriate action.

Similarly, accident prevention tags will be used as a temporary means of warning an employee of an existing hazard on certain items, such as defective tools or equipment. Don’t use tags in place of accident prevention signs or consider them a complete warning. Tags must be attached to prevent accidental disengagement, and they must be large enough to attract attention to the hazard. Use “Do Not Start,” “Out of Order,” and “Out of Service” tags in appropriate situations.

Sanitation

Potable water must be provided and placed in locations readily accessible to all employees. The water must be suitably cool and available continuously in sufficient amounts to keep all workers hydrated, taking into account the air temperature, humidity and nature of the work performed. The water will be dispensed in sanitary single-use drinking cups, or by fountains. Common drinking cups are prohibited.

Portable containers used to dispense drinking water must be tightly covered, regularly cleaned and refilled at least daily. Containers must have a tap, and water must not be dipped from containers. The containers must be clearly marked as to the nature of their contents, made of a material that maintains water quality, and not used for any other purpose.

Potable drinking water, as well as toilet and hand-washing facilities, must be maintained in accordance with appropriate public health sanitation practices.

Outlets for non-potable water, such as water for industrial or firefighting purposes only, will be identified by signs that clearly indicate the water is unsafe and is not to be used for drinking, washing or cooking purposes. There will be no cross-connection, open or potential, between a system that furnishes potable water and a system that furnishes non-potable water.

Employers must provide onsite general washing facilities (one per 20 employees) for construction projects, must keep them in sanitary condition, and must provide suitable cleaning agents/single-use towels for the removal of hazardous and other substances.

Toilet facilities must be adequately ventilated, readily accessible, and maintained in a clean and sanitary condition. Mobile crews may be provided transportation to nearby toilet facilities.

Every enclosed workplace must be constructed, equipped, and maintained, as reasonably practicable, to prevent the entrance and presence of rodents, insects, and other vermin. A continuing and effective extermination program must be instituted where their presence is detected.

Color Coding

- Green is used for general safety or accident-prevention signs; yellow is the basic color for designating caution on signage, and for marking physical hazards—solid yellow, yellow and black stripes, or yellow with a suitable contrasting background may be used interchangeably; red is used to indicate a warning/danger on signage, and to indicate “stop” when used with buttons
- A stop bar, stop button, electrical switch, or other mechanical device for the emergency stopping of machinery, excluding cables, will be red in color
- A safety can will be red in color

FORMS AND ATTACHMENTS

Please find the following document on the next page:

- General Safety Rules Receipt and Attestation

This form may be reproduced freely by Bannister Electric LLC of West Monroe for the purposes of implementing and maintaining a safety and health program.

GENERAL SAFETY RULES RECEIPT AND ATTESTATION

This is to certify that I have received a copy of the general safety rules.

- I have read these instructions, understand them and will comply with them while working for Bannister Electric LLC of West Monroe.
- I understand that failure to follow the company injury and illness prevention program may result in disciplinary action and possible termination of my employment with this company.
- I understand that I am to report any injury to my supervisor and report all safety hazards as soon as safely possible.
- I further understand that I have the following safety rights:
  - I am not required to work in any area I feel is not safe.
  - I am entitled to receive information about all hazards I am exposed to while working.
  - I am entitled to see a copy of the company safety and health manual.
  - I will not be discriminated against for reporting safety concerns.

Employee Name	Signature	Date
Supervisor Name	Signature	Date

cc: Employee File

SCOPE

This chapter is based on OSHA interpretations of the following training regulations to be applicable to the global training policy.

- 1910.134(k) Respiratory Protection; Training and Information
- 1910.147(c) The Control of Hazardous Information; General
- 1910.1030(g) Bloodborne Pathogens; Communication of Hazards to Employees
- 1910.1200(h) Hazard Communication; Employee Information and Training
- 1926.21 Construction; Safety Training and Education

Where unique training requirements particular to specific regulations are needed, they will be addressed in that chapter.

POLICY

Bannister Electric LLC of West Monroe will freely provide training necessary for employees to perform assigned work in a safe and healthful manner.

Training will be tailored to encourage and assist understanding for all employee education and literacy levels in the languages they receive other job instruction.

EMPLOYER RESPONSIBILITIES

- Provide training to employees:
  - Free of charge
  - During regular working hours
  - In a language and at a competence level that employees can understand
- Train employees in routine and emergency response procedures
- Ensure that, where necessary, only competent/qualified personnel will deliver the training
- Maintain records of employee training for the duration of their employment, or as required by specific regulations
- Provide additional and/or refresher training as required or requested

EMPLOYEE RESPONSIBILITIES

- Attend and participate in all company required training
- Follow all company procedures and safe work practices
- Not perform any work that they have not been trained to safely complete
- Request additional training as needed

GENERAL TRAINING REQUIREMENTS

Employees must know how to identify the health and safety issues at their worksite, analyze the causes, and bring about healthier and safer workplaces for themselves and their co-workers.

Particular standards of training requirements common to most workplaces include:

- Emergency response and evacuation procedures
- Fire protection and prevention
- First Aid (if required)
- Hazardous Communication, as necessary
- Personal Protective Equipment (PPE)

Emergency Action Plan

Employees designated in the emergency evacuation plan to assist in evacuation, will be trained how to safely and orderly help evacuate other employees

Additional educational considerations include:

- Reviewing the plan with each designated employee when:
- The plan is developed
- An employee is first assigned to a job
- The employee's emergency action plan responsibilities change
- The plan is changed
- Providing the written plan for review when an employee asks to see it.

Fire Prevention Plan

Employees will be informed of the fire hazards they are exposed to at the worksite, and the parts of the fire prevention plan they need to know to protect themselves.

The written plan will be available for review when an employee asks to see it.

First Aid

The company will have the appropriate number of people available for employees to talk to and give advice on health and safety matters relevant to that worksite hazards.

At worksites that are too far from a clinic or hospital identified as able to handle likely safety and health hazards and injuries at that worksite, there will be an appropriate number of people adequately trained provide first aid.

Hazard Communication Standard

Written programs maintained at each worksite will describe how employees will be provided effective information and training on hazardous chemicals they might encounter in their work area:

- At the time of initial assignment
- When a new physical or health hazard is introduced

This training will cover at least:

- How to detect the presence or release (e.g. spills) of hazardous chemicals in that work area
- Physical and health hazards of chemicals in the work area (i.e. either the specific chemicals, or broader categories of hazards like: flammable or cancer causing)

- How employees are to protect themselves from exposure, such as specific safe work procedures
- Details of the written program, particularly the labels and Safety Data Sheets (SDS) of specific chemicals at the worksite, and how to get and use needed hazard information

Personal Protective Equipment (PPE)

Before beginning work that requires PPE, employees will be trained in at least:

- What PPE is needed and when it is necessary
- The protective limitations of the PPE
- How to put on, take off, adjust, and wear the assigned PPE
- How to properly care for and maintain the PPE
- Knowing and recognizing the assigned PPE's useful life, and how to properly dispose it when necessary

Retraining will occur when the employee shows that they don't understand or have the skill required to correctly use the PPE in the way they've been trained.

Training records will show that the employee as demonstrated they understand the training and how to correctly use the PPE how they've been trained.

REFRESHER TRAINING

Bannister Electric LLC of West Monroe will provide refresher training to employees when:

- There are periodic intervals required by the regulation
- Changes in the workplace render previous training obsolete
- Changes in the types of equipment or materials being used render previous training obsolete
- Inadequacies in an affected employee's knowledge or use of safe practices indicate that the employee has not retained the requisite understanding or skill
- Periodic evaluations show inadequacy in training or results in new safe work procedures

The Company will verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

SUPPLEMENTAL TRAINING

Company training in each subject will be developed according to the intent of each regulation; covering all elements listed in prescriptive regulations (e.g. respiratory protection training), and focusing on the desired outcome in performance regulations (e.g. confined spaces training.)

In addition to the common training listed above, Bannister Electric LLC of West Monroe will provide affected employees with job specific training based on their responsibilities. This training can include, but is not limited to:

- Lockout/Tagout
- Confined spaces
- Hand and power tool use

- Fall protection
- Equipment/machinery operation
- Scaffold work
- Welding and hot work
- Respiratory protection

TRAINING RECORDS

Bannister Electric LLC of West Monroe will maintain records of all employee training for the length of their employment, or for the time required by specific OSHA regulations. These records will include:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

All training records will be provided when an employee or their representative, or another authorized person asks for it.

FORMS AND ATTACHMENTS

On the following page, please find a generic training record sheet. This form may be reproduced for the purposes of implementing and maintaining a safety and health program.

(TOPIC NAME) _____ TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name:	**Signature:**

POLICY

Bannister Electric LLC of West Monroe is committed to providing a safe, healthy workplace by eliminating or controlling all workplace hazards. A Job Hazard Analysis (JHA) systematically investigates a job process, equipment, and the workplace environment to identify hazards and reduce risk. Dolphus Bannister is responsible for ensuring facilities and workplaces are inspected regularly for hazards, and will do so with support and assistance from employees.

EMPLOYER RESPONSIBILITIES

Bannister Electric LLC of West Monroe is responsible for:

- Ensuring that safety inspections of the facility occur on regular basis
- Training personnel in how to perform a job hazard analysis
- Responding quickly to eliminate workplace hazards
- Ensuring all equipment is kept in good repair
- Ensuring employees follow safe job procedures
- Reviewing job hazard analysis whenever there is a significant change to any element of the job or there has been an injury or illness

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Assist in job hazard analyses
- Follow safe job procedures
- Report hazards to a supervisor immediately

TRAINING

Bannister Electric LLC of West Monroe will ensure every manager, supervisor and safety team member participates in a JHA training program. This training will be provided at no cost to the employee during working hours.

The Company will use only training material appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

Dolphus Bannister will verify that all employees have been trained in the following minimum elements:

- Importance of involving employees in job safety analyses
- How to review safety records to identify areas that present hazards
- How to analyze a job to determine the level of risk it presents
- How to prioritize job hazard analysis and hazard control activities

- Basic steps of a job hazard analysis, including: breaking the job into steps, analyzing risks, and determining controls
- How much detail to include when listing the steps of a job for a JHA
- What kinds of workplace hazards might exist and what types of risk they pose
- H Process of hazard controls and advantages of certain types of controls
- How to review a job hazard analysis and how to write a safe job procedure
- When to reanalyze a job for hazards

The person conducting the training will be knowledgeable in the subject matter of the training program as it relates to the workplace.

All employees will be trained in basic hazard identification and will be trained in their jobs according to safe job procedures, as directed by the job safety analysis.

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions and attached documents
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions
- Attendance and attestation forms of all persons trained

Employee training records will be retained for the length of their employment.

EMPLOYEE INVOLVEMENT

No one knows how to do a job better than the person currently doing that job does. Employees who are included in a JHA) provide valuable insight and knowledge into work procedures that is valuable in identifying hazards and controlling them. This insight can help prevent potentially dangerous oversights.

Further, soliciting employee input demonstrates that management values everyone's involvement in creating a safer workplace and provides an opportunity for employees' active involvement in the JHA process.

Preliminary Review

Reviewing the worksite's accident history with employees draws attention to failures in hazard controls and deficiencies in work processes, which in turn suggests opportunities for safety program growth. A thorough review of recorded accidents, illnesses and near misses points to jobs, processes and tasks that require closer examination. It also indicates the immediate actions necessary to control all existing risks.

A discussion with employees about hazards they already know to exist also provides an opportunity to discuss ideas to control them.

If there is a hazard that poses an immediate danger, do not wait until after the JHA is complete to establish controls. Problems need to be corrected quickly. This demonstrates a commitment to safety and permits more time and thought for more complicated work safety issues.

Prioritize Hazardous Jobs

Understanding the risk posed by a job requires consideration of two main factors: the likely severity or impact of the injury or illness caused by a hazard and the likelihood injury or illness will actually occur (see Table 1). It is important, when assessing the overall risk of a job to determine the number of people exposed to a hazard who could be affected by an incident. Hazards that affect the whole worksite present much more risk than hazards that affect only one worker.

Jobs that present unacceptable risk need to take priority. Place priority on jobs:

- With exceptionally high injury or illness rates
- Where there already have been close calls
- Where violations of standards already have occurred
- With potential to cause serious harm

Severity

Factors that increase risk because they increase the severity of an injury or illness often rely on chance. However, certain job elements and behaviors intensify the severity of possible incidents:

- Using high-powered machinery and heavy equipment
- Working at elevation
- Working around hazardous chemicals
- Moving heavy or cumbersome loads
- Working around or with electrically energized equipment
- Working in a confined space

Probability

Factors that increase risk because they increase the likelihood of an injury or illness include the number of employees exposed to a hazard, frequency of exposure, duration of exposure, proximity to “point of danger”, unreasonable workload, working under stress, and environment.

TABLE 1: RISK ASSESSMENT MATRIX

		Probability of Harm		
		Not Likely	**Likely**	**Very Likely**
Severity of Harm	**Serious Harm**	Moderate Risk	High Risk	Very High Risk
	Significant Harm	Low Risk	Moderate Risk	High Risk
	Minor or no harm	Low Risk	Low Risk	Moderate Risk

Analysis

When analyzing a job's hazards and determining how best to control them, it's important to identify all significant hazards accurately, and understand each within the context of the entire job.

Break Job into Steps

Every job requires several steps. Each has its share of hazards that puts workers at risk.

To complete a job hazard analysis, first there must be a clear understanding of the steps required to complete the job. The observer will watch the worker perform the job and list the steps the worker takes to complete it.

When breaking a job into its individual steps, it's important to balance between too much and too little detail. Too much detail will make the analysis needlessly long, and too little will not cover the basic steps.

Each step is one action. Some actions may not be observable, and some steps may involve specifically not doing things.

The observation stage of the JHA shouldn't focus on either the employee's performance, or individual unsafe acts, it should focus on the task itself. All phases of the analysis benefit from employee insight and feedback, and extensive employee involvement is strongly encouraged.

OSHA recommends video recording or photographing the worker performing the job, having them explain each step, and why they did it that way. These visual records can be handy references when doing a more detailed assessment of the work.

When all the steps are documented, the observer will review them with the employee to ensure nothing is missed.

Identify Hazards

The JHA requires answers to the following:

- What can go wrong?
- What are the consequences?
- How could the hazard arise?
- What are the other contributing factors?
- How likely is it that the hazard will result in an incident?

A good description of a possible hazard scenario will reveal the answers to those questions by describing the hazard in terms of the environment in which it occurs, the trigger that would precipitate an incident, how a worker faces exposure to the hazard, and the worst-case consequences.

Again, workers provide excellent insight into the hazards they work with as well as suggestions for how to control risks presented by hazards where they work.

The JHA will not only include actual hazards, but also potential hazards that could arise while performing the job:

- Is there danger of striking against, being struck by or otherwise making harmful contact with an object?
- Can the worker be caught in, by, or between objects?
- Is there potential for a slip or trip?
- Can the employee fall from one level to another or even on the same level?
- Can pushing, pulling, lifting, lowering, bending or twisting cause strain?
- Is the work environment hazardous to safety or health?
- Are there concentrations of toxic gas, vapor, fumes or dust?
- Are there potential exposures to heat, cold, noise or ionizing radiation?
- Are there flammable, explosive or electrical hazards?

Please see the table of Workplace Hazards at the end of this chapter for reference.

A list of hazards must accompany each step of the job. This provides a framework pointing to controls already in place and controls needed to prevent hazards from causing injuries or illnesses.

Control

Though awareness and thoughtfulness are excellent ways to reduce risk in the workplace, it is not enough simply to identify workplace hazards. Hazards in the workplace that are identified must be controlled if possible to minimize their risk. The JHA provides a systematic way to approach hazards and their controls. To control a hazard, it is important to remember two very basic principles. First, either eliminate the hazard itself or control worker exposure to the hazard. Second, eliminating a hazard is more effective than controlling exposure to a hazard.

These two principles shape a hierarchy of hazard control strategies (see Figure 1). When considering how to address the hazards in each step of a given job, controls at the top of the hierarchy need to be considered before controls toward the bottom of the hierarchy. The more reliable and less likely a hazard control can be circumvented, the better.

A good hazard control plan often includes a mixture of different things, such as the following:

- Priority given to high-risk hazards
- Inexpensive, easy improvements and temporary solutions until more reliable controls are in place
- Long-term solutions to risks most likely to cause accidents or ill health
- Long-term solutions to risks with the worst potential consequences
- Arrangements for training workers on the main risks that remain and how they are to be controlled
- Regular checks to make sure the control measures stay in place, and clear responsibilities. Who will lead on what action, and by when?

Controlling the Hazard

The most effective strategy is to "engineer the hazard out" by using control methods that physically remove or change a hazardous machine, work environment condition or other hazard. If, during the JHA, you discover a hazard that can be engineered out, do it. Turn the dangerous step into a safe step that doesn’t require safety precautions.

Elimination

If there are hazards that can be removed from the worksite, do this first. Good housekeeping procedures keep many hazards under control. Removing redundant or unnecessary equipment, materials or processes also rids the workplace of any risks associated with them.

Substitution

There may be alternative chemicals, machines or processes to accomplish the job but pose fewer hazards to workers. Explore ways to incorporate these alternatives into the job.

Isolation and Other Engineering Approaches

Creating a boundary between a hazard and workers can reduce risk almost as effectively as removing the hazard from the workplace altogether. Limit access to hazards with enclosures, machine guards and physical barriers that reduce the likelihood of exposure to a hazard before turning to controls that rely on a person.

Redesigning equipment and installing new guards (within manufacturer specifications) can remove or redirect hazards away from workers to prevent exposure.

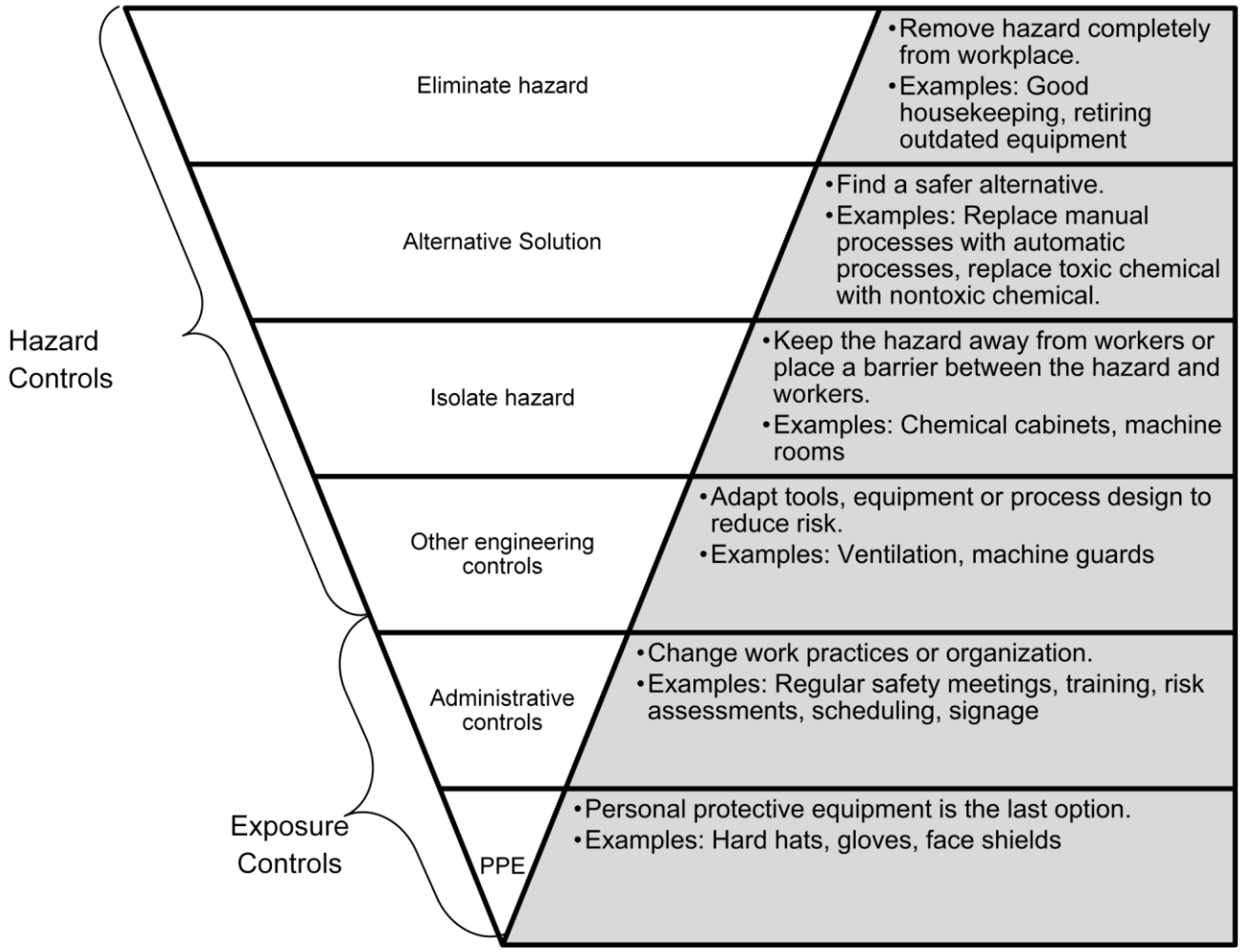
Controlling Exposure

Some jobs and processes demand a level of exposure to some workplace hazards. If this is the case, controlling risk means controlling or eliminating the exposure and the negative effects of exposure.

Administrative or Management Controls

Administrative hazard controls are far-reaching and varied when implemented. These controls rely on appropriate human behavior, which is why they are lower on the hazard control hierarchy than engineering controls. Administrative controls include:

- Policies, procedures and practices to reduce exposure
- Modifying work schedules to reduce exposure
- Monitoring the use of hazardous
- Alarms, signs and warnings
- The buddy system
- Training



Personal Protective Equipment

Personal protective equipment (PPE) is the least effective way to control hazards, but is necessary for some hazardous jobs. The following are examples of when PPE is acceptable:

- When engineering controls are not feasible or do not totally eliminate the hazard
- While engineering controls are being developed;
- When safe work practices do not provide sufficient additional protection
- During emergencies when engineering controls may not be feasible

PPE needs to be chosen carefully to address the hazard, and fitted to the person using it.

Document and Evaluate

By the end of the JHA, there will be a document that clearly outlines the steps to perform the job, the hazards encountered in each step, and appropriate controls that need to be in place to reduce the risk posed by those hazards. This will paint a picture of a process that considers safety from the start to end of the job.

However, unsafe habits have a way of introducing themselves into a process as workers find their "own way" of performing tasks — ways that may not take into account the safety measures identified in the JHA. Further, there may be risks that were not identified or were left insufficiently controlled that may only become evident after the JHA is complete. Monitoring and periodic reviews help ensure the JHA remains current to prevent accidents and injuries.

Document the Safe Job Procedure

Once the analysis is complete, communicate the results to all workers who are, or will be, performing that job. The side-by-side format used in JHA worksheets is not an ideal one for instructional purposes. Use a narrative-style communication format to create a safe job procedure that is easy to understand:

Write in step-by-step format. Each step needs its own paragraph that describes the step as one action.

Point out the hazard: If the step involves exposure to a hazard, point out the hazard in the step. Include the possible injury or illness that could result from unprotected exposure to the hazard.

Identify safety precautions: If the step involves exposure to a hazard, also point out the safety precautions to stay safe and healthy.

Paint a 'word picture': Write the procedure in a way that someone unfamiliar with the task could perform it safely. The safe job procedure can serve as a training document as well as a safety document. Avoid jargon and technical terms so new employees can easily understand the process.

Write in the second person, present tense. Treat the safe job procedure as a set of instructions. Tell the person who is doing the job exactly how to do it.

Write clearly. While it is important to be concise, it is more important to be clear and accurate. Keep sentences short. Clear writing helps make sure all workers can understand the instructions and follow them. If employees speak a language other than English, translate the job procedure into the language they speak so there is as little confusion as possible.

Monitor and Review

Periodically reviewing your JHA ensures it is current and continues to prevent workplace accidents and injuries. Even if the job does not change, unnoticed hazards may become apparent. It is particularly important to review job hazard analyses if an illness or injury occurs.

Based on the circumstances, the job procedure may need to change to prevent similar incidents in the future. If an employee's failure to follow proper job procedures results in a "close call or near miss," discuss the situation with all employees who perform the job and remind them of proper procedures. Any time you revise a job hazard analysis, it is important to train all employees affected by the changes in the new job, procedures or protective measures.

Hazard identification, and risk assessment and control are ongoing processes. Make sure to undertake a hazard identification and risk control analysis whenever there is a change to the workplace, including when work systems, tools, machinery or equipment change, or when the existing process is otherwise potentially out of date or no longer valid.

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Workplace Hazards
- Job Hazard Analysis Worksheet
- Safe Job Procedure Form
- Job Hazard Analysis Training Documentation

WORKPLACE HAZARDS (PAGE 1 OF 2)

Hazard		Description
Slips/Trips/Falls		Conditions that result in falls (impacts) from height or walking surfaces (such as slippery floors, poor housekeeping, uneven walking surfaces, exposed ledges, etc.)
Mechanical	Failure	Self-explanatory; typically occurs when devices exceed designed capacity or are inadequately maintained.
	Caught-in/ Caught-on/Crush	Skin, muscle or body part exposed to crushing, caught-between, cutting, tearing, shearing items or equipment.
Impact	Struck By	Accelerated mass that strikes the body causing injury or death. (Examples are falling objects and projectiles.)
	Struck Against	Injury to a body part due to coming into contact with a surface in where the action was initiated by the person. (An example is when a screwdriver slips.)
Chemical	Toxic	A chemical that exposes a person by absorption through the skin, inhalation, or through the blood stream that causes illness, disease, or death. The amount of chemical exposure is critical in determining hazardous effects. Check Safety Data Sheets (SDS), and/or OSHA 1910.1200 for chemical hazard information.
	Flammable	A chemical that, when exposed to a heat ignition source, results in combustion. Typically, the lower a chemical's flash point and boiling point, the more flammable the chemical. Check SDS for flammability information.
	Corrosive	A chemical that, when it comes into contact with skin, metal, or other materials, causes damage. Acids and bases are examples of corrosives.
Explosion	Chemical Reaction	Self-explanatory.
	Pressurization	Sudden and violent release of a large amount of powder blast/gas/energy due to ignition or a significant pressure difference such as rupture in a boiler or compressed gas cylinder.
Temperature Extreme		Temperatures that result in heat stress, exhaustion, or metabolic slow down such as hypothermia or hyperthermia.

WORKPLACE HAZARDS (PAGE 2 OF 2)

Electrical	Shock/Short Circuit	Contact with exposed conductors or a device that is incorrectly or inadvertently grounded, such as when a metal ladder comes into contact with power lines. 60Hz alternating current (common house current) is very dangerous because it can stop the heart.
	Fire	Use of electrical power that results in electrical overheating or arcing to the point of combustion or ignition of flammables, or electrical component damage.
	Static / ESD	The moving or rubbing of wool, nylon, other synthetic fibers, and even flowing liquids can generate static electricity. This creates an excess or deficiency of electrons on the surface of material that discharges (spark) to the ground resulting in the ignition of flammables or damage to electronics.
	Loss of Power	Safety-critical equipment failure due to a loss of power.
Ergonomics	Strain	Damage of tissue due to overexertion (strains and sprains), work positioning or repetitive motion.
	Human Error	A system design, procedure or equipment that is likely to cause error. (A switch goes up to turn something off).
	Vibration	Vibration that can cause damage to nerve endings, or material fatigue that results in a safety-critical failure.
Radiation	Ionizing	Alpha, Beta, Gamma X-rays and neutral particles that cause injury (tissue damage) by ionization of cellular components.
	Non-Ionizing	Ultraviolet, visible light, infrared, and microwaves that cause injury to tissue by thermal or photochemical means.
Noise		Noise levels that result in hearing damage (an 8-hour time-weighted average greater than 85 decibels) or inability to communicate safety-critical information.
Visibility		Lack of lighting or obstructed vision that results in an error or other hazard.
Weather Phenomena		Self-explanatory.

JOB HAZARD ANALYSIS WORKSHEET (PAGE 1 OF 2)

Department/Project:			
Job/Activity:			
Date:	Created By:		

Step	Hazard(s)	Controls
1)		
2)		
3)		
4)		
5)		
6)		
7)		

JOB HAZARD ANALYSIS WORKSHEET (PAGE 2 OF 2)

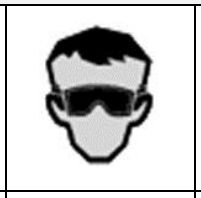
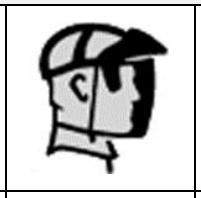
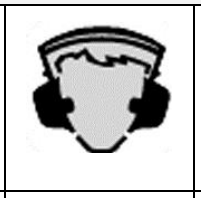
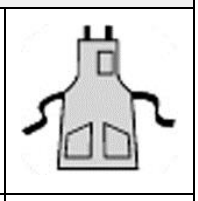
Step
8)
9)
10)
11)
12)
Required Training:
Required Personal Protective Equipment:
Special Inspection Requirements:
Please attach any diagrams, flowcharts, or photographs that may be helpful in hazard assessment.

SAFE JOB PROCEDURE

DO NOT undertake this job unless a supervisor has instructed you in the safe use of all equipment and appropriate safety precautions for work processes associated with the job. Any employee who undertakes this job must have explicit supervisor permission to do so.

Job Performed	
Potential Hazards	

Personal Protective Equipment

						
Hand Protection	Respiratory Protection	Eye Protection	Face Protection	Special Footwear	Hearing Protection	Special Clothing

Other (Specify)	

Safe Work Procedures (attach additional sheets if necessary)

Pre-Operation	
Operation	
Post-Operation	

Competent Personnel
These individuals are permitted to perform the job and supervise others learning to do this job

Name		Title		Contact	
Name		Title		Contact	

JOB HAZARDS TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name:	**Signature:**

POLICY

Bannister Electric LLC of West Monroe has implemented this policy for the protection of our employees during emergencies in the workplace. Dolphus Bannister will supervise the Emergency Action Plan.

The Company will have a written Emergency Action Plan (EAP). The EAP will be posted in the workplace and remain available to employees for review, along with the names and job titles of every person in the chain of command during emergencies.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Bannister Electric LLC of West Monroe to:

- Ensure adequate workplace safeguards against hazards, including appropriate exit routes, fire alarms, and fire protection systems
- Ensure development and implementation of the EAP
- Ensure training of employees in accordance with this policy

EMPLOYEE RESPONSIBILITIES

Every employee is expected to:

- Report fires or other emergencies
- Follow the EAP

TRAINING

Bannister Electric LLC of West Monroe will ensure every employee is provided training on emergency planning. This training will be provided at no cost to the employee and held during their working hours.

Training will be provided:

- At the time of assignment
- When the employee's responsibilities under the Plan change
- When any element of the Plan is changed
- At least annually thereafter, annual training for all employees will be provided within one year of their previous training

The Company will provide additional training when tasks or procedures are added or changed that may affect the employee’s work. It is acceptable for additional training to be limited to addressing only the changes or additions to the employees’ exposure.

Bannister Electric LLC of West Monroe will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

Dolphus Bannister will ensure all employees are informed and trained in the following minimum elements for the Emergency Action Plan and Fire Protection Program:

- Fire hazards at the worksite
- Means of controlling or removing fire hazards at the worksite
- Procedures for reporting a fire or other emergency
- Procedures for emergency evacuation for all areas of work, including type of evacuation and exit route assignments
- Safe assembly areas designated for all work areas in the event of evacuation
- Procedures to be followed by employees who are requested to remain to operate critical plant operations before they evacuate, if applicable
- Procedures to account for all employees after evacuation
- Procedures to be followed by employees performing rescue or medical duties
- The members in the chain of command who may be contacted by employees for information about the plans or for an explanation of their duties under the plans
- Proper operation of fire extinguishers provided by the company if the EAP allows employees to fight incipient stage fires rather than evacuate
- The hazards involved in incipient stage firefighting. Employees are instructed to ensure the local emergency response service (Fire Department) is notified before attempting to extinguish any fire, and that if a fire is not immediately extinguished, or the fire recurs to evacuate immediately

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

Emergency Action Plan

Bannister Electric LLC of West Monroe is committed to providing a safe workplace and ensuring procedures are in place to protect employees in the event of any emergency. Accordingly, Bannister Electric LLC of West Monroe will ensure there is an Emergency Action Plan, written and available to employees, that includes:

- Procedures for reporting a fire or other emergency
- Procedures for emergency evacuation, including type of evacuation and exit route assignments
- Procedures to account for all employees after evacuation

- Procedures to be followed by employees performing rescue/medical duties and operating critical plant operations
- The name or job title of every employee from whom other employees can find out more about the plan

Employee Involvement

The continued development and thorough implementation of the EAP is a company-wide effort that demands concerted effort of management and all employees. Accordingly, employees will be involved in every step of the EAP from planning to training to implementation in an emergency.

Dolphus Bannister, or an approved designate, will review the EAP with all employees to verify they understand procedures to be followed in an emergency.

Employees will report or remedy workplace hazards and unsafe work practices as soon as they may do so safely.

Possible Workplace Emergencies

In the planning and implementation of the company's EAP, employees will consider the range of emergencies that may require response and develop contingencies that respond to the unique workplace impact of these emergencies.

Weather

Weather-related events include hurricanes, tornadoes, blizzards, floods and severe storms. Supervisors must communicate unexpected schedule changes because of severe weather to employees as quickly as possible. Such events may result in a loss of power or communication and may limit the ability of first-responders to respond quickly.

Medical

Medical emergencies are the most likely workplace emergency. Response time is critical to a positive outcome during a severe medical emergency. Onsite medical first responders will know first aid and CPR, but no employee will perform first aid beyond their training or capability. If first aid trained, personnel are not available, stop any bleeding with firm pressure (avoiding contact with body fluid) and in case of choking, clear the air passages. In the event of a medical emergency, it is imperative to call 911 promptly.

Threat of Violence

Threats of violence can come through a range of modes of communication, directed at a single employee, a group of employees or the entire workplace. Every threat is serious. If you receive or are aware of a threat of violence, contact a supervisor immediately, if you are able to do so safely. Please see the chapter on "Workplace Violence Prevention" for more information about how to prevent and respond to threats of violence and violence in the workplace.

Fire

The fire prevention plan requires involvement of all employees to prevent fire emergencies. Response to a fire emergency depends on whether your workplace has decided to allow all employees or some employees to fight incipient-stage fires. Supervisors may have to serve as evacuation wardens, and if the emergency action plan demands it, an employee may need to shut down critical operations before evacuation. A quick, orderly evacuation accompanied by a call to 911 is the acceptable response to an out-of-control fire.

Explosion

If there are flammable substances at your worksite, take extra care during planning to address the hazards they present. Explosions do not offer any warnings, and often, panic presents the biggest obstacle to safety in the wake of such a disaster. Further, explosions often accompany fires, adding complexity to fire response planning.

Earthquake

When an earthquake strikes, the greatest risks come from above, collapsing ceilings and falling objects can severely injured workers. If the workplace is in an earthquake-prone location, consider earthquake drills and make sure you and your coworkers know to protect their head and neck under sturdy furniture or against an inside wall. A severe earthquake will occupy emergency workers, and onsite rescue and triage may be a task that falls into the hands of supervisors or members of the safety committee, if applicable. No employee should perform first aid or attempt rescue beyond training or capacity to do so safely.

CHAIN OF COMMAND

During an emergency, it’s critical that employees understand the chain of command in the emergency action plan. In addition to the chain of command, it’s also important to recognize that the authority of local emergency response officials, like members of the fire department, supersedes the authority of any Bannister Electric LLC of West Monroe employee.

Emergency Scene Commander

Unless precluded by unforeseen contingencies, Dolphus Bannister will act as the scene commander in the event of a workplace emergency. Bannister Electric LLC of West Monroe will determine whether an emergency exists, oversee procedures during an emergency, and notify and coordinate with outside emergency services.

Emergency Scene Coordinators

The emergency action plan requires the worksite to have enough people trained to assist in the evacuation of employees and assist the safety coordinator/emergency scene commander. The number of scene responders depends on the number of employees, the size and complexity of the worksite and the hazards posed by likely emergencies.

Table 3 provides a good guideline when considering how many coordinators will be necessary to implement the EAP. Scene coordinators should know CPR and first aid and would benefit from additional safety training, including workplace violence response. Their duties in an emergency include, but are not limited to the following:

- Checking for employees who may be unable to evacuate
- Knowing who may need assistance during evacuation and how to assist them
- Coordinating emergency activities
- Using their knowledge of workplace, escape routes and hazards to perform a swift, safe evacuation
- Verifying all employees are in designated safe areas following an evacuation

TABLE 3

Number of Emergency Scene Responders for Typical Workplaces		
Employees in Workplace	**Emergency Scene Commander**	**Emergency Scene Coordinator**
11-19	1	1
20-49		1-2
50-99		2-5
100-249		5-12
250+		12+

Emergency Reporting Procedures

Employees must report emergencies as quickly as they may do so safely. Emergencies may be reported through manual pull stations or other alarm systems. If the EAP requires employees to call Dolphus Bannister or other assigned staff, those numbers will be posted at every phone. Major emergencies demand an immediate call to 911 to prevent damage, injury or death. After the report of an emergency, the alarm system will notify employees about the emergency.

WORKPLACE EVACUATION

The EAP will include a floor diagram with arrows to designate exit route assignments based on location within the building. There need be secondary routes and exits whenever possible. It is important every employee knows the building's exit routes and keeps them free of obstacles and debris at all times. For more information about exit routes, please see the floor diagram and consult "Exit Routes" in this chapter.

Evacuation Assistance

Scene coordinators or other assigned personnel will act as evacuation wardens to ensure employees move from danger to safety during an emergency. An employee designated to assist in evacuations will need to know which employees need extra assistance and be trained and prepared to offer this assistance. Further, any visitors on premises may need assistance during evacuations. It is useful to implement a system to account for visitors, like a sign-in sheet, to promote facility security and account for everyone in case of an emergency.

Services During Evacuation

Workplaces with equipment and processes that take time to shut down or with systems that may pose a hazard if not shut down may include, as part of the EAP, a partial evacuation procedure. The roles of those performing critical operations during evacuation must be clear, and anyone left behind must be able to recognize when to abandon the task and evacuate. The same goes for workplaces that plan for employees to fight incipient-stage fires.

Accounting for Employees

The emergency action plan requires Bannister Electric LLC of West Monroe to account for employees after an evacuation. Employees will gather in an established assembly area (or areas) after an evacuation. After the evacuation is complete, Dolphus Bannister or an approved designate, will perform a headcount and note the names and last known whereabouts of anyone missing. Accuracy in accounting for employees during an evacuation is vital to prevent a dangerous search-and-rescue operation if one is not needed. Procedures need to include a way to account for visitors, customers and suppliers who are onsite as well.

Sheltering in Place

Not every emergency requires evacuation. Certain contaminants and disasters present greater hazards outside than inside. If an emergency does not require evacuation, it may demand employers instead “shelter-in-place.” Dolphus Bannister will determine the extent of evacuation, and whether employees need to shelter in place. Sheltering in place means taking refuge in an interior room with no or few windows until the emergency has passed. In many cases, local authorities will issue advice to shelter-in-place via TV or radio. In case of chemical release, special precautions to protect against toxic atmospheres may be necessary. Including shelter-in-place preparations in the EAP demands a means of alerting employees in distinguishable ways and additional training on shelter-in-place procedures.

First Aid and Rescue

Bannister Electric LLC of West Monroe will ensure that local fire, police and other emergency medical personnel are available and trained to provide assistance. In the absence of those resources, at least one person on staff will be trained to render first aid. An amount and dispersal of first aid supplies appropriate to the size of the facility, number of employees and hazards present will remain readily available. First aid supplies will be added or replaced as frequently as necessary to ensure availability. Facilities for rinsing or drenching eyes or body will be provided as hazards demand. First Aid kits will include or will be accompanied by appropriate personal protective equipment for anticipated hazards, including exposure to blood borne pathogens for personnel while performing first aid. More information is available in the chapters titled “Medical Services and First Aid” and “Bloodborne Pathogens.”

Critical Information

As part of the personnel file, there will be a record of emergency contact information for employees, in case an employee is unable to contact someone for themselves. The confidential record should include physician information and any other medical information the employee shares for use in case of an emergency.

Multi-Employer Workplaces

If the company shares a building or worksite with other employers, consider working with them to develop a building-wide emergency plan. If a building-wide plan is not feasible, take all necessary steps to ensure the EAP does not conflict with the plans of other employers in the building.

PERSONAL PROTECTIVE EQUIPMENT

During some emergencies, it is necessary for an employee to encounter hazards that require personal protective equipment. A medical emergency involving blood, for instance, will call for gloves as indicated in the bloodborne pathogen exposure control plan. Training, preparation and procedures will include consideration for any necessary PPE.

EXIT ROUTES

During an emergency, swift evacuation can ensure the safety and well-being of employees. In an emergency that requires employees to evacuate, Bannister Electric LLC of West Monroe will adhere to all applicable regulations to ensure safe exit routes remain available to employees in case fire or other emergency demands evacuation of the workplace.

Basic Requirements

An exit route must be established and separated by fire resistant materials as quickly as possible during construction, and a safe means of egress must be maintained during renovation and demolition.

If the route connects three or fewer floor levels, construction materials separating the exit from other parts of the workplace must have a one-hour of fire resistance rating. (More stories call for a two-hour resistance rating.) An opening to an exit will only have self-closing, laboratory-tested fire doors as necessary to allow passage of individuals through the established route.

Enclosure and protection of openings for means of passage must occur as soon as possible after exterior walls/windows are in place.

Adequate Exit Routes

Bannister Electric LLC of West Monroe will ensure sufficient exit routes for the workplace. While a single exit route is permissible in small workplaces with possible safe evacuation, two exit routes, located as far as practical from each other helps employees evacuate safely if one exit route is blocked. There will be enough exit routes to ensure safe evacuation of all employees.

Consult local codes to ensure safe means of passage in any construction. Exit stairways and means of egress in multi-level buildings must be provided immediately after floor decking is installed. In new multi-level buildings, one of the exit stairs may be obstructed for construction, but do not obstruct exit stairs for more than two contiguous floor levels.

Exit Discharge

Exits must discharge outside or to a space with access to the outside that is large enough to accommodate the number of people taking that route. For stairs that continue past the evacuation level, there will be indication of proper direction to discharge area.

Unlocked, Side-Hinged

Under no circumstances will an exit door be locked from the inside. Nothing can restrict the use of an exit door or any means of egress established in the fire protection plan in an emergency.

All exit doors will be side-hinged, with doors that swing out in the direction of exit travel, and rooms designed to hold more than 50 people or in a high-hazard area.

Capacity and Size Requirements

Exit routes must be able to handle the maximum occupant load for that floor. The capacity may not decrease as the route approaches the exit discharge.

The ceiling of an exit route must be at least seven feet six inches high. Any projection from the ceiling must not reach a point less than six feet eight inches from the floor.

An exit access must be at least 28 inches wide at all points. Where there is only one exit access leading to an exit or exit discharge, the width of the exit and exit discharge must be at least equal to the width of the exit access. The width of an exit route must be sufficient to accommodate the maximum permitted occupant load of each floor served by the exit route.

Objects that project into the exit route must not reduce the width of the exit route to less than the minimum width requirements for exit routes.

Outdoor Exit Routes

An outdoor exit route must be protected by guardrails if a fall hazard is present; covered or protected from slipping hazards; reasonably straight, smooth, solid and level; and free of dead ends longer than 20ft.

Minimize Dangers

Exit routes will be unobstructed and clear of hazardous materials or flammable furnishings. An exit route that goes toward a high hazard area requires barriers or partitions to provide a suitable shield from the hazard for workers.

Lighting and Marking

Exit routes must be adequately lit, clearly visible and marked by a sign reading “EXIT.” Decorations and signs must not obstruct or obscure the visibility of the exit door. If a doorway could be mistaken for an exit, it must be marked “Not an Exit” or a sign that identifies its use. If the direction to the exit is not apparent, signs must be posted to indicate the direction for evacuation.

Exit signs must be lighted and comply with the NFPA requirements.

Construction, Repairs, Alterations

Employees may not occupy any workplace during construction, repairs or alterations unless all exit routes and required safety standards are maintained. The Company will ensure removal of or appropriately minimize hazards beyond normal conditions during construction activities.

FORMS

On the following pages, please find the Emergency Action Plan form, which may be reproduced freely by the Company Bannister Electric LLC of West Monroe for the purposes of implementing and maintaining a safety and health program.

EMERGENCY ACTION PLANS (PAGE 1 OF 4)

Company Name			Job Location				
Street		City		State		ZIP	
Prepared By		Title			Phone		
Signature					Date		

Purpose
This plan is for the safety and well-being of company employees. It identifies necessary management and employee actions during fires and other emergencies. Education and training are provided so that all employees know and understand the Emergency Action Plan.
Location of Plan
The Emergency Action Plan can be found at the station or office of
Upon request, an OSHA representative may obtain a copy of the plan from
Exit Routes
Draw a diagram of jobsite or facility exit routes in space below. Locate meeting place or “Roll-Call” area on diagram

EMERGENCY ACTION PLANS (PAGE 2 OF 4)

Accounting for Employees			
After exiting jobsite or facility, all employees are to assemble for “Roll-Call” at this location Note location on exit route diagram			
The following are responsible for ensuring that employees comply with this requirement			
Name		Title	
Name		Title	

Critical Operations	
To minimize damage from the emergency, the following personnel are responsible for shutting down the listed critical operations	
Personnel Names	Critical Operations
As soon as shutdowns are completed, the employees who performed critical operations must take the nearest exit route in accordance with general emergency procedures.	

Rescue and Medical Duties		
The following personnel are certified and trained in both CPR and general first aid		
Name	Title	Phone Number

EMERGENCY ACTION PLANS (PAGE 3 OF 4)

Reporting Emergencies		
The following personnel have the duty of contacting public responders to come to the emergency scene. The personnel are listed in descending order of availability		
Name	Title	Phone Number

Alarm Systems and Notification of Emergencies	
In the event of a workplace or facility emergency, employees will be notified as follows	

Types of Evacuation	
OSHA requires this Company to have an established system of types of evacuation to follow for different emergency circumstances. The following listing represents Company policy for various emergency situations	
PARTIAL EVACUATION: Code Yellow – 3 rings or horn blasts RESPONDERS (trained extinguisher personnel and trained rescue and medical personnel)	
FULL EVACUATION: Code Red – 4 rings or horn blasts: RESPONDERS (n/a)	
NOTE: If there is more than one evacuation type, the alarm signal for each must be distinctive.	
Other (describe)	

EMERGENCY ACTION PLANS (PAGE 4 OF 4)

Public Emergency Response Information	
911 emergency services DO / DO NOT cover the area this Emergency Action Plan covers. (circle one)	
Local Police Department	
Local Fire Department	
Local Ambulance/EMS	
Local Hospital	

Further Information	
For further information or explanation about any duties under this Plan, contact	
Name	Title

This Emergency Action Plan is authorized and approved by (Name and Title)		
Name (print)	Signature	Title

POLICY

Safety incidents indicate the failure of safety control systems and demand changes to prevent future harm. In order to implement necessary changes and prevent future harm, Bannister Electric LLC of West Monroe will investigate accidents and near misses to identify causes and make safety recommendations.

The primary purpose of workplace accident investigations performed by Bannister Electric LLC of West Monroe is to find facts to guide future actions, not to find fault or assign blame.

Fatalities must be reported to OSHA within eight hours. Serious accidents where an employee is admitted to a hospital for treatment or observation because of injuries suffered from a workplace accident must be reported to OSHA within 24 hours.

If an employee with an occupational injury or illness receives a medical emergency procedure, Dolphus Bannister or designate will document the incident on OSHA's Form 301, "Injury and Illness Incident Report," and record the injury or illness on OSHA's Form 300, "Log of Work Related Injuries and Illnesses." See "29 CFR 1904.7 — Recordkeeping Forms and Recording Criteria" for more information.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Bannister Electric LLC of West Monroe to:

- Provide accident investigation training
- Require that every accident is investigated to find and remedy the root causes
- Respond promptly to any recommendation following an accident
- Take corrective actions to prevent the recurrence of an accident
- Avoid blaming individuals in incident investigations for safety purposes
- Report to the appropriate authority, as required by law, any fatality, injury or work-related illness
- Share with employees the findings of accident investigations
- Review these accident investigation procedures and this policy annually and revise as necessary

EMPLOYEE RESPONSIBILITIES

Every Bannister Electric LLC of West Monroe employee is expected to:

- Immediately report any work-related accident, injury, or near miss
- Actively cooperate with investigators during accident investigations
- Participate in recommending changes to processes, systems, and the workplace, and in helping to implement changes as necessary to prevent future accidents

TRAINING

Bannister Electric LLC of West Monroe will ensure all employees are provided training on their role in the accident investigation process. This training will be provided at no cost to the employee during working hours.

Bannister Electric LLC of West Monroe will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

Dolphus Bannister will ensure that all employees at Bannister Electric LLC of West Monroe are informed and trained in the following minimum elements for accident investigation:

- What an accident is and why accidents occur
- What a near-miss is
- How to report an accident
- A general overview of the accident investigation process
- Why accident investigations are important, and the purpose of them
- Different levels of causes for accidents

Managers and supervisors will complete training in the following minimum elements for accident investigation:

- Learning the legal requirements of accident reporting
- Securing an accident scene
- Planning an accident investigation
- Collecting information from an accident scene
- Conducting interviews as part of an accident investigation
- Photographing and sketching an accident
- Creating a timeline of an accident
- Learning root-cause analysis techniques
- Compiling accident investigation reports
- Recommending change to prevent accidents

Training Records

The company will retain training records for three years from the date on which the training occurred.

The following information must be included:

- Dates of the training
- Contents or a summary of the training
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training

PROCEDURE

It is easy to think of an accident simply as a single event that results in injury or illness to an employee, or in property damage. In reality, an accident is the culmination of a series of events. Accidents are the end of an unplanned, unintended and undesired process. They are complex, and in some industries exceedingly rare, often with several events that can be identified as causes.

It is also easy to think of accidents as being the result of poor chance or fate. However, a competent person can examine workplace conditions, behaviors, and underlying systems to predict what kind of accidents will occur. There is certainly an element of chance in every incident. However, most accidents can be prevented by eliminating and controlling workplace hazards.

A serious accident may result in disability, severe property damage or even death; a minor accident may only cause an inconvenience; near misses may not harm anyone or anything. However, nearly all accidents and near misses point to failures in safety systems that demand a closer look to prevent more harm in the future.

Investigations

An accident investigation may have different purposes, including:

- Identifying and describing the actual course of events
- Identifying the direct and root causes / contributing factors of the accident
- Identifying risk-reducing measures to prevent future, comparable accidents
- Investigating and evaluating the basis for potential criminal prosecution
- Fulfilling legal requirements or processing workers' compensation claims
- Evaluating the question of guilt in order to assess the liability for compensation

Police, insurance investigators and safety regulators may investigate an accident for other reasons, but Bannister Electric LLC of West Monroe accident investigations emphasize finding the root causes of the accident to prevent future accidents from happening again.

Investigators are interested in not only individual harmful events, but also the events, systems, and processes that led to the accident. Accident investigations need to determine exactly what happened, but more importantly, must look for deeper causes — the how and why.

Incidents that don't involve injury or property damage will still be investigated to determine which hazards need to be corrected. The same principles apply to a quick inquiry of a minor incident, and to the more formal investigation of a serious event.

Procedures for Accident Investigations

The best time to develop accident investigation procedures is before the accident occurs.

The plan will include procedures that determine:

- Who to notify when an accident occurs
- Who may notify outside agencies (fire, police, etc.)
- Who will conduct investigations

- Who will maintain recordkeeping documents
- What training is required for accident investigators
- Who receives and acts on investigation reports
- Timetables for conducting hazard correction

At Bannister Electric LLC of West Monroe, pre-accident investigation planning is a team effort between supervisors and Dolphus Bannister. Nevertheless, there are some key steps to help ensure an accident investigation will accomplish its goal of preventing future incidents. See Figure 1 for an outline of the general steps of an accident investigation.

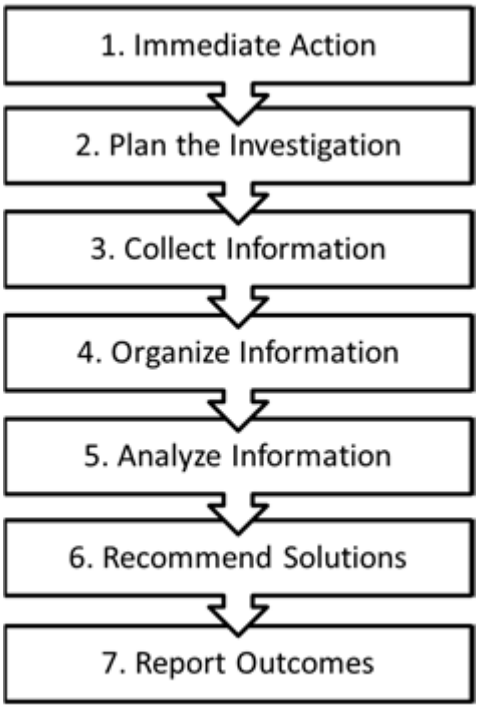


Figure 1

IMMEDIATE ACTION

Secure Accident Scene

The first action to take at an accident scene is to prevent further injuries and make the area safe. Administer first aid (or ensure it is administered) or summon appropriate emergency responders as necessary.

Sometimes, an investigation can begin while the victim is being assisted by emergency responders. However, the priority is always taking care of the victim, and usually investigations don't begin until emergency response is completed. Material evidence will most likely not be in its original location, but effective interviews can shed light on the scene at the time of the accident.

At this point, gathering as much pertinent information as possible for later analysis takes priority over determining the cause of the accident, but the top priority must always be the safety and well-being of workers and the public.

Preliminary Investigation

It is important to start the investigation as soon as possible. Significant elapsed time between the accident and the investigation can lead to a deterioration of evidence and undermine the accuracy of the investigation.

Material Evidence

There is a temptation to clean up the accident scene immediately so people can get back to work, but an effective procedure will protect material evidence for the investigation.

It is important to secure the scene of an accident quickly and effectively. Tape, rope, cones, or even personnel, can secure the accident scene.

Plan Investigation

Most investigation planning should happen well in advance of an accident. However, some details of the investigation can only be seen after the fact. The nature of the accident will determine the extent of the investigation, the resources that will be needed, what types of investigative processes will be required, who will need to be interviewed, etc.

Build Team

Ideally, someone experienced in accident causation and investigative techniques will conduct accident investigations. An investigator who is also fully knowledgeable of the work processes, procedures, peoples, and general work environment of a particular situation will be able to shed some light on the causes of the accident.

In most cases, the supervisor will help investigate, together with the safety coordinator and/or whoever is in charge of worksite inspections.

Other members of the team can include:

- Employees with knowledge of the work
- A union representative, if applicable
- Employees with experience in investigations
- An impartial expert from outside the company

It's important the team represent a variety of expert perspectives on workplace safety and the job being performed when the accident happened. However, everyone on the team needs to be trained in appropriate investigative techniques and not be involved in any disciplinary proceedings that might emerge out of the incident, if possible.

It is important to keep the safety-related aspect of the investigation separate from any possible disciplinary action. Accident investigations will always focus on identifying safety failures and remedying them promptly.

COLLECT INFORMATION

The next step is to gather useful information about what directly and indirectly contributed to the accident. When collecting information to understand an incident or accident, consider all possible sources.

Photograph and Video

Photographs and video recording can help in the preparation of a report, as well as in analyzing conditions at the site of the incident. Take photographic evidence as soon as safely possible.

Following are some techniques useful in taking photographs at incident scenes:

- Photograph the overall area before moving to detail the precise incident site
- Take photos from different perspectives and angles—close-up and from a distance
- Use witnesses to help you decide what to shoot, and note their comments

- Record what photos you take in a log that includes details like when the shot was taken, by whom, where, what the shot contains, identifying number on a sketch of the area, and a brief description of what the photograph is trying to identify
- Keep the photos in a safe place along with notes, evidence, and sketches from the accident investigation
- Narrate video with details like those above

Sketch Scene

Sketches complement information in photos or video, indicating distances among elements of the accident scene. It is important to be as precise as possible when making sketches.

Following are some things to remember:

- Make sketches large and clear
- Include basic facts (date, time, location, identity of objects, victims, etc.)
- Define spatial relationships with identifiable points of reference and compass directions
- Include important measurements, and note key concepts
- Indicate what has been included in photographs
- Mark where people were standing

Eventually, a precise diagram can reflect the information in a sketch, but it is important to get as much information as possible immediately after the accident.

Interview Witnesses

Interviewing witnesses is the easiest way to gain an understanding of how the accident occurred, and the conditions that led to it. Witnesses include people who saw the incident, such as any injured people, and others whose behavior, actions and/or inactions— either intentionally or unintentionally—contributed to the incident. This can include supervisors and trainers, maintenance personnel, and anyone else tied to the investigation.

When interviewing, it is important to remember emotions can run high in the wake of an accident, especially a catastrophic one. The accident investigation is a cooperative effort to create a safer workplace by gathering and understanding information. Keep an open mind and listen with a calm, relaxed, unhurried demeanor.

- Use a voice recorder only with permission; if possible, offer a copy of the recorded conversation, or a transcription, to the interviewee
- Express to the individual that the information given is important, but put the person at ease. Explain the purpose of the interview and your role. Express sincere concern regarding the accident and your desire to prevent a similar occurrence
- Interview witnesses separately, and ensure witnesses can discuss the incident with you in relative privacy where possible. Don’t promise confidentiality though
- Take the witness to the scene if they are comfortable. If you can’t conduct a private interview at the location, find an office or meeting room that the interviewee considers a "neutral" location

- Allow witnesses to have a support person present, but ensure the support person is not directly linked to the incident and is not a witness. If there is a collective bargaining agreement, and a worker requests union representation, do not continue the interview until representation has been secured
- Direct an eyewitness to "explain what happened" in their own words. If you don't ask them to explain, you may be left with a simple "Yes" or No" response, which is not as helpful. Open-ended questions elicit much more information than closed-ended questions. "Why" questions can put an interviewee on guard. Look for facts and observations; ignore speculation
- Take notes casually, but with care. Allow the interviewee to review notes of the interview to ensure accuracy and help bring details to mind. Give the interviewee a copy of the notes you take to help reduce any thought that you're trying to conceal information
- Repeat the facts and sequence of events back to the person to avoid misunderstanding, and to establish the correct version of events
- Request interviewees to offer their own suggestions as to how the incident could have been avoided
- Conclude interviews by thanking interviewees for their contribution. Ask them to contact you if they think of anything else. If possible, tell witnesses personally of the outcome of the investigation before it becomes public knowledge

Consult Records

When searching for information, investigations will continue after evaluating the scene of the accident, collecting physical evidence and interviewing the people involved. Documents related to the incident can provide incredible insight into the causes of an accident; especially root causes.

Some examples of useful documents include:

- Technical data sheets
- Inspection reports
- Company policies
- Maintenance reports
- Past accident reports
- Job hazard analyses and safe-work procedures
- Training records and reports
- Work schedules
- Injury and illness logs
- Any other document that may shed light on the safety-related systems in place where the accident took place

Determining the causes of the accident based on available information may be difficult because events must be analyzed not only to identify direct causes for the accident, but also related root causes. "Surface" causes can be obvious. However, it may take a great deal of additional time to unearth weaknesses in management systems, or other root causes that contributed to the conditions and practices associated with the accident.

ORGANIZE AND ANALYZE THE FACTS

Develop Sequence of Events

When all of the evidence is collected, and all the interviews are complete, a timeline of the accident should emerge. Each event on the timeline describes an actor and an action. The actor effects change through action or inaction. Actors do not have to be personnel. Equipment or processes can affect the system to precipitate an accident.

When developing the sequence of events, do not hesitate to stretch the timeline further back as deeper causes begin to emerge. Accidents often result from long-term oversights and failures that have taken some time to have a negative impact.

If gaps in the timeline are apparent, they need to be filled in. If re-interviewing witnesses or investigating the evidence fails to fill the gaps, develop an “educated guess” supported by the rest of the timeline and available evidence.

The sequence of events must describe what happened in such a way that someone unfamiliar can understand what likely happened.

Determine the Causes

When the timeline is established, the next step is to determine the causes of the accident. The key question for an investigator to establish cause is “Why?” Why did an unsafe condition emerge in the workplace? Why did the worker end up exposed to the unsafe condition? Determining the root causes of an accident requires asking “Why?” over and again.

Implement Solutions

Although an accident investigation can be a reactive safety process, it typically ends in recommendations for effective control strategies and system improvements that will help prevent similar accidents in the future.

WRITE THE REPORT

An accident or incident investigation aims to create systemic change and ensure everyday safeguards remain in place to reduce risk and promote safety in the workplace. However, the information uncovered in the investigation, and recommendations that come from the investigation, need to be available to people with authority. A report that includes the pertinent information about the causes of an incident, as well as concrete recommendations, helps the investigation to positively affect the safety culture of Bannister Electric LLC of West Monroe.

Please see the “Accident/Incident Report” at the end of this chapter for an example template for an incident report.

Background: This section of the report covers the basic information about the accident: when and where the accident occurred, who was involved, etc.

Description: The description of the incident is a timeline of the incident, a step-by-step narrative of what occurred. The incident and the findings of the investigation will determine how far before and after the incident itself, the narrative should stretch. Include enough information to give a person who was not there a clear understanding of the accident. Be specific. Include a diagram of the event.

Findings: Report results of the root-cause analysis with complete thoughts, not short notes. Remember to describe both hazardous conditions and unsafe actions. Findings need to include direct and indirect surface causes. Findings must also clearly outline the root causes of the accident and frame recommendations. Remember, the point of the investigation is not to assign blame. Findings will describe unsafe actions of individuals, but any lack of hazard controls, or deficient safety systems, at the organizational level is what the report aims to remedy.

Recommendations: Recommendations can only be as effective as the findings on which they are based. In the report, recommendations need to be specific and help those in authority take the first steps to implement the recommendations. Include who will be responsible to implement the recommendations, a timeline, and estimated cost—if that can be determined.

Summary: Review the causes of the accident and the corrective steps that are recommended.

Review and Follow-up: This can be included as part of the recommendations. Necessary changes require a system of accountability. Suggesting a specific timeframe and identifying individuals with appropriate authority to enact recommendations will drive the needed changes. Incorporating accident follow-up and accountability is a useful way to build widespread accountability for the types of safety system changes workplace accidents often demand.

Attachments: Be sure to include with the report the notes from interviews, as well as photographs and any other pertinent information and evidence from the investigation.

REPORTING ACCIDENTS

Bannister Electric LLC of West Monroe will investigate all lost-time injuries. Any fatality, or the hospitalization of three or more employees, must be reported to OSHA within eight hours.

Effective January 1, 2015 any accidents resulting in hospitalization, amputation, and eye loss must be reported within 24 hours (amputations do not include avulsions, enucleations, deglovings, scalpings, severed ears, or broken/chipped teeth.)

Employees will report all accidents and near-miss incidents that result in personal injury, property damage, chemical spills or other emergencies to the assigned supervisor at the time of the event. In addition, emergency medical services, the fire department, and hazmat services will be immediately summoned as needed.

NOTE: Effective Jan. 1, 2017, OSHA will require certain employers to electronically submit injury and illness data that they are already required to record on their onsite Injury and Illness forms.

The new reporting requirements will be phased in over two years:

Establishments with 250 or more employees in industries covered by the recordkeeping regulation must submit information from their 2016 Form 300A by July 1, 2017. These same employers will be required to submit information from all 2017 forms (300A, 300 and 301) by July 1, 2018. Beginning in 2019 and every year thereafter, the information must be submitted by March 2.

Establishments with 20-249 employees in certain high-risk industries must submit information from their 2016 Form 300A by July 1, 2017, and their 2017 Form 300A by July 1, 2018. Beginning in 2019 and every year thereafter, the information must be submitted by March 2.

For a complete list of industries that fall into the “high risk” category, please refer to the compliance section of the following OSHA web location: osha.gov/recordkeeping/finalrule/index.html

OSHA's Form 300, 300A and 301

Unless a company is in a low-hazard industry (see list at right) or employs 10 or fewer individuals, all recordable injuries and illnesses must be recorded appropriately. See 1904.7 — Recordkeeping Forms and Recording Criteria.

If an employee with an occupational injury or illness receives a medical emergency procedure, Dolphus Bannister or designate will document the incident on OSHA’s Form 301 “Injury and Illness Incident Report” and record the injury or illness on OSHA’s Form 300 “Log of Work Related Injuries and Illnesses.” within seven (7) calendar days of receiving information that a recordable injury or illness has occurred.

Yearly, OSHA’s form 300A “Summary of Work-Related Injuries and Illnesses,” will be completed based on the information in form 300 and posted between February 1 and April 30 of the year following the year covered by the form.

FORMS AND ATTACHMENTS

Please find the documents listed below on the following pages:

- Accident/Incident Report
- Accident Investigation Training Documentation

These forms may be reproduced freely by Bannister Electric LLC of West Monroe for the purpose of implementing and maintaining a safety and health program.

OSHA reporting forms and work-related injury and illness logs are available at:

http://www.osha.gov/recordkeeping/new-osha300form1-1-04.pdf

ACCIDENT/INCIDENT REPORT FORM (PAGE 1 OF 3)

Date of Accident	Time	Day of Week	Shift	Department
		☐ S ☐ M ☐ T ☐ W ☐ T ☐ F ☐ S	☐ 1 ☐ 2 ☐ 3	

Injured Person

Name				Address	
Age		Phone			
Job Title		Supervisor Name			
Length of Employment at Company			Length of Employment at Job		
Employment Classification		☐ Full Time ☐ Part Time ☐ Contract ☐ Temporary			

Nature of Injury	☐ Bruising	☐ Dislocation	☐ Other (specify)	Injured Body Part
☐ Strain/Sprain	☐ Scratch/Abrasion	☐ Internal		
☐ Fracture	☐ Amputation	☐ Foreign Body	Remarks	
☐ Laceration/Cut	☐ Burn/Scald	☐ Chemical Reaction		

Treatment	Name and Address of Treating Physician or Facility
☐ First Aid	
☐ Emergency Room	
☐ Doctor's Office	
☐ Hospitalization	

Damaged Property

Property, Equipment, or Material Damaged	Describe Damage
Object or Substance Inflicting Damage	

ACCIDENT/INCIDENT REPORT FORM (PAGE 2 OF 3)

Incident Description	
Describe what happened (attach photographs or diagrams if necessary)	
Make sketches or illustrations to help describe incident	

ACCIDENT/INCIDENT REPORT FORM (PAGE 3 OF 3)

Root Cause Analysis (check all that apply)		
Unsafe Acts	Unsafe Conditions	Management Deficiencies
☐ Improper work technique ☐ Safety rule violation ☐ Improper PPE or PPE not used ☐ Operating without authority ☐ Failure to warn or secure ☐ Operating at improper speeds ☐ Bypassing safety devices ☐ Guards not used ☐ Improper loading or placement ☐ Improper lifting ☐ Servicing machinery in motion ☐ Horseplay ☐ Drug or alcohol use ☐ Unnecessary haste ☐ Unsafe act of others ☐ Other:	☐ Poor workstation design/layout ☐ Congested work area ☐ Hazardous substances ☐ Fire or explosion hazard ☐ Inadequate ventilation ☐ Improper material storage ☐ Improper tool or equipment ☐ Insufficient knowledge of job ☐ Slippery conditions ☐ Poor housekeeping ☐ Excessive noise ☐ Inadequate hazard guards ☐ Defective tools/equipment ☐ Insufficient lighting ☐ Inadequate fall protection ☐ Other:	☐ Lack of written policies and procedures ☐ Safety rules not enforced ☐ Hazards not identified ☐ PPE unavailable ☐ Insufficient worker training ☐ Insufficient supervisor training ☐ Improper maintenance ☐ Inadequate supervision ☐ Inadequate job planning ☐ Inadequate hiring practices ☐ Inadequate workplace inspection ☐ Inadequate equipment ☐ Unsafe design or construction ☐ Unrealistic scheduling ☐ Poor process design ☐ Other:

Accident/Incident Analysis	
Using the root-cause analysis list, explain the cause(s) of the incident in as much detail as possible. Attach a sheet if there is not enough room.	
How bad could the accident have been?	☐ Very Serious ☐ Serious ☐ Minor
What is the chance of the accident happening again?	☐ Frequent ☐ Occasional ☐ Rare

ACCIDENT/INCIDENT REPORT FORM

Recommendations and Follow Up			
Describe actions that will be taken to prevent recurrence (attach another sheet if necessary)	Deadline	By Whom	Complete

Summary

Investigation Team		
Name	Signature	Position

POLICY

Bannister Electric LLC of West Monroe is committed to the safety and health of our employees and to ensuring prompt medical attention for any injury that occurs at work.

Part of that commitment includes having readily available medical personnel. Where there is no medical facility close to the worksite, Dolphus Bannister and other personnel as needed will be trained to provide first aid. First-aid kits are located at: Company Vehicles and Shop Office

Bannister Electric LLC of West Monroe will provide, at no cost, medical services for employee evaluations, employment requirements and special conditions of work.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Bannister Electric LLC of West Monroe to:

- Verify that all employees receive training that explains the first-aid response plan
- Determine who must be trained to render first aid and ensure every employee expected to render first aid will be trained in appropriate practices and techniques, including response to site-specific hazards
- Check that the first-aid response plan, amount of first-aid-trained personnel, first-aid equipment and all other hazard controls protect against the workplace hazards as determined in job hazard analyses and worksite inspections
- Check that first-aid kits remain fully stocked and any emergency response equipment is in good repair
- Respond to recommendations and concerns from Bannister Electric LLC of West Monroe employees

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Follow the first-aid policy and the first-aid response plan
- Understand the hazards presented by “Good Samaritan” first aid response

TRAINING

Bannister Electric LLC of West Monroe will ensure every employee receives training that covers the Bannister Electric LLC of West Monroe first-aid response plan. All personnel expected to render first aid will be certified by an approved first-aid training organization. All training for workplace safety will be provided at no cost to the employee during working hours.

Bannister Electric LLC of West Monroe will provide training:

- At the time of assignment to tasks where occupational exposure may take place.
- At least annually thereafter, annual training will be provided within one year of previous training.

Bannister Electric LLC of West Monroe will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The training program for medical services and first aid will contain at a minimum the following elements:

- Location and contents of workplace first-aid kits
- “Good Samaritan” hazards and bloodborne pathogens
- Self-care and incident reporting

The person conducting the training will be knowledgeable in the subject matter of the training program as it relates to the workplace.

Any Bannister Electric LLC of West Monroe employee who is expected to render first aid as part of his or her job duties, will receive additional training from an external organization (e.g. American Heart Association, American Red Cross, and the National Safety Council) including, but not limited to:

- Recommended first-aid practices, especially those that may be necessary for hazards specific to the Bannister Electric LLC of West Monroe workplace
- Bloodborne pathogen exposure control
- Cardiopulmonary resuscitation incorporating use of automated external defibrillators (if present at worksite)

If a third-party first aid training provider is unable to provide first aid training specific to hazards at Bannister Electric LLC of West Monroe, first aid responders require supplementary training over the appropriate response to injuries that may result from worksite-specific hazards.

Potential First Aid Training Elements

OSHA suggests a number of elements to include when planning first-aid training programs.

Teaching Methods

Training programs will incorporate the following principles:

- Basing the curriculum on a consensus of scientific evidence where available
- Having trainees develop “hands-on” skills through the use of mannequins and partner practice
- Having appropriate first-aid supplies and equipment available
- Exposing trainees to acute injury and illness settings as well as to the appropriate response through the use of visual aids
- Including a course information resource for reference both during and after training
- Allowing enough time for emphasis on commonly occurring situations
- Emphasizing skills training and confidence-building over classroom lectures
- Emphasizing quick response to first-aid situations

First Aid Training Elements

The training program will include instruction in repositioning ill/injured victims to prevent further injury.

Preparing to Respond to a Health Emergency

The training program will include instruction or discussion in the following:

- Prevention as a strategy in reducing fatalities, illnesses and injuries
- Interacting with the local EMS system
- Maintaining a current list of emergency telephone numbers (police, fire, ambulance, poison control) accessible to all employees
- Understanding the legal aspects of providing first-aid care, including Good Samaritan legislation, consent, abandonment, negligence, assault and battery, State laws and regulations
- Understanding the effects of stress, fear of infection, panic; how they interfere with performance; and what to do to overcome these barriers to action
- The importance of universal precautions and body substance isolation to provide protection from bloodborne pathogens and other potentially infectious materials
- Learning about personal protective equipment — gloves, eye protection, masks, and respiratory barrier devices
- Appropriate management and disposal of blood-contaminated sharps and surfaces; and awareness of OSHA's Bloodborne Pathogens standard 29 CFR 1910.1030

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Bannister Electric LLC of West Monroe will maintain employee-training records for the length of their employment.

First aid training courses provided to Bannister Electric LLC of West Monroe employees will include instruction in general and workplace hazard-specific knowledge and skills.

First-aid trained employees will repeat training periodically to maintain and update knowledge and skills.

First Aid Response Planning

Dolphus Bannister, working with management, will determine a first-aid response plan appropriate to the worksite.

The first-aid response plan can be incorporated into the emergency action plan and will:

- Fit the work location, type of work and environmental conditions
- Identify the police, fire and emergency medical services available, and determine their estimated response times to the worksite
- Verify they are trained to handle the types of emergencies that can be expected
- Verify that their contact numbers are posted at the work site
- Describe the type of first-aid training employees receive, if applicable
- Identify the location(s) of first-aid supplies and/or first-aid station
- Identify the contents of first-aid kits
- Describe how first-aid supplies, kits and equipment will be inspected and maintained
- List all first-aid trained employees

Sharing First Aid Response Plan Information

First-aid policies and procedures are most effective when they are in writing. Whether in writing or not, the first-aid response plan needs to be communicated in such a way that every worker, can understand and follow the plan.

IMPLEMENTATION

Hazard Assessment

A job hazard analysis (see chapter on “Job Hazard Analysis”) will define the extent and nature of first-aid training for a given job and determine the first-aid supplies that need to be available.

First Aid Kits

First-aid supplies will remain available in adequate quantities and be readily accessible at Company Vehicles and Shop Office.

Dolphus Bannister or a designated person will determine the types and quantities of kits and additional first-aid equipment and supplies required at the work site to accommodate larger operations or multiple operations.

Responding to Medical Emergencies

A wide variety of medical emergencies can occur in the workplace; however, they can be divided into two categories, life threatening and non-life threatening. It’s important for Bannister Electric LLC of West Monroe first aid providers to be trained to deal with situations as they arise, and to be able to recognize the severity of the emergency. Medical emergencies can include, but are not limited to:

- Chest pain
- Impalements
- Electrocution
- Breathing problems
- Hypoglycemia in diabetics taking insulin
- Pregnancy complications
- Reduced level of consciousness
- Stroke
- Crushing
- Severe bleeding
- Anaphylactic reaction
- Seizures
- Abdominal injury

Assessing the Scene and the Victim(s)

The top priorities of first aid providers when responding to a medical emergency are”

- Assessing the scene for safety, number of injured, and nature of the event
- Assessing the toxic potential of the environment and the need for respiratory protection
- Establishing the presence of a confined space and the need for respiratory protection and specialized training to perform a rescue
- Prioritizing care when there are several injured
- Assessing each victim for responsiveness, airway patency (blockage), breathing, circulation, and medical alert tags
- Taking a victim’s history at the scene, including determining the mechanism of injury
- Performing a logical head-to-toe check for injuries
- Continuous monitoring of the victim
- Early activation of EMS
- Safely moving and rescuing victims

RESPONDING TO LIFE-THREATENING EMERGENCIES

First aid training will be designed for the specific worksite and include first-aid instruction for the management of the following:

Breathing Problems

The training program will be designed or adapted for the specific worksite and may include first-aid instruction in the following:

- Establishing responsiveness
- Establishing and maintaining an open and clear airway
- Performing rescue breathing
- Treating airway obstruction in a conscious victim
- Recognizing asphyxiation and the danger of entering a confined space without appropriate respiratory protection

Additional training is required if first-aid personnel will assist in the rescue from the confined space.

Poisoning

- Ingested poisons: alkali, acid, and systemic poisons. Role of the Poison Control Center (1-800-222-1222)
- Inhaled poisons: carbon monoxide; hydrogen sulfide; smoke; and other chemical fumes, vapors, and gases. Assessing the toxic potential of the environment and the need for respirators
- Knowledge of the chemicals at the worksite and of first aid and treatment for inhalation or ingestion
- Effects of alcohol and illicit drugs so that the first-aid provider can recognize the physiologic and behavioral effects of these substances

Physical Injuries

Bannister Electric LLC of West Monroe first aid providers will be able to:

- Recognize the signs and symptoms of shock and provide first aid for shock due to illness or injury
- Assess and treat a victim who has an unexplained change in level of consciousness or sudden illness
- Control bleeding with direct pressure

Sudden Cardiac Arrest

Cardiopulmonary Resuscitation

OSHA standards require training in cardiopulmonary resuscitation (CPR) in some employment situations where sudden cardiac arrest from asphyxiation, electrocution or exertion may occur: permit-required confined spaces; logging operations; electric power generation, transmission, and distribution; dive teams; and power transmission and distribution construction. However, sudden cardiac arrest is a potential risk at all worksites and those trained in first aid benefit greatly from learning CPR regardless of work hazards.

Automated External Defibrillators

Bannister Electric LLC of West Monroe will determine the need for an automated external defibrillator (AED) program as part of the first-aid response plan. Training will reflect whether an AED is included.

If an AED is available at the worksite, CPR training will incorporate AED training.

Corrosive Materials, Strong Irritants or Toxic Chemicals

If a job hazard analysis determines hazards from corrosive materials, strong irritants or toxic chemicals, the Bannister Electric LLC of West Monroe first-aid plan will include appropriate hazard controls. These controls include eye irrigation equipment, eyewash stations and emergency showers.

Even worksites without high-risk levels from corrosives, irritants and toxic chemicals may find eye-irrigation equipment and eyewash equipment appropriate to address workplace hazards. Be aware that some state requirements and specific chemical safety procedures require such equipment on worksites. Where such requirements exist, Bannister Electric LLC of West Monroe will adhere to applicable workplace safety and health regulations, and industry best practices.

At construction jobsites, employers must provide a sanitary washing facility for every 20 employees. At jobsites where employees work with paint, coatings, or any substance that may be harmful, the facilities must include suitable cleaning agents/towels for the removal of hazardous and other substances.

Bloodborne Pathogens

If an employee is designated to render first aid as part of his or her job duties, or if they may otherwise be exposed to the hazard of bloodborne pathogens, the employee must meet the requirements of 29 CFR 1910.1030, Bloodborne Pathogens, and must be trained accordingly. Additional requirements may also apply. Please see the chapter on “Bloodborne Pathogens” for more information.

Employees who have not received first-aid training need to understand the hazards presented by delivering first aid to a coworker. While Bannister Electric LLC of West Monroe discourages the administration of first aid by any employee who has not been trained in first aid, “Good Samaritan” first-aid delivery is a possibility if necessary.

RESPONDING TO NON-LIFE-THREATENING EMERGENCIES

First aid training will be designed for the specific worksite and include first-aid instruction for the management of the following:

Wounds

- Assessment and first aid for wounds including abrasions, cuts, lacerations, punctures, avulsions, amputations and crush injuries
- Principles of wound care, including infection precautions
- Principles of body substance isolation, universal precautions and use of personal protective equipment

Burns

- Assessing the severity of a burn
- Recognizing whether a burn is thermal, electrical, or chemical and the appropriate first aid
- Reviewing corrosive chemicals at a specific worksite, along with appropriate first aid

Temperature Extremes

- Exposure to cold, including frostbite and hypothermia
- Exposure to heat, including heat cramps, heat exhaustion and heat stroke

Musculoskeletal Injuries

- Fractures
- Sprains, strains, contusions and cramps
- Head, neck, back and spinal injuries
- Appropriate handling of amputated body parts

Eye Injuries

- First aid for eye injuries
- First aid for chemical burns

Mouth and Teeth Injuries

- Oral injuries; lip and tongue injuries; broken and missing teeth
- The importance of preventing aspiration of blood and/or teeth

Bites and Stings

- Human and animal bites
- Bites and stings from insects; instruction in first-aid treatment of anaphylactic shock

RECORD KEEPING

All safety and health incidents and near misses will be documented and investigated according to the policy on “Accident Investigation.” This includes prompt notification to OSHA of fatalities and may include other reporting requirements.

PROGRAM REVIEW

Dolphus Bannister will review the first-aid response plan and all elements at least annually to ensure all elements sufficiently address the safety needs of Bannister Electric LLC of West Monroe and its employees. Recommended first-aid techniques and knowledge change over time, and Bannister Electric LLC of West Monroe policy will reflect those changes.

FORMS AND ATTACHMENTS

On the following page, please find a First-Aid Response Plan form that you can use to create your companies plan

FIRST AID RESPONSE PLAN FORM (PAGE 1 OF 2)

Company		Date	
This plan was written for (site or location this plan covers)			
The following person/position is responsible for managing our first-aid response plan			
The emergency medical service to be called			
Summon the emergency medical service by doing the following (in most cases, it will be to call 911 or some other phone number, but a direct alarm or some other method may be the preferred way)			
Emergency phone numbers are posted at the following location(s)			
Other means to summon aid are at the following location			
When employees need first aid they must do the following			
Employees on site who are first-aid trained			

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FIRST AID RESPONSE PLAN FORM (PAGE 2 OF 2)

First-aid kits (or a first aid station) are located at	
The following person/position is responsible for inspecting the first-aid kits	
The Company's Designated Medical Provider is	

Person Preparing Plan	Signature	Date
Supervisor's Name	Signature	Date

POLICY

Bannister Electric LLC of West Monroe is committed to the safety and health of our employees and to preventing the spread of bloodborne pathogens. Therefore, Bannister Electric LLC of West Monroe adheres to the following bloodborne pathogen policy and Exposure Control Plan (ECP).

Bloodborne pathogens are diseases caused by microorganisms that live in the bloodstream and are spread through blood and other body fluids. Bloodborne pathogens include the human immunodeficiency virus (HIV), hepatitis B virus (HBV) and hepatitis C virus (HCV). HIV compromises the body's immune functions and can lead to acquired immunodeficiency syndrome. While the virus does not live out of the body for long, it can enter the bloodstream through cuts, abrasions, small tears in mucous membranes, etc. Hepatitis affects the health of the liver.

Bloodborne pathogens can be transmitted through any bodily fluid, and employees must take care when they are near, or are exposed to, possible contaminants, in order to prevent the spread of bloodborne infections.

If employees, such as those designated as responsible for first aid and medical assistance, or those doing work in certain medical or sanitation facilities, are exposed to bloodborne pathogens, will use universal precautions that requires them to treat all human blood and certain human body fluids as if they were known to be infectious. This includes the use of appropriate gloves, mask and/or gowns.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Bannister Electric LLC of West Monroe to:

- Enact and enforce an exposure control plan to prevent occupational exposure to potentially infectious materials
- Identify employees who may reasonably be anticipated to come into contact with blood and other potentially infectious materials
- Provide for post-exposure evaluation and follow-up if an employee is exposed to potentially infectious materials
- Verify employees receive appropriate bloodborne pathogens training
- Check that there's an adequate supply of Personal Protective Equipment

EMPLOYEE RESPONSIBILITIES

Every employee is expected to:

- Offer input on ECP as appropriate, including identification, evaluation, and selection of new control methods
- Follow all elements of the bloodborne pathogens policy and training
- Notify a supervisor if they encounter any problems or concerns related to this policy

TRAINING

Bannister Electric LLC of West Monroe will ensure every employee who may reasonably anticipate coming into occupational exposure to potentially infectious materials, participate in a bloodborne pathogen training program. This training will be provided at no cost to the employee during working hours.

Training will be provided:

- At the time of assignment to/prior to working on tasks where occupational exposure may take place
- At least annually thereafter

Bannister Electric LLC of West Monroe will provide additional training when tasks or procedures are added or changed that affect the employee's occupational exposure. It is acceptable for additional training to be limited to addressing only the changes or additions to the employees' exposure.

The Company will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The training program will contain, at a minimum, the following elements:

- A general explanation of bloodborne diseases
- An explanation of the modes of transmission of bloodborne pathogens
- An explanation of the methods for recognizing tasks and other activities that could cause exposure to blood and other potentially infectious materials
- An explanation of methods to prevent or reduce exposure, including engineering controls, work practices, and personal protective equipment
- Information on the types, proper use, location, handling, decontamination and disposal of PPE
- Information on the hepatitis B vaccine, the benefits of being vaccinated and that the vaccine and vaccination will be offered free of charge to employees who face occupational exposure
- Information on the actions to take and persons to contact in an emergency involving blood or other potentially infectious materials
- An explanation of the procedures to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available
- Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident
- An explanation of the applicable signs, labels, and/or color coding

The training will be conducted by a person knowledgeable in the subject matter.

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

PROCEDURES

Exposure Determination

It is crucial to determine what jobs expose an employee to blood and other potentially infectious material, as well as how that exposure might occur. Accordingly, management will determine which job classifications can reasonably expect occupational exposure to potentially infectious material.

The following will be determined and documented:

- Job classifications in which all employees have occupational exposure
- Job classifications in which some employees have occupational exposure
- Tasks and procedures in which occupational exposure occurs

Further, input from non-managerial employees exposed to contaminated sharps and infectious material is vital to the success of this exposure control plan, and every employee is encouraged to offer suggestions that will help the effectiveness of the exposure control plan.

Methods of Compliance

Employees will take universal precautions to prevent contact with potentially infectious material. If an employee can't easily determine the nature of a body fluid, he or she must treat it as infectious.

Engineering and Work Practice Controls

As part of this exposure control plan, Bannister Electric LLC of West Monroe will seek methods by which to eliminate occupational exposure to the greatest extent possible. This plan encourages work task changes to reduce exposure, as well as for isolating or removing materials that might pose a hazard. The exposure control plan requires the Company to examine regularly, and maintain or replace, engineering controls to ensure their effectiveness.

Handwashing

- Bannister Electric LLC of West Monroe will provide readily accessible handwashing facilities to every employee. If providing handwashing facilities is not feasible, the Company will provide antiseptic towelettes or an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels.
- For construction projects, employers must provide onsite general washing facilities (one per 20 employees), keep them in sanitary condition and provide suitable cleaning agents/towels for the removal of hazardous and other substances.
- In addition to basic workplace hygiene requirements, employees will wash their hands as soon as possible after removing gloves or other PPE.
- If an employee's skin or mucous membrane were exposed to potentially infectious materials, the employee will immediately wash their skin with soap and water or flush their mucous membranes with water.

Sharps

- Employees will handle and dispose of contaminated sharps in a way that prevents unnecessary exposure to hazards. Employees will not bend, recap or remove contaminated sharps unless no alternative is feasible and the employee can accomplish any bending, recapping or needle removal using a mechanical device or one-handed technique.
- As soon as possible after use, contaminated reusable sharps will be placed in a container that is puncture resistant, labeled or color-coded appropriately, leak-proof on the sides and bottom, constructed in a manner that does not require employees to reach into it to use it.

Other Engineering and Work-Practice Controls

- Employees may not eat, drink, smoke, apply cosmetics or handle contact lenses where occupational exposure may occur.
- No food or drink is to be stored where potentially infectious materials are present.
- Employees may not use their mouths to pipette or suction potentially infectious materials.
- Containers used to store or transport potentially infectious materials must be closable, prevent leaks and be appropriately labeled or color-coded. They should also be puncture resistant, if necessary.
- Employees will examine any equipment that may be contaminated before servicing or shipping, and will decontaminate it as necessary and feasible. If decontamination is impossible, the employee will attach a label to the equipment, and inform all appropriate personnel of the contamination to ensure they take proper precautions.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

- Where the possibility of occupational exposure exists, Bannister Electric LLC of West Monroe will provide personal protective equipment appropriate to the hazards and the work being performed. Appropriate personal protective equipment is impermeable to blood or other potentially infectious material under normal conditions and durations of use
- PPE will be provided free to employees and available in appropriate sizes, and provisions will be made for employees who are allergic to gloves normally provided
- An employee may decline using appropriate PPE under “rare and extraordinary circumstances” when PPE use might prevent the delivery of health care or public safety services. These exceptions will be investigated and documented to prevent future occurrences
- PPE will be removed as soon as feasible before leaving the general work area. After removal, the employee will place contaminated PPE in an appropriate area or container to be stored, washed, decontaminated or disposed of

Gloves

Employees must wear gloves if they anticipate hand contact with potentially infectious materials. Do not reuse single-use gloves, and replace as quickly as possible if torn, punctured or otherwise compromised.

Masks, Eye Protection, and Face Shields

Employees will wear masks, together with proper eye-protection devices whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose or mouth contamination can be reasonably anticipated.

Gowns, Aprons, etc.

Employees will wear appropriate protective clothing like gowns or clinic jackets when appropriate; the type of protective clothing is determined by the nature of exposure, and will be sufficient to protect against occupational exposure.

HOUSEKEEPING

- Employees will keep the workplace clean and sanitary. Bannister Electric LLC of West Monroe will implement a written schedule for cleaning and decontamination based on the demands of the site
- Employees will use an appropriate disinfectant to clean and decontaminate contaminated or potentially contaminated work surfaces after any spill of infectious materials, and at the end of the work shift. Bannister Electric LLC of West Monroe will replace protective surface coverings as soon as possible if they are contaminated. Bins, cans, pails or other receptacles that may become contaminated must be inspected and decontaminated regularly, in addition to being decontaminated as soon as feasible after visible contamination. Employees must not pick up, by hand, any broken glassware that may be contaminated. Use a brush/dustpan or tongs

LAUNDRY

Employees will handle any contaminated laundry as little as possible. They must put such laundry into a color-coded or labeled container at the site where it was used. Place wet laundry in a leak-proof container. Employees handling contaminated laundry must use appropriate PPE. Employees must never take or wear contaminated clothing outside of the work site.

HEPATITIS B VACCINATION

Bannister Electric LLC of West Monroe will make available the hepatitis B vaccination series at no cost to any employee who faces occupational exposure. If not vaccinated, employees will be informed of the opportunity to be vaccinated within 24 hours of an exposure incident.

An employee occupationally exposed to potentially infectious material may decline the hepatitis B vaccine, but must sign a declination statement to be kept on file. Anyone who declines vaccination may request and receive the vaccination later at no cost.

Medical records relating to employees' hepatitis B vaccination status and post-exposure evaluation and follow-up must be kept for 30 years plus the duration of employment.

If an exposure incident occurs, the employee must contact Dolphus Bannister (or designate), immediately.

In Case of Exposure

A licensed health care professional will conduct a confidential medical evaluation and follow-up, and will provide a medical opinion on diagnosis/course of action, as soon as possible following an exposure incident. After administering initial first aid (cleaning the wound, flushing the eyes or other mucous membranes, etc.), follow the procedure below:

1. Document the routes of exposure and how the exposure occurred.

2. Identify and document the source individual (unless the employer can establish that identification is infeasible or prohibited by state or local law).

3. Obtain consent, and arrange to have the source individual tested as soon as possible, to determine HIV, HCV and HBV infectivity, document and notify the employee's health care provider of the source individual's test results. If the source individual is known to be HIV, HCV and/or HBV positive, new testing is not necessary.

4. Provide the exposed employee with the source individual's test results and with information about applicable disclosure laws and regulations concerning the identity and infectious status of the source individual (e.g., laws protecting confidentiality).

5. After obtaining consent, collect the exposed employee's blood as soon as feasible after an exposure incident, and test the blood for HBV and HIV serological status. This will establish a baseline for periodic testing over the next six months. Depending upon the circumstances of the exposure, post-exposure prophylaxis may be recommended to reduce the risk of infection from HIV or HBV.

6. If the employee does not give consent for HIV serological testing during collection of blood for baseline testing, preserve the baseline blood sample for at least 90 days; if the exposed employee elects to have the baseline sample tested during this waiting period, perform testing as soon as feasible.

Administrative Responsibilities Following Exposure

The Company will ensure that the health care professional responsible for post-exposure evaluation and follow-up receives the following:

- A copy of OSHA's bloodborne pathogens standard
- A description of the employee's job duties relevant to the exposure incident
- Route(s) of exposure
- Circumstances of exposure
- Results of the source individual's blood test if possible
- Relevant employee medical records, including vaccination status
- The Company will provide the employee with a copy of the evaluating healthcare professional's written opinion within 15 days of the completion of the evaluation

Counseling

The Company will make post-exposure counseling available to employees following an exposure incident. Counseling should include Centers for Disease Control and Prevention (CDC) recommendations for prevention and transmission of bloodborne infections including HIV, HBV and HCV. Counseling must be made available regardless of the employee's decision to accept serological testing.

RECORDKEEPING

Medical Records

The Company will maintain a confidential medical record for every employee with occupational exposure that will include at least the following:

Figure 1

- Name and social security number of the employee
- Copy of the employee's HBV status (with dates of all Hep B vaccinations)
- Copy of all post-exposure documentation and healthcare professional's written opinion
- Copy of the information provided to the healthcare professional

Do not share or report this record unless the employee provides written consent

Sharps Injury/Exposure Incident Log

A Sharps Injury Log is a record of each exposure incident involving a sharp. The purpose of the Sharps Injury Log is to generate a record of exposure incidents that will include enough information about the cause of the incidents to allow the company to analyze them and take preventive action.

The Sharps Injury Log must include:

- The date and time of the sharps-related exposure incident
- The type and brand of the sharp involved in the incident
- A description of the incident including:
  - The job classification of the exposed employee
  - The department or work area where the incident occurred
  - The procedure being performed
  - How the incident occurred
  - The body part injured
  - For sharps with engineered sharps injury protection (ESIP), if the safety mechanism was activated
  - If the incident occurred before action, during activation or after activation of the mechanism. For sharps without ESIP, the employee's opinion if ESIP could have prevented the injury

Sharps injuries/exposures must be recorded on the log within 14 working days of when the incident was reported to the employer. The Sharps Injury Log must be maintained for five years from the date of the occurrence of the exposure incident.

HAZARD COMMUNICATION

Label containers of regulated biological waste, any container used to store or transport potentially infectious material, as well as contaminated equipment, to prevent exposure. Labels for such containers will include the legend depicted in Figure 1.

All such labels will be fluorescent orange or orange-red and be attached on, or as close as feasible to, the container.

REVIEW AND UPDATE OF EXPOSURE CONTROL PLAN (ECP)

Management will review this ECP and update it at least annually, and whenever necessary, to reflect new or changed tasks and procedures that affect occupational exposure.

Reviews and updates will:

- Reflect changes in technology that eliminate or reduce exposure to bloodborne pathogens
- Document the annual consideration and implementation of effective medical, and commercially available, devices and services designed to eliminate or minimize occupational exposure

The Company will seek the input of non-managerial employees to identify, evaluate and select controls to reduce occupational exposure. This input will be documented as part of this ECP.

FORMS AND ATTACHMENTS

Please find the following documents on the pages below:

- Exposure Control Plan Documentation
- Declination Statement
- Exposure Incident Report
- Evaluating Physician’s Written Opinion
- Sharps Injury Log

These forms may be reproduced freely for the purposes of implementing and maintaining a safety and health program.

EXPOSURE CONTROL PLAN DOCUMENTATION FORM

Exposure Determination	
Jobs in which all employees have occupational exposure to potentially infectious materials	Task or procedure where exposure occurs
Jobs in which some employees have occupational exposure to potentially infectious materials	Task or procedure where exposure occurs
Engineering Controls and Work Practice Controls	
The following types of PPE are available in the following locations	
Personal Protective Equipment	Location

HEPATITIS B DECLINATION STATEMENT FORM

DECLINATION STATEMENT			
I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.			
Employee Signature		Date	

DECLINATION STATEMENT			
I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.			
Employee Signature		Date	

DECLINATION STATEMENT			
I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring Hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with Hepatitis B vaccine, at no charge to myself. However, I decline Hepatitis vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring Hepatitis B, a serious disease. If in the future, I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with Hepatitis B vaccine, I can receive the vaccination series at no charge to me.			
Employee Signature		Date	

EXPOSURE INCIDENT REPORT FORM (PAGE 1 OF 2)

(Routes and Circumstances of Exposure Incident) – Please Print					
Employee's Name				Date	
Date of Birth			SS#		
Telephone	Business		Home		
Job Title					
Date of Exposure		Time of Exposure		☐ AM ☐ PM	
Hepatitis B Vaccination Status					
Location of Incident					
Describe job duties you were performing when the exposure incident occurred					
Describe the circumstances under which the exposure incident occurred (What happened that resulted in the incident?)					
What body fluid(s) were you exposed to?					

EXPOSURE INCIDENT REPORT FORM (PAGE 2 OF 2)

What was the route of exposure? (e.g., mucosal contact, contact with non-intact skin, percutaneous)			
Describe any personal protective equipment in use at time of exposure incident			
Did PPE fail?	☐ Yes ☐ No	If yes, how?	
Identification of source individual(s) (names)			
Other pertinent information			

EVALUATING PHYSICIAN'S WRITTEN OPINION FORM

To the Evaluating Physician:

This employee may have suffered an exposure incident to a Bloodborne Pathogen. In accordance with OSHA standards, covering post-exposure evaluation and follow up, the following documents are provided for you:

- A copy of OSHA regulations covering Occupational Exposure to Bloodborne Pathogens
- A description of the exposed employee's duties as they relate to the exposure incident
- Documentation of the routes of exposure and circumstances under which exposure occurred
- Results of the source individual's blood testing, if available
- All medical records relevant to this employee's appropriate treatment, including vaccination status

---

After you have determined whether there are contra-indications to vaccination of this employee with Hepatitis B vaccine, please state in the space below if:

Vaccine was indicated	Vaccine was received	
(All other findings are to remain confidential and are not to be included on this page)		
Please return this sheet to this employee		
Thank you for your evaluation of this employee.		
Physician's name (printed)	Physician's signature	Date

SHARPS INJURY LOG

Facility/Location					Year	
Address						
City			State		ZIP	
Date	Time	Type, Brand, Model of Sharp Device	Department / Work Area	Description of How Incident Occurred		

(Retain at least 5 years)

POLICY

Bannister Electric LLC of West Monroe encourages a safe and healthy work environment. Verbal or physical intimidation, harassment, threats of violence or any violent acts are expressly forbidden. A person who makes threats of violence, exhibits threatening behavior, or engages in violent acts on Bannister Electric LLC of West Monroe property will be removed from the premises as quickly as safety permits and will be kept off premises pending the outcome of an investigation.

Bannister Electric LLC of West Monroe is committed to preventing acts of violence and intimidation. Bannister Electric LLC of West Monroe has adopted a system of controls to prevent workplace violence, mitigate the harm caused by it and otherwise address violence and harassment in the workplace.

Paula Goodwin is responsible for implementing and enforcing this policy and will do so with the assistance of management and all employees.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Bannister Electric LLC of West Monroe to:

- Ensure managers remain committed to preventing aggression and violence
- Document plan to control aggressive or violent behavior in the workplace
- Evaluate reports of workplace violence at least yearly to determine necessary changes to violence prevention policy
- Ensure job hazard analyses include workplace violence hazards
- Exhibit commitment to the safety and health of workers and customers
- Ensure employees understand and fulfill obligations under the violence prevention program
- Establish a program to address medical and psychological repercussions of workplace violence
- Enforce prohibition on sexual harassment

EMPLOYEE RESPONSIBILITIES

Bannister Electric LLC of West Monroe employees are expected to:

- Contribute to developing procedures to address concerns over safety and security
- Understand and comply with the workplace violence prevention program, and safety and security measures
- Report violent incidents promptly and accurately
- Refrain from hostile and violent acts
- Participate in safety and health committees or teams that receive reports of violent incidents or security problems, make facility inspections and respond with recommendations for corrective strategies
- Participate actively in training programs and share on-the-job experiences that cover techniques to recognize escalating agitation, aggressive behavior or criminal intent

TRAINING

Bannister Electric LLC of West Monroe will provide training to employees regarding their roles in workplace violence prevention. This training will come at no cost to the employee during working hours.

Bannister Electric LLC of West Monroe will use only training material that is appropriate in content and vocabulary to the educational level, literacy and language of employees.

Training Components

Paula Goodwin will ensure that every employee is trained in the following elements:

- The workplace violence prevention policy
- Risk factors that cause or contribute to assaults
- Early recognition of escalating behavior or recognition of warning signs or situations that may lead to assaults
- Ways to prevent or diffuse volatile situations, manage anger and appropriately
- A standard response action plan for violent situations, including the availability of assistance, response to alarm systems and communication procedures
- Ways to deal with hostile people in the workplace
- Relaxation, stress management and anger control
- Basic self-protection measures
- The location and operation of safety devices such as alarm systems, along with the required maintenance schedules and procedures
- Ways to protect oneself and coworkers, including use of the “buddy system”
- Policies and procedures for reporting and recordkeeping
- Information on multicultural diversity to increase staff sensitivity to racial and ethnic issues and differences
- Policies and procedures for obtaining medical care, counseling, workers’ compensation or legal assistance after a violent episode or injury
- The sexual harassment policy

Managers and Supervisors at Bannister Electric LLC of West Monroe will be trained in:

- The Company’s Workplace Violence Prevention Program
- Communication skills
- Recognition of aggressive behavior
- Dealing with employee layoffs, job terminations, and discipline; how to assess violence potential of individuals; and take appropriate measures
- Violence prevention, Bannister Electric LLC of West Monroe security and response procedures
- Addressing problems and conflict promptly

Any employee engaged in a task that faces a high risk of workplace violence (e.g. working alone, especially late at night) will be trained for workplace safety practices specific to the worksite that reduce the risk of workplace violence.

Where Bannister Electric LLC of West Monroe operations require security personnel, such personnel will receive training specific to the worksite, including the psychological components of handling aggressive and abusive customers, types of disorders and ways to handle aggression and defuse hostile situations.

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

PROCEDURES

Workplace Violence

Workplace violence includes violence or the threat of violence against workers. It can occur at or outside the workplace and can range from threats and verbal abuse to physical assaults and homicide. For this policy, workplace violence also includes aggressive behavior, workplace harassment, bullying and intimidation.

Bannister Electric LLC of West Monroe permits no workplace violence. No negative action will be taken against an employee for reporting any hazardous situation, and appropriate confidentiality considerations will be taken in every instance of such a report.

High-Risk Occupations

Workplace violence is a hazard at any worksite for every worker. Some workers, however, are at significantly increased risk, including workers who:

- Exchange money with the public
- Deliver passengers, goods, or services
- Work alone or in small groups, during late night or early morning hours, in high-crime areas, or in community settings and homes with extensive contact with the public

Any Bannister Electric LLC of West Monroe employee, who faces an increased risk of workplace violence, will be informed of the increased risk, and trained in appropriate practices based on a job hazard analysis of the job. Please see “Workplace Risk Factors” later in this chapter.

Types of Workplace Violence

Type I Criminal Intent: The perpetrator has no legitimate relationship to the business or its employees and may be committing a crime in conjunction with the violence. These crimes can include robbery, shoplifting, trespassing and terrorism.

Type II Customer Client: The perpetrator has a legitimate relationship with the business and becomes violent while being served by the business. This category includes customers, clients, patients, students, inmates, and any other group for which the business provides services.

Type III Worker on Worker: The perpetrator is an employee or past employee of the business who attacks or threatens another employee(s) or past employee(s) in the workplace.

Type IV Personal Relationship: The perpetrator usually does not have a relationship with the business but has a personal relationship with the intended victim. This category includes victims of domestic violence assaulted or threatened while at work.

Horseplay

Horseplay includes playing tricks on coworkers; distracting coworkers; wrestling; showing off; playing punching, kicking, or slapping games; and otherwise drawing focus away from the task to engage in a playful way that disregards safety precautions. Horseplay creates unnecessary hazards in the workplace and presents needless distractions. While horseplay is not necessarily violent, it can have a harmful impact on the safety of Bannister Electric LLC of West Monroe employees, and is therefore forbidden and will be treated as a workplace violence issue for the sake of this company's safety and health program.

PROGRAM PLANNING

As with any element of the Bannister Electric LLC of West Monroe safety and health program, workplace violence prevention requires site-specific and job-specific planning.

Paula Goodwin will work with management and appropriate employees to evaluate the ability of Bannister Electric LLC of West Monroe to prevent workplace violence and handle incidents involving violence to enforce effective protections from workplace violence.

Plans to prevent workplace violence will be evaluated regularly, and when changes are made that affect the risk of workplace violence and when a workplace incident involving violence occurs.

Job Hazard Analyses

Workplace violence risks will be considered in every job hazard analysis performed at Bannister Electric LLC of West Monroe. If a job or task presents hazards, steps will be taken to control those hazards as soon as safely possible to prevent injury. (See the chapter on "Job Hazard Analysis" in this manual for more information).

Other Planning Considerations

As part of the organization-wide violence prevention program, Bannister Electric LLC of West Monroe may conduct a screening survey to get employee ideas on the potential for violent incidents and to identify opportunities for improved security measures. These surveys may be repeated as part of the periodic review of this policy.

Independent reviewers such as safety and health professionals, security consultants or law enforcement professionals can provide expert opinions on workplace safety and provide a fresh perspective on preventing workplace violence.

HAZARDS

Violent behavior, like any safety and health risk factor, occurs within a context. Controlling workplace violence hazards first requires identifying them.

Warning Signs of Violence

There is no way to predict all acts of violence; however, the FBI suggests the following indicators of escalating violence risk in an individual:

- Increasing belligerence
- Hypersensitivity to criticism
- Apparent obsession with another person
- Interest in recently publicized violent events
- Extreme disorganization
- Homicidal/suicidal comments or threats
- Ominous, specific threats
- Recent acquisition/fascination with weapons
- Preoccupation with violent themes
- Outbursts of anger
- Noticeable changes in behavior

Workplace Risk Factors

A variety of workplace factors can contribute to violence risk as well, including the following:

- Understaffing
- Frustrations arising from poorly defined job tasks and responsibilities
- Downsizing or reorganization
- Labor disputes and poor labor-management relations
- Inadequate security or a poorly trained, poorly motivated security force
- A lack of employee counseling
- Poor management styles (for example, arbitrary or unexplained orders; over-monitoring; corrections or reprimands in front of other employees, inconsistent discipline)
- A high injury rate or frequent grievances may be clues to problem situations in a workplace

Research indicates that in addition to management oversights, certain job elements increase risk and may indicate the need for greater care when performing job hazard analysis and violence prevention planning.

These factors include the following:

- Contact with the public
- Exchange of money
- Delivery of passengers, goods, or services
- Having a mobile workplace
- Working with unstable or volatile people
- Working alone or in small numbers
- Working late at night or during early morning hours
- Working in high-crime areas
- Guarding valuable property
- Working in community-based settings

CONTROLS

Bannister Electric LLC of West Monroe will identify and implement effective controls to protect workers against violence hazards. These controls will be determined based on the work, the environment and the organizational context of the work. Controls may include a variety of engineering and administrative approaches to control the hazards associated with violence in the workplace.

Please see the section on “Control” in the chapter covering “Job Hazard Analysis.”

Engineering

- Develop emergency signaling, alarms and monitoring systems
- Increase visibility, especially in high-risk areas. Use cameras and curved mirrors in hallways, and ensure good lighting in the workplace and in parking lots
- Restrict movement of the public and employees with appropriate barriers and card- or key-controlled access
- Design public areas to minimize assault risk
- Provide staff restrooms and emergency exits
- Install enclosed stations, deep service counters, or bullet resistant and shatterproof glass enclosures in reception areas if appropriate
- Arrange furniture and other objects with safety in mind. Be mindful of objects or furniture that can easily be turned into weapons

Administrative and Work Practice Controls

- Demonstrate concern for workers’ emotional and physical health and safety, communicating that violence is not permitted
- Design staffing patterns to prevent personnel from working alone and to minimize waiting time for customers
- Provide security escorts to the parking lots at night if appropriate
- Develop a system for alerting security personnel or management to threats of violence and recording incidents to determine need for additional controls
- Encourage employees to use the “buddy system” when personal safety threatened
- Limit the amount of accessible cash and valuables in the workplace

- Consider an employee assistance program to help employees handle their personal problems that may affect job performance and workplace safety
- Consider potential for violence in human resources operations. Areas where appropriate procedures and policies to prevent violence should be in place include the following:
  - Pre-employment screening
  - Employee assistance
  - Employment transition or outplacement services during layoffs
  - Substance abuse prevention programs
  - Detailed post-termination security protocol

RESPONSE

Bannister Electric LLC of West Monroe understands violence can best be prevented through appropriate workplace security measures and caring for the people who work for our company through communication, adequate training and a system for reporting and following up on incidents. However, regardless of the level of hazard control, Bannister Electric LLC of West Monroe may experience a safety incident involving violence. Response to violence in the workplace will depend on the nature of the incident, but will focus on reducing the negative impacts of the incident and discovering ways to prevent similar incidents in the future.

Workplace violence will be considered during the development of the Emergency Action Plan. Please see the chapter entitled “Fire Prevention and Emergency Action Plans” for more information.

NOTIFICATION

Employees will notify a supervisor as soon as safely possible if an incident involving violence occurs. However, if there is an immediate danger of harm and the situation demands the presence of emergency responders, an employee will contact the appropriate authorities or see that a supervisor contacts them. Employees must report any criminal act immediately to police if safely possible and keep a line of communication with the authorities until police arrive.

Management will handle all reports of violence and threats of violence in a manner that respects the sensitive nature of such reports and maintains confidentiality.

It is a good idea for every worksite to have a means to alert others to an emerging incident. Such means include alarms, codes and signals. These alerts need to be in place, and shared, before an incident occurs to ensure their effectiveness.

DE-ESCALATION STRATEGIES

DO	DON'T
Be calm. Move and speak slowly, quietly, and confidently. Encourage the person to talk; listen closely and patiently. Maintain a relaxed, attentive posture. Position yourself at an angle. Arrange yourself so your access to emergency exits is not blocked. Acknowledge the person's feelings. Ask for small, specific favors such as asking the person to move outside. Use delaying tactics to give the person time to calm down, such as offering a drink of water. Point out choices, break big problems into smaller ones. Avoid sudden movements and maintain a 3-6 foot distance. If necessary, call the police when safe. A fitness-for-duty evaluation may be appropriate for employees exhibiting dysfunctional behaviors. Potential victims will be informed of any threat made to them and permitted access to legal assistance and psychological counseling as warranted.	Make sudden movements. Speak rapidly, raise your volume or use an accusatory tone. Reject all demands. Make physical contact, jab your finger at the other person or use long periods of eye contact. Pose in challenging stances — directly opposite someone, hands on hips or with arms crossed. Challenge, threaten or dare the individual. Belittle the other person. Criticize or act impatient. Attempt to bargain with a threatening individual. Try to make the situation seem less serious than it is. Make false statements or promises you cannot keep. Try to impart a lot of technical or complicated information when emotions are high. Take sides or agree with distortions. Invade individual's personal space.

INCIDENT RESPONSE TEAM

Paula Goodwin and management, as part of hazard control planning may determine the need for an incident response team responsible for violence response. Training for this team will include identifying hazard escalation, techniques for de-escalating conflict and other appropriate incident response.

EVACUATION AND SHELTER IN PLACE

All employees will be made aware of appropriate evacuation and "Shelter-In-Place" procedures and follow them as necessary in response to a violent workplace incident. Training and preparation may include drills and simulations for a violent incident.

POST-INCIDENT RESPONSE

In the event of workplace violence, Bannister Electric LLC of West Monroe will ensure victims and witnesses are provided appropriate treatment, regardless of the severity of the incident. In addition to physical injuries, victims of workplace violence may suffer other consequences such as the following:

- Psychological trauma
- Fear of returning to work
- Changes to relationships
- Feelings of guilt, powerlessness and incompetence
- Fear of criticism by supervisors

Further, to address opportunities to remedy oversights in the violence prevention program, any incident that demands managerial response under this violence prevention program will be followed by an incident investigation.

Please see the chapter on “Accident Investigation” for more information.

RECORDKEEPING AND PROGRAM EVALUATION

Bannister Electric LLC of West Monroe will record and communicate injuries and illnesses to workers according to applicable regulations.

This policy will be reviewed, and these reviews documented, at least once a year or under the following circumstances:

- Following a workplace violence incident or report
- Change in management
- Change of contact person
- To make needed changes or improvements to the policy
- To identify new training or refresher training needs

SEXUAL HARASSMENT

It is Bannister Electric LLC of West Monroe’s policy that sexual discrimination, unwelcome sexual advances, requests for sexual favors, and any other conduct of a sexual nature is strictly prohibited.

Requiring coworkers, subordinate employees, or prospective employees to submit to conduct of this nature, explicitly or implicitly, as a term or condition of employment, or used as a basis for any employment decisions is forbidden.

Any behavior that has the purpose or effect of unreasonably interfering with an individual’s work performance, or creating an intimidating, hostile or offensive work environment is banned.

Sexual harassment can occur in a variety of circumstances:

- The victim as well as the harasser may be a woman or a man. The victim does not have to be of the opposite sex
- The harasser can be the victim's supervisor, an agent of the employer, a supervisor in another area, a co-worker or a non-employee
- The victim does not have to be the person harassed but could be anyone affected by the offensive conduct
- Sexual harassment may occur without economic injury to or discharge of the victim
- The harasser's conduct must be unwelcome

Prevention is the best tool to eliminate sexual harassment in the workplace. Bannister Electric LLC of West Monroe has designated appropriate managers (rather than a direct supervisor) and other alternative routes by which an employee can issue formal complaints of sexual harassment. If possible, any victimized employee should attempt to resolve a sexual harassment issue informally by directly informing the harasser that the conduct is unwelcome and must stop. If informal resolution is unsuccessful, the victim will use the formal complaint form and submit it to an appropriate supervisor.

Bannister Electric LLC of West Monroe will take immediate appropriate action when an employee files a complaint.

Bannister Electric LLC of West Monroe recognizes that the question of whether a particular course of conduct constitutes sexual harassment requires a factual determination. Bannister Electric LLC of West Monroe also recognizes that false accusations of sexual harassment can have serious effects on innocent persons. If an investigation results in a finding that a person who has accused another of sexual harassment has maliciously or recklessly made false accusations, the accuser will be subject to appropriate sanctions, including discharge.

When investigating allegations of sexual harassment, this company will look at the whole record, the circumstances, and the context in which the alleged incidents occurred. Bannister Electric LLC of West Monroe will make a determination on the allegations from available facts on a case-by-case basis. Outside avenues of resolution are available to employees who feel their rights have not been protected. Bannister Electric LLC of West Monroe tolerates no sexual harassment.

FORMS AND ATTACHMENTS

Please find the below documents on the following pages:

- Assault/Threat Report
- Sexual Harassment Complaint Form

ASSAULT/THREAT REPORT FORM (PAGE 1 OF 3)

(Attach additional sheets as necessary)

Employee Information			
Name		Telephone	
Address		Employee Classification	
Manager's Name		Telephone	

Employee Information			
Name of Assailant		Is he/she an employee?	☐ Yes ☐ No
Date of Incident		Location of Incident	
This Incident Occured	☐ Over the phone ☐ In person ☐ Over the internet ☐ Other (please explain)		
Were there any witnesses?	☐ Yes ☐ No	(Please provide relevant information below and attach statements)	

Witnesses			
Name		Telephone	
Address		Witness Roll (e.g. employee, customer)	
Name		Telephone	
Address		Witness Roll (e.g. employee, customer)	

Threat Information	
As closely as possible, what were the exact words used?	
Was the assailant in a position to carry out the threat immediately?	
How serious do you believe the threat was and why?	

ASSAULT/THREAT REPORT FORM (PAGE 2 OF 3)

(Attach additional sheets as necessary)

Assault Information	
What (if anything) happened to set off the assault?	
Did the assailant say anything during the assault? What?	
How did the assailant attack? (e.g. punching, kicking, knife, words)	
What injuries, if any, did you sustain? Did injuries require medical treatment?	
What ended the assault?	
How did you leave the site of the assault?	

ASSAULT/THREAT REPORT FORM (PAGE 3 OF 3)

(Attach additional sheets as necessary)

Employee Actions					
What actions did you take later? (e.g. worker's comp claim, medical treatment, sick leave)					
Do you request Bannister Electric LLC of West Monroe action at this time related to the assault? What? (If none, please specify "None.")					
Law Enforcement Information (attach police report when possible)					
Law Enforcement Agency Contacted					
Name of Official		Date Contacted		Telephone	
Was a written report completed?	☐ Yes ☐ No	Indicate any action promised			
Manager Actions					
Directions given to employee					
Manager Recommendation	☐ Prosecution ☐ Restraining Order ☐ Letter to Threatener ☐ Other (please specify)				
Legal Counsel Actions					

SEXUAL HARASSMENT COMPLAINT FORM (PAGE 1 OF 2)

Please write legibly and fill out form completely. Attach additional sheets if necessary. Submit completed form to appropriate manager.

Complainant		Alleged Harasser	
Department		Department	
Job Title		Job Title	
Mailing Address		Other relevant information about Alleged Harasser	
Home Phone			
Work Phone			
Details of Incident			
What exactly occurred or was said?			
When did it occur, and is it ongoing?			
Where did it occur?			
How often did it occur?			
How did it affect you?			
What response did you make when the incident(s) occurred or afterwards, and how did you react?			
Has your job been affected in any way?			
Was anyone present when the alleged harassment occurred? List any third-party witnesses			

SEXUAL HARASSMENT COMPLAINT FORM (PAGE 2 OF 2)

Please write legibly and fill out form completely. Attach additional sheets if necessary. Submit completed form to appropriate manager.

Are there any persons who have relevant information?	
Did you tell anyone about it?	
Did anyone see you immediately after episodes of alleged harassment?	
Did the person who harassed you harass anyone else?	
Do you know whether anyone complained about harassment by that person?	
Are there any notes, physical evidence or other documentation regarding the incident(s)?	
Do you know of any other relevant information?	
How would you like to see the situation resolved?	

I am aware that false accusations of sexual harassment can have serious effects on innocent persons. I further understand that if it is determined, after investigation, that I have maliciously or recklessly made false accusations, I will be subject to appropriate sanctions, including discharge.

Complainant's printed name	Complainant's signature	Date
Received by	Signature	Date

POLICY

Bannister Electric LLC of West Monroe has implemented this policy for the protection of our employees against the fire and other emergencies in the workplace. Dolphus Bannister will supervise the Fire Protection Program.

Bannister Electric LLC of West Monroe will have a written Fire Protection Program (FPP). The FPP will be posted in the workplace and remain available to employees for review along with the names and job titles of every person in the chain of command during emergencies.

EMPLOYER RESPONSIBILITIES

It is the responsibility of Bannister Electric LLC of West Monroe to:

- Ensure adequate workplace safeguards against hazards, including appropriate exit routes, fire alarms, and fire protection systems
- Ensure development and implementation of FPP and EAP
- Ensure training of employees in accordance with this policy

EMPLOYEE RESPONSIBILITIES

Every Bannister Electric LLC of West Monroe employee is expected to:

- Report a fire or other emergency
- Follow fire prevention plan and emergency action plan
- Report any suspected problem with fire control systems to their supervisor
- Assist in fire hazard assessment

TRAINING

Bannister Electric LLC of West Monroe will ensure every employee is provided training on fire protection and emergency planning. This training will be provided at no cost to the employee and held during their working hours.

Training will be provided:

- At the time of assignment
- At least annually thereafter

Bannister Electric LLC of West Monroe will provide additional training when tasks or procedures are added or change, that may affect the employee's work. It is acceptable for additional training to be limited to addressing only the changes or additions to the employees' exposure.

Bannister Electric LLC of West Monroe will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

Bannister Electric LLC of West Monroe is committed to informing employees about all fire hazards with which they may come into contact. Dolphus Bannister or a designate will review the FPP with all employees and inform them of any fire hazards a new assignment might present.

Dolphus Bannister will verify all employees at Bannister Electric LLC of West Monroe are informed and trained in the following minimum elements for the Emergency Action Plan and Fire Protection Program:

- Fire hazards at the worksite
- Means of controlling or removing fire hazards at the worksite
- Procedures for reporting a fire or other emergency
- Procedures for emergency evacuation for all areas of work, including type of evacuation and exit route assignments
- Safe assembly areas designated for all work areas in the event of evacuation
- Procedures to be followed by employees who are requested to remain to operate critical plant operations before they evacuate, if applicable
- Procedures to account for all employees after evacuation
- Procedures employees are to follow when performing rescue or medical duties
- The members in the chain of command that employees can contact for information about the plans or for an explanation of their duties under the plans
- Proper operation of fire extinguishers provided by the company if the EAP allows employees to fight incipient stage fires rather than evacuate
- The hazards involved in incipient stage firefighting. Employees are instructed to ensure the local emergency response service (Fire Department) is notified before attempting to extinguish any fire, and that if a fire is not immediately extinguished, or the fire recurs to evacuate immediately
- Where employees have been provided portable fire extinguishers, Bannister Electric LLC of West Monroe will provide training on the general principles of fire extinguisher use and the hazards involved with incipient-stage firefighting. This training will occur upon hire and repeated annually

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FIRE PREVENTION PLAN

Bannister Electric LLC of West Monroe is committed to protecting its employees in the event of a fire emergency. Accordingly, Bannister Electric LLC of West Monroe will ensure there is a Fire Protection Program written and available to employees as required by OSHA regulations.

This plan will include the following:

- A list of all major fire hazards, proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard
- Procedures to control accumulations of flammable and combustible waste materials
- Procedures for regular maintenance of safeguards installed on heat-producing equipment to prevent the accidental ignition of combustible materials
- The name or job title of employees responsible for maintaining equipment to prevent or control sources of ignition or fires; and the name or job title of employees responsible for the control of fuel source hazards

Determining Fire Hazards

A fire is essentially the rapid oxidation of a chemical. It requires heat, oxygen and fuel in the right proportion. Different types of fuel react in different ways and require different levels of heat and oxygen to ignite; however, once the chemical reaction begins, fire provides a source of heat for continued ignition until one of the essential aspects of combustion — fuel, heat or oxygen — is removed and the reactions end. See figure 1.

Figure 1

Dolphus Bannister or designee will perform an area-by-area assessment of fire hazards and record them by location on the “Major Fire Hazards” list. The assessment will ascertain and document whether the hazard is a fuel or ignition source, control systems in place to protect against fire, and the name or job title of the individual who is responsible for removing or minimizing the listed hazard.

The goal is to systematically eliminate fire hazards wherever possible; ensure a means to prevent a fire if the hazard cannot be removed; inform employees about fire hazards in their workspace; and identify the party responsible for controlling any given fire hazard. Fire hazard identification plays a central role in the FPP, and all employees are expected to contribute their efforts to identify and mitigate fire hazards in the workplace.

Employees will familiarize themselves with the safety data sheet of any hazardous chemicals with which they work and know proper handling and storage procedures to reduce hazards. Flammable and combustible material will be stored and staged in amounts as small as possible for operations and away from sources of ignition. It is important for employees to monitor the workplace for changes that might pose additional fire hazards.

FIRE PROTECTION EQUIPMENT AND SAFEGUARDS

Local Fire Alarm Systems

An alarm system to alert employees and the local fire department will provide a distinctive signal in case of fire or other emergency. The alarm needs to be audible above ambient noise levels and/or seen over ambient light levels.

Inspection, Maintenance and Testing

Bannister Electric LLC of West Monroe will provide for the frequent testing of all alarm systems and make sure they remain in operating condition. A local, unsupervised fire alarm system must be tested by a qualified, trained, and authorized employee or an outside service not less than once a week to insure operability by the activation of not less than 1 box, not using the same box in consecutive tests, and replacing power supplies as necessary.

Tests for systems that are capable of being supervised will occur at least annually.

Portable Fire Extinguishers

Any portable fire extinguisher provided will:

- Be fully charged and operable
- Be kept in a conspicuous place when not in use
- Not use carbon tetrachloride, chlorobromomethane, or other toxic vaporizing extinguishing agents
- Not be operated by inverting the extinguisher to rupture a cartridge or initiate an uncontrollable pressure-generating chemical reaction to expel the extinguishing agent
- Be protected from freezing (if subject to freezing)

Fire extinguishers are composed of a variety of materials depending on the type of fire they are designed to eliminate. All extinguishers will contain contents under high pressure:

Not all fire extinguishers are manufactured exactly alike. Variations may include operating instructions or distance the user should stand from the fire when dispersing contents. See the required cylinder labeling for specific information.

Each 3,000 square feet of protected buildings during construction requires a fire extinguisher rated at least 2A, spaced within 100 feet of any point of the protected area. In multi-story construction, each floor needs its own extinguisher rated at least 2A, adjacent to the stairwell

Bannister Electric LLC of West Monroe will provide a fire extinguisher rated not less than 10B within 50 feet of anywhere there is more than 5 gallons of flammable or combustible liquids being used on the jobsite (aside from vehicle fuel tanks)

Inspection, Maintenance and Testing

Bannister Electric LLC of West Monroe is responsible for the inspection, maintenance and testing of all portable fire extinguishers in the workplace. Maintenance checks of portable fire extinguishing equipment will occur at least annually. The dates of fire extinguisher checks will be recorded; the record of these checks will be retained for at least a year after the last check or the life of the shell (whichever is less). An individual trained to perform hydrostatic testing will test each portable fire extinguisher with suitable equipment. Such testing is also called for when portable fire extinguishers show new evidence of corrosion or mechanical wear.

Each extinguisher in the workplace will be accompanied by a record securely fixed to the extinguisher that indicates:

- Name of the person or agency who performed the last test, and the test date
- Signature of the person who performed the test
- Serial number or other identifier of the fire extinguisher that was tested

Alternatives to Portable Fire Extinguishers

During construction activities, a 55-gallon drum with two fire pails may substitute for a fire extinguisher with a 2A rating.

A ½-inch diameter garden-type hose no longer than 100 feet, can substitute for the same as long as it can discharge at least 5 gallons per minute and the stream ranges at least 30 feet horizontally.

Further, 100 feet or fewer of 1½-inch hose with a nozzle capable of discharging water at 25 gallons or more per minute may be substituted, if the hose line can reach all points in the area. (Make sure the hose connections are compatible with local firefighting equipment.)

Other Fire Protection Systems

Bannister Electric LLC of West Monroe will meet or exceed all legal requirements for any fire protection system in the workplace and keep in good working order all safeguards designed to protect employees during emergencies, including fire retardant paints and solutions. Any other fire protection systems in use will also meet applicable regulatory requirements and may include the following:

- Temperature limit switches
- Fixed extinguishing systems
- Fire detection systems
- Standpipe and hose systems
- Flashback arresters
- Automatic sprinkler systems
- Fire brigades

During demolition activities involving combustible materials, charged hose lines that are supplied by hydrants, water tank trucks with pumps, or equivalent, must be available.

WATER SUPPLY

A water supply adequate for the operation of firefighting equipment must be available as soon as there is an accumulation of combustible materials. Underground water mains must be made available as soon as practicable where they are to be provided.

SPRINKLERS

If there will be an automatic sprinkler fire protection system, install, and place it in service as soon as permitted following completion of each story.

Ensure that sprinklers are spaced to provide a maximum protection area per sprinkler, a minimum of interference to the discharge pattern by building or structural members or building contents and suitable sensitivity to possible fire hazards.

Maintain a 36” clearance between the top of stored material and sprinkler heads.

A stock of extra sprinklers must be on hand or readily available for each temperature rating and type so that the system can be returned to readiness as soon as possible.

An automatic sprinkler system having 20 or more sprinklers must have at least one automatic water supply capable of providing design water flow for at least 30 minutes.

During demolition or alterations, keep automatic sprinkler installations in service as long as reasonable. Only authorized personnel may operate sprinkler control valves. Expedite sprinkler system modifications made to permit alterations or additional demolition so that the automatic protection may be returned to service as quickly as possible. Check sprinkler control valves daily at close of work to ensure service.

No one may occupy a portion of a structure (except as permitted under law) that must be protected by automatic sprinklers until the sprinkler system is operable and has been approved.

STANDPIPES

If standpipes are required, or exist in structures being altered, they must be brought up as soon as applicable laws permit and will be maintained as construction progresses in such a manner that they are always ready for fire protection use. Standpipes will be provided with Siamese fire department connections on the outside of the structure, at the street level, and conspicuously marked. Local codes may specify lighting or painting requirements. There must be at least one standard hose outlet at each floor.

During demolition, maintain a standpipe as long as possible in operable condition for firefighting use. Do not demolish the standpipe further than one floor below the floor being demolished.

FIRE PROTECTION

Controlling fire hazards (e.g. accumulations of flammable and combustible materials) and ensuring safe storage of building materials is a priority of the highest order for Bannister Electric LLC of West Monroe and its employees. Controlling fuel sources demands all workers maintain a tidy work area and dispose of refuse in the appropriate receptacle; it also calls for due consideration of piles and stacks or materials at the worksite. Controlling means of ignition requires following appropriate safety guidelines especially around electricity, open flame, or any work that may produce arc, sparks, excessive heat, etc.

No Smoking, No Open Flame

Smoking is prohibited at the jobsite at all times. Signs will be posted according to local requirements alerting employees and the public to this prohibition. Open fires may not be ignited or maintained at the worksite. Only approved heaters may be used in designated locations in such a way to prevent fires.

Ignition Hazards

Electrical wiring onsite must be installed safely by qualified personnel and in compliance with applicable regulations. If equipment is powered by an internal combustion engine, make sure it is located so that the exhausts are well away from combustible materials. If the exhausts are piped outside, verify there is a 6 in. clearance between piping and combustible materials. If portable battery powered lighting equipment is used near flammable gases or liquids, make sure it's approved for hazardous locations.

During the cleaning or ventilation of tanks and vessels that contain hazardous concentrations of flammable gases or vapors nozzles, lines, or hoses for air, inert gas, or steam must be bonded to the tank or vessel shell and neither attached nor detached in hazardous concentrations of flammable gases or vapors.

All debris and refuse must be disposed of promptly (at the end of each shift or more frequently as required), especially if it is combustible. If material is to be disposed of by burning onsite, make sure that method has been approved, and complies with all relevant safety controls. All materials susceptible to spontaneous ignition (oily rags) will be stored in an approved disposal container.

Hotwork must be completed according to appropriate guidelines, and appropriate fire watch must be established and maintained to ensure safety of any operation that presents a fire hazard.

TEMPORARY BUILDINGS

- No temporary building may adversely affect a means of exit
- Temporary buildings erected within another building must be of noncombustible construction or of combustible construction with a fire resistance rating of at least 1 hour
- Temporary buildings, not inside another building and not used for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, must be located at least 10 feet from another building or structure
- Groups of temporary buildings, not exceeding 2,000 square feet in size total, will be considered a single temporary building

OPEN YARD STORAGE

Combustible materials must not be piled higher than 20 feet and must be piled in a stable manner.

Where driveways go between or around combustible storage piles, they must be at least 15 feet wide and free of any obstruction. A driveway grid formed by such driveways may not exceed 50ft. by 150ft.

Make sure the storage area is clean and any plant life is controlled to prevent additional fire hazards. Piles of combustible material must be organized, orderly and 10 feet or more from buildings. Ensure appropriate fire extinguishers (at least 2A) are easily accessible.

INDOOR STORAGE

Make sure materials stored indoors do not block exits or impede exit in any way and are piled to maintain a 36” clearance between the top of the stored material and sprinkler heads.

Maintain safe clearance between material piles and lights or heating elements. Also, provide a barricade or ensure at least 24” around the path of travel to fire doors. Never store material within 36” of a fire door.

ACCESS FOR FIREFIGHTING

Vehicle access to a construction, remodel or demolition site must be maintained at all times within 100 feet (consult local codes) of available fire department connections. Temporary vehicle access must be maintained until permanent access is established. Such roads may need to be inspected by local authorities to comply with local laws. Horizontal and vertical clearance for such access routes must be sufficient for emergency vehicle approach and meet applicable local codes.

FLAMMABLE LIQUIDS

Flammable liquids must be stored and handled in approved containers and tanks. Handling and use of flammable liquid materials in quantities of 5 gallons or less requires approved safety cans or DOT-approved containers. Flammable liquids that are hard to pour may be stored, handled and used in quantities of one gallon or less in their original container.

Ensure flammable or combustible liquids are kept clear of areas used for exits or safe passage of people.

This section applies to the handling, storage and use of flammable liquids with a flashpoint below 140°F but not to:

- Bulk transportation of flammable and combustible liquids
- Storage, handling and use of fuel oil tanks and containers connected with oil burning equipment

NOTE: With the adoption of the Globally Harmonized Standards (GHS) by OSHA, liquids capable of being ignited are divided into four categories based on their flash points.

Category 1	**Category 2**	**Category 3**	**Category 4**
Flash Point < 72ºF Boiling point ≤ 95ºF	Flash Point < 72ºF Boiling point > 95ºF	Flash Point ≥ 72ºF Boiling point ≤ 140ºF	Flash Point > 140ºF Boiling point ≤ 200ºF
Extremely flammable	Highly flammable	Flammable	Combustible

INDOOR STORAGE

Outside of an approved storage cabinet, limit storage of flammable or combustible liquids to 25 gallons. An approved storage cabinet must adhere to the following specifications:

- The bottom, sides, and top will be constructed of an exterior grade of plywood at least 1 in. thick, which will not break down or delaminate under standard fire test conditions

- All joints must be rabbeted and fastened in two directions with flathead wood screws
- When more than one door is used, there will be a rabbeted overlap of not less than 1 inch
- Steel hinges will be mounted in such a manner as to not lose their holding capacity due to loosening or burning out of the screws when subjected to fire
- These cabinets will be painted inside and out with fire retardant paint
- Approved metal storage cabinets are acceptable
- Cabinets must be labeled in conspicuous lettering, “Flammable-Keep Fire Away”

Any one storage cabinet is limited to 60 gallons of flammable liquids, and 120 gallons of combustible liquids. Any one storage area is limited to three storage cabinets. Higher quantities must be stored inside a storage room.

INDOOR STORAGE ROOMS

Storage rooms inside must be sufficiently fire-resistive for their use and comply with test specifications outlined in “Standard Methods of Fire Test of Building Construction and Material, NFPA 251-1969” and table 2.

Fire Protection Provided*	Fire Resistance	Maximum size	Total allowable quantities gals. / sq.ft. / floor area
Yes	2 hrs.	500 sq.ft.	10
No	2 hrs.	500 sq.ft.	4
Yes	1 hr.	150 sq.ft.	5
No	1 hr.	150 sq.ft.	2

Automatic extinguishing systems will be designed and installed to meet the following requirements:

- Openings to other rooms or buildings require noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area must be at least 4 inches below the surrounding floor
- Openings will be equipped with approved self-closing fire doors
- The room will be liquid-tight where the walls join the floor
- A permissible alternate to the sill or ramp is an open-grated trench, inside of the room, which drains to a safe location
- Where other portions of the building or other buildings are exposed, windows will be protected as set forth in the Standard for Fire Doors and Windows, NFPA No. 80-1970, for Class E or F openings
- Wood of at least 1-inch nominal thickness may be used for shelving, racks, dunnage, scuff boards, floor overlay, and similar installations
- Materials that will react with water and create a fire hazard may not be stored in the same room with flammable or combustible liquids
- Wiring and equipment in such rooms must be approved for Class I, Division 1, Hazardous Locations as outlined in CFR 1926.449

- Every storage room must have one clear three-foot wide aisle
- Containers over 30 gallons capacity cannot be stacked on top of each other

Each indoor storage room must be equipped with either a gravity or a mechanical exhausting system that meets the following specifications:

- It must start no more than 12 inches above the floor
- It must be designed to provide a complete change of air within the room at least 6 times per hour
- If a mechanical exhausting system is used, it must be controlled by a switch located outside of the door
- Ventilating equipment and any lighting fixtures must not be operated by the same switch
- An electric pilot light will be installed next to the switch if flammable liquids are dispensed within the room
- Where gravity ventilation is provided, the fresh air intake, as well as the exhausting outlet from the room, must be on the exterior of the building where the room is located

Limit the quantity of flammable or combustible liquids near any spraying operations to the minimum required for operations. This must not exceed a supply for 1 day or one shift. Bulk storage of portable containers of flammable or combustible liquids will be in a separate, constructed building detached from other important buildings or cut off in a standard manner.

STORAGE OUTSIDE BUILDINGS

Flammable and combustible liquids in excess of the amount permitted in inside storage rooms will be stored outside of buildings.

Limit groupings of containers (not more than 60 gallons each) to 1,100 gallons in any one pile or area. Piles or groups must be separated by a 5-foot clearance and placed 20 feet or further away from a building.

Within 200 feet of such piles, ensure a 12-foot-wide access for fire control approach.

The area reserved for storing flammable and combustible liquids must be graded to divert spills away from building. Alternatively, the area may be surrounded by a curb or dike at least 12 inches high if provisions are made for draining off accumulations of ground or rain water, or spills of the stored liquids. Drains must terminate at a safe location and be accessible to operation under fire conditions.

OUTDOOR PORTABLE TANK STORAGE

- Portable tanks must be at least 20 feet from any building
- Two or more portable tanks, grouped together, having a combined capacity in excess of 2,200 gallons, must be separated by a 5-foot-clear area
- Individual portable tanks exceeding 1,100 gallons must be separated by a 5-foot-clear area
- There must be a 12-foot-wide access way within 200 feet of each portable tank, to permit approach of fire control equipment
- Storage areas will be kept free of weeds, debris, and other combustible material not necessary to the storage

- Portable tanks, not exceeding 660 gallons, must have emergency venting and other devices, as required by chapters III and IV of NFPA 30, The Flammable and Combustible Liquids Code
- Portable tanks, in excess of 660 gallons, must have emergency venting and other devices, as required by chapters II and III of “The Flammable and Combustible Liquids Code, NFPA 30”

FIRE CONTROL FOR FLAMMABLE LIQUIDS

- At least one portable fire extinguisher, with a rating of at least 20-B units (capable of extinguishing a twenty square foot fire), must be located outside of, but not more than 10 feet from, the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids
- At least one portable fire extinguisher having a rating of at least 20-B units must be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside
- When sprinklers are provided, they will be installed in accordance with the current “Standard for the Installation of Sprinkler Systems, NFPA 13”
- At least one portable fire extinguisher having a rating of not less than 20-B:C units will be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids

DISPENSING LIQUIDS

- Areas where combustible liquids are transferred more than 5 gallons at a time must be separated from other activity by 25ft. or construction with a fire resistance rating of 1 hour. Drainage in such areas to control spills is required as is ventilation sufficient to maintain flammable vapor concentrations below 10 percent of the lower flammable limit
- Flammable liquid transfer between two containers requires the containers to be electrically bonded
- Draw or transfer flammable or combustible liquids from vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. Transferring by means of air pressure on the container or portable tanks is prohibited
- Protect dispensing units against collision damage
- Dispensing devices and nozzles for flammable liquids must be of an approved type

HANDLING LIQUIDS AT POINT OF FINAL USE

- Keep Flammable liquids in closed containers when not in use
- Dispose of leakage or spillage of flammable or combustible liquids promptly and safely
- Flammable liquids may be used only where there are no open flames or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance

SERVICE AND REFUELING AREAS

- Flammable or combustible liquids must be stored in approved closed containers, in tanks located underground, or in above-ground portable tanks
- Tank trucks must comply with the requirements covered in the latest edition of the Standard for Tank Vehicles for Flammable and Combustible Liquids, NFPA No. 385
- Only approved types of dispensing hoses may be used
- The dispensing nozzle will be an approved automatic-closing type without a latch-open device
- Do not abandon underground tanks
- Provide clearly identified and easily accessible switch(es) at a location remote from dispensing devices to shut off the power to all dispensing devices in the event of an emergency
- Heating equipment of an approved type may be installed in the lubrication or service area where there is no dispensing or transferring of flammable liquids, provided the bottom of the heating unit is at least 18 inches above the floor and is protected from physical damage
- Heating equipment installed in lubrication or service areas, where flammable liquids are dispensed, must be of an approved type for garages, and will be installed at least 8 feet above the floor
- No smoking or open flames will be permitted in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids
- Post conspicuous and legible signs prohibiting smoking
- Shut off motors of equipment being fueled during the fueling operation; and provide each service or fueling area with at least one fire extinguisher having a rating of not less than 20B:C located so that an extinguisher will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service area.

FORMS AND ATTACHMENTS

Please find on the following page the Major Fire Hazards Form, which may be reproduced freely by Bannister Electric LLC of West Monroe for the purposes of implementing and maintaining a safety and health program.

MAJOR FIRE HAZARDS FORM

Major Fire Hazards Form						
Location		Fire Hazard	Fuel source hazard	Ignition source hazard	Handling, storage, and/or maintenance procedures and other relevant protections (include PPE)	Name or job title of responsible party
Example	Site Gate	cigarette butts at gate	Yes	Yes	Ensure all materials have been completely extinguished and properly disposed of. Fire extinguisher is inside office.	Housekeeping: Employees, Custodian Fire extinguisher: Dolphus Bannister

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POLICY

Bannister Electric LLC of West Monroe will manage or eliminate hazards in the workplace to the greatest extent possible with engineering controls and work practice controls. However, if such controls fail to provide employees sufficient protection, Site Supervisors or designate will provide employees with personal protective equipment (PPE) and ensure proper use thereof. PPE minimizes exposure to a range of hazards. All protective devices must meet the following minimum requirements:

- Provide adequate protection against the hazards for which they are designed
- Be of safe design and construction for the work to be performed
- Be reasonably comfortable when worn under the designated condition
- Fit snugly and not unduly interfere with the movements of the wearer
- Be durable
- Be capable of being disinfected
- Easily cleaned
- Be distinctly marked to facilitate identification of the manufacturer

HAZARD ASSESSMENT

As explained in the chapter on Job Hazard Analysis, hazard assessment is the backbone of the Bannister Electric LLC of West Monroe safety and health program. Recognizing and documenting hazards is the first step to protecting employees from them. An initial walk-through to develop a list of potential hazards will be followed by a review of records and an analysis of the facility layout to determine what controls would best protect workers. If engineering and administrative controls are unable to protect employees from hazards they face, Dolphus Bannister and management will determine what PPE is necessary.

Bannister Electric LLC of West Monroe job hazard analysis is an ongoing process. Daily inspections and periodic reassessments will look for changes that may affect occupational hazards for workers and will determine if PPE remains viable (in terms of condition, age and appropriateness) to protect a worker from hazards on the job.

Bannister Electric LLC of West Monroe must certify and document the required workplace hazard assessment in a way that identifies the following:

- Workplace evaluated
- Person certifying the evaluation has been performed
- Date of the hazard assessment
- Document as a certification of hazard assessment

EMPLOYER RESPONSIBILITIES

It is the responsibility of Bannister Electric LLC of West Monroe to:

- Identify in the hazard assessment where PPE is appropriate and what type is necessary
- Identify and provide properly fitting PPE for employees
- Inform employees how and when to use identified PPE
- Enforce PPE use
- Train employees in the use and care of PPE
- Ensure employees maintain PPE
- Replace worn or damaged PPE
- Ensure employee provided PPE is adequate
- Periodically review, update and evaluate the effectiveness of the PPE program

EMPLOYEE RESPONSIBILITIES

Bannister Electric LLC of West Monroe employees are expected to attend PPE training sessions provided by management

Bannister Electric LLC of West Monroe requires employees use personal protective equipment (PPE) appropriate to the hazards of their job. This equipment may include protection for the following: eyes, face, feet, hands, head and body.

Employees required to use such equipment will be trained in all aspects of its use, maintenance and applicability.

The following list of PPE is available to employees and will be used as required: eye protection, hard hat, hearing protection, gloves, fall protection, reflective or safety vests and other as required per job site.

- Use, and properly wear, all PPE provided by the employer
- Properly care for, clean, and maintain all PPE
- Inform a supervisor of the need to repair or replace PPE

TRAINING

Bannister Electric LLC of West Monroe will ensure every employee is provided training on personal protective equipment. This training will be provided at no cost to the employee during working hours.

Bannister Electric LLC of West Monroe will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

Bannister Electric LLC of West Monroe will ensure training for every employee in the following minimum elements:

- When PPE is necessary
- What specific PPE is necessary
- How to properly put on, take off, adjust and wear PPE

- Limitations of PPE
- Proper care, maintenance, useful life and disposal of the PPE

Affected employees must demonstrate an understanding of all training and the ability to use PPE properly before they will be permitted to perform work requiring PPE.

Bannister Electric LLC of West Monroe will provide retraining for any affected employee who is unable to demonstrate the understanding or skills to use PPE properly. Circumstances that require retraining include, but are not limited to the following:

- When there have been changes in the workplace that have rendered previous training obsolete
- When there have been changes to PPE used that render previous training obsolete
- When an employee demonstrates or expresses inadequacies in understanding or skill needed to use assigned PPE properly

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

PPE SELECTION

Bannister Electric LLC of West Monroe will select only PPE of safe design and construction and will work with employees to ensure PPE remains clean and reliable. In selecting PPE used to control hazards in the workplace, Bannister Electric LLC of West Monroe will consider comfortable fit, providing sizes appropriate to the affected employees, and ensure any PPE used will be compatible to provide sufficient protection. Comfort and ease of use is an important consideration because workers are more likely to wear comfortable PPE.

All PPE at Bannister Electric LLC of West Monroe, including any employee-owned PPE, will meet at least the minimum standards and requirements to provide sufficient protection for workers. Following are the standards referenced by OSHA for select groups of PPE:

- Eye and Face: ANSI Z87.1
- Head: ANSI Z89.1
- Foot: ANSI Z41.1

However, alternative protective equipment is acceptable if Bannister Electric LLC of West Monroe demonstrates it is at least as effective as equipment constructed according to the above standards.

NON-PROVIDED PPE

Bannister Electric LLC of West Monroe will provide all PPE and replacement PPE at no cost to employees except for the following:

- Non-specialty safety-toe protective footwear, non-specialty prescription eyewear, provided they may be worn away from work
- Shoes or boots with metatarsal protection if Bannister Electric LLC of West Monroe provides separate metatarsal guards
- Logging boots
- Everyday clothing
- Clothing worn only for protection from weather
- Replacement PPE the employee has intentionally damaged or lost
- Where the employee provides his or her own adequate PPE

WORK CLOTHING

Bannister Electric LLC of West Monroe requires employees to wear clothing appropriate to the work and conditions. Examples of this stipulation include clothing that provides protection against high temperature hazards that can cause burns, and not wearing loose clothing like ties or loose fitting clothing near moving machinery. Employees will not wearing jewelry that might contact or electric circuitry.

Also any clothing contaminated with a hazardous material (e.g. flammable liquids, toxic substances, irritants or oxidizers) must be removed immediately and properly cleaned before it can be worn again.

EYE AND FACE PROTECTION

Bannister Electric LLC of West Monroe will ensure adequate protection against the following:

- Flying particles
- Molten metal
- Liquid chemicals
- Acids or caustic liquids
- Chemical gases or vapors
- Potentially infected material
- Potentially harmful light radiation

When there is a hazard from flying particles, eye protection will provide side protection, or Bannister Electric LLC of West Monroe will provide effected employees with detachable side protectors.

- Employees will ensure that face and eye protectors are used by only the person to whom the items are issued.
- Eye and face PPE must have the manufacturer’s identification distinctly marked.

Prescription Lenses

Everyday glasses will not provide sufficient protection against the types of hazards that require eye protection. Employees who wear prescription lenses to correct their vision must wear either eye protection that incorporates their prescription or that can be worn over glasses without compromising the glasses’ ability to correct the wearer’s vision.

If Bannister Electric LLC of West Monroe requires more than one worker to wear the same piece of eyewear, employees must disinfect the protective eyewear after each use.

Types of Eye Protection

Safety Spectacles: These protective eyeglasses have safety frames constructed of metal or plastic and impact-resistant lenses. Side shields are available on some models.

Goggles: These tight-fitting eye protectors completely cover the eyes, eye sockets and the facial area immediately surrounding the eyes and provide protection from impact, dust and splashes. Some goggles will fit over corrective lenses.

Welding Shields: Constructed of vulcanized fiber or fiberglass and fitted with a filtered lens, welding shields protect eyes from burns caused by infrared or intense radiant light; they also protect both the eyes and face from flying sparks, metal spatter, and slag chips produced during welding, brazing, soldering and cutting operations. OSHA requires filter lenses to have a shade number appropriate to protect against the specific hazards of the work being performed in order to protect against harmful light radiation.

Laser Safety Goggles: These specialty goggles protect against intense concentrations of light produced by lasers. The type of laser safety goggles an employer chooses will depend upon the equipment and operating conditions in the workplace.

Face Shields: These transparent sheets of plastic extend from the eyebrows to below the chin and across the entire width of the employee's head. Some are polarized for glare protection. Face shields protect against nuisance dusts, potential splashes or sprays of hazardous liquids, and smaller particles, but will not provide adequate protection against larger impact hazards. Face shields must be worn over the top of basic eye protection devices such as goggles or safety spectacles.

Typical uses for face shields include, but are not limited to, the following situations: woodworking operations where chips and particles fly; metal machining that causes flying particles; buffing, polishing, wire brushing, and grinding; operations that cause flying particles or objects; spot welding; and handling of hot or corrosive materials.

Laser Operations

Laser light radiation can be extremely dangerous to the unprotected eye, and direct or reflected beams can cause permanent eye damage.

Laser retinal burns can be painless, so it is essential that all personnel in or around laser operations wear appropriate eye protection.

Laser safety goggles must protect for the specific wavelength of the laser and must be of sufficient optical density for the energy involved. Safety goggles intended for use with laser beams must be labeled with the laser wavelengths for which they provide protection, the optical density of those wavelengths and the visible light transmission.

TABLE1 - LASER SAFETY GLASS

Intensity, CW maximum power density (watts/cm²)	Attenuation	
	Optical density (O.D.)	Attenuation factor
10^{-2}	5	105
10-1	6	106
1.0	7	107
10.0	8	108

Laser safety goggles must protect for the specific wavelength of the laser and must be of sufficient optical density for the energy involved. Safety goggles intended for use with laser beams must be labeled with the laser wavelengths for which they provide protection, the optical density of those wavelengths and the visible light transmission.

When a face shield is used in atmospheres or working areas requiring special conditions of non-conductivity or non-sparking, the equipment and materials used must meet those requirements. A face shield must be identified as a “non-conductive face shield” or “non-sparking face shield.”

Welding Operations

The intense light associated with welding operations can cause serious and sometimes permanent eye damage if operators do not wear proper eye protection. The intensity of light or radiant energy produced by welding, cutting or brazing operations varies according to a number of factors including the task producing the light, the electrode size and the arc current. Table 2 shows the minimum protective shades for a variety of welding, cutting and brazing operations in general industry and in the shipbuilding industry.

Helmets or hand shields must be used during all arc welding or arc cutting operations, excluding submerged arc welding. Helpers or attendants must be provided with proper eye protection. A hand shield must be constructed of materials similar to those used for a helmet, in a like manner, to protect the body from direct radiant energy.

TABLE 2 -- FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operations	Electrode Size 1/32 in.	Arc Current	Minimum (*) Protective Shade
Shielded metal arc welding	Less than 3	Less than 60	7
	3-5	60-160	8
	5-8	160-250	10
	More than 8	250-550	11
Gas metal arc welding and flux cored arc welding		Less than 60	7
		60-160	10
		160-250	10
		250-500	10
Gas tungsten arc welding		Less than 50	8
		50-150	8
		150-500	10
Air carbon arc cutting	(Light)	Less than 500	10
	(Heavy)	500-1000	11
Plasma arc welding		Less than 20	6
		20-100	8
		100-400	10
		400-800	11
Plasma arc cutting	(light)(**)	Less than 300	8
	(medium)(**)	300-400	9
	(heavy)(**)	400-800	10
Torch brazing			3
Torch soldering			2
Carbon arc welding			14

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operations		Plate Thickness – inches	Plate Thickness – mm	Minimum (*) Protective Shade
Gas Welding	Light	Under ⅛	Under 3.2	4
	Medium	⅛ to ½	3.2 to 12.7	5
	Heavy	Over ½	Over 12.7	6
Oxygen Cutting	Light	Under 1	Under 25	3
	Medium	1 to 6	25-150	4
	Heavy	Over 6	Over 150	5
Footnote (*) As a rule of thumb, start with a shade that is too dark to see the weld zone. Then go to a lighter shade, which gives sufficient view of the weld zone without going below the minimum. In oxyfuel gas welding or cutting where the torch produces a high yellow light, it is desirable to use a filter lens that absorbs the yellow or sodium line in the visible light of the (spectrum) operation. Footnote (**) These values apply where the actual arc is clearly seen. Experience has shown that lighter filters may be used when the arc is hidden by the workpiece.				

HEAD PROTECTION

Bannister Electric LLC of West Monroe will protect employees from potential head injuries by providing proper head protection and accessories, and ensuring that employees wear these items to protect themselves from injury. Hard hats and helmets can protect employees from impact and penetration hazards, as well as from electrical shock and burn hazards.

Bannister Electric LLC of West Monroe will ensure employees wear head protection if any of the following apply:

- Objects might fall from above and strike them on the head;
- They might bump their heads against fixed objects, such as exposed pipes or beams
- There is a possibility of accidental head contact with electrical hazards or any other harmful contacts or exposures
- There is a risk of injury from any of the following:
  - Electric shock
  - Hair entanglement
  - Chemicals
  - Temperature extremes

Some examples of occupations where employees will be required to wear head protection include construction workers, carpenters, electricians, linemen, plumbers and pipefitters, timber and log cutters, welders, among many others. Whenever there's a danger of objects falling from above, such as working below others who are using tools or working under a conveyor belt, head protection must be worn. Hard hats must be worn with the bill forward to protect employees properly.

In general, protective helmets or hard hats should do the following:

- Resist penetration by objects
- Absorb the shock of a blow
- Be water-resistant and slow burning
- Have clear instructions explaining proper adjustment and replacement of the suspension and headband, which must be replaced if slack, twisted, worn out, sweat-soaked, etc.

Hard hats must have a hard outer shell and a shock-absorbing lining that incorporates a headband and straps that suspend the shell from 1 to 1¼ inches (2.54 cm to 3.18 cm) away from the head. This type of design provides shock absorption during an impact and ventilation during normal wear.

A metallic head device must not be furnished by an employer or used by an employee for head protection, except where it has been determined that the use of other types of protective helmets or safety hats or caps is impractical, such as where chemical reaction will cause the deterioration of other types of head protection.

Types of Hard Hats/Helmets

Bannister Electric LLC of West Monroe will select protective headgear that meets ANSI standard requirements and will ensure employees wear hard hats/helmets to provide appropriate protection against potential workplace hazards. Hardhat selection must consider all hazards on the worksite, including electrical hazards. This can be done through a comprehensive hazard analysis and an awareness of the different types of protective headgear available.

Hard hats are divided into three industrial classes:

- **Class G** (formerly Class A) hard hats (General) provide impact and penetration resistance along with limited voltage protection (up to 2,200 volts)
- **Class E** (formerly class B) hard hats (Electrical) provide the highest level of protection against electrical hazards, with high-voltage shock and burn protection (up to 20,000 volts). They also provide protection from impact and penetration hazards by flying/falling objects
- **Class C** hardhats (Conductive) provide lightweight comfort and impact protection but offer no protection from electrical hazards

In addition, hard hats/helmets that protect against impacts are classified as either:

- **Type I** – Helmets that are intended to reduce the force of impact resulting from a blow only to the top of the head
- **Type II** – Helmets that are intended to reduce the force of impact resulting from a blow to the top or sides of the head

Another class of protective headgear on the market is called a “bump hat,” designed for use in areas with low head clearance. They are recommended for areas where protection is needed from head bumps and lacerations. These are not designed to protect against falling or flying objects and are not ANSI approved. It is essential to check the type of hardhat employees are using to ensure that the equipment provides appropriate protection. Each hat will have a label inside the shell that lists the manufacturer, the ANSI designation and the class of the hat.

Size and Care Considerations

Head protection that is too large or too small is inappropriate for use, even if it meets all other requirements. Protective headgear must fit appropriately on the body and for the head size of each individual. Most protective headgear comes in a variety of sizes with adjustable headbands to ensure a proper fit (many adjust in ⅛-inch increments). A proper fit allows sufficient clearance between the shell and the suspension system for ventilation and distribution of an impact. The hat must not bind, slip, fall off or irritate the skin.

Some protective headgear allows for the use of various accessories to help employees deal with changing environmental conditions, such as slots for earmuffs, safety glasses, face shields and mounted lights. Optional rims may provide additional protection from the sun and some hats have channels that guide rainwater away from the face. Protective headgear accessories must not compromise the safety elements of the equipment.

Periodic cleaning and inspection will extend the useful life of protective headgear. A daily inspection of the hardhat shell, suspension system, and other accessories for holes, cracks, tears or other damage that might compromise the protective value of the hat is essential. Paints, paint thinners and some cleaning agents can weaken shells of hard hats and may eliminate electrical resistance. Consult the helmet manufacturer for information on the effects of paint and cleaning materials on their hard hats. Never drill holes, paint, or apply labels to protective headgear as this may reduce the integrity of the protection. Do not store protective headgear in direct sunlight, such as on the rear window shelf of a car, since sunlight and heat can damage them.

Hardhats with any of the following defects must be removed from service and replaced:

- Perforation, cracking, or deformity of the brim or shell
- Indication of exposure of the brim or shell to heat, chemicals or ultraviolet light and other radiation (in addition to a loss of surface gloss, such signs include chalking or flaking)

Always replace a hardhat if it sustains an impact, even if damage isn't noticeable. Suspension systems are available as replacement parts, and must be replaced if damaged or excessive wear is noticed. It's not necessary to replace the entire hard hat when deterioration or tears of the suspension systems are noticed.

Hoods

A hood must be made of materials that combine all of the following:

- Have mechanical strength and lightness of weight to a high degree
- Be non-irritating to the skin when subjected to perspiration
- Be capable of withstanding frequent cleaning and disinfection
- Materials used in the manufacture of hoods must be suitable to withstand the hazards to which the user may be exposed
- A hood must be designed to provide adequate ventilation for the wearer

A protective helmet must be used in conjunction with a hood where there is a head injury hazard and the hood must be designed to accommodate helmets.

Accessories

Faceshield Protection: Faceshield devices can be attached to the helmet without changing the helmet strength and electrical protection. A metal faceshield bracket system can be used on a Class G helmet; however, if a Class E helmet is to be used in an area where Class E protection is required, a type of bracket and shield system that won't conduct electricity (has a dielectric rating) must be used.

Earmuffs: The required degree of hearing protection will be considered prior to selecting earmuff attachments. If earmuffs are to be attached to helmets, metal attachments are acceptable for Class G helmets. Attachments with a dielectric rating must be used for Class E helmets.

Sweat Bands: If sweatbands are necessary, they must not interfere with the effectiveness of the helmet headband system. Some sweatband devices are made to fit on the headband. For electrical work, metal components must not be used to attach sweatbands to helmets.

Winter Liners: There are many varieties of winter liners. One type fits over the hardhat assembly. It must be flame retardant and elasticized to give the user a snug, warm fit. Other styles fit under the helmet. If the liner is to be used with a Class E helmet, it must have a dielectric rating. Regardless of the warmth characteristics, the liner and helmet combination must be compatible. The liner and helmet must fit properly to give the employee proper impact and penetration protection.

Chin Straps: When wind or other conditions present the possibility of the hard hat being accidentally removed from the head, chinstraps can be used. If chinstraps are used, they must be the type that fastens to the shell of the hard hat. If the chinstraps fasten to the headband and suspension system, the shell may blow off and strike another employee.

Hair Enclosures: Employees must wear a hat, cap or net if there's a danger of hair entanglement in moving machinery or equipment, or where there's a risk of exposure to an ignition source. Hair enclosures must completely enclose all loose hair; be adjustable to accommodate all head sizes; be designed to be reasonably comfortable to the wearer.

FOOT AND LEG PROTECTION

Employees who are exposed to possible foot or leg injuries from falling or rolling objects or from crushing or penetrating materials must wear protective footwear. In addition, employees whose work involves exposure to hot substances or corrosive or poisonous materials must have protective gear to cover exposed body parts, including legs and feet. If an employee's feet may be exposed to electrical hazards, nonconductive footwear must be worn. On the other hand, workplace exposure to static electricity may necessitate the use of conductive footwear.

An employer must ensure that employees wear protective footwear when working in areas where any of the following occur:

- Employees' feet are exposed to electrical hazards
- There is a danger of foot injuries due to falling or rolling objects, such as barrels or tools
- There is a danger of sharp objects, such as nails or spikes, piercing the soles of shoes
- There is exposure to molten metal that might splash on feet or legs
- There is possible exposure to chemical spills

Employees must also wear proper footwear (including protective footwear when necessary) when working on or around hot, wet, or slippery surfaces.

Foot and leg protection choices include the following:

- Leggings or high boots made of a suitable material (e.g. leather, rubber) for workers exposed to dangerous chemical spill and heat hazards such as molten metal or welding sparks
- When an employee uses a chain saw, he must wear chaps or leg protectors, made from material designed to resists cuts, covering from at least upper thigh to mid-calf
- Metatarsal guards protect the instep area from impact and compression. Made of aluminum, steel, fiber, or plastic, these guards may be strapped to the outside of shoes. Footwear designed to newer versions of ANSI Z41 and the ASTM standards require metatarsal protection to be built into the footwear
- Toe guards fit over the toes of regular shoes to protect the toes from impact and compression hazards. They may be made of steel, aluminum, or plastic

An employer who chooses to provide employees with toe guards must demonstrate that they are as protective as an incorporated toebox used in safety-toe footwear.

- Combination foot and shin guards protect the lower legs and feet, and may be used in combination with toe guards when greater protection is needed
- Safety shoes have impact-resistant toes and heat-resistant soles that protect the feet against hot work surfaces common in roofing, paving and hot metal industries. The metal insoles of some safety shoes protect against puncture wounds. Safety shoes may also be designed to be electrically conductive to prevent the buildup of static electricity in areas with the potential for explosive atmospheres or nonconductive to protect workers from workplace electrical hazards
- If a hazard is created from a process, environment, chemical, or mechanical irritant that could cause an injury or impairment to the feet by absorption or physical contact, other than from impact, the employer must provide any of the following to the employee:
  - Boots
  - Overshoes
  - Rubbers
  - Wooden-soled shoes
  - An equivalent of the above

Special Purpose Shoes

Electrically conductive shoes provide protection against the buildup of static electricity. Employees working in explosive and hazardous locations such as explosives manufacturing facilities or grain elevators must wear conductive shoes to reduce the risk of static electricity buildup on the body that could produce a spark and cause an explosion or fire.

Don’t use foot powder when wearing protective conductive footwear because it provides insulation, reducing the conductive ability of the shoes. Don’t wear silk, wool and nylon socks that can produce static electricity with conductive footwear. Conductive shoes must be removed when the task requiring their use is completed.

Employees exposed to electrical hazards must never wear conductive shoes. Electrical hazard, safety-toe shoes are non-conductive, and will prevent the wearers' feet from completing an electrical circuit to ground. These shoes can protect against open circuits of up to 600 volts in dry conditions, and should be used with other insulating equipment and additional precautions to reduce the risk of a worker becoming a path for hazardous electrical energy.

The insulating protection of electrical hazard, safety-toe shoes may be compromised if the shoes become wet, the soles are worn through, metal particles become embedded in the sole or heel, or workers touch conductive grounded items. Note: Nonconductive footwear must not be used in explosive or hazardous locations.

Foundry shoes insulate the feet from the extreme heat of molten metal. They keep hot metal from lodging in shoe eyelets, tongues or other shoe parts. These snug-fitting leather or leather-substitute shoes have leather or rubber soles and rubber heels. All foundry shoes must have built-in safety toes.

Care of Protective Footwear

As with all protective equipment, safety footwear must be inspected prior to each use. Shoes and leggings need to be checked for wear and tear at reasonable intervals. This includes looking for cracks or holes, separation of materials, broken buckles or laces. Check the soles of shoes for pieces of metal or other embedded items that could present electrical or tripping hazards. Employees will follow the manufacturers' recommendations for cleaning and maintenance of protective footwear.

HAND AND ARM PROTECTION

If a workplace hazard assessment reveals employees face potential injury to hands and arms that cannot be eliminated through engineering and work practice controls, Bannister Electric LLC of West Monroe will ensure employees wear appropriate protection. Potential hazards that require protection include skin absorption of harmful substances, chemical or thermal burns, electrical dangers, bruises, abrasions, cuts, punctures, fractures, amputations and harmful temperature extremes.

Protective equipment includes gloves, finger guards, and arm coverings. In addition, items such as machine guards and barriers are examples of engineering controls that may eliminate hazards to the hands and arms.

Types of Protective Gloves

There are many types of gloves available today to protect against a wide variety of hazards. The nature of the hazard and the operation involved will affect the selection of gloves. The variety of potential occupational hand injuries makes selecting the right pair of gloves challenging. No gloves can provide protection against all potential hand hazards. Employees must use gloves specifically designed for the hazards and tasks found in their workplace. Gloves designed for one function may not protect against a different function even though they may appear to be an appropriate protective device.

The following are examples of some factors that may influence the selection of protective gloves for a workplace:

- Type of chemicals handled (toxic properties of the chemical(s))
- Chemical concentration and temperature (the higher the concentration and temperature, the shorter the breakthrough time)
- Nature of contact (total immersion, continual contact, splash, etc)
- Duration of contact
- Area requiring protection (hand only, forearm, arm)
- Degree of dexterity (fine motor work)
- Grip requirements (dry, wet, oily)
- Thermal protection
- Size and comfort
- Abrasion/cut resistance requirements
- Other job hazards (such as biological, electrical, and radiation hazards)

Gloves are made from a wide variety of materials and are designed for many types of workplace hazards. In general, gloves fall into four groups:

- Gloves made of leather, synthetic fibers, or metal mesh
- Fabric and coated fabric gloves
- Chemical protective gloves
- Insulating rubber gloves (See 29 CFR 1910.137, Electrical Protective Equipment, for detailed requirements on the selection, use and care of insulating rubber gloves)

Leather, Canvas or Metal Mesh Gloves

- Sturdy gloves made from metal mesh, leather or canvas provide protection against cuts and burns. Leather or canvas gloves also protect against sustained heat
- Leather gloves protect against sparks, moderate heat, blows, chips and rough objects. These gloves can be used for tasks such as welding
- Aluminized gloves provide radiant heat protection by reflection and insulate/reduce heat conduction with a liner or insert. Employees working with molten materials would benefit from this type of glove
- Aramid fiber gloves such as Kevlar, protect against heat, are cut- and abrasion-resistant and wear well. Employees working in jobs such as firefighting, automotive work, metal fabrication, glass and ceramic handling would benefit from this type of glove
- Synthetic gloves of various materials offer protection against heat and cold, are cut- and abrasion-resistant and may withstand some diluted acids. These materials do not stand up against alkalis and solvents
- Metal mesh hand, wrist, arm and finger protective wear protects against knife cuts; however, it offers very little, if any, protection against punctures. Plastic dots can be adhered to the metal mesh to facilitate gripping

Fabric and Coated Fabric Gloves

Fabric and coated fabric gloves are made of cotton or other fabric to provide varying degrees of protection.

- Fabric gloves protect against dirt, slivers, chafing and abrasions. They do not provide sufficient protection for use with rough, sharp or heavy materials. Adding a plastic coating will strengthen some fabric gloves
- Coated fabric gloves normally are made from cotton flannel with napping on one side. By coating the un-napped side with plastic, fabric gloves are transformed into general-purpose hand protection offering slip-resistant qualities. These gloves are used for tasks ranging from handling bricks and wire to chemical laboratory containers. When selecting gloves to protect against chemical exposure hazards, always check with the manufacturer or review the manufacturer's product literature to determine the gloves' effectiveness against specific workplace chemicals and conditions

Chemical- and Liquid-Resistant Gloves

Chemical-resistant gloves are made with different kinds of rubber: natural, butyl, neoprene, nitrile and fluorocarbon (viton); or various kinds of plastic: polyvinyl chloride (PVC), polyvinyl alcohol and polyethylene. These materials can be blended or laminated for better performance. As a general rule, the thicker the glove material, the greater the chemical resistance but thick gloves may impair grip and dexterity, having a negative impact on safety

Some examples of chemical-resistant gloves include:

- Butyl gloves are made of a synthetic rubber and protect against a wide variety of chemicals, such as peroxide, rocket fuels, highly corrosive acids (nitric acid, sulfuric acid, hydrofluoric acid and red-fuming nitric acid), strong bases, alcohols, aldehydes, ketones, esters and nitro-compounds. Butyl gloves also resist oxidation, ozone corrosion and abrasion, and remain flexible at low temperatures. Butyl rubber does not perform well with aliphatic and aromatic hydrocarbons and halogenated solvents
- Natural (latex) rubber gloves are comfortable to wear, which makes them a popular general-purpose glove. They feature outstanding tensile strength, elasticity and temperature resistance. In addition to resisting abrasions caused by grinding and polishing, these gloves protect workers' hands from most water solutions of acids, alkalis, salts and ketones. Latex gloves have caused allergic reactions in some individuals and may not be appropriate for all employees. Hypoallergenic gloves, glove liners and powderless gloves are possible alternatives for workers who are allergic to latex gloves
- Neoprene gloves are made of synthetic rubber and offer good pliability, finger dexterity, high density, and tear resistance. They protect against hydraulic fluids, gasoline, alcohols, organic acids and alkalis. They generally have chemical and wear resistance properties superior to those made of natural rubber

- Nitrile gloves are made of a copolymer and provide protection from chlorinated solvents such as trichloroethylene and perchloroethylene. Although intended for jobs requiring dexterity and sensitivity, nitrile gloves stand up to heavy use even after prolonged exposure to substances that cause other gloves to deteriorate. They offer protection when working with oils, greases, acids, caustics, and alcohols but are generally not recommended for use with strong oxidizing agents, aromatic solvents, ketones, and acetates

Care of Protective Gloves

Protective gloves will be inspected before each use to ensure they are not torn, punctured or made ineffective in any way. A visual inspection will help detect cuts or tears but a more thorough inspection by filling the gloves with water and tightly rolling the cuff towards the fingers will help reveal any pinhole leaks. Gloves that are discolored or stiff may also indicate deficiencies caused by excessive use or degradation from chemical exposure. Interiors of gloves must be kept free of corrosive or irritating contaminants.

Any gloves with impaired protective ability must be discarded and replaced. Reuse of chemical-resistant gloves must be evaluated carefully, taking into consideration the absorptive qualities of the gloves. A decision to reuse chemically exposed gloves should take into consideration the toxicity of the chemicals involved and factors such as duration of exposure, storage and temperature. All gloves must be sanitized and clean before reissue.

BODY PROTECTION

Employees who face possible bodily injury of any kind that cannot be eliminated through engineering, work practice or administrative controls must wear appropriate body protection while performing their jobs. In addition to radiation, the following are workplace hazards that could cause bodily injury, and require protection:

- Temperature extremes
- Hot splashes from molten metals and other hot liquids
- Potential impacts from tools, machinery, and materials
- Hazardous chemicals
- Wetness

There are many varieties of protective clothing available for specific hazards. Employers are required to ensure that their employees wear personal protective equipment only for the parts of the body exposed to possible injury. Examples of body protection include laboratory coats, coveralls, vests, jackets, aprons, surgical gowns and full body suits.

If a hazard assessment indicates a need for full body protection against toxic substances or harmful physical agents, the clothing must be carefully inspected before each use, it must fit each worker properly and it must function properly and for the purpose for which it is intended.

Protective clothing comes in a variety of materials, each effective against particular hazards, such as:

- Paper-like fiber, which is used for disposable suits provide protection against dust and splashes
- Treated wool and cotton, which adapts well to changing temperatures, is comfortable and fire-resistant, and protects against dust, abrasions and rough, irritating surfaces

- Duck, which is a closely woven cotton fabric that protects against cuts and bruises when handling heavy, sharp, or rough materials
- Leather, which is often used to protect against dry heat and flames
- Rubber, rubberized fabrics, neoprene and plastics, which protect against certain chemicals and physical hazards
- When chemical or physical hazards are present, check with the clothing manufacturer to ensure that the material selected will provide protection against the specific hazard

HEARING PROTECTION

Determining the need to provide hearing protection for employees can be challenging. Employee exposure to excessive noise depends upon a number of factors, including:

- The loudness of the noise as measured in decibels (dB)
- The duration of each employee's exposure to the noise
- Whether employees move between work areas with different noise levels
- Whether noise is generated from one or multiple sources

Generally, the louder the noise, the shorter the exposure time before hearing protection is required. For instance, employees may be exposed to a noise level of 85 dB for 8 hours per day (unless they experience a Standard Threshold Shift) before hearing protection is required. At a noise level of 85 dB the Company is required to implement a hearing protection program that includes monitoring, employee audiometric testing and training on the use of hearing protection. If employees are exposed to a noise level of 115 dB, hearing protection is required and the exposure time can't exceed 15 minutes. For more information on the requirements for a comprehensive hearing conservation program, see the chapter on hearing protection.

If engineering and work practice controls do not lower employee exposure to workplace noise to acceptable levels, employees must wear appropriate hearing protection. It is important to understand that hearing protectors reduce only the amount of noise that gets through to the ears. The amount of this reduction is referred to as attenuation, which differs according to the type of hearing protection used and how well it fits. Hearing protectors worn by employees must reduce an employee's noise exposure to within the acceptable limits.

Types of hearing protection include the following:

- Single-use earplugs are made of waxed cotton, foam, silicone rubber or fiberglass wool. They are self-forming and, when properly inserted, they work as well as most molded earplugs
- Pre-formed or molded earplugs must be individually fitted by a professional and can be disposable or reusable. Reusable plugs must be cleaned after each use
- Earmuffs require a perfect seal around the ear. Glasses, facial hair, long hair, or facial movements such as chewing may reduce the protective value of earmuffs

Safety Belts, Lifelines, And Lanyards

The only acceptable use of lifelines, safety belts and lanyards is to safeguard employees. If a lifeline, safety belt or lanyard is subjected to in-service loading; it must be removed from service and discarded.

- Lifelines must be secured above the point of operation to an anchorage or structural member capable of supporting a minimum dead weight of 5,400 pounds
- If a lifeline is subject to cutting or abrasion, as may be the case on rock scaling operations, it must be at least ⅞-inch wire core manila rope. Otherwise, it may be a ¾-inch manila or equivalent, with a nominal breaking strength of at least 5,400 pounds
- Safety belt lanyards will be at least ½-inch nylon and provide for a fall that does not exceed 6 feet. They must also have a nominal breaking strength of 5,400 pounds
- Hardware on safety belts and lanyards in use must be drop forged or pressed steel or cadmium plated according to federal specifications. The surface must be smooth and free of sharp edges
- Safety belt and lanyard hardware, except rivets, must withstand a tensile loading of 4,000 pounds without cracking, breaking, or taking a permanent deformation

For more information, see the “Fall Protection” chapter.

OTHER PPE

High Visibility Apparel

High visibility apparel must be used by workers involved in traffic control, such as flaggers or law enforcement officers, or for employees who work on the roadways, such as sanitation, utility or construction workers and emergency responders. The apparel must be high visibility orange, yellow, yellow-green or a fluorescent version so that it contrasts with the surrounding area. Reflective material visible from all sides for 1,000 feet must be worn during dark hours.

Flotation Vests

Employees working over or near water, where the danger of drowning exists, will be provided with approved life jackets or buoyant work vests. These vests are available as flotation pads inside high visibility international orange nylon shells or as vinyl coated flotation pads of international orange. The flotation vests must be U.S. Coast Guard approved.

Additionally, in any other workplace where employees work over or near water, or use boats, approved life jackets, buoyant work vests or other flotation devices must be provided. All buoyant work vests and life preservers will be checked for defects before and after each use.

Welding and High Heat

Coveralls, jackets, pants and aprons are available for operations involving high heat or molten metal splashes. Leather is the traditional protective material for many welding operations. Where there is exposure to radiant heat as well as molten metal splashes, aluminized garments may be used. They reflect up to 95 percent of the radiant heat. Flame-resistant cotton coveralls designed for comfort and protection are sometimes preferred. Whatever the type of clothing used for welding operations, it must not have external pockets or cuffs. Fabrics of silica, ceramic and fiberglass eliminate the need for asbestos and are now available for welding operations. Protective clothing with asbestos will not be used.

FORMS AND ATTACHMENTS

Please find on the following pages the PPE Hazard Assessment Certification Form, which may be reproduced freely by Bannister Electric LLC of West Monroe for the purposes of implementing and maintaining a safety and health program.

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 1 OF 5)

Workplace		Conducted By	
Address		Date	
Area(s)		Job or Task	

Eyes

Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ abrasive blasting ☐ chopping ☐ cutting ☐ drilling ☐ hammering ☐ other: ☐ punch press operations ☐ sanding ☐ sawing ☐ grinding ☐ chipping	☐ airborne dust ☐ dirt ☐ UV ☐ flying particles/ objects ☐ blood splashes ☐ hazardous liquid chemicals and mists ☐ chemical splashes ☐ molten metal splashes ☐ glare/ high intensity lights ☐ laser operations ☐ intense light ☐ hot sparks ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Safety glasses ☐ Safety goggles ☐ Dust-tight goggles ☐ Impact goggles ☐ Welding helmet/shield ☐ Chemical goggles ☐ Chemical splash goggles ☐ Laser goggles ☐ Shading/ Filter (# ___) ☐ Welding shield ☐ Other: **With:** ☐ Side shields ☐ Face shield ☐ Shaded ☐ Prescription

Face

Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ cleaning ☐ cooking ☐ siphoning ☐ painting ☐ dip tank operations ☐ pouring ☐ other: ☐ foundry work ☐ welding ☐ mixing ☐ pouring molten metal ☐ working outdoors	☐ hazardous liquid chemicals ☐ extreme heat ☐ extreme cold ☐ potential irritants ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Face shield ☐ Shading/ filter (#____) ☐ Welding shield ☐ other:

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 2 OF 5)

Head		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ building maintenance ☐ confined space operations ☐ electrical wiring ☐ walking/ working under catwalks ☐ walking/ working on catwalks ☐ walking/ working under conveyor belts ☐ working with/ around conveyor belts ☐ walking/ working under crane loads ☐ utility work ☐ other:	☐ beams ☐ pipes ☐ exposed electrical wiring or components ☐ falling objects ☐ fixed object ☐ machine parts ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Protective Helmet ☐ Type G (low voltage) ☐ Type E (high voltage) ☐ Type C ☐ Bump cap (not ANSI-approved) ☐ Hair net or soft cap ☐ other:

Hand/Arms		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ baking ☐ cooking ☐ grinding ☐ welding ☐ working with glass ☐ using computers ☐ using knives ☐ dental and health care services ☐ garbage disposal ☐ computer work ☐ material handling ☐ sanding ☐ sawing ☐ hammering ☐ using power tools ☐ working outdoors ☐ other:	☐ blood ☐ irritating chemicals ☐ tools or materials that could scrape, bruise, or cut ☐ extreme heat ☐ extreme cold ☐ animal bites ☐ electric shock ☐ vibration ☐ musculoskeletal disorders ☐ sharps injury ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Gloves ☐ Chemical resistance ☐ Liquid/leak resistance ☐ Temperature resistance ☐ Abrasion/cut resistance ☐ Slip resistance ☐ Latex or nitrile ☐ Anti-vibration ☐ Protective sleeves ☐ Ergonomic equipment _____ ☐ Other:

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 3 OF 5)

Feet/Legs		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ building maintenance ☐ construction ☐ demolition ☐ food processing ☐ foundry work ☐ working outdoors ☐ logging ☐ plumbing ☐ trenching ☐ use of highly flammable materials ☐ welding ☐ other:	☐ explosive atmospheres ☐ explosives ☐ exposed electrical wiring or components ☐ heavy equipment ☐ slippery surfaces ☐ impact from objects ☐ pinch points ☐ slippery/wet surface ☐ crushing ☐ sharps injury ☐ blood ☐ chemical splash ☐ chemical penetration ☐ extreme heat/cold ☐ fall ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Safety shoes or boots ☐ Toe protection ☐ Electrical protection ☐ Puncture resistance ☐ Anti-slip soles ☐ Leggings or chaps ☐ Foot-Leg guards ☐ Metatarsal protection ☐ Heat/Cold protection ☐ Chemical resistance ☐ Other:

Body/Skin		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ baking or frying ☐ battery charging ☐ dip tank operations ☐ fiberglass installation ☐ sawing ☐ other:	☐ chemical splashes ☐ extreme heat ☐ extreme cold ☐ sharp or rough edges ☐ irritating chemicals ☐ blood ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Vest ☐ Coveralls ☐ Raingear ☐ Apron ☐ Welding leathers ☐ Abrasions/ cut resistance ☐ Other:

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 4 OF 5)

Body/Whole				
Work activities, such as	Work-related exposure to		Can hazard be eliminated without the use of PPE?	
☐ building maintenance ☐ construction ☐ logging ☐ computer work ☐ working outdoors ☐ utility work ☐ other:	☐ working from heights of 10 feet or more ☐ impact from flying objects ☐ impact from moving vehicles ☐ sharps injury ☐ blood ☐ electrical/ static discharge ☐ hot metal ☐ sparks	☐ musculo-skeletal disorders ☐ chemicals ☐ extreme heat/cold ☐ elevated walking/working surface ☐ working near water ☐ injury from slip/trip/fall ☐ other:	☐ Yes **If No, use:** ☐ Fall arrest/restraint ☐ Traffic vest ☐ Static coats/overalls ☐ Flame resistant jacket/pants ☐ Insulated jacket ☐ Cut-resistant sleeves/ wristlets	☐ No ☐ Hoists/lift ☐ Ergonomic equipment _____ ☐ Other: **With:** ☐ Hood ☐ Full sleeves

Lungs/Respiratory				
Work activities, such as		Work-related exposure to		Can hazard be eliminated without the use of PPE?	
☐ cleaning ☐ mixing ☐ painting ☐ fiberglass installation ☐ compressed air or gas operations ☐ confined space work	☐ floor installation ☐ ceiling repair ☐ working outdoors ☐ pouring ☐ sawing ☐ other:	☐ dust or particulate ☐ toxic gas/vapor ☐ chemical irritants (acids) ☐ welding fume ☐ asbestos ☐ pesticides	☐ organic vapors ☐ oxygen deficient environment ☐ paint spray extreme heat/ cold ☐ other:	☐ Yes **If No, use:** ☐ Dust mask ☐ Disposable particulate respirator ☐ Replaceable filter particulate w/cartridge ☐ PAPR (air recycle) ☐ PPSA (air supply)	☐ No **With:** ☐ Face shield ☐ Acid/gas crtg ☐ Organic crtg ☐ Pesticide crtg ☐ Spray paint crtg ☐ Half-faced ☐ Full-faced ☐ Hooded

PPE HAZARD ASSESSMENT CERTIFICATION FORM (PAGE 5 OF 5)

Ears/Hearing		
Work activities, such as	Work-related exposure to	Can hazard be eliminated without the use of PPE?
☐ generator ☐ ventilation fans ☐ motors ☐ sanding ☐ pneumatic equipment ☐ punch or brake presses ☐ use of conveyers ☐ grinding ☐ machining ☐ routers ☐ sawing ☐ sparks ☐ other:	☐ loud noises ☐ loud work environment ☐ noisy machines/tools ☐ punch or brake presses ☐ other:	☐ Yes ☐ No **If No, use:** ☐ Ear muffs ☐ Ear plugs ☐ Leather welding hood
Additional Notes		

POLICY

Bannister Electric LLC of West Monroe is committed to the safety and health of its employees. To identify and control hazards presented by products that contain materials, chemicals or components that may cause injury or illness in the workplace, Bannister Electric LLC of West Monroe has in place a Hazard Communication Program (HCP) to provide information to employees about any hazardous materials to which they are exposed.

If Bannister Electric LLC of West Monroe employees are exposed to any hazardous chemical, Bannister Electric LLC of West Monroe designates Supervisors to ensure a written HCP is created, communicated to all employees, and maintained according to all applicable regulations, standards and industry best practices.

All aspects of this policy and the Bannister Electric LLC of West Monroe Hazard Communication Program are subject to annual review by Supervisors to verify the effectiveness of the policy, to guarantee a safe working environment for Bannister Electric LLC of West Monroe employees, and to reflect any regulatory changes to which the policy must respond.

OSHA has adopted the United Nation's Globally Harmonized System (GHS) of Classification and Labeling of Chemicals into its Hazard Communication standard, this includes:

- Safety Data Sheets (SDS) and their new format instead of Material Safety Data Sheets (MSDS)
- The requirements and formats for the new primary and secondary labels
- Employee Training requirements so workers understand the risks to safety and health that hazardous materials pose at their worksite, and being able to read and understand the new SDS sheets and labels."

The Hazard Communication Program (HCP) describes how Bannister Electric LLC of West Monroe will meet all applicable requirements regarding identifying hazardous chemicals, labeling under the GHS guidelines, providing availability of safety data sheets (SDS), and employee information and training.

The HCP also will include the following:

- A list of chemicals (SDS) in inventory known to present a hazard to Bannister Electric LLC of West Monroe employees
- Methods Bannister Electric LLC of West Monroe will use to inform employees of hazards presented by non-routine tasks
- Methods Bannister Electric LLC of West Monroe will use to inform employees of hazards associated with chemicals contained in unlabeled pipes in their work areas

EMPLOYER RESPONSIBILITIES

- It is the responsibility of Bannister Electric LLC of West Monroe (through Supervisors) to:
- Establish a Hazard Communication Program if employees work with or around any potentially hazardous material
- Ensure that proper safeguards are in place to ensure the safety of personnel working with or around hazardous chemicals
- Maintain a list of hazardous chemicals that exist in the workplace as well as in formation on the hazards they present (SDS), and ensure that every employee can readily access them
- Ensure all hazardous chemicals in the workplace are labeled and have a complete safety data sheet on file
- Ensure all employees are trained on the Hazard Communication Program (HCP)
- Provide support for the implementation of HCP
- Review the HCP at least annually to evaluate the effectiveness of the program
- Report the use of known carcinogens to the state OSHA division as required.

EMPLOYEE RESPONSIBILITIES

Every Bannister Electric LLC of West Monroe employee is expected to:

- Follow safety policy and adhere to all precautions and safety requirements when working with or around hazardous chemicals
- Understand the hazards of the chemicals in the workplace by reviewing SDS before using any hazardous chemical
- Understand how to lessen or prevent exposure to hazardous chemicals through safe work practices and use of personal protective equipment
- Understand emergency procedures in the event of exposure to these chemicals
- Verify the proper labeling of chemicals at the worksite, and the presence of SDS for each
- Report any deficiencies in hazard communication as soon as safely possible to his or her supervisor
- Attend and participate actively in safety trainings

TRAINING

Bannister Electric LLC of West Monroe will provide training covering all aspects of the Hazard Communication Program. Bannister Electric LLC of West Monroe will provide training on hazardous chemicals in their employee's work area at the time of assignment and whenever a new hazard is introduced to their work area.

All employees who may be exposed to hazardous chemicals under normal operating conditions while performing their job duties in their assigned work areas must receive training. Bannister Electric LLC of West Monroe may design training or use training designed to cover categories of hazards or specific chemicals.

The HCP will be made available upon request to any employee (or their designated representatives) and any regulatory official with the authority to demand it.

Training Components

Supervisors will ensure that all employees at Bannister Electric LLC of West Monroe are informed and trained in the following minimum elements for hazard communication:

- The requirements of regulatory bodies, industry standards and best safety practices regarding specific chemicals
- Operations in the employee's work area that involve hazardous chemicals
- Physical, health, simple asphyxiation, combustible dust, and pyrophoric gas hazards, as well as hazards not otherwise classified, of the chemicals in the work area
- Reading and understanding hazardous chemical labeling, including pictograms, signal words, hazard statements, and precautionary statements
- The availability and location of the written HCP, list of hazardous chemicals, and SDS
- How to detect the presence or release of a hazardous chemical in the work area
- The classified and unclassified hazards of chemicals in the work area
    - The Globally Harmonized System of Classification (GHS) determines if a substance or mixture meets their criteria for a hazardous substance, meaning harmful to the environment or to humans. OSHA has adopted the GHS classification of chemicals. Those substances that are identified as hazardous are referred to as Classified. Substances that have not yet been classified are referred to as 'Hazards Not Otherwise Classified' (HNOC) or Unclassified.
- Measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented for employee protection
- The details of the HCP, including an explanation of all labels and SDS, how employees can obtain and use the appropriate hazard information. Training must include the order of information on the SDS and how to obtain and use the hazard information

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Bannister Electric LLC of West Monroe will retain employee training records for the length of their employment.

HAZARD DETERMINATION AND COMMUNICATION

Bannister Electric LLC of West Monroe will rely on the evaluation of the chemical manufacturer or importer of any hazardous chemicals at the worksite to provide the identifying labels and safety data information required for the HCP.

Container Warning Labels

The purpose of a container warning label is to warn employees about the container's contents and to refer employees to an appropriate SDS for more information about the chemical's physical and health hazards. Manufacturers, importers and distributors must ensure that each hazardous chemical product sold to you has a label that includes the chemical's identity, a hazard warning, and a name and address for additional information about the product. If you use hazardous chemicals at your workplace, you must ensure that each hazardous chemical container has a legible label, in English that identifies the chemical and warns of its hazards.

Original Containers

Original containers of hazardous chemicals from a manufacturer, importer or distributor must have warning labels. Do not remove or deface them.

The GHS does not specify a label format or layout, but requires the inclusion of several elements. All hazardous material containers at Bannister Electric LLC of West Monroe will be labeled, tagged or marked with the following:

1. **Product Identifier**. The product identifier must match the identifier on the safety data sheet and include the chemical identity of the substance or ingredients in a mixture that contribute to the product's hazards.

2. **Pictograms**. Pictograms are combinations of graphical elements that convey information about the product's hazards. GHS hazard pictograms are a black symbol on a white field within a red diamond.

3. **Signal Word**. Signal words indicate the severity of the product's hazard. "Danger" indicates severe hazards while "Warning" indicates less sever hazards.

4. **Hazard Statements**. Hazard statements are assigned based on the nature of the product's hazards.

5. **Precautionary Statements**. Precautionary statements inform the reader about how to prevent or minimize the negative effects of storing or handling the product unsafely. They fall into four categories: prevention, response, storage and disposal.

6. **Supplier Identification**. The supplier identification includes the name, address and telephone number that can be used to locate or communicate with the manufacturer or supplier.

Other Elements: GHS permits competent authorities to require or allow additional information and specify where it must be presented on the product label as long as it does not impede, contradict or confuse the standard information. Examples include transport pictograms, precautionary pictograms, first-aid recommendations, universal product codes, general usage information, etc.

Secondary/Portable Containers

Secondary containers are used to hold material transferred from the manufacturers' original container. These must be labelled if:

- It's not used within the work shift by the individual who makes the transfer
- The worker who made the transfer leaves the work area
- The container is moved to another work area and is no longer in the possession of the person who filled the container

Bannister Electric LLC of West Monroe will verify that workplace labels or other forms of warning are legible, in English, and prominently displayed on the container, or readily available in the work area throughout each work shift. If Bannister Electric LLC of West Monroe has employees who speak other languages, the company may add the information in their language to the material presented, as long as the information is presented in English as well.

Labels for secondary containers must include:

- The identity of the chemical and appropriate hazard warnings must be shown on the label.
- The hazard warning that provides users with an immediate understanding of the primary health and/or physical hazard(s) of the chemical through the use of words, pictures, symbols, or any combination of these elements
- The name and address of the manufacturer, importer or other responsible party

The hazard label message must be legible, permanently displayed and written in English

Portable containers are intended for immediate use of a chemical by the person who makes the transfer. Labels on portable containers are not required if the worker who made the transfer uses all of the contents during the work shift, or the chemical is return to a labelled primary or secondary container at the end of the shift, or when work is completed.

For unclassified hazards, the label requires supplementary information, a description of the unclassified hazards and appropriate precautionary measures to take for safe handling and use.

- Alternatively, hazardous material containers at Bannister Electric LLC of West Monroe can be marked with the product identifier and words, pictures, symbols, or combination thereof, to provide at least general information regarding the hazards of the chemicals. Labeling is done in conjunction with other information immediately available to employees under the HCP to provide employees with the specific information regarding the physical and health hazards of the hazardous chemical
- Instead of labelling individual containers, the Bannister Electric LLC of West Monroe HCP may rely on signs, placards, process sheets, batch tickets, operating procedures or similar written materials, as long as the alternative method provides workers with the same information. See the signage provisions of the National Fire Protection Association contained in NFPA 704 – Standard System for the Identification of the Hazards of Materials for Emergency Response
- A container for a hazardous substance into which the substance has been transferred for immediate use does not have to be labeled. Labels are necessary, however, for any container that is stored
- No employee will remove or deface labels or other forms of warnings
- Bannister Electric LLC of West Monroe will check that labels are legible in English, but may present the chemical's hazard information in another language, as long as it's also present in English

- Don't use any container that's contained a hazardous substance unless the it's been thoroughly cleaned to remove all traces of any hazardous substance, except where the container is refilled with the same substance
- Verify that every container is correctly labeled with regard to its contents

SAFETY DATA SHEETS

Bannister Electric LLC of West Monroe will continuously compile and keep at the workplace a list of all known hazardous chemicals that are present

The GHS does not specify a specific format or layout for the data sheet, but requires the inclusion of several elements, which will include the following section numbers and headings, and the information about the chemical associated with each:

- Section 1, Identification
- Section 2, Hazard(s) identification
- Section 3, Composition/information on ingredients
- Section 4, First-aid measures
- Section 5, Fire-fighting measures
- Section 6, Accidental release measures
- Section 7, Handling and storage
- Section 8, Exposure controls/personal protection
- Section 9, Physical and chemical properties
- Section 10, Stability and reactivity
- Section 11, Toxicological information
- Section 12, Ecological information
- Section 13, Disposal considerations
- Section 14, Transport information
- Section 15, Regulatory information
- Section 16, Other information, including date of preparation or last revision.

EMERGENCY PLANNING

Facilities that maintain Extremely Hazardous Substances (EHS) on-site in quantities greater than corresponding threshold planning quantities must cooperate in emergency plan preparation with local/state governments. Local governments are required to prepare chemical emergency response plans, and to review plans at least annually. State governments are required to oversee and coordinate local planning efforts.

For a complete list of related requirements, see the Emergency Planning and Community Right-to-Know Act (EPCRA), passed by Congress in 1986. This section, and the two that follow, contain the major provisions of the EPCRA.

REPORTING

Facilities must immediately report to state and local officials accidental releases of EHS chemicals and "hazardous substances" in quantities greater than corresponding Reportable Quantities (RQs) defined under the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA). Information about accidental chemical releases must also be available to the public.

The EPA requires facilities that manufacture, use, or store 500 pounds or the Threshold Planning Quantity (whichever is less), of an extremely hazardous substance (EHS), report to state and local officials, and to local fire departments, inventories of all on-site chemicals for which safety data sheets exist. Facilities that manufacture, use or store 10,000 pounds of any hazardous chemical must also follow the same reporting procedures (gasoline and diesel fuel are the only hazardous chemicals to have higher threshold levels).

Facilities, as applicable, must complete and submit a toxic chemical release inventory form (Form R) annually. Form R must be submitted for each of the over 600 TRI chemicals that are manufactured or otherwise used above the applicable threshold quantities.

COMMUNITY RIGHT TO KNOW

In addition to providing employees with information regarding the hazards of chemicals in the workplace, employers must also, upon request, inform members of the public about the health and environmental hazards posed by stored or released chemicals. The public is also entitled to know the approximate quantities of chemicals stored or released at a given workplace. If an employer denies a reasonable request, the requesting party may then file an application for information with the state agency that has jurisdiction, or federal OSHA.

HAZARD CONTROL

Employers must protect workers against the potential negative health effects of exposure to hazardous substances by ensuring employees use respirators and appropriate equipment if they are, or may be, exposed to substances at levels above permissible exposure limits (PELs).

Permissible Exposure Limits (PELs)

Approximately 500 PELs have been established by OSHA as part of 29 CFR 1910.1000. See tables Z-1 and Z-2 for the current levels, and check to see if their state OSHA (if applicable) has more stringent standards for specific hazardous substances.

Multi-Employer Workplaces

If hazardous chemicals present risk to employees of another employer, Bannister Electric LLC of West Monroe will ensure the HCP includes the methods to do the following for the other employers on the site:

- Provide onsite access to SDS for each hazardous chemical to which their employees may be exposed
- Inform them of any precautionary measures that need to be taken for worker protection during normal operating conditions and foreseeable emergencies
- Inform them of the labeling system used in the workplace

Multiple Workplaces

If employees must travel between workplaces during a shift, Bannister Electric LLC of West Monroe may keep the HCP at only the primary workplace facility.

Non-Routine Tasks

Before employees begin work on hazardous non-routine tasks, the appropriate supervisor will give affected employees information about hazardous chemicals to which the employee may be exposed during such activity. This information will include the following:

- Specific chemical hazards
- Protective/safety measures employees can take
- Measures Bannister Electric LLC of West Monroe has taken to reduce the hazards

Hazardous Chemicals in Unlabeled Pipes

If there are hazards associated with chemicals in the piping system in the work area, a supervisor must inform employees working around the pipes and provide information about the chemical and its hazards. Labels to relay this information are good practice for workplaces that transport potentially hazardous chemicals through pipes, and may be required by other regulations.

Standards for labeling pipes in the workplace can be found in ANSI A13.1.

FORMS AND ATTACHMENTS

Please find on the following pages the below documents, which may be reproduced freely by Bannister Electric LLC of West Monroe for the purposes of implementing and maintaining a safety and health program.

- Hazardous Chemical labels
- Hazardous Chemicals List

HAZARDOUS CHEMICAL LABEL

HAZARDOUS CHEMICAL	**HAZARDOUS CHEMICAL**
NAME OF CHEMICAL:	**NAME OF CHEMICAL:**
Physical Hazards:	Physical Hazards:
Health Hazards, Target Organs, or Systems:	Health Hazards, Target Organs, or Systems:
Optional Information, such as Personal Protective Equipment or Safe Handling:	Optional Information, such as Personal Protective Equipment or Safe Handling:
HAZARDOUS CHEMICAL	**HAZARDOUS CHEMICAL**
NAME OF CHEMICAL:	**NAME OF CHEMICAL:**
Physical Hazards:	Physical Hazards:
Health Hazards, Target Organs, or Systems:	Health Hazards, Target Organs, or Systems:
Optional Information, such as Personal Protective Equipment or Safe Handling:	Optional Information, such as Personal Protective Equipment or Safe Handling:

HAZARDOUS CHEMICALS LIST

The following list identifies all hazardous chemicals used at this workplace. Detailed information about the physical and health effects of each chemical is included in a safety data sheet; the identity of each chemical on the list matches the identity of the chemical on its safety data sheet. Safety data sheets are readily available to employees in their work areas.

Product or Brand Name	Manufacturer	Hazardous Ingredient

POLICY

Bannister Electric LLC of West Monroe has established this electrical safety policy to protect all employees from the hazards of working with and around electricity. This policy is intended for employees who may be exposed to electrical hazards on the job. Employees who are qualified and assigned the duties of performing electrical work need to refer to the “Electrical Work” chapter of this manual for additional information. Qualified workers (electrical trade workers) require additional training and or certification.

Many workers in manufacturing and construction deal with potential electrical hazards when working with power equipment and tools, but office personnel and others can also be exposed to these hazards. For that reason, all employees must be trained on electrical hazards and how to avoid them.

EMPLOYER RESPONSIBILITY

Bannister Electric LLC of West Monroe is responsible for providing:

- All tools and equipment will meet the required safety standards
- Approved PPE to employees as needed
- A written electrical safety program and training on the program

EMPLOYEE RESPONSIBILITIES

All Bannister Electric LLC of West Monroe employees are expected to:

- Follow safe work practices and adhere to all precautions and safety requirements when working with or around electrical equipment or circuits
- Understand how to reduce or prevent exposure to electrical hazards through safe work practices and use of PPE
- Use only hand tools, electric tools, extension cords and other equipment that are in good repair
- De-energize electric power circuits and/or equipment before working near, inspecting or making repairs
- Understand emergency procedures in the event of an electrical accident
- Report any potential electrical hazards as soon as safely possible to their supervisor
- Attend and participate actively in safety trainings
- Exercise good judgment when working near energized lines (including underground and overhead lines). Comply with OSHA regulations and the current National Electric Code, NFPA 70

HAZARDS

Electrical Shock

An electrical shock is received when electrical current passes through the body. Current will pass through the body in a variety of situations. Whenever two wires are at different voltages, current will pass between them if they are connected. Your body can connect the wires if you touch both of them at the same time. Current will pass through your body.

The severity of injury from electrical shock depends on the amount of electrical current and the length of time the current passes through the body. For example, 100 milliamps of electricity going through the body for just 2 seconds is enough to cause death. The amount of internal current a person can withstand and still be able to control the muscles of the arm and hand can be less than 10 milliamps

The table below shows what usually happens for a range of currents (lasting one second) at typical household voltages. Longer exposure times increase the danger to the shock victim. For example, a current of 100 mA applied for 3 seconds is as dangerous as a current of 900 mA applied for 0.03 seconds. The muscle structure of the person also makes a difference. People with less muscle tissue are typically affected at lower current levels. Even low voltages can be extremely dangerous because the degree of injury depends not only on the amount of current but also on the length of time the body is in contact with the circuit.

LOW VOLTAGE DOES NOT MEAN LOW HAZARD!

Effects of Electrical Current* on the Body	
Current	**Reaction**
1 milliamp	Just a faint tingle
5 milliamps	Slight shock felt. Disturbing, but not painful. Most people can “let go.” However, strong involuntary movements can cause injuries.
6–25 milliamps (women)† 9–30 milliamps (men)	Painful shock. Muscular control is lost. This is the range where “freezing currents” start. It may not be possible to “let go.”
50–150 milliamps	Extremely painful shock, respiratory arrest (breathing stops), severe muscle contractions. Flexor muscles may cause holding on; extensor muscles may cause intense pushing away. Death is possible.
1,000–4,300 milliamps (1–4.3 amps)	Ventricular fibrillation (heart pumping action not rhythmic) occurs. Muscles contract; nerve damage occurs. Death is likely.
10,000 milliamps (10 amps)	Cardiac arrest and severe burns occur. Death is probable.
15,000 milliamps (15 amps)	Lowest over-current at which a typical fuse or circuit breaker opens a circuit!
*Effects are for voltages less than about 600 volts. Higher voltages also cause severe burns. †Differences in muscle and fat content affect the severity of shock.	

Electrical Burns

The most common shock-related, nonfatal injury is a burn. Electrical burns can result when a person touches electrical wiring or equipment that’s being used or maintained improperly. Typically, such burns occur on the hands. Electrical burns are one of the most serious injuries you can receive. They need to be given immediate attention. Additionally, clothing may catch fire and a thermal burn may result from the heat of the fire.

Electrical Fires

Electricity is one of the most common causes of fires and thermal burns in homes and workplaces. Defective or misused electrical equipment is a major cause of electrical fires. If there is a small electrical fire, be sure to use only a Class C or multipurpose (ABC) fire extinguisher, or you might make the problem worse.

All fire extinguishers are marked with letter(s) that tell you the kinds of fires they can put out. Some extinguishers contain symbols, too.

Thermal burns may result if an explosion occurs when electricity ignites an explosive mixture of material in the air. This ignition can result from the buildup of combustible vapors, gasses or dusts. Occupational Safety and Health Administration (OSHA) standards, the NEC, and other safety standards give precise safety requirements for the operation of electrical systems and equipment in such dangerous areas. Ignition can also be caused by overheated conductors or equipment, or by normal arcing at switch contacts or in circuit breakers.

PREVENTING ELECTRICAL ACCIDENTS

To prevent electrical accidents, Bannister Electric LLC of West Monroe will take the following steps:

- Establish safe practices and procedures for working around electrical control cabinets without getting hurt
- Make sure all employees know the importance of de-energizing electrical sources before performing repairs

Note: only qualified personnel can perform work on circuits, including testing

PERSONAL PROTECTIVE EQUIPMENT

Employees who are not working directly on energized parts, equipment or circuits may still be required to wear PPE to prevent the risk of electrical injury. This equipment must meet OSHA/ANSI requirements and be appropriate for the parts of the body that need protection and the work performed. When working near electrical circuits, or on equipment that could become energized, employees must:

- Wear electrically protective gloves
- Wear insulated shoes
- Use only insulated tools

FIRST AID FOR ELECTRICAL INJURIES

If a co-worker is shocked or burned by electricity, the following actions need to be taken:

- Shut off the electrical current if the victim is still in contact with the energized circuit
- Have someone else call for help
- If you can’t shut off the power quickly, pry the victim from the circuit with something that doesn’t conduct electricity such as dry wood. Don’t touch the victim yourself if he or she is still in contact with an electrical circuit!

- Don't leave the victim unless there's no other option. Stay with the victim while Emergency Medical Services (EMS) is contacted. The caller should come back to you afterwards to verify that the call was made

Once you know that electrical current is no longer flowing through the victim, call out to the victim to see if he or she is conscious. If the victim is conscious, tell them not to move. It's possible for a shock victim to be seriously injured and not realize it. Quickly examine the victim for signs of major bleeding. If there's heavy bleeding, place a cloth over the wound and apply pressure. If the wound is in an arm or leg, gently elevate the injured area while keeping pressure on the wound. Keep the victim warm and talk to them until help arrives.

If the victim is unconscious, check for signs of breathing. While you do this, move the victim as little as possible. If the victim isn't breathing, someone trained should begin CPR.

You also need to know the location of:

- Electricity shut-offs ("kill switches")
- First-aid supplies
- A telephone so you can find them quickly in an emergency

CREATE A SAFE WORK ENVIRONMENT

A safe work environment is created by controlling contact with electrical voltages and the currents they can cause. Electrical currents need to be controlled so they don't pass through the body. In addition to preventing shocks, a safe work environment reduces the chance of fires, burns and falls.

You need to guard against contact with electrical voltages and control electrical currents in order to create a safe work environment.

A safe work environment isn't enough to control all electrical hazards. You must also work safely. Safe work practices help you control your risk of injury or death from workplace hazards. If you are working on electrical circuits or with electrical tools and equipment, you need to use safe work practices.

Before you begin a task, ask yourself:

- What could go wrong?
- Do I have the knowledge, tools and experience to do this work safely?

All workers need to be very familiar with the safety procedures for their jobs. You must know how to use specific controls that help keep you safe. You must also use good judgment and common sense.

ELEMENTS OF ELECTRICAL SAFETY

Bannister Electric LLC of West Monroe employees will use the three-stage approach to safety: recognize, evaluate and control hazards. To be safe, you must think about your job and plan for hazards. To avoid injury or death, you must understand and recognize hazards. You need to evaluate the situation you are in and assess your risks. You need to control hazards by creating a safe work environment, by using safe work practices, and by reporting hazards to a supervisor. If you do not recognize, evaluate and control hazards, you may be injured or killed by the electricity itself, electrical fires or falls.

Recognize Hazards

The first part of the safety model is recognizing the hazards around you. Only then, can you avoid or control the hazards. It is best to discuss and plan hazard recognition tasks with your co-workers. Sometimes others see hazards that we overlook.

Knowing where to look helps you to recognize hazards.

- Inadequate wiring is dangerous
- Exposed electrical parts are dangerous
- Overhead power-lines are dangerous
- Wires with bad insulation can give you a shock
- Electrical systems and tools that are not grounded or double insulated are dangerous
- Damaged power tools and equipment are electrical hazards
- Using the wrong PPE is dangerous
- Using the wrong tool is dangerous
- Ladders that conduct electricity are dangerous
- Electrical hazards can be made worse if the worker, location or equipment is wet
- Overloaded circuits are dangerous

Hazard Indicators

- Tripped circuit breakers and blown fuses show that too much current is flowing in a circuit. This condition could be due to several factors, such as malfunctioning equipment or a short between conductors. You need to determine the cause in order to control the hazard
- An electrical tool, appliance, wire or connection that feels warm may indicate too much current in the circuit or equipment. A qualified person must evaluate the situation
- An extension cord that feels warm can indicate there's too much current for the wire size of the cord. Unplug the cord and notify your supervisor or a qualified person
- A cable, fuse box or junction box that feels warm may indicate too much current in the circuits
- A burning odor may indicate overheated insulation
- Worn, frayed or damaged insulation around any wire or other conductor is an electrical hazard because the conductors could be exposed. Contact with an exposed wire could cause a shock. Damaged insulation can cause a short, leading to arcing or a fire. Inspect all insulation for scrapes and breaks. You need to evaluate the seriousness of any damage you find and decide how to deal with the hazard
- A GFCI that trips indicates there is current leakage from the circuit. Have a qualified person inspect the circuit

Any of these conditions, or "clues," tell you something important, there is a risk of fire and electrical shock. The equipment or tools involved must be avoided. You can find yourself in a situation where you need to decide if these clues are present. A supervisor needs to be called if there are signs of overload and you're not sure of the degree of risk. Ask for help whenever you're not sure what should be done.

Evaluate Hazards

After you recognize a hazard, your next step is to evaluate your risk from the hazard. Obviously, exposed wires are a hazard. If the exposed wires are 15 feet off the ground, your risk is low. However, if you are going to be working on a roof near those same wires, your risk is high. The risk of shock is greater if you will be carrying metal conduit that could touch the exposed wires. You must constantly evaluate your risk.

Combinations of hazards increase your risk. Improper grounding and a damaged tool greatly increase your risk. Wet conditions combined with other hazards also increase your risk. You'll need to make decisions about the nature of hazards in order to evaluate your risk.

Control Hazards

Once electrical hazards have been recognized and evaluated, they must be controlled.

In order to control hazards, you must first create a safe work environment, and then work in a safe manner. Generally, it is best to remove the hazards altogether and create an environment that is truly safe. When OSHA regulations and the NEC are followed, safe work environments are created.

However, you never know when materials or equipment might fail. Prepare yourself for the unexpected by using safe work practices. Use as many safeguards as possible. If one fails, another may protect you from injury or death.

Controlling electrical hazards (as well as other hazards) reduces the risk of injury or death.

HAZARD TYPES

Wiring Hazards

An electrical hazard exists when the wire is too small a gauge for the current it will carry. Normally, the circuit breaker in a circuit is matched to the wire size. However, in older wiring, branch lines to permanent ceiling light fixtures could be wired with a smaller gauge than the supply cable.

For example, let's say a light fixture is replaced with another device that uses more current. The current capacity (ampacity) of the branch wire could be exceeded. When a wire is too small for the current it is supposed to carry, the wire will heat up. The heated wire could cause a fire.

When you use an extension cord, the size of the wire you are placing into the circuit may be too small for the equipment. The circuit breaker could be the right size for the circuit but not right for the smaller-gauge extension cord. A tool plugged into the extension cord may use more current than the cord can handle without tripping the circuit breaker. The wire will overheat and could cause a fire.

The kind of metal used as a conductor can cause an electrical hazard. Special care needs to be taken with aluminum wire. Since it is more brittle than copper, aluminum wire can crack and break more easily. Connections with aluminum wire can become loose and oxidize if not made properly, creating heat or arcing. You need to recognize that inadequate wiring is a hazard.

Exposed Electrical Parts Hazards

Electrical hazards exist when wires or other electrical parts are exposed. Wires and parts can be exposed if a cover is removed from a wiring or breaker box. The overhead wires coming into a home may be exposed. Electrical terminals in motors, appliances and electronic equipment may be exposed. Older equipment may have exposed electrical parts. If you contact exposed live electrical parts, you will be shocked. You need to recognize that an exposed electrical component is a hazard.

Overhead Power-Line Hazards

Most people don't realize that overhead power-lines aren't normally insulated. More than half of all electrocutions are caused by direct worker contact with energized power-lines.

When dump trucks, cranes, work platforms or other conductive materials (such as pipes and ladders) contact overhead wires, the equipment operator or other workers can be killed. If you do not maintain required clearance distances from power-lines, you can be shocked and killed. Never store materials and equipment under or near overhead power-lines. You need to recognize that overhead power-lines are a hazard.

Defective Insulation Hazards

Insulation that is defective or inadequate is an electrical hazard. Usually, a plastic or rubber covering insulates wires. Insulation prevents conductors from coming in contact with each other. Insulation also prevents conductors from coming in contact with people.

Extension cords may have damaged insulation. Sometimes the insulation inside an electrical tool or appliance is damaged. When insulation is damaged, exposed metal parts may become energized if a live wire inside touches them.

Electric hand tools that are old, damaged or misused may have damaged insulation inside. If you touch damaged power tools or other equipment, you will receive a shock. You are more likely to receive a shock if the tool is not grounded or double insulated. (Double-insulated tools have two insulation barriers and no exposed metal parts.) You need to recognize that defective insulation is a hazard.

Improper Grounding Hazards

When an electrical system is not grounded properly, a hazard exists. The most common OSHA electrical violation is improper grounding of equipment and circuitry. The metal parts of an electrical wiring system that we touch (switch plates, ceiling light fixtures, conduit, etc.) must be grounded and at 0 volts. If the system is not grounded properly, these parts may become energized. Metal parts of motors, appliances or electronics that are plugged into improperly grounded circuits may be electrified. When a circuit is not grounded properly, a hazard exists because unwanted voltage cannot be safely eliminated. If there is no safe path to ground for fault currents, exposed metal parts in damaged appliances can become energized.

Extension cords may not provide a continuous path to ground because of a broken ground wire or plug. If you touch a defective electrical device that's not grounded or grounded improperly, you will be shocked. You need to recognize that an improperly grounded electrical system is a hazard.

Electrical systems are often grounded to metal water pipes that serve as a continuous path to ground. If plumbing is used as a path to ground for fault current, all pipes must be made of conductive material (a type of metal). Many electrocutions and fires occur because (during renovation or repair) parts of metal plumbing are replaced with plastic pipe, which does not conduct electricity. In these cases, the path to ground is interrupted by nonconductive material.

A ground fault circuit interrupter, or GFCI, is an inexpensive lifesaver. GFCIs detect any difference in current between the two circuit wires (the black wires and white wires). This difference in current can occur when electrical equipment isn't working correctly, causing leakage current. If leakage current is detected in a GFCI-protected circuit, the GFCI switches off the current, protecting you from a dangerous shock. GFCIs are set at about 5 mA and are designed to protect workers from electrocution. GFCIs are able to detect the loss of current resulting from leakage through a person who is beginning to be shocked.

GFCIs are different from circuit breakers because they detect leakage currents rather than overloads. Circuits with missing, damaged or improperly wired GFCIs may allow you to be shocked. You need to recognize that a circuit improperly protected by a GFCI is a hazard.

Overload Hazards

Overloads in an electrical system are hazardous because they can produce heat or arcing. Wires and other components in an electrical system or circuit have a maximum amount of current they can carry safely. If too many devices are plugged into a circuit, the electrical current will heat the wires to a very high temperature. If anyone tool uses too much current, the wires will heat up. The temperature of the wires can be high enough to cause a fire. If their insulation melts, arcing may occur. Arcing can cause a fire in the area where the overload exists, even inside a wall.

In order to prevent too much current in a circuit, a circuit breaker or fuse is placed in the circuit. If there is too much current in the circuit, the breaker "trips" and opens like a switch. If an overloaded circuit is equipped with a fuse, an internal part of the fuse melts, opening the circuit. Both breakers and fuses do the same thing: open the circuit to shut off the electrical current.

If the breakers or fuses are too big for the wires they are supposed to protect, an overload in the circuit will not be detected and the current will not be shut off. Overloading leads to overheating of circuit components and may cause a fire. You need to recognize that a circuit with improper overcurrent protection devices—or one with no overcurrent protection devices at all—is a hazard.

Overcurrent protection devices are built into the wiring of some electric motors, tools and electronic devices. For example, if a tool draws too much current or if it overheats, the current will be shut off from within the device itself. Damaged tools can overheat and cause a fire. You need to recognize that a damaged tool is a hazard.

Wet Conditions Hazards

Working in wet conditions is hazardous because you may become an easy path for electrical current. If you touch a live wire or other electrical component—and you are well grounded because you are standing in even a small puddle of water—you will receive a shock.

Damaged insulation, equipment or tools can expose you to live electrical parts. A damaged tool may not be grounded properly, so the housing of the tool may be energized, causing you to receive a shock. Improperly grounded metal switch plates and ceiling lights are especially hazardous in wet conditions. If you touch a live electrical component with an uninsulated hand tool, you are more likely to receive a shock when standing in water.

Remember: you don't have to be standing in water to be electrocuted. Wet clothing, high humidity and perspiration also increase your chances of being electrocuted. You need to recognize that all wet conditions are hazards.

HAZARD CONTROL

Lock-Out and Tag-Out Circuits and Equipment

Don't work on equipment unless it's been locked and tagged out. Only qualified and trained persons are allowed to perform lockout/tagout procedures.

OSHA requires companies to have adequate machine-specific procedures for lockout/tagout. These will be written procedures that are on site and readily available to employees. Provide training on lock-out/tag-out to both authorized and affected employees. Interlocks may not be used as lockout or as equivalent lockout protection.

For more information on lock-out/tag-out procedures, see the "Controlling Hazardous Energy" chapter (if included) of this manual.

Control Inadequate Wiring Hazards

Electrical hazards result from using the wrong size or type of wire. You must control such hazards to create a safe work environment. You must choose the right size wire for current expected in a circuit. The wire must be able to handle the current safely. The wire's insulation must be appropriate for the voltage and tough enough for the environment. Connections need to be reliable and protected.

MAXIMUM CURRENT DIFFERENT WIRE SIZES CAN SAFELY CONDUCT

Gauge Amperage	12 AWG (stranded)	12 AWG (solid)	10 AW G	8 AW G	6 AW G	2 AW G	1/0 AW G
	25 amps	25 amps	30 amps	40 amps	55 amps	95 amps	125 amps

Control Hazards of Fixed Wiring

The wiring methods and size of conductors used in a system depend on several factors:

- Intended use of the circuit system
- Building materials
- Size and distribution of electrical load
- Location of equipment (such as underground burial)
- Environmental conditions (such as dampness)

- Presence of corrosives
- Temperature extremes

Fixed, permanent wiring is better than extension cords, which can be misused and damaged more easily. NEC requirements for fixed wiring must always be followed.

Control Hazards of Flexible Wiring

Electrical cords supplement fixed wiring by providing the flexibility required for maintenance, portability, isolation from vibration, and emergency and temporary power needs. Flexible wiring can be used for extension cords or power supply cords. Power supply cords can be removable or permanently attached to the appliance. **DO NOT** use flexible wiring in situations where frequent inspection would be difficult, where damage would be likely, or where long-term electrical supply is needed. Flexible cords cannot be used as a substitute for the fixed wiring of a structure.

Flexible cords must not be

- Run through holes in walls, ceilings, or floors
- Run through doorways, windows, or similar openings (unless physically protected)
- Attached to building surfaces (except with a tension take-up device within 6 feet of the supply end)
- Hidden in walls, ceilings, or floors
- Hidden in conduit or other raceways

Use the Right Extension Cord

The size of wire in an extension cord must be compatible with the amount of current the cord will be expected to carry. The amount of current depends on the equipment plugged into the extension cord. Current ratings (how much current a device needs to operate) are often printed on the nameplate. If a power rating is given, it is necessary to divide the power rating in watts by the voltage to find the current rating. For example, a 1,000-watt heater plugged into a 120-volt circuit will need almost 10 amps of current. Let’s look at another example: A 1- horsepower electric motor uses electrical energy at the rate of almost 750 watts, so it will need a minimum of about 7 amps of current on a 120-volt circuit. However, electric motors need additional current as they startup or if they stall, requiring up to 200% of the nameplate current rating. Therefore, the motor would need 14 amps.

Add to find the total current needed to operate all the appliances supplied by the cord. Choose a wire size that can handle the total current.

AMERICAN WIRE GAUGE (AWG)

Wire Size	Handles Up To
#10 AW G	30 amps
#12 AW G	25 amps
#14 AW G	18 amps
#16 AW G	13 amps
Remember: The larger the gauge number, the smaller the wire!	

The length of the extension cord also needs to be considered when selecting the wire size. Voltage drops over the length of a cord. If a cord is too long, the voltage drop can be enough to damage equipment. Many electric motors only operate safely in a narrow range of voltages and will not work properly at voltages different from the voltage listed on the nameplate. Even though light bulbs operate (somewhat dimmer) at lowered voltages, do not assume electric motors will work correctly at less-than-required voltages. In addition, when electric motors start or operate under load, they require more current. The larger the size of the wire, the longer a cord can be without causing a voltage drop that could damage tools and equipment.

The grounding path for extension cords must be kept intact to keep you safe.

A typical extension cord grounding system has four components:

1. A third wire in the cord, called a ground wire
2. A three-prong plug with a grounding prong on one end of the cord
3. A three-wire, grounding-type receptacle at the other end of the cord
4. A properly grounded outlet

Control Hazards to Exposed Live Electrical Parts

Isolate Energized Components

Electrical hazards exist when wires or other electrical parts are exposed. These hazards need to be controlled to create a safe work environment. Isolation of energized electrical parts makes them inaccessible unless tools and special effort are used. Isolation can be accomplished by placing the energized parts at least 8 feet high and out of reach, or by guarding. Guarding is a type of isolation that uses various structures—like cabinets, boxes, screens, barriers, covers and partitions—to close-off live electrical parts.

Take the following precautions to prevent injuries from contact with live parts:

- Immediately report exposed live parts to a supervisor
- Unless qualified, don’t attempt to correct the condition yourself without supervision
- Provide guards or barriers if live parts cannot be enclosed completely

- Use covers, screens, or partitions for guarding that require tools to remove them
- Replace covers that have been removed from panels, motors, or fuse boxes
- Even when live parts are elevated to the required height (8 feet), use caution when using objects (like metal rods or pipes) that can contact these parts
- Close unused conduit openings in boxes so that foreign objects (pencils, metal chips, conductive debris, etc.) cannot get inside and damage the circuit

Control Hazards of Exposure to Live Electrical Wires

Use Proper Insulation

Insulation is made of material that does not conduct electricity (usually plastic, rubber, or fiber). Insulation covers wires and prevents conductors from coming in contact with each other or any other conductor. If conductors make contact, a short circuit is created.

In a short circuit, current passes through the shorting material without passing through a load in the circuit, and the wire becomes overheated. Insulation keeps wires and other conductors from touching, which prevents electrical short circuits. Insulation prevents live wires from touching people and animals, thus protecting them from electrical shock.

Insulation helps protect wires from physical damage and conditions in the environment. Insulation is used on almost all wires, except some ground wires and some high-voltage transmission lines. Insulation is used internally in tools, switches, plugs, and other electrical and electronic devices.

Special insulation is used on wires and cables that are used in harsh environments. Wires and cables that are buried in soil must have an outer covering of insulation that is flame-retardant and resistant to moisture, fungus and corrosion.

In all situations, you must be careful not to damage insulation while installing it. Do not allow staples or other supports to damage the insulation. Bends in a cable must have an inside radius of at least 5 times the diameter of the cable so that insulation at a bend is not damaged. Extension cords come with insulation in a variety of types and colors. The insulation of extension cords is especially important.

Since extension cords often receive rough handling, the insulation can be damaged. Extension cords might be used in wet places, so adequate insulation is necessary to prevent shocks. Because extension cords are often used near combustible materials (such as wood shavings and sawdust) a short in an extension cord could easily cause arcing and a fire.

Insulation on individual wires is often color-coded. In general, insulated wires used as equipment grounding conductors are either continuous green or green with yellow stripes. The grounded conductors that complete a circuit are generally covered with continuous white or gray insulation. The ungrounded conductors, or “hot” wires, may be any color other than green, white or gray. They are usually black or red.

Conductor and Cable Markings

Conductors and cables must be marked by the manufacturer to show the following:

- Maximum voltage capacity
- AWG size
- Insulation-type letter
- Manufacturer's name or trademark

Control Shock Hazards

When an electrical system is not grounded properly, a hazard exists. This is because the parts of an electrical wiring system that a person normally touches may be energized, or live, relative to ground. Parts like switch plates, wiring boxes, conduit, cabinets and lights need to be at 0 volts relative to ground. If the system is grounded improperly, these parts may be energized. The metal housings of equipment plugged into an outlet need to be grounded through the plug.

Grounding is connecting an electrical system to the earth with a wire. Excess or stray current travels through this wire to a grounding device (commonly called a "ground") deep in the earth. Grounding prevents unwanted voltage on electrical components. Metal plumbing is often used as a ground. When plumbing is used as a grounding conductor, it must also be connected to a grounding device such as a conductive rod. (Rods used for grounding must be driven at least 8 feet into the earth.

Sometimes an electrical system will receive a higher voltage than it is designed to handle. These high voltages may come from a lightning strike, line surge, or contact with a higher voltage line. Sometimes a defect occurs in a device that allows exposed metal parts to become energized. Grounding will help protect the person working on a system, the system itself, and others using tools or operating equipment connected to the system. The extra current produced by the excess voltage travels relatively safely to the earth.

Grounding creates a path for currents produced by unintended voltages on exposed parts. These currents follow the grounding path, rather than passing through the body of someone who touches the energized equipment. However, if a grounding rod takes a direct hit from a lightning strike and is buried in sandy soil, the rod must be examined to make sure it will still function properly. The heat from a lightning strike can cause the sand to turn into glass, which is an insulator. A grounding rod must be in contact with damp soil to be effective.

Leakage current occurs when an electrical current escapes from its intended path. Leakages are sometimes low-current faults that can occur in all electrical equipment because of dirt, wear, damage or moisture. A good grounding system must be able to carry off this leakage current. A ground fault occurs when current passes through the housing of an electrical device to ground. Proper grounding protects against ground faults. Ground faults are usually caused by misuse of a tool or damage to its insulation. This damage allows a bare conductor to touch metal parts or the tool housing.

When you ground a tool or electrical system, you create a low-resistance path to the earth (known as a ground connection). When done properly, this path has sufficient current-carrying capacity to eliminate voltages that may cause a dangerous shock. Grounding does not guarantee that you will not be shocked, injured or killed from defective equipment. However, it greatly reduces the possibility.

EQUIPMENT GROUNDING REQUIREMENTS

Equipment needs to be grounded under any of these circumstances:

- The equipment is within 8 feet vertically and 5 feet horizontally of the floor or walking surface
- The equipment is within 8 feet vertically and 5 feet horizontally of grounded metal objects, you could touch
- The equipment is located in a wet or damp area and is not isolated
- The equipment is connected to a power supply by cord and plug and is not double- insulated

Use of GFCIs

The use of GFCIs has lowered the number of electrocutions dramatically. A GFCI is a fast- acting switch that detects any difference in current between two circuit conductors. If either conductor comes in contact—either directly or through part of your body—with a ground (a situation known as a ground fault), the GFCI opens the circuit in a fraction of a second. If a current as small as 4 to 6 mA does not pass through both wires properly, but instead leaks to the ground, the GFCI is tripped. The current is shut off.

There is a more sensitive kind of GFCI called an isolation GFCI. If a circuit has an isolation GFCI, the ground fault current passes through an electronic sensing circuit in the GFCI. The electronic sensing circuit has enough resistance to limit current to as little as 2 mA, which is too low to cause a dangerous shock.

GFCIs are usually in the form of a duplex receptacle. They are also available in portable and plug-in designs and as circuit breakers that protect an entire branch circuit. GFCIs can operate on both two- and three-wire ground systems. For a GFCI to work properly, the neutral conductor (white wire) must:

- Be continuous
- Have low resistance
- Have sufficient current-carrying capacity

GFCIs help protect you from electrical shock by continuously monitoring the circuit. However, a GFCI does not protect a person from line-to-line hazards such as touching two “hot” wires (240 volts) at the same time or touching a “hot” and neutral wire at the same time. Also, be aware that instantaneous currents can be high when a GFCI is tripped. A shock may still be felt. Your reaction to the shock could cause injury, perhaps from falling.

Test GFCIs regularly by pressing the “test” button. If the circuit does not turn off, the GFCI is faulty and must be replaced.

The NEC requires that GFCIs be used in these high-risk situations:

- Electricity is used near water
- The user of electrical equipment is grounded (by touching grounded material)
- Circuits are providing power to portable tools or outdoor receptacles
- Temporary wiring or extension cords are used

Specifically, GFCIs must be installed in bathrooms, garages, outdoor areas, crawl spaces, unfinished basements, kitchens, and near wet bars.

Bond Components to Assure Grounding Path

In order to assure a continuous, reliable electrical path to ground, a bonding jumper wire is used to make sure electrical parts are connected. Some physical connections, like metal conduit coming into a box, might not make a good electrical connection because of paint or possible corrosion. To make a good electrical connection, a bonding jumper needs to be installed.

A metal cold water pipe that is part of a path to ground may need bonding jumpers around plastic anti-vibration devices, plastic water meters or sections of plastic pipe. A bonding jumper is made of conductive material and is tightly connected to metal pipes with screws or clamps to bypass the plastic and assure a continuous grounding path. Bonding jumpers are necessary because plastic doesn't conduct electricity and will interrupt the path to ground.

Additionally, interior metal plumbing must be bonded to the ground for electrical service equipment in order to keep all grounds at the same potential (0 volts). Even metal air ducts need to be bonded to electrical service equipment.

Control Overload Current Hazards

When a current exceeds the current rating of equipment or wiring, a hazard exists. The wiring in the circuit, equipment or tool cannot handle the current without heating up or even melting.

Not only will the wiring or tool be damaged, but the high temperature of the conductor can also cause a fire. To prevent this from happening, an overcurrent protection device (circuit breaker or fuse) is used in a circuit. These devices open a circuit automatically if they detect current in excess of the current rating of equipment or wiring. This excess current can be caused by an overload, short circuit or high-level ground fault.

Overcurrent protection devices are designed to protect equipment and structures from fire. They do not protect you from electrical shock! Overcurrent protection devices stop the flow of current in a circuit when the amperage is too high for the circuit. A circuit breaker or fuse will not stop the relatively small amount of current that can cause injury or death. Death can result from 20 mA (.020 amps) through the chest. A typical residential circuit breaker or fuse will not shut off the circuit until a current of more than 20 amps is reached!

However, overcurrent protection devices are not allowed in areas where they could be exposed to physical damage or in hazardous environments. Overcurrent protection devices can heat up and occasionally arc or spark, which could cause a fire or an explosion in certain areas. Hazardous environments are places that contain flammable or explosive materials such as flammable gasses or vapors (Class I Hazardous Environments), finely pulverized flammable dusts (Class II Hazardous Environments), or fibers or metal filings that can catch fire easily (Class III Hazardous Environments). Hazardous environments may be found in aircraft hangars, gas stations, storage plants for flammable liquids, grain silos and mills where cotton fibers may be suspended in the air. Special electrical systems are required in hazardous environments.

If an overcurrent protection device opens a circuit, there may be a problem along the circuit. (In the case of circuit breakers, frequent tripping may also indicate that the breaker is defective.) When a circuit breaker trips or a fuse blows, the cause must be found.

A circuit breaker is one kind of overcurrent protection device. It is a type of automatic switch located in a circuit. A circuit breaker trips when too much current passes through it. Don't use a circuit breaker to turn power on or off in a circuit, unless it's designed for this purpose and marked "SWD" (stands for "switching device").

A fuse is another type of overcurrent protection device. A fuse contains a metal conductor that has a relatively low melting point. When too much current passes through the metal in the fuse, it heats up within a fraction of a second and melts, opening the circuit. After an overload is found and corrected, a blown fuse must be replaced with a new one of appropriate amperage.

Avoid Wet Working Conditions and Other Dangers

Remember that any hazard becomes much more dangerous in damp or wet conditions. To be on the safe side, assume there is dampness in any work location, even if you do not see water. Even sweat can create a damp condition!

Avoid Overhead Power Lines

Be very careful not to contact overhead power lines or other exposed wires. More than half of all electrocutions are caused by contact with overhead lines. When working in an elevated position near overhead lines, avoid locations where you (and any conductive object you hold) could contact an unguarded or uninsulated line. Stay at least 10 feet away from high-voltage transmission lines.

Vehicle operators must also pay attention to overhead wiring. Dump trucks, front-end loaders and cranes can lift and make contact with overhead lines. If you contact equipment that is touching live wires, you will be shocked and may be killed. If you are in the vehicle, stay inside. Always be aware of what is going on around you.

USE PROPER WIRING AND CONNECTORS

- Avoid overloads — Don't overload circuits
- Test GFCIs — Test GFCIs monthly using the "test" button
- Check switches and insulation — Tools and other equipment must operate properly
- Make sure that switches and insulating parts are in good condition
- Use three-prong plugs — Never use a three-prong grounding plug with the third prong broken off

When using tools that require a third-wire ground; use only three-wire extension cords with three-prong grounding plugs and three-hole electrical outlets. Never remove the grounding prong from a plug! You could be shocked or expose someone else to a hazard. If you see a cord without a grounding prong in the plug, remove the cord from service immediately.

Use extension cords properly — If an extension cord must be used, choose one with sufficient ampacity for the tool being used. An undersized cord can overheat and cause a drop in voltage and tool power. Check the tool manufacturer's recommendations for the required wire gauge and cord length. Make sure the insulation is intact. To reduce the risk of damage to a cord's insulation, use cords with insulation marked "S" (hard service) rather than cords marked "SJ" (junior hard service). Make sure the grounding prong is intact. In damp locations, make sure wires and connectors are waterproof and approved for such locations. Do not create a tripping hazard.

Check power cords and extensions — Electrical cords must be inspected regularly using the following procedure:

- Remove the cord from the electrical power source before inspecting
- Make sure the grounding prong is present in the plug
- Make sure the plug and receptacle are not damaged
- Wipe the cord clean with a diluted detergent and examine for cuts, breaks, abrasions, and defects in the insulation

Coil or hang the cord for storage. Do not use any other methods. Coiling or hanging is the best way to avoid tight kinks, cuts and scrapes that can damage insulation or conductors.

Test electrical cords regularly for ground continuity using a continuity tester as follows:

- Connect one lead of the tester to the ground prong at one end of the cord
- Connect the second lead to the ground wire hole at the other end of the cord
- If the tester lights up or beeps (depending on design), the cord's ground wire is okay. If not, the cord is damaged and must not be used
- Don't pull on cords, always disconnect a cord by the plug
- Use correct connectors — Use electrical plugs and receptacles that are right for your current and voltage needs. Connectors are designed for specific currents and voltages so that only matching plugs and receptacles will fit together. This safeguard prevents a piece of equipment, a cord and a power source with different voltage and current requirements from being plugged together. Standard configurations for plugs and receptacles have been established by the National Electric Manufacturers Association (NEMA)
- Use locking connectors — Use locking-type attachment plugs, receptacles, and other connectors to prevent them from becoming unplugged

USE AND MAINTAIN TOOLS PROPERLY

Your tools are at the heart of your craft. Tools help you do your job with a high degree of quality. Tools can do something else, too. They can cause injury or even death! You must use the right tools for the job. Proper maintenance of tools and other equipment is very important. Inadequate maintenance can cause equipment to deteriorate, creating dangerous conditions.

Inspect tools before using them — Check for cracked casings, dents, missing or broken parts and contamination (oil, moisture, dirt, corrosion). Damaged tools must be removed from service and properly tagged. Don't use these tools until they are repaired and tested.

Use the right tool correctly — Use tools correctly and for their intended purposes. Follow the safety instructions and operating procedures recommended by the manufacturer. When working on a circuit, use approved tools with insulated handles. **However, do not use these tools to work on energized circuits. Always shut off and de-energize circuits before beginning work on them.**

Protect your tools — Keep tools and cords away from heat, oil and sharp objects. These hazards can damage insulation. If a tool or cord heats up, stop using it! Report the condition to a supervisor immediately. If equipment has been repaired, make sure that it has been tested and certified as safe before using it. Never carry a tool by the cord. Disconnect cords by pulling the plug—not the cord!

Use double-insulated tools — Portable electrical tools are classified by the number of insulation barriers between the electrical conductors in the tool and the worker. The NEC permits the use of portable tools only if they have been approved by Underwriter's Laboratories (UL Listed). Equipment that has two insulation barriers and no exposed metal parts is called double insulated.

When used properly, double-insulated tools provide reliable shock protection without the need for a third ground wire. Power tools with metal housings or only one layer of effective insulation must have a third ground wire and three-prong plug.

Use multiple safe practices — Remember, A circuit may not be wired correctly. Wires may contact other "hot" circuits. Someone else may do something to place you in danger. Take all possible precautions.

ATTACHMENTS

The following pages contain a Safe Electrical Practices Checklist that can be reproduced and used by Bannister Electric LLC of West Monroe and its employees to ensure any electrically related work is performed safely.

"SAFE ELECTRICAL WORK PRACTICES" CHECKLIST (PAGE 1 OF 2)

- ☐ Are all employees required to report (as soon as practical) any obvious hazard to life or property observed in connection with electrical equipment or lines?
- ☐ Are employees instructed to make preliminary inspections and/or appropriate tests to determine what conditions exist before starting work on electrical equipment or lines?
- ☐ When electrical equipment or lines are to be serviced, maintained, or adjusted, are necessary switches opened, locked out and tagged?
- ☐ Are portable hand-held electrical tools and equipment grounded or are they of the double-insulated type?
- ☐ Do extension cords have a grounding conductor? Are multiple plug adaptors prohibited?
- ☐ Are ground-fault circuit interrupters installed on each temporary 15, 20, or 30 ampere, 125-volt AC circuit at locations where construction, demolition, modifications, alterations or excavations are being performed? OR…
- ☐ Do you have an assured equipment-grounding conductor program in place?
- ☐ Are all temporary circuits protected by suitable disconnecting switches or plug connectors at the junction with permanent wiring?
- ☐ Is exposed wiring and cords with frayed or deteriorated insulation repaired or replaced promptly?
- ☐ Are flexible cords and cables free of splices or taps?
- ☐ Are clamps or other securing means provided on flexible cords or cables at plugs, receptacles, tools, equipment, and are the cord jackets securely held in place?
- ☐ Are all cords, cable and raceway connections intact and secure?
- ☐ In wet or damp locations, are electrical tools and equipment appropriate for the use or locations (or otherwise protected)?
- ☐ Are electrical power lines and cables located (overhead, underground, underfloor, other side of walls) before digging, drilling, or similar work begins?
- ☐ Is the use of metal measuring tapes, ropes, hand lines or similar devices with metallic thread woven into the fabric prohibited where these could come into contact with energized parts of equipment or circuit conductors?
- ☐ Is the use of metal ladders prohibited in areas where the ladder or the person using the ladder could be exposed to energized parts of equipment, fixtures or circuit conductors?
- ☐ Are all disconnecting switches and circuit breakers labeled to indicate their use or equipment served?
- ☐ Are disconnecting means always opened before fuses are replaced?
- ☐ Are all energized parts of electrical circuits and equipment guarded against accidental contact by approved cabinets or enclosures?
- ☐ Is sufficient access and working space provided and maintained around all electrical equipment to permit ready and safe operations and maintenance?
- ☐ Are all unused openings (including conduit knockouts) of electrical enclosures and fittings closed with appropriate covers, plugs or plates?
- ☐ Are electrical enclosures such as switches, receptacles and junction boxes provided with tight-fitting covers or plates?

"SAFE ELECTRICAL WORK PRACTICES" CHECKLIST (PAGE 1 OF 2)

- ☐ Are employees prohibited from working alone on energized lines or equipment more than 600 volts?
- ☐ Are employees forbidden (unless properly qualified/certified) from working closer than 10 feet from high-voltage (more than 750 volts) lines?
- ☐ Have all underground utilities been located prior to any excavation work?
- ☐ Is all digging within 4 feet of power lines done by hand?
- ☐ Are power lines de-energized? Has the utility company been consulted before digging?
- ☐ Has the power company been notified if work is to be done near overhead lines?
- ☐ Are live parts of electrical circuits de-energized before an employee works on or near them?
- ☐ Are all exposed energized parts in the temporary power supply protected from possible contact?
- ☐ Are all power-supply circuit disconnects marked according to their functions?
- ☐ Is splicing allowed on extension cords only if they are larger than size 12 and the splicing retains insulation protection equal to the original extension cord?
- ☐ Are all plug connections used with the voltage for which they were designed?
- ☐ Do you always ensure that flexible cords are not immersed in water or exposed to damage from vehicles?
- ☐ Are all junction boxes used in a wet environment waterproof?
- ☐ Are you using a GFCI, or has an AEGCP been established?

POLICY

This policy for the prevention of employee exposure to hazards from toxic dust or hazards of abrasive blasting complies with the following OSHA regulations:

- §1926.57 (f) – Ventilation/Abrasive Blasting
- §1910.244 (b) – Abrasive Blast Cleaning Nozzles

SAFE PRACTICES

This policy is designed to ensure no employee is exposed to hazards from toxic dust or hazards of abrasive blasting at levels in excess of the Permissible Exposure Limits (PEL). The safety supervisor responsible for ensuring the following engineering controls and work practices are enforced:

The safety coordinator will ensure that any employee involved in abrasives blasting work is trained in proper safety techniques and procedures to prevent injury from the physical hazards of abrasive blasting or from exposure to airborne particulates or toxic dust. Employees will be trained according to Company policy on use of respiratory protection.

Whenever hazardous substances such as dusts, fumes, mists, vapors, or gases exist, or are produced during construction work, their concentrations will not exceed the specified PELs.

Signs will be posted to warn workers about the hazard of airborne particulates and specify any protective equipment required.

When ventilation is used as an engineering control method, the system will be installed and operated according to OSHA requirements.

Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. The composition and toxicity of the dust from these sources will be considered in making an evaluation of the potential health hazards.

- Workers will change into disposable or washable work clothes at the worksite
- Workers will change into clean clothing before leaving the worksite

All employees required to perform abrasive blasting work will wear eye/face protection, heavy canvas or leather gloves, and aprons or equivalent protection to protect them from the impact of abrasives. Safety shoes will be worn to protect against foot injury where heavy pieces of work are handled, and respiratory protection will be worn at all times during work operations.

Approved equipment for eye and face protection will be supplied to the operator when the respirator design does not provide such protection and to any other personnel working near abrasive blasting operations.

If engineering controls cannot keep silica exposures below the NIOSH PEL, respiratory protection will be used. A respiratory protection program that meets OSHA requirements will be established wherever it is necessary to use respiratory protective equipment.

The required respiratory protection will conform to company policy and program for respiratory protection that is administered by the safety coordinator.

Only respirators approved by the National Institute for Occupational Safety and Health (NIOSH) will be used for abrasive blasting to protect employees from dust produced during blasting operations.

Air for abrasive-blasting respirators will be free of harmful quantities of dusts, mists, or noxious gases, and will meet the requirements for supplied-air quality and use.

Engineered ventilation will be used to keep the concentration of respirable dust or fume in the breathing zone of the abrasive-blasting operator or any other exposed worker, below the permissible exposure level as specified in §1910.1000.

USE OF AN ALTERNATE BLASTING MEDIA

All abrasive blasting will be performed using containment methods such as blast cleaning machines and cabinets, blasting rooms, or portable equipment.

Only non-combustible abrasives will be used for blasting by the company. Any abrasive blasting enclosure used will meet the requirements of OSHA regulation §1910.94.

Organic abrasives that are combustible will only be used in automatic systems. Where flammable or explosive dust mixtures may be present, the construction of the equipment, including the exhaust system and all electric wiring, will conform to the requirements of American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying.

The blast nozzle will be bonded and grounded to prevent the buildup of static charges.

Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts and the dust collector will be constructed with loose panels or explosion venting areas, located on sides away from any occupied area, to provide for pressure relief in case of explosion.

Dust will not be permitted to accumulate on the floor or on ledges outside of an abrasive blasting enclosure and dust spills will be cleaned up promptly.

Aisles and walkways will be kept clear of steel shot or similar abrasive that may create a slipping hazard.

The blast cleaning nozzles will be equipped with an operating valve or trigger that will be held open manually. A support will be provided on which the nozzle may be mounted when it is not in use.

RESPIRATORY POLICY

All personnel that operate sandblasting equipment and their co-workers that have the same exposure to silica will be provided information and instruction about adverse health effects, work practices, HazCom, and use and care of PPE.

Symptoms of silicosis are characterized by shortness of breath, fever, and bluish skin. It could be diagnosed as pulmonary edema (fluid in lungs), pneumonia, or tuberculosis. Silica dust causes severe fungal infections to develop. This condition could be fatal.

The three types of silicosis include:

- Chronic – 10 years exposure to low concentrations
- Accelerated – Exposure to high concentrations & develops 5-10 yrs. after initial exposure
- Acute – Exposure to extremely high concentrations & symptoms develop within a few weeks to a few years

- Air monitoring will be performed to measure worker exposure to airborne crystalline silica and to provide a basis for selecting engineering controls
- Required personal hygiene practices include:
  - All sandblasters will wash their hands & faces before eating, drinking or smoking
  - No eating, drinking or tobacco products in the blasting area. Workers will shower before leaving worksite
- Vehicles will not be parked in contaminated area
- Compressed air will not be used for cleaning purposes except where reduced to less than 30 p.s.i. and then only with effective chip guarding and personal protective equipment.

Medical monitoring and examination of workers exposed to crystalline silica will occur before job placement and at least every 3 years thereafter. More frequent examinations (for example, annual) may be necessary for workers at risk or displaying symptoms of acute or accelerated silicosis.

Exams will include at least the following items:

- A medical and occupational history to collect data on worker exposure
- Chest X-rays
- Pulmonary function testing
- Annual evaluation for tuberculosis

All cases of silicosis discovered through medical surveillance will be reported to the State Health Departments and to OSHA or MSHA.

POLICY

Air compressors are used for a variety of applications. Storage tanks hold excess air that's generated from the compressor, providing a convenient and readily accessible air source. Because of the air pressure within these storage tanks, potential dangers can develop if certain practices and precautions are not followed.

This safety policy and program provides the safe practices for the safe use of air compressor storage tanks. It lists training requirements, guidelines for locating drains and traps, and requirements for gauges and valves.

EMPLOYER RESPONSIBILITIES

It is the responsibility of this company to:

- Provide training for affected employees
- Ensure proper use and maintenance of air compressor storage tanks and equipment
- Ensure that only those employees who have been trained to work with air compressor storage tanks are allowed to operate such equipment
- Ensure that equipment needed is available and is in good working condition
- Ensure damaged equipment is removed from service until repaired and tested
- Ensure that air compressor storage tanks are inspected every six months
- Provide employees with Personal Protective Equipment (PPE) necessary for their job

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Inspect all hoses and equipment before connecting to any compressed air system
- Immediately report any damages or defects to their supervisors
- Empty manual drains and taps on a regularly scheduled basis
- Inspect air compressor storage tanks prior to use and note any damage or defects

TRAINING

We will ensure every employee is provided training on air compressors. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The safety coordinator or designee will verify that all employees working with air compressors are trained in the following minimum elements:

- The purpose of air compressor storage tanks
- The basic operation of air compressor storage tanks

- Maintenance requirements of drains and traps
- Reading gauges and operating valves
- Identifying damage and defects in the storage tanks, hoses, or air driven equipment

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

SAFE PRACTICES

Pneumatic Tools

Pneumatic tools include air compressors and a variety of tool attachments such as wrenches, nail guns, drills, and blowguns. Although they require some special handing, they can save a great deal of time and effort and are relatively easy to use.

Always inspect the tool, air hose, and fittings for damage, disrepair, or missing parts before using. Make sure air hoses and fittings are securely tightened. If a tool fails the pre-use inspection, notify your supervisor and remove it from service by attaching a red tag that states “DO NOT USE.”

Never point pneumatic impact tools, such as riveting guns, toward anyone. Turn off the air supply at the control valve and tool blade before disconnecting a pneumatic tool (unless it has quick disconnect plugs). Be especially careful when using pneumatic tools around fuel, flammable vapors, or explosive atmospheres. They can generate static electricity and must be grounded or bonded when these chemical hazards are present.

Compressed Air Systems

A compressed air system consists of an air receiver, air distribution lines, and a pressure regulatory device.

Air Receivers

Each air tank must have at least one pressure gauge and an American Society of Mechanical Engineers (ASME) safety valve. Use a spring-loaded safety release valve to prevent the receiver from exceeding the maximum allowable working pressure.

Consider the drainage issues associated with receivers. Fit air receivers with a drain cock on the bottom of the receiver. Drain receivers frequently to prevent accumulation of liquid inside the unit. Receivers having automatic drains are exempt from this requirement.

Testing air receivers: Only hydrostatically tested and approved tanks can be used as air receivers. The only time the maximum allowable pressure of an air receiver can be exceeded is when it’s being tested.

Whenever possible, install air tanks so that the entire outside surface can be easily inspected. Do not bury them or place them in hard to reach locations. The intake and exhaust pipes of small tanks must be removable for interior inspections. Tanks over 36 inches in diameter must have manholes. Inspection openings are sufficient for smaller tanks. Tanks with volumes of 5 cubic feet or less can have pipe lug openings.

Air Distribution Lines

Select airlines made of high quality materials with standard fittings and secure connections. Check hoses before use to make sure they're free of defects and properly connected to pipe outlets. Repair or replace defective equipment immediately.

Identify the maximum allowable pressures (psi) by tagging or marking pipeline outlets.

Air hoses are subject to damage and can become hazards. Avoid bending or kinking air hoses. Hose reels can help with this. Keep air hoses free of grease and oil to prevent deterioration. Secure hose ends to prevent whipping if an accidental cut or break occurs. Whenever possible, suspend hoses overhead for more efficient access and protection.

Pressure Regulation Devices

Use ASME approved cast iron seat or disk safety valves that are stamped for the intended service application. Always install valves, gauges, and other regulating devices so they can't be disabled. Never set the valve higher than the maximum allowable working pressure of the receiver.

The safety valves should be set to blow at pressures slightly above those necessary to pop the receiver safety valves. Settings must be no more than 10% above the standard operating pressure of the compressor. Shield blow-off valves to prevent personal injury and equipment damage from sudden blow-offs. Don't position stop valves on airlines running between the compressor and the receiver. If the design of a safety or a relief valve allows liquid to collect on the discharge side of the disk, equip the valve with a drain at the lowest point where liquid can collect.

PPE

The company requires employees to wear the appropriate personal protective equipment (PPE) for the task. Safety glasses, face guards or shields, and hearing protection are required with impact tools.

An air-impact wrench creates a noise exposure of about 103 dB, requiring hearing protection. Gloves and steel-toed shoes are also required.

Never wear loose clothing and always keep your shirt tucked into your pants when using pneumatic tools. Tie long hair back or secure under a cap. Respirators may be required when using compressed air for tasks such as painting.

MAINTENANCE

Keep equipment appropriately lubricated while avoiding over lubricating. Don’t use flammable lubricants on compressors because they often operate at high temperatures that could cause a fire or explosion.

Frequent cleaning with soapy water (e.g., lye solutions) is recommended to keep carbon deposits off compressor parts. Don’t use kerosene or other flammable substances to clean compressed air equipment. Be sure to purge air systems after each cleaning.

SCOPE

This chapter defines the procedures and safe practices to be followed by qualified persons when performing electrical work. This includes working near high voltages, on live circuits, and anywhere arc flash hazards may be present.

This policy will comply with the requirements of OSHA regulations 1926 Subpart K, 1910 Subpart S, NFPA 70E, and all applicable state or local regulations relating to construction or general industry electrical work.

This information does not include our Lockout/Tagout policy, which is contained in a separate chapter.

POLICY

This company has adopted this policy for the prevention of employee exposure to electrical hazards.

DEFINITIONS

Qualified Person: A qualified person is someone who has demonstrated the skills and knowledge of the construction and operation of electrical equipment and installations and has received safety training to identify and avoid the hazards involved.

Unqualified Person: An unqualified person is someone who has not been trained on the hazards and safe practices of working on or near energized electrical circuits or equipment.

EMPLOYER RESPONSIBILITIES

- Ensuring that safety inspections of the facility occur on regular basis
- Ensuring that only qualified personnel perform work on high-voltage circuits, live circuits and anywhere there is a risk of an arc flash incident
- Training personnel in how to perform a job hazard analysis
- Responding quickly to eliminate workplace hazards
- Ensuring all equipment is kept in good repair
- Ensuring employees follow safe job procedures
- Reviewing job hazard analysis whenever there is a significant change to any element of the job or when there has been an injury or illness

SUPERVISOR RESPONSIBILITIES

- Establishing and maintaining safe and healthful working conditions
- Familiar with the electric safety and health hazards that their employees are exposed to, how to recognize them, the potential effects these hazards have on the employees, and rules, procedures and work practices for controlling exposure to those hazards
- Setting good examples, instructing their employees, making sure they fully understand and follow safe procedures

EMPLOYEE RESPONSIBILITIES

- No employee is expected to undertake a job until he/she has received instructions on how to do it properly and safely and is authorized to perform the job

- No employees should undertake a job that appears to be unsafe
- Mechanical safeguards must always be in place and kept in place
- Employees are to report to a superior or designated individual all unsafe conditions encountered during work
- PPE must be used when and where required, and properly maintained

SAFE PRACTICES

De-Energized Electrical Equipment

Conductors and parts of electrical equipment that have been de-energized but not locked out will be treated as energized.

While any employee is exposed to fixed electric equipment or circuits, the energized parts will be de-energized, locked out and tagged.

Electrical Low Voltage

Low-Voltage Electrical Safety applies to all electrical installations and electrical equipment operating or intended to operate on systems of 600 volts, nominal, or less and to all work performed directly on or in proximity to such electrical installations, equipment or systems in all places of employment. Only qualified personnel are authorized to perform work, service or maintenance on electrical parts or systems.

All employees will treat the electrical equipment as energized until tested or otherwise proven to be de-energized.

LOCKOUT/TAGOUT PROCEDURES

Employees are responsible for following host employer's Lockout Tagout (LOTO) procedures. While any employee is exposed to contact with parts of fixed electric equipment or circuits that have been de-energized, the circuits energizing the parts will be locked out and/or tagged.

Employees will be responsible for the following before working on energized electrical equipment or systems unless the equipment is physically removed from the wiring system:

- Notifying all involved personnel
- Locking the disconnecting means in the "open" position with the use of lockable devices, such as padlocks, combination locks, or disconnecting of the conductor(s), or other positive methods or procedures which will effectively prevent unexpected or inadvertent energizing of a designated circuit, equipment, or appliance

Employees will not remove LOTO locks or tags, or energize electrical equipment or systems.

Safety Precautions:

Whenever there is access to opened enclosures containing exposed energized equipment that is not under the control of an authorized or certified person, suitable temporary barriers or barricades will be installed. These can be any one of the following:

- Barricades may be of a single placard, vertical type, a double placard, horizontal type
- A solid orange, plastic cone designed to be moved or rearranged quickly

- Barricades may be equipped with flashers for use at night and are often used with temporary signs which give specific directions to be followed
- Caution, Warning, or Danger Barricade Tape

Employees will have an authorized person remove temporary barriers and reinstall permanent barriers or covers.

Conductive Equipment

When working on or near exposed energized conductors or parts of equipment conductive measuring tapes, ropes, or similar measuring devices will not be used. Conductive fish tapes will not be used in raceways entering enclosures containing exposed energized parts unless such parts are isolated by suitable barriers.

ELECTRICAL HIGH VOLTAGE

All work locations will be safely accessible whenever work is to be performed.

All employees will inspect each safety device, tool or piece of equipment each time it is used and only use those items that are found to be in good condition. The company will require the use of all safety devices and safeguards where applicable.

Only qualified employees will work on energized conductors or equipment connected to energized high-voltage systems. Except for the following:

- Replacing fuses
- Operating switches
- Operations that don’t require the employee to contact energized high-voltage conductors or energized parts of equipment
- Clearing “trouble” or in emergencies involving hazard to life or property
- No employees will be assigned to work alone in the following situations:
- Employees in training, who are qualified by experience and training, will be permitted to work on energized conductors or equipment connected to high-voltage systems while under the supervision or instruction of a qualified electrical worker
- During the time work is being done on any exposed conductors or exposed parts of equipment connected to high-voltage systems, a qualified electrical worker, or an employee in training, will be in close proximity at each work location to:
    - Act primarily as an observer for the purpose of preventing an accident
    - Render immediate assistance in the event of an accident

The observer will not be required in connection with work on overhead trolley distribution circuits not exceeding 1,500 volts D.C. where there is no conductor of opposite polarity less than four feet (4ft) there from, or where such work is performed from suitable tower platforms or other similar structures.

Employees will not be permitted to approach or take any conductive object without an approved insulating handle closer to energized parts. To provide clearance distances as specified in Cal/OSHA table 2940.2-1: NOTE: These distances are the air, bare-hand and live-line tool distances.

ILLUMINATION

Illumination will be provided as needed to perform the work safely. This can be done by using any one of the following: droplights, floodlights, flashlights, etc.

Employees may not enter spaces containing exposed energized parts without illumination that enables employees to work safely.

PERSONAL SAFETY AND PROTECTIVE EQUIPMENT

Insulating equipment will be provided and designed for the voltage levels to be encountered.

The company will be responsible for the periodic visual and electrical re-testing of all insulating gloves, sleeves and blankets. The following maximum re-testing intervals according to the listed American Society for Testing and Materials (ASTM) standards:

- In–Service Care of Insulating Gloves and Sleeves ASTM F 496-97: six (6) Months
- In–Service Care of Insulating Blankets ASTM F 479-95: twelve (12) Months
- In–Service Care of Line Hose and Covers ASTM F 478-92: When to be found damaged or defective

All gloves, sleeves and blankets will be marked to indicate compliance with the re-test schedule and will be marked with either the date tested or the date of the next scheduled test.

All insulating equipment found to be defective or damaged will be immediately removed from service.

Test equipment (multi-meters, electrical leads, proximity testers) will be rated for the circuits and equipment on which they will be used. To check they are working properly, test equipment will be checked against a known voltage source to verify it's working properly, before and after determining a part is de-energized. In addition, a second method that includes listening to the transformer, checking lights and trying to operate the equipment will be used to confirm de-energization.

Calibration and Testing of equipment and tools will be performed according to the following schedule:

- Analog equipment – six months
- Digital equipment – 12 months
- Torque wrenches – 12 months
- Insulated tools – 24 months

Safety grounds will be checked before each use and installed with hot sticks while wearing PPE.

Shock protective tools and equipment will be inspected before every use and after each incident that could cause damage, looking for damage to the insulation that prevents it from working correctly, or could add to the risk. Electrical and safety equipment will meet the ANSI and ASTM standards.

OVERHEAD POWER LINES

Protective measures will be provided before starting work under or near overhead lines, such as de-energizing and grounding the power lines.

Vehicles or mechanical equipment that can be elevated near energized lines will always keep a 10 ft. clearance.

A qualified person working near energized overhead lines may not approach or take a conductive object without an approved insulating handle closer than five feet. An unqualified worker may not approach an energized overhead line or take a conductive object within 10 feet for voltages 50kV or below. For voltages over 50kV, the distance is 10 feet, plus 4 inches for every 10kV over 50kV.

WARNING SIGNS

Warning signs will be placed in areas where equipment is working around or near overhead power lines. The warning signs will be posted and maintained in plain view of the operator and driver on each of the following that may be in use: crane, derrick, power shovel, drilling rig, hay loader, hay stacker, pile driver or similar apparatus.

A durable warning sign legible at twelve feet (12ft) reading “Unlawful to Operate This Equipment within Ten Feet (10ft) Of High-Voltage Lines of 50,000 Volts or Less.”

CONFINED SPACES

When an employee works in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the Company will provide, and the employee will use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts

PORTABLE LADDERS

Portable ladders will have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized parts.

CONDUCTIVE APPAREL

Conductive articles of jewelry and clothing (such a watchbands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) may not be worn if they might contact exposed energized parts. However, such articles may be worn if they are rendered nonconductive by covering, wrapping or other insulating means.

ENERGIZING EQUIPMENT

Opened enclosures and exposed energized equipment not under the control of an authorized person will have suitable temporary barriers installed by an authorized person. After the work is completed, the authorized person is responsible for removing temporary protective equipment and reinstalling all permanent barriers and equipment.

COMMUNICATING HAZARDS

The company will communicate to the host employer of unique hazards found or created and the steps taken to correct the hazards.

ENERGIZED WORK PERMITS

Only qualified employees can work on energized equipment. An energized work permit will be completed before starting any work on energized equipment including an explanation why the equipment can’t be de-energized, signed by a qualified person. Work that doesn’t require an energized work permit is: voltage or current testing, electrical troubleshooting, infrared thermography, and visual inspections where the plane of the cover will not be breached.

The energized work permit will include documentation of a job briefing before the job, where the employee in charge will discuss with affected workers the relevant hazards, work procedures, special precautions, energy source controls, PPE requirements and other information on the permit.

ARC FLASH AND SHOCK BOUNDARIES

Established shock and arc flash limited and restricted approach boundaries will be observed for uncovered and energized electrical equipment. Qualified persons can cross these boundaries to perform tasks such as testing, troubleshooting and voltage measuring if they follow the correct safety procedures, while unqualified persons must remain outside the boundaries.

The limited approach shock boundary requires workers to be trained according the Training section and be qualified to do the job to enter and carry out work like: testing, troubleshooting, and measure voltage.

The restricted approach shock boundary requires qualified workers entering the boundary to:

- Have a documented plan approved by management
- Use appropriate PPE
- Keep as much of the body out of the restricted space, using only protected body parts
- Verify they are properly insulated from live parts and conductive objects before taking a conductive object into the boundary

A hazard evaluation will be performed prior to work being done within the Limited Approach Boundary, in order to determine the safe practices to be employed. The Hazard Analysis should contain event severity, frequency, probability, and avoidance to determine the level of safe practices employed.

The first option for working on energized electrical equipment will be to shut it off, de-energize it, lock it out and verify it is locked out. All equipment will be treated as it is energized until it’s proven de-energized. This means wearing the appropriate PPE while verifying the equipment.

TRAINING

Only qualified individuals are authorized to perform work, service, or maintain energized electrical parts or systems. Training and documentation is required for qualified individuals. Employees not qualified will be trained in electrically related safety practices necessary for their safety. All employees will be able to identify and understand electrical energy hazards.

Qualified persons (those permitted to work on or near exposed energized parts) will be trained in, and familiar with, the following at a minimum:

- Distinguishing exposed live parts from other parts of electric equipment
- The specific task they are going to perform and the safe work practices that related to their job assignment
- Determining the nominal voltage of exposed live parts
- The clearance distances and the corresponding voltages they will be exposed to
- The proper use of special precautionary techniques to prevent electric shock and injuries from direct or indirect contact when working near or on energized electrical equipment, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment (e.g., panels or equipment supplied from more than one source)

- Performing job related electrical tasks according to NFPA 70E, including the approach distances
- Determining the risk level of the hazard, job planning, and PPE needed to safely perform the task
- Personnel exposed to the presence of 50 volts or more will have formal documented electrical training in both the job related electrical tasks and electrical safety awareness
- Tasks that are performed less often than once per year will require retraining before the performance of the work practices involved
- An employee who is undergoing on-the-job training for the purpose of obtaining the skills and knowledge necessary to be considered a qualified person, and who in the course of such training demonstrates an ability to perform specific duties safely at his or her level of training, and who is under the direct supervision of a qualified person will be considered to be a qualified person for the performance of those specific tasks
- Documentation of qualifications will include records of academic courses, experience, on the job training, safety courses and task related certification. The employer will document that each employee has received the required training. This documentation will be made when the employee demonstrates proficiency in the work practices involved and will be maintained for the duration of the employee's employment. The documentation will contain the content of the training, each employee's name and dates of training.
- The Company requires retraining at least every three years and when workplace changes necessitate safety-related work practices that are different from what the employee normally uses. Different work practices may be new technology, types of equipment, or changes in procedures.

SCOPE

This chapter contains the requirements and safe practices to be followed to prevent illness or injury from exposure to cold weather. These practices will comply with the OSHA General Duty clause and any state or local regulations. They will also follow the recommendations provided by OSHA's Cold Stress guide and quick reference card.

POLICY

All work operations involving exposure to low temperatures have the potential for inducing cold stress. This policy has been developed to address these issues. All employees will receive training relating to the causes and effects of, the personal and environmental factors that may lead to, and prevention measures to fight cold stress.

EMPLOYER RESPONSIBILITIES

It is the responsibility of this Company to:

- Provide employees with information on signs and prevention of cold stress
- Provide reliable means of preventing cold stress and other related health hazards

EMPLOYEE RESPONSIBILITIES

Employees working in cold environments, where illness or injury is a risk, are expected to:

- Wear appropriate clothing
- Make sure to protect ears, face, hands, and feet
- Move into warm locations during work breaks; limit the amount of time outside on extremely cold days
- Carry cold weather gear, such as extra socks, gloves, hats, jacket, blankets, a change of clothes, and a thermos of hot liquid
- Include a thermometer and chemical hot packs in your first aid kit
- Avoid touching cold metal surfaces with bare skin
- Monitor your physical condition and that of your co-workers

SAFE PRACTICES

Employees who work in cold environments, or are exposed to extreme cold, are at risk of cold stress. Extremely cold or wet weather is a dangerous situation that can cause occupational illness and injuries such as hypothermia, frostbite, and trench foot. When the body is unable to warm itself, serious cold-related illnesses, and injuries may occur, and permanent tissue damage and death may result.

An individual gains body heat from food and muscular activity and loses it through convection, conduction, radiation, and sweating to maintain a constant body temperature. When a person's body temperature drops even a few degrees below its normal temperature of 98.6° F, the blood vessels constrict, decreasing peripheral blood flow to reduce heat loss from the surface of the skin. Shivering generates heat by increasing the body's metabolic rate.

Risk Factors

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds, dampness, and cold water. One of the gravest dangers of winter weather is wind chill. The wind chill is based on the rate of heat loss from exposed skin by combined effects of wind and cold. As the wind increases, heat is carried away from the body at an accelerated rate, driving down the body temperature. Below is a wind chill chart from the National Weather Service.

WIND CHILL CHART

Wind Speed	Calm	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	-45
5	36	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40	-46	-52	-57	-63
10	34	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47	-53	-59	-66	-72
15	32	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51	-58	-64	-71	-77
20	30	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55	-61	-68	-74	-81
25	29	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58	-64	-71	-78	-84
30	28	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60	-67	-73	-80	-87
35	28	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62	-69	-76	-82	-89
40	27	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64	-71	-78	-84	-91
45	26	19	12	5	-2	-9	-16	-23	-30	-37	-44	-51	-58	-65	-72	-79	-86	-93
50	26	19	12	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95
55	25	18	11	4	-3	-11	-18	-25	-32	-39	-46	-54	-61	-68	-75	-82	-89	-97
60	25	17	10	3	-4	-11	-19	-26	-33	-40	-48	-55	-62	-69	-76	-84	-91	-98

Temperature (°F)

Frostbite Times: 30 minutes 10 minutes 5 minutes

To work safely, these challenges have to be counterbalanced by proper insulation, such as layered protective clothing, physical activity and by controlling exposure; e.g., work/rest schedule.

Air Temperature: Air temperature is measured by an ordinary thermometer in degrees Fahrenheit (°F) or degrees Celsius (°C).

Wind Speed: Various types of commercially available anemometers are used to measure wind speed or air movement.

Wind speed is usually measured in km/h or mph. The following is a suggested guide for estimating wind speeds if accurate information is not available:

- 5 mph (8 km/h): light flag moves
- 10 mph (16 km/h): light flag fully extended

- 15 mph (24 km/h): raises newspaper sheet
- 20 mph (32 km/h): causes blowing and drifting snow

Humidity: Water conducts heat away from the body 25 times faster than dry air.

Physical Activity: The production of body heat by physical activity is difficult to measure. However, tables are available in literature, which shows metabolic rates for a variety of activities. Metabolic heat production is measured in kilocalories (kcal) per hour. One kilocalorie is the amount of heat needed to raise the temperature of one kilogram of water by 24° F.

Diet: Workers have increased energy requirements when working in the cold. Consider adding additional wholesome foods to the diet, such as pasta, potatoes, rice, dairy products, nuts, meat, herring, and salmon. Light snacks and warm fluids should be taken during rest breaks. Alcohol must not be consumed when working in the cold. Alcohol produces a deceptive feeling of warmth but may contribute to dehydration and impair judgment.

Work/rest Schedule: Regular rest breaks in a heated area are recommended for anyone working in the cold. The frequency of breaks depends on the air temperature and wind speed, as well as the degree of physical activity.

Protective Clothing: To be protected from the cold, workers should dress in layers.

- The inner layers should trap moisture and wick it away from the body; the middle layers provide insulation; the outer layers protect against the wind and weather
- As work activity and environmental conditions change, workers should be able to easily add or remove layers

Wind Chill

At any temperature, you feel colder as the wind speed increases. The combined effect of cold air and wind speed is expressed as equivalent chill temperature (ECT) or simply wind chill temperature in degrees Fahrenheit or Celsius.

- It is essentially the air temperature that would feel the same on exposed human flesh as the given combination of air temperature and wind speed
- It can be used as a general guideline for deciding clothing requirements and the possible health effects of cold
- In some parts of the United States, the term wind chill factor is used. This is a measurement of a heat loss rate caused by exposure to wind and it is expressed as the rate of energy loss per unit area of exposed skin per second (e.g., joules/ [second-metre^2] or watts/metre^2, W/m^2)
- Cold Stress Prevention Controlling Cold Stress Environmental Measures
- Temperature and wind conditions should be known; e.g., weather report on the radio, current weather office information
- Steps should be taken to protect workers from wind (or indoors from drafts or forced air from air handling units). The combination of low temperatures and even moderate winds can quickly create dangerous working conditions
- Ensure that heated rest areas, such as a truck cab, tent, or hut, are available

Equipment Design

For work below the freezing point, metal handles and bars should be covered by thermal insulating material. In addition, machines and tools should be designed so that they can be operated without a person having to remove mittens or gloves.

Here are some examples of engineering controls to reduce cold exposure:

- Isolate the worker from the environment, where possible
- Use local heating for the body and especially bare hands (when fine work is required)
- This may include the use of warm air jets, radiant heaters, or contact warming plates
- Provide structures to block air or reduce air velocities at the work location
- Provide heated metal tools and handles or cover them with thermal insulating materials
- Use machine controls and tools designed so that workers do not have to remove mittens or gloves to use them

Work Practices

A schedule of regular rest breaks should be established to allow workers to warm up. These breaks should be not less than 10 minutes in length and should be taken in a heated area.

- Heated warming shelters; e.g., tents, cabins, rest rooms, should be provided
- When entering the heated shelter, outer and middle clothing layers (as necessary) should be removed to prevent overheating and to allow dampness to evaporate. A change of dry clothing may be necessary since returning to cold work while damp or sweaty may result in rapid chilling
- Warm fluids should be consumed at the work site to provide energy and warmth and to replace fluids lost during work
- Recognize the symptoms of cold stress. The onset of severe shivering, the feeling of excessive fatigue, drowsiness, irritability, or euphoria indicate the need to immediately return to the shelter

The following additional precautions apply at colder temperatures:

- Workers should be under constant protective observation by a buddy or supervisor
- Work rate should not be high enough to cause sweating. If heavy work must be performed, rest periods in heated shelters and the opportunity to change into dry clothing should be provided
- New employees should not be required to work full-time in the cold during the first days of employment until they become accustomed to the working conditions and required protective clothing
- Weight and bulkiness of clothing should be included in estimating required work performance
- Work should be arranged to minimize periods of standing or sitting still
- Workers should be appropriately trained
- Recognize the environmental and workplace conditions that lead to potential cold-induced illnesses and injuries
- Learn the signs and symptoms of cold-induced illnesses/injuries and what to do to help the worker

- Train the workforce about cold-induced illnesses and injuries
- Select proper clothing for cold, wet, and windy conditions. Layer clothing to adjust to changing environmental temperatures. (Tight clothing, however, can reduce blood circulation to the extremities.) Wear a hat and gloves, in addition to underwear that will keep water away from the skin (polypropylene). Be aware that some clothing may restrict movement resulting in a hazardous situation
- Protect the ears, face, hands, and feet in extremely cold or wet weather. Boots should be waterproof and insulated
- Carry extra socks, gloves, hats, jacket, blankets, a change of clothes, and a thermos of hot liquid
- Include chemical hot packs in your first aid kit
- Avoid touching cold metal surfaces with bare skin
- Take frequent short breaks in warm dry shelters to allow the body to warm up
- Perform work during the warmest part of the day
- Avoid exhaustion or fatigue because energy is needed to keep muscles warm
- Use the buddy system (work in pairs)
- Drink warm, sweet beverages (sugar water, sports-type drinks). Avoid drinks with caffeine (coffee, tea or hot chocolate) or alcohol
- Eat warm, high-calorie foods like hot pasta dishes

Dressing for the Cold

Clothes must be layered to manage moisture and keep dry. Insulating layers trap air for warmth, and outer layers protect workers from wind and weather.

To remain comfortable as weather and work conditions change, clothing layers should be added or removed, or ventilation openings in clothing opened or closed.

Every effort must be made to avoid sweating and becoming damp. Clothing selections are normally made based on staying warm while inactive. Consider the work to be performed and weather conditions, and then have workers dress so layers can be shed and still remain comfortably warm. If clothing layers do become damp and remain that way, workers should be prepared to replace them before becoming chilled and hypothermic. If a worker is sweating, then his or her clothing is probably too warm for the conditions and tasks being performed.

Hand Wear

- Mittens keep hands warmer than gloves since fingers are together. With gloves, fingers are separated and lose heat from one another
- Have workers wear thin liners under gloves or mittens. Liners need not be removed when removing the gloves
- Removable glove and mitten liners can be replaced and dried when they become damp
- New mitten styles, including three-finger lobster claws that keep fingers warm yet offer good dexterity are available
- Windproof over mitts offer additional hand protection, without adding significant bulk

Headwear

- Avoid cotton; use synthetic fabrics or wool instead
- Workers must use an appropriate hard hat liner to reduce heat loss
- Select a hat appropriate for the weather conditions and activity level. Consider thickness, extent of head coverage (e.g., open-faced, full balaclava, ear coverage), need for Wind protection, effect on vision and hearing, and ability to fit into or over protective headwear, if required
- A facemask and eye protection may sometimes be necessary

Footwear

- Warm, insulated safety footwear is essential. Boots should have thick soles for insulation while standing in snow or on cold concrete. Footwear selection should be based on the work being performed, the surfaces on which the worker will work and the weather conditions to which the worker will normally be exposed. Tight-fitting boots reduce circulation and can make feet feel cold
- Footwear should be sized so that it will accommodate an extra layer(s) of socks
- A synthetic sock liner, worn beneath a synthetic blend or wool outer sock, wicks moisture away from the skin, keeping feet drier and warmer

COLD-ENVIRONMENT CONDITIONS AND FIRST AID MEASURES

Hypothermia

Symptoms of hypothermia can vary depending on how long you have been exposed to the cold temperatures. They include:

Early	Late
Fatigue	No shivering
Confusion and disorientation	Blue skin
Shivering	Dilated pupils
Loss of coordination	Slowed pulse and breathing
	Loss of consciousness

Treating hypothermia

- Alert the supervisor and request medical assistance.
- Move the victim into a warm room or shelter.
- Remove their wet clothing.
- Warm the center of their body first-chest, neck, head, and groin using an electric blanket, if available; or use skin-to-skin contact under loose, dry layers of blankets, clothing, towels, or sheets.

- Warm beverages may help increase the body temperature, but do not give alcoholic beverages. Do not try to give beverages to an unconscious person.
- After their body temperature has increased, keep the victim dry, and wrapped in a warm blanket, including the head and neck.
- If victim has no pulse, begin cardiopulmonary resuscitation (CPR).

Cold Water Immersion

Cold water immersion creates a specific condition known as immersion hypothermia. It develops much more quickly than standard hypothermia because water conducts heat away from the body 25 times faster than air. Typically, people in temperate climates don't consider themselves at risk from hypothermia in the water, but hypothermia can occur in any water temperature below 70° F. Survival times can be lengthened by wearing proper clothing (wool and synthetics and not cotton), using a personal flotation device (PFD, life vest, immersion suit, dry suit), and having a means of both signaling rescuers (strobe lights, personal locator beacon, whistles, flares, waterproof radio) and having a means of being retrieved from the water. Below you will find links with information about cold water survival and cold-water rescue.

Frostbite

Frostbite is an injury to the body that is caused by freezing. Frostbite causes a loss of feeling and color in the affected areas. It most often affects the nose, ears, cheeks, chin, fingers, or toes. Frostbite can permanently damage body tissues, and severe cases can lead to amputation. In extremely cold temperatures, the risk of frostbite is increased in workers with reduced blood circulation and among workers who are not dressed properly.

Symptoms of frostbite include:

- Reduced blood flow to hands and feet
- Numbness
- Tingling or stinging
- Aching
- Bluish or pale, waxy skin

Workers suffering from frostbite should:

- Get into a warm room as soon as possible
- Unless absolutely necessary, do not walk on frostbitten feet or toes-this increases the damage
- Immerse the affected area in warm-not hot- water (the temperature should be comfortable to the touch for unaffected parts of the body)
- Warm the affected area using body heat; for example, the heat of an armpit can be used to warm frostbitten fingers
- Do not rub or massage the frostbitten area; doing so may cause more damage
- Do not use a heating pad, heat lamp, or the heat of a stove, fireplace, or radiator for warming. Affected areas are numb and can be easily burned

Trench Foot

Trench foot, also known as immersion foot, is an injury of the feet resulting from prolonged exposure to wet and cold conditions. Trench foot can occur at temperatures as high as 60 degrees F if the feet are constantly wet. Injury occurs because wet feet lose heat 25-times faster than dry feet. Therefore, to prevent heat loss, the body constricts blood vessels to shut down circulation in the feet. Skin tissue begins to die because of lack of oxygen and nutrients and due to the buildup of toxic products.

Symptoms of trench foot include:

- Reddening of the skin
- Numbness
- Leg cramps
- Swelling
- Tingling pain

Workers suffering from trench foot should:

- Remove shoes/boots and wet socks
- Dry their feet
- Avoid walking on feet, as this may cause tissue damage
- Gangrene (the foot may turn dark purple
- Bleeding under the skin blue, or gray)
- Blisters or ulcer

Chilblains

Chilblains are caused by the repeated exposure of skin to temperatures just above freezing to as high as 60 degrees F. The cold exposure causes damage to the capillary beds (groups of small blood vessels) in the skin. This damage is permanent and the redness and itching will return with additional exposure. The redness and itching typically occurs on cheeks, ears, fingers, and toes.

Symptoms of chilblains include:	Workers suffering from chilblains should:
Itching Inflammation Possible blistering Redness Possible ulceration in severe cases	Avoid scratching Slowly warm the skin Keep blisters and ulcers clean and covered Use corticosteroid creams to relieve itching and swelling

TRAINING

We will ensure every employee is provided training on all equipment, procedures, and processes to protect from cold stress. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The safety coordinator will ensure that every employee will be trained in the following minimum elements:

- proper clothing and equipment
- safe work practices
- guidelines for eating and drinking
- risk factors that increase the health effects of cold exposure
- how to recognize signs and symptoms of frostbite
- how to recognize signs and symptoms of hypothermia
- Appropriate first aid treatment, including rewarming procedures

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

SCOPE

This chapter provides information on the safe practices for working with compressed gas cylinders. Our safe practices will comply with the requirements of OSHA regulations 1910.101 and/or 1926.350 whichever is applicable.

POLICY

Compressed gas cylinders can be extremely hazardous when misused or abused. Compressed gas cylinders can present a variety of hazards due to their pressure and/or content. Because of the hazards posed by compressed gas cylinders in the workplace, employees must adhere to industry best practices and safety regulations applicable to the transportation, use, and storage of compressed gas cylinders.

EMPLOYER RESPONSIBILITIES

This company will:

- Train employees on compressed gas cylinder safety
- Procure and track pressurized gas cylinders to minimize quantity onsite
- Document procedures on safe pressurized cylinder handling and storage
- Train emergency response personnel to handle an emergency
- Label and identify every cylinder
- Ensure each cylinder has the hydrostatic test label
- Document procedures to dispose of cylinder and have them refilled
- Secure gas cylinders

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Use appropriate PPE as needed
- Transport, store, and use compressed gas cylinders according to best safety practices
- Report any unexpected hazard that cannot safely be remedied immediately

SAFE PRACTICES

Depending on the particular gas, there is a potential for simultaneous exposure to both mechanical and chemical hazards. Gases used may be:

- Flammable or combustible
- Corrosive
- Explosive
- Poisonous
- Inert
- Acidic
- Reactive
- A combination of hazards

Without proper use and care, compressed gas cylinders can explode, killing workers and destroying equipment. Cylinders can become flying projectiles when cylinder valves are damaged or broken off. Regulators can become bullets that tear through workers if safety precautions are not taken.

- When the gas is flammable, flash points lower than room temperature compounded by high rates of diffusion present a danger of fire or explosion
- Additional hazards of reactivity and toxicity of the gas, as well as asphyxiation, can be caused by high concentrations of even "harmless" gases such as nitrogen
- Since the gases are contained in heavy, highly pressurized metal containers, the large amount of potential energy resulting from compression of the gas makes the cylinder a potential rocket or fragmentation bomb
- Careful procedures are necessary for handling the various compressed gases, the cylinders containing the compressed gases, regulators, or valves used to control gas glow, and the piping used to confine gases during flow
- Always use safety glasses (preferably with a face shield) when handling and using compressed gases, especially when connecting and disconnecting compressed gas regulators and lines

Careful procedures are necessary for handling the various compressed gases, cylinders, regulators or valves used to control gas flow, and the piping used to confine gases during flow.

Identifying Contents of Compressed Gas Cylinders

The contents of any compressed gas cylinder must be clearly identified. Gas identification should be stenciled or stamped on the cylinder or a label. Commercially available three-part tag systems may be used for identification and inventory.

No compressed gas cylinder should be accepted for use that does not legibly identify its contents by name. If the labeling on a cylinder becomes unclear, the cylinder should be marked “contents unknown” and returned to the supplier.

Do not rely on the color of the cylinder for identification, always read the label. Color-coding is not reliable because cylinder colors may vary with supplier. Also, never rely on labels on caps because they are interchangeable.

All gas lines leading from a compressed gas supply should be clearly labeled to identify the gas and the area served. The labels should be coded to distinguish hazardous gases such as flammable, toxic, or corrosive substances. Signs should be posted in areas where flammable compressed gases are stored or used, identifying the substance and appropriate precautions.

Transporting Gas Cylinders

- Never drag, slide, or roll a cylinder; use a cylinder cart or basket
- Always have the protective cap covering the valve when transporting the cylinder
- Never transport the cylinder with the regulator in place
- Make sure the cylinder is secured to the cart before moving it
- Do not drop cylinders or strike them against each other or against other surfaces violently
- Do not use valve covers to lift cylinders; they could be damaged and become unattached. If the cylinder is dropped on a hard surface, it can cause an explosion

Storage of Gas Cylinders

- Gas cylinders must be secured at all times to prevent tipping
- Use appropriate material, such as chain, plastic coated wire cable, commercial straps, etc., to secure cylinders
- Gas cylinders cannot be stored in public hallways or other unprotected areas
- Cylinders must be segregated in hazard classes while in storage. Oxidizers (oxygen) must be separated from flammable gases, and empty cylinders must be isolated from filled cylinders
- The proper storage for oxygen cylinders requires a minimum of 20 feet to be maintained between flammable gas cylinders and oxygen cylinders or the storage area be separated, at a minimum, by a firewall five (5) feet high with a fire rating of 30 minutes
- Store out of direct sunlight and away from sources of heat and ignition; temperatures must not exceed 125° F
- Acetylene cylinders must never be stored on their sides
- Always place valve protectors on gas cylinders when the cylinders are not connected for use
- Cylinders must be protected from damage. Do not store cylinders near elevators or gangways, or in locations where heavy-moving objects may strike or fall on them
- Cylinders must be stored where they are protected from the ground to prevent rusting
- Cylinders should be protected against tampering by unauthorized individuals
- Storage areas must be well-ventilated, cool, dry, and free from corrosive materials

Use of Compressed Gas Cylinders

Before first use:

- Make sure the cylinder is equipped with the correct regulator
- Inspect the regulator and cylinder valves for grease, oil, dirt, and solvent. Never use grease or oil to lubricate regulators or cylinder valves because they can cause an explosion
- The cylinder should be placed so that the valve handle at the top is easily accessible
- When using toxic or irritating gas, the valve should only be opened while the cylinder is in a working fume hood
- Only use wrenches or tools that are provided by the cylinder supplier to open or close a valve. Pliers should never be used to open a cylinder valve. Some regulators require washers; this should be checked before the regulator is fitted
- Refer to the Safety Data Sheet for the gas being used for information regarding use and toxicity
- Fire extinguishing equipment should be readily available when combustible materials can be exposed to welding or cutting operations using compressed cylinder gases

During use:

- Only properly trained personal should handle compressed gas cylinders
- Back off the pressure adjusting screw of the regulator to release spring force before opening the cylinder valve
- Open the valve slowly and only with the proper regulator in place. Stand with the cylinder between yourself and the regulator (cylinder valve outlet facing away) when opening the cylinder valve

- Acetylene or other flammable gas cylinder valves should not be opened more than ½ turns of the spindle, and preferably no more than ¾ of a turn. This reduces the risk of explosion and allows the cylinder valve to be closed quickly cutting off the gas flow
- Never heat a cylinder to raise the pressure of the gas (this can defeat the safety mechanisms built in by the supplier)
- Keep the cylinder clear of all electrical circuits, flame, and sparks
- Never leave the valve open when equipment is not in use, even when empty; air and moisture may diffuse through an open valve causing contamination and corrosion within the cylinder
- Do not refill a cylinder; mixing of residual gases in a confined area may cause a dangerous reaction
- Never use copper fittings or tubing on acetylene tanks – an explosion may result
- Never use compressed gas to dust off clothing; this could cause injury to the eyes or body and create a fire hazard. Clothing can become saturated and burst into flames if touched off by an ignition source such as a spark or cigarette
- Never leave pressure in a regulator when it is not in use
- Valve protection caps should remain in place until ready to withdraw gas or connect to a manifold
- Cylinder discharge lines should be equipped with approved check valves to prevent inadvertent contamination of cylinders connected to a closed system
- Do not force connections that do not fit
- Close the cylinder valve and release all pressure before removing the regulator
- Do not smoke when oxygen or fuel gases are present. Smoking can cause a fire or explosion
- Do not use acetylene at operating pressures above 15 psig
- Purge fuel and oxygen hoses individually before lighting up a torch tip
- Follow the equipment manufacturer's operating instructions at all times
- If an outlet valve becomes clogged with ice, thaw it with warm water (if the gas is not water reactive), applied only to the valve
- Use the cylinder valve for turning gas off, not the regulator
- Workers should wear safety glasses and face shields when handling and using compressed gases, especially when connecting and disconnecting regulators and lines
- Never use oxygen as a substitute as a "compressed air" to run pneumatic tools, in oil heating burners, to start internal combustion engines, to blow out pipelines, or to create pressure for ventilation
- Oxygen cylinder valves should be opened all of the way during use

Housekeeping Procedures

The following are housekeeping items to remember when working with all compressed gas cylinders:

When you're unsure about the proper handling of a compressed gas cylinder or its content, consult the manufacturer or supplier. Information about the gas is available from the safety coordinator, or on the Safety Data Sheet (SDS), kept in the Right-to-Know folder in your work area. It contains the material's identity; hazardous ingredients; and the name, address, and phone number of the manufacturer. The person handling the cylinder and connections is responsible for checking the identity of the gas by reading the label or other markings on the cylinder before using it. If the content is not clearly marked, do not use it.

Return it to the supplier as soon as possible. If a foreign substance enters a cylinder or the valves are damaged, notify the owner or manufacturer. Be prepared to provide details about the incident and serial number of the cylinder involved.

Keep oily substances away from cylinders, valves, coupling hoses, and other apparatus. Valves on empty cylinders should be kept closed at all times. Keep valve protection caps in place when cylinders are moved or not in use. Screw the protection cap all the way down.

Close cylinder valves when the job is finished.

When transporting compressed gas cylinders outside your work area:

- Make sure the valves are closed
- Remove the regulators
- Make sure the protection cap is in place
- Secure the cylinder on a cylinder cart

NEVER use compressed gases to dust off clothing or skin, as this may cause serious injury to the eyes and/or body in the form of an air embolism in the bloodstream, which can lead to heart failure. Compressed air used for cleaning purposes must be reduced to less than 30 psi, compressors must be visually inspected, and the safety valves must be tested. Compressed air used for cleaning is only permitted with effective chip guarding and personal protective equipment to protect the operator and other employees from the hazards of the release of compressed air and flying debris.

Cylinder Leaks

- If the cylinder contains a **flammable, inert, or oxidizing gas**, remove it to an isolated area, away from possible ignition sources. Allow it to remain isolated until the gas has discharged, making certain that appropriate warnings have been posted
- If the gas is a **corrosive**, remove the cylinder to an isolated, well-ventilated area. The stream of leaking gas should be directed into an appropriate neutralizing material
- For toxic material, the cylinder should be removed to an isolated, well-ventilated area but only if this is possible while maintaining personal safety. It may be necessary to evacuate the facility
- If the leak is at the junction of the cylinder valve and cylinder, do not try to repair it. Contact the supplier and ask for response instructions
- **Never** use a flame to detect a gas leak. Use soapy water

Empty Cylinders

- Do not completely empty the cylinder; always leave some residual pressure
- If the cylinder is empty, replace the cap and remove it to the empty cylinder storage area
- Label all empty cylinders with tags so that everyone will know their status. Empty cylinders can be marked with “MT” and date with chalk
- Handle empty cylinders as carefully as full ones; residual pressure can be dangerous
- Never refill a cylinder. This requires specialized equipment and techniques
- Never mix gases in a cylinder. The next person who draws from it may unknowingly cause an explosion

Piping, Hoses and Connections

Piping

- Polyvinyl chloride (PVC) plastic pipes cannot be used for transporting compressed gases aboveground unless they are completely enclosed in a conduit or casing of sufficient strength to provide protection from external damage and deterioration. The heat generated from compressed air can weaken the PVC pipe and create an explosion hazard. When PVC piping explodes, plastic shrapnel pieces can be thrown in all direction and injure workers or damage equipment
- Do not use copper piping for acetylene
- Do not use cast iron pipe for chlorine
- Distribution lines and their outlets need to be clearly labeled
- Inspect piping systems on a regular basis
- Pay attention to fittings as well as possible cracks that may have developed

Hoses and Connections

- Examine hoses regularly for leaks and set up an inspection schedule
- Do not use unnecessarily long hoses
- Keep hoses free from kinks and away from high traffic areas
- Repair leaks promptly and properly
- Store hoses in a cool place and protect them from hot objects and sparks
- Do not use a single hose having more than one gas passage

Engineering Controls

Listed below are some engineering controls that can be used in some cases to control the risk of compressed gas use:

- **Emergency Shutoff Switch** – can be used at a remote location to cause pneumatic valves to shut, stopping gas flow. Switches should be non-electric so that arcs or sparks are not created around flammable gases
- **Gas Cabinets** – hazardous gas cylinders should be housed in a gas cylinder cabinet. These cabinets can be equipped with sprinkler protection and ventilation

- **Flow Restrictors** – can be used to limit hazardous gas flow to just over maximum flow needed, must be installed immediately downstream of each hazardous gas cylinder
- **Emergency Eyewash** – must be present in areas were corrosive materials or gas is used

SPECIAL PRECAUTIONS

Flammable Gas

- Cylinders of flammable gas must be stored away from flammable liquids, combustible materials, oxidizers, open flames, sparks and other sources of heat or ignition. Maintain a distance of at least 20-feet from these materials unless separated by a noncombustible wall, not less than 5-feet high, having a fire-resistance rating of ½-hour
- All lines and equipment associated with flammable gas systems must be grounded and bonded
- Flash arrestors are designed to prevent a flashback, should it occur, in a line containing a flammable gas
- Portable fire extinguishers should be available in the area of use and storage
- Use spark-proof tools when working with flammable gas
- Do not leave “flow” experiments unattended
- Do not use acetylene at operating pressures over 15 psig
- Never use copper fittings or tubing on acetylene tanks

Oxidizing Gas

- Cylinders of oxygen and other oxidizers must be stored at least 20-feet from fuel-gas or other combustible materials unless separated by a noncombustible wall, not less than 5-feet high, having a fire-resistance rating of ½-hour
- All equipment used for oxidizing gases must be cleaned with oxygen-compatible materials free from oils, greases, and other contaminants
- Do not use oily hands or gloves when handling cylinders. The reaction between oxygen and hydrocarbons can be violent even when small quantities are involved

Corrosive Gas

- Avoid contact with skin and eyes
- An emergency shower and eyewash must be installed within 50 feet where corrosive materials are used
- Metals become brittle when used in corrosive gas service; check equipment and lines frequently for leaks

Inert Gases

Inert gases such as argon, carbon dioxide, helium, krypton, neon nitrogen, and xenon are simple asphyxiants that can displace oxygen in the air and can cause suffocation. When the normal amount of oxygen in the air is reduced by displacement with an inert gas, it is a potential hazard to employees. Reduced concentration of oxygen in the air causes sleepiness, fatigue, loss of physical coordination, even death.

Poisonous Gases

Storage of highly toxic or poisonous gases must be outdoors or in a separate non-combustible building without any other occupancy. Poison gases such as arsine, diorama, methyl bromide, nitric oxide, nitrogen dioxide, phosgene, and phosphine can cause potential hazards to personnel and requires special handling.

These products must never be handled except by specially trained personnel who are fully aware of the potential hazards involved and who are equipped with such special personal safety gear as is necessary in the handling of these products.

Top Safety Tips

- Cylinders must be secured
- Racks containing small cylinders must be secured by special attachments
- Storage areas must be labeled for the specific gases to be stored in those areas
- NO SMOKING signs must be posted and clearly visible
- Flammable gas cylinders and oxidizer cylinders must be separated by 20 feet or by a noncombustible barrier 5 feet high having a fire resistance rating of at least one half-hour. No ignition sources are allowed in the area
- Cylinders of all gases must be stored upright with the cylinder cap in place
- Empty and full cylinders must be segregated in the rack or otherwise clearly marked
- Cylinder storage areas must not be placed next to combustible materials or obstruct exit routes
- Storage areas must be well ventilated
- Take care in handling and storing compressed gas cylinders. If you have any questions about particular gases check the SDS, or speak to the manufacturer or senior safety officer in your area. Following safety procedures will minimize the risks involved with handling compressed gas cylinders

TRAINING

We will ensure every employee is provided training on compressed gas cylinder safety. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the Compressed Gas Cylinders Safety Training Document. This form may be reproduced for the purposes of implementing and maintaining a safety and health program.

COMPRESSED GAS CYLINDERS SAFETY TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter provides the safe practices and requirements for performing the following types of concrete and asphalt work:

- Core Drilling
- Concrete Slab Cutting
- Concrete Wall Cutting
- Asphalt Cutting
- Safety Grooving and Texturing

It does not cover pouring, placing, or mixing concrete or asphalt; those topics are covered in separate chapters. Although OSHA does not have specific regulations regarding concrete and asphalt sawing and drilling, the Concrete Sawing and Drilling Association (CSDA) does provide recommended training and best practices, which will be followed by this Company whenever practical. We will also adhere to the OSHA Silica Dust exposure standard 1926.1153.

POLICY

This Company has instituted the following program to ensure its employees are aware of the safety and health risks arising from performing concrete cutting and drilling work. All employees are expected to use safe work practices when performing their jobs.

EMPLOYER RESPONSIBILITIES

This Company will:

- Verify that only trained employees are allowed to operate cutting and drilling equipment
- Keep all saws and drills in good working order
- Train all employees on the proper care and use of the required PPE
- Enforce all safe practices

EMPLOYEE RESPONSIBILITIES

All employees are expected to:

- Attend all necessary training
- Follow all Company safe practices
- Report any unsafe conditions or acts immediately

MAJOR HAZARDS AND SUGGESTED CONTROLS

This section provides general information about the major hazards associated with concrete cutting and drilling operations. Following are some examples and suggested measures for controlling exposure to the risk associated with each hazard.

Airborne Hazards

Airborne hazards affecting the health and safety of concrete cutting and drilling operators can arise in several different ways:

- From dusts created from the cutting or drilling of the concrete itself
- From exhaust gases generated by machines powered by internal combustion engines
- From work conducted in confined spaces
- From hazardous substances (chemicals or additives) used in the process

Concrete cutting and drilling can generate large quantities of dust which can include respirable silica dust. Exposure to silica dust can result in silicosis, a stiffening and scarring of the lungs. It results in shortness of breath, coughing, and chest pain. The effects are irreversible and lead to degeneration in the person's health, invariably resulting in death. The coarser rock and cement dust particulates can cause upper respiratory irritation and symptoms, such as bronchitis, if extensively exposed over long periods.

Dry methods of concrete cutting and drilling produce the highest levels of respirable dust.

Control Measures

During operations where powered tools or equipment are used to cut, grind, core, or drill concrete or masonry materials, a dust reduction system will be applied to effectively reduce airborne particulate. Exceptions include: operations where it can be shown that permissible exposure limits are not exceeded; roofing operations with tile, pavers or similar materials; and during the first 24 hours of an emergency operation.

Wherever possible, concrete cutting and drilling equipment will be fitted with collection devices to eliminate generated dust at the source.

Where dust extraction is not practical, wet methods will be used to minimize dust generation. Ensure that enough water/coolant is supplied to the operation to adequately suppress the dust.

Whenever the above controls are not practical, or fail to achieve full compliance, respiratory protection must be used. An appropriate "N" series or "P" series particulate respirator will provide adequate protection for respirable quartz concentrations.

Where it is necessary to carry out the task dry, (e.g., due to the proximity of electrical fittings or machinery) ensure that particulate respirators with adequate protection are used.

Other people in the vicinity will also be protected from any dusts created by the cutting or drilling operation. Remove slurry before it dries, otherwise the dried dust can be re-dispersed to expose unprotected workers and others on the site.

If possible, workers will change into disposable or washable work clothes at the job site, shower (where available), and change into clean clothing after leaving the site to prevent contamination of cars, homes, and other areas. Workers must not eat, drink, smoke, or apply cosmetics (including sunscreen) in areas where there is dust containing crystalline silica.

Exhaust Gases from Machinery

Exhaust gases from equipment powered by internal combustion engines, including carbon monoxide, oxides of nitrogen, and aldehydes, are all toxic. Carbon monoxide is a chemical asphyxiant, which can cause rapid loss of coordination, unconsciousness, and death. Any engine operated in, or near, a poorly ventilated area can quickly produce dangerous levels of contaminants.

Control Measures

Because of the extreme risks from hazardous exhaust gases, equipment with an internal combustion engine will NOT be used in an enclosed or poorly ventilated space. Instead, use hydraulic, electric, or pneumatic machines in poorly ventilated spaces. Attempts to use general dilution ventilation to remove exhaust gases are rarely successful because of the large amounts of contaminants produced and physical difficulties in producing and directing the flow of adequate fresh air supplies.

Do not use conventional filtering type respirators to deal with general exhaust gases. There is NO filter to protect a wearer against carbon monoxide for regular respiratory protective equipment.

Working in Confined Spaces

Any work activity undertaken in a confined space can be hazardous. Hazards include:

- Inadequate air quality caused by lack of oxygen (e.g. displacement by carbon dioxide)
- Presence of toxic constituents of the atmosphere (e.g. hydrogen sulphide, carbon monoxide)
- Presence of explosive air contaminants (e.g. methane)

Further (as noted above), for concrete cutting or drilling, the operation of an internal combustion engine equipped machine may produce additional extremely toxic gases in the confined space.

Control Measures

For concrete cutting and drilling, where entry into or on a confined space is needed, the atmosphere must first be tested to check for adequate oxygen, absence of both toxic contaminants and explosive gases or vapors. Where the atmosphere is not suitable for entry, it must be ventilated until it is shown by test to be suitable for safe entry.

Use of machinery in a confined space will be restricted to hydraulic, pneumatic, or electric machines. All machines capable of causing sparks, particularly electric machines, can provide a source of ignition in an explosive atmosphere.

Hazardous Substances Used in the Process

In some instances, chemicals or other hazardous substances may be added as aids in the cutting or drilling operations. The nature of the hazard and the risks will depend on the hazardous substance used.

Control Measures

Relevant safety and health information can be obtained from the SDS for a hazardous substance.

Noise

Noise from concrete cutting and drilling is a serious issue. An operator's hearing may be damaged by very loud noise over a relatively short period or by exposure to a lower level of loud noise over a longer period. In a normal working day, noise from concrete cutting or drilling equipment will lead to exposure to excessive noise for the operator and other nearby workers. The hearing ability of the operators and workers will therefore be at risk if no control measures are implemented.

Control Measures

- There are currently no cutting and drilling equipment available that are quiet enough as not to create excessive noise with normal daily use. Modifications in the form of engineering noise control measures at the source also offer limited noise reduction
- Operators, nearby workers, and bystanders, therefore, must protect their hearing through the wearing of personal hearing protectors. Employers providing hearing protectors must also provide training and instruction in the proper use and maintenance of such personal hearing protectors (and any other protective equipment) the employer requires the worker to wear

Manual Tasks Including Manual Handling

Awkward or static working postures and forceful exertions repeated or maintained for long periods increase the risk of injury by increasing loads on the back, other joints, and soft tissues of the body.

Holding hand held equipment (such as hand held concrete cutting saws) over extended periods increases the loads on the body and the risk of injury.

Control Measures

Possible solutions include:

- Suspending or supporting equipment in a frame to reduce the forces and the awkward and static working postures needed to position it
- Reducing the range of movement of the equipment to minimize the effort or forces needed to guide and control it
- Training workers in safe methods of work and in principles for handling the equipment

Vibration of the Whole Body and/or Hand Arm

Vibration transmitted from concrete cutting and drilling machinery and equipment can affect the body as a whole or segments of the body such as the hands and arms of the operator. The harmful effects from whole body vibration are predominantly of a musculoskeletal nature, especially in the lower spine region. Other effects include fatigue, headaches, gastrointestinal problems, and a reduction in job efficiency.

Hand-arm vibration may cause disturbances in the peripheral nerve and vascular systems of the hands resulting in Raynaud's Syndrome (also known as vibration white finger) which causes the loss of senses of touch and heat, numbness, and loss of grip strength. Other effects can include: damage to tendons, bones, and joints in the hands, wrists, arms, elbows, and shoulders and carpal tunnel syndrome.

Control Measures

Choose equipment:

- That vibrates less or does not have to be held or supported
- That is well balanced, as light as possible, and able to be held with either hand and different sized hands
- With vibration absorbing handles or with an even surface on the handles to distribute gripping force

Covering of metal handles of existing equipment with a soft, resilient rubber can also be very effective in reducing vibration exposure.

Train workers in the use of the equipment with a minimum grip force while still able to perform the work safely.

The use of gloves has minimal effect on vibration exposure. The beneficial effects of the use of gloves are that they can improve grip on the equipment and can keep hands warm and thus increase blood flow to the fingers.

Working at Heights

Working at height with any concrete cutting or drilling equipment is dangerous. Heavy equipment cannot be used safely on an unstable platform and portable equipment should not be used from a ladder.

Control Measures

Do not use ladders when operating concrete cutting and drilling equipment. All work at heights must be done from safe working platforms, such as scaffolding and elevated working platforms.

Electrical Safety

There is a risk of electrocution if extension leads, plugs, and electric powered tools are used in the presence of water. Electrocution can also be caused by inverting hand held equipment when wet cutting.

Control Measures

Equipment operators must make sure:

- Double adaptors and piggyback plugs are not used
- Electrical equipment is inspected, tested, and tagged by a competent person at regular, prescribed intervals
- Electrical equipment is immediately withdrawn from use if it is not safe to use
- Electrical equipment is connected to a GFCI
- Portable GFCI devices are tested at regular, prescribed intervals
- GFCI devices are withdrawn from use if they are not working properly

In addition, suspend cords and extension leads on stands and use waterproof connectors where water may be present. Do not use electrical equipment for inverted cutting.

Damage to Structures

Operators risk injury and the safety of others on site by cutting through stressed components in buildings and any other components that could affect the integrity of the structure.

Control Measures

If components, such as stressing tendons, must be cut, the person responsible for workplace safety must assess the risk. Advice and supervision from a structural engineer must be obtained for all cuts to structural components. The relevant person responsible for workplace safety will locate and mark the location of all components that will affect the strength of a structure if cut as part of initial planning for safety.

Damage to Services

Operators risk injury and the safety of others on the site by cutting through gas, electricity, or water services.

Control Measures

The relevant person responsible for workplace safety on site will locate and mark the location of all services during initial planning for safety. If services are to be cut through, they must be disconnected and tagged. Disconnection will be confirmed and tagged by the relevant service personnel before the work begins. At conclusion of the work, the service personnel will remove their tags.

Loss of Vacuum

Operators using a vacuum assembly to anchor a core drill stand to the surface may risk injury if the vacuum pump fills with slurry. This can cause loss of vacuum, which can result in the drill stand breaking free and rotating around the drill.

Control Measures

Use bolt down stands where practical. Ensure that the surface to be cut is sound and monitor the equipment to ensure that vacuum pressure is being maintained.

Working Alone

When working alone it may be difficult to set up equipment on site

Control Measures

A second person will be available to assist in the set up and relocating equipment on site.

PERSONAL PROTECTIVE EQUIPMENT

The company will provide all necessary personal protective equipment (PPE) to minimize exposure to a risk, the person responsible for workplace safety and health will make sure that workers are properly trained and instructed in the correct use of the equipment, BEFORE starting any concrete cutting or drilling work.

All workers are required to use the PPE provided by the company and the Company will ensure the worker is properly instructed in its use.

The following PPE will be provided, where required:

- Safety Helmets/Hardhats
- Hearing Protection
- Eye Protection
- Safety clothing such as safety boots, waterproof clothing, aprons, gloves, and reflective safety vest
- Respirators
- Gloves to improve grip and reduce force

In addition, operators working outside for long periods will be protected from harsh sunlight and/or reflected light by applying a sunscreen with a SPF rating of at least 15+. They will also wear hats, eye protection, long sleeve shirts, and long trousers.

When selecting items of PPE, they must comply with relevant standards.

Operators will not wear loose clothing and long hair will be covered or tied back. All clothing needs to be comfortable and suitable for the work and the weather conditions.

Storage and Maintenance of PPE

PPE will be stored in a clean and operational condition and in a location that is safe from interference and damage. It must be easily accessible when needed. Employees will inspect PPE regularly to determine that they are in a serviceable condition. Any PPE found to be damaged or defective will be repaired or discarded.

SAFE PRACTICES

General Cautions for Using Hand-Held Concrete Cutting Saws

- ALWAYS follow the designer's recommendations for the safe use of the saw
- ONLY use correct blade size, as recommended by the saw manufacturer. Oversized blades are dangerous
- NEVER use the saw with the guards removed
- Do NOT hold hand-held concrete cutting saws any higher than shoulder height
- Do NOT use hand-held concrete cutting saws for inverted cutting

Preparing a Safe Site

- Those people responsible for workplace safety and health must ensure that the work site is safe, based on the results of the workplace health and safety risk management process, as recorded in the Job Hazard Analysis (JHA) or similar site evaluation
- Site preparation for concrete cutting and drilling operations will include consideration of:
  - Weather/environmental conditions that can create hazards (e.g. heat, rain)
  - Access to and from the work site
  - Barricades and warning signs

- Provisions for appropriate personal protective equipment
- Specific health and safety instructions for the site
- Whether the equipment is suitable for the work, is properly maintained, and will be used according to manufacturer's recommendations
- Provision for GFCI residual current devices for electrical equipment
- Safe removal of cut pieces and cores
- A method to collect residue to prevent the surface becoming slippery and to prevent residue entering storm water drains. Residue will be disposed of according to environmental protection requirements

Setting up Safely: Using a Site Checklist

When setting up the site safely for concrete cutting and drilling activities, a safety checklist, such as the one at the end of this section, will be used to make sure that:

- Work areas and/or work platform are suitable and safe
- Locations of all services are marked/disconnected
- Exact location of the cut or drilling is clearly marked
- The blade/equipment is of correct type and in good condition
- Appropriate barricading and warning signs are erected
- The work area is adequately ventilated
- Adequate lighting is provided, where necessary
- Specific site hazards have been identified and safe systems of work are in place
- There is a method of collecting residue from the operation to prevent surfaces becoming slippery
- There is a method for safe removal or support of cut pieces or cores

Using Cutting Equipment Safely

Before cutting with road, floor, wall, and hand-held saws, the operator will check that the equipment is safe. The operator will check the general condition of the equipment before commencing each job to ensure that the cutting tool, guards, leads, and hydraulic hoses are in good order.

The operator will ensure that:

- The cutting blade is the right size and right type for the machine
- The blade is in good working condition and is free from cracks and deterioration
- The specified blade speed matches the saw drive speed
- The shaft and flanges are clean and undamaged
- The blade fits securely over the shaft
- The shaft nut is tightened against the outside flange
- The blade guard is fitted and in good working order
- The drive belt is at the correct tension
- For wet cuttings, adequate coolant/water is available
- A trolley is used to support the cutting machine for horizontal work at low level, so that operators do not have to work on their knees

- Other people on the site are not at risk
- Safe removal or support of cut pieces or cores is provided
- The equipment is protected at the power outlet with a Ground Fault Circuit Interrupter
- The area behind the cut is barricaded and warning signs are posted when cutting through floors or walls to prevent people entering that area
- Safe operating procedures are in place when hand held saws are used in confined areas
- Appropriate personal protective equipment is provided, where required

During cutting, ensure that:

- The blade guard is in the lowered position
- When starting the machine, the operator and other people stand outside the path of the blade
- If the machine stalls, the blade is raised and the outside flange and nut are checked for tightness
- Wall cuts are performed with the operator's back close to vertical and the hands do not move above shoulder height
- Where possible, cut from a standing position with the feet braced and the body balanced. In some circumstances, it may be necessary to kneel on one knee to enable cuts to be made close to the floor. In such circumstances, protection for the knee will be necessary.
- When cutting horizontally across a wall, the operator's hand is at waist height
- The length of time the operator spends in a fixed position is minimized
- The throttle lock is only used when starting the equipment. If the throttle lock is used during normal operation then the ability to cut power will be reduced
- The equipment is stopped when changing grip to move between horizontal and vertical cuts
- When pre-cutting to 6 inches and changing to a second blade, the blade is aligned with the previous cut on resumption of cutting
- The handles provided (rather than the belt guard) are used to support the equipment
- When using electrical equipment, the leads will not be cut during operation
- Any person, who is providing assistance to the operator, is located where they will not be exposed to danger from sudden saw movement, ejection of material, a dropped machine, or falling offcuts
- The saw is only used with blade rotating in the opposite direction to the cut and not used for inverted cutting
- Plenty of water or coolant is used and that the coolant/water is suppressing dust at the point of generation (airborne dust is a health hazard)
- Appropriate personal protective equipment is being worn

In situations where the power pack for a hydraulic and compressed air wall saw is not easily accessible, or the machine is not remotely controlled at the working head, a second operator must be available.

Using Hand-Held Concrete Cutting Saws

Hand-held concrete cutting saws will only be used where the use of larger, self-supporting saws is not practical. When it is necessary to use a hand-held concrete cutting saw, select one which:

- Has handholds for the operator's non-trigger hand

- Is as light weight as is practical for the type of work, to reduce manual handling risks
- Has the best type of guarding around the blade
- Is well-balanced and has hand grips that are comfortable to use (poorly balanced machines might require operators to place their hands in dangerous positions near the blades to support the machine)
- Has the least vibration when in use, so as to reduce the risk of damage to the operator's blood circulation
- Can be used both left-handed and right-handed
- For horizontal cutting, can be used left-to-right and right-to-left without having to reposition the blade or guard

The operator must be instructed in, and competent at, operating the saw safely. Where possible, the saw will be used with the operator's hands at waist height when cutting horizontally and between shoulders to knee height when cutting vertically. When necessary, provide scaffolding or supports to ensure safe use of the saw. Always check to ensure that hand-held concrete cutting saws have not been modified.

General Cautions for Using Hand-Held Concrete Cutting Saws

- ALWAYS follow the designer's recommendations for the safe use of the saw
- ONLY use correct blade size, as recommended by the saw manufacturer
- Do NOT use oversized blades
- NEVER use the saw with the guards removed
- Do NOT hold hand-held concrete cutting saws any higher than shoulder height
- Do NOT use hand-held concrete cutting saws for inverted cutting

Using Concrete Drilling Equipment Safely

Operators drilling concrete will ensure that:

- Close fitting clothing is worn to avoid entanglement
- The drill is securely fastened to the work surface
- The area below or behind the operation is barricaded to prevent people entering during drilling
- Appropriate warning signs are posted
- The drilling equipment is connected to a GFCI
- Appropriate PPE is provided and being used
- Hydraulic, air, or flexible drive units and a drill stand are used for inverted drilling
- Supply of coolant/water is adequate to suppress dust

Protecting the Public

If cutting or drilling is carried out on a road, or in a public place, the public must be protected and a safe route around the work area must be provided.

Public safety measures include:

- Complying with local government requirements for road or footpath closure

- Barricading or screening the work area to protect pedestrians and to prevent vehicle entry
- Displaying warning signs and caution lighting where necessary lighting the area but ensuring there is no glare or shadows (where flood lighting is used, ensure it is positioned so as not to blind motorists)
- Providing wheelchair access around the area

MAINTAINING CONCRETE CUTTING AND DRILLING EQUIPMENT

Maintenance can prevent equipment from deviating from the design intention in a way that is a risk to safety and health.

Equipment will be maintained according to the manufacturer's specifications for maintenance or, in the absence of such specifications, in accordance with other proven and tested procedures. Regular inspection and routine maintenance undertaken by a competent person will help to ensure safe and efficient operation of equipment.

A suggested schedule is:

- The operator will check the general condition of the equipment daily, before use
- The equipment will be inspected and maintained by a qualified person at least every month or after 50 hours of operation

Defects and Repairs

Defects to concrete cutting and drilling equipment will be reported immediately to the person responsible for equipment maintenance. Because of their day-to-day experience, operators will be regularly consulted about the performance of equipment. Their suggestions for improvements should also be encouraged.

- A qualified person will carry out repairs
- Ensure that equipment with defects that could endanger people is not used

Keeping Records

Complete records of any inspections, services or repairs carried out will be kept for all concrete cutting and drilling equipment. These records will include any faults identified in normal use. Records must be up to date and retained for the life of the equipment.

TRAINING AND INSTRUCTING OPERATORS

All operators of concrete cutting and drilling equipment must know how to work safely and be able to demonstrate competency before using this equipment.

Employers must ensure their workers are trained in safe concrete cutting and drilling work practices and procedures, and are supervised by experienced people before carrying out this unsupervised work.

Training will be conducted at least annually, and will include information and instruction on:

- Dust, fumes, and air quality

- The hazards and risks associated with the work activities, including the potential health hazards of overexposure to airborne dust generated from concrete materials, including silicosis, lung cancer, chronic obstructive lung disease (COPD) and decreased lung function
- Recognition of poorly ventilated areas and confined spaces
- Methods to control exposure to airborne dust from concrete materials, including wet cutting, local exhaust ventilation systems, and process isolation, as applicable
- Proper use and maintenance of dust reduction systems, including the safe handling and disposal of waste materials
- The importance of good personal hygiene and housekeeping practices when working in proximity to dust from concrete, including: not smoking tobacco products, cleaning up appropriately before eating, cleaning clothes appropriately, avoiding other activities that could cause exposure to airborne dusts
- Additional safe work practices and procedures, including: the safe operation of equipment, the control measures in place, safe handling procedures (including lifting and moving), the safe use of hazardous substances, fire protection, emergency and first aid procedures, electrical safety, safety in confined spaces, proper sun protection, and other training required under hazard-specific regulations
- The correct use, fit, care, and storage of tools and personal protective equipment

The operator will be monitored, as necessary or required, to ensure safe work practices and procedures are being followed.

In addition, supervisors must be trained:

- To know and understand the information outlined above in this section
- To identify tasks that may result in employee exposure to dust or other hazards and, as necessary, initiate procedures that reduce employee exposure to dust or other hazards

Employee training records will be retained for the length of their employment.

ATTACHMENTS

- Concrete Cutting and Drilling Site Safety Checklist
- Concrete Cutting and Drilling Equipment Safety Checklist

CONCRETE CUTTING AND DRILLING SITE SAFETY CHECKLIST (PAGE 1 OF 3)

Company Name:			Operator's Name		
Site Location:		Type of Job		Date	

Check the site for safety — on arrival at the site, mark the correct answer where relevant to the job. If the answer is no the situation is unsafe. Alert the office.

	Yes	No	Comment
Site Evacuation			
Checked with Client	☐	☐	
Located First Aid/Accessible	☐	☐	
Scaffolding			
Erected as Required	☐	☐	
Services Located/Marked			
Electricity	☐	☐	
Gas	☐	☐	
Other	☐	☐	
Ventilation			
Adequate	☐	☐	
Lighting			
Lighting in Place	☐	☐	
Control/Public Safety			
Barricades in Position	☐	☐	
Warning Signs Displayed	☐	☐	
Traffic Control in Place	☐	☐	
Safety Equipment			
Safety Equipment is Functional, Clean and Safe	☐	☐	

CONCRETE CUTTING AND DRILLING EQUIPMENT SAFETY CHECKLIST (PAGE 2 OF 3)

Company Name:			Operator's Name		
Site Location:		Type of Job		Date	

Check the equipment for safety — on setting up, mark the correct answer where relevant to the job and equipment. If the answer is NO the situation is unsafe. Alert your supervisor.

	Yes	No	Comment
Floor Saw			
Shaft Nut Secure Belt	☐	☐	
Belt Tensioned and Undamaged	☐	☐	
Adequate Water and Waterways Clear	☐	☐	
Flaps In Place	☐	☐	
Guards In Place	☐	☐	
Hand Held Saw			
Belts Tensioned And Undamaged	☐	☐	
Flange Locking Nut Secure	☐	☐	
Water Supply Adequate	☐	☐	
Guards In Place	☐	☐	
Wall Saw			
Tracks Securely Fastened	☐	☐	
Blade Secured	☐	☐	
Job Wedged/Securely Supported	☐	☐	
Wire Saw			
Pulleys Secure	☐	☐	
Hydraulic Pressure Correct	☐	☐	

CONCRETE CUTTING AND DRILLING EQUIPMENT SAFETY CHECKLIST (PAGE 3 OF 3)

Company Name:			Operator's Name		
Site Location:		Type of Job		Date	

Check the equipment for safety — on setting up, mark the correct answer where relevant to the job and equipment. If the answer is NO the situation is unsafe. Alert your supervisor.

	Yes	No	Comment
Drills			
Electric Switch, Plug, And Lead Safe	☐	☐	
Water Collar Operable	☐	☐	
Carriage Clamp And Shims Operable	☐	☐	
Blade And Bits			
No Undercutting Evident	☐	☐	
Blades Free Of Cracks and Deterioration	☐	☐	
Blade Is Right Size And Type For The Machine	☐	☐	
All Segments Secure	☐	☐	
Electrical Leads			
Plugs In Good Condition	☐	☐	
Outer Casing Intact Correctly Tagged	☐	☐	
GFCIs Fitted	☐	☐	

Notes	

SCOPE

This chapter provides information on the hazards of confined spaces in both Construction and General Industry work. It also covers the current OSHA regulations for both industries and the actions the Company will take to protect employees from those hazards.

POLICY

This confined space policy is designed to ensure the safety and health of employees by limiting exposure to the hazards present while performing construction or general industry work in and around confined spaces.

The OSHA construction confined space regulations do not apply to work already governed by excavation, underground work, or diving regulations.

Although the OSHA confined space regulations for General Industry (1910.146) and for construction (1926 Subpart AA) are similar, there are new components that reflect different challenges present in construction work, including higher employee turnover, changing worksites and multiple contractors (controlling and subcontractors).

DEFINITION

Confined spaces have the following attributes:

- They are enclosed spaces that are large enough to work in
- Existing (natural) ventilation is insufficient to remove dangerous air contamination, or to improve any oxygen deficiency/enrichment that may exist or develop
- They are difficult to enter and exit, and the removal of a suddenly disabled employee is difficult due to the location and/or size of the opening(s)
- They are not designed to be occupied continuously by any employee or person

For these reasons, a confined space can present life-threatening hazards that a qualified person must evaluate, and that must be controlled, before workers may enter the space.

STANDARDS AND REGULATIONS

Except where applicable state regulations specify more stringent requirements, this confined space policy will comply either the OSHA general industry or construction regulations, depending on which is applicable, and will be followed whenever and wherever the Company's employees could be exposed to confined space hazards.

This program will be available to any employee and their representative at any time.

Working in confined spaces requires close coordination and communication between contractors, companies and employees. Written policies and procedures defining responsibilities are essential for protecting workers.

EMPLOYER RESPONSIBILITIES

This Company will create and implement the following measures to protect its and other employees both inside and outside confined spaces.

- Identify all confined spaces that employees could enter, inform all affected employees of their presence
- Involve affected employees on this policy, ensuring they are educated on the elements of confined space safety and trained in worksite specific procedures
- Document training and keep training records for all current employees
- Complete all confined space entry permits
- Keep cancelled permits until an annual review can be conducted
- Prevent unauthorized entry by using covers, posting signs or an attendant at the entrance
- Enforce safe permit space entry procedures
- Provide the necessary equipment
- Evaluate permit spaces during entry
- Provide attendants outside permit spaces during entry
- Describe how the attendant assigned to monitor multiple spaces will respond to emergencies
- Assign a role to every person in an entry, identify their duties and provide required training
- Arrange for rescue and emergency services for PRCS
- Coordinate entry operations
- Review this policy annually and following any incidents or near misses
- Provide all documents to the Secretary of Labor upon request

ENTRY SUPERVISOR RESPONSIBILITIES

For every permit-required confined space entry, the entry employer will assign an entry supervisor who has the ability to complete the following responsibilities:

- Knowing the hazards of the confined space
- Verifying the permit is completed correctly
- Ordering evacuation and cancelling or suspending the permit
- Communicating with and verifying the availability of emergency and rescue services
- Removing anyone unauthorized who tries to go into a permit space
- Assessing the permit-confined space when taking over responsibility and periodically as needed

Entry supervisors will know and understand the potential hazards of each confined space such as how entrants could be exposed, signs, symptoms and consequences. The entry supervisor will be someone who knows at least as much as the authorized entrants and attendants, and should be someone who knows even more about the space and hazards.

Before signing it, the supervisor will check the completed permit to be sure everything identified in the permit is correct: tests completed, procedures followed, and equipment in place.

The entry supervisor is responsible for deciding when there are unsafe conditions for an ongoing permit entry, terminating the entry and then cancelling or suspending the permit. A permit can be cancelled when the entry permit is completed or when a new condition not addressed in the permit occurs. The supervisor can also suspend a permit if a condition requires temporary evacuation, and the space soon returns to acceptable conditions in the permit. After reevaluating the permit space, the entry supervisor can remove the suspension but will record it on the permit.

The entry supervisor will check that needed emergency and rescue services are available; can be reached, and can themselves respond in a timely manner during the permit-required confined space entry.

When taking over responsibility of a permit space entry, the new entry supervisor will check the confined space conditions to make sure they are within safe levels and consistent with the permit. The entry supervisor is also responsible for periodically assessing the hazards and work within a confined space as often as deemed necessary according to the nature of the possible hazards and expected change of conditions.

ATTENDANT RESPONSIBILITIES

An attendant's primary responsibility is to evaluate and protect authorized entrants inside a PRCS. These responsibilities include:

- Knowing the hazards of the confined space
- Keeping track of authorized entrants
- Remaining outside permit spaces during entry and communicating with entrants
- Assessing the confined space conditions
- Ordering necessary evacuations
- Calling emergency services
- Non-entry rescues
- Keeping unauthorized entrants out
- Focusing exclusively on primary responsibility

Attendants will know and understand the potential hazards of the confined space such as, how entrants could be exposed, signs, symptoms and consequences. This includes knowing how the hazard could affect entrants' behavior.

Attendants will also continuously track authorized entrants in the permit space, and accurately document it on the permit.

An attendant must stay outside the permit space during an entry, even during emergencies regardless of whether entrants can escape, until relieved by another attendant. Once another attendant is on the scene, the attendant still can only try an entry rescue if they have the necessary equipment, are trained to do so and the entry permit allows for it.

Communication includes working with the entrant to make sure they are aware of the potential hazards of the confined space conditions, and understand when to evacuate.

The attendant is responsible for determining when a confined space is no longer safe and ordering entrants to evacuate whenever: there is a prohibited condition, the entrant is showing behavioral effects of exposure, something outside the confined space could be dangerous to entrants or if the attendant can't focus on all required responsibilities.

As soon as the attendant assesses that entrants need help to evacuate the permit space, he/she will immediately call rescue and emergency services as described in the permit and start non-entry rescue established in the permit.

When an unauthorized person approaches a confined space, the attendant will tell he/she to exit immediately. The attendant will tell the entrants and supervisor there is an unauthorized person in the permit space.

Attendants will not be assigned or allowed to do any work that takes their attention away from their focus on the confined space and the safety of people inside and outside it. This means attendants can do tasks that add to their knowledge of permit space conditions, like monitoring atmospheric conditions or passing tools to entrants from outside the space. Although this knowledge can be part of the job description, tasks that do not require continued attention away from or leaving the permit-required confined space are not included.

AUTHORIZED ENTRANTS

Authorized entrants will know and understand the potential hazards of the confined space such as how they could be exposed, signs, symptoms and consequences.

Entrants are expected to properly use all equipment, communicate with attendant and be ready to exit any permit space quickly.

Communication includes working with the attendant to share information attendant about any symptoms, warning signs or prohibited conditions.

The entrant must exit permit spaces when told to by the attendant or entry supervisor, there is an exposure warning sign or symptom, they detect a prohibited condition or an evacuation alarm is activated.

CONFINED SPACES IN CONSTRUCTION

Confined space hazards in construction work differ from those in general industry work mostly due to changing worksites and multiple contractor involvement. These differences require additional communications between employers and more stringent training.

Communicating Between Employers

The host employer will communicate all details about confined spaces at the worksite to the controlling contractor before and after entry. Where the Company has contracted with the property owner to manage it and transmit all confined space details, this Company will be considered both the controlling contractor and the host employer.

As the controlling contractor, all details about confined spaces at the worksite will be communicated with the host employer and all entry employers (i.e. subcontractors) before and after entry, ensuring that information is transferred to the different entry employers before and during entry so they don't create additional hazards for other entry employers' workers. Details will be communicated with other non-entry employers so that their workers do not create hazards or go into the confined space.

The entry employer will communicate all details about the confined space with the controlling contractor before and after entry.

A non-entry employer will communicate with the controlling contractor to determine where the confined spaces, are and the necessary steps to prevent employees from accessing them or creating hazards for other workers. Employees will be instructed not to enter the identified confined space.

IDENTIFYING CONFINED SPACES AND HAZARDS

A confined space is an area a worker can enter, but isn't designed for continuous occupancy and doesn't have an unrestricted entry or exit. A PRCS has a serious health or safety hazard, such as a hazardous atmosphere, material that can engulf a person or is in a shape that can trap or asphyxiate a person (e.g. converging or sloping walls or floor).

The Company will ensure that a competent person will identify all confined spaces an employee might work in, before the work begins, and determine which require permits. Employees and the controlling contractor will be informed directly of the location and danger in each permit space. Signs that warn of the danger and prohibit entry will be placed at permit space entrances.

As an entry employer, a competent person will re-evaluate non-permit spaces and determine if they are a permit spaces whenever there's an indication that the use or configuration has changed increasing the danger, or the original evaluation is incorrect.

Work will be scheduled as much as reasonably possible to avoid confined spaces by finishing tasks in areas before they become confined spaces.

Permit Required Confined Spaces include:

Oxygen-Deficient Atmospheres

An atmosphere with an oxygen concentration below 19.5% has insufficient oxygen for an employee and is a hazardous atmosphere. Such spaces require an approved breathing apparatus and a permit.

Flammable Atmospheres

An atmosphere is flammable, and hazardous, if any of the following conditions are true:

- Flammable gas, vapor, or mist is present in excess of 10% of its lower flammable limit (LFL)
- Airborne combustible dust is present at a concentration at or above its LFL
- Atmospheric oxygen concentration exceeds 23%

Toxic Atmospheres

An atmospheric concentration of any substance in excess of its permissible exposure limit (PEL) creates a hazardous atmosphere, as does any other atmospheric condition that is immediately dangerous to life or health.

Engulfing Potential

Any liquid or flowable solid that can kill by suffocation, strangulation, constriction or crushing has engulfing potential. A confined space that contains a material that can engulf an entrant is hazardous and requires a confined-space entry permit.

Trapping or Asphyxiation Risk

If the walls of a confined space converge inwardly or the floor of a confined space slopes downward to taper to a smaller cross-section an entrant runs the risk of becoming trapped and can face an asphyxiation risk. Confined spaces with such hazards are permit spaces.

Temperature Extremes

Extremely hot or cold temperatures can present problems for workers. Confined spaces can trap heat to create a condition dangerous to the life or health of a worker entering the space.

Noise

The design and acoustic properties in a confined space can amplify noise. Excessive noise can not only damage hearing and reduce reaction time to hazards, but can also affect communication. This can cause a shouted warning to go unheard.

Slippery Surfaces

Slips and falls can occur on a slick, wet, or icy surface, causing injury or death to workers. Further, wet environments can increase the likelihood of electric shock.

Falling Objects

Many confined spaces have openings above the worker that introduce hazards from objects falling from above onto a worker below. Before any worker may enter a confined space, appropriate barriers must protect entrants from falling objects.

CONFINED SPACES WITH ONLY ATMOSPHERIC HAZARDS

The following procedures and conditions are for entering a confined space with only atmospheric hazards that can be made safe to enter through forced air ventilation during entry.

To be more specific, all physical hazards have to be eliminated or isolated through engineering controls, the forced air ventilation has to keep the space safe for entry and entrants must be able to exit safely if ventilation stops working.

If the above can be proven and documented with monitoring and inspection where the data is available to each entrant, the space can be entered without a permit, attendant, or rescue and emergency equipment once the Company certifies that:

- Entrance covers can be safely removed
- Entrance openings are immediately guarded by a railing, temporary cover or barrier that prevents accidental falls into the opening and protects entrants from foreign objects falling into the space
- The internal atmosphere is tested with a calibrated direct-reading instrument in the following order: oxygen content, flammable gases and vapors, and potential toxic air contaminants. The testing procedure is evaluated to ensure it's appropriate for the possible atmospheric hazards. This may mean identifying the possible toxic air contaminants and ensuring the gas detector can detect it, and testing at the top, middle, and bottom of the space to account for different gases' density
- Testing and continuous monitoring ensures there is no hazardous atmosphere
- Continuous forced air ventilation from a clean source directed to the lowest spot or furthest corner, so that it eliminates any hazardous atmosphere from the space while anyone is in the space
- Continuous monitoring of the atmosphere in the space with monitoring equipment that will sound an alarm notifying all entrants if a hazard exceeds the atmospheric thresholds
- Where the preferred continuous monitoring is not used because of equipment limitations, or periodic monitoring is shown to be sufficient, periodic monitoring will be done often enough to detect a hazardous atmosphere is building up and make sure entrants have time to exit
- Once a hazard is observed, everyone will immediately leave the space. The hazard source is then found, and the Company will take steps that protect employees before they enter that space again
- There is a safe way to enter and exit the space, including a personnel hoist made for that purpose, or a job hoist approved ahead of time in writing by a registered professional engineer

The written certificate must contain the date, location of the space and the signature of the person certifying the above conditions have been met. The certification must be made before anybody enters and be available to every employee entering the space. The employer will re-evaluate the space if there is a change to the space that may increase hazards or there is indication the current evaluation is incorrect.

RECLASSIFYING PERMIT REQUIRED CONFINED SPACES FOR ENTRY

Permit required confined spaces without any potential atmospheric hazard can be reclassified as non-permit required once the entry employer certifies that:

- The hazards can be eliminated or isolated without entering the space
- If the entry employer can show they have to enter the space to remove the hazard, then they can do that following the permit process

The written certificate must contain how all the hazards have been eliminated or isolated, the date, location of the space, and the signature of the person certifying the above conditions have been met. The certification must be made before anybody enters and be available to every employee entering the space. If new hazards are identified everyone must leave the space, and the entry employer will reevaluate.

ENTRY PERMIT SYSTEM

Before any employee may enter a PRCS, the employer/entry supervisor must follow the measures outlined in the “Pre-Entry” and “Additional Requirements” sections of this chapter.

The employer must also complete and sign documentation of the measures used to render the space safe for entry and maintain control over potential hazards to workers (an entry permit). The permit must be readily available to all authorized entrants or their representatives, posted at the entry. If the nature of the space prevents permit posting at the entry, the permit must remain available by an equally effective means.

The entry permit that documents compliance with this section and authorizes entry to a permit space will include a written description of:

- The location of permit space to be entered
- The purpose of the entry, including the type of work that will be done
- The time, date and authorized duration of the permit (the duration of the permit can’t exceed one shift or 12 hours; the permit may be extended for another 12-hour period pending recertification of acceptable conditions)
- The names of authorized entrants within the permit space
- The personnel, by name, currently serving as attendants
- The name and signature of the entry supervisor, and if different, the names and signatures of the qualified person responsible for securing the permit, and of the qualified person responsible for reviewing conditions prior to entry
- The hazards of the permit space to be entered
- The measures used to isolate the permit space and eliminate or control permit space hazards before entry, including all means of isolation, cleaning, purging, or inserting
- The minimum acceptable environmental conditions for entry/work in the space
    - See the NIOSH standards for the current permissible exposure/IDHL levels for the chemicals that can be found in confined spaces
- The personal protective equipment required, including respiratory protection, clothing or harnesses required for entry and rescue
    - The results of initial and periodic (at least hourly) atmospheric tests performed to ensure safe entry/work conditions, accompanied by the names of the testers, as well as when the tests were performed
    - The last calibration dates for the oxygen detector and combustible gas indicator being used
- Additional permits needed to complete the task in the confined space
    - The rescue and emergency services that can be summoned and the means of summoning those services
    - The communication procedures used by authorized entrants and attendants to maintain contact during the entry

  - Equipment to be provided for compliance with this section
  - Special work practices or procedures, or any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety
- Any additional permits, such as for hot work, that have been issued to authorize work in the permit space

AFTER ENTRY

Cancel Permit

The entry supervisor will terminate entry and cancel the permit as soon as a condition that is not allowed occurs in or near the confined space, or upon completion of operations requiring permit-space entry.

Retain Permit

Entry permits (and in particular canceled permits) will be retained for at least a year to help in the required regular evaluation of the confined space program. If entry or work presented any problems, the entrant, attendant, or supervisor will note them on the permit to facilitate necessary revisions to the permit space program.

No Entrant

If no employee or contractor will enter a permit-required confined space, effective measures must prevent anyone from entering the permit space.

SAFE PERMIT SPACE ENTRY OPERATIONS

The employer will take the following steps to check out the PRCS before entry.

Test the Air

Before entry, the air must be tested by a qualified individual to determine whether an oxygen enrichment and/or an oxygen deficiency exists, if potential flammable hazards (gases and vapors) exist, and if there is the presence or potential for toxic air contaminants—in that order. Oxygen levels must remain between 19.5% and 23%. A written record of such testing results will be made and kept at the work site during work, and for at least one year afterward. Affected employees or their representative may review and record the testing results.

Testing is not necessary if a toxic material is known to exist, and appropriate PPE is worn.

If interconnected spaces are blinded off as separate units, each space must be tested and the results recorded. In this case, the most hazardous condition that is found will determine the procedures to be followed.

If the space is part of a larger continuous system and can’t be isolated, pre-entry testing will be done, and conditions will be continuously monitored unless necessary monitoring equipment isn’t commercially available. Work in large or continuous system also requires a sufficient early-warning system continuously monitoring for engulfment hazards.

Air Contamination/Hazard Does Not Exist

If an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination don't exist within the space, entry into and work within the space may proceed subject to the following provisions:

The air must continue to be tested and documented by a qualified individual at least hourly if continuous monitoring devices are not used, to ensure that an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination don't occur within the space during the performance of any operation.

Air Contamination/Hazard Exists

Where the existence of an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination is confirmed, existing ventilation must be improved by the use of additional mechanical ventilation or other appropriate means. Work may begin/resume only when air tests reveal that an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination has been eliminated. Ventilation will continue as long as the recurrence of the hazards is possible, or appropriate PPE must be worn by all employees.

Mechanical and Electrical Devices

All fixed mechanical devices and equipment that are capable of causing injury must be placed at zero mechanical state. Electrical equipment, excluding lighting, must be locked out with a key-type padlock and the key will remain with the person working inside the confined space, in cases where locking is impossible, equipment must be properly tagged. Installations under the exclusive control of electric utilities or companies performing the same functions, on their own/leased or public properties, may be exempt.

Continuously monitor the atmosphere in the space with monitoring equipment that will sound an alarm notifying all entrants if a hazard exceeds the atmospheric thresholds.

Pre-Entry

A competent person will identify and evaluate permit space hazards before any employees enter it and establish all the following elements to ensure safe work in the area have been met, especially:

- Citing the acceptable entry conditions
- Authorized entrants can observe space testing and monitoring
- Isolating the space and its hazards
- Controlling atmospheric hazards through purging, inerting, flushing or ventilating
- Reducing the atmosphere to below 10 percent of its Lower Flammable Limit (LFL) or inerting the atmosphere so that it is entirely non-combustible and addressing the other atmospheric hazards like oxygen deficiency through PPE
- Ensuring monitoring procedures will detect atmospheric hazard level increases quickly enough for entrants to exit, in case ventilation stops working
- Having necessary barriers to protect entrants from outside hazards

- Conditions continue to allow safe entry the entire time
- The necessary PPE effectively protects every employee, and that they have the PPE before entering a hazardous atmosphere
- Conditions, like high pressure, that can make removing an entrance cover unsafe are eliminated

Prevent Dangerous Air Contamination

Before any employee enters the permit space, the space must be emptied, flushed or otherwise purged of flammable, injurious or incapacitating substances to the greatest extent possible. In short, the space must be isolated from hazards (which may require lockout/tagout).

Pumps and lines must be disconnected, blinded or blocked off by other positive means to prevent the development of dangerous air contamination, as well as oxygen enrichment and/or oxygen deficiency. The disconnection or blind should be located or performed in a manner that prevents the inadvertent reconnection of the line or removal of the blind. The closing of valves alone, or the closing of valves and locking or tagging them, is not considered effective protection. Initial cleaning must be done from outside the confined space to the extent feasible.

Exceptions: This does not apply to public utility gas distribution systems, and it does not necessarily require blocking of all laterals to sewers or storm drains.

Additional Requirements

When oxygen-consuming equipment such as salamanders, plumbers' torches, furnaces and similar equipment will be used, measures must be taken to ensure adequate combustion air and exhaust gas venting.

No sources of ignition are permitted in a confined space until procedures have been implemented to ensure that oxygen enrichments and/or oxygen deficiencies, flammable hazards, or toxic air contamination do not exist. Fans or other equipment used for removing flammable gases or vapors must not create an ignition hazard. Never take cylinders of compressed gases into a confined space, except for cylinders that are part of self-contained breathing apparatus or resuscitation equipment. When left unattended, a torch and hose must be removed from a confined space. Open-end fuel gas and oxygen hoses must be immediately removed from an enclosed space when they are disconnected from the torch or other gas-consuming device.

All electrical cords, tools and equipment must be inspected for defects before use in a confined space. In the absence of low voltage circuits and equipment or double-insulated tools, equipment must be of the heavy-duty insulation type, or ground-fault circuit interrupters must be used. Temporary lighting must be operated at 12 volts or less. However, 120-volt lights may be used if protected by a ground-fault circuit interrupter.

Efforts must be made to permit ready entry and exit to the confined space, to the greatest extent feasible. Where it’s not feasible to provide for ready exit from spaces equipped with automatic fire-suppression systems that use harmful concentrations of toxic or oxygen-displacing gases, or total foam flooding, these systems must be deactivated. Where it is not practical or safe to deactivate such systems, the use of respiratory protective equipment will apply during entry into, and work within, such confined spaces.

Measures such as posting warning signs or erecting barriers will be implemented to prevent unauthorized entry into permit spaces, and to protect entrants from falling objects and other hazards from outside of the space.

Smoking is prohibited in confined spaces or within 20 feet of a confined space opening.

Confined Space Entry

The following provisions apply to the entry into, and work within a PRCS. A confined space is considered to be permit-required if, through the steps outlined in the “Pre-Entry” subsection above, an atmosphere is found to contain, or can’t be verified to be free of, an oxygen enrichment and/or oxygen deficiency, flammable hazard, or toxic air contamination.

Safe Practices

- Tanks, vessels, or other confined spaces with side and top openings must be entered from side openings when practicable. For the purposes of this requirement, side openings are those within 3½ feet of the bottom
- Appropriate, approved respiratory protective equipment must be provided and worn
- If entry into a confined space is through a top opening, an approved safety belt with an attached line must be used. The free end of the line will be secured outside the entry opening. The line must be at least ½ inch in diameter and 2,000-pounds test. The exception to this requirement is where it can be shown that a safety belt and attached line would further endanger the life of the employee
- At least one standby employee/attendant must stand by outside of, in near proximity to, and within view of the entry of the confined space ready to give assistance in case of emergency. The standby employee must maintain visual, voice or single-line communications with all individuals in the confined space and must have means available to summon assistance. At least one additional employee who may have other duties must be within sight or call of the standby employee(s)
- The standby employee(s) will have appropriate training, as well as approved respiratory protective equipment, including an independent source of breathing air available for immediate use
- The protected standby employee(s) may enter the confined space, but only in case of an emergency, and only after alerting at least one other trained rescue worker or emergency response team (fire department) of the existence of an emergency and of their intent to enter the confined space
- Entry into a confined space without an attendant is allowed only when there is no potential for engulfment or IDHL atmospheres. In that case, at least one entrant must wear a continuous monitoring device equipped with an alarm and capable of evaluating oxygen concentrations and combustible gas concentrations in the confined space. When large confined spaces are entered, a sufficient number of monitoring devices must either be worn or located in the work area to monitor the atmosphere adequately

When entry must be made through a top opening, the following requirements will also apply:

- The safety belt will be a harness type that suspends a person in an upright position
- The lifeline must be strung from the employee overhead and back down to the employee, where it must be tied to the employee's "D" ring, keeping the lifeline reasonably taut at all times
- A hoisting device or other effective means must be provided for lifting employees out of the space
- Work involving the use of a flame, arc, spark or other source of ignition is prohibited within a confined space (or any adjacent space having common walls, floor or ceiling with the confined space) that contains, or is likely to develop, oxygen enrichment or dangerous air contamination due to flammable and/or explosive substances
- When gases such as nitrogen are used to provide an inert atmosphere for preventing the ignition of flammable gases or vapors, no flame, arc, spark or other source of ignition is permitted unless the oxygen concentration is maintained at less than 20 percent of the concentration that will support combustion
- Testing of the oxygen content must be conducted with sufficient frequency to ensure conformance with this oxygen concentration
- A written record of the results of such testing must be made and kept at the work site for the duration of the work
- Only approved lighting and electrical equipment may be used in confined spaces subject to oxygen enrichment or dangerous air contamination by flammable and/or explosive substances
- Employees working in confined spaces that contain, or contained, substances corrosive to the skin or substances that can be absorbed through the skin, must be provided with, and will be required to wear, appropriate personal protective clothing or devices. Eyewashes and safety showers may also be required
- The Company requires a second employee be available to help in an emergency when an employee enters a manhole, unless the employee can safely enter for a brief period to perform inspections and housekeeping, take readings, or some other task that can safely be done

When a host employer arranges to have employees of another employer (contractor) perform work that involves a confined space entry, the host employer must:

- Inform the contractor that the workplace contains a confined space and that confined space entry is allowed only through compliance with this confined space program, as they apply to the project/contractor
- Inform the contractor of the elements, including the hazards identified and the host employer's experience with the confined space, that make the space in question a confined space
- Inform the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near the confined space where the contractor's personnel will be working
- Coordinate entry operations with the contractor, when both host employer and contractor personnel will be working in or near the confined space, so that operations of one employer won't endanger the employees of any other employer

- Debrief the contractor at the conclusion of the confined space operation regarding the confined space program followed, and any hazards confronted or created in the confined space during entry, or other, operations

In addition to complying with the confined space requirements that apply to all employers, each contractor retained to perform confined space entry operations must:

- Obtain any available information regarding confined space hazards and entry operations from the host employer
- Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near a confined space, so that operations of one employer will not endanger the employees of any other employer
- Inform the host employer of the confined space program that the contractor will follow, and of any hazards confronted or created in the confined space, either through a debriefing or during the entry operation

EQUIPMENT

The Company will provide suitable equipment needed to safely enter, exit from and conduct rescues in confined spaces. The equipment will be properly maintained and all employees will know how to use it correctly. Equipment requirements can include:

- Adequate testing and monitoring equipment
- Ventilating equipment that makes entering possible
- Communication equipment that allows attendant to talk to entrants
- PPE that meets any other applicable requirements where engineering and administrative controls don't give enough protection
- Lighting that meets the minimum illumination requirements, that won't ignite any gas, vapor, dust or fiber present, and that enables employees to work safely and exit during emergencies
- Barriers and shields that effectively isolate the confined space
- Ladders needed to enter and exit the confined space
- Rescue and emergency equipment that is called for in the Company's emergency rescue policy

TRAINING

Employees will be trained in a vocabulary and language they understand so that they are proficient in their expected responsibilities. This training will occur:

- Before they are first assigned duties that involve confined-spaces work
- Before there is a change in their assigned duties, as applicable to confined spaces
- When there is a change in permit-space operations that warrants training
- When any new hazard on which the employee has not been trained is, or may become, introduced to a confined space
- When the employee does not follow or understand entry procedures

Assigned duties include authorized entrant, attendant, entry supervisor and emergency rescue. Employees not authorized to enter confined spaces will be trained on the hazards of the confined spaces at the worksite, and how to avoid them.

The training and determination of proficiency will be documented and kept for all current employees. This documentation will be available to all employees who ask for it, and the Secretary of Labor upon request.

Training Components

All employees will be trained in the following minimum elements:

- How to identify a confined workspace
- The need for safe, confined-space entry procedures
- Hazard recognition, including inherent or possible hazards presented by confined spaces in the workplace
- The use of respiratory protection equipment, if it is required or may be needed
- The use of atmospheric testing devices, if employees are required to use them, training will cover field checks as specified by the manufacturer, normal use and specific limitations of the equipment
- Lockout/tagout procedures
- The use of any special equipment and tools
- The roles of individuals involved in the safe entry into, and work in, confined spaces
- Emergency and rescue procedures and methods

Employees expected to perform duties as an entry supervisor, hazardous confined space entry attendant or authorized entrant will receive specific training and demonstrate the understanding, knowledge and skills necessary to participate safely in the confined space entry program, including, but not limited to the following:

- The specific hazards of all confined spaces in the workplace
- Conditions under which a confined space may or must be reclassified under the confined space entry program
- Conditions required to participate in alternate confined space entry procedures and the alternate procedures for permit space entry
- Pre-entry procedures for confined space entry
- Any equipment provided or used as part of the confined space entry program
- Plans and procedures for response or rescue in case of an emergency in a permit space and permit-space evacuation
- The contents and requirements of a confined-space entry permit
- The roles and responsibilities of each employee involved in confined space entry and operations
- The importance of atmospheric monitoring, and how to perform such monitoring
- The steps that are required following permit space entry
- The permit space program review process

Rescue Teams

- Rescue teams, if applicable, must be trained to use the equipment they may need to perform the rescue functions that are assigned to them
- At least annually, rescue teams will practice removing victims through openings and portals of the same size, configuration and accessibility as those of spaces from which an actual rescue could be required
- The attendant or at least one member of each rescue team must hold current certifications in basic first aid and CPR

Training Records

Training will be certified by recording the following:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment, and will be made available to employees and their representatives.

PRECAUTIONS FOR EMERGENCIES IN CONFINED SPACES

At least one person trained in first aid and cardiopulmonary resuscitation (CPR) must be immediately available when the use of respiratory protective equipment is required in a confined space. Standards for CPR training will follow the principles of the American Heart Association or the American Red Cross.

An effective means of communication between employees inside a confined space and a standby employee will be used when the use of respiratory protective equipment is required, and when employees inside a confined space are out of sight of the standby employee(s). All affected employees must be trained in the use of the communication system, and the system must be tested before each use.

RESCUE AND EMERGENCY SERVICES FOR PRCS

Rescue and emergency service procedures are a necessary component of the permit and include the preferred non-entry and entry rescues. The non-entry can be initiated immediately by the attendant and entry supervisor who remains outside the PRCS. Entry rescues need to be either from a designated outside source or a team of selected employees, and each has their own requirements. Unauthorized personnel must not attempt a rescue.

Any injured entrant that is exposed to a hazardous substance at the worksite will bring the associated Safety Data Sheet (SDS) and provide it to the facility where the medical treatment takes place.

Any injured entrant that is exposed to a substance with a SDS at the worksite will be given to the medical facility where he is treated.

Outside Rescue and Emergency Services

Outside rescue and emergency services will be evaluated to ensure they can respond quickly, and have both the equipment and ability to provide rescue when considering each PRCS and the identified hazards.

The Company will provide hazard information about its confined spaces and allow the service to go to the PRCS and develop rescue plans. The service selected must have the training, equipment, ability and willingness to perform rescues. The service also has to agree to tell the Company when it will be unable to perform rescues.

The time it takes the service to reach the permit space, enter and retrieve entrants will also be considered, along with the rescue requirements of other regulations. In particular, if the PRCS could have an atmosphere that is immediately dangerous to life or health (IDLH), the respiratory protection standard requires standby rescue personnel equipped with respiratory protection. A response time of 15 minutes may be determined adequate for mechanical hazards that could cause broken bones or abrasions.

Employee Rescue and Emergency Services

When selecting a team of employees to provide rescue and emergency services, they will: have the necessary equipment and PPE; be trained to be proficient as entrants and rescuers, correct PPE use, basic first aid and cardiopulmonary resuscitation (CPR); and practice attempting the type of rescue needed at least once every 12 months. At least one member of the rescue team will have current basic first aid and CPR certifications.

If a rescue operation is correctly performed in the last 12 months, then practice is not necessary.

Non-Entry Rescue and Retrieval Equipment

Authorized entrants who enter a permit space must wear a chest or full body harness with a retrieval line attached to the center of their backs near shoulder level or above their heads. Wristlets may be used if the employer can demonstrate that the use of a chest or full body harness is not feasible or creates a greater hazard.

The other end of the retrieval line must be secured outside of the permit space, either by another person holding the line, or by attaching it to a mechanical device or a fixed point. A mechanical device must be available to retrieve someone from vertical-type permit spaces deeper than five feet deep. When entry is made through a top opening, a hoisting device such as a tripod must be provided for lifting employees out of the space.

The line will be attached outside the permit space so that it can be used to pull entrants out as soon as they need to be rescued. This can either be a mechanical device like a block and tackle or winch system, or a fixed point. Vertical entrances more than five feet deep call for a mechanical device to assist rescue.

Circumstances described by OSHA that increase risk of or hamper rescue include anything that can catch onto or entangle the retrieval line like physical obstructions, airlines, electric cords and additional retrieval lines from multiple entrants. The distance entrants have to go into the space and how much they will have to move around can also affect the decision that a retrieval system is too dangerous.

Additional Management Responsibilities

Management is also required to adhere to the following requirements, as applicable to the job at hand:

- Evaluate the workplace to determine whether any spaces are permit-required confined spaces
- Inform exposed employees of the presence of permit-required confined spaces with signs or equally effective means
- Take measures to prevent employees from entering permit spaces without permit
- Develop and implement a written permit space program — available for inspection by employees or their representatives — if employees are permitted to enter permit spaces
- Reevaluate, and reclassify as necessary, a non-permit confined space when there are changes in use or configuration of that space that may increase hazards to entrants
- Abide by all applicable standards and regulations when work with a contractor involves permit space entry
- Provide and keep in good repair all equipment necessary for the written permit space program
- Evaluate permit space conditions when entry operations are concluded
- Provide at least one attendant outside of a permit space during entry operations in order to respond to an emergency
- Designate individuals with active roles in entry operations, identify their duties, and provide appropriate training
- Develop and implement all other elements of a permit space program including, but not limited to:
  - A system for preparing, issuing, using and cancelling entry permits
  - Procedures for summoning rescue and emergency services
  - Procedures for concluding entry/operations
- Review entry operations and the permit space program to ensure employees are protected from permit space hazards
- Consult with affected employees or their representatives in the development and implementation of all elements of the permit space program, and make available to them all information required for the program

POLICY REVIEW

This policy will be reviewed annually and when measures may not protect employees, such as after any incidents or near misses. Any deficiencies will be corrected before entering any additional PRCS.

Some examples of situations that may require a review are:

- An unauthorized person enters a PRCS

- A new hazard not covered by the permit is detected in a PRCS
- A new condition prohibited by the permit is detected in a PRCS
- An injury takes place during entry
- A change in the PRCS configuration or use
- An employee issues a complaint

The annual review will ensure that all cancelled permits are included in the review within one year after entry. This review will evaluate the policy's effectiveness of providing protection to all affected employees.

FORMS AND ATTACHMENTS

Evaluate the documents on the following pages along with their source material from the General Industry Regulation's appendixes, and consider using them to implement and maintain your safety program.

- Confined-Space Entry Permit
- Confined Space Entry Training Record Sheet
- Initial Evaluation of Confined Space Rescue Plans
- Evaluation of Confined Space Rescue Program
- Planning Confined Space Rescue Drills

CONFINED SPACES ENTRY PERMIT (1 OF 3)

GENERAL INFORMATION				
Permit Space Location				
Purpose of Entry				
Permit Valid For	Date		To	
	Time		To	

PERMIT SPACE HAZARDS		Y	N
ATMOSPHERIC	Oxygen Deficient	☐	☐
	Oxygen Enriched	☐	☐
	Explosive (Gas/Vapor)	☐	☐
	Explosive Dust	☐	☐
	Carbon Monoxide	☐	☐
	Hydrogen Sulfide	☐	☐
	Other Toxic Vapors	☐	☐
ENGULFMENT		☐	☐
CONFIGURATION (ENTRAPMENT)		☐	☐
MECHANICAL		☐	☐
ELECTRICAL		☐	☐
SUBSTANCE HAZARD TO SKIN/EYES		☐	☐
HEAT STRESS		☐	☐
OTHER POTENTIAL HAZARDS (radiation, noise, etc, list)		☐	☐
		☐	☐
		☐	☐

CONTROLS AND EQUIPMENT

- ☐ ISOLATION
  - ☐ Lockout/Tagout
  - ☐ Blanking/Blinding
  - ☐ Double Block and Bleed
  - ☐ Line Breaking/Misalignment
  - ☐ Other: _____
- ☐ INERTING
- ☐ PURGE/CLEAN
- ☐ METHOD FOR SAFE COVER REMOVAL AND SECURING AREA
- ☐ ATMOSPHERIC TESTING
  - ☐ Periodic (give interval) _____
  - ☐ Continuous
- ☐ VENTILATION
  - ☐ Natural
  - ☐ Continuous Forced Air
  - ☐ Local Exhaust
- ☐ ENTRY EQUIPMENT
  - ☐ Ladders
  - ☐ Other: _____
- ☐ PERSONAL PROTECTIVE EQUIPMENT
  - ☐ Respiratory (SCBA, SAR, air purifying)
  - ☐ Clothing
  - ☐ Eye and Face Protection
  - ☐ Hearing Protection
- ☐ RESCUE and RETRIEVAL EQUIPMENT
  - ☐ Full Body Harness ☐ Lifeline
  - ☐ Tripod w/Mechanical Wench
  - ☐ Explosion-Proof Lighting
- ☐ NON-SPARKING TOOLS
- ☐ SAFE ELECTRICAL EQUIPMENT and GFCI
- ☐ COMMUNICATION EQUIPMENT
  - ☐ Radio ☐ Phone
  - ☐ Other:_____
- ☐ HOT WORK PERMIT
- ☐ FIRE EXTINGUISHERS

CONFINED SPACES ENTRY PERMIT (2 OF 3)

PERSONNEL		
Entrant(s)	Time In	Time Out
Attendant(s)		
Entry Supervisor(s)		

COMMUNICATION PROCEDURES							
Visual	☐	Voice	☐	Rope	☐	Radio	☐
Other							

RESCUE AND EMERGENCY SERVICES				RESCUE PROCEDURES
Name		Phone		
Name		Phone		
Summoning Procedure				

CONFINED SPACES ENTRY PERMIT (3 OF 3)

ATMOSPHERIC TESTING RECORD									
Condition	Acceptable Level	Record continuous monitoring results every 2 hours							
OXYGEN	19.5% - 23%								
EXPLOSIVE (GAS/VAPOR)	<10% LFL								
EXPLOSIVE DUST	<LFL (5ft Visibility)								
CARBON MONOXIDE	50ppm								
HYDROGEN SULFIDE	10ppm								
OTHER (Specify)									
NAME(S) OF TESTER(S)									
TESTING EQUIPMENT	Type								
	Serial #								

ENTRY AUTHORIZATION (ENTRY AUTHORIZED BY)					
Signature		Date		Time	
ENTRY SUSPENSION (ENTRY SUSPENDED BY)					
Signature		Date		Time	
Resumed after Reevaluation		Date		Time	
Description					
ENTRY CANCELLATION (ENTRY CANCELLED BY)					
Name				Date	
Signature				Time	
Reason for Cancellation	☐	Entry Operations Completed	☐	Prohibited Condition Arose	
Problems Encountered					

RESCUE AND EMERGENCY SERVICES

Name	Rescue Duties	Rescue Equipment and PPE Authorized For Use	Training		Certified (Y/N)	Rescue Practice Date	Rescue Practice Session Description	Name of Trainer	Date of Training
			First Aid	CPR					

TRAINING RECORD

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name:	**Signature:**

INITIAL EVALUATION OF CONFINED SPACE RESCUE PLANS

Use this worksheet to determine if a permit-required confined space rescue plan is sufficient. This plan could be a response team of employees trained by the employer or calling 911. Both must pass muster. Answering "no" to any question means an alternative must be considered to satisfy the requirements in this guide.

Tasks	Results
1. Determine the rescue response time needed for permit-required confined spaces. In other words, how long can a person remain trapped in the confined space? Consider any PEL, REL time limits (e.g. H_2S has an NIOSH REL 10 ppm ceiling for 10 minutes) If there is a possible IDLH, a rescue team needs to be standing by. If the hazards are only physical (e.g. broken bones, abrasions) a longer response time can be tolerated.	Needed rescue response time _____ minutes
2. Calculate the time required for the rescue service by adding the needed time to: get the notification, arrive at the scene, set-up and be ready to enter. Consider the rescue team's distance from each worksite, quality of roads and traffic, reliability and training of the drivers. Then subtract the needed response time. The answer must be a positive number to continue.	Receive notification _____ minutes + Arrive at the scene _____ minutes + Set up and be ready for entry _____ minutes - Needed rescue response time _____ minutes = _____ minutes Must result in a positive number
3. Determine the rescue response service availability: a) Is the rescue service available when workers will enter the permit-required confined space? b) Are key rescue members available at these times? c) Can the rescue service notify the attendant when they are unavailable so entries can be prevented or stopped?	☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
4. Has the rescue service passed the most recent performance requirement evaluations?	☐ YES ☐ NO
5. Is the planned 911 service willing to perform rescues: a) If you call 911, is a responder available? b) Is the 911 responder willing to perform rescue and first aid? c) Are the 911 responders able to perform rescues at the worksite?	☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
6. Can the attendant immediately request a rescue?	☐ YES ☐ NO

EVALUATION OF CONFINED SPACE RESCUE PLANS

Follow this checklist to determine if a permit-required confined space rescue plan meets all performance requirements. This critique should occur during any periodic drills or following a successful rescue. Answering “no” to any question, means an appropriate corrective action must be considered.

Tasks	Results
1. Has the entire team been trained as entrants, and know the potential hazards of at least the types of spaces they may have to perform a rescue?	☐ YES ☐ NO
2. Can the team recognize signs, symptoms, and consequences of hazardous atmospheres possible in the permit confined space?	☐ YES ☐ NO
3. Is every team member: a) Provided with and trained in PPE necessary to perform rescues? b) Trained to perform rescues and use rescue equipment (e.g. ropes, backboards)?	 ☐ YES ☐ NO ☐ YES ☐ NO
4. Is every team member trained in first-aid and medical skills to treat victims injured or overcome by possible hazards?	☐ YES ☐ NO
5. Do team members perform duties safely and efficiently?	☐ YES ☐ NO
6. Do team members focus on their own safety before the victim’s?	☐ YES ☐ NO
7. If necessary, can the rescue service test the air identifying entry conditions?	☐ YES ☐ NO
8. Can team members find information that applies to rescues? a) Entry permits b) Hot work permits c) Safety Data Sheets	 ☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
9. Does the rescue service know of any hazards from outside the permit area (e.g. nearby construction)?	☐ YES ☐ NO
10. If necessary, can the rescue service safely rescue victims from: a) A limited size opening (less than 2 ft. in diameter)? b) Limited internal space? c) Internal obstacles or hazards?	 ☐ YES ☐ NO ☐ YES ☐ NO ☐ YES ☐ NO
11. If necessary, can the rescue service safely perform an elevated rescue?	☐ YES ☐ NO
12. Does the rescue service have a plan for each type of rescue needed? a) A plan for each kind of permit space rescue operation at the worksite? b) Does the plan cover all types of possible necessary rescue operations?	 ☐ YES ☐ NO ☐ YES ☐ NO

PLANNING CONFINED SPACE RESCUE DRILLS

Follow this worksheet to check off that the rescue team's periodic drills – at least once every 12 months when a successful rescue has not been completed – covers all possible scenarios and worksite characteristics. Practices may occur in representative spaces or in the "worst-case" environment with the most restrictive access, entrance size, and configurations.

Tasks	Results
1. **Horizontal Access**. The entrance is located on the side of the permit space. Using retrieval lines may be difficult.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
2. **Vertical Access**. The entrance is located: a) On the top of the permit space so rescuers must climb down, or b) On the bottom of the permit space so rescuers must climb up to enter.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
3. **Restricted Entrance Size**. Smallest diameter entrance is 2 ft. or less. These are too small for rescuers to enter with a SCBA, or allow normal spinal immobilization of an injured employee.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
4. **Unrestricted Entrance Size**. Smallest diameter entrance is 2 ft. or more, and allows relatively free movement into and out of the permit space.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
5. **Open Internal Configuration**. The space has no barriers, obstacles, or obstruction (e.g. a water tank).	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
6. **Obstructed Internal Configuration**. The space has an obstacle that requires the rescuer to maneuver around it (e.g. baffle, mixing blades). Equipment brought into the space (e.g. ladder, scaffold) can be an obstruction if its position or size increases the rescue difficulty.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
7. **Elevated Entrance Configuration**. The entrance is 4 ft. or more above grade, requiring high angle rescue procedures because of the difficulty transporting victims from the entrance to the ground.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐
8. **Non-elevated Entrance Configuration**. The entrance is less than 4 ft. above grade, and the rescue team can normally transport victims.	Is this a possibility at the worksite? ☐ YES ☐ NO Description attached? ☐

SCOPE

This chapter defines the requirements for ensuring cranes and crane operators are fully qualified to protect the safety of all employees according to OSHA regulation 1926 Subpart CC Cranes and Derricks in Construction. The information included here is general in nature and applies to all cranes, hoists and mobile lifting devices. Always refer to the manufacturers' information for specific requirements of the equipment being used.

POLICY

This policy applies to crane operators, cranes, and other material handling equipment for the movement of material by hoisting.

EMPLOYER RESPONSIBILITIES

A Competent Person designated by the Company will have the authority over all crane and hoisting operations. The competent person will ensure that all safety measures and systems are in place; all safety procedures are adhered to, and make sure regular inspections of the crane, operational site and rigging equipment are made.

- An employer must limit the use of a crane to the following personnel:
  - An employee who has been trained and qualified in safe operating procedures for the type of crane they will be using
  - A trainee who is under the direct supervision of a designated operator
  - Designated maintenance personnel while performing their duties
- Employers must maintain a crane and its accessories in good condition
- The original safety factor of equipment must not be reduced if modifications or changes are made to the equipment. Modifications or changes must be certified by a qualified registered engineer. The capacity, operation and maintenance instruction plates, tags or decals must be changed accordingly to reflect any modifications or changes
- The manual provided by the crane manufacturer must be readily accessible for the crane operator's reference at the work site
- A load-rating chart must be permanently mounted in the cab of each crane, easily readable from the operator's normal operating station
- Certified written operational and rated load tests will be obtained from the manufacturer and kept available with the equipment. Equipment will be re-tested after any structural repairs or modifications which may only be made by the manufacturer or technician certified by the manufacturer
- The Company will comply with the manufacturer's specifications and limitations. If specifications are not available, a qualified engineer will determine the equipment's limitations, which must be documented and recorded. Attachments used with cranes must not exceed the capacity, rating, or scope recommended by the manufacturer

- Obtain all necessary permits and operator certifications for using fixed and mobile cranes. These will depend on the size and rated capacity of the crane, as well as the regulatory agency with jurisdiction (state or federal OSHA)
- A preventive maintenance program based on the crane manufacturer's recommendations will be established, and performed
- Any unsafe condition found during an inspection must be corrected by a trained and qualified employee or crane Service Company before the crane is put into operation. Designated repair personnel must have a permit to operate the type of crane being serviced. Maintenance records will be kept of all repairs and replacements
- Before any servicing or maintenance of equipment is done, personnel will perform proper applicable lockout/blockout/tagout procedures to ensure the safety of all workers

OPERATOR RESPONSIBILITIES

An employee selected to operate a crane must possess all of the following minimum physical qualifications and be examined for the qualifications at least once every 3 years:

- Have corrected vision that meets the same requirements as for the applicable state's driver's license (possession of a state driver's license or doctor's certificate covers this requirement)
- Have effective use of all four limbs
- Be of a height sufficient to operate the controls and to have an unobstructed view over the controls into the work area
- Have coordination between eyes, hands, and feet
- Be free of known convulsive disorders and episodes of unconsciousness
- Be able to understand signs, labels, and instructions

INSPECTIONS

The Company requires a visual crane inspection before each shift by a designated competent person to ensure that the crane is working properly. Required crane inspections include initial, pre-use, monthly, quarterly and annual. Supporting inspection logs will be kept to satisfy this requirement. The following will be checked:

- Control mechanisms for wear and malfunction, each daily use
- Deterioration or leakage of air or hydraulic systems, each daily use
- Hydraulic system for oil level, each daily use
- Hydraulic hoses and fittings for leaks and deterioration
- All running ropes, each daily use
- Replace a hook having a crack, a throat opening of more than 15% of normal or more than 10-degree twist from the plane of an unbent hook
- Rope reeving in conformance with the original installation
- Electrical apparatus for malfunction, wear, dirt, and moisture accumulations
- Tires for specified pressure
- The ground conditions

Monthly inspections will be made and documented by a designated competent person. The things to be inspected monthly include the following:

- Structural members and boom for cracks, deformation, and corrosion
- Bolts and rivets for tightness
- Sheaves, drums, pins, bearings, shafts, gears, rollers, locking and clamping devices for wear, distortion, and cracks
- Power sources for performance
- Brake and clutch system parts, linings, pawls, and ratchets for excessive wear
- Load, boom angle, and other indicators for inaccuracies over their full range
- Travel, steering, braking, and locking devices for malfunction
- Tires for wear or damage
- Radiators and oil coolers for leakage, blockage of air passages, and improper performance
- Rust on piston rods and control valves
- Oil strainers and filters for blockage

The documentation of monthly inspections must include the parts of the crane checked, the results of the inspection and the name and signature of the inspector with the date of the inspection.

Records of the documentation must be kept for at least 3 months.

Occasional and Out of Service Inspections

- A crane which has been idle more than 1 month, but less than 6 months will receive an inspection before being placed in service
- A crane, which has been idle more than 6 months, will receive an inspection before being placed in service
- A standby crane will be inspected at not less than 6-month intervals

ASSEMBLY AND DISASSEMBLY OF CRANES

Employer procedures must be developed by a qualified person and satisfy specific requirements: providing adequate support and stability for all parts of the equipment, and positioning employees involved to minimize exposure to any unintended movement or collapse.

Follow all manufacturer established procedures when assembling and disassembling cranes. You must follow manufacturer procedures when using synthetic slings during assembly or disassembly rigging. Synthetic slings must be protected from abrasive, sharp or acute edges and configurations that might reduce the sling’s rated capacity.

Procedures

All assembly/disassembly work will be supervised by an A/D (Assembly/Disassembly) director. The A/D director must meet the criteria for both a competent person and a qualified person or be a competent person assisted by a qualified person.

The A/D director must:

- Understand the applicable procedures
- Review procedures immediately prior to beginning work unless they understand the procedures and has used them before for that equipment type and configuration
- Ensure that each crew member understands their tasks, the hazards, and any hazardous positions or locations to avoid
- Verify all capacities of any equipment used, including rigging
- Address hazards associated with the operation, including 12 specified areas of concern: site and ground conditions, blocking material, proper location of blocking, verifying assist crane loads, boom and jib pick points, center of gravity, stability upon pin removal, snagging, struck by counterweights, boom hoist brake failure, loss of backward stability and wind speed and weather

Inspection

Before using the completed assembly, the qualified person will inspect the assembly to ensure it is configured in accordance with the manufacturer equipment criteria. If the criterion is unavailable, the qualified person, with the assistance of a registered professional engineer, must develop the appropriate configuration criteria and ensure they are met.

Tests for Cranes

A crane, prior to initial use and after modification, will be given an operational test to insure compliance, including the following:

- Load hoisting and lowering mechanisms
- Boom hoisting and lowering mechanisms
- Travel mechanism
- Safety devices
- Boom extension mechanisms for a mobile hydraulic crane

A test load will not exceed 110% of the rated load at any working radius.

Results of operational tests and load tests will be kept at the job site.

Where re-rating is necessary, it will not be in excess of the original load rating unless a letter of approval is obtained from the manufacturer and maintained at the job site.

SAFE PRACTICES

The Company will verify that before operations begin, the proper safety devices are installed on the crane and in proper working order. If any of the safety devices such as but not limited to; the crane level indicator, boom stops, jib stops, foot pedal brake locks or horns are not in proper working order, the crane must be taken out of service and operation will not be used until it’s deemed in proper working order.

- Our Company will comply with the manufacturer's procedures, specifications and limitations applicable to the operation of all cranes and derricks. Where manufacturer's specifications are not available, the limitations assigned to the equipment will be based on the determinations of a qualified engineer competent in this field and those determinations will be documented and recorded. Attachments used with cranes will not exceed the capacity, rating or scope recommended by the manufacturer
- Rated load capacities, recommended operating speeds, special hazard warnings or instructions and the operations manual for the crane will be kept in the cab of the crane at all times
- Hand signals to crane and derrick operators will be those prescribed by the applicable American National Standards Institute (ANSI) standard for the type of crane in use. An illustration of the signals will be posted at the job site
- The designated competent person will inspect all machinery and equipment before each use, and during use, to make sure it’s in safe operating condition. Any deficiencies will be repaired, or defective parts replaced, before being returned to use
- The Company will maintain a crane and its accessories in a safe condition
- A thorough, annual inspection of the hoisting machinery will be made by the designated competent person, a government or private agency recognized by the U.S. DOL. The Company will keep all dates and results of inspections for each hoisting machine and piece of equipment
- Whenever internal combustion engine powered equipment exhausts in enclosed spaces, tests will be made and recorded to see that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres
- A portable dry powder fire extinguisher with at least a 5 BC rating, or higher, will be available in the cab, in the operating enclosure, or on the unit. The operator and maintenance employees will be trained in its use
- Modifications or additions that affect the safe operation of the equipment may not be made without the manufacturer's written approval. The original safety factor of the equipment must not be reduced if modifications or changes are made to the equipment. Modifications or changes will be certified by a qualified registered engineer. The capacity, operation and maintenance instruction plates, tags or decals will be changed accordingly to reflect any modifications or changes

Operators have the authority to stop or refuse to handle loads if they feel that the operation jeopardizes safety concerns. The operations must not proceed until a qualified person deems that the safety is assured.

Hazard Identification and Risk Assessment

The Company will ensure that a competent person conducts hazard identification and a designated risk assessment before work begins. Boundaries of the work zone must be identified by marking with flags and range limiting devices. The work zone must be defined using a 360-degree radius around the crane or the max radius of the crane.

Where the assessment identifies that the crane has the potential to hit and injure or pin/crush a worker against an object, the hazardous areas of the crane swing radius will be marked with warning lines or railings.

If the assessment identifies that the crane, load line, load or any part of the crane could get closer than 20 feet to an electrical power line, the following measures must be followed:

- Any overhead wire will be considered an energized line until a representative of the owner or utility has checked and indicated otherwise
- Before any crane operation is started closer than 20 feet to a power line the owner or utility representative will be notified
- Arrangements will be made with the utility operator/owner to de-energize and ground them.
- Except where electrical power lines and equipment have been de-energized and visibly grounded at the point of work or where an insulating barrier, not a part of the crane has been erected, or the employee is insulated or isolated from the crane, a crane will maintain the following clearances:

Voltage (KV)	Minimum Clearance Distance (Feet)
Up to 50	10
50 to 200	15
200 to 350	20
350 to 500	25
500 to 750	35
750 to 1000	45
Over 1000	As established by the line owner

Signal Person

A signal person is required when:

- The point of operation is not in full view of the operator
- The operator's view is obstructed in the direction the equipment is traveling
- Either the operator or the person handling the load determines that a signal person is needed because of site-specific safety concerns

The signal person is considered qualified if they:

- Know and understand the type of signals used at the worksite
- Are competent in using these signals
- Understand the operations and limitations of the equipment, including the crane dynamics involved in swinging, raising, lowering and stopping loads and in boom deflection from hoisting loads
- Know and understand the relevant signal person qualification requirements specified in 1926 subpart CC
- Passes an oral or written test and a practical test

Employers must use one of the following options to ensure a signal person is qualified

- Third party qualified evaluator. The signal person has documentation from a third party qualified evaluator showing that he or she meets the qualification requirements
- The employer's qualified evaluator (not a third party) assesses the individual, determines the individual meets the qualification requirements and provides documentation that specifies each type of signaling for which the signal person is qualified under the requirements of the standard

An operator will respond to signals only from the employee directing a lift. However, they must obey at all times an emergency stop signal from any employee. When two or more cranes are used to lift a load, a designated employee will give all signals.

General Crane Operations

An equipment operator will be familiar with the equipment and its proper care. If adjustments or repairs are necessary or if any defects are known, the operator will report the needed adjustments or repairs or the defects to the responsible supervisor and, upon changing shifts, notify the next operator of the defects.

An operator will test all controls before beginning a new shift. Any controls that do not operate properly will be adjusted or repaired before operations are begun.

No one under eighteen years of age will be employed to operate any power-driven hoisting equipment or assist in hooking on, loading slings or rigging operations.

Operators will not engage in any practice that will divert their attention while operating equipment. The operator will not eat, smoke or read while operating of the crane, or when physically unfit.

Equipment operators will be responsible for all operations under their direct control. When there is any doubt as to safety, an operator will stop operations and consult with the supervisor before continuing work.

Equipment operators will not leave a crane unattended unless the responsible supervisor notifies them that it is safe to do so. Before leaving, the operator will:

- Land any attached load
- Disengage clutches
- Put the controls in the off or neutral position
- Open the main switch or stop the engine
- Engage manual locking devices, in the absence of automatic holding equipment, and the crane is secured against accidental travel

When a tag or lock is on the switch or engine starting controls, the operator will not close the switch or the person who placed it there has removed start operations until the lock or tag.

Before closing the switch or starting the equipment, an operator will put all controls in the off or neutral position and will make sure that all personnel are in the clear.

If power fails during operation, an equipment operator will do all of the following:

- Set all brakes and locking devices

- Move all clutch or other power controls to the off or neutral position
- Communicate with the responsible supervisor in charge of equipment operations
- If practical, and applicable, land the load under brake control

An operator will respond to signals only from the designated signalman using appropriate signals, except where voice communications equipment is used. An operator will obey a stop signal from anyone. Operating signals will follow an established standard. Whistle signals can be used where only one crane is in operation.

A crane will be equipped with an audible signaling device that will be actuated before traveling without a signalperson and intermittently during travel. When moving a crane, the following signals will be used:

- Stop, 1 audible signal
- Go ahead, 2 audible signals
- Back up, 3 audible signals
- The operator, or maintenance personnel, will properly lubricate all working parts of the crane
- Cranes will be kept clean
- Whenever the operator finds the main or emergency switch open, it will not be closed; even when starting on regular duty, until it is determined that, no one is on or near the crane. The crane will not be oiled or repaired unless the main switch is open
- If the power goes off, the operator will immediately throw all controllers to the “OFF” position until the power is again available
- Before closing the main switch, the operator will make sure that all controllers are in the “OFF” position until the power is again available
- When lowering a load, the operator will proceed carefully and make sure the load is under safe control
- When leaving the cage, the operator will throw all controllers to the “OFF” position and open the main switch
- All necessary operator clothing and personal belongings will be stored so that they don’t interfere with access or operation
- Tools, oil cans, waste, extra fuses and other necessary articles will be stored in the tool box, and will not be permitted to lie loose in or about the cab
- The safety coordinator will ensure that operators are trained in the operation and care of the fire extinguishers provided
- A legible rating chart will be provided at the operator station showing the following information:
  - Load capacity relating to corresponding boom angles and operating radii for all boom lengths, jib lengths and angles. Where optional equipment, such as outriggers or extra counterweights are provided by the manufacturer, alternate ratings will be provided
  - Where structural competence limits the ratings, such information will be shown on the chart
  - The required parts of line for hoist reeving, including the size and construction of rope will be on the rating chart or in the operating manual
- A crane will not be operated with more than the designed amount of ballast or counterweight. The amount of ballast or counterweight will not be changed without authorization of the manufacturer in writing and making corresponding changes in the rating chart

- When assembling or disassembling a boom on the ground, it will be blocked to prevent dropping the boom and boom sections
- When a boom section is manually telescoped it will be positioned so through and through pinning of the cylinder eye may be accomplished and will be checked in a horizontal position
- When 2 or more cranes are used to lift a single load, one designated employee will direct the rigging, lift, and movement
- A locomotive crane will not be rotated into a position where other rail cars on an adjacent track might strike it, except when it has been verified that cars are not moving on the adjacent track and flag protection has been provided
- Specified tire pressures will be maintained

Outriggers and Stabilizers

- Outriggers and stabilizers must be fully extended or, if permitted by manufacturer procedures, deployed as specified in the load chart
- Set outriggers to remove equipment weight from the wheels, except for locomotive cranes. Outrigger floats, if used, must be attached to the outriggers, stabilizer floats, if used, must be attached to the stabilizers
- Each outrigger or stabilizer must be visible to the operator or to a signal person during extension and setting
- Place outrigger and stabilizer blocking under the float/pad of the jack or, if there is no jack, under the outer bearing surface of the outrigger or stabilizer beam. Blocking must be sufficient to sustain the loads and maintain stability and must be properly placed

Tower Cranes

Tower cranes are subject to additional requirements for erecting, climbing and dismantling, including a pre-erection inspection (29 CFR 1926.1435).

Attaching and Holding a Load

A load will be attached to the hook by means of a sling or other lifting device. The hoist rope will not be wrapped around a load except when setting or removing a pole.

Before starting to hoist, the operator will make sure:

- The hoist rope is not kinked
- The multiple part lines are not twisted around each other
- The hook is not swinging when brought over the load

No employees are permitted to pass or stand under a suspended load.

An operator will not load a crane beyond the rated load. A load that’s limited by structural competence rather than by stability will be checked by the operator to determine that the weight does not exceed the rated load.

Moving a Load

- When moving a load, an operator will avoid sudden acceleration and deceleration of a movements that would cause a swinging action by the load
- An operator will not move a load or hook if an employee is on it
- A load will be secured and balanced before it is lifted more than 6 inches
- An operator will test the hoisting brakes before moving a near rated load by raising the load a few inches and applying the hoisting brakes. This requirement applies to both single or multiple line reeving
- A load or boom will not be lowered below a point where less than 2 full wraps of rope remain on the drum
- A load will not be moved in a manner that would allow it to contact obstructions
- The rotational speed of a crane must not allow the center of the load to swing out beyond the radius of the point sheave in use
- A tag line will be used when rotation of the load would be hazardous
- A crane will not be used for dragging a load sideways
- Loads will not be lifted over the front area of a truck crane, unless it is within the capacity of the rating chart for the front area of the truck crane
- Floats or pads secured to outriggers will be used when the load to be handled at a particular radius exceeds the rated load without outriggers. A wood block used to support an outrigger will be:
  - Large enough to prevent shifting and toppling of the load
  - Strong enough to resist crushing
  - Free of knots and cracks that could affect its ability to support the load
  - Before moving with a load, a designated employee will determine the position to carry the load, boom location, ground conditions, travel route, speed of movement and location of overhead wires
- A crane, while moving, from one location to another, will have:
  - The boom carried in line with the direction of movement
  - The superstructure secured against rotation, except when negotiating a turn with an operator in the cab or the boom on a dolly
  - An empty hook restrained against movement
  - A crane with or without a load will not travel with the boom at a height that would allow it to bounce back over the cab
  - A crane operating at a fixed radius will have the boom-hoist pawl or other positive locking device engaged

Refueling

A crane fuel tank will not be refueled while the engine is running.

When refueling is done with portable containers, the containers will be safety cans having automatic closing caps and be labeled as approved by underwriters' laboratories, Inc., factory mutual laboratory or other nationally recognized laboratory.

Smoking or other sources of sparks and flame will be kept at least 25 feet from a refueling operation.

WIRE ROPE AND SLING INSPECTION

Running ropes in continuous service will have an inspection at least once a month. The inspection will include: measurement of diameter of rope; count of broken wires in 1 lay when concentrated; end connections for broken wires; corrosion, kinking, crushing, cutting, or other conditions affecting the capability of the rope; cracked, bent, worn, corroded, or improperly applied end connectors.

For rope in contact with equalizer sheaves or saddles, or on sheaves where rope travel is limited, the inspection will include moving the rope from its normal position on the sheave and examining the rope at the rope contact point.

Inspection of a non-rotating type rope will include verifying that the wires are not broken or worn within the rope.

A rope that has been idle more than 1 month will be given a complete inspection before being placed in service.

GENERAL MAINTENANCE

The Company will establish and maintain a preventative maintenance program under the supervision of an authorized and trained employee or outside service.

Before adjustments and repairs to a crane are started, the following steps will be taken:

- The crane will be placed where it does not interfere with other operations
- A "warning" or "out of order" sign will be placed at the controls, and the controls will be in the "off" position. The sign is not needed if the energy source is locked out
- The power plant will be disconnected, locked out, or made safe by other means
- The boom will be lowered to the ground or otherwise secured against dropping
- All hydraulic cylinders used for boom hoist and boom telescope on a mobile hydraulic crane will be retracted
- Hydraulic oil pressure from all hydraulic circuits will be relieved before loosening or removing hydraulic components of a mobile hydraulic crane
- The load block will be lowered to the ground or otherwise secured against dropping, except when operation is necessary for the adjustment
- After adjustments and repairs have been completed, the crane will not be returned to operations until all guards have been installed, safety devices activated, trapped air removed from the hydraulic system of a mobile hydraulic crane and maintenance equipment and warning signs or locks are removed
- Hazardous conditions identified by the inspection requirements will be corrected before operation of the crane is resumed

- Adjustments will be maintained to assure correct functioning of operating mechanisms, safety devices, control systems, power plants and brakes and clutches
- The original safety factor will be maintained when repairs and replacements are made. Hooks showing defects will be replaced. Pitted or burned electrical contacts affecting their operations will be replaced in sets
- A crane or its wire rope will not be used as a ground or to carry current. The ground will be attached to the part being welded while welding

Wire Rope and Sling Maintenance

Running wire ropes will be replaced when they show:

- 6 random broken wires in 1 rope lay or 3 broken wires in 1 strand of a rope lay
- Wear of 1/3 of the original diameter of outside individual wires
- Kinking, crushing, or bird caging
- Heat damage
- Reduction in nominal diameter of 3/64 inch for ropes to 3/4 inch, 1/16 inch for ropes 7/8 inch to 11/8 inch, 3/32 inch for ropes 11/4 inch to 11/2

A standing wire rope will be replaced if it has:

- More than 2 broken wires in 1 lay section beyond an end connection
- 1 broken wire at an end connection

A wire rope having more than one broken wire at a socketed fitting will be re-socketed.

Wire rope will be stored in a way that prevents damage or deterioration, and handled in a manner to prevent kinking or twisting.

Before cutting preformed rope, a seizing will be placed on each side of the cut to prevent unlaying of the strands. On non-preformed rope 7/8 inch in diameter or smaller, 2 seizings will be placed on each side of the cut, and for non-preformed rope more than 7/8 inch in diameter, 3 seizings on each side will be used.

During installation, do not drag wire rope in dirt or around sharp objects.

TRAINING

The Company will verify that only certified employees are allowed to operate cranes. All employees that were certified prior to November 10th, 2017 must be recertified within 4 years of this date through one of the following:

- An accredited crane operator testing organization
- An audited program provided by the Company
- Have U.S. military licensing by a government authority

Operators not certified prior to November 10th, 2017 must be certified through one of these programs prior to being allowed to operate cranes for our Company.

Crane operators will be designated based on their experience and training, which must include the minimum amounts of classroom sessions and hands-on training including lubricating points, adjustments, principles of crane operators, load charts, hand signals and inspections. Training will include use of fire extinguishers.

Crane operator qualifications must be maintained and refreshed every five years and may include vision and medical condition evaluations.

Crane Operator Requirements and Qualifications

Operators must pass a written examination, understand and be able to use a load chart, as well as calculate loads for the crane type.

While the OSHA operator qualification regulation does not include physical requirements for operators, ASME B30-5 has established physical requirements for operators. These ASME requirements have endorsed by several professional organizations and may be included in some state regulations. Always check with the governing authority to determine the requirements for your worksite.

ASME B30-5 identifies the following minimum physical requirements for crane operators and trainees:

- Have corrected vision that meets the same requirements as vision for a valid driver's license. Possession of a driver's license or a doctor's certificate is evidence of meeting this requirement
- Be able to read and understand signs, labels, and instruction manuals
- They will be able to distinguish colors, regardless of position of colors, if color differential is required for operation
- Have depth perception be able to distinguish between red, yellow, and green
- Their hearing, with or without hearing aid, must be adequate for a specific operation
- Have vision of at least 20/30 Snellen in one eye and 20/50 in the other eye with or without glasses
- No history of disabling medical condition which may be sufficient reason for disqualification

Qualifications for crane operators will be maintained every four years and will include medical and vision evaluations.

SITE-SPECIFIC CRANE OPERATION PLAN

A site-specific operation plan must be created prior to any crane work. This plan will be developed by a competent person and reviewed by all involved parties. Employers should refer to the OSHA standard 1926.1400-1442 for specific crane requirements.

Please see below for the following documents:

- Site-Specific Crane Operation Plan Checklist
- Crane/Boom Inspection Report
- Recommended Hand Signals for Controlling Crane Operations

SITE-SPECIFIC CRANE OPERATION PLAN AND CHECKLIST (PAGE 1 OF 2)

Company		Job Name and Location	
Job Supervisor		Dates on Site	
Project Engineer		Qualified Person	
Crane Operator		Qualified Rigger	

Scope of Work					
Roofing	☐	Sq. Ft.		Tons	
Siding	☐	Sq. Ft.		Tons	
Decking	☐	Sq. Ft.		Tons	
General Miscellaneous	☐	Sq. Ft		Tons	

General Description of Work

Site Layout	Yes	No
1. Has controlling contractor provided adequate access to site?	☐	☐
2. Is laydown area firm, properly graded, well drained, and accessible?	☐	☐

Pre-Construction Site Conference	Yes	No
Has a Pre-Construction Site Conference been held?	☐	☐

Please list those attending:	

SITE-SPECIFIC CRANE OPERATION PLAN AND CHECKLIST (PAGE 2 OF 2)

Sequence of Crane Activity	
• Give a general sequence of crane activities:	
• Material delivery date	
• How will activities be coordinated with other trades:	
Cranes	
• Crane type:	
• Crane brand:	
• Crane capacity:	
• How is the site prepared for the crane?	
• How many different locations will the crane have and where are they?	
• What is the path for overhead loads?	
• How will employees be notified of overhead loads?	
• Are there any critical lifts? (75% of capacity or dual crane) How many?	Yes ☐ No ☐
• Describe critical lifts:	
• Are lift permits attached for critical lifts?	Yes ☐ No ☐
• Are lift permits attached for all lifts over 5,000 lbs.	Yes ☐ No ☐

Crane Inspection Report

Use only equipment which is in safe working condition. DO NOT operate equipment if any inspected items need repair.

	Time:	Date:

Job Site Location:

Operator's Name:	**Supervisor's Name:**
Inspector(s) Name:	**Hour Meter Reading:**

Subcontractors On-Site (List Name and Trade):

Equipment Type:	**Equipment I.D. Numbers:**	**Manufacturer:**

OK	REPAIR	N/A	GENERAL SITE INFORMATION:	OK	REPAIR	N/A	GENERAL SITE INFORMATION:
☐	☐	☐	Safety Program Manual on site?	☐	☐	☐	Hazard assessment of work area?
☐	☐	☐	Are required OSHA Posters posted?	☐	☐	☐	Controls in place for identified hazards?
☐	☐	☐	Emergency Phone numbers posted?	☐	☐	☐	Crane swing areas signed and barricaded?
☐	☐	☐	Tailgate/Toolbox talks up-to-date?	☐	☐	☐	Operator's manual on lift?
☐	☐	☐	Site Lift Plan completed?	☐	☐	☐	Prelift meeting completed?

OK	REPAIR	N/A	CARRIER VEHICLE:	OK	REPAIR	N/A	CARRIER VEHICLE:
☐	☐	☐	Motor	☐	☐	☐	Cab
☐	☐	☐	Crank case oil is clean and full	☐	☐	☐	Steering
☐	☐	☐	Clutch /Converter	☐	☐	☐	Lights
☐	☐	☐	Drive Line	☐	☐	☐	Fire Extinguisher
☐	☐	☐	Transmission fluid at proper level	☐	☐	☐	Glass
☐	☐	☐	Frame	☐	☐	☐	Warning Lights
☐	☐	☐	Brakes	☐	☐	☐	Access
☐	☐	☐	Differentials	☐	☐	☐	Rims & Bolts
☐	☐	☐	Outriggers	☐	☐	☐	Cuts or bulges in the tires
☐	☐	☐	Engine coolant is about 2" below cap	☐	☐	☐	Tires properly inflated (look on load charts for MFGR recommendations)

OK	REPAIR	N/A	HYDRAULICS:	OK	REPAIR	N/A	HYDRAULICS:
☐	☐	☐	Relief Valve(s)	☐	☐	☐	Hoist Motor
☐	☐	☐	Restrictor Valves	☐	☐	☐	Pumps
☐	☐	☐	Pipe Lines	☐	☐	☐	Bearings
☐	☐	☐	Hose Lines	☐	☐	☐	Check hydraulic oil level
☐	☐	☐	Outrigger Cylinders	☐	☐	☐	Mounting Bolts
☐	☐	☐	Boom Hoist Cylinder	☐	☐	☐	Swing Gear
☐	☐	☐	Boom Crowd Cylinder	☐	☐	☐	Swing Pinion
☐	☐	☐	Control Valves	☐	☐	☐	Seals - Hydraulic
☐	☐	☐	Swing Motor				

OK	REPAIR	N/A	BOOM:	OK	REPAIR	N/A	BOOM:
☐	☐	☐	Shipper Welds	☐	☐	☐	Bearing Sheave
☐	☐	☐	Boom Welds	☐	☐	☐	Load Block Sheave
☐	☐	☐	Pins - Boom Pivot	☐	☐	☐	Load Block Hook
☐	☐	☐	Support Roller	☐	☐	☐	Boom Main Section
☐	☐	☐	Boom Pins				

OK	REPAIR	N/A	WEDGE SOCKETS:
☐	☐	☐	Wire rope size and wedge socket is a proper match?
☐	☐	☐	Dead end of wire rope extends at least 9 inches beyond wedge socket?
☐	☐	☐	Dead end of the wire rope is secured properly?

OK	REPAIR	N/A	SHEAVES:
☐	☐	☐	The wire rope is seated properly in the sheaves?
☐	☐	☐	The wire rope keepers (keeps cable from coming out of the sheaves) are in good shape?
☐	☐	☐	Check the bolts on the sheave plates for tightness?
☐	☐	☐	Check for any weld cracks?
☐	☐	☐	Signs of bent or buckled panels or parts?
OK	**REPAIR**	**N/A**	**OPERATIONAL CHECKS:**
☐	☐	☐	Crane operators' logs up-to-date and on-site?
☐	☐	☐	Operators familiar with load charts?
☐	☐	☐	Load chart is in cab?
☐	☐	☐	Hand signal charts on crane?
☐	☐	☐	Handrails leading into crane cab are good condition?
☐	☐	☐	Out riggers are extended out; working properly?
☐	☐	☐	Out rigger pads not cracked?
☐	☐	☐	Outriggers extended & swing radius barricades in place?
☐	☐	☐	Hydraulic hoses in good condition?
☐	☐	☐	The drum cable is properly spooled?
☐	☐	☐	Boom angle indicator is available and working?
☐	☐	☐	Swing through 360 degrees, does boom angle indicator stay the same throughout rotation?
☐	☐	☐	Does boom swing brake work properly?
☐	☐	☐	Back-up alarm is working?
☐	☐	☐	Does the horn work?
☐	☐	☐	Engine started, gauges are checked & working properly?
☐	☐	☐	Crane is leveled, working properly?
☐	☐	☐	Boom up, unlock the swing break, does it swing when level?
☐	☐	☐	Extend out the boom, are all sections extending evenly?
☐	☐	☐	Brakes & brake systems check out?
☐	☐	☐	Safety pressure relief valves check out?
☐	☐	☐	Is equipment a safe distance from edge of trench or excavation?
OK	**REPAIR**	**N/A**	**MATERIALS HANDLING:**
☐	☐	☐	Chains and slings inspected and tagged as required?
☐	☐	☐	Employees kept from under suspended loads?
☐	☐	☐	Materials properly stored or stacked?
☐	☐	☐	Employees using proper lifting methods?
☐	☐	☐	Tag lines used to guide loads?
OK	**REPAIR**	**N/A**	**HOOKS – Replace If:**
☐	☐	☐	If hook throat opening has increased by 15%
☐	☐	☐	If load-bearing point (throat) has been worn by 10%, the hook must be replaced.
☐	☐	☐	If hook tip is twisted by 10° or more, the hook must be replaced.
☐	☐	☐	Check for excessive damage from chemicals and for deformation and cracks.
☐	☐	☐	Check for and replace damaged, inoperative, or missing hook latches.

Unsafe Conditions, Situations, Acts, or Practices Observed: _____

_____

Comments: _____

_____

_____ _____

Signature **(person performing inspection/evaluation if different from operator)** **Date**

_____ _____

Operator's Signature **Date**

TRAINING RECORD

Trainer:	
Signature:	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter provides the safe practices and requirements for employees authorized to drive a Company vehicle or personal car on Company business. It does not include information on vehicle inspections, maintenance or load securement, which are addressed in other chapters of this manual.

POLICY

Driving any vehicle presents significant risks to workers. This Company is committed to reducing traffic-related deaths and injuries. As part of this commitment, this Company maintains a driver safety policy designed to support a culture of safety and reduce accidents.

EMPLOYER RESPONSIBILITIES

This Company will:

- Establish and maintain policies and rules in accordance with applicable regulations and best industry practices to promote safety and prevent injuries and illnesses
- Ensure that every employee asked to drive a Company car or personal car on Company business has been trained in the Company's driver safety policy and safe driving practices
- Record and maintain documents pertaining to the eligibility and qualification of an employee to drive a Company car or a personal vehicle on Company business
- Ensure vehicles driven on Company business are in good repair and adhere to all legal regulations and requirements
- Encourage and respect the involvement of employees in the planning and implementation of safe driving policy
- Ensure drivers participate in regular safety meetings to promote a continued culture of safety and address safety concerns
- Devise and implement a system of disciplinary action and rewards to encourage safe driving habits, as appropriate
- Prevent unnecessary travel by employees

EMPLOYEE RESPONSIBILITIES

Company employees who, as part of their job, drive a Company vehicle or their own on Company business are expected to:

- Complete a driver safety course that addresses general driver safety as well as hazards specific to the job being done
- Ensure the roadworthiness of his or her vehicle before operation
- Operate the vehicle according to best safety practices
- Respond to accidents and near misses according to established Company policies and procedures
- Inform a supervisor of any changes to their Motor Vehicle Record that may impact their eligibility to drive

- Maintain a driver's license that permits them to perform their job in compliance with the law
- Demonstrate awareness and understanding of the Company driver safety policy
- Make recommendations to improve the Company's driver safety policy

SAFE PRACTICES

This Company recognizes that its greatest assets are its employees, a fact demonstrated by a commitment to their safety.

A driver safety program saves lives and reduces injuries. It also prevents material losses and helps this Company guard against the range of liabilities that may emerge from a vehicular accident.

Accordingly, management will provide resources needed to support a culture of safety and will actively encourage employees to participate in planning and implementation of the driver safety program.

If the Company operates any of the following types of commercial motor vehicles in interstate commerce, it will comply with applicable U.S. Department of Transportation (DOT) safety regulations, many of which may not be detailed in this chapter.

- A vehicle with a gross vehicle weight rating or gross combination weight rating of 10,0001 lbs. or more
- A vehicle designed or used to transport between 9 and 15 passengers for compensation
- A vehicle designed or used to transport 16 or more passengers
- Any size vehicle used in the transportation of materials classified as hazardous under the Hazardous Materials Transportation Act and are required to be placarded under the Hazardous Materials Regulations

FLEET

This Company will maintain a fleet of vehicles if necessary for business in accordance with relevant regulatory standards and vehicle manufacturer's advice.

Fleet Selection

The safety coordinator will work with this Company's insurance Company to establish guidelines for the selection of Company vehicles, and will include the following:

- The appropriate vehicle type for expected use
- Required safety equipment
- Maintenance procedures
- Inspection procedures
- Protections against unauthorized use
- Record-keeping procedures
- Insurance

The National Highway Transportation Administration provides information on vehicle safety according to make and model.

Preventive Maintenance

All Company vehicles will be maintained according to a regular schedule to ensure their safety and roadworthiness. All maintenance will be performed by a qualified individual or automotive shop according to the manufacturer's recommended service schedule.

In addition to regularly scheduled maintenance, fleet upkeep should include, but not be limited to:

- Basic inspections of the vehicle by the driver before every trip
- Immediate removal from service of any vehicle with mechanical problems
- Managerial certification of requested repairs before return to service

Recordkeeping

All vehicle maintenance, repair certification and driver review will be recorded and kept through the life of the vehicle.

Vehicle Inspection

The operator will inspect each vehicle or piece of equipment on a daily basis before and after operation. Each operator is responsible for the safe condition of the equipment. No employee may drive a vehicle having steering, brake or other safety problems until a mechanic has made repairs. Drivers will report any other unsafe conditions to their supervisor as soon as safely possible.

DRIVER SELECTION, QUALIFICATION AND EVALUATION

The safety coordinator will work with management and the Company's insurance Company to determine the qualification standards for motor vehicle operators.

Employment History

The evaluation for any new employee anticipated to drive a vehicle on Company business will include a reference check and review of driving history through past employers.

Licenses

Any driver of a Company vehicle or a personal vehicle on Company business will possess a valid driver's license appropriate for the vehicle that will be driven and the circumstances in which the vehicle will be driven. All government regulations and insurance Company requirements will be followed concerning driver qualification.

A driver will only operate a vehicle that requires a commercial driver's license (and any endorsement) if he or she is in possession of the appropriate license.

Motor Vehicle Records

This Company will check the driving records of any employee expected to drive for work. Further, periodic review of a motor vehicle record (MVR) for employees expected to drive for work reasons will indicate if they remain eligible to drive a Company vehicle or their own on Company business.

Initial Assignment

The Company will request and review an MVR for new applicants or current employees expected to add driving to existing responsibilities, whether operating their own vehicle or a Company vehicle. The MVR review will consider the most recent three years of driving and should include motor vehicle records from all states in which the applicant has lived in that time.

MVRs and the information contained therein will remain as confidential as possible. Discussions of motor vehicle records will be restricted to individuals with a legitimate “need to know.”

Any qualification standard may entail a multi-tiered or point system approach to driver eligibility based on the frequency of the employee’s anticipated work driving and the severity of traffic convictions recorded in the MVR

Following are some examples of violations that, having occurred in the past 3 years, may warrant ineligibility to drive on Company business:

- DWI/DUI
- Negligent motor vehicle homicide
- Operating with a suspended license
- Using a motor vehicle for commission of a felony
- Aggravated assault with a motor vehicle
- Operating a motor vehicle without the owner’s consent
- Reckless, careless or negligent driving, including speeding more than 15 MPH over limit
- Hit and run or leaving the scene of an accident with injury or death resulting, or property damage in excess of $1,000

Following are examples of violations that, having occurred more than three times in two years, may warrant ineligibility to drive:

- Minor moving violations
- Accidents

Annual Review

Employees cited for a violation that may affect their eligibility to drive on Company business will inform their supervisor.

In addition to the initial MVR review, a review of an employee’s MVR will occur annually to confirm the driver’s continued eligibility to drive for work.

Defensive Driver Training

The Company may consider or require the completion of a driver safety course or defensive driving course in determining eligibility to drive a Company vehicle or a personal vehicle while on Company business.

Driver Agreements

Employees who will operate a motor vehicle as part of their job are required to confirm awareness and understanding of the Company’s driver safety policy.

The safety coordinator, with the safety committee, will create a “driver agreement” that allows a driver to confirm his or her awareness and understanding of this policy, driver expectations, vehicle maintenance and care requirements, and the procedures for reporting moving violations and accidents.

Driver Qualification File

The Company will maintain a driver qualification file for every driver including all documents required to verify his or her qualifications.

Meetings

The safety coordinator, with the safety committee, will determine whether or under what conditions an employee may permit another individual to drive a Company vehicle.

A driver or other employee who permits an unauthorized individual to operate a Company vehicle faces disciplinary action and financial accountability for any costs incurred by allowing unauthorized personnel to operate a Company vehicle.

Securing Materials

The driver will prevent the unsafe movement of any materials such as tools or equipment by securing it appropriately. Drivers should secure anything that may present a hazard outside the passenger compartment.

Vehicle Occupancy

No Company vehicle transport more passengers than safely possible. Every adult in the vehicle must have a seatbelt. If children must be transported, each must have the appropriate child safety restraint. Vehicles may be operated only if each passenger is safely restrained in their seat.

Seat Belts

The Company recognizes that seat belts effectively prevent injuries and loss of life in an automotive accident.

All Company employees will wear seatbelts when operating a Company-owned vehicle or any vehicle on Company premises or on Company business. Any occupant of a vehicle owned by this Company, on Company premises, or in a vehicle on Company business will wear a seatbelt or, if required, an appropriate child restraint system.

This Company encourages its employees to always wear a seatbelt when driving or riding in an automobile, to ensure child restraints are used properly, and to encourage other passengers or drivers do the same.

Alcohol and Drug Use

The Company forbids employees from consuming or being under the influence of alcohol or illegal drugs during “duty hours.” Duty hours include working hours, break periods and on-call periods. The consumption of alcohol or illegal drugs while performing Company business or while in a Company facility may result in disciplinary action up to and including termination.

If an employee takes prescribed medication or over-the-counter medication known to affect the ability to operate a motor vehicle or other heavy machinery, the employee will inform his or her immediate supervisor and refrain from such duties until able to do so safely.

Drivers will remain aware of driving behaviors that indicate impairment such as weaving, inappropriate speed and erratic or abrupt driving. Staying a safe distance from drivers who may be impaired and bringing dangerous drivers to the attention of the authorities helps keep roads safe.

Drivers who operate a commercial motor vehicle as defined by the federal highway administration (FHA) must possess a CDL and are subject to FHA's regulations on alcohol and drug use and testing.

A drug free workplace policy and supporting procedures must be in place and communicated to all employees before drug testing. The rule requires pre-employment, reasonable suspicion, random, post-accident, return-to-duty and follow-up testing. For details on the program, refer to the Federal Motor Carrier Safety Regulations, Title 49, Part 382.

Distracted Driving

Driving skills rely on the focus of the vehicle operator. Every driver will devote his or her full attention to the task of driving while behind the wheel. Text messaging while driving is strictly prohibited. Distractions come in many forms and contribute to 25 to 30 percent of all traffic accidents. Distractions include, but are not limited to the following:

- Text messaging and other cell phone use (even with hands-free headset)
- Reaching for an object inside the vehicle
- Looking at an object, person or event outside the vehicle
- Eating and drinking
- Reading
- Grooming and hygiene
- Electronics use (computer, tablet, GPS)
- Adjusting non-critical controls
- Horseplay
- Emotional distractions

Fatigued Driving

Drowsy driving greatly increases the risk of an accident. All drivers will be trained in the dangers of driving drowsy and the importance of sufficient rest before operating a motor vehicle.

Aggressive Driving

The Company prohibits aggressive driving while operating a Company vehicle or a personal vehicle on Company business. Aggressive driving behaviors include, but are not limited to the following:

- Excessive Speed
- Tailgating
- Failure to signal lane change

- Running a red light
- Passing on the right
- Any offensive, rude, or hostile act or gesture directed at another driver

Young Drivers

Teenage drivers are the most likely to engage in risky driving behaviors, and vehicle crashes are the leading cause of death for 15-20-year-olds. Federal law prohibits drivers under 17 to operate a vehicle as part of their job, and it is at the discretion of the safety coordinator to prohibit driving for any employee based on a lack of driving experience.

Driving in Work Zones

All drivers in work zones must take special care. Patience and care goes a long way to contribute to driving safely around construction. Heavy machinery and workers can slow everything down, but driving rushed makes it difficult to observe other workers and leads to poor decision making. Workers must be vigilant and minimize distractions to respond quickly to the unexpected when behind the wheel, especially when driving where others are working.

MONITORING

As part of our driver safety policy, every work-related accident and near miss involving motor vehicles will be handled in a way to reduce risk and encourage future safe behaviors in the future.

Additionally, the Company's driver safety policy requires periodic review of the policy itself and its impact on the safety and health of employees.

Incident, Accident Analysis, and Reporting

If an employee experiences a vehicular accident while driving a Company car or a personal car on Company business, he or she will do the following:

- Stop the vehicle. If it can be done safely, move the vehicle off the road
- Call appropriate law enforcement authority if damage is done to another vehicle or property that does not belong to this Company For an emergency, call 911 to summon both police and emergency medical services
- Mark the scene as necessary for safety
- Gather the names of other drivers and witnesses
- Diagram the accident, noting vehicles involved, where vehicle occupants were seated at the time of the accident, the date, time and weather conditions
- Exchange the following information with other drivers involved: License plate number, registration information and insurance information
- Document the name and badge number of the responding law enforcement professional.
- Notify the supervisor as soon as safely possible
- Cooperate with law enforcement professionals and participate in the Company's accident investigation

Do not assume blame or apologize. Only give statements about what happened to police or an appropriate member of Company management.

Any accident will be investigated according to the Company's accident investigation policy. (See chapter on "Accident Investigation" for more details.) Use the Motor Vehicle Accident Report at the end of this chapter to accompany the Company's Accident/Incident Report.

This Company will comply with all recordkeeping requirements of our safety policy and any applicable regulatory authority.

Disciplinary Actions

Safety incidents involving an employee and a violation of our safety policy in a Company vehicle (or personal vehicle used on Company business) may result in disciplinary actions up to termination, including the revocation of driving privileges as determined by management.

Reward Program

It is at the discretion of the safety coordinator and, if appropriate, the safety committee to devise and implement a safe driver reward program to encourage safe driving habits and reward safe driving behaviors.

Policy Review

All aspects of this policy and the Company's driver safety program are subject to annual review by the safety coordinator and the safety committee to ensure the effectiveness of the policy to guarantee a safe working environment for Company employees.

TRAINING

This Company will train every employee who will drive for work related reasons on driver safety at no cost to the employee during working hours.

The Company will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

DRIVER TRAINING

The driver safety program focuses on training and prevention. All new drivers must complete an orientation to cover:

- Policies and procedures for drivers
- Governmental regulations
- Maintenance guidelines and inspection procedures
- Driver training that encourages safe, defensive road behavior

Training Components

The safety coordinator will ensure any employee at this Company who drives on work business is qualified and capable to drive. Drivers will complete training in the following minimum elements for driver safety:

- Defensive driving
- Safe distances

- Intersection driving
- Poor driving conditions
- Split-second decision making
- Distracted driving
- Driving in Work Zones
- Safety restraints

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of the employees attending the training

The Company will retain employee training records for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Motor Vehicle Accident Report
- Driver Safety Training Documentation

MOTOR VEHICLE ACCIDENT REPORT

AFTER AN ACCIDENT: 1 Stay Calm 2 If the vehicles are drivable and it is safe to do so, move them safely out of traffic 3 Apply first aid (if properly trained) 4 Call police, and if necessary, ambulance 5 Take brief notes

Vehicle Driver Name	Other Vehicle Driver Name
Address	Address
Phone Driver License #	Phone Driver License #
Vehicle Type	Other Vehicle Type
Vehicle License Plate #	Vehicle License Plate #
Owner's Name	Owner's Name
Address	Address
Vehicle Insurance Co. Name	Other Vehicle Insurance Co. Name
Name Policy is Under Policy #	Name Policy is Under Policy #

Passenger Info				

Accident Detail

Date of Accident	Explain how the accident happened
Time of Accident ☐ am ☐ pm	
Street	
City	
State/Province	
Approx. Speed: Your MPH Other MPH	Describe your vehicle's damage
Describe any Injuries	
	Describe other vehicle's damage

Investigating Officer Name

Phone Badge #

Police Department

Investigating Officer Name

Phone Badge #

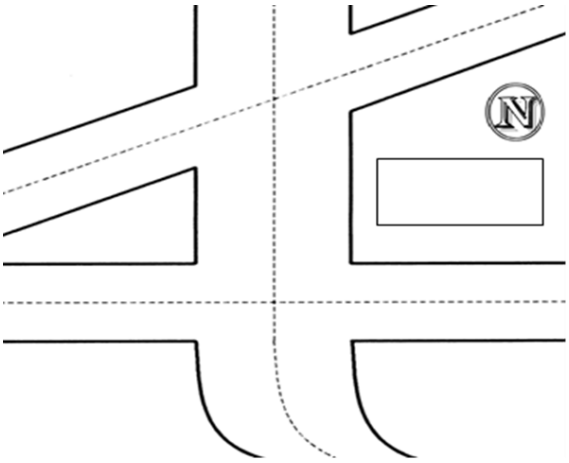
Police Department

Witness Info

Witness Info

Report Completed By

Signature



SKETCH OF ACCIDENT SCENE

DRIVER SAFETY TRAINING

Trainer (include qualifications):	
Signature:	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter contains the safe practices and requirements for performing drywall, plastering and insulation work. The procedures in this chapter will comply with all applicable OSHA regulations regarding:

- Working from ladders or scaffolds
- Respiratory protection
- Electrical safety
- Hand and power tools use

Included here are the procedures for installing, finishing and repairing or replacing drywall, plaster and insulation. This chapter does not include information on performing mold remediation work or spraying polyurethane insulation, which are covered in other chapters.

POLICY

This Company has developed this policy to protect employees from the hazards of drywall, plastering and insulation work.

EMPLOYER RESPONSIBILITIES

This Company will:

- Train all affected employees on the hazards of drywall, plaster and insulation work
- Train all affected employees on the safe practices of performing their jobs
- Provide all necessary PPE, and train its employees on the proper care and use of their equipment
- Verify that employees can safely operate any tools or equipment they will use

EMPLOYEE RESPONSIBILITIES

All Company employees are expected to:

- Follow all safe practice procedures
- Wear all necessary PPE
- Report any unsafe conditions or acts immediately

HAZARDS

There are a number of hazards associated with the installation, finishing and repairing or replacing drywall, plaster and insulation. These can include:

- Falls from working at heights
- Exposure to materials and substances that can cause respiratory problems including:
  - Asbestos
  - Silica

- Injuries from the improper use of tools or equipment
- Musculoskeletal injuries from improper lifting or material handling

PERSONAL PROTECTIVE EQUIPMENT

- Wear steel-toed boots when handling panels and in material handling environments designated by your supervisor
- Make sure you wear work gloves when handling fiberglass batts, sprayed on finishes, rough textured gypsum board panels, metal lath, or when sanding surfaces
- Wear your safety glasses and dust mask when handling or mixing plaster ingredients and additives, or applying mud, finishing ceilings, or sanding
- Always wear your safety glasses when snipping metal pieces such as corner beads, trims, and wire mesh
- Do not continue to work if your safety glasses become fogged. Stop work and clean the glasses until the lenses are clear and defogged
- Wear chemical goggles when using, applying, or handling chemical liquids or powders from containers labeled caustic or corrosive
- Wear your safety glasses when mixing plaster ingredients and additives, applying spackling, finishing ceilings, or sanding
- Wear dust mask or respirator when emptying sacks of dry material such as additives for fireproofing or plaster ingredients
- Use lifelines, safety harnesses or lanyards when you are working higher than 6 feet off the ground
- Wear safety glasses while plastering, applying mud or sanding
- Wear safety goggles when using power tools or when applying a finishing material
- Wear earplugs or earmuffs when the minimum noise level is exceeded

Respiratory Protection

When employees are required to use respirators to prevent exposure to hazardous dusts or materials, they will be provided with approved respirators. Those employees will follow these practices to protect themselves.

- Shave daily to prevent facial hair from interfering with the face seal of the respirator
- Clean and return respirators to their carrying cases or cartons. Store them in your locker or in a designated storage area as instructed by your employer when the work is completed
- Only use the respirator that has been fitted and issued to you

Infection Control

- Wash your hands (after removing your gloves) with soap or mild detergent and water before eating, smoking, using the toilet, or on any areas of the body that may have contacted cementitious mixtures, pastes, or spray-on insulation at the end of each workday
- Use a mechanic's cream hand cleaner where water is not readily available

SAFE PRACTICES

It is the duty of each worker to obey all Company safety rules and to use all required safety equipment. If you are unsure of the safe method to do your job, stop and ask your supervisor. Ignorance is no excuse for a safety violation.

- Bring any new hazards you observe to the attention of your supervisor
- Develop a daily routine of checking your job area and equipment for any potential hazards or deficiencies
- Maintain a clean and orderly work place
- Wear all personal protective devices (i.e. safety eyewear, safety footwear, protective gloves, etc.) as required by your position or the job task
- Become familiar with the performance limitations of your tools and equipment
- Know the location of fire and safety exits
- Learn the location of first aid kits and fire extinguisher equipment in your work area
- Each employee is expected to be responsible for his/her own safety and at the same time to exercise care to avoid injury to his fellow workers and others
- Always perform your job task in a safe manner. No horseplay or practical jokes
- Lift correctly and safely, with your legs, not your back. Ask for help whenever in doubt
- Observe all warning, caution, and danger signs as well as safety and health notices
- Smoking is not permitted inside the building
- All employees will wear fall protection equipment when applicable

Job Site

- Do not walk under partially demolished walls or floors
- Stop working outdoors and seek shelter during lightning storms
- Do not begin working until barricades, warning signs, or other protective devices have been installed to isolate the work area
- Never throw or toss debris outside barricaded areas
- Stay clear of all trucks, forklifts, cranes, and other heavy equipment when in operation
- Do not approach any heavy equipment until the operator has seen you and has signaled to you that it is safe to approach
- Keep shirts on to avoid dehydration and sunburn

Barriers and Signs

- Place signs (lights) well in advance of the work area to permit upcoming pedestrians and motorists time to react
- Erect protective barriers or guards and warning signs prior to demolition work where accessible by vehicular or pedestrian traffic
- Position the work vehicle to guard the work area while work is in progress
- Do not work on open sided floors, elevated walkways, or elevated platforms if there are no guardrails in place
- Stand clear of floor openings if guardrails or covers are removed or displaced

Housekeeping

- Never place trash in walkways and passageways
- Do not kick objects out of your pathway; pick them up or push them aside and out of the way
- Never throw matches, cigarettes, or other smoking materials into trash bins
- Do not store or leave items on stairways
- Never block or obstruct stairwells, exits, or accesses to safety and emergency equipment such as fire extinguishers or fire alarms
- Do not leave loose tools, lunch boxes, or other items on a ledge or lying around on the floor. Return tools to their storage places after use
- Keep walking surfaces of elevated working platforms, such as scaffolds and aerial lifts, clear of tools and materials that are not being used
- Do not use gasoline for cleaning purposes
- Sweep up scraps and debris from wallboard installation such as screws, mesh, and tape by using a broom and a dustpan
- Use a vacuum to eliminate dust and small particles

Lifting

- Plan the move before lifting; remove obstructions from your chosen pathway
- Test the weight of the load before lifting by pushing the load along its resting surface
- If the load is too heavy or bulky, use lifting and carrying aids such as hand trucks, dollies, pallet jacks and carts. Get assistance from a co-worker when necessary
- When assistance is required to perform a lift, coordinate and communicate your movements with those of your co-worker
- Never lift anything if your hands are greasy or wet
- Wear protective gloves when lifting objects with sharp corners or jagged edges
- Do not lift an object from the floor to a level above your waist in one motion. Set the load down on a table or bench and then adjust your grip before lifting it higher

MATERIAL STACKING AND HANDLING

- When stacking panels by hand, position the panels sideways slightly in front of you, so you do not have to reach over your head or twist your body to lift the materials
- Position panels to lean flat against a wall so they do not wobble or slide
- Push and slide panels along their edge or get assistance from a co-worker
- Store all wallboard flat
- Do not store boards vertically; this will damage the edges creating unstable stacks
- Stand each board vertically on its side as close to the edge of the pile as possible, tilt the board toward the stack, and let the board drop freely on top of the stack
- Do not allow boards to overhang more than an inch. Align flush all boards, to keep the boards from becoming unstable and topple on someone while restacking
- Use a co-worker to assist handling the boards when stocking. Coordinate and communicate your movements with those of your co-worker

Drywall Access Hatch

- Proper access to all projects over one story is a major concern. Drywall delivery at many construction projects, particularly up to four stories tall, has become more difficult in recent years. Often access to the upper levels is limited to interior staircases requiring delivery workers to carry the drywall up manually
- A safety access hatch will ensure a safe and efficient means of placing drywall on the upper levels when there is no safe alternative. The use of window openings that meet the 2 ft. wide by 5 ft. high minimums is an acceptable alternative
- Without an access, the possibility of back and shoulder injury increases when deliveries have to be made up the stairs. A Company's time loss due to job related injuries is a concern
- Safety regulations clearly place responsibility for worker safety on all employers responsible for the site to arrange the work area to allow the safe movement of workers, equipment, and materials

Opening

- Delivery can be facilitated by the prime contractor providing an unobstructed opening in the exterior wall at each floor level. An appropriately framed exterior-wall delivery hatch opening that is 24 inches wide and 60 inches high will meet the minimum requirements. An existing opening can be used if it meets the minimum hatch size, and does not have the door or window installed
- If the opening needs to be covered, the prime contractor can tack temporary sheathing material over the opening on the inside. The supplier removes the cover, the drywall is delivered through the opening, and the cover can be replaced from the inside
- Unobstructed access for equipment to reach the building is required, and should not exceed a distance of 18 feet from the delivery entrance

WORKING AT HEIGHTS

Employees will use the following safe practices when working from ladders of scaffolds.

Ladders and Step Ladders

- Do not use ladders that have loose rungs, cracked, or split side rails, missing rubber footpads, or are otherwise visibly damaged
- Keep ladder rungs clean of grease. Remove any buildups of plaster, dirt, or mud
- Secure the ladder in place by having another employee hold it
- Face the ladder when climbing up or down
- Maintain a three-point contact by keeping both hands and one foot, or both feet and one hand on the ladder at all times when climbing up or down
- Do not carry items in your hands while climbing up or down a ladder
- Read and follow the manufacturer's instructions label on the ladder if you're not sure of the maximum weight allowance
- Do not use a metal ladder on rooftops or within 50 feet of electrical power lines
- Never jump from rooftops, platforms, scaffolds, or ladders

- Do not use building materials as improvised climbing devices
- Never use electrical tools while working on a metal ladder unless the ladder has rubber feet.
- Do not stand on the top two rungs of any ladder
- One person must be on the ladder at a time
- Face the ladder and do not lean backward or sideways from the ladder
- Never use a ladder that wobbles or that leans to the left or right
- Do not try to "walk" a ladder by rocking it. Climb down the ladder, and then move it

Scaffolding

- Inspect the scaffold prior to use. Do not use a scaffold if any pulley, block, hook or fitting is visibly worn, cracked, rusted or otherwise damaged. Do not use a scaffold if any rope is frayed, torn, or visibly damaged
- Do not use any scaffold tagged "Out of Service”
- Never use unstable objects, such as barrels, boxes, loose brick, or concrete blocks to support scaffolds or planks
- Do not work on platforms or scaffolds unless they are fully planked
- Never use a scaffold unless the guardrails and all flooring are in place
- Level the scaffold after each move. Do not extend adjusting leg screws more than 12 inches
- Do not walk or work beneath a scaffold unless a wire mesh has been installed between the mid rail and the toeboard or planking
- Use your safety belts and lanyards when working on scaffolding at a height of 10 feet or more above ground level (Cal/OSHA is 7 ½ feet). Attach the lanyard to a secure anchor on the scaffold
- Do not climb the cross braces for access to the scaffold. Use the ladder
- Never jump from, to, or between scaffolding
- Do not slide down cables, ropes, or guys used for bracing
- Keep both feet on the decking. Do not sit or climb on the guardrail
- Do not lean out from the scaffold. Do not rock the scaffold
- Keep the scaffold free of scraps, loose tools, tangled lines, and other obstructions
- Do not throw anything overboard unless a spotter is available. Use a debris chute or lower things by hoist or by hand
- Never move a mobile scaffold if anyone is on the scaffold
- Chock the wheels of the rolling scaffold, using the wheel blocks, and lock the wheels by using your foot to depress the wheel lock, before using the scaffold
- Do not work on scaffolds outside during stormy or windy weather
- Never climb on scaffolds that wobble or lean to one side

POWER TOOL USE

Use these safe practices when working with any type of powered tool.

Electric Powered Tools

- Do not use power equipment or tools on which you have not been trained
- Never carry plugged in equipment or tools with your finger on the switch
- Do not leave tools running or unattended
- Disconnect the tool from the outlet by pulling on the plug, not the cord
- Do not raise or lower a tool by its cord
- Make sure the tool is off before plugging or unplugging it
- Turn off the electrical tool and unplug it from the outlet before attempting repairs or service work. Tag the tool: Out of Service
- Wear rubber-soled or insulated work boots when operating electrical equipment
- Do not operate a power hand tool or portable appliance while holding a part of the metal casing or while holding the extension cord in your hand
- Hold all portable power tools by the plastic handgrips
- Never handle or operate electrical tools when your hands are wet or when you are standing on wet floors

Do not operate a power hand tool or portable appliance:

- That has a frayed, worn, cut, improperly spliced or damaged cord
- That has a two-pronged adapter or a two-conductor extension cord
- If the ground prong from the three-pronged power plug is missing or has been removed
- If its housing is cracked

Electrical Cords

- Keep power cords away from the path of drilling and cutting equipment
- Do not use cords that have splices, exposed wires, or cracked or frayed ends
- Never remove the ground prong from electrical cords
- Do not use an adapter such as a cheater plug that eliminates the ground
- Never plug multiple electrical cords into a single outlet

Power Saws

- Wear safety goggles, protective gloves, a dust mask, and hearing protection when operating a power saw
- Do not wear loose clothing or jewelry
- Clean any residue from the blade or cutting head before making a new cut with the power saw
- Do not use a power saw that has cracked, broken, or loose guards
- Keep your hands away from the exposed blade
- Operate the saw at full cutting speed, with a sharp blade, to prevent kickbacks
- Do not alter the anti-kickback device or blade guard
- Never perform cutting operations with the power saw while standing on a wet or slippery floor

- When using the power saw, do not reach across the cutting operation
- Cut away from your body and below your shoulder level when you are using a power saw
- If the saw becomes jammed, turn the power switch of the saw to "Off" before pulling out the incomplete cut

Pneumatic Tools

- Do not point a compressed air hose at bystanders
- Never use compressed air to clean your clothing
- Do not use tools that have handles with burrs or cracks
- Turn the tool "off" and let it come to a complete stop before leaving it unattended
- Disconnect the tool from the airline before making any adjustments or repairs to the tool
- Do not use compressors if their belt guards are missing. Replace the belt guards before use
- Engage positive locks on hoses and attachments before use
- Shut off pressure valve and disconnect airline when not in use
- Tag damaged or defective pneumatic tools "Out of Service" to prevent usage of the tool by other employees

Powder Actuated Tools

- Wear impact resistant safety goggles or face shields when operating any powder actuated tools.
- Do not attempt to fasten through a pre-drilled hole unless the powder actuated tool has a hole locator
- Keep your head and body behind the powder-actuated tool when firing it
- Before using powder-actuated tools, do not alter, bypass or remove the shield or guard at the muzzle end of the powder-actuated tool
- Do not load a powder-actuated tool until you are ready to fire it

Hand Tools

- Use tied off containers to keep tools from falling off elevated work platforms
- Never use a tool if its handle has splinters, burrs, cracks, splits, or if the head of the tool is loose
- Do not use tools while your hands are oily, greasy, or wet
- When handing a tool to another person, direct sharp points and cutting edges away from yourself and the other person
- Never carry sharp pointed hand tools such as screwdrivers in your pocket unless the tool or your pocket is sheathed
- Do not perform makeshift repairs to tools
- Never throw tools from one location to another, from one employee to another, or from scaffolds and other elevated platforms
- Do not carry tools in your hand when climbing. Carry tools in tool belts or hoist the tools to the work area with a hand line

- Transport hand tools only in toolboxes or tool belts. Do not carry tools in your clothing
- When you are performing electrical work, use tools with rubber sleeves covering the handle, these are insulated

Hammers

- Do not strike nails or other objects with the cheek of the hammer
- Never strike one hammer against another hammer
- Do not use hammers with mushroomed heads

Pliers

- Never attempt to force pliers by using a hammer on them
- Do not use pliers that are cracked, broken, or sprung
- When using diagonal cutting pliers, shield the loose pieces of cut material from flying into the air by using a cloth or your gloved hand

Hand Saws

- Keep control of saws by releasing downward pressure at the end of the stroke
- Make sure your hands and fingers are away from the saw blade while using
- When using a handsaw, hold your panel firmly against the worktable
- Do not use a saw that has dull saw blades
- Never carry a saw by the blade
- Oil saw blades after each use of the saw

Snips

- Wear safety glasses or safety goggles when cutting lath or corner beads
- Make sure you wear your work gloves when cutting materials with snips
- Do not use straight cut snips to cut curves
- Keep the blade aligned by tightening the nut and bolt on the snips
- Do not use snips as a hammer, screwdriver, or pry bar
- Engage the locking clip on the snips after use
- Keep your snips in a sheath or toolbox when not in use

Knives/Sharp Instruments

- When handling knife blades and other cutting tools, direct sharp points and edges away from you
- Always cut in the direction away from your body
- Carry all sharp tools in a sheath or holster. Store knives in knife blocks or in sheaths after using them
- Do not use knives that have dull blades. Use the knife that has been sharpened
- Never use knives as screwdrivers
- Do not pick up knives by their blades
- Carry knives with the tips pointed towards the floor

Tool Boxes/Chests/Cabinets

- Tape over or file off sharp edges on toolboxes, chests, or cabinets
- Do not stand on toolboxes, chests, or cabinets to gain extra height
- Lock the wheels on large toolboxes, chests, or cabinets to prevent them from rolling
- Push large chests, cabinets, and toolboxes; do not pull
- Do not open more than one drawer of a toolbox at a time
- Close and lock all drawers and doors before moving the tool chest to a new location
- Never use a toolbox or chest as a workbench
- Do not move a toolbox, chest, or cabinet if it has loose tools or parts on the top

LATHING WORK

When performing lath and plaster work employees will use the following safe practices.

Lifting Bags, Cans, Buckets

- Position your feet 6 to 12 inches apart with one foot slightly in front of the other
- Face the load
- Bend at the knees, not at the back
- Keep your back straight
- Get a firm grip on the object with your hands and fingers. Use handles when present
- Perform lifting movements smoothly and gradually; do not jerk the load
- Hold objects as close to your body as possible
- If you must change direction while lifting or carrying the load, pivot your feet and turn your entire body. Do not twist at the waist
- Set down objects in the same manner as you picked them up, except in reverse
- Slide materials to the end of the tailgate before attempting to lift them off a pick-up truck. Do not lift over the walls or tailgate of the truck bed

SANDBLASTING

Follow the safe practices when removing plaster.

- Do not perform asbestos removal operations, unless you have been trained, qualified, and certified in asbestos removal procedures
- Use the respirator that has been fit tested and assigned to you by your supervisor
- Always assume that materials used prior to 1976, such as plaster and blown insulation, contain asbestos
- Never use sanders or power devices that may create dust or airborne particles
- Do not dry scrape, bead blast, or mechanically pulverize any existing plaster or blown insulation
- Notify the state OSHA division at least 24 hours before beginning any asbestos-related demolition work in which more than 100 sq. ft. of asbestos-containing material (greater than 0.1 percent asbestos by weight) will be disturbed

FIBERGLASS BATTS AND SPRAYED-ON INSULATION

- Do not take work clothes home when exposed to sprayed-on insulation or fiberglass batts
- Change your work clothes before leaving the job site
- Place work clothes contaminated with fiberglass or sprayed-on insulation in a closed labeled container approved by your employer
- Use your respirator when working with sprayed-on insulation or fiberglass

FINISHING

When performing finishing work using plaster or cement based materials:

- Apply Vaseline to exposed skin surfaces on your arms and hands prior to handling plaster, lime, or any cementitious mixtures
- Do not handle lime or cementitious mixtures if you have open cuts or scratches on exposed skin surfaces such as your arms or hands
- Use personal protective clothing or equipment such as canvas gloves and protective eyewear to avoid cement poison or burns
- Open doors and windows, and make sure exhaust fans are turned on when working indoors

Applying Exterior Finishes (Scratch Coats, Coquina, And Stucco)

- Never use a metal ladder on rooftops or within 50 feet of electrical power lines
- Do not block the walking surfaces of elevated working platforms, such as scaffolds, with tools or materials that are not being used
- When working outdoors, drink plenty of fluids and keep shirts on to avoid dehydration and sunburn

Using Joint Compounds

- Wear protective gloves when handling compounds or chemicals from containers labeled flammable, toxic, caustic or poisonous. Wash your hands after removing the gloves
- Follow the instructions on the label and in the corresponding Safety Data Sheet for each joint compound or chemical product used in your workplace
- Each time you use your gloves, wash your gloves before removing them. Use cold tap water and normal hand washing motion. Always wash your hands after removing the gloves
- Do not use joint/filler compounds or chemicals from unlabeled containers
- Do not store chemical containers labeled oxidizer with containers labeled corrosive or caustic
- Always use goggles and gloves when handling joint/filler compounds or chemicals labeled corrosive or caustic

Applying Interior Finishes (Plaster, Coquina, Popcorn or Other)

- Do not smoke or eat while performing stucco or popcorn finishes
- Stand clear of mixing or blowing operations
- Do not stand, work, or operate pneumatic equipment such as blowers with hoses within three feet of any unprotected roof opening or within five feet of any unprotected roof edge

Drywall Mold Inspection/Testing

When preparing to work in an area where there's a possibility of mold, follow these procedures to inspect for mold:

- Do not enter or work in an area where mold is suspected without wearing proper respiratory and other personal protection. Molds are known allergens and may be toxic
- Always wear PPE when investigating a mold problem. The minimum PPE includes an N-95 respirator, gloves, and eye protection
- Many different types of mold can be found growing on the same or nearby sections of drywall. Different molds appear at different locations according to variations in moisture level. Attics, basements, and outdoor environments contract many molds
- Crawl spaces can have high levels of airborne mold spores and mold spores in settled dust. Do not assume that because there is no visible mold on surfaces that there is not a problem mold reservoir in exposed insulation
- Inspect ceilings, wall and ceiling cavities, floors, carpeting, backsides of stairs, exposed sides of all framing, joists, girders, posts, and exposed fiberglass insulation as a possible mold reservoir for moisture
- For larger areas of mold, look for the dominant mold present
- Collect one sample per location using clear adhesive tape. Do not use the same tape to sample from multiple locations. Put the sample into a clear Ziploc bag. Look for variations in appearance, texture, growth surface, or mold growing in different areas for reasons to sample more than one. Dust samples need to be taken where there is no visible mold. Collect settled dust particles from a horizontal surface. If you are going to collect a single dust-screening sample, collect it from the area you are most suspicious of, or from the area where building occupants spend the most time. Where the tape sample is collected can make a big difference in what you find. Send the mold samples to a reputable tester
- If you suspect there's a mold problem, call a professional testing Company. The tester will take air and physical samples and incubate them
- Different molds may be found growing in the same building on the drywall room side, drywall cavity side, plywood sheathing, wood stud or joist framing, painted surfaces, exposed fiberglass insulation, and paper vapor barrier
- Water-loving molds grow closest to the floor, molds on drywall grow a little higher on a vertical wall
- When in doubt go on-line to: www.epa.gov/iaq/molds/preventionandcontrol.html, or call 800-490-9198
- Indoor Air Quality Association is at: www.IAQA.org

NOTE: only qualified persons may develop a mold remediation plan and perform mold remediation. See the Mold Remediation chapter of this manual for more information.

After Remediation Is Complete

- Make sure outside problems have been fixed that are causing wet conditions such as the roof, roof gutter, or downspout spillage by the building foundation
- Make sure inside conditions such as plumbing leaks or improper ventilation have been fixed

TRAINING

This Company will provide training for all employees engaged in drywall, plastering and insulation work. This training will include:

- The proper use of tools and equipment
- The proper care and use of all necessary PPE
- The hazards associated with drywall, plastering and insulation work
- How to recognize potential mold contaminated areas

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

Retraining

Retraining will reestablish proficiency and introduce new or different control measures whenever the following occur:

- A change in job assignment, equipment or process present a new hazard
- There is a change in the procedures
- A periodic inspection reveals deviations from or inadequacies in employee knowledge or use of the safe practices

SCOPE

This chapter covers the safe practices and requirements for performing electrical power generation, transmission and distribution, and the control, transformation, transmission, distribution lines, and equipment. These provisions apply to power generation, transmission and distribution installations, including related equipment for the purpose of communication or metering and installations that generate, transmit and distribute electric utility power as well as equivalent installations of industrial establishments. All Company safe practices will comply with the applicable OSHA regulations.

This chapter covers working around power generating, transmission and distribution equipment whether in a facility, overhead or belowground. It does not cover arc flash, excavation, fall protection or supplementary electric generating equipment, used to supply a workplace for emergency, standby or similar purposes only procedures, as these are covered in separate chapters.

POLICY

This Company has created the following policies and procedures to protect its employees from the hazards associated with electric power generation, transmission and distribution work.

EMPLOYER RESPONSIBILITIES

This Company will ensure that:

- Only Qualified persons perform electrical power generation, transmission and distribution work
- All necessary site-specific training is provided
- All required PPE is provided and used properly

EMPLOYEE RESPONSIBILITIES

All employees engaged in electric power generation, transmission and distribution work will:

- Follow all Company safe practices
- Use and maintain all required PPE
- Report any unsafe conditions or acts immediately

Qualified Person

The Company will determine, through regular supervision and through inspections conducted on at least an annual basis; that each employee is complying with all safety-related work practices.

An employee is required to receive additional training (or retraining) under the following conditions:

- When supervision and annual inspections indicate that the employee is not complying with the safety-related work practices
- When new technology, new types of equipment, or changes in procedures require changes in the safe work practices that are different from those the employee would normally use

- When he or she must employ safety-related work practices that are not normally used during his or her regular job duties
- OSHA would consider tasks that are performed less often than once per year to necessitate retraining before the performance of the work practices involved

HAZARDS

The Company will assess the workplace to determine if hazards are present, or are likely to be present, which necessitate the use engineering, administrative controls or personal protective equipment.

The Company will verify that the required workplace hazard assessment has been performed through a written certification that identifies the workplace evaluated; the person certifying that the evaluation has been performed; the date(s) of the hazard assessment; and identifies the hazards present.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

If hazards are present, or likely to be present, the Company will:

- Select, and have all affected employees use, the PPE that will protect them from the hazards identified in the hazard assessment
- Communicate selection decisions to all affected employees
- Select PPE that properly fits each employee

PPE can include, but is not limited to eye protection, hardhats, hearing protection, respiratory devices, safety shoes or boots and protective shields and barriers.

Employee owned equipment: Where employees provide their own protective equipment, the Company is responsible to assure its adequacy, including proper maintenance, and sanitation of such equipment.

Design: All PPE will be approved for the work to be performed.

All hardhats approved for electrical are marked "Class E. Newer hats may also be marked "Type 1" or "Type 2." Type 1 hard hats protect you from impacts on the top of your head. Type 2 hard hats protect you from impacts on the top and sides of your head.

Defective and damaged equipment: Defective or damaged personal protective equipment must not be used.

Training: The Company will provide training to each employee who is required to use PPE.

Each such employee will be trained to know at least the following:

- When PPE is necessary
- What PPE is necessary
- How to properly don, doff, adjust, and wear PPE
- The limitations of the PPE
- The proper care, maintenance, useful life and disposal of the PPE

Each affected employee must demonstrate an understanding of the training, and the ability to use PPE properly, before being allowed to perform work requiring the use of PPE.

ELECTRICAL PROTECTIVE EQUIPMENT

When required, insulating blankets, matting, covers, line hose, gloves and sleeves made of rubber will meet the following requirements:

- Blankets, gloves, and sleeves must be produced by a seamless process

Each item must be clearly marked as follows:

- Class 1 through 4 equipment must be marked with its class number
- Non-ozone-resistant equipment other than matting must be marked Type I
- Ozone-resistant equipment other than matting must be marked Type II
- Other relevant markings, such as the manufacturer's identification and the size of the equipment, may also be provided
- Markings must be non-conducting and are required to be applied in such a manner as not to impair the insulating qualities of the equipment
- Markings on gloves must be confined to the cuff portion of the glove

FIRST AID AND MEDICAL SERVICES

- The Company will ensure the ready availability of medical personnel for advice and consultation on matters of workers health
- In the absence of an infirmary, clinic or hospital in near proximity to the workplace that is used for the treatment of all injured employees, a person or persons must be adequately trained to render first aid. Adequate first aid supplies must be readily available
- Where the eyes or body of any person may be exposed to corrosive materials, suitable facilities for quick drenching or flushing of the eyes and body will be provided within the work area for immediate emergency use

First Aid Kits

First aid supplies will be readily available. The supplies available will meet the American National Standard (ANSI) Z308.1 "Minimum Requirements for Industrial Unit-Type First-aid Kits”.

- The contents should be adequate for the worksite
- When larger operations or multiple operations are being conducted at the same location, the Company will determine the need for additional first-aid kits at the worksite, additional types of first aid equipment and supplies and additional quantities and types of supplies and equipment in the first-aid kits
- If the Company has unique or changing first-aid needs in their workplace may need to enhance their first-aid kits
- The Company will use the OSHA 200 log, OSHA 101's or other reports to identify these unique problems. Consultation from the local fire/rescue department, appropriate medical professional or local emergency room may be helpful in these circumstances
- By assessing the specific needs of their workplace, the Company can ensure that reasonably anticipated supplies are available. The Company will assess the specific needs of their worksite periodically and augment the first-aid kit appropriately

- If it is reasonably anticipated that employees will be exposed to blood or other potentially infectious materials while using first aid supplies, the Company will provide appropriate PPE in compliance with the provisions of the Occupational Exposure to Bloodborne Pathogens standard. This standard lists appropriate PPE for this type of exposure, such as gloves, gowns, face shields, masks, and eye protection
- First aid supplies: First aid supplies will be kept in weatherproof containers if they could be exposed to the weather
- First aid kits: Each first-aid kit must be maintained, readily available for use, and inspected frequently enough to ensure that expended items are replaced at least once per year

Cardiopulmonary Resuscitation and First Aid Training:

When employees are performing work on, or associated with, exposed lines or equipment energized at 50 volts or more, persons trained in first aid including cardiopulmonary resuscitation (CPR) must be available as follows:

- For field work involving two or more employees at a work location, at least two trained persons are required to be available
- Only one trained person need be available if all new employees are trained in first aid, including CPR, within 3 months of their hiring dates
- For fixed work locations such as generating stations, the number of trained persons available must be sufficient to ensure that each employee exposed to electric shock can be reached within 4 minutes by a trained person. However, where the existing number of employees is insufficient to meet this requirement (at a remote substation, for example); all employees at the work location must be trained

Emergency Procedures and First Aid

The Company will provide training or require employees to be knowledgeable and proficient in:

- Procedures involving emergency situations
- First-aid fundamentals including resuscitation

SAFE PRACTICES

Night work: When working at night, spotlights or portable lights for emergency lighting will be provided as needed to perform the work safely.

Work near and over water: When crews are engaged in work over or near water and when danger of drowning exists, suitable protection must be provided.

Hydraulic fluids: All insulated sections of derrick trucks, aerial lifts and hydraulic tools that are used on or around energized lines and equipment will use insulating hydraulic fluids.

- Existing conditions related to the safety of the work to be performed will be determined before work on or near electric lines or equipment is started
- Conditions include, but are not limited to:
  - The nominal voltages of lines and equipment

- The maximum switching transient voltages
- The presence of hazardous induced voltages
- The presence and condition of protective grounds and equipment grounding conductors
- The condition of poles
- Environmental conditions relative to safety
- The locations of circuits and equipment, including power and communication lines and fire protective signaling circuits

Job Briefing

The Company will ensure that the employee in charge conducts a job briefing with the employees involved before they start each job.

Briefings must cover the following:

- Hazards associated with the job
- Work procedures involved
- Special precautions
- Energy source controls
- Personal protective equipment requirements

Number of Briefings

- When the work or operations to be performed during the workday or shift are repetitive and similar, at least one job briefing will be conducted before the start of the first job of each day or shift. Additional job briefings must be held if significant changes that could affect the safety of the employees occur during the course of the work
- A brief discussion is satisfactory if the work involved is routine and if the employees can reasonably be expected to recognize and avoid the hazards involved in the job
- A more extensive discussion will be conducted, when the work is complicated or particularly hazardous, or when the employee cannot be expected to recognize and avoid the hazards involved in the job
- An employee working alone need not conduct a job briefing. However, the Company must ensure that the tasks to be performed are planned as if a briefing were required

Electrical Requirements

All electrical protective gloves must comply with the requirements of OSHA standards 1910.137.

- Equipment must be capable of withstanding the AC proof-test voltage or the DC proof-test voltage listed in the standard
- The proof test is required to indicate that the equipment can withstand the voltage involved
- The test voltage is required to be applied continuously for 3 minutes for equipment other than matting and will be applied continuously for 1 minute for matting
- Gloves must also be capable of withstanding the AC proof-test voltage specified after a 16-hour water soak

- Equipment that has been subjected to a minimum breakdown voltage test may not be used for electrical protection
- Material used for Type II insulating equipment must be capable of withstanding an ozone test, with no visible effects
- The ozone test is required to indicate that the material will resist ozone exposure in actual use
- Any visible signs of ozone deterioration of the material, such as checking, cracking, breaks or pitting, is evidence of failure to meet the requirements for ozone-resistant material

Workmanship and Finish

Equipment must be free of harmful physical irregularities that can be detected by the tests or inspections.

All surface irregularities on rubber goods that appear as indentations, protuberances or imbedded foreign material, are acceptable under the following conditions:

- The indentation or protuberance blends into a smooth slope when the material is stretched
- Foreign material remains in place when the insulating material is folded and stretches with the insulating material surrounding it

In-Service Care and Use

Electrical protective equipment must be maintained in a safe, reliable condition

The following specific requirements apply to insulating blankets, covers, line hose, gloves, and sleeves made of rubber:

- Maximum use voltages must conform to the OSHA standards in 1910.137
- Insulating equipment is required to be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage
- Insulating gloves must be given an air test, along with the inspection

Insulating equipment with any of the following defects may not be used:

- With a hole, tear, puncture, or cut
- Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks)
- An embedded foreign object
- Any of the following texture changes: swelling, softening, hardening, or becoming sticky or inelastic
- Any other defect that damages the insulating properties
- Insulating equipment found to have other defects that might affect its insulating properties must be removed from service and returned for testing
- Insulating equipment must be cleaned as needed to remove foreign substances
- Insulating equipment must be stored in a location that will protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions

Protector gloves must be worn over insulating gloves, except as follows:

- Protector gloves need not be used with Class 0 gloves, under limited-use conditions, where small equipment and parts manipulation require high finger dexterity
- Extra care is needed when visually inspecting the gloves and when handling sharp objects
- Any other class of glove may be used for similar work without protector gloves if the Company can demonstrate that the possibility of physical damage to the gloves is small, and if the class of glove is one class higher than that required for the voltage involved
- Insulating gloves that have been used without protector gloves may not be used at a higher voltage until they have been tested

Electrical protective equipment must be periodically tested. Test voltages and the maximum intervals between tests are required to be in accordance with the tables listed in OSHA standards 1910.137.

Insulating equipment failing to pass inspections or electrical tests may not be used by employees, except as follows:

- Rubber insulating line hose may be used in shorter lengths with the defective portion cut off
- Rubber insulating blankets may be repaired using a patch that results in physical and electrical properties equal to those of the blanket
- Rubber insulating blankets may be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area may not be smaller than 22 inches by 22 inches for Class 1, 2, 3, and 4 blankets
- Rubber insulating gloves and sleeves with minor physical defects, such as small cuts, tears, or punctures, may be repaired by the application of a compatible patch
- Rubber insulating gloves and sleeves with minor surface blemishes may be repaired with a compatible liquid compound. The patched area must have the same electrical and physical properties equal to those of the surrounding material. Repairs to gloves may only be made in the area between the wrist and the reinforced edge of the opening
- Repaired insulating equipment must be retested before it can be used by employees
- The Company will certify that equipment has been tested according to OSHA requirements
- Marking of equipment and entering the results of the tests and the dates of testing onto logs are two acceptable means of meeting this requirement

ARC FLASH

Flash Hazard Analysis

A flash hazard analysis involved (in mega volt-amps) must be done in order to protect personnel from the possibility of being injured by an arc flash. The analysis is required to determine the Flash Protection Boundary and the personal protective equipment that workers within the Flash Protection Boundary must use.

NOTE: For additional information on Arc Flash procedures and requirements, see the Electrical Safety chapter of this manual.

TRANSFERRING INFORMATION

Company safety related information, work rules and procedures will be shared with both host employers and contractors. Similar information will be requested from host employers and contractors and used for workplace specific plans.

HAZARDOUS ENERGY CONTROL (LOCKOUT/TAGOUT) PROCEDURES

This Company has established a program consisting of energy control procedures, employee training, and periodic inspections to ensure that, before any employee performs any servicing or maintenance on a machine or equipment, the machine or equipment is isolated from the energy source and rendered inoperative.

Only qualified persons will perform lockout/tagout operations. For information on our LO/TO policy, please refer to the Lockout/Tagout chapter of this manual.

CONFINED SPACES

When electrical power generation, transmission and distribution work requires employees to enter a confined space, only those employees who have been trained on confined space entry procedures will be permitted to perform this work. This does not apply to vented vaults if a determination is made that the ventilation system is operating to protect employees before they enter the space.

Please refer to the Confined Spaces chapter of this manual to the safe practices and procedures regarding confined space entry.

EXCAVATIONS AND TRENCHING

When electrical power generation, transmission and distribution work requires trenching and excavation work, only authorized personnel will perform those tasks.

See the Excavation chapter of this manual for our excavation policy and procedures

FALL PROTECTION

When electrical power generation, transmission and distribution work requires employees to work at heights, only personnel who have been trained on the safe practices of fall protection will be permitted to perform that work.

Please refer to the Fall Protection chapter of this manual for details on our fall protection policy.

Ladders, Platforms, Step Bolts, and Manhole Steps

Ladders and platforms must meet the following requirements:

- Ladders and platforms must be secured to prevent their becoming accidentally dislodged
- Ladders and platforms may not be loaded in excess of the working loads for which they are designed
- Ladders and platforms may be used only in applications for which they were designed

- Ladders and platforms must be capable of supporting without failure at least 2.5 times the maximum intended load
- Portable metal ladders and other portable conductive ladders may not be used near exposed energized lines or equipment. However, in specialized high-voltage work, conductive ladders may be used where the Company can demonstrate that nonconductive ladders would present a greater hazard than conductive ladders

HAND AND PORTABLE POWER TOOLS

When Company employees are required to use hand and portable power tools the following safe practices will be used:

- Any cord and plug connected equipment not powered by facility wiring must be equipped with a cord containing an equipment grounding conductor connected to the tool frame and to a ground at the other end (however, this option may not be used where the introduction of the ground into the work environment increases the hazard to an employee)
- It must be of the double-insulated type
- It must be connected to the power supply through an isolating transformer with an ungrounded secondary

Portable and vehicle mounted generators used to supply cord and plug connected equipment must meet the following requirements:

- The generator will only supply power to equipment located on the generator or the vehicle, and cord and plug-connected equipment through receptacles mounted on the generator or the vehicle
- The non-current-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles must be bonded to the generator frame
- In the case of vehicle-mounted generators, the frame of the generator must be bonded to the vehicle frame
- Any neutral conductor must be bonded to the generator frame

HYDRAULIC AND PNEUMATIC TOOLS

When Company employees are required to use hydraulic or pneumatic powered tools, the following safe practices will be used:

- Safe operating pressures for hydraulic and pneumatic tools, hoses, valves, pipes, filters and fittings must not be exceeded
- If any hazardous defects are present, the hydraulic or pneumatic equipment involved may not be used. In the absence of defects, the maximum rated operating pressure is the maximum safe pressure
- A hydraulic or pneumatic tool used where it may contact exposed live parts must be designed and maintained for such use
- The hydraulic system supplying a hydraulic tool used where it may contact exposed live parts must be protected against loss of insulating value for the voltage involved due by the formation of a partial vacuum in the hydraulic line

- A pneumatic tool used on energized electric lines or equipment or used where it may contact exposed live parts must be protected from the accumulation of moisture in the air supply
- Pressure must be released before connections are broken, unless quick acting, self- closing connectors are used. Hoses may not be kinked
- Employees may not use any part of their bodies to locate or attempt to stop a hydraulic leak

LIVE-LINE TOOLS

Live-line tool rods, tubes and poles must be designed and constructed to withstand the following minimum tests:

- 100,000 volts per foot of length for 5 minutes if the tool is made of fiberglass-reinforced plastic (FRP)
- 75,000 volts per foot of length for 3 minutes if the tool is made of wood
- Tests that the Company can demonstrate are equivalent

CONDITION OF TOOLS

- Each live-line tool must be wiped clean and visually inspected for defects before use each day
- If any defect or contamination that could reduce the insulating qualities or mechanical integrity of the live-line tool is present after wiping, the tool will be removed from service, examined and tested before being returned to service

Live-line tools used for primary employee protection will be removed from service every 2 years for examination, cleaning, repair and testing as follows:

- Each tool must be thoroughly examined for defects
- If a defect or contamination that could adversely affect the insulating qualities or mechanical integrity of the live-line tool is found, the tool must be repaired and refinished or is required to be permanently removed from service
- If no such defect or contamination is found, the tool must be cleaned and waxed

Tools must be tested under the following conditions:

- After the tool has been repaired or refinished
- After the examination, unless the tool is made of FRP rod or foam-filled FRP tube and the Company can demonstrate that the tool has no defects that could cause it to fail in use

The test method used must be designed to verify the tool's integrity along its entire working length and, if the tool is made of fiberglass-reinforced plastic, its integrity under wet conditions.

The voltage applied during the tests must be as follows:

- 75,000 volts per foot of length for 1 minute if the tool is made of fiberglass
- 50,000 volts per foot of length for 1 minute if the tool is made of wood
- Other tests that can be shown to be equivalent

Materials Storage Near Energized Lines or Equipment

In areas not restricted to qualified persons only, materials or equipment will not be stored closer to energized lines or exposed energized parts of equipment than the following distances plus an amount providing for the maximum sag and side swing of all conductors and providing for the height and movement of material handling equipment:

- For lines and equipment energized at 50 kV or less, the distance is 10 feet
- For lines and equipment energized at more than 50 kV, the distance is 10 feet plus 4 inches for every 10 kV over 50 kV
- In areas restricted to qualified employees, material may not be stored within the working space about energized lines or equipment

EXPOSED ENERGIZED PARTS

When work is being performed on exposed live parts, or near enough to them, to expose an employee to any hazard they present, the following requirements apply:

- Only qualified employees may work on or with exposed energized lines or parts of equipment
- Only qualified employees may work in areas containing unguarded, uninsulated energized lines or parts of equipment operating at 50 volts or more
- Electric lines and equipment must be considered and treated as energized unless specific provisions have been followed

At least two employees must be present while the following types of work are being performed:

- Installation, removal, or repair of lines that are energized at more than 600 volts
- Installation, removal, or repair of de-energized lines if an employee is exposed to contact with other parts energized at more than 600 volts
- Installation, removal, or repair of equipment, such as transformers, capacitors, and regulators, if an employee is exposed to contact with parts energized at more than 600 volts
- Work involving the use of mechanical equipment, other than insulated aerial lifts, near parts energized at more than 600 volts
- Other work that exposes an employee to electrical hazards greater than or equal to those posed by specific operations

The above requirements do not apply to the following operations:

- Routine switching of circuits, if it can be shown that conditions at the site allow this work to be performed safely
- Work performed with live-line tools if the employee is positioned so that he or she is neither within reach of nor otherwise exposed to contact with energized parts
- Emergency repairs to the extent necessary to safeguard the general public

Minimum Approach Distances

The Company will ensure that no employee approaches or takes any conductive object closer to exposed energized parts than defined in the OSHA standard 1910.269 unless:

- The employee is insulated from the energized part (insulating gloves or insulating gloves and sleeves that are considered insulation of the employee only with regard to the energized part upon that's being worked on)
- The energized part is insulated from the employee and from any other conductive object at a different potential
- The employee is insulated from any other exposed conductive object, as during live-line bare-hand work

Substations contain requirements for the guarding and isolation of live parts. Parts of electric circuits that meet substation provisions are not considered as "exposed" unless a guard is removed or an employee enters the space intended to provide isolation from the live parts.

As of April 1, 2015, for voltages over 72.5 kilovolts, the maxim anticipated per-unit transient overvoltage, phase-to-ground must be determined, or the maximum will be assumed from Table V-8 in 1926 Subpart V Appendix B.

- When using portable protective gaps to control maximum transient overvoltage, the value for the maximum anticipated must provide for five standard deviations between the statistical sparkover voltage of the gap and the statistical withstand voltage corresponding to the electrical component of the minimum approach distance

Type of Insulation

If an employee is to be insulated from energized parts by the use of insulating gloves, insulating sleeves must also be used.

Insulating sleeves are not be required under the following conditions:

- If exposed energized parts not being work on are insulated from the employee
- If the insulation is placed in a position that prevents the employee's upper arm from contacting other energized parts

The Company will verify that employees working in a position where a slip or shock could cause them to contact with exposed, uninsulated parts energized at a potential different from the employee are protected by insulation.

The Company will verify that connections are made as follows:

- When connecting de-energized equipment or lines to an energized circuit by means of a conducting wire or device, employees must first attach the wire to the de-energized part
- When disconnecting equipment or lines from an energized circuit by using a conducting wire or device, an employee must remove the source end first
- When lines or equipment are connected to or disconnected from energized circuits, loose conductors must be kept away from exposed energized parts

Apparel

- When work is performed within reaching distance of exposed energized parts, the Company will ensure that employees remove or insulate all exposed conductive personal items, such as key or watch chains, rings, or wristwatches or bands, unless they don't increase the hazards associated with contact with the energized parts
- The Company will verify that employees who are exposed to the hazards of flames or electric arcs do not wear clothing that could increase the extent of injury that would be sustained by the employee

Warning: Clothing made from the following types of fabrics, either alone or in blends, is prohibited, unless the Company can show that the fabric has been treated to withstand the conditions that may be encountered, or that the clothing is worn in a way that eliminates the hazard involved: acetate, nylon, polyester, rayon.

Fuse handling: When fuses must be installed or removed with one or both terminals energized at more than 300 volts or with exposed parts energized at more than 50 volts, the Company will ensure that tools or gloves rated for the voltage are used.

When expulsion-type fuses are installed with one or both terminals energized at more than 300 volts, the Company will ensure that employees wear the proper eye protection; use tools rated for the voltage and are clear of the exhaust path of the fuse barrel.

Covered (non-insulated) conductors: Requirements that pertain to the hazards of exposed live parts also apply when work is performed in the proximity of covered (non-insulated) wires.

Noncurrent-carrying metal parts: Noncurrent-carrying metal parts of equipment or devices, such as transformer cases and circuit breaker housings, must be treated as energized at the highest voltage that they are exposed to, unless the Company inspects the installation and determines that these parts are grounded before work is performed.

Opening circuits under load: Devices used to open circuits under load conditions must be designed to interrupt the current involved.

DE-ENERGIZING LINES AND EQUIPMENT

If a system operator is in charge of the lines or equipment and their means of disconnection, they are responsible for performing those tasks. If no system operator is in charge of the lines or equipment, all of these requirements must be observed:

- If no system operator is in charge of the lines or equipment and their means of disconnection, one employee in the crew will be designated as being in charge of the clearance. The employee in charge of the clearance will take the place of the system operator, as necessary
- This does not apply if only one crew will be working on the lines or equipment and the means of disconnection is accessible and visible to, and under the sole control of, the employee in charge of the clearance
- Any disconnecting means that are accessible to persons outside the Company's control (for example, the general public) must be rendered inoperable while they are open to protect employees

De-Energizing Lines and Equipment

- A designated employee must make a request of the system operator to have the particular section of line or equipment de-energized. The designated employee becomes the employee in charge and is responsible for the clearance
- All switches, disconnectors, jumpers, taps and other means through which electric energy may be supplied, must be opened unless its design prohibits it, and tagged to indicate that employees are at work
- Automatically and remotely controlled switches that could cause the opened disconnecting means to close must also be tagged at the point of control
- The automatic or remote-control feature must be rendered inoperable, unless its design does not so permit
- Tags will be applied to prohibit operation of the disconnecting means and will indicate that employees are at work
- After all conditions have been met and the employee in charge of the work has been given a clearance by the system operator, the lines and equipment to be worked must be tested to ensure that they are de-energized
- Protective grounds will be installed as required
- If two or more independent crews will be working on the same lines or equipment, each crew must independently comply with the requirements

Transferring the Clearance

The employee in charge (or, if the employee in charge is forced to leave the worksite due to illness or other emergency, the employee's supervisor) must inform the system operator and employees in the crew must be informed of the transfer; and the new employee in charge will be responsible for the clearance.

To release a clearance, the employee in charge will:

- Notify employees under his or her direction that the clearance is to be released
- Determine that all employees in the crew are clear of the lines and equipment
- Determine that all protective grounds installed by the crew have been removed
- Report this information to the system operator and release the clearance
- The person releasing a clearance must be the same person that requested the clearance, unless responsibility has been transferred
- Tags may not be removed unless the associated clearance has been released
- Only after all protective grounds have been removed, after all crews working on the lines or equipment have released their clearances, after all employees are clear of the lines and equipment, and after all protective tags have been removed from a given point of disconnection, can the lines or equipment be reenergized

Grounding for the Protection of Employees

Before an employee can work lines or equipment as de-energized, the lines or equipment must be de-energized and grounded.

If the Company can demonstrate that installing a ground is impracticable or that the conditions resulting from grounding would present greater hazards than working without grounds, the lines and equipment may be treated as de-energized provided all of the following conditions are met:

- The lines and equipment have been de-energized
- There is no possibility of contact with another energized source
- The hazard of induced voltage is not present

Equipotential zone: Temporary protective grounds must be placed and arranged at locations to prevent employees from being exposed to hazardous differences in electrical potential.

De-Energizing Lines and Equipment Over 600 Volts

When de-energizing lines and equipment operated in excess of 600 volts, and the method of disconnecting is not visibly open or visibly locked out, the following provisions must be complied with:

- The particular section of line or equipment to be de-energized must be clearly identified, and it must be isolated from all sources of voltage
- Notification and assurance from the designated employee must be obtained that:
  - All switches and disconnectors through which electric energy may be supplied to the particular section of line or equipment to be worked have been de-energized
  - All switches and disconnectors are plainly tagged indicating that men are at work
  - Where design of such switches and disconnectors permits, they have been rendered inoperable
- After all designated switches and disconnectors have been opened, rendered inoperable and tagged, visual inspection or tests will be conducted to verify that equipment or lines have been de-energized
- Protective grounds will be applied on the disconnected lines or equipment to be worked on
- Guards or barriers must be erected as necessary to adjacent energized lines
- When more than one independent crew requires the same line or equipment to be de-energized, a prominent tag for each such independent crew must be placed on the line or equipment by the designated employee in charge
- After work on de-energized lines or equipment has been completed, the designated employee in charge will determine that all employees in his crew are clear and that protective grounds installed by his crew have been removed, he must report to the designated authority that all tags protecting his crew may be removed

When a crew working on a line or equipment can clearly see that the disconnecting method is visibly open or locked-out, the provisions of this section will apply:

- Guards or barriers are installed as necessary to adjacent energized lines
- After work on de-energized lines or equipment has been completed, the designated employee in charge will determine that all employees in his crew are clear and that protective grounds installed by his crew have been removed, he must report to the designated authority that all tags protecting his crew may be removed

PROTECTIVE GROUNDING EQUIPMENT

- Protective grounding equipment must be capable of conducting the maximum fault current that could flow at the point of grounding for the time necessary to clear the fault. This equipment is required to have a current rating greater than or equal to that of No. 2 AWG copper
- Guidelines for protective grounding equipment are contained in American Society for Testing and Materials Standard Specifications for Temporary Grounding Systems to be Used on De-Energized Electric Power Lines and Equipment, ASTM F855
- Protective grounds will have an impedance low enough to cause immediate operation of protective devices in case of accidental energizing of the lines or equipment

Testing: Before any ground is installed, lines and equipment will be tested to verify no voltage is present, unless a previously installed ground is present.

Order of connection: When a ground is to be attached to a line or to equipment, the ground- end connection must be attached first, and then the other end will be attached by means of a live-line tool.

On lines less than 600 volts, different insulating equipment may be used if the line or equipment is not energized or if the employee is protected from hazards if the line or equipment is energized.

Order of removal: When a ground is to be removed, the grounding device will be removed from the line or equipment using a live-line tool before the ground-end connection is removed.

Additional precautions: When work is performed on a cable at a location remote from the cable terminal, the cable will not be grounded at the cable terminal if there is a **possibility of hazardous transfer of potential should a fault occur**.

Removal of grounds for test: Grounds may be removed temporarily during tests. During the test procedure, the Company will ensure that each employee uses insulating equipment and is isolated from any hazards involved, and the Company will institute any additional measures necessary to protect each exposed employee in case the previously grounded lines and equipment become energized.

Testing and Test Facilities

- Testing and test facilities provides for safe work practices for high-voltage and high- power testing performed in laboratories, shops and substations, and in the field and on electric transmission and distribution lines and equipment
- It applies only to testing involving interim measurements using high voltage, high power, or combinations of both, and not to testing involving continuous measurements as in routine metering, relaying, and normal line work
- Routine inspection and maintenance measurements made by qualified employees are considered routine line work and are not included, as long as the hazards related to the use of high-voltage or high-power sources require only the normal precautions associated with routine operation and maintenance work required. Two typical examples of such excluded test work procedures are "phasing-out" testing and testing for a "no-voltage" condition

GENERAL REQUIREMENTS

The Company will establish and enforce safe work practices for the protection of each worker from the hazards of high-voltage or high-power testing at all test areas, temporary and permanent.

These practices will include, at a minimum, test area guarding, grounding and the safe use of measuring and control circuits. A method of providing for periodic safety checks of field test areas will also be included. Employees must be trained in safe work practices upon their initial assignment to the test area, with periodic reviews and updates provided as required.

Guarding of Test Areas

Permanent test areas will be guarded by walls, fences or barriers designed to keep employees out of the test areas. In field-testing, or at a temporary test site where permanent fences and gates are not provided, one of the following methods will be used to prevent unauthorized employees from entering:

- The test area will be guarded by the use of distinctively colored safety tape, supported approximately waist high with safety signs are attached
- The test area is guarded by a barrier or barricade that limits access to the test area
- The test area is guarded by at least one test observer stationed so the entire area can be monitored

The barriers must be removed when the protection they provide is no longer needed.

Guarding must be provided in test areas to limit access to test equipment or the apparatus under test that may become energized as part of the testing by either direct or inductive coupling, to prevent accidental employee contact with energized parts.

GROUNDING PRACTICES

- The Company will establish and implement safe grounding practices for the test facility
- All conductive parts accessible to the test operator during the time the equipment is operating at high voltage must be kept at ground potential except for the parts of the equipment that are isolated from the test operator by guarding
- Wherever ungrounded terminals of test equipment or apparatus under test may be present, they must be treated as energized until determined by tests to be de-energized
- Visible grounds must be applied, automatically or manually using insulated tools, to the high-voltage circuits after they are de-energized and before work is performed on the circuit, item or apparatus under test. Common ground connections must be solidly connected to the test equipment and the apparatus under test
- In high-power testing, an isolated ground-return conductor system must be provided to prevent the intentional passage of current in the ground grid or in the earth

An isolated ground-return conductor is not necessary if the Company can demonstrate that both the following conditions are met:

- An isolated ground-return conductor can’t be provided due to the distance of the test site from the electric energy source

- Employees are protected from any hazardous step and touch potentials that may develop during the test

Protection from Step and Touch Potentials

- When a ground fault occurs on a power line, voltage is impressed on the grounded object faulting the line
- The voltage that object rises to depends largely on the voltage on the line, the impedance of the faulted conductor and the impedance to true, or absolute, ground represented by the object
- If the object causing the fault represents a relatively large impedance, the voltage impressed on it is essentially the phase-to-ground system voltage. However, even faults to well-grounded transmission towers or substation structures can result in hazardous voltages. The degree of the hazard depends upon the magnitude of the fault current and the time of exposure
- This information applies primarily to employee protection from contact between the equipment being used and an energized power line. The information is also relevant to ground faults to transmission towers and substation structures
- Grounding systems for these structures will be designed to minimize the step and touch potentials involved

Voltage-Gradient Distribution Curve

The dissipation of voltage from a grounding electrode (or from the grounded end of an energized grounded object) is called the ground potential gradient. Voltage drops associated with this dissipation of voltage are called ground potentials.

Step and Touch Potentials

Step potential is the voltage between the feet of a person standing near an energized grounded object. It is equal to the difference in voltage between two points, at different distances from the “electrode.” A person could be at risk of injury during a fault simply by standing near the grounding point.

Touch potential is the voltage between the energized object and the feet of a person in contact with the object. It is equal to the difference in voltage between the object (which is at a distance of 0 feet) and a point some distance away. It should be noted that the touch potential could be clearly the full voltage across the grounded object if that object is grounded at a point remote from the place where the person is in contact with it. For example, a crane that was grounded to the system neutral and that contacted an energized line would expose any person in contact with the crane or its uninsulated load line to touch potential nearly equal to the full fault voltage.

Protection from the Hazards of Ground-Potential Gradients

An engineering analysis of the power system under fault conditions can be used to determine whether hazardous step and touch voltages will develop. The result of this analysis can determine the need for protective measures and can guide the selection of appropriate precautions. Several methods may be used to protect employees from hazardous ground- potential gradients, including equipotential zones, insulating equipment and restricted work areas.

- The creation of an equipotential zone will protect a worker standing within it from hazardous step and touch potentials. Such a zone can be produced by a metal mat connected to the grounded object. In some cases, a grounding grid can be used to equalize the voltage within the grid. Equipotential zones however, will not protect employees who are either wholly or partially outside the protected area. Bonding conductive objects in the immediate work area can also be used to minimize the potential between the objects and between each object and ground. (Bonding an object outside the work area however, can increase the touch potential to that object in some cases)
- Using insulating equipment, such as rubber gloves, can protect employees handling grounded equipment and conductors from hazardous touch potentials. The insulating equipment must be rated for the highest voltage that can be impressed on the grounded objects under fault conditions (rather than for the full system voltage)
- Restricting employees from areas where hazardous step or touch potentials could arise can protect employees not directly involved in the operating being performed. Employees on the ground near transmission structures will be kept at a distance where step voltages would be insufficient to cause injury. Employees must not handle grounded conductors or equipment likely to become energized to hazardous voltages unless they are within an equipotential zone or are protected by insulating equipment
- In tests where the grounding of test equipment using the equipment grounding conductor the equipment power cord can’t be used due to increased hazards to test personnel or the prevention of satisfactory measurements, a ground that affords equivalent safety must be provided, and the safety ground must be clearly indicated in the test set-up
- When the test area is entered after equipment is de-energized, a ground must be placed on the high-voltage terminal and any other exposed terminals
- High capacitance equipment or apparatus must be discharged through a resistor rated for the available energy
- A direct ground is required to be applied to the exposed terminals when the stored energy drops to a level at which it is safe to do so
- If a test trailer or test vehicle is used in field testing, its chassis must be grounded
- Protection against hazardous touch potentials with respect to the vehicle, instrument panels and other conductive parts accessible to employees must be provided by bonding, insulation or isolation

Control and Measuring Circuits

- Control wiring, meter connections, test leads and cables may not be run from a test area unless they are contained in a grounded metallic sheath and terminated in a grounded metallic enclosure or unless other precautions are taken that can demonstrate equivalent safety
- Meters and other instruments with accessible terminals or parts must be isolated from test personnel to protect against hazards of those terminals and parts becoming energized during testing. If this isolation is provided by locating test equipment in metal compartments with viewing windows, interlocks must be provided to interrupt the power supply if the compartment cover is opened

- The routing and connections of temporary wiring must be protected from damage, accidental interruptions and other hazards. To the maximum extent possible, signal, control, ground and power cables must be kept separate
- If employees will be present in the test area during testing, a test observer must be present. The test observer must be capable of immediately de-energizing of test circuits for safety purposes

Safety Check

Safety practices governing employee work at temporary or field test areas must provide for a routine check of such test areas for safety at the beginning of each series of tests.

The test operator in charge will conduct these safety checks before each series of tests and must verify at least the following conditions:

- That barriers and guards are in working condition and are properly placed to isolate hazardous areas
- That system test status signals, if used, are in operable condition
- That test power disconnects are clearly marked and readily available in an emergency
- That ground connections are clearly identifiable
- That personal protective equipment is provided and used properly as required
- That signal, ground and power cables are properly separated

Mechanical Equipment

The critical safety components of mechanical elevating and rotating equipment must receive a thorough visual inspection before use on each shift.

Critical safety components of mechanical elevating and rotating equipment are components whose failure would result in a free fall or free rotation of the boom.

No vehicular equipment having an obstructed view to the rear may be operated on off- highway jobsites where any employee is exposed to the hazards created by the moving vehicle, unless:

- The vehicle has a reverse signal alarm audible above the surrounding noise level
- The vehicle is backed up only when a designated employee signals that it is safe to do so

The operator of an electric line truck may not leave his or her position at the controls while a load is suspended, unless it can be demonstrated that no employee (including the operator) might be endangered.

Rubber-tired, self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler-type tractors, crawler-type loaders and motor graders, with or without attachments, must have rollover protective structures.

Outriggers

- Vehicular equipment, if provided with outriggers, must be operated with the outriggers extended and firmly set as necessary for the stability of the specific configuration of the equipment

- Outriggers may not be extended or retracted outside of clear view of the operator unless all employees are outside the range of possible equipment motion
- If the work area or the terrain precludes the use of outriggers, the equipment may be operated only within its maximum load ratings for the particular configuration of the equipment without outriggers

Applied loads: Mechanical equipment used to lift or move lines or other material must be used within its maximum load rating and other design limitations for the conditions under which the work is being performed.

OPERATIONS NEAR ENERGIZED LINES OR EQUIPMENT

- Mechanical equipment must be operated so that the minimum approach distances, as defined in OSHA regulation 29 CFR 1910.269, are maintained from exposed energized lines and equipment. The insulated portion of an aerial lift is exempt from this requirement
- A designated employee other than the equipment operator must observe the approach distance to exposed lines and equipment and give timely warnings before the minimum approach distance is reached, unless the Company can demonstrate that the operator can accurately determine that the minimum approach distance is being maintained
- If, during operation of the mechanical equipment, the equipment could become energized, use the following procedures to ensure safety:
  - The energized lines exposed to contact must be covered with insulating protective material that will withstand the type of contact that might be made during the operation
  - The equipment is required to be insulated for the voltage involved
  - The equipment must be positioned so that its uninsulated portions cannot approach the lines or equipment any closer than the minimum approach distances
  - Each employee must be protected from hazards that might arise from equipment contact with the energized lines. The measures used must ensure that employees will not be exposed to hazardous differences in potential

Unless the Company can demonstrate that, the methods in use protect employees from the hazards that might arise if the equipment contacts the energized line, the measures used will include all of the following techniques:

- Using the best available ground to minimize the time the lines remain energized
- Bonding equipment together to minimize potential differences
- Providing ground mats to extend areas of equipotential
- Employing insulating protective equipment or barricades to guard against any remaining hazardous potential differences

Refer to the information on hazardous step and touch potentials and on methods of protecting employees from hazards resulting from such potentials.

Overhead Lines (Additional Requirements)

Before elevated structures, such as poles or towers are subjected to stresses from climbing or the installation or removal of equipment, the Company will determine that the structures are capable of sustaining the additional or unbalanced stresses.

If the pole or other structure cannot withstand the loads, it must be braced or otherwise supported to prevent failure.

Methods of Inspecting and Testing Wood Poles

When work is to be performed on a wood pole, the condition of the pole will be determined before it is climbed. The weight of the employee, the weight of equipment being installed and other working stresses (such as the removal or re-tensioning of conductors) can lead to the failure of a defective pole or one that is not designed to handle the additional stresses. For these reasons, it is essential that an inspection and test of the condition of a wood pole be performed before it is climbed.

A properly guyed pole in good condition should be able to handle the weight of an employee climbing it. If the pole is found to be unsafe to climb or to work from, it must be secured so that it does not fail while an employee is on it. The pole can be secured by a line truck boom, by ropes or guys or by lashing a new pole alongside it. If a new one is lashed alongside the defective pole, work will be performed from the new one

Inspection of Wood Poles

The employee performing the inspection must be qualified to make a determination as to whether or not it is safe to perform the work without taking additional precautions.

- The presence of any of the conditions listed below is an indication that the pole may not be safe to climb or to work from
- Wood poles will be inspected by a qualified employee for the following conditions:

Buckling: The pole will be inspected for buckling at the ground line and for an unusual angle with respect to the ground. Buckling and odd angles may indicate that the pole has rotted or is broken.

Cracks: The pole will be inspected for cracks. Horizontal cracks perpendicular to the grain of the wood may weaken the pole. Vertical ones, although not considered a sign of a defective pole, can pose a hazard to the climber, and the employee must keep his or her gaffs away from them while climbing.

Holes: Hollow spots and woodpecker holes can reduce the strength of a wood pole.

Shell Rot and Decay: Rotting and decay are cutout hazards and are possible indications of the age and internal condition of the pole

Knots: One large knot or several smaller ones at the same height on the pole may be Depth of Setting: Evidence of the existence of a former ground line substantially above the existing ground level may be an indication that the pole is no longer buried to a sufficient extent.

Soil conditions: Soft, wet or loose soil may not support any changes of stress on the pole.

Burn Marks: Burning from transformer failures or conductor faults could damage the pole so that it cannot withstand mechanical stress changes.

Testing of Wood Poles

Hammer Test: Rap the pole sharply with a hammer weight about 3 pounds, starting near the ground line and continuing upwards circumferentially around the pole to a height of approximately 6 feet. The hammer will produce a clear sound and rebound sharply when striking sound wood. Decay pockets will be indicated by a dull sound or a less pronounced hammer rebound. Also, prod the pole as near the ground line as possible using a pole prod or a screwdriver with a blade at least 5 inches long. If substantial decay is encountered, the pole is considered unsafe.

Rocking Test: Apply a horizontal force to the pole and attempt to rock it back and forth in a direction perpendicular to the line. Caution must be exercised to avoid causing power lines to swing together. The force may be applied by either pushing with a pike pole or pulling with a rope. If the pole cracks during the test, it will be considered unsafe.

- When poles are set, moved, or removed near exposed energized overhead conductors, the pole may not contact the conductors
- When a pole is set, moved or removed near an exposed energized overhead conductor, the Company will ensure that each employee wears electrical protective equipment or uses insulated devices when handling the pole and that no employee contacts the pole with uninsulated parts of his or her body
- To protect employees from falling into holes into which poles are to be placed, the holes must be attended by employees or physically guarded whenever anyone is working nearby

INSTALLING AND REMOVING OVERHEAD LINES

The following provisions apply to the installation and removal of overhead conductors or cable:

- The Company will use the tension stringing method, barriers or other equivalent measures to minimize the possibility that conductors and cables being installed or removed will contact energized power lines or equipment
- The protective measures required for mechanical equipment must also be provided for conductors, cables, and pulling and tensioning equipment when the conductor or cable is being installed or removed close enough to energized conductors that any of the following failures could energize the pulling or tensioning equipment or the wire or cable being installed or removed:
  - Failure of the pulling or tensioning equipment
  - Failure of the wire or cable being pulled
  - Failure of the previously installed lines or equipment
- If the conductors being installed or removed cross over energized conductors in excess of 600 volts and if the design of the circuit-interrupting devices protecting the lines so permits, the automatic-reclosing feature of these devices must be made inoperative

- Before lines are installed parallel to existing energized lines, the Company will determine the approximate voltage to be induced in the new lines, or work must proceed on the assumption that the induced voltage is hazardous

Unless the Company can demonstrate that the lines being installed are not subject to the induction of a hazardous voltage or unless the lines are treated as energized, the following requirements also apply:

- Each bare conductor will be grounded in increments so that no point along the conductor is more than 2 miles from a ground
- The grounds must be left in place until the conductor installation is completed between dead ends
- The grounds must be removed as the last phase of aerial cleanup
- If employees are working on bare conductors, grounds must also be installed at each location where these employees are working, and grounds are required to be installed at all open dead-end or catch-off points or the next adjacent structure
- If two bare conductors are to be spliced, the conductors must be bonded and grounded before being spliced
- Reel handling equipment, including pulling and tensioning devices, must be in safe operating condition and must be leveled and aligned
- Load ratings of stringing lines, pulling lines, conductor grips, load-bearing hardware, and accessories, rigging, and hoists may not be exceeded
- Pulling lines and accessories must be repaired or replaced when defective
- Conductor grips can’t be used on wire rope, unless specifically designed for this application
- Reliable communications, through two-way radios or other equivalent means, must be maintained between the reel tender and the pulling rig operator
- The pulling rig may only be operated when it is safe to do so
- While the conductor or pulling line is being pulled (in motion) with a power-driven device, employees are not permitted directly under overhead operations or on the cross arm, except as necessary to guide the stringing sock or board over or through the stringing sheave

Live-Line Bare-Hand Work

In addition to other applicable provisions contained in this section, the following requirements apply to live-line bare-hand work:

- Before using or supervising live-line bare-hand techniques on energized circuits, employees must be trained in the technique and in the safety requirements
- Employees are required to receive refresher training as necessary

Before any employee uses the live-line bare-hand technique on energized high-voltage conductors or parts, the following information must be obtained:

- The nominal voltage rating of the circuit on which the work is to be performed
- The minimum approach distances to ground of lines and other energized parts that are being worked on
- The voltage limitations of equipment to be used

The insulated equipment, insulated tools, and aerial devices and platforms used must be designed, tested and intended for live-line bare-hand work. Tools and equipment must be kept clean and dry while they are in use.

The automatic-reclosing feature of circuit-interrupting devices protecting the lines must be disabled, if the design of the devices permits.

No work may be performed when adverse weather conditions would make the work hazardous even after the work practices required by this section are employed.

Work may not be performed when winds reduce the phase-to-phase or phase-to-ground minimum approach distances at the work location below that specified, unless the grounded objects and other lines and equipment are covered by insulating guards.

Warning: Thunderstorms in the immediate vicinity, high winds, snowstorms and ice storms are examples of adverse weather conditions that are presumed to make live-line bare-hand work too hazardous to perform safely.

Buckets: A conductive bucket liner or other conductive device will be used for bonding the insulated aerial device to the energized line or equipment.

- The employee must be connected to the bucket liner or other conductive device by the use of conductive shoes, leg clips or other means
- Where differences in potentials at the worksite pose a hazard to employees, electrostatic shielding designed for the voltage being worked will be provided

Before the employee contacts the energized part, the conductive bucket liner or other conductive device must be bonded to the energized conductor. This connection must remain attached to the energized conductor until the work on the energized circuit is completed.

Aerial lifts to be used for live-line bare-hand must have dual controls (lower and upper) as follows:

- The upper controls must be within easy reach of the employee in the bucket. On a two-bucket-type lift, access to the controls must be within easy reach from either bucket
- The lower set of controls must be located near the base of the boom, and they are required to be so designed that they can override operation of the equipment at any time
- Lower (ground level) lift controls may not be operated with an employee in the lift, except in case of emergency
- Before employees are elevated into the work position, all controls (ground level and bucket) must be checked to determine that they are in proper working condition
- Before the boom of an aerial lift is elevated, the body of the truck must be grounded, or the body of the truck will be barricaded and treated as energized
- A boom-current test must be made before work is started each day, each time during the day when higher voltage is encountered, and when changed conditions indicate a need for an additional test
- This test must consist of placing the bucket in contact with an energized source equal to the voltage to be encountered for a minimum of 3 minutes

- The leakage current may not exceed 1 microampere per kilovolt of nominal phase-to- ground voltage
- Work from the aerial lift must be immediately suspended upon indication of a malfunction in the equipment
- The minimum approach distances specified in OSHA regulation 29 CFR 1910.269 must be maintained from all grounded objects and from lines and equipment at a potential different from that to which the live-line bare-hand equipment is bonded, unless such grounded objects and other lines and equipment are covered by insulating guards
- While an employee is approaching, leaving, or bonding to an energized circuit, the minimum approach distances in OSHA regulation 29 CFR 1910.269 must be maintained between the employee and any grounded parts, including the lower boom and portions of the truck
- While the bucket is positioned alongside an energized bushing or insulator string, the phase-to-ground minimum approach distances must be maintained between all parts of the bucket and the grounded end of the bushing or insulator string or any other grounded surface
- Hand lines may not be used between the bucket and the boom or between the bucket and the ground. However, non-conductive-type hand lines may be used from conductor to ground if not supported from the bucket. Ropes used for live-line bare-hand work may not be used for other purposes
- Uninsulated equipment or material may not be passed between a pole or structure and an aerial lift while an employee working from the bucket is bonded to an energized part
- A minimum approach distance table must be printed on a plate of durable non-conductive material. This table is required to be mounted so as to be visible to the operator of the boom
- A non-conductive measuring device is required to be readily accessible to assist employees in maintaining the required minimum approach distance

Towers and Structures

The following applies to work performed on towers or other structures that support overhead lines:

- The Company will ensure that no employee is under a tower or structure while work is in progress, except where it can be shown that such a working position is necessary to assist employees working above
- Tag lines or other similar devices will be used to maintain control of tower sections being raised or positioned, unless it can be shown that the use of such devices would create a greater hazard
- The load line may not be detached from a member or section until the load is safely secured.
- Except during emergency restoration procedures, work must be discontinued when adverse weather conditions would make the work hazardous in spite of the work practices required by this section

Warning: Thunderstorms in the immediate vicinity, high winds, snowstorms and ice storms are examples of adverse weather conditions that are presumed to make this work too hazardous to perform, except under emergency conditions.

LINE-CLEARANCE TREE TRIMMING OPERATIONS

- Line-clearance tree trimmers must know about the exposed live parts, their voltage, and how to maintain minimum approach distances
- Before an employee climbs, enters or works around any tree, a determination must be made of the nominal voltage of electric power lines posing a hazard to employees. However, a determination of the maximum nominal voltage to which an employee will be exposed may be made instead, if all lines are considered as energized at this maximum voltage

There must be a second line-clearance tree trimmer within normal (that is, unassisted) voice communication under any of the following conditions:

- If a line-clearance tree trimmer is to approach more closely than 10 feet any conductor or electric apparatus energized at more than 750 volts
- If branches or limbs being removed are closer to lines energized at more than 750 volts than the allowable minimum approach distances
- If roping is necessary to remove branches or limbs from such conductors or apparatus
- Line-clearance tree trimmers must maintain the minimum approach distances from energized conductors
- Branches that are contacting exposed energized conductors or equipment or that are within the minimum approach distances may be removed only using insulating equipment
- A tool constructed of a material that has insulating qualities is considered as insulated if the tool is clean and dry
- Ladders, platforms, and aerial devices may not be brought closer to an energized part than the allowable approach distances
- Line-clearance tree-trimming work may not be performed when adverse weather conditions make the work hazardous in spite of the work practices required by this section. Each employee performing line-clearance tree trimming work in the aftermath of a storm or under similar emergency conditions must be trained in the special hazards related to this type of work

Gasoline-Engine Power Saws

Gasoline-engine power saw operations must meet the requirements of the following:

- Each power saw weighing more than 15 pounds that is used in trees must be supported by a separate line, except when work is performed from an aerial lift and except during topping or removing operations where no supporting limb will be available
- Each power saw must be equipped with a control that will return the saw to idling speed when released
- Each power saw is required to be equipped with a clutch and will be so adjusted that the clutch will not engage the chain drive at idling speed
- A power saw must be started on the ground or where it is otherwise firmly supported

Drop starting of saws over 15 pounds is permitted outside of the bucket of an aerial lift only if the area below the lift is clear of personnel.

- A power saw engine may be started and operated only when all employees, other than the operator, are clear of the saw
- A power saw may not be running when the saw is being carried up into a tree by an employee
- Power saw engines are required to be stopped for all cleaning, refueling, adjustments, and repairs to the saw or motor, except as the manufacturer's servicing procedures require otherwise

Rope

- Climbing ropes are required to be used by employees working aloft in trees
- These ropes must have a minimum diameter of 0.5 inch with a minimum breaking strength of 2300 pounds
- Synthetic rope is required to have elasticity of not more than 7 percent
- Rope must be inspected before each use and, if unsafe (for example, because of damage or defect), may not be used
- Rope is required to be stored away from cutting edges and sharp tools. Rope contact with corrosive chemicals, gas, and oil will be avoided
- When stored, rope must be coiled, piled or be suspended, so that air can circulate through the coils
- Rope ends are required to be secured to prevent their unraveling
- Climbing rope may not be spliced to effect repair
- A rope that is wet, that is contaminated to the extent that its insulating capacity is impaired, or that is otherwise not considered to be insulated for the voltage involved may not be used near exposed energized lines
- Each employee is required to be tied in with a climbing rope and safety saddle when the employee is working above the ground in a tree, unless he or she is ascending into the tree

Communication Facilities: Microwave Transmission

- The Company will ensure that no employee looks into an open waveguide or antenna that is connected to an energized microwave source
- If the electromagnetic radiation level within an accessible area associated with microwave communications systems exceeds the radiation protection guide, the area is required to be posted with the warning symbol

The lower half of the warning symbol must include the following statements or ones that are equivalent:

- Radiation in this area may exceed hazard limitations and special precautions are required
- Obtain specific instruction before entering

When an employee works in an area where the electromagnetic radiation could exceed the radiation protection guide, the Company will institute measures that ensure that the employee's exposure is less than that permitted by that guide. These measures may include administrative and engineering controls and PPE.

Power line carrier work, including work on equipment used for coupling carrier current to power line conductors, must be performed according to the requirements for working on energized lines.

UNDERGROUND ELECTRICAL INSTALLATIONS

Access: A ladder or other climbing device must be used to enter and exit a manhole or subsurface vault exceeding 4 feet in depth. No employee may climb into or out of a manhole or vault by stepping on cables or hangers.

Lowering equipment into manholes: Equipment used to lower materials and tools into manholes or vaults must be able to support the weight to be lowered and must be checked for defects before use. Before tools or materials are lowered into the opening for a manhole or vault, each employee working in the manhole or vault must be clear of the area directly under the opening.

Attendants for manholes: While work is being performed in a manhole containing energized electric equipment, an employee with first aid and CPR training must be available on the surface, in the immediate vicinity, to render emergency assistance.

- Occasionally, the employee on the surface may briefly enter a manhole to provide assistance, other than emergency
- An attendant may also be required. One person may serve to fulfill both requirements
- Employees entering manholes containing unguarded, uninsulated energized lines or parts of electric equipment operating at 50 volts or more are required to be qualified
- For the purpose of inspection, housekeeping, taking readings, or similar work, an employee working alone may enter, for brief periods, a manhole where energized cables or equipment are in service, if the Company can demonstrate that the employee will be protected from all electrical hazards
- Reliable communications, through two-way radios or other equivalent means, must be maintained among all employees involved in the job

Duct rods: If duct rods are used, they must be installed in the direction presenting the least hazard to employees. An employee must be stationed at the far end of the duct line being rodded to ensure that the required minimum approach distances are maintained.

Multiple cables: When multiple cables are present in a work area, the cable to be worked must be identified by electrical means, unless its identity is obvious due to distinctive appearance or location or by other readily apparent means of identification. Cables other than the one being worked must be protected from damage

Moving cables: Energized cables that are to be moved must be inspected for defects.

Defective cables: Where a cable in a manhole has one or more abnormalities that could lead to or be an indication of an impending fault, the defective cable must be de-energized before any employee may work in the manhole, except when service load conditions and a lack of feasible alternatives require that the cable remain energized.

In that case, employees may enter the manhole provided they are protected from the possible effects of a failure by shields or other devices that are capable of containing the adverse effects of a fault in the joint.

Warning: Abnormalities such as oil or compound leaking from cable or joints, broken cable sheaths or joint sleeves, hot localized surface temperatures of cables or joints, or joints that are swollen beyond normal tolerance are presumed to lead to or be an indication of an impending fault.

Sheath continuity: When work is performed on buried cable or on cable in manholes, metallic sheath continuity must be maintained or the cable sheath must be treated as energized.

SUBSTATIONS

Access and working space

- Sufficient access and working space is required to be provided and maintained about electric equipment to permit ready and safe operation and maintenance of such equipment
- Guidelines for the dimensions of access and working space about electric equipment in substations are contained in American National Standard - National Electrical Safety Code, ANSI C2

An installation that does not conform to this ANSI standard will still be considered as complying if the Company can demonstrate that the installation provides ready and safe access based on the following evidence:

- That the installation conforms to the edition of ANSI C2 that was in effect at the time the installation was made
- That the configuration of the installation enables employees to maintain the minimum approach distances while they are working on exposed, energized parts
- That the precautions taken when work is performed on the installation provide protection equivalent to the protection that would be provided by access and working space meeting ANSI C2

Draw-out-type circuit breakers: When draw-out-type circuit breakers are removed or inserted, the breaker is required to be in the open position. The control circuit must be rendered inoperative, if the design of the equipment permits.

Substation fences: Conductive fences around substations must be grounded. When a substation fence is expanded or a section is removed, fence grounding continuity must be maintained, and bonding will be used to prevent electrical discontinuity.

Guarding of rooms containing electric supply equipment

Rooms and spaces in which electric supply lines or equipment are installed are required to meet specific requirements under the following conditions:

- If exposed live parts operating at 50 to 150 volts to ground are located within 8 feet of the ground or other working surface inside the room or space
- If live parts operating at 151 to 600 volts and located within 8 feet of the ground or other working surface inside the room or space are guarded only by location, as permitted

If live parts operating at more than 600 volts are located within the room or space, unless:

- The live parts are enclosed within grounded, metal-enclosed equipment whose only openings are designed so that foreign objects inserted in these openings will be deflected from energized parts
- The live parts are installed at a height above ground and any other working surface that provides protection at the voltage to which they are energized corresponding to the protection provided by an 8-foot height at 50 volts
- Rooms and spaces must be so enclosed within fences, screens, partitions, or walls as to minimize the possibility that unqualified persons will enter
- Signs warning unqualified persons to keep out must be displayed at entrances to the rooms and spaces
- Entrances to rooms and spaces that are not under the observation of an attendant are required to be kept locked
- Unqualified persons may not enter the rooms or spaces while the electric supply lines or equipment are energized

Guarding Energized Parts

- Guards are required to be provided around all live parts operating at more than 150 volts to ground without an insulating covering, unless the location of the live parts gives sufficient horizontal or vertical or a combination of these clearances to minimize the possibility of accidental employee contact
- Guidelines for the dimensions of clearance distances about electric equipment in substations are contained in American National Standard - National Electrical Safety Code, ANSI C2

An installation that does not conform to this ANSI standard will, still be considered as complying if the Company can demonstrate that the installation provides sufficient clearance based on the following evidence:

- That the installation conforms to the edition of ANSI C2 that was in effect at the time the installation was made
- That each employee is isolated from energized parts at the point of closest approach
- That the precautions taken when work is performed on the installation provide protection equivalent to the protection that would be provided by horizontal and vertical clearances meeting ANSI C2

Except for fuse replacement and other necessary access by qualified persons, the guarding of energized parts within a compartment will be maintained during operation and maintenance functions to prevent accidental contact with energized parts and to prevent tools or other equipment from being dropped on energized parts.

When guards are removed from energized equipment, barriers must be installed around the work area to prevent employees who are not working on the equipment, but who are in the area, from contacting the exposed live parts.

Substation Entry

Upon entering an attended substation, each employee other than those regularly working in the station is required to report his or her presence to the employee in charge in order to receive information on special system conditions affecting employee safety.

The job briefing is required to cover such additional subjects as the location of energized equipment in or adjacent to the work area and the limits of any de-energized work area.

POWER GENERATION

- Interlocks and other safety devices must be maintained in a safe, operable condition
- No interlock or other safety device may be modified to defeat its function, except for test, repair, or adjustment of the device

Changing brushes: Before exciter or generator brushes are changed while the generator is in service, the exciter or generator field must be checked to determine whether a ground condition exists. The brushes may not be changed while the generator is energized if a ground condition exists.

Access and working space: Sufficient access and working space must be provided and maintained about electric equipment to permit ready and safe operation and maintenance of such equipment.

Guidelines for the dimensions of access and working space around electric equipment in generating stations are contained in ANSI C2. An installation that does not conform to this ANSI standard will still be considered as complying if the Company can demonstrate that the installation provides ready and safe access based on the following evidence:

- That the installation conforms to the edition of ANSI C2 that was in effect at the time the installation was made
- That the configuration of the installation enables employees to maintain the minimum approach distances while they are working on exposed, energized parts
- That the precautions taken when work is performed on the installation provide protection equivalent to the protection that would be provided by access and working space meeting ANSI C2

Guarding of Rooms Containing Electric Supply Equipment

Rooms and spaces in which electric supply lines or equipment are installed are required to meet the specific requirements under the following conditions:

- If exposed live parts operating at 50 to 150 volts to ground are located within 8 feet of the ground or other working surface inside the room or space
- If live parts operating at 151 to 600 volts and located within 8 feet of the ground or other working surface inside the room or space are guarded only by location

If live parts operating at more than 600 volts are located within the room or space, unless:

- The live parts are enclosed within grounded, metal-enclosed equipment whose only openings are designed so that foreign objects inserted in these openings will be deflected from energized parts

- The live parts are installed at a height above ground and any other working surface that provides protection at the voltage to which they are energized corresponding to the protection provided by an 8-foot height at 50 volts
- The rooms and spaces must be so enclosed within fences, screens, partitions, or walls as to minimize the possibility that unqualified persons will enter
- Signs warning unqualified persons to keep out are required to be displayed at entrances to the rooms and spaces
- Entrances to rooms and spaces that are not under the observation of an attendant must be kept locked
- Unqualified persons may not enter the rooms or spaces while the electric supply lines or equipment is energized

Guarding Energized Parts

Guards will be provided around all live parts operating at more than 150 volts to ground without an insulating covering, unless the location of the live parts gives sufficient horizontal or vertical or a combination of these clearances to minimize the possibility of accidental employee contact.

An installation that does not conform to this ANSI standard will still be considered as complying if the Company can demonstrate that the installation provides sufficient clearance based on the following evidence:

- That the installation conforms to the edition of ANSI C2 that was in effect at the time the installation was made
- That each employee is isolated from energized parts at the point of closest approach
- That the precautions taken when work is performed on the installation provide protection equivalent to the protection that would be provided by horizontal and vertical clearances meeting ANSI C2

Except for fuse replacement or other necessary access by qualified persons, the guarding of energized parts within a compartment will be maintained during operation and maintenance functions to prevent accidental contact with energized parts and to prevent tools or other equipment from being dropped on energized parts.

When guards are removed from energized equipment, barriers must be installed around the work area to prevent employees who are not working on the equipment, but who are in the area, from contacting the exposed live parts.

Water or Steam Spaces

Requirements applying to work in water and steam spaces associated with boilers:

- A designated employee is required to inspect conditions before work is permitted and after its completion
- Eye protection, or full-face protection if necessary, must be worn at all times when condenser, heater, or boiler tubes are being cleaned
- Where it is necessary for employees to work near tube ends during cleaning, shielding is required to be installed at the tube ends

Chemical Cleaning of Boilers and Pressure Vessels

Requirements applying to chemical cleaning of boilers and pressure vessels:

- Areas where chemical cleaning is in progress are required to be cordoned off to restrict access during cleaning
- If flammable liquids, gases, or vapors or combustible materials will be used or might be produced during the cleaning process, the following requirements also apply:
  - The area must be posted with signs restricting entry and warning of the hazards of fire and explosion
  - Smoking, welding, and other possible ignition sources are prohibited in these restricted areas
- The number of personnel in the restricted area must be limited to those necessary to accomplish the task safely
- There must be ready access to water or showers for emergency use
- Potable water must be provided
- Washing facilities must be maintained in a sanitary condition
- Employees in restricted areas must wear the proper protective equipment including, but not limited to, protective clothing, boots, goggles, and gloves

Chlorine Systems

Chlorine system enclosures must be posted with signs restricting entry and warning of the hazard to health and the hazards of fire and explosion.

Health effects of chlorine

Low concentrations: Burning in the eyes, nose and throat; redness in the face, sneezing, and coughing

High concentrations: Tightness in throat and chest – pulmonary edema. 1000 PPM is rapidly fatal.

- Liquid chlorine causes severe irritation and blistering of skin
- Eyewashes and oxygen will be available. Self- contained breathing apparatus or canister type respirators will also be accessible
- Only designated employees may enter the restricted area. The number of personnel must be limited to those necessary to accomplish the task safely
- Emergency repair kits must be available near the shelter or enclosure to allow for the prompt repair of leaks in chlorine lines, equipment, or containers
- Before repair procedures are started, chlorine tanks, pipes, and equipment must be purged with dry air and isolated from other sources of chlorine
- The Company must ensure that chlorine is not mixed with materials that would react with the chlorine in a dangerously exothermic or other hazardous manner

Boilers

- Before internal furnace or ash hopper repair work is started, overhead areas must be inspected for possible falling objects. If the hazard of falling objects exists, overhead protection such as planking or nets must be provided

- When opening an operating boiler door, employees are required to stand clear of the opening of the door to avoid the heat blast and gases that may escape from the boiler

Turbine Generators

- Smoking and other ignition sources are prohibited near hydrogen or hydrogen sealing systems, and signs warning of the danger of explosion and fire must be posted
- Excessive hydrogen makeup or abnormal loss of pressure is required to be considered as an emergency and will be corrected immediately
- A sufficient quantity of inert gas must be available to purge the hydrogen from the largest generator

Coal and Ash Handling

- Only designated persons may operate railroad equipment
- Before a locomotive or locomotive crane is moved, a warning is required to be given to employees in the area
- Employees engaged in switching or dumping cars may not use their feet to line up drawheads
- Drawheads and knuckles may not be shifted while locomotives or cars are in motion
- When a railroad car is stopped for unloading, the car is required to be secured from displacement that could endanger employees
- An emergency means of stopping dump operations must be provided at railcar dumps
- Employees who work in coal or ash-handling conveyor areas will be trained and knowledgeable in conveyor operation
- Employees may not ride a coal- or ash-handling conveyor belt at any time
- Employees may not cross over the conveyor belt, except at walkways, unless the conveyor's energy source has been de-energized and has been locked out or tagged
- A conveyor that could cause injury when started may not be started until personnel in the area are alerted by a signal or by a designated person that the conveyor is about to start
- If a conveyor that could cause injury when started is automatically controlled or is controlled from a remote location, an audible device must be provided that sounds an alarm that will be recognized by each employee as a warning that the conveyor will start and that can be clearly heard at all points along the conveyor where personnel may be present
- The warning device must be actuated by the device starting the conveyor and must continue for a period of time before the conveyor starts; that are long enough to allow employees to move clear of the conveyor system
- A visual warning may be used in place of the audible device if the Company can demonstrate that it will provide an equally effective warning in the particular circumstances involved

Exception: If the Company can demonstrate that the system's function would be seriously hindered by the required time delay, warning signs may be provided in place of the audible warning device.

- If the system was installed before January 31, 1995, warning signs may be provided in place of the audible warning device until the conveyor or its control system is rebuilt or rewired

- Warning signs are required to be clear, concise, and legible and must indicate that conveyors and allied equipment may be started at any time, that danger exists, and that personnel must keep clear
- Warning signs are required to be provided along the conveyor at areas not guarded by position or location

Emergency Stops

- Remotely and automatically controlled conveyors, and conveyors that have operating stations which are not manned or which are beyond voice and visual contact from drive areas, loading areas, transfer points, and other locations on the conveyor path not guarded by location, position, or guards are required to be furnished with emergency stop buttons, pull cords, limit switches, or similar emergency stop devices
- If the Company can show that the design, function, and operation of the conveyor doesn't expose an employee to hazards, an emergency stop device is not required
- Emergency stop devices must be easily identifiable in the immediate vicinity of such locations
- An emergency stop device must act directly on the control of the conveyor involved and may not depend on the stopping of any other equipment
- Emergency stop devices must be installed so that they cannot be overridden from other locations

Combustible and Flammable Gas and Dust

Where coal-handling operations may produce a combustible atmosphere from fuel sources or from flammable gases or dust, sources of ignition must be eliminated or safely controlled to prevent ignition of the combustible atmosphere.

Locations that are hazardous because of the presence of combustible dust are classified as Class II hazardous locations.

Shifting Coal

An employee may not work on or beneath overhanging coal in coalbunkers, coal silos or coal storage areas, unless the employee is protected from all hazards posed by shifting coal.

Fall Protection

An employee entering a bunker or silo to dislodge the contents must wear a body harness with lifeline attached. The lifeline will be secured to a fixed support outside the bunker and must be attended at all times by an employee located outside the bunker or facility.

Hydroplants and Equipment

Employees working on or close to water gates, valves, intakes, forebays, flumes, or other locations where increased or decreased water flow or levels may pose a significant hazard will be warned and must vacate such dangerous areas before water flow changes are made.

SPECIAL CONDITIONS

Capacitors (Additional Requirements)

- Before employees work on capacitors, the capacitors must be disconnected from energized sources and, after a wait of at least 5 minutes from the time of disconnection, short-circuited
- Before the units are handled, each unit in series-parallel capacitor banks must be short-circuited between all terminals and the capacitor case or its rack
- If the cases of capacitors are on ungrounded substation racks, the racks must be bonded to ground
- Any line to which capacitors are connected is required to be short-circuited before it is considered de-energized

Current Transformer Secondaries

- The secondary of a current transformer may not be opened while the transformer is energized
- If the primary of the current transformer cannot be de-energized before work is performed on an instrument, a relay, or other section of a current transformer secondary circuit, the circuit must be bridged so that the current transformer secondary will not be opened

Series Streetlighting

- If the open-circuit voltage exceeds 600 volts, the series streetlighting circuit must be worked as appropriate
- A series loop may only be opened after the streetlighting transformer has been de-energized and isolated from the source of supply or after the loop is bridged to avoid an open-circuit condition

Illumination

Sufficient illumination will be provided to enable the employee to perform the work safely.

Protection Against Drowning (PFD)

- Whenever an employee may be pulled or pushed or may fall into water where the danger of drowning exists, the employee must be provided with and is required to use U.S. Coast Guard approved personal flotation devices (PFD)
- Each personal flotation device is required to be maintained in safe condition and must be inspected frequently enough to ensure that it does not have rot, mildew, water saturation, or any other condition that could render the device unsuitable for use
- An employee may cross streams or other bodies of water only if a safe means of passage, such as a bridge, is provided

Employee Protection in Public Work Areas

- Traffic control signs and traffic control devices used for the protection of employees must meet all traffic control

- Before work is begun near vehicular or pedestrian traffic that may endanger employees, warning signs or flags and other traffic control devices must be placed in conspicuous locations to alert and channel approaching traffic
- Where additional employee protection is necessary, barricades must be used
- Excavated areas are required to be protected with barricades
- At night, warning lights are required to be prominently displayed

Voltage Backfeed

If there is a possibility of voltage backfeed from sources of cogeneration or from the secondary system (e.g. backfeed from more than one energized phase feeding a common load), all requirements apply if the lines or equipment are to be worked as energized, and if the lines or equipment are to be worked as de-energized.

Lasers: Laser equipment must be installed, adjusted and operated properly.

Hydraulic fluids: Hydraulic fluids used for the insulated sections of equipment must provide insulation for the voltage involved.

Work on Exposed Energized Parts

- Electric transmission and distribution line installations have been designed to meet National Electrical Safety Code (NESC), ANSI C2, requirements and to provide the level of line outage performance required by system reliability criteria. Transmission and distribution lines are also designed to withstand the maximum overvoltage expected to be impressed on the system
- Such over-voltages can be caused by such conditions as switching surges, faults, or lighting. Insulator design and lengths and the clearances to structural parts (which, for low voltage through extra-high voltage, or EHV, facilities, are generally based on the performance of the line as a result of contamination of the insulation or during storms) have, over the years, come closer to the minimum approach distances used by workers (which are generally based on non-storm conditions)
- Thus, as minimum approach (working) distances and structural distances (clearances) converge, it is increasingly important that basic considerations for establishing safe approach distances for performing work be understood by the designers and the operating and maintenance personnel involved
- The information here will assist in complying with the minimum approach distance requirements. The technical criteria and methodology presented here is mandatory when using reduced minimum approach distances. This section is intended to provide essential background information and technical criteria for the development or modification, if possible, of the safe minimum approach distances for electric transmission and distribution live-line work
- The development of these safe distances must be undertaken by persons knowledgeable in the techniques discussed in this appendix and competent in the field of electric transmission and distribution system design

Installations Energized at 50 to 300 Volts

- The hazards posed by installations energized at 50 to 300 volts are the same as those found in many other workplaces. That is not to say that there is no hazard, but the complexity of electric protection required does not compare to that required for high voltage systems
- The employee must avoid contact with the exposed parts, and the protective equipment used (such as rubber insulating gloves) must provide insulation for the voltages involved

Exposed Energized Parts Over 300 Volts Ac

- OSHA standard 1910.269 defines the safe approach working distances near energized electrical apparatus so that work can be done safely without risk of electrical flashover
- The working distances must withstand the maximum transient overvoltage that can reach the work site under the working conditions and practices in use
- Normal system design may provide or include a means to control transient over-voltages, or temporary devices may be employed to achieve the same result
- The use of technically correct practices or procedures to control over-voltages (e.g., portable gaps or preventing the automatic control from initiating breaker reclosing) enables line design and operation based on reduced transient overvoltage values

Voltages of 1.1kv to 72.5 Kv

For voltages of 1.1 kV to 72.5 kV, the electrical component of minimum approach distances is based on American National Standards Institute (ANSI) American Institute of Electrical Engineers (AIEE) Standard No. 4, Tables III and IV.

Voltages of 72.6 Kv to 800 Kv

For voltages of 72.6 kV to 800 kV, the electrical component of minimum approach distances is based on ANSI/IEEE Standard 516, “IEEE Guide for Maintenance methods on Energized Power Lines.” This standard gives the electrical component of the minimum approach distance based on power frequency rod-gap data, supplemented with transient overvoltage information and a saturation factor for high voltages.

Provisions for Inadvertent Movement

- The minimum approach distances (working distances) must include an “adder” to compensate the inadvertent movement of the worker relative to an energized part or the movement of the part relative to the worker
- A certain allowance must be made to account for this possible inadvertent movement must be added to the electrical component to determine the total safe minimum approach distances used in live-line work
- One approach that can be used to estimate the ergonomic component of the minimum approach distance is response time-distance analysis. When this technique is used, the total response time to a hazardous incident is estimated, and converted to distance traveled

- In the case of live-line work, the employee must first perceive that he or she is approaching the danger zone. Then, the worker responds to the danger and must decelerate and stop all motion toward the energized part. During the time it takes to stop, a distance will have been traversed. This distance must be added to the electrical component of the minimum approach distance to obtain the total safe minimum approach distance
- At voltages below 72.5 kV, the electrical component of the minimum approach distance is smaller than the ergonomic component. At 72.5 kV the electrical component is only a little more than 1 foot
- An ergonomic component of the minimum approach distance is needed that will provide for all the worker's unexpected movements. The usual live-line work method for these voltages is the use of rubber insulating equipment, frequently rubber gloves. The energized object needs to be far enough away to provide the worker's face with a safe approach distance, as his or her hands and arms are insulated. In this case, 2 feet has been accepted as a sufficient and practical value
- For voltages between 72.6 and 800 kV, there is a change in the work practices employed during energized line work. Generally, live-line tools (hot sticks) are employed to perform work while equipment is energized. These tools, by design, keep the energized part at a constant distance from the employee and thus maintain the appropriate minimum approach distance automatically
- The length of the ergonomic component of the minimum approach distance is also influenced by the location of the worker and by the nature of the work. In these higher voltage ranges, the employees use work methods that more tightly control their movements than when the workers perform rubber glove work. The worker is farther from energized line or equipment and needs to be more precise in his or her movements just to perform the work
- For these reasons, a smaller ergonomic component of the minimum approach distance is needed, and a distance of 1 foot has been selected for voltages between 72.6 and 800 kV

Miscellaneous Correction Factors

The strength of an air gap is influenced by the changes in the air medium that forms the insulation. A brief discussion of each factor follows, with a summary at the end.

- Dielectric strength of air: The dielectric strength of air in the uniform electric field at standard atmospheric conditions is approximately 31 kV (crest) per cm at 60 Hz. The disruptive gradient is affected by the air pressure, temperature, humidity, by the shape, dimensions, and separation of the electrodes, and by the characteristics of the applied voltage (wave shape)
- Atmospheric effect: Flashover for a given air gap is inhibited by an increase in the density (humidity) of the air. The empirically determined electrical strength of a given gap is normally applicable at standard atmospheric conditions. The combination of temperature and air pressure that gives the lowest gap flashover voltage is high temperature and low pressure. These are conditions not likely to occur simultaneously. Low air pressure is generally associated with high humidity, and this causes increased electrical strength. An average air pressure is more likely to be associated with low humidity. Hot and dry working conditions are thus normally associated with reduced electrical strength
- Altitude: The electrical strength of an air gap is reduced at high altitude, due principally to the reduced air pressure. An increase of about 3% per 1000 feet in the minimum approach distance for altitudes above 3000 feet is required

- Summary: After taking all these correction factors into account and after considering their interrelationships relative to the air gap insulation strength and the conditions under which live work is performed, one finds that only a correction for altitude need be made
- An elevation of 3000 feet is established as the base elevation, and the values of the electrical component of the minimum approach distances have been derived with this correction factor in mind. Thus, the values used for elevations below 3000 feet are conservative without any change; corrections have to be made only above this base elevation

Determination of Reduced Minimum Approach Distances

Factors Affecting Voltage Stress at the Work Site

- System voltage (nominal): The nominal system voltage range sets the absolute lower limit for the minimum approach distance. The highest value within the range, as given in the relevant table, is selected and used as a reference for per unit calculations
- Transient over-voltages: Transient over-voltages may be generated on an electrical system by the operation of switches or breakers, by the occurrence of a fault on the line or circuit being worked or on an adjacent circuit, and by similar activities. Most of the over-voltages are caused by switching, and the term “switching surge” is often used to refer generically to all types of over-voltages. However, each overvoltage has an associated transient voltage wave shape. The wave shape arriving at the site and its magnitude vary considerably. The information used in the development of the minimum approach distances takes into consideration the most common wave shapes; thus, the required minimum approach distances are appropriate for any transient overvoltage level usually found on electric power generation, transmission, and distribution systems. The values of the per unit (p.u.) voltage relative to the nominal maximum voltage are used in the calculation of these distance
- Standard deviation – air-gap withstand: For each air gap length, and under the same atmospheric conditions, there is a statistical variation in the breakdown voltage. The probability of the breakdown voltage is assumed to have a normal (Gaussian) distribution. The standard deviation of this distribution varies with the wave shape, gap geometry and atmospheric conditions. The withstand voltage of the air gap used in calculating the electrical component of the minimum approach distance has been set at three standard deviations (3 sigma) below the critical flashover voltage. (The critical flashover voltage is the crest value of the impulse wave that, under specified conditions causes flashover on 50 percent of the applications. An impulse wave of three standard deviation below this value, that it, the withstand voltage, has a probability of flashover of approximately 1 in 1000.) Sigma “σ” is the symbol for standard deviation

- Broken Insulators: Tests have shown that the insulation strength of an insulator string with broken skirts is reduced. Broken units may have lost up to 70% of their withstand capacity. Because the insulating capability of a broken unit cannot be determined without testing it, damaged units in an insulator are usually considered to have no insulating value. Additionally, the overall insulating strength of a string with broken units may be further reduced the presence of a live-line tool alongside it. The number of good units that must be present in a string is based on the maximum overvoltage possible at the worksite

Minimum Approach Distances Based on Known Maximum Anticipated Per-Unit Transient

Over-voltages

Reduction of the minimum approach distance for AC system: When the transient overvoltage values are known and supplied by the Company, OSHA 1910.269 allows the minimum approach distances from energized parts to be reduced. In order to determine what this maximum overvoltage is, the Company will perform an engineering analysis of the system. As a result of this engineering study, the Company will provide new live work procedures, reflecting the new minimum approach distances, the conditions and limitations of application of the new minimum approach distances, and the specific practices to be used when these procedures are implemented.

METHODS OF CONTROLLING TRANSIENT OVERVOLTAGE STRESS

There are several means of controlling over-voltages on transmission systems. First, the operation of circuit breakers or other switching devices may be modified to reduce switching transient over-voltages. Second, the overvoltage itself may be forcibly held to an acceptable level by means of installation of surge arresters at the specific location to be protected. Third, the transmission system may be changed to minimize the effect of switching operations.

Operation of circuit breakers: The maximum transient overvoltage that can reach the work site is often due to switching on the line on which work is being performed.

- If the automatic reclosing is removed during energized lie work, the maximum switching surge overvoltage is then limited to the larger of the opening surge or the greatest possible fault-generated surge, provided that the devices (for example, insertion resistors) are operable and will function to limit the transient overvoltage. It is essential that the operating ability of such devices be assured when they are employed to limit the overvoltage level
- If it is prudent not to remove the reclosing feature (because of system operating conditions), other methods of controlling the switching surge level may be necessary
- The detailed designs of a circuit interrupter, such as the design of the contacts, of resistor insertion, and of breaker timing control, are beyond the scope of this appendix. These features are routinely provided as part of the design for the system. Only features that can limit the maximum switching transient overvoltage on a system are discussed in this appendix

- Transient surges on an adjacent line, particularly for double circuit construction, may cause a significant overvoltage on the line on which work is being performed. The coupling to adjacent lines must be accounted for when minimum approach distances are calculated based on the maximum transient overvoltage

Surge arresters: The use of modern surge arresters has permitted a reduction in the basic impulse-insulation levels of much transmission system equipment. The primary function of early arresters was to protect the system insulation from the effects of lightning.

- Modern arresters not only dissipate lightning-caused transients, but may also control many other system transients, but may also control many other system transients that may be caused by switching or faults
- It is possible to use properly designed arresters to control transient overvoltages along a transmission line and thereby reduce the requisite length of the insulator string. On the other hand, if the installation of arresters has not been used to reduce the length of the insulator string, it may be used to reduce the minimum approach distance instead
- Surge arrestor application is beyond the scope of this appendix. However, if the arrestor is insulated near the work site, the application would be similar to protective gaps

Switching Restrictions: Another form of overvoltage control is the establishment of switching restrictions, under which breakers must not be operated until certain system conditions are satisfied. Restriction of switching is achieved by the use of a tagging system, similar to that used for a “permit,” except that the common term used for this activity is a “hold- off” or “restriction.” These terms are used to indicate that operation is not prevented, but only modified during the live-work activity.

Location of Protective Gaps

- Installation of the protective gap on the structure adjacent to the work site is an acceptable practice, as this does not significantly reduce the protection afforded by the gap
- Gaps installed at terminal stations of lines or circuits provide a given level of protection
- The level however, may not extend throughout the length of the line to the worksite. The use of gaps at terminal stations must be studied in depth. The use of substation terminal gaps raises the possibility that separate surges could enter the line at opposite ends, each with low enough magnitude to pass the terminal gaps without flashover. When voltage surges are initiated simultaneously at each end of a line and travel toward each other, the total voltage on the line at the point where they meet is the arithmetic sum of the two surges. A gap that is installed within 0.5 mile of the work site will protect against such intersecting waves. Engineering studies of a particular line or system may indicate that adequate protection can be provided by even more distant gaps
- If protective gaps are used at the work site, the work site impulse insulation strength is established by the gap setting. Lightning strikes as much as 6 miles away from the worksite may cause a voltage surge greater than the insulation withstand voltage, and a gap flashover may occur. The flashover will not occur between the employee and the line, but across the protective gap instead

There are two reasons to disable the automatic-reclosing feature of circuit-interrupting devices while employees are performing live-line maintenance:

- To prevent the reenergizing of a circuit faulted by actions of a worker, which could possibly create a hazard or compound injuries or damage produced by the original fault
- To prevent any transient overvoltage caused by the switching surge that would occur if the circuit were reenergized. However due to system stability considerations, it may not always be feasible to disable the automatic-reclosing feature

Construction of Electric Transmission and Distribution Lines and Equipment

The occupational safety and health standards contained in this Subpart V must apply to the construction of electric transmission and distribution lines and equipment.

- As used in this Subpart V the term "construction" includes the erection of new electric transmission and distribution lines and equipment, and the alteration, conversion, and improvement of existing electric transmission and distribution lines and equipment
- Existing electric transmission and distribution lines and electrical equipment need not be modified to conform to the requirements of applicable standards in this Subpart V, until such work is to be performed on such lines or equipment
- The standards defined in Subpart V provide minimum requirements for safety and health. Companies may require adherence to additional standards that are not in conflict with the standards contained in this Subpart V

Initial Inspections, Tests, or Determinations

- Existing conditions must be determined before starting work, by an inspection or a test.
- Such conditions must include, but not be limited to, energized lines and equipment, conditions of poles, and the location of circuits and equipment, including power and communication lines, CATV and fire alarm circuits
- Electric equipment and lines must be considered energized until determined to be de-energized by tests or other appropriate methods or means
- Operating voltage of equipment and lines must be determined before working on or near energized parts

Clearances

No employee will be permitted to approach or take any conductive object without an approved insulating handle closer to exposed energized parts than permitted by Subpart V unless:

- The employee is insulated or guarded from the energized part (gloves or gloves with sleeves rated for the voltage involved must be considered insulation of the employee from the energized part)
- The energized part is insulated or guarded from him and any other conductive object at a different potential
- The employee is isolated, insulated, or guarded from any other conductive object(s), as during live-line bare-hand work

The minimum working distance and minimum clear hot stick distances stated in OSHA Subpart V must not be violated. The minimum clear hot stick distance is that for the use of live- line tools held by linemen when performing live-line work.

Conductor support tools, such as link sticks, strain carriers and insulator cradles, may be used if the clear insulation is at least as long as the insulator string or the minimum distance specified by OSHA for the operating voltage.

TRAINING

- Risks and potential hazards will be considered when developing the training. Qualified workers will know to recognize and control electrical hazards that are at the worksite
- Employees must be trained in and familiar with safety-related work practices, safety procedures, and other safety requirements that pertain to their respective job assignments
- Employees must be trained in and familiar with any other safety practices, including applicable emergency procedures (such as pole top and manhole rescue), that are not specifically addressed but that are related to their work and are necessary for their safety
- Qualified employees must be trained and competent in the skills and techniques necessary to:
  - Distinguish exposed live parts from other parts of electric equipment
  - Determine the nominal voltage of exposed live parts, the minimum approach distances corresponding to the voltages to which a qualified employee will be exposed
  - Determine the proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electric equipment

Training Is Required to Be in a Classroom or on-the-Job.

- Training must establish employee proficiency in the work practices and is required to introduce the procedures necessary for compliance
- Certification is required to be made when the employee demonstrates proficiency in the work practices involved
- Certification must be maintained for the duration of the employee's employment
- Employment records that indicate that an employee has received the required training are an acceptable means of meeting this requirement

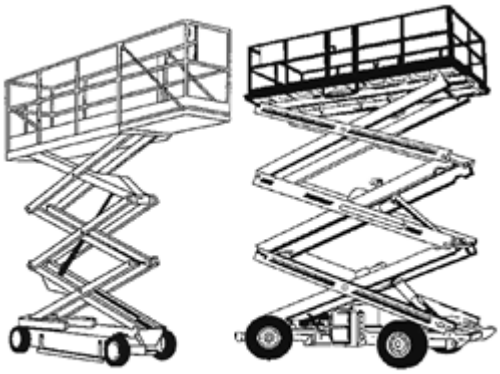


FIGURE 1: Scissor-type Powered

When the Company has reason to believe that any affected employee, who has already been trained, does not have the understanding and skill required, the Company must retrain each such employee.

Circumstances where retraining is required include, but are not limited to, situations where:

- Changes in the workplace render previous training obsolete
- Changes in the types of PPE to be used render previous training obsolete
- Inadequacies in an affected employee's knowledge or use of assigned PPE indicate that the employee has not retained the requisite understanding or skill

The Company will verify that each affected employee has received and understood the required training through a written certification that contains the name of each employee trained, the date(s) of training, and that identifies the subject of the certification.

SCOPE

This chapter covers the safe use of elevating work platforms (EWPs), also known as either aerial work platforms (AWPs) or mobile elevating work platforms (MEWPs). This category of equipment includes articulating aerial devices (cherry pickers) and scissor lifts. These devices can be vehicle mounted, self-propelled or unpowered, and are intended to provide workers access to work areas above ground.

The designs and styles of the devices vary greatly, ant the manufacturer's information should always be referenced before using a particular model.

POLICY

This Company has adopted this program for the safety of employees when working on or around "Vehicle Mounted Elevating and Rotating Work Platforms" from OSHA regulations.

The safety coordinator is designated by this Company as the competent person in authority over all aerial device work procedures. The Safety Coordinator, or designee, will ensure that all safety measures and systems are correctly installed, all safety procedures are adhered to, and ensure regular inspections of the operational site and aerial equipment are made. This Company has implemented, and will enforce, the following work practices and procedures to assure that no employee will be exposed to hazards during aerial lifting operations:

RESPONSIBILITIES

Because Elevated Work Platforms (EWPs) are often rented from an equipment supplier, there can be confusion as to the responsibilities of the parties involved. Generally, the responsibilities can be summarized in the following ways:

Equipment Owner or Supplier

The owner or supplier must ensure that the machine:

- Is maintained in good operating condition
- Conforms to appropriate regulations and standards
- Includes the operator's manual and correct load rating charts

The Employer

The Company and/or safety coordinator will:

- Make sure that the operator is fully trained to operate the particular equipment being used
- Verify that the machine has the correct load rating capacity for the job
- Maintain the equipment and all its protective devices
- Maintain a daily inspection log for each platform
- Require all workers to use the necessary PPE
- Keep the manufacturer's operating instructions and safety rules with the equipment

- Confirm and verify that all employees follow all safety procedures to protect all employees involved in aerial lifting operations or who work near aerial lifting operations
- Keep all work platform proper working order according to the manufacturer's instructions
- Remove any unsafe work platform from service until it is repaired
- Ensure all repairs are made by a qualified service person according to the manufacturer's instructions
- Make no modifications or alterations to work platforms without the written permission of the manufacturer or any other equivalent entity
- Ensure each work platform has a mechanical parking brake that will hold the unit on any slope it's capable of climbing
- Use wheel chocks, whenever possible, when installing or using an aerial lift on an incline

Employee Responsibility

An employee must:

- Operate an aerial device only after being trained and authorized by the Company
- Report known defects and hazards concerning an aerial device to the supervisor
- Operate the machine in a safe manner as prescribed by the manufacturer and according to Company safety and health policies
- Inspect the equipment each day or each shift before use
- Perform function tests before use
- Report any defects to the supervisor
- Read, understand, and obey the manufacturer's safety rules, including the operating manual and warning decals

Osha Regulations and Responsibilities

OSHA Regulations include the following requirements:

- EWPs must be engineered and tested to meet the applicable standards for that equipment
- Aerial devices must be checked each day before use by a trained worker
- The owner or supplier must keep a log of all inspections, tests, repairs, modifications, and maintenance
- The log must be kept up to date and include names and signatures of persons who performed inspections and other work
- Workers must be given oral and written instruction before using the platform for the first time. Instruction must include items to be checked daily before use

VEHICLE MOUNTED ELEVATING AND ROTATING WORK PLATFORMS

There are two basic types of elevating work platforms (EWP) – boom and scissor. Both types come in:

1. "On-Slab" models for use on smooth hard surfaces such as concrete or pavement

2. "Rough-Terrain" models for use on firm level surfaces such as graded and compacted soil or gravel

Both types share three major components: base, lifting mechanism, and platform assembly.

Scissor-Type Machines

These are raised and lowered by hydraulic pistons and an expanding scissor mechanism. Platforms are available in various configurations with different capabilities for extension and movement. Some have extendable platforms or platforms that can rotate. Extendable platforms should be retracted before raising or lowering the device. Typical machines are illustrated in Figure 1.

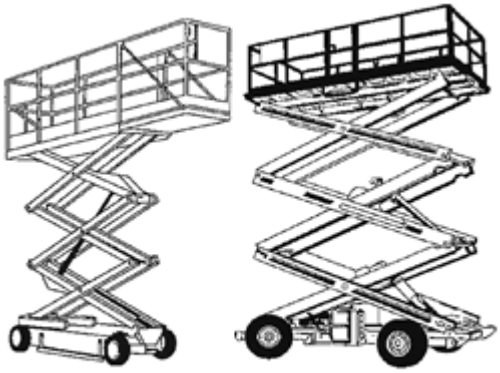


FIGURE 1: Scissor-type Powered

On-Slab Units

- Not designed for uneven or sloping ground
- Normally have solid rubber tires
- Generally powered by rechargeable DC battery
- Some are powered by internal combustion engine, either gasoline or propane
- Most have “pothole protection” – a metal plate lowered close to the ground to afford some protection against inadvertent movement into depressions or debris
- Lifting mechanism is hydraulic
- Normally have wider wheelbases, larger wheels, and pneumatic tires
- Some fitted with outriggers for extra stability
- Usually powered by internal combustion engines: gasoline, diesel, or propane
- DC Battery powered units are also available, but are not common

Rough-Terrain Units

- Similar in design to on-slab machines
- Built to handle rigorous off-slab challenges

Scissor-lifts range in capacity from 500 to several thousand pounds. They’re available with platform heights often reaching 50 feet or more. Scissor-lifts must be set up on stable, level ground, even with outriggers deployed. A slight imbalance or instability is amplified when the machine is raised.

EWP HAZARDS

The following are some of the basic hazards to be aware of during operations:

- Machine Tipping or Overturning – Many factors can cause instability sudden stops, depressions, drop-offs, overreaching and overloading. Overturning and tipping result in many fatalities and injuries
- Overriding Safety Features – Defective or disabled features such as the tilt or level warnings or a deadman switch; can prevent operators from knowing when they are in a dangerous situation. Overriding a deadman switch has resulted in fatalities; so has the malfunction of the tilt warning
- Overhead Powerline Contact – Contacting overhead wires can cause electrocution. This can happen with any type of machine – and with the loads carried by or overhanging the machine
- Falls from Elevated Platforms – Many falls occur because workers get in a hurry and fail to use standard fall protection procedures

- Makeshift Extensions – If an EWP can't reach the desired working height, don't compensate by using scaffold planks, ladders, blocks of wood or other makeshift arrangements, these practices lead to falls and machine instability
- Overloading the Platform – Elevating work platforms overloaded or loaded unevenly can become unstable and fail. Articulating type machines are especially sensitive to overloading. Always stay within the operating range specified by the manufacturer
- Failure to Cordon Off:
  - EWPs can be struck by other construction equipment or oncoming traffic if the work area isn't properly marked or cordoned off. Make sure there's enough clearance for all aerial work platforms
  - Workers have been injured when they inadvertently entered an unmarked area and were struck by falling material, tools, or debris
  - Workers have also been injured in unmarked areas by swinging booms and pinched by scissor mechanisms
- Accidental Contact – Many work platforms have blind spots. Moving the machine or platform can cause contact with workers or with obstacles. Use a designated signaler on the ground to guide the operator when the path of travel is not clear or access is tight
- Improper Blocking During Maintenance – Failing to block, or improperly blocking the machine, boom, or platform can cause serious crushing injuries and property damage
- Improper Access – Never enter or leave the platform by climbing the scissors or the boom. Don't use extension ladders to gain access. Ladders exert lateral loads on the platform and can cause it to overturn. For the safest access, lower the machine completely
- Moving with Platform Raised – Lower the platform before moving the machine unless:
  - The machine is designed to move with platform raised
  - The supporting surface is smooth and level. Slight dips and drops are amplified when the platform is raised and can cause the machine to overturn
- Improper Refueling – Take care when refueling. Gasoline, for instance, should be kept in approved containers and dispensed to prevent spills and sparking
- Pinch Points – Clothing, fingers and hands can get caught in scissor mechanisms. As platforms are raised, machines may sway. Workers can be pinched between guardrails and the structure. Position the platform so that work takes place above guardrail height

FALL PROTECTION REQUIREMENTS

The fall protection required for persons who work on aerial lifts depends on the type of aerial lift used. The table below shows acceptable fall protection.

Type of Lift	Fall Protection Required
Vehicle-Mounted Elevating and Rotating Work Platforms (ANSI A92.2 devices)	Platforms other than buckets or baskets must include guardrail systems – guardrails, a midrail and toeboards. Each person who works on a boom-supported platform must wear a body harness and lanyard attached to the boom or basket.
Manually Propelled Elevating Aerial Platforms (ANSI A92.3 devices)	The platform must have a guardrail at least 42 inches ±3 inches above the floor, a midrail and toeboards at least 4 inches high.
Boom-Supported Elevating Work Platforms (ANSI A92.5 devices)	The platform must have a guardrail at least 42 inches ±3 inches above the floor, a midrail and toeboards at least 4 inches high. Each worker on the platform must wear a body harness and lanyard attached to the boom or platform.
Self-Propelled Elevating Work Platforms (ANSI A92.6 devices)	The platform must have a guardrail 42 inches ±3 inches above the floor, a midrail and toeboards at least 4 inches high.

- Employees must maintain firm footing on the platform while working on the platform. The use of railings, planks, ladders or any other devices on the platform for achieving additional height is prohibited
- The Company will provide employees with a safety harness that has an approved lanyard that's affixed to attachment points provided and approved by the manufacturer. A fall arrest system will only be used when the aerial lift is designed to withstand the vertical and lateral loads caused by an arrested fall
- A body belt may be used with a restraint device with the lanyard and the anchor arranged so that the employee is not exposed to any fall distance. A restraint device is required where the aerial lift cannot withstand the vertical and lateral loads imposed by an arrested fall
- Belting off to an adjacent pole, structure, or equipment while working from an aerial work platform is prohibited
- The Company will not allow employees to exit an elevated aerial work platform, except where elevated work areas are inaccessible or hazardous to reach. When employees exit to unguarded work areas, adequate fall protection will be provided and used

Fall Protection for Aerial Devices

- Employees must always stand firmly on the floor of the basket, and must not sit or climb on the edge of the basket or use planks, ladders, or other devices for a work position
- Boom and basket load limits specified by the manufacturer must not be exceeded
- A safety belt or harness must be used with a lanyard attached to the boom or basket when working from an aerial lift. The employer must provide the safety belt, harness and lanyard. An in-plant, industrial-type aerial device used on a level surface and equipped with a platform with approved railings is exempt from this rule

- Body belts are not acceptable as part of a personal fall arrest system. The use of a body belt in a tethering system or in a restraint system is acceptable
- A boom platform must have a rail or other structure around its upper periphery that's at least 38 inches above the floor of the platform and with a toeboard at least 4 inches high. A basket of a cherry picker is considered to meet this requirement. A platform may have the guardrail removed from the working side if a safety belt and lanyard is worn by the employee on the platform

STABILITY AND TIPPING

In general, elevating work platforms are well manufactured and are safe to use within their specific limitations. However, as with any equipment or tool, there are rules to follow. One of the most dangerous hazards in operating elevating work platforms is tipping over. This can be caused by one or more of the following factors:

- Sudden movement of the unit or parts of the unit when elevated
- Making sudden stops while in motion with platform elevated
- Uneven or overloading of the platform
- Traveling or operating on a slope or uneven terrain
- Changing the weight distribution of the machine by replacing parts with others of a different weight or adding attachments not approved by the manufacturer
- Holes or drop-offs in the floor surface causing one wheel to drop suddenly
- Operating the equipment in windy conditions

FACTORS AFFECTING STABILITY

Dynamic Forces

Dynamic forces are forces generated by movement or change of movement. For example, applying the brakes suddenly or traveling too fast around corners can cause instability – as in a car or van. Sudden stops while raising or lowering the platform can also cause instability.

Traveling

Traveling the platform over rough or uneven ground can also cause instability. Figure 10 shows how a tire dropping 4 inches can cause the boom to sway 2 feet. It is important to lower the platform fully or to retract telescoping sections while traveling, particularly on uneven surfaces.

Stability on Inclined Surfaces

Unless recommended for such use by the manufacturer, no elevating work platform must be used on an inclined surface. Procedures for maintaining stability must be clearly outlined in the special warnings section of user's manual. The user must not deviate from the manufacturer's instructions.

EQUIPMENT INFORMATION

EWPs are designed for different uses. It is essential to select the appropriate equipment for the job.

Typical Mistakes

- Using an on-slab machine on rough terrain
- Using a unit undersized with respect to height, reach, and lifting capacity
- Lifting large materials that overhang the platform
- Using a scissor lift where the reach of a boom-type machine is needed
- Extending the platform with planks, ladders, or other devices because the machine cannot reach the required height

Factors to Consider

- Capacity – Does the machine have the lifting capacity, the reach and the height to complete the task?
- Surface Conditions – Are the surface conditions hard or soft, sloped or level? Will the ground have an effect on the type of machine selected?
- Platform Size and Configuration – Do you need a regular or extendable platform? Is rotation required? Are there space restrictions to consider?
- Mobility – Is a boom type better suited than a scissor lift for the job?
- Material to be Lifted – Will the machine be able to lift the size and weight of material required for the job?
- Access – Will the machine be able to travel around the workplace safely? Are there obstructions or depressions that will restrict the use of certain machines?
- Operator Skill or Training – Are the people on site competent to operate the machine? If a propane-powered engine is used, has the operator received propane training?
- Work Environment – If the work is to be done indoors, or in a poorly ventilated area, will an electrically powered machine be required?

Construction

- Aerial work platforms must be designed, constructed and tested to comply with the requirements of ANSI standards A92.2, A92.3, A92.5, and A92.6
- Aerial work platforms must not be field-modified for uses other than those intended by the manufacturer, unless the modification has been certified in writing by the manufacturer or by any other equivalent entity, to comply with the applicable ANSI standard, and to be at least as safe as the equipment was before modification
- Directional controls must be in compliance with all of the following provisions:
  - Be of the type that will automatically return to the off or neutral position when released
  - Be protected against inadvertent operation
  - Be clearly marked as to their intended function
- The platform must have a working overriding control that’s continuously activated for platform directional controls, and which automatically returns to the off position when released
- Aerial work platforms must be equipped with emergency controls at ground level
- Emergency ground level controls must be clearly marked as to their intended function and be capable of overriding the platform controls

- All of the following information must be clearly and permanently marked on each work platform
  - Special workings, cautions, or restrictions necessary for operation
  - Rated workload
  - A clear statement of whether or not the aerial work platform is electrically insulated
- Rotating shafts, gears and other moving parts that are exposed to contact must be guarded
- Attachment points must be provided for fall protection devices for personnel who occupy the platform on aerial work platforms

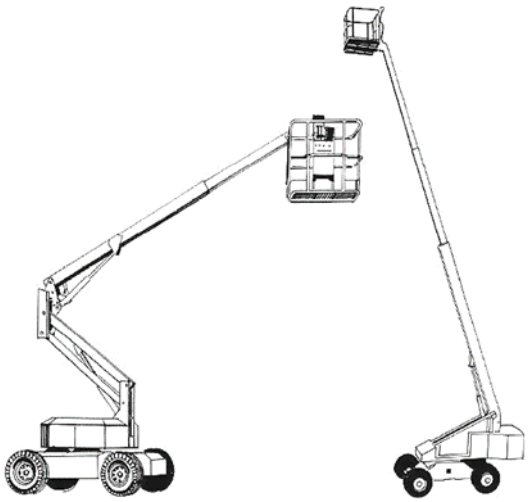
Elevating Work Platform Equipment

- The platform deck must be equipped with a guardrail or other structure around its upper periphery that must be 42 inches high, plus or minus 3 inches, with a midrail. (Chains or the equivalent may be substituted where they give equivalent protection.) Where the guardrail is less than 39 inches high, an approved personal fall protection system must be used
- The configuration of an elevating work platform may include a ladder for employees to use in reaching the platform deck. Any ladder device used in this way must have rungs located on uniform centers not to exceed 12 inches
- Any elevating work platform equipped with a powered elevating assembly and having a platform height exceeding 60 inches must be supplied with safe emergency lowering means compatible with the specific elevating assembly employed
- Elevating Work Platforms must include:
  - Toeboards at sides and ends, which must be at least 4 inches high
  - Exception: Toeboards may be omitted at the access openings
  - A hinged trap access door, if applicable
  - A platform with a minimum width of 16 inches

Guarding of Moving Parts

All rotating shafts, gearing and other moving parts must be guarded.

Self-Propelled Boom-Supported Platforms



- Normally fitted with rough-terrain undercarriages
- Some smaller on-slab units
- Platforms have lifting capacity of about 500 pounds or two workers
- Lack capacity of scissor-type machines; not intended for lifting materials
- Usually powered by an internal combustion engine: gasoline, diesel, or propane

Booms can be:

- Telescopic, articulating, or combination of both
- Raised and extended by hydraulic cylinders
- Can reach up to 150 feet

Platforms can extend well beyond the wheelbase

Although the controls of boom machines are fixed in position, operators can become disoriented by the machines rotation, and must remain aware of the direction of its movement. Many machines have color-coded directional arrows to help the operator move the machine in the right direction.

As with mobile cranes, stability decreases with length of boom and boom angle as the center of gravity moves in relation to the platform position. The machine will overturn if the center of gravity moves outside the machine's base.

Machines come with load charts that show safe operating configurations. Machines with booms long enough to cause overturning at low boom angles are required to have radius- limiting interlocks to prevent operation in unstable configurations.

Users must be familiar with the operating range of the individual make and model of the equipment they are using. This knowledge is essential in order to position the machine correctly and reach the work location safely.

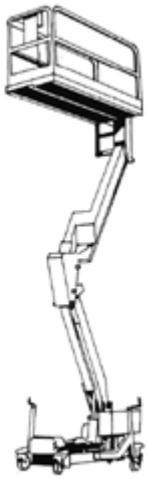
Non-Self-Propelled or Push-Arounds

As the name indicates, these units are not self-propelled and must be transported from one location to another with an independent power source or manually in the case of the smaller devices.

The machines are intended primarily for use on smooth, level, hard surfaces or on- slab conditions. Some trailer-mounted units are available. Many of the smaller models can be folded up to pass through standard doorways, and can be transported by pick-up trucks. As a result, they are suitable for maintenance or renovation work.

Push-Arounds

- Raising mechanism normally powered by gasoline or propane engine or by electric motors, either AC or DC
- Normally raised and lowered by hydraulic cylinders
- Platform capacities vary from 300 to 1000 pounds or more but are generally less than 500 pounds
- Devices with capacity less than 500 pounds are Not Recommended for construction—this type is better suited to maintenance activities
- Platforms usually do not exceed 36 feet in height
- As platform is raised, risk of overturning increases
- Extra care required when operating at maximum height



Factors of Safety in Design of Work Platform Assembly

- Where the platform is supporting its rated workload by a system of wire ropes or lift chains, or both, the safety factor of the wire or chain must not be less than 6 to 1

- All critical components of a hydraulic or pneumatic system used in a work platform must have a bursting strength that exceeds the pressure attained when the system is subjected to the equivalent of four times the rated workload. Critical components are those in which a failure would result in a free fall or free rotation of the boom. All noncritical hydraulic components must have a bursting safety factor of at least 2 to 1
- Automatic safety devices or systems must be provided to prevent free fall of the work platform should a failure of the power supply or elevating system occur

Construction and Modification

All aerial devices and elevating work platforms must be assembled and erected in accordance with these rules and must be maintained in safe operating condition.

- ANSI A92.2 — Vehicle Mounted Elevating and Rotating Aerial Devices
- ANSI A92.3 — Manually Propelled Elevating Work Platforms
- ANSI A92.5 — Boom Supported Elevating Work Platforms
- ANSI A92.6 — Self-Propelled Elevating Work Platforms

All electrical tests must conform to the requirements of the applicable NFPA 70 Standard or equivalent DC voltage test approved by the equipment manufacturer or equivalent entity.

Mobile elevating devices must be mounted on a vehicle capable of handling the imposed load. The vehicle must be a stable support for the aerial device.

The lifting and outrigger system of an aerial device must have a means to ensure that the system will not permit the work platform to drop in a free fall in event of a power or hydraulic line failure.

In addition to the welding requirements prescribed in ANSI A92.2, an aerial device must conform to the AWS D2.0, Specifications for Welding Highway and Railway Bridges standard.

Controls

- Any powered elevating work platform must have both upper and lower control devices
- An emergency stopping device must be provided at the upper controls of elevating work platforms
- Upper controls must be located within reach of the operator
- Lower controls must be capable of overriding the upper controls. Except in case of an emergency, the lower controls must not be operated unless approved by the employee in the basket or on the work platform
- Controls must be designed, guarded and oriented so that the operator doesn’t inadvertently move the machine in the wrong direction. Many machines have color-coded directional arrows on the chassis to aid the operator in moving the machine

Stability Requirements for New or Modified Aerial Devices

Each new or modified aerial device must be inspected and tested before initial use to assure compliance with all of the following requirements.

- Each aerial device mounted on a vehicle that meets the manufacturer's minimum vehicle specifications must be capable of sustaining a static load 1 ½ times its rated load capacity in every position where the load can be placed when the vehicle is on a firm and level surface. If having the outriggers extend to a firm footing is part of the definition of the configuration, they must be extended to provide leveling for determining whether the mobile unit meets the stability requirements
- Each aerial device mounted on a vehicle that meets the manufacturer's minimum vehicle specifications must be capable of sustaining a static load 1 1/3 times its rated load capacity in every position in where the load can be placed when the vehicle is on a slope of 5 degrees downward in the direction most likely to cause overturning
- If having the outriggers extended to a firm footing is part of the definition of the configuration, they must be extended to provide leveling for determining whether the mobile unit meets the stability requirements. If other facilities, such as a means of turntable leveling, are provided to minimize the effect of the sloping surface, then those facilities must be used to determine whether the mobile unit meets the stability requirements. Vertical towers designed specifically for operation only on a level surface must be excluded from this requirement
- None of the stability tests described must produce instability of the mobile unit, or cause permanent deformation of any component. The lifting of a tire or outrigger on the opposite side of the load does not necessarily indicate a condition of instability

Verification by the manufacturer or an equivalent entity that the stability of an aerial device meets the requirements may be used to demonstrate compliance

MANUALS, SIGNS, AND DECALS

Signs Clearly Visible to the Operator at the Controls Must Indicate:

- The equipment's rated working load
- All limiting operating conditions, including the use of outriggers, stabilizers and extendable axles
- The specific firm, level surface conditions required for use in elevated position
- All warnings that are specified by the manufacturer
- Other than for a boom-type elevating work platform, the direction of machine movement for each operating control
- The name/number of the ANSI standard that the platform was designed to meet
- The name and address of the owner

Ansi Standards Required Information

- Caution or restrictions of operation or both
- Operating instructions
- A permanently affixed plate containing the designed rating capacity

- The make, model, serial number and manufacturer's name and address
- The maximum platform height
- The maximum travel height, if not equal to the maximum platform height
- Maximum recommended operating pressure of hydraulic or pneumatic system(s) or both
- The nominal voltage rating of the batteries, if battery-powered
- A warning to study the operating manual before using the equipment
- A statement identifying whether or not the platform is insulated
- A notice outlining the required inspections
- Diagrams/description of various platform configurations and its capacity in each configuration
- Warnings against replacing, without the manufacturer's consent, components critical to the machine's stability

Each unit must have a manual containing instructions for maintenance and operations. If a unit can be operated in different configurations, then these must be clearly described, including the rated capacity in each configuration.

Many of these signs are vital to the operation of the machine and the protection of workers. All signs and decals must be kept clear of dust and grease so they can be easily read. Torn or damaged signs must be replaced.

PROCEDURES

This section provides for the safe operation and maintenance by the employer and the safe use by the employee of vehicle mounted elevating and rotating work platforms in, around and about a place of employment. Firefighting equipment and powered industrial trucks are not included in these rules.

Elevating Work Platforms

These rules apply to equipment that has a primary function of elevating personnel, together with their tools and necessary materials, on a platform that is mechanically positioned. The following units are covered:

- ANSI Standard A92.2, "Vehicle-Mounted Elevating Work Platforms," which applies to vehicle-mounted devices installed on commercial chassis and covers the following type of units:
  - Extensible boom aerial devices
  - Aerial ladders
  - Articulating boom aerial devices
  - Vertical towers
  - A combination of any of the equipment specified
- ANSI Standard A92.3, "Manually Propelled Elevating Work Platforms," which is adopted by applies to work platforms that are manually propelled, vertically adjustable by manual or powered means, and which may be towed or manually moved horizontally on wheels or casters that are an integral part of the work platform base
- ANSI Standard A92.5, "Boom-Supported Elevating Work Platforms," which applies to all integral frame, boom-supported elevating work platforms which telescope, articulate, rotate or extend beyond the base dimensions

- ANSI Standard A92.6, "Self-Propelled Elevating Work Platforms," which applies to self-propelled vertically adjustable integral chassis work platforms. Such work platforms are power operated with primary controls for all movement operated from the platform,

Equipment Not Covered

- Equipment that has a primary function other than elevating personnel, such as fork trucks or cranes that are adapted to elevating personnel, are not covered by these rules
- Also excluded from coverage of these rules is firefighting equipment that's covered by the provisions of the publication entitled "American National Practices for the Maintenance, Care, Testing and Use of Fire Department Aerial Ladders and Elevating Platforms"

SAFE PRACTICES

Operators must be familiar with the requirements for the specific machine they will use:

- The manufacturer's operating manual
- The manufacturer's warning and caution signs on the machine
- The location of all emergency controls and emergency procedures
- The daily maintenance checks to perform

General Safety Guidelines

- Always check for overhead power lines before moving the machine or operating the platform. The limits of approach from overhead power lines must be observed. If work must be done within these limits, make arrangements with the owner of the utility to have the power line de-energized. Allow for movement or sway of the lines as well as the platform. Be aware of overhanging tools or equipment
- Wear a full body harness and tie off to a designated tie-off point while the machine is moving
- Never leave the machine unattended without locking it or otherwise preventing unauthorized use
- Don't load the platform above its Rated Working Load (RWL). Wherever possible, keep the load below 2⁄3 of the RWL
- Make sure that all controls are clearly labeled with action and direction
- Keep guardrails in good condition and ensure that gate is securely closed before moving the platform. Don't remove guardrails while the platform is raised
- Shut off power and insert the required blocking before maintenance or servicing
- Deploy stabilizers or outriggers according to the manufacturer's instructions
- Position the boom in the direction of travel where possible
- Keep ground workers away from the machine and out from under platform
- Never access the platform by walking on the boom
- Don't try to push or move the machine by telescoping the boom
- Don't use the machine as a ground for welding
- Don't use a boom-supported platform as a crane
- Don't operate the EWP in windy conditions. For safe wind speeds, refer to the operator's manual

- Don’t place the boom or platform against any structure to steady either the platform or the structure
- Secure loads and tools on the platform so that machine movement will not dislodge them
- Make sure that extension cords are long enough for the full platform height and won’t be pinched or severed by the scissor mechanism
- Use three-point contact and proper climbing techniques when mounting or dismounting the machine
- Stunt driving and horseplay is prohibited
- Employees must keep a firm footing while working on the platform unless they are secured by safety harness and lanyard devices fixed to manufacturer-approved anchor points. Don’t railings or planks, ladders or any other device on the work platform to achieve additional height
- The operator will immediately report defects or malfunctions that become evident during operation and must stop use of the work platform until correction has been made
- Altering or disabling of safety devices or interlocks is prohibited

Important Note: Never operate equipment that you haven’t been trained on, or that you’re not comfortable operating. Your safety and that of others on site depends on competent, knowledgeable operation of the equipment.

Vehicles

Before a vehicle supporting an aerial ladder, is moved for highway travel:

- The ladders must be secured in the lower position, and the manually operated device at the base of the ladder, or other effective means, must be used to prevent elevation or rotation of the ladder
- The boom must be inspected to make sure that it’s properly cradled and the outriggers are in the stowed position

A vehicle supporting an aerial device must not be moved at the job site when the boom is elevated with employees in working position, unless the equipment is specifically designed for this type of operation and.

Pre-Operation Procedures

Before operating elevating work platforms and aerial devices, check the work area for:

- Drop-offs or holes in the ground
- Slopes
- Bumps or floor obstructions
- Debris
- Overhead obstructions
- Overhead wires, power lines, or other electrical conductors
- Hazardous atmospheres
- Adequate operating surface – ground or floor

- Sufficient ground or floor support to withstand all forces imposed by the platform in every operating configuration
- Wind and weather conditions

Before each elevation of the work platform, the operator must:

- Make sure the brakes are set and outriggers, when used, are positioned on pads or a solid surface
- Install wheel chocks before using an aerial device on an incline
- Check for overhead obstructions and high-voltage conductors. A minimum distance of ten feet from energized high-voltage conductors must be maintained at all times between the conductors and the operator and platform equipment
- Make sure that the load and its distribution on the platform meet the manufacturer's rated capacity. The manufacturer's recommended load limits must never be exceeded
- Operate all platform and ground controls to verify that they perform their intended function
- Make sure that guardrails are properly installed and gates are closed

Before and during driving while the platform is elevated, the operator will:

- Be required to look in the direction of, and keep a clear view of, the path of travel and assure that the path of travel is firm and level
- Keep a safe distance from obstacles, debris, drop-offs, holes, depressions, ramps or other hazards to safe elevated travel
- Maintain a safe distance from overhead obstacles
- The operator must limit travel speed according to conditions. Conditions to be observed are ground surface, congestion, slope, location of personnel and other factors that may create a hazard of collision or injury to personnel

Before use on each work shift, an aerial work platform must be given a visual inspection by the operator for defects that would affect its safe operation and use. The visual inspection will be done for all of the following:

- Cracked welds
- Bent or broken structural members
- Hydraulic or fuel leaks
- Damaged controls and cables
- Loose wires
- Tire condition
- Fuel and hydraulic fluid levels
- Slippery conditions on the platform

All unsafe items found because of the inspection of the aerial work platform or work area must be corrected before further use of the aerial work platform.

When the specified clearances can’t be maintained, the owner of electrical lines, the authorized representative or the utility must be notified and provided with all pertinent information before the commencement of operations near electrical lines.

Any overhead wire must be considered an energized line until the owner of the line or the authorized representative states that it is de-energized/visibly grounded, or the line is insulated for the system voltages and the task will not compromise the insulation of the conductor and/or cause an electrical hazard.

Operating Procedures

- The aerial work platform must be used according to the manufacturer's operating instructions and safety rules
- The manufacturer's rated load capacity for any given angle of elevation must not be exceeded. The Company will ensure that the load and its distribution on the platform comply with the manufacturer's specifications. The aerial work platform's rated load capacity must not be exceeded when loads are transferred to the platform at elevated heights
- Only personnel, their tools and necessary materials must be on or in the platform
- The guardrail system of the platform must not be used to support any of the following:
  - Materials
  - Other work platforms
  - Employees
- Personnel must maintain firm footing on the platform while working on the platform. The use of railings, planks, ladders or any other devices on the platform to achieve additional height is prohibited
- Fuel gas cylinders must not be carried on platforms that would allow the accumulation of gases
- A safety harness with a lanyard, that meets the construction Fall Protection safety standard and is affixed to attachment points provided and approved by the manufacturer will be provided by the Company and used by any employee using an aerial work platform. A fall arrest system must only be used if the aerial lift is designed to withstand the vertical and lateral loads caused by an arrested fall
- A body belt with a lanyard may be used as a restraint device when anchored so that the employee is not exposed to any fall distance. A restraint device is required where the aerial lift cannot withstand the vertical and lateral loads imposed by an arrested fall
- The Company does not allow employees to exit an elevated aerial work platform, except where elevated work areas are inaccessible or hazardous to reach. Employees may exit the platform with the knowledge and consent of the employer. When employees exit to unguarded work areas, fall protection must be provided and used as required
- Only aerial work platforms that are equipped with a manufacturer's installed platform controls for horizontal movement must be moved while in the elevated position
- Before and during driving while elevated, an operator of a platform must do both of the following:
  - Look in the direction of, and keep a clear view of, the path of travel and make sure that the path is firm and level

- Maintain a safe distance from all of the following:
  - Obstacles
  - Drop-offs
  - Depressions
  - Overhead obstructions
  - Other hazards to safe elevated travel
  - Debris
  - Holes
  - Ramps
  - Overhead electrical lines
- Outriggers or stabilizers, when provided, will be used according to the manufacturer's instruction. Outriggers and stabilizers must be placed on pads or a solid surface
- Aerial work platforms must be elevated only when on a firm and level surface or within the slope limits allowed by the manufacturer's instructions
- Platform gates must be closed while the platform is in an elevated position
- Stunt driving and horseplay are prohibited
- Altering, modifying, or disabling safety devices or interlocks is prohibited
- Ropes, cords, and hoses must be prevented from becoming entangled in the aerial work platform
- A platform operator must ensure that the area surrounding the EWP is clear of personnel and equipment before lowering the platform
- Before and during travel, except as provided for horizontal movement, an operator must do all of the following:
  - Inspect to see that booms, platforms, aerial ladders, or towers are properly cradled or secured
  - Ensure that outriggers are in a stored position
  - Limit travel speed according to the following factors:
    - ☐ Condition of the surface
    - ☐ Congestion
    - ☐ Slope
    - ☐ Location of personnel
    - ☐ Other hazards
- Do not positioned the work platform against another object to steady the platform
- The aerial work platform must not be operated from a position on a truck, trailer, railway car, floating vessel, scaffold or similar equipment
- Do not use the boom and platform of the aerial work platform to move or jack the wheels off the ground unless the machine is designed for that purpose by the manufacturer
- If the platform or elevating assembly becomes caught, snagged or otherwise prevented from normal motion by adjacent structures or other obstacles, and control reversal does not free the platform, all employees must be removed from the platform before attempts are made to free it

Operating Instructions (Elevating Work Platforms)

- No employee will ride, or tools, materials, or equipment be allowed on a traveling elevated platform unless the following conditions are met:
  - The travel speed at Maximum Travel Height does not exceed 3 feet per second
  - Self-propelled units must have an electrical or other interlock means to prevent driving them with the platform height greater than the Maximum Travel Height or at speeds greater than permitted at Maximum Travel Height

  - The operating surface of the unit is level with no hazardous irregularities or accumulation of debris that might cause a moving platform to overturn
- Units must be assembled, used and disassembled according to the manufacturer's instructions
- Units must be assembled, and used only by employees who have been trained in their use. Units must be inspected for damaged and defective parts before use
- Units must not be loaded in excess of their working load and must be taken out of service when damaged or weakened from any cause. They must not be used until repairs are completed
- Employees must not sit, stand or climb on the guardrails of an elevating work platform or use planks, ladders, or other devices to gain greater working height or reach
- Employees must not work on units when exposed to high winds, storms or when they are covered with ice or snow (unless provisions have been made to ensure the safety of the employees)
- Employees climbing or descending vertical ladders must have both hands free for climbing
- Where moving vehicles are present, the work area must be marked with warning flags, roped-off or other effective means of traffic control must be provided
- Unstable objects such as barrels, boxes, loose brick, tools, debris, must not be allowed to accumulate on the work level
- Screens must be installed that extend along the entire opening between toeboards and guardrails, when the work being performed creates small debris or involves the use of small tools and materials if persons are will work or pass under the equipment,

Pin-On Platforms

- Pin-on platforms must be securely pinned to the boom or boom extension
- Employees on the elevated pin-on platform must be secured to the boom by a safety belt and lanyard or a body belt and safety strap

Operating Instructions (Aerial Devices)

- Aerial baskets or platforms must not be supported by adjacent structure(s) when workers are on the platform or in the basket while in an elevated position
- Lift controls must be tested before use to determine that they are in safe working condition
- Only authorized persons must operate an aerial device
- Belting off to an adjacent pole, structure, or equipment while working from an aerial device is not be permitted
- Employees must not sit or climb on the edge of the basket or use planks, ladders or other devices to gain greater working height
- Boom, basket and platform load limits specified by the manufacturer must not be exceeded
- When elevating personnel with the vehicle stationary the braking systems must be set
- Provided they can be safely installed, wheel chocks must be installed before using an aerial device on an incline
- When used, outriggers must be positioned on pads or a solid surface. All outriggers must be equipped with hydraulic holding valves or mechanical locks at the outriggers
- Climbers must not be worn while performing work from an aerial device

- When an insulated aerial device is required, the aerial device must not be altered in any manner that might reduce its insulating value
- An aerial device truck must not be moved when the boom is elevated in a working position with employees in the basket or platform except when all of the following are complied with:
  - The equipment is specifically designed for this type of operation
  - All controls and signaling devices are tested and are in good operating condition
  - An effective communication system must be maintained at all times between the basket or platform operator and where applicable, the vehicle operator
  - The route to be traveled is surveyed immediately prior to the work trip, checking for overhead obstructions, traffic, holes in the pavement, ground or shoulder, ditches, slopes, etc., for areas other than paved, a survey should be made on foot
  - The speed of the vehicle does not exceed three (3) miles per hour
  - Only one employee is in the basket
  - Both the driver and/or the elevated employee have been specifically trained for this type of work
- Lower level controls must not be operated unless authorized by the employee in the device, except in case of emergency
- Before moving an aerial device for travel, the boom(s) must be inspected to see that it is properly cradled and outriggers are in stowed position
- An employee, while in an elevated aerial device, must be secured to the boom, basket or tub of an aerial device by a safety belt, body belt or body harness equipped with safety strap or lanyard
  - Safety belts/body belts are prohibited for use in personal fall arrest systems, but may be used as part of a fall restraint or positioning device system
  - Safety belts/body belts used as part of a positioning device system must be rigged to prevent an employee from free falling more than 2 feet
  - A body harness may be used in a personal fall restraint, positioning or fall arrest system. When a body harness is used in a fall arrest system, the lanyard must be rigged with a deceleration device to limit maximum arresting force on an employee to 1,800 pounds and prevent the employee from hitting any levels or objects below the basket or platform, and must limit free fall to a maximum of 6 feet

Use – Near Power Lines

- Any overhead line must be considered energized until the owner, owner representative or utility indicates otherwise and the line has been visibly grounded
- Except as prescribed, or where insulating barriers not a part of, or an attachment to the aerial device, have been erected to prevent physical contact with the lines, an aerial device must maintain the distances from energized distribution and transmission power lines and equipment shown in Table 1
- A qualified lineman or a qualified line clearance tree trimmer, working on or near an exposed power transmission or distribution line from an aerial lift, must maintain the clearance distances shown in Table 2, unless they are insulated or guarded from the energized part by gloves or gloves and sleeves, or insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee

- A qualified telecommunications employee must maintain the clearance distances shown in Table 3 when working from an aerial lift, unless they are insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee

TABLE 1

Minimum Clearance Distances for Equipment		
Voltage	Clearance with Boom Raised	Clearance Boom Lowered and no Load in Transit
To 50kV	10 feet	4 feet
Over 50kV	10 feet + .4 inch per each 1 kV over 50 kV	10 feet
50 to 345kV		10 feet
346 to 750 kV		15 feet

TABLE 2

Minimum Working Distances for Qualified Line Clearance Tree Trimmers and Qualified Linemen	
Voltage Range Phase to Phase (KV)	Minimum Working Distance
2.1 to 15.0	2´0˝
15.1 to 35.0	2´4˝
35.1 to 46.0	2´6˝
46.1 to 72.5	3´0˝
72.6 to 121.0	3´4˝
138.0 to 145.0	3´6˝
161.0 to 169.0	3´8˝
230.0 to 242.0	5´0˝
345.0 to 362.0	7´0˝
550.0 to 552.0	11´0˝
700.0 to 765.0	15´0˝
*NOTE: For 345 — 362 kV., 500 — 552 kV., and 700 — 765 kV., the minimum working distance and the minimum clear hot stick distance may be reduced that such distances are not less than the shortest distance between the energized part and a grounded surface.	

TABLE 3

Minimum Approach Distances for Qualified Telecommunications Employees	
Voltage Range (Nominal Phase to Phase)	Minimum Approach Distances
300 V and less	12″
Over 300 V, not over 750 V	18″
Over 750 V, not over 2 kV	24″
Over 2 kV, not over 15 kV	36″
Over 15 kV, not over 37 kV	42″
Over 37 kV, not over 87.5 kV	48″
Over 87.5 kV, not over 121 kV	54″
Over 121 kV, not over 140 kV	--″

- The clearance requirements of this rule do not apply to the following situations:
  - Where work is performed from an insulated aerial device that is insulated for the work and the work is performed in accordance with the provisions of construction safety standard "Power Transmission and Distribution" and "Telecommunications”
  - Where the owner, authorized representative, or utility representative have ensured that the conductor is insulated for the system voltages and the task will not compromise the insulation of the conductor and/or cause an electrical hazard
  - Where the electric power transmission or distribution lines have been de-energized and visibly grounded at the point of work or where insulating barriers that are not a part of an attachment to the aerial work platform have been erected to prevent physical contact with the line
  - Where work is being performed by journeymen electricians on equipment up to .5kV. Two journeymen electricians will be required for work within the minimum clearance on equipment over .5kV
- The insulated bucket, gloves and sleeves used to comply must be rated at more than the voltage to be worked on, or that with which they might come into contact

INSPECTION, TESTING, AND MAINTENANCE

The Company will comply with all of the following requirements:

- Each aerial work platform must be inspected, maintained, repaired, and kept in proper working condition in accordance with the manufacturer’s operating, maintenance, and repair manuals

- Any aerial work platform found not to be in a safe operating condition must be removed from service until repaired
- All repairs must be made by an authorized person in accordance with the manufacturer's operating, maintenance, and repair manuals
- If the aerial work platform is rated and used as an insulated aerial device, the electrical insulating components must be tested for compliance with the rating of the aerial platform in accordance with ANSI standard A92.2

Inspection and Tests

- An aerial device must be inspected and tested at least annually for permanent deformation and cracks by using 1 ½ times the rated load and for defects by visual inspection during and following the load test
- Written, dated and signed test reports must be made available by the employer for examination by regulatory agencies
- The insulated part of an EWP must not be altered in any way that might reduce its insulating value
- An annual electrical test of insulated aerial devices must be made. An equivalent DC voltage test may be used in place of the prescribed AC voltage
- Field inspection and tests must be performed only by an authorized and trained employee or outside service
- Lift controls must be tested daily before use to determine they are in safe working condition. An aerial device with defective controls must not be used until repaired
- All danger, caution and control markings and operational plates must be legible and not obscured

Equipment Inspection

All components that affect the safe operation of the EWP, and can change from day to day, must be inspected daily.

Users must check the operator's manual for a complete list of pre-operational checks. See the end of this section for Daily Inspection Checklists for Elevating Work Platforms and Aerial Devices.

Minimum Requirements

Before climbing onto a work platform, check:

- Tires for proper pressure and wheels for loose or missing lug nuts
- Steer cylinder, linkage, and tie rods for loose or missing parts, damage, and leaks
- Hydraulic oil for leaks and fluid level. Hydraulic hoses, lift cylinder(s), and connections for leaks or loose connections
- Fuel supply – adequate fuel, filler cap in place, no damage, leaks, or spills
- Battery for fluid level and state of charge
- Proper connection of all quick-disconnect hoses
- Structural components for damage, broken parts, cracks in welds, including scissor arms, outrigger arms, and pads

- Ladder or steps for damage and debris (ladder must be firmly secured to the platform and relatively free of grease, mud, and dirt)
- Beacon and warning lights for missing and defective lenses or caps
- Ground controls (manual and powered) – including emergency stop switch and platform lower/lift switch – for proper function and damaged and missing control sticks/switches
- Decals and warning signs to make sure they are clean, legible, and conspicuous

After mounting the platform, check:

- Platform assembly for missing or loose parts, missing or loose lock pins and bolts
- Platform floor for structural damage, holes, or cracked welds and any dirt, grease, or oil that can create a hazard
- Operator's manual to make sure it is in place
- Extendable platform deck for ease of extension/retraction and proper function of locking position of platform
- Guardrails to make sure they are in place and secure
- Access gate for ease of movement, missing parts, latch, and locking capabilities
- All fall protection anchorage points
- All control mechanisms for broken or missing parts
- All emergency controls for proper function – stopping, descending, master OFF switch
- All safety devices such as tilt and motion alarms for malfunction
- Swivels for freedom of rotation
- Scissors for smooth movement up and down
- Brakes for stopping capabilities
- Horn for proper function

Maintenance and Repairs

- The materials used to repair aerial devices and elevating work platforms must meet the standard specifications of strength, dimensions, and weights and must be able to support the rated workload
- Electrical wiring and equipment must meet NFPA 70 provisions
- All exposed surfaces must be free from sharp edges, burrs, or other hazardous projections

Electrical Ratings

- The EWP rating plate must indicate whether the aerial device is insulated or non-insulated and, if insulated, the rated line voltage for which the aerial device was designed and tested
- The insulating portion of an aerial device must not be altered in any manner that might reduce its insulating value

TRAINING AND PERMITS

Training Requirements

The Company will provide employees who will operate an aerial work platform with instruction and training regarding the equipment before a required permit is issued or reissued. Such instruction and training must include the following:

- Instruction by a qualified person in the intended purpose and function of each of the controls
- Proper use and care of all necessary PPE
- Training by a qualified person, or reading and understanding the manufacturer's or owner's operating instructions and safety rules
- Understanding by reading, or by having a qualified person explain, all decals, warnings, and instructions displayed on the aerial work platform
- Reading and understanding all of the following provisions of this "Training and Permits" standard, or being trained by a qualified person on their content

Employees who will use fall protection equipment must receive additional training specific to the type of equipment used.

Permits

The Company will provide operators of aerial work platforms with an operators permit. The operator must carry the permit or have it available at the jobsite/workplace, and must be displayed upon request by a regulatory agency. The permit must indicate the type of work platforms an operator has been trained on, and is qualified to operate. A permit to operate an aerial work platform is valid only when performing work for the Company who issued the permit.

The Company will certify that their employees are competent to operate applicable aerial work platforms at least once every three years. Permits will be issued at the time of certification or recertification.

A permit will contain the following information:

- The Company's name
- The operator's name
- The name of the issuing authority
- The types of aerial work platforms the operator is authorized to operate. These include:
  - Vehicle-mounted elevating work platform such as: extensible boom aerial devices, aerial ladders, articulating boom aerial devices, and vertical towers
  - Manually propelled elevating work platforms
  - Boom-supported elevating work platforms
  - Self-propelled elevating work platforms
- The date issued
- The expiration date

Training Records

The Company will maintain employee-training records for three years. These records will include the name of the employee, the type of training received, the date of the training, and the name of the instructor.

Retraining

Employees operating aerial devices and elevated work platforms should receive training annually, and any time there is a change in operating procedures or equipment. In addition, employees must be retrained anytime there is an accident or near miss, or they demonstrate a lack of understanding of safe work procedures, equipment operation or the use of PPE.

ATTACHMENTS

The following pages contain a sample inspection checklist that can be reproduced for Company use.

SCISSOR LIFT OPERATOR DAILY INSPECTION/CHECKLIST (PAGE 1 OF 2)

Company Name:				Site Location:		
Date				Time		
Person(s) Making Inspection:				Job Foreman/Supervisor		
Equipment Type:				Equipment #s:		Manufacturer:
OK	Repair	N/A	**Mechanical**			
☐	☐	☐	Structural damage or cracked welds – Visual walk-around inspection.			
☐	☐	☐	Parking brake – Check operation.			
☐	☐	☐	Tires/wheels and fasteners – Visually inspect, check operation and tightness.			
☐	☐	☐	Guides/rollers and slider pads – Visually inspect, check operation, and ensure there is no metal to metal contact with slider, slider side, or running surface. Check for free movement of surface. Also check for free movement of the slider pin through the slider.			
☐	☐	☐	Railings and railing lock pins – Visually inspect and check tightness.			
☐	☐	☐	Entry chains or gates – Check operation and tightness.			
☐	☐	☐	Bolts and fasteners – Check tightness.			
☐	☐	☐	Safety Bar – Check operation.			
☐	☐	☐	Wheel Bearings and Kingpins – Visually inspect, check operation and lubricate.			
☐	☐	☐	Pothole Protection – Visually inspect and check operation.			
☐	☐	☐	Steering cylinder and tie rod – Visually inspect, check operation and lubricate.			
OK	Repair	N/A	**Electrical**			
☐	☐	☐	Battery fluid level – Visually inspect.			
☐	☐	☐	Control switches – Visually inspect and check operation.			
☐	☐	☐	Cables and wiring harnesses – Visually inspect.			
☐	☐	☐	Battery Terminals – Visually inspect and check tightness.			
☐	☐	☐	Terminals and Plugs – Check tightness.			
☐	☐	☐	Generator/receptacle – Visually inspect and check operation.			
☐	☐	☐	Limit switches – Check operation.			

SCISSOR LIFT OPERATOR DAILY INSPECTION/CHECKLIST (PAGE 2 OF 2)

OK	Repair	N/A	**Hydraulic**
☐	☐	☐	Hydraulic oil reservoir level – Check oil level.
☐	☐	☐	Hydraulic Hoses/Fittings – Visually inspect and check for leaks.
☐	☐	☐	Lift/lowering time – Check operation and refer to specification tables.
☐	☐	☐	Cylinders – Visually inspect and check operation.
☐	☐	☐	Emergency lowering – Check operation.
☐	☐	☐	Lift capacity – Check relief valve setting and refer to specification tables.
OK	Repair	N/A	**Miscellaneous**
☐	☐	☐	Manual – Visually check that proper manual is in box.
☐	☐	☐	Placards, I.D. plates, warnings and control labels – Replace if missing/illegible.
OK	Repair	N/A	**Prestart Checks**
☐	☐	☐	Ensure that there are no obstacles around the work platform and in the path of travel such as holes, drop offs, ditches, soft fill, or debris.
☐	☐	☐	Check overhead clearances.
☐	☐	☐	Make sure the batteries are fully charged. Disconnect the AC charger cord from the external power source.
☐	☐	☐	Make sure that the Free-Wheeling Valve is fully closed.
☐	☐	☐	Make sure all guardrails and lock-pins are in place and locked in position
☐	☐	☐	Make sure both side battery and hydraulic trays are closed and locked.

NOTE: At any point during this inspection there are any deficiencies, do not operate lift any further. Notify the proper personnel or repair unit as needed. Do not operate equipment without proper authorization and training.

Signature (person(s) performing inspection/evaluation)	Date

GENERAL ELEVATING WORK PLATFORM INSPECTION LIST

Items to check during the daily inspection:

- ☐ Tires for proper pressure and wheels for loose or missing lug nuts.
- ☐ Steer cylinder, linkage, and tie rods for loose or missing parts, damage, and leaks.
- ☐ Hydraulic oil for leaks and fluid level. Hydraulic hoses, lift cylinder(s), and connections for leaks or loose connections.
- ☐ Fuel supply – adequate fuel, filler cap in place, no damage, leaks, or spills.
- ☐ Battery for fluid level and state of charge.
- ☐ Proper connection of all quick-disconnect hoses.
- ☐ Structural components for damage, broken parts, cracks in welds, including scissor arms, outrigger arms, and pads.
- ☐ Ladder or steps for damage and debris (ladder must be firmly secured to the platform and relatively free of grease, mud, and dirt).
- ☐ Beacon and warning lights for missing and defective lenses or caps.
- ☐ Ground controls (manual and powered) – including emergency stop switch and platform lower/lift switch – for proper function and damaged and missing control sticks/switches
- ☐ Decals and warning signs to make sure they are clean, legible and conspicuous.

After mounting the platform, check:

- ☐ Platform assembly for missing or loose parts, missing or loose lock pins and bolts.
- ☐ Platform floor for structural damage, holes, or cracked welds and any dirt, grease, or oil that can create a hazard.
- ☐ Operator's manual to make sure it is in place.
- ☐ Extendable platform deck for ease of extension/retraction and proper function of locking position of platform
- ☐ Guardrails to make sure they are in place and secure.
- ☐ Access gate for ease of movement, missing parts, latch and locking capabilities.
- ☐ All fall protection anchorage points.
- ☐ All control mechanisms for broken or missing parts.
- ☐ All emergency controls for proper function – stopping, descending, master OFF switch.
- ☐ All safety devices such as tilt and motion alarms for malfunction.
- ☐ Swivels for freedom of rotation.
- ☐ Scissors for smooth movement up and down.
- ☐ Brakes for stopping capabilities.
- ☐ Horn for proper function.

SCOPE

This chapter provides information on the safe practices and fall protection requirements of OSHA 1926 Subpart M and 1910 Subpart D. Included is information on fall protection equipment, the types of fall protection systems and limitations regarding alternative fall protection methods.

POLICY

This company has implemented this policy to ensure that proper safe work practices and procedures are followed to protect employees from the fall hazards. A Program Administrator will be designated as the responsible person for managing and supervising the Fall Protection Program.

EMPLOYER RESPONSIBILITIES

This company will:

- Provide adequate and timely resources to support the fall protection program
- Identify fall hazards and implement procedures to eliminate or control them
- Develop and maintain written fall protection procedures wherever an active fall protection system is being used
- Inform authorized employees about a foreseeable fall hazard before exposure
- Provide continuous fall protection or ensure that such protection is available to employees and within regulations
- Provide training to operate any active fall protection systems
- Ensure supervision of employees exposed to fall hazards
- Verify all fall protection procedures are understood and followed

FALL PROTECTION PROGRAM ADMINISTRATOR

The program administrator will:

- Develop and implement the managed fall protection program
- Be knowledgeable of current fall protection regulations, standards, equipment, and systems
- Advise and provide guidance to managers, employees, and other departments on all managed fall protection program matters
- Establish and assign all duties and responsibilities outlined in this policy to trained and qualified individuals
- Provide or verify that the personnel have the necessary resources to accomplish their duties and responsibilities
- Establish and implement a system to identify, eliminate, or control new and existing fall hazards
- Ensure that written procedures for fall protection, rescue, and evacuation are developed for every foreseeable fall hazard to which persons are exposed
- Develop training programs for all Authorized Persons
- Verify that all Authorized Persons are provided with training

- Measure and evaluate the effectiveness of the managed fall protection program by: conducting periodic program evaluations and making improvements
- Participate, either personally or through a designated qualified person, in the investigation of all incidents related to falls from heights, including:
  - Reviewing incident reports
  - Taking corrective action to eliminate causes
  - Making necessary reports to management
  - Maintaining an incident report system

COMPETENT AND QUALIFIED PERSONNEL

Effective fall protection relies on the efforts of all personnel. However, each worksite that demands fall protection measures must have personnel onsite with the knowledge and authority to prevent injury as hazards arise.

Qualified Person Responsibilities

A qualified person has successfully demonstrated his or her ability to solve problems relating to the project by possession of a recognized degree, certificate or professional standing or by extensive knowledge, training and experience.

Company employees who are identified as “a qualified person” are expected to:

- Analyze and design all anchor points for structural engineering strength requirements as set by this standard and also be in compliance with local and state building code requirements
- Analyze and design all horizontal lifeline systems for structural engineering strength requirements and also be in compliance with local and state building code requirements
- Establish the clearance requirements for each fall protection system selected
- Verify the fall protection equipment system is adequate for the specific fall hazards
- Verify that available clearance is adequate before allowing persons to work at heights
- Maintain a safety factor of 2.0 against failure of the structural system for both anchor points and horizontal lifeline systems
- Establish adequate vertical and horizontal clearance requirements for each fall protection system. Analyze swing fall consideration and establish limitation requirements for each fall protection system
- Supervise design, installation, and use of horizontal lifeline systems to ensure that they can maintain a safety factor of at least twice the impact of a worker free-falling six feet
- Supervises design, installation, and use of personal fall-restraint anchorages
- Supervises design, installation, and use of personal fall-arrest anchorages
- Verify that fall protection systems have been installed and inspected in compliance with this standard and all applicable federal, state, and local regulations
- Identify, evaluate, and impose limits on the workplace activities to control fall hazard exposures and swing falls
- Communicate limits to all Authorized Persons who use the fall protection systems
- Prepare, update, and approve written fall protection, rescue, and evacuation procedures

- Specify that written fall protection rescue, and evacuation procedures include:
  - Anchorage locations
  - Connecting means
  - Body supports
  - Other required fall protection equipment
- Review the written procedures as workplace activities change for needed additional practices, procedures, or training
- Verify that Authorized Persons:
  - Are trained and have reviewed the fall protection, rescue, and evacuation procedures reviewed before work begins
  - Provide or ensure that a prompt rescue can be accomplished with the rescue and evacuation procedures
  - Participate in the investigation of all incidents related to falls from heights
  - Immediately remove from service all damaged equipment or components (and equipment or components that have experienced a fall arrest)
  - Inspect for damage and follow the manufacturer's instructions for damaged equipment and equipment that has experienced a free-fall arrest
  - Periodically inspect all fall protection equipment as per the manufacturer's requirements and applicable regulations

Competent Person Responsibilities

A competent person can identify existing hazards as well as potential hazards. Furthermore a competent person has the authority to take prompt corrective actions to eliminate such hazards and ensure employees are out of harm's way until the hazards can be eliminated.

The competent person:

- Serves as the monitor in a safety-monitoring system, is responsible for recognizing hazards that cause falls, and warns workers about hazards
- Determines whether safety nets meet requirements
- Inspects a personal fall-arrest system after it arrests a fall and determines whether the system is damaged
- Evaluates alteration to a personal fall-arrest system and determines if it is safe to use
- Supervises installation of slide-guard systems
- Trains employees how to recognize fall hazards and follow safety procedures

Authorized Person Responsibilities

Company employees who are identified as "an authorized person" are expected to:

- Follow the instructions of the program administrator and the Competent Person regarding the use of fall protection systems
- Understand and adhere to the fall protection procedures
- Notify the Competent Person of unsafe or hazardous conditions or acts that may cause injury before proceeding with workplace activities

- Correctly use, inspect, maintain, store, and care for fall protection equipment and systems
- Inspect any fall protection equipment, prior to use, for defects or damage
- Notify the Competent Person of defects and damage found from inspections
- Use only equipment free of defects or damage

FALL PROTECTION REQUIREMENTS

Fall protection may be required in areas and activities including, but not limited to, the following:

- Ramps, runways, and other walkways
- Excavations
- Hoist areas
- Holes
- Formwork and reinforcing steel
- Leading edge work
- Unprotected sides
- Edges
- Overhand bricklaying and related work
- Roofing work
- Precast concrete erection
- Wall openings
- Residential construction
- Other walking/working surfaces

Employees will be protected from fall hazards and falling objects whenever an affected employee is above the established threshold height (6 feet for construction or 4 feet for general industry) above a lower level. Typical fall protection systems are shown in this table.

FALL PROTECTION SYSTEMS

Type of fall protection system	What it does
Personal fall-arrest system	Controls a fall
Personal fall-restraint system	Prevents a fall
Positioning-device system	Positions and limits fall to 2 feet
Guardrail system	Prevents a fall
Safety-net system	Controls (arrests) a fall
Warning line	Warns of fall hazard

FALL PROTECTION PLAN

Planning Fall Protection

Methods, systems, and procedures to control exposure to fall hazards must be established before work commences. Careful preparation lays the groundwork for an accident-free workplace. A site-specific fall protection plan must reflect all anticipated fall hazards at the worksite. The nature and scope of the planning effort depend on the complexity and size of the project.

Planning must at least identify fall hazards and the systems and procedures to control the hazards. Effective planning reduces exposure risks for workers during a project and for others after the project is finished. For example, anchor points used by construction workers on a project might also be used to protect window cleaners or other maintenance personnel.

Use the plan will:

- Identify all fall hazards that workers are likely to encounter during the project
- Describe how workers will gain access to the worksite (by ladders or stairs, for example)
- Describe how workers will prevent tools and materials from dropping to lower levels
- Establish procedures for inspecting, maintaining, and storing fall protection equipment
- Identify the tasks that expose workers to fall hazards
- Make sure workers use fall protection systems appropriate for their tasks
- Identify anchor point locations
- Describe the methods for setting anchors and securing lifelines
- Identify areas where workers may be exposed to falling objects and how they will be controlled
- Describe emergency-response procedures for rescuing workers who fall
- Post emergency responders' phone numbers and make sure workers know them
- Describe all equipment that will be available for rescuing workers who fall

Assign supervisory responsibility to a competent person: A competent person must know the site-specific fall protection plan, how to perform work tasks safely and the hazards associated with those tasks. You must designate a competent person to implement the fall protection plan.

Document accountability: Your fall protection plan must describe how workers and supervisors will comply with its requirements.

Establish a training program: Everyone covered by a fall protection plan must be trained by a competent person. Be sure to document the names of those who receive fall protection training and their training dates.

The training program must cover:

- Fall hazards that workers will encounter
- Types of systems that will protect workers from falls
- Workers' responsibilities under the fall protection plan
- Procedures for assembling, maintaining, and dissembling personal fall arrest systems

- How workers should comply with the plan
- Retraining procedures when the plan changes, tasks change or when workers are not following the plan

Update the plan when site conditions change: When worksite conditions change and affect how workers are protected from falling, you must update your fall protection plan so that it addresses the changes. An on-site qualified person must approve the changed plan.

The updated plan must:

- Describe the site-condition changes that required the update
- Include the qualified person's reasons for the update
- Include the date the qualified person approved the plan changes and the person's signature

Investigate accidents: If a worker falls or has a near miss incident, you must investigate the accident and, if necessary, change the plan so that similar events don't occur.

Keep the plan at the job site: You must keep a copy of the fall protection plan, with all approved changes, at the job site.

Other Fall Protection Requirements

If activities at height include any of the following, consult the appropriate regulation and/or policy for more information on appropriate fall protection:

- Scaffolds
- Cranes and derricks
- Steel erection work
- Tunneling operations
- Electric transmission lines/equipment
- Stairways and ladders

Covers for Roof Openings or Holes

Roof Openings are fall hazards and must either be covered or surrounded by a guardrail. Skylights will usually break unless guarded or screened.

A cover is necessary regardless of the fall distance and includes any rigid object used to overlay openings in floors, roofs, and other walking and working surfaces. Covers must be able to support at least twice the maximum anticipated load of workers, equipment, and materials. Covers should have full edge bearing on all four sides. All covers must be color-coded or marked with the word "Hole" or "Cover" and must be secured to prevent accidental displacement.

CONVENTIONAL FALL PROTECTION

Personal Fall Arrest System

These consist of an anchorage, connectors and a body harness and may include a deceleration device, lifeline, or suitable combinations. If a personal fall arrest system is used for fall protection, it must do the following:

- Limit maximum arresting force on an employee to 900 pounds used with a body belt
- Limit maximum arresting force on an employee to 1,800 pounds used with a body harness
- Be rigged so that an employee can neither free fall more than 6 feet nor contact any lower level
- Bring an employee to a complete stop and limit maximum deceleration distance an employee travels to 3.5 feet
- Have sufficient strength to withstand twice the potential impact energy of an employee free falling a distance of 6 feet or the free fall distance permitted by the system, whichever is less

The use of body belts for fall arrest is prohibited; however, the use of a body belt in a positioning device system is acceptable.

Personal fall arrest systems must be inspected before each use for wear, damage, and other deterioration. Defective components must be removed from service.

Anchorage - a fixed structure or structural adaptation, often including an anchorage connector, to which the other components of the PFAS are rigged

Body Wear - a full body harness worn by the worker

Connector - a subsystem component connecting the harness to the anchorage, such as a lanyard

Deceleration Device - a subsystem component designed to dissipate the forces associated with a fall arrest event

Anchor

An anchor provides a secure point of attachment for a lifeline, lanyard, or deceleration device and is perhaps the most important personal fall arrest system component. It must support a minimum load of 5,000 pounds – a challenging requirement, particularly on wood framed and residential-type structures. If you don't know how much weight an anchor will hold, you should have a qualified person design a complete fall protection system. The system must be installed under the supervision of the qualified person and it must maintain a safety factor of at least two – twice the impact force of a worker free-falling six feet.

Never use hoists or guardrails as anchors. They are not built to withstand the forces generated by a fall.

In addition to anchor strength, consider the following:

- Anchorage connector: Unless an existing anchorage has been designed to accept a lanyard or lifeline, you'll need to attach an anchorage connector — a device that provides a secure attachment point. Examples include tie-off adapters, hook anchors, beam connectors and beam trolleys. Be sure the connector is compatible with the lanyard or lifeline and appropriate for the task
- Attachment point: The anchorage can be used only as the attachment point for a personal fall-arrest system; it can't be used to support or suspend platforms
- Location: The anchorage should be located directly above the worker, if possible, to reduce the chance of a swing fall
- Fall distance: Because a personal fall-arrest system doesn't prevent a fall, the anchorage must be high enough above a worker so that the arrest system, rather than a lower level, stops the fall. Consider free-fall distance, lanyard length, shock-absorber elongation, and body-harness stretch in determining the height of an anchorage

Body Harness

The full-body harness has straps that distribute the impact of a fall over the thighs, waist, chest, shoulders and pelvis. Before you purchase harnesses, make sure that they fit those who will use them, they're comfortable and they're easy to adjust.

A full-body harness should include a back D-ring for attaching lifelines or lanyards and a back pad for support. Never use a body belt as part of a personal fall-arrest system.

Full-body harnesses must:

- Be made from synthetic fibers
- Have an attachment point, usually a D-ring, in the center of the back at about shoulder level. The D-ring should be large enough to easily accept a lanyard snap hook
- Have chest straps that are easy to adjust and strong enough to withstand a fall without breaking
- Are made for industrial use, not recreational climbing
- They meet ANSI and CSA standards

Connectors

An anchorage, a lanyard and a body harness are not useful until they're linked together. Connectors do the linking; they make the anchorage, the lanyard and the harness a complete system. Connectors include carabiners, snap hooks and D-rings. Connectors must be dropforged, pressed or made from formed steel or equally strong material. They must be corrosion-resistant, with smooth surfaces and edges that will not damage other parts of the personal fall arrest system.

Carabiner

This high-tensile alloy steel connector has a locking gate and is used mostly in specialized work such as window cleaning and high-angle rescue. Carabiners must have a minimum tensile strength of 5,000 pounds.

Snap hook

A hook-shaped member with a keeper that opens to receive a connecting component and automatically closes when released. Snap hooks are typically spliced or sewn into lanyards and self-retracting lifelines. Snap hooks must be high-tensile alloy steel and have a minimum tensile strength of 5,000 pounds. Use only locking snap hooks with personal fall-arrest systems; locking snap hooks have self-locking keepers that won't open until they're unlocked.

D-ring

D-rings are the attachment points sewn into a full-body harness. D-rings must have a minimum tensile strength of 5,000 pounds.

Deceleration Devices

Deceleration devices protect workers from the impact of a fall. Any mechanism with a maximum length of 3.5 feet, such as a rope grab, rip stitch lanyard, tearing or deforming lanyards, self-retracting lifelines, etc. which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest may be used as a deceleration device.

Shock Absorbing Lanyard

Because a shock-absorbing lanyard extends up to 3.5 feet, it's critical that the lanyard stops the worker before the next lower level. Allow about 20 vertical feet between the worker's anchorage point and the level below the working surface. Always estimate the total distance of a possible fall before using a shock-absorbing lanyard.

Remember: Never use a shock-absorbing lanyard if the shock absorber is even partially extended or if the lanyard has arrested a fall.

Self-Retracting Lanyards or Lifelines

Self-retracting lanyards and lifelines offer more freedom to move than shock-absorbing lanyards. Each has a drum-wound line that unwinds and retracts as the worker moves. If the worker falls, the drum immediately locks, which reduces free-fall distance to about two feet — if the anchorage point is directly above the worker. Some self-retracting lanyards will reduce free-fall distance to less than one foot. Self-retracting lanyards are available in lengths up to 20 feet. Self-retracting lifelines, which offer more freedom, are available in lengths up to 250 feet.

Rope Grab

A rope grab allows a worker to move up a vertical lifeline but automatically engages and locks on the lifeline if the worker falls.

When using a rope grab, keep the following in mind:

- The rope grab must be compatible with the lifeline
- The rope grab must be correctly attached to the lifeline (not upside down)
- Keep the lanyard (between the rope grab and the body harness) as short as possible
- Keep the rope grab as high as possible on the lifeline

Lifelines

A lifeline is a cable or rope that connects to a body harness, lanyard or deceleration device, and at least one anchorage. There are two types of lifelines, vertical and horizontal.

Vertical Lifeline: A vertical lifeline is attached to an overhead anchorage and must be connected directly to a worker's full-body harness, lanyard, retractable device, or rope grab; it must have a minimum breaking strength of 5,000 pounds. When a worker needs to move horizontally, however, a vertical lifeline can be hazardous due to the potential for a swing fall — the pendulum motion that results when the worker swings back under the anchor point. A swing fall increases a worker's risk of striking an object or a lower level during the pendulum motion.

Horizontal Lifeline: Unlike a vertical lifeline, the horizontal lifeline stretches between two anchorages. When you connect a lanyard or rope grab to a horizontal lifeline, you can move about freely, thus reducing the risk of a swing fall. However, horizontal lifelines are subject to much greater loads than vertical lifelines. Horizontal lifelines can fail at the anchorage points if they're not installed correctly. For this reason, horizontal lifelines must be designed, installed and used under the supervision of a qualified person.

Sag Angles: Any load on a horizontal lifeline will cause it to deflect or sag. The sag angle is a horizontal lifeline's angle of deflection when it's subjected to a load, such as a falling worker. Reducing the sag angle (making a horizontal lifeline too tight) actually increases the force on the line during a fall. As you tighten a horizontal lifeline, you increase the impact load dramatically!

For example, when the sag angle is 15 degrees, the force on the lifeline and anchorages subjected to a load is about 2:1. However, if you decrease the sag angle to five degrees, the force increases to about 6:1.

Fall Arrest Rules

When using personal fall arrest systems:

- If you fall, the impact force to the body has to be less than 1800 pounds, achieved by using shock absorbing lanyards and a harness
- Minimize fall distance; the maximum free fall distance can only be 6 feet
- There cannot be any structures below in your fall distance
- Maximum weight of an individual w/tools is 310 pounds

OTHER FALL PROTECTION SYSTEMS AND METHODS

Those who work on elevated surfaces must be familiar with systems and methods that control their exposure to fall hazards; they must also ensure that their equipment and tools don't endanger workers below them.

Common methods for protecting workers from falling objects include the following:

- Canopies suspended above the work area
- Barricades and fences to keep people from entering unsafe areas
- Screens, guardrail systems, and toeboards to prevent materials from falling to lower levels

The following guidelines will help you keep your tools and equipment where they belong:

- If you use toeboards, they must be strong enough to withstand a force of at least 50 lbs. applied in any downward or outward direction and be at least 3½" high
- If you need to pile material higher than the top edge of a toeboard, install panels or screens to keep the material from dropping over the edge
- If you use canopies as falling object protection, make sure they won't collapse or tear from an object's impact
- You can use guardrails with toeboards as falling object protection if the guardrail openings are small enough to keep the objects from falling through
- When you do overhand bricklaying work, keep material and equipment – except masonry and mortar – at least four feet from the working edge. Remove excess mortar and other debris regularly
- When you do roofing work, keep materials and equipment at least six feet from the roof edge unless there are guardrails along the edge. All piled, grouped, or stacked material near the roof edge must be stable and self-supporting

Fall Restraint System

OSHA allows the use of a fall restraint system instead of a personal fall arrest system. The fall restraint system must be rigged to prevent a worker from reaching a fall hazard and falling over the edge. A fall restraint system can consist of a full body harness or body belt that's connected to an anchor point at the center of a roof by a lanyard of a length that will not allow a worker to physically reach the edge of the roof.

A personal fall-restraint system prevents a worker from reaching an unprotected edge and thus prevents a fall from occurring. The system consists of an anchorage, connectors, and a body harness or a body belt. The attachment point to the body belt or full-body harness can be at the back, front, or side D-rings.

The anchorage for a fall-restraint system must support at least 3,000 pounds or be designed and installed by a qualified person and have a safety factor of at least two — twice the impact force of a worker free-falling six feet.

Positioning Device System

Positioning-device systems make it easier to work with both hands free on a vertical surface such as a wall or concrete form. Positioning-device systems are also called "class II Work-positioning systems" and "work-positioning systems."

The components of a positioning-device system — anchorage, connectors, and body support — are similar to those of a personal fall arrest system. However, the systems serve different purposes. A positioning-device system provides support and must stop a free fall within two feet; a personal fall arrest system provides no support and must limit free-fall distance to six feet.

- Anchorage. Positioning-device systems must be secured to an anchorage that can support at least twice the potential impact of a worker's fall or 3,000 pounds, whichever is greater

- Connectors. Connectors must have a minimum strength of 5,000 pounds. Snap hooks and D-rings must be proof-tested to a minimum load of 3,600 pounds without deforming or breaking
- Body support. A body belt is acceptable as part of a positioning-device system. However, it must limit the arresting force on a worker to 900 pounds and it can only be used for body support. A full-body harness is also acceptable but must limit the arrest force to 1,800 pounds. Belts or harnesses must have side D-rings or a single front D-ring for positioning

Guardrails

A guardrail system consists of a top rail, midrail, and intermediate vertical member. Guardrail systems can also be combined with toeboards that prevent materials from rolling off the walking/working surface.

Guardrail systems must be free of anything that might cut a worker or snag a worker's clothing. Top rails and midrails must be at least ¼-inch thick to reduce the risk of hand lacerations; steel and plastic banding cannot be used for top rails and midrails.

Other requirements for guardrails include:

- Wire rope used for a top rail must be marked at least every six feet with high-visibility material
- The top rail of a guardrail must be 42 inches (plus or minus three inches) above the walking/working surface. The top-edge height can exceed 45 inches if the system meets all other performance criteria
- Midrails must be installed midway between the top rail and the walking/working surface unless there is an existing wall or parapet at least 21 inches high
- Screens and mesh are required when material could fall between the top rail and midrail or between the midrail and the walking/working surface
- Intermediate vertical members, when used instead of midrails between posts, must be no more than 19 inches apart
- A guardrail system must be capable of withstanding a 200-pound force applied within two inches of its top edge in any outward or downward direction
- Midrails, screens, and intermediate structural members must withstand at least 150 pounds of force applied in any downward or outward direction

Safety Nets

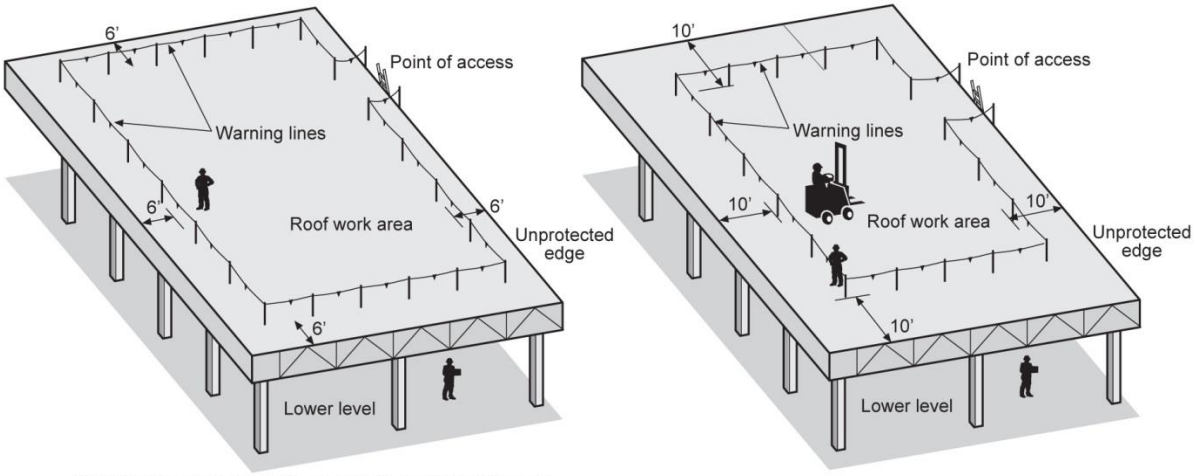
Safety-net systems consist of mesh nets and connecting components.

- Safety-net openings can't be more than six inches on a side, center to center
- Safety nets must not be installed more than 30 feet below the working surface
- An installed net must be able to withstand a drop test consisting of a 400-pound sandbag, 30 inches in diameter, dropped from the working surface
- Inspect safety nets regularly and remove debris from them no later than the start of the next work shift

Warning Line System

Warning line systems consist of ropes, wires, or chains, and supporting stanchions that form a barrier to warn those who approach an unprotected roof side or edge. The lines mark off an area within which one can do roofing work without using guardrails or safety nets; warning line systems can be combined with guardrail systems, personal fall arrest systems, or safety monitoring systems to protect those doing roofing work on low slope roofs (4:12 or less, 2:12 in some jurisdictions).

When mechanical equipment is not being used, the warning line shall be erected not less than 6 feet from the roof edge. When mechanical equipment is being used, the warning line shall be erected not less than 6 feet from the roof edge that is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 m) from the roof edge that is perpendicular to the direction of mechanical equipment operation



Warning-line system where no mobile equipment is used

Warning-line system where mobile equipment is used

Safety Monitoring System

A safety monitoring system is a set of procedures assigned to a competent person for monitoring and warning workers who may be unaware of fall hazards. A safety monitoring system used in conjunction with a controlled access zone and a fall protection plan is also appropriate in situations where conventional fall protection is not feasible.

Controlled Access Zones

The controlled access zone is best thought of as a combination of a warning line system and a safety monitoring system.

It defines an area where workers can do leading edge, overhand bricklaying and related work, or work under a fall protection plan without using conventional fall protection. All others are prohibited from entering a controlled access zone. The zone is created by erecting a control line, or lines, to restrict access to the area. The control line warns workers that access to the zone is limited to authorized persons.

Control lines must meet the following criteria:

- Consist of ropes, wires, tapes, or equivalent materials and supporting stanchions
- Be flagged at least every 6 feet with high visibility material
- Be no less than 39 inches from the working surface at its lowest point and no more than 45 inches from the working surface at its highest point (50 inches in overhand bricklaying operations)
- Have a minimum breaking strength of 200 lbs.
- For work such as overhand bricklaying, the control lines should be 10-15 ft. from the unprotected edge

ALTERNATIVE FALL PROTECTION METHODS

If leading edge, precast concrete erection or residential-type construction work is being performed, an alternative fall protection system can be used provided the company can demonstrate that using the conventional systems aren't feasible or would create a fall hazard.

Alternative Fall Protection Plan

If implemented, an alternative fall protection plan used by this company will meet the following requirements:

- The fall protection plan will be prepared and maintained by a qualified person for the site where the work is being performed
- A copy of the fall protection plan and changes will be maintained at the job site
- A competent person will implement the fall protection plan
- The fall protection plan will document the reasons why the use of conventional fall protection systems are infeasible or why their use would create a greater hazard
- The fall protection plan will include a written discussion of other measures that will be taken to reduce or eliminate the fall hazard for workers who can't be provided with protection from the conventional fall protection systems. For example, the employer must discuss the extent to which scaffolds, ladders, or vehicle mounted work platforms can be used to provide a safer working surface and thereby reduce the hazard of falling
- The fall protection plan will identify each location where conventional fall protection methods can't be used. These locations will then be classified as controlled access zones and adhere to all appropriate policies and regulations
- Where no other alternative measure has been implemented, the company will implement a safety monitoring system
- The fall protection plan must include a statement that provides the name or other method of identification for each employee designated to work in controlled access zones. No other employees may enter controlled access zones
- In the event an employee falls, or some other related, serious incident occurs, the company will investigate the circumstances of the fall or other incident to determine if the fall protection plan needs to be changed (e.g. new practices, procedures, or training) and will implement those changes to prevent similar types of falls or incidents

In addition, you must:

- Describe access to controlled-access zones will be limited, including procedures that authorize workers to enter controlled-access zones
- Describe how controlled-access zones will be identified and separated from other work areas
- Identify all workers who will enter controlled-access zones

INSPECTING AND MAINTAINING FALL PROTECTION EQUIPMENT

Employees will inspect fall protection systems and equipment regularly for wear or damage.

- Inspect manila, plastic, or synthetic rope used for top rails or midrails or a guardrail system frequently
- Inspect safety nets at least once a week, removing defective nets from service
- Inspect PFAS or positioning device systems every time they are used
- A PFAS that has been subjected to a fall must not be used again until a competent person determines it is safe

Lanyard Inspections

Snaps

Inspect closely for hook and eye distortions, cracks, corrosion, or pitted surfaces. The keeper (latch) should seat into the nose without binding and should not be distorted or obstructed. The keeper spring should exert sufficient force to firmly close the keeper. Keeper locks must prevent the keeper from opening when the keeper closes.

Thimbles

The thimble must be firmly seated in the eye of the splice and the splice should have no loose or cut strands. The edges of the thimble must be free of sharp edges, distortion, or cracks.

Wire Rope (Steel) Lanyard

Always wear gloves when inspecting a wire rope lanyard because broken strands can cause injury. To inspect, rotate the wire rope lanyard while watching for cuts, frayed areas or unusual wearing patterns on the wire. Broken strands will separate from the body of the lanyard.

Web Lanyard

While bending webbing over a pipe, observe each side of the webbed lanyard. This will reveal any cuts, snags or breaks. Swelling, discoloration, cracks and charring are obvious signs of chemical or heat damage. Observe closely for any breaks in stitching.

Rope Lanyard

Rotate the rope lanyard while inspecting from end-to-end for any fuzzy, worn, broken or cut fibers. Weakened areas from extreme loads will appear as a noticeable change in original diameter. The rope diameter should be uniform throughout, following a short break-in period.

Shock Absorber Pack

The outer portion of the pack should be examined for burn holes and tears. Stitching on areas where the pack is sewn to D-rings, belts or lanyards should be examined for loose strands, rips, deterioration or other signs of activation.

Shock-Absorbing Lanyard

Shock-absorbing lanyards should be examined as a web lanyard. However, also look for the warning flag or signs of deployment. If the flag has been activated, remove this shock-absorbing lanyard from service.

Common Types of Damage to Webbing and Lanyards

Heat

In excessive heat, nylon becomes brittle and has a shriveled brownish appearance. Fibers will break when flexed and must not be used above 180 degrees Fahrenheit.

Chemical

Change in color usually appears as a brownish smear or smudge. Transverse cracks appear when belt is bent over tight. This causes a loss of elasticity in the belt.

Ultraviolet Rays

Do not store webbing and rope lanyards in direct sunlight, because ultraviolet rays can reduce the strength of some material.

Molten Metal or Flame

Webbing and rope strands may be fused together by molten metal or flame. Watch for hard, shiny spots or a hard and brittle feel. Webbing will not support combustion, nylon will.

Paint and Solvents

Paint will penetrate and dry, restricting movements of fibers. Drying agents and solvents in some paints will appear as chemical damage.

Self-Retracting Lines

Check Housing

Before every use, inspect the unit’s housing for loose fasteners and bent, cracked, distorted, worn, malfunctioning or damaged parts.

Lifeline

Test the lifeline retraction and tension by pulling out several feet of the lifeline and allow it to retract back into the unit. Maintain a light tension on the lifeline as it retracts. The lifeline should pull out freely and retract all the way back into the unit. Do not use the unit if the lifeline does not retract. Also, check for signs of damage. Inspect for cuts, burns, corrosion, kinks, frays or worn areas. Inspect any sewing (web lifelines) for loose, broken or damaged stitching.

Braking Mechanism

Test the braking mechanism by grasping the lifeline above the load indicator and applying a sharp steady pull downward to engage the brake. There should be no slippage of the lifeline while the brake is engaged. Once tension is released, the brake should disengage and the unit should return to the retractable mode. Do not use the unit if the brake does not engage.

Snap Hook

Check the snap hook to be sure it operates freely, locks, and the swivel operates smoothly. Inspect the snap hook for any signs of damage to the keepers and any bent, cracked or distorted components.

Anchorage Connection

Make sure the carabiner is properly seated and in the locked position between the attachment swivel/point on the device and the anchor point

Self-Retracting Lines

Webbing

Grasp the webbing with your hands 6 to 8 inches apart. Bend the webbing in an inverted “U.” The surface tension resulting makes damaged fibers or cuts easier to detect. Follow this procedure the entire length of the webbing, inspecting both sides of each strap. Look for frayed edges, broken fibers, pulled stitches, cuts, burns and chemical damage.

D-Rings/Back Pads

Check D-rings for distortion, cracks, breaks, and rough or sharp edges. The D-ring should pivot freely. Inspect for any unusual wear, frayed or cut fibers, or broken stitching of the D-ring attachments. Pads should also be inspected for cracks, excessive wear, or other signs of damage.

Buckles

Inspect for any unusual wear, frayed or cut fibers, or broken stitching of buckle attachments.

Tongue Buckles/Grommets

Buckle tongues should be free of distortion in shape and motion. They should overlap the buckle frame and move freely back and forth in their socket. Roller should turn freely on frame. Check for distortion or sharp edges. Inspect for loose, distorted, or broken grommets. Webbing should not have additional punched holes.

Friction and Mating Buckles

Inspect the buckle for distortion. The outer bars and center bars must be straight. Pay special attention to corners and attachment points at the center bar.

Quick-Connect Buckles

Inspect the buckle for distortion. The outer bars and center bars must be straight. Make sure buckles engage properly.

Harness Fall Arrest Indicators

Inspect fall arrest indicators (located on the back D-ring pad) for signs of activation. Remove from service if broken or stretched between any of the four pairs of arrows.

Cleaning of Equipment

Basic care for fall protection safety equipment will prolong the life of the equipment and contribute to its safety performance. Proper storage and maintenance after use is as important as cleaning dirt, corrosives or contaminants off the equipment. The storage area should be clean, dry, and free of exposure to fumes or corrosive elements.

Nylon and Polyester

Wipe off all surface dirt with a sponge dampened in plain water. Squeeze the sponge dry. Dip the sponge in a mild solution of water and commercial soap or detergent. Work up a thick lather with a vigorous back and forth motion. Then wipe the belt dry with a clean cloth. Hang freely to dry but away from excessive heat.

Housing

Periodically clean the unit using a damp cloth and mild detergent, and towel dry.

Drying

Harness, belts, and other equipment should be dried thoroughly without exposure to heat, steam, or long periods of sunlight.

EMERGENCY PLANNING

The best strategy for protecting workers from falls is to eliminate the hazards that cause falls. If you can't eliminate the hazards, you must protect workers with an appropriate fall protection system or method. If a worker is suspended in a personal fall-arrest system, you must provide for a prompt rescue.

The emergency response plan outlines key rescue and medical personnel, equipment available for rescue, emergency communications procedures, retrieval methods, and primary first-aid requirements. Please see the chapter on Emergency Action Plans for more information.

Before Work Begins

- Identify emergencies that could affect your work site
- Establish a chain of command
- Document procedures for responding to emergencies and make sure they're available on-site
- Post emergency-responder phone numbers and addresses at the work site
- Identify critical resources and rescue equipment
- Train on-site responders
- Identify off-site responders and inform them about any conditions at the site that may hinder a rescue effort

- Identify emergency entry and exit routes
- Make sure responders have quick access to rescue and retrieval equipment, such as lifts and ladders

During Work

- Identify on-site equipment that can be used for rescue and retrieval, such as extension ladders and mobile lifts
- Maintain a current rescue-equipment inventory at the site. Equipment may change frequently as the job progresses
- Re-evaluate and update the emergency-response plan when on-site work tasks change

When an Emergency Occurs

- First responders should clear a path to the victim. Others should direct emergency personnel to the scene. You can use 911 for ambulance service; however, most 911 responders are not trained to rescue a worker suspended in a personal fall-arrest system
- Make sure only trained responders attempt a technical rescue
- Prohibit all nonessential personnel from the rescue site

After an Emergency

- Report fatalities to OSHA within eight hours
- Report injuries requiring overnight hospitalization with medical treatment (other than first aid) to OSHA within 24 hours
- Identify equipment that may have contributed to the emergency and put it out of service
- Have a competent person examine equipment. If the equipment is damaged, repair or replace it. If the equipment caused the accident, determine how and why
- Document in detail the cause of the incident and describe how it can be prevented from happening again
- Review emergency procedures. Determine how the procedures could be changed to prevent similar events. Revise the procedures accordingly

TRAINING

This company will ensure every employee is provided training on Fall Protection. This training will be provided at no cost to the employee during working hours.

The company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training Components

The program administrator will ensure that every employee will be trained in the following minimum elements:

- The nature of fall hazards in the work area
- The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used

- The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, controlled access zones, and other protection to be used
- The role of each employee in the safety monitoring system when this system is used
- The limitations on the use of mechanical equipment during the performance of roofing work on low-sloped roofs
- The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection
- The role of employees in fall protection plans

Training Records

Training records will include the following information as a written certification:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of the attendees

Employee training records will be maintained for the duration of the employee's employment.

Retraining

If the company has reason to believe that any employee who has already been trained doesn't have the understanding and skill required, the employee must be retrained. Examples where such retraining may be required include, but are not limited to, the following:

- Changes in the workplace render previous training obsolete
- Changes in the types of fall protection systems or equipment to be used render previous training obsolete
- Inadequacies in an affected employee's knowledge or use of fall protection systems or equipment indicate that the employee has not retained the requisite understanding or skill

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Fall Hazard Assessment
- Employee Training for Fall Protection Certification

FALL HAZARD ASSESSMENT

Job Name:		Location:		Date Assessed:	
Related Operating Procedures Reviewed:		Yes ☐ No ☐	Location Marked and Entry Controlled		Yes ☐ No ☐

Fall Hazard Assessment Checklist	Yes	No
1. Can an employee enter the area without restriction and perform work?	☐	☐
2. Are fall prevention systems such as cages, guardrails, toeboards and manlifts in place?	☐	☐
3. Have slipping and tripping hazards been removed or controlled?	☐	☐
4. Have visual warnings of fall hazards been installed?	☐	☐
5. Can the distance a worker could fall be reduced by installing platforms, nets etc.?	☐	☐
6. Are any permanently installed floor coverings, gratings, hatches or doors missing?	☐	☐
7. Does the location contain any other recognized safety and or health hazards?	☐	☐
8. Is the space designated as a Permit Required Confined Space?	☐	☐
9. Have anchor points been designated and load tested?	☐	☐

Assessment Information

Initials	Hazard	Remarks/Recommendations
	Total potential fall distance:	
	Number of workers involved:	
	Frequency of task:	
	Obtainable anchor point strength:	
	Required anchor point strength: (not less than 5000 lbs.)	

Additional Requirements

Potential environmental conditions that could impact safety:

Initials	Condition	Remarks/Recommendations

Possible required structural alterations:		
Initials	Alteration	Remarks/Recommendations
Possible task modification that may be required:		
Initials	Task	Remarks/Recommendations
Training requirements:		
Initials	Requirement	Remarks/Recommendations
Personal protective equipment required:		
Initials	Requirement	Remarks/Recommendations
Comments:		

Authorization	☐Approved
I certify that I have conducted a Fall Hazard Assessment of the above designated location and have detailed the findings of the assessment on this form. * Further detailed on attachment: Yes ☐ No ☐	

Title:		Name		
Signature			Date	Time

EMPLOYEE TRAINING FOR FALL PROTECTION

The Company certifies that the following employee has been trained in the understanding, knowledge, and skills necessary for the safe performance of duties assigned in areas of fall protection hazards.

_____ has demonstrated proficiency in the following areas of fall protection:

- ☐ The nature of fall hazards in the work area.
- ☐ The correct procedures for erecting, maintaining, disassembling, and inspecting the fall protection systems to be used.
- ☐ The use and operation of guardrail systems, personal fall arrest systems, safety net systems, warning line systems, safety monitoring systems, personal fall restraint systems, slide guard systems, positioning devices, and other protection to be used.
- ☐ The role of each employee in the safety monitoring system when this system is used.
- ☐ The limitations on the use of mechanical equipment during the performance of roofing work.
- ☐ The correct procedures for the handling and storage of equipment and materials and the erection of overhead protection.
- ☐ The role of employees in the fall protection work plan.

Employee Tranied by	Date of Training
Signature of Trainer	Date
Employee Signature	Date

cc: Employee Personnel File

POLICY

This Company is committed to creating a safe and healthy work environment. Forklifts (also known as Powered Industrial Trucks) can help employees move material safely, but create hazards that must be controlled. This forklift safety program will ensure the safe use and service of such equipment.

Each forklift operator must be competent to operate the equipment safely, as demonstrated by the successful completion of the training and evaluation specified in OSHA regulations.

EMPLOYER RESPONSIBILITIES

It is the responsibility of this Company to:

- Select and purchase equipment compliant with relevant regulations and safety standards
- Ensure safe operation of forklifts in the workplace
- Designate areas to store fuel and batteries, change and charge batteries, and maintain forklifts safely, including equipment to prevent and respond to hazard exposure
- Ensure operators and those maintaining forklifts are: 18 or older, fully trained and re-tested not less than every three years, mentally and physically competent, in receipt of a state-issued driver's license, and knowledgeable in safe practices regarding forklifts. Exceptions for trainees over 18 are permitted
- Provide a safe work environment free from hazards to employees

EMPLOYEE RESPONSIBILITIES

Company employees are expected to:

- Be aware of hazards associated with forklifts
- Store and handle fuel and batteries in a safe manner, according to established safe procedures
- Actively participate in all training relevant to their position
- Operate forklifts safely, according to all relevant standards and regulations
- Report potentially hazardous situations or maintenance concerns as soon as safely possible
- Load and unload forklifts in a safe manner

TRAINING

The Company will ensure every employee is provided training on forklifts. This training will be provided at no cost to the employee during working hours.

The Company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Trainees may operate a forklift only:

- Under the direct supervision of persons who have the knowledge, training, and experience to train operators and evaluate their competence
- Where such operation does not endanger the trainee or other employees

Training Components

Training for forklift operation will include formal instruction, practical training and evaluation. Trainers will be competent, and demonstrate the knowledge and experience necessary to both train and evaluate operators.

The Safety Coordinator will ensure that every employee who works with forklifts will be trained in the following minimum elements:

- Truck-related topics
- Operating instructions, warnings, and precautions for the types of truck the operator will be authorized to operate
- Differences between the truck and the automobile
- Controls and instrumentation: where they are located, what they do, and how they work
- Engine or motor operation
- Steering and maneuvering
- Visibility (including restrictions due to loading)
- Fork and attachment adaptation, operation, and use limitations
- Vehicle capacity
- Vehicle stability
- Any vehicle inspection and maintenance that the operator will be required to perform
- Refueling and/or charging and recharging of batteries
- Operating limitations
- Any other operating instructions, warnings, or precautions listed in the operator's manual for the types of vehicle operated
- Workplace-related topic
- Surface conditions where the vehicle will be operated
- Composition of loads to be carried and load stability
- Load manipulation, stacking, and unstacking
- Pedestrian traffic in areas where the vehicle will be operated
- Narrow aisles and other restricted places where the vehicle will be operated
- Hazardous (classified) locations where the vehicle will be operated
- Ramps and other sloped surfaces that could affect the vehicle's stability
- Closed environments and other areas where insufficient ventilation or poor vehicle maintenance could cause a buildup of carbon monoxide or diesel exhaust
- Other unique or potentially hazardous environmental conditions in the workplace that could affect safe operation

Refresher Training

Refresher training in relevant topics will be provided to operators under any of the following conditions:

- They operate the vehicle in an unsafe manner
- They are involved in an accident or a near-miss incident

- They receive an evaluation that reveals they are not operating the truck safely
- They are assigned to a different type of truck
- A condition in the workplace changes that could affect safe operation of the truck

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be maintained for three years from the date on which the training occurred.

Testing

All employees must successfully pass a test no less than every three years in order to operate a forklift, except a motorized hand truck.

The test will assess the employees:

- Operating ability
- Knowledge of the equipment
- Knowledge of state safety standards
- Knowledge of daily checks

The assessment will include a performance test to determine whether the employee can operate the assigned forklift through the functions necessary to perform the required work.

Employees who have a valid permit to operate a forklift issued by another employer may be tested without receiving the training outlined above. They must receive the training, however, if they do not pass their test.

Permits

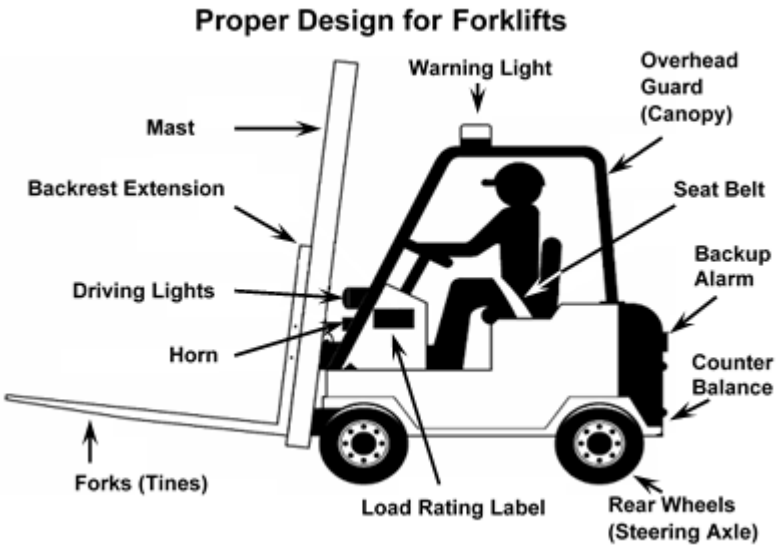
If employees meet the training/testing requirements, the employer may issue those employees permits to operate applicable forklifts. Permits must be carried by employees, and the employer must keep a list of permits issued. Permits must list the specific truck(s) that the named employee is qualified to operate. Also included should be the name of the issuing Company/employee, and the issue/expiration dates.

Trainees are exempt from the permit requirement for a period of not more than 30 days if they are under the supervision of an authorized, competent individual.

SAFE PRACTICES

Design and Construction Requirements

Forklifts and attachments will be selected based on the work performed, with utmost concern for the safety and wellbeing of employees. All forklifts will meet OSHA-approved design and construction requirements for trucks of their type.



Labels, Nameplates, Markings

Any forklift in use will bear a label that indicates approval by a nationally recognized testing lab. This durable, corrosion-resistant nameplate must be inscribed with the following information:

- Truck model and serial number
- Truck weight
- designation of compliance with the mandatory requirements of ASME B56.1, "Safety Standard for Low and High Lift Trucks," applicable to the manufacturer
- Type designation to show conformance with the requirements, such as those prescribed by Underwriters Laboratories, Inc., and Factory Mutual Research Corporation; and Capacity

Before employees operate a forklift, they must demonstrate the ability to read and interpret truck nameplates to prevent overloading or other improper use.

Modifications and Attachments

Any modification or addition to industrial trucks used that will affect their capacity or safe operation requires the written approval of the original manufacturer of that truck. If equipped with an after-market attachment, the truck will be marked to indicate the approximate weight of the truck with the attachment.

SAFETY GUARDS AND OTHER COMPONENTS

Overhead Guard

An end control, reach, narrow aisle, order picker high-lift, order picking and stacking, and motorized hand rider truck must be equipped with an overhead guard that extends beyond the operator's position on each side. The guard must be able to withstand a compression load equal to impact of the maximum load capacity. The guard must permit rapid and unobstructed access to and from the truck. All high-lift rider trucks, order-picker trucks and rough-terrain forklift trucks must be equipped with an overhead guard in accordance with OSHA regulations and ANSI B56.1, "Safety Standard for Low and High-Lift Trucks".

Seat Belts

If the forklift is equipped with a seat belt or any operator restraint system designed to contribute to the safety of truck operation, the operator is required to use the restraint.

Handling Controls and Guards

With regard to levers or handle-type controls, including toggle switches, the sense of rotation of the control handle should be in the same direction as the desired motion of the mast or load (if the load should go forward, the control should go forward, etc.).

Moving parts that represent a hazard from the operator's position must be protected by suitable guards.

Vertical Load Backrest

A load backrest extension prevents the load from shifting back when the carriage is lifted to full height and will be used when necessary to prevent any part of a load from falling rearward.

Steering Controls

Except on a motorized hand and motorized hand or rider truck, the steering controls of a forklift are best suited to be contained inside the truck. If they are not, the steering controls must be guarded to prevent injury to the operator's hands during movement of the truck.

On a motorized hand and motorized hand or rider truck, the steering handle must be provided with a guard or device to protect the operator's hands from injury when passing obstacles.

A spinner knob must not be attached to a steering hand wheel of a truck unless: it was originally equipped with such; the truck is equipped with power steering or the truck is equipped with an anti-kickback device on the steering mechanism. If installed, the knob must be placed within the periphery of the hand wheel.

Platforms

An employee must not be lifted or transported on a forklift, except when a platform is attached to the forks by enclosed sleeves, a safety chain or a mechanical device that prevents the platform from tipping or slipping.

Personnel on a platform must have a means to shut off power to the truck. Protection from falling objects must be provided to personnel on a platform as necessitated by the environment and operating conditions.

A platform must be equipped with a railing not less than 36 inches or more than 42 inches high, and a toeboard. The railing must consist of one of the following materials:

- Wood posts of at least 2x4-inch nominal stock; the top rail must be made of two right-angle pieces of not less than 1x4-inch nominal stock and an intermediate rail of 1x4-inch nominal stock
- Steel or aluminum pipe posts and rails of not less than one inch inside diameter, and an intermediate rail of ¾-inch inside diameter pipe
- Structural steel or aluminum posts, rails, and an intermediate rail of angle iron of not less than 1x1x 3/16 inch size, or other shapes of equal strength

The intermediate rail may be omitted from one side.

A toeboard must be made of not less than 1x4-inch nominal wood stock, or a material of equal strength.

Other Safety Guards

Forklifts may be equipped with a range of other devices designed to contribute to safe operation. Employees will maintain all safety equipment in good repair, and all operators must understand the use of such safety equipment and devices. These include, but are not limited to the following: horns, flashing warning lights, backup alarms, directional signals, fire extinguisher and mirrors.

Forklift Classes

Forklifts come in a range of sizes and configurations; the industrial truck association classifies industrial trucks into eight categories that suggest the utility of the truck. Each class is subdivided by lift codes. Table 1 outlines the classifications and lift codes of forklifts.

TABLE 1: FORKLIFT CLASSES AND LIFT CODES

Classes	Lift codes	Description
Class I: electric motor rider trucks	1	Counterbalanced rider type, stand up
	4	Three wheel electric truck, sit down
	5	Counterbalanced rider type, cushion tires, sit down
	6	Counterbalanced rider, pneumatic or either tire type, sit down
Class II: electric motor narrow aisle trucks	1	High lift straddle
	2	Order picker
	3	Reach type outrigger
	4	Side loaders, turret trucks, swing mast and convertible turret/stock pickers
	6	Low lift pallet and platform (rider)
Class III: electric motor hand trucks	1	Low lift platform
	2	Low lift walkie pallet
	3	Tractors
	4	Low lift walkie/center control
	5	Reach type outrigger
	6	High lift straddle
	7	High lift counterbalanced
	8	Low lift walkie/rider pallet
Class IV: internal combustion engine trucks (cushion tires only)	3	Fork, counterbalanced (cushion tire)
Class V: internal combustion engine trucks (pneumatic tires only)	4	Fork, counterbalanced (pneumatic tire)
Class VI: electric and internal combustion engine tow tractors	1	Sit-down rider
Class VII: rough terrain fork lift trucks	1	All rough-terrain lift trucks
Class VIII: personnel and burden carriers	1	All personnel and burden carriers

High-Lift, Order-Picker Trucks

All of the following apply to high-lift, order- picker trucks:

- A removable operator platform (device) must directly attach to the lifting means (the forks themselves or unattached boards, planks, etc. are prohibited from serving as a platform)
- The operator platform must be equipped with side guardrails
- When the platform is elevated, the horizontal travel speed of the truck must be automatically reduced to a degree necessary to maintain stability under maximum braking load and turning

When the high-lift truck is equipped with vertical-only or vertical and horizontal controls traveling with the lifting carriage or forks for lifting an employee, employers must assure that the following is provided:

- A platform equipped with a railing or other limiting device, including but not limited to a chain, strap, or tether
- A control device that allows the employee on the platform to shut off power to the truck
- Protection from falling objects, as indicated necessary by the operating conditions

INDUSTRIAL TRUCK DESIGNATIONS AND OPERATING LOCATIONS

Workplace hazards may limit the types of forklifts permitted in the workplace. Internal combustion engines and electric motors may ignite flammable atmospheres. This Company will follow all restrictions on trucks in potentially hazardous environments. OSHA provides guidelines based on NFPA standards to establish the types of safeguards that must be present in trucks used in such environments.

Designations

In addition to classification based on the configuration, use and features of the truck, forklifts are categorized based on safety features and power sources to indicate in which potentially hazardous locations the truck may be used. Table 2 lists the designations of industrial trucks based on their power sources and safeguards.

TABLE 2: DESIGNATIONS OF FORKLIFTS

Power Source	Class	Safeguards
Diesel	D	minimum
	DS	exhaust, fuel and electrical systems
	DY	exhaust, fuel and electrical systems; no electrical equipment including the ignition; temperature limitation features
Electric	E	minimum
	ES	electrical system (prevent emission of hazardous sparks, limit surface temperatures)
	EE	electrical system; electric motors and all other electrical equipment completely enclosed
	EX	electrical system; electric motors and all other electrical equipment completely enclosed; electrical fittings and equipment designed, constructed and assembled to be used in certain atmospheres containing flammable vapors or dusts
Gasoline	G	minimum
	GS	exhaust, fuel and electrical systems
Liquefied Petroleum Gas	LP	minimum
	LPS	exhaust, fuel and electrical systems

Internal Combustion Engines

Forklifts powered by internal combustion engines run on a variety of fuels, including gasoline, diesel fuel, liquid petroleum gas (LPG), and compressed natural gas. Forklifts with internal combustion engines can be quickly refueled but require regular maintenance checks for leaks of fuel or oil and worn parts to keep systems working properly. Forklifts powered by internal combustion engines used indoors may increase worker exposure to exhaust and noise.

Safeguards to exhaust, fuel and electrical systems, as well as electrical equipment limitations and temperature limitation features allow internal combustion engine trucks in certain designated locations.

Electric

Electric-powered forklifts are most commonly used indoors in warehouses. Unlike internal combustion forklifts, electric forklifts are quiet and generally non-polluting but present other hazards to address, specifically related to batteries and their charging.

Safeguards to the electrical system, motors, fittings and equipment, and special construction must still be in place for operation of such trucks in certain locations.

Locations

OSHA and NFPA classify environments to define which designations of industrial trucks are appropriate to use with the hazards present. Table 3 indicates hazardous location classifications and indicates which types of industrial trucks have sufficient safeguards for such locations.

OTHER OPERATING ENVIRONMENT CONCERNS

Any environment where employees operate forklifts will provide the necessary protection to allow safe use.

Lighting

If lighting is less than two lumens/ft^2, the truck will be equipped with directional lighting.

Noxious Gases and Fumes

Trucks with internal combustion engines produce exhaust and fumes that may be hazardous to forklift operators and other employees. The concentration of carbon monoxide gas must not exceed 50ppm or the levels specified by OSHA, whichever is less. Trucks powered by an internal combustion engine require well-ventilated areas.

Loading Trucks, Trailers, and Railroad Cars

Operators must take the following precautions when loading or unloading from trucks or railroad cars to ensure safety:

- The brakes of highway trucks must be set and wheel chocks placed under the rear wheels to prevent the trucks from rolling when boarded with forklifts
- Wheel stops or other recognized positive protection must prevent railroad cars from moving during loading or unloading operations (including while dockboards or bridge plates are in position)
- Provisions must be made to isolate rail cars during switching operations
- Fixed jacks may be necessary to support a semitrailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor
- The landing gear of all semi-trailers must be visually inspected immediately before the trailer is uncoupled from the tractor to assure the landing gear is fit to support the imposed load
- Employers must ensure that the flooring of trucks, trailers, and railroad cars is safe, free from breaks and weakness, before it is driven onto

SUMMARY TABLE ON USE OF INDUSTRIAL TRUCKS IN VARIOUS LOCATIONS

Classes	Unclassified	Class I Locations				Class II Locations			Class III Locations
Description of classes	Locations not possessing atmospheres as described in other columns	Locations in which flammable gases or vapors are, or may be, present in the air in quantities sufficient to produce explosive or ignitable mixtures				Locations which are hazardous because of the presence of combustible dust			Locations where easily ignitable fibers or flyings are present but not likely to be in suspension in quantities sufficient to produce ignitable mixtures
Groups	None	A	B	C	D	E	F	G	None
Examples of locations or atmospheres in classes or groups	Piers and wharves inside and outside general storage, general industrial or commercial properties	Acetylene	Hydrogen	Ethyl ether	Gasoline, Naptha, Alcohols, Acetone, Lacquer solvent Benzene	Metal dust	Carbon black coal dust, coke dust	Grain dust, flour dust, starch dust, organic dust	Baled waste, cocoa fiber, cotton, excelsior, hemp, istle, jute, kapok, oakum, sisal, Spanish moss, synthetic fibers, tow

Classes	Class I Locations		Class II Locations		Class III Locations	
Divisions	1	2	1	2	1	2
Nature of hazardous conditions	Above condition exists continuously, intermittently, or periodically under normal operating conditions.	Above condition may occur accidentally as due to a puncture of a storage drum.	Explosive mixture may be present under normal operating conditions, or where failure of equipment may cause the condition to exist simultaneously with arching or sparking of electrical equipment, or where dusts of an electrically conducting nature may be present.	Explosion mixture not normally present, but where deposits of dust may cause heat rise in electrical equipment, or where such deposits may be ignited by arcs or sparks from electrical equipment.	Locations in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used	Locations in which easily ignitable fibers are stored or handled (except in the process of manufacture)

Authorized uses of trucks by types in groups of classes and divisions

Classes	Unclassified	Class I Locations								Class II Locations						Class III Locations	
Divisions	None	1				2				1			2			1	2
Groups		A	B	C	D	A	B	C	D	E	F	G	E	F	G	None	None
Diesel:																	
Type D	D**																
Type DS									DS						DS		DS
Type DY									DY						DY	DY	DY
Electric:																	
Type E	E**														E		E
Type ES									ES						ES		S
Type EE									EE						EE	EE	EE
Type EX					EX				EX		EX	EX			EX	EX	EX
Gasoline:																	
Type G	G**																
Type GS									GS						GS		GS
LP-Gas																	
Type LP	LP**																
Type LPS									LPS						LPS		LPS
Para. Ref. in No. 505	210.211	201(a)			203(a)	209(a)			204(a)(b)		202(a)	205(a)		209(a)	206(a)(b)	207(a)	208(a)

** Trucks conforming to these types may also be used — see subdivision (c)(2)(x) and (c)(2)(xii)

Dockboards and Bridgeplates

Dockboards and bridgeplates must:

- Be strong enough to carry the load driven over them
- Include a carrying capacity that is clearly marked
- Be secured in position by anchoring or devices that will prevent it from slipping
- Include handholds or other means for placement that will protect the employee during handling; where a fork truck is used, fork loops, pockets, or lugs will be provided for safe handling
- Have a slip-resistant surface, such as a tread plate
- Be designed so that the edges have sufficient contact with the dock or loading platform to prevent the board or plate from rocking or sliding out of position
- Have curbs if it is used by a forklift to bridge an opening more than 18 inches wide; the height of the curbs must be at least 15% the diameter of the largest tire of the truck, but need not exceed three inches

A positive means such as, but not limited to, chocks, blocks or brakes must be used to restrict a vehicle or rail car from moving while a dockboard/plate is in position

MAINTENANCE AND RELATED CONCERNS

Policy requires all equipment to remain in good repair and for operators to use equipment in an always-safe manner. Any power-operated industrial truck not in safe operating condition must be removed from service so authorized personnel may repair it. All maintenance, refueling and battery charging will be performed in a way to ensure the safety of employees.

Pre-Operation Inspection

Industrial trucks must be examined daily or after each shift if used around the clock, and before being placed in service. Operators must report any defects immediately after they are found so that an authorized person can service the truck appropriately. An example pre-operation daily checklist is included at the end of this chapter, but one specific to the truck in service should be available from its manufacturer.

Visual Check

Before starting the vehicle, an operator must conduct a pre-operation (or pre-start) inspection to check a variety of items, including but not limited to:

- Fluid levels — oil, water, and hydraulic fluid
- Leaks, cracks or any other visible defect including hydraulic hoses and mast chains. Operators should not place their hands inside the mast. Use a stick or other device to check chain tension
- Tire condition and pressure including cuts and gouges
- Condition of the forks, including the top clip retaining pin and heel
- Load backrest extension
- Finger guards

- Safety decals and nameplates. Ensure all warning decals and plates are in place and legible. Check that information on the nameplate matches the model and serial numbers and attachments
- Operator manual and legible nameplate
- Operator compartment. Check for grease and debris
- All safety devices are working properly including the seat belt

In addition to this general inspection, operators must check forklift-specific (electric or internal combustion, including liquid propane) features.

Operational Check

After completing the pre-operation inspection, operators should conduct an operational inspection with the engine running. This inspection includes:

- Accelerator linkage
- Brakes
- Drive control: forward and reverse
- Hoist and lowering control
- Horn (mandatory, except for motorized hand trucks)
- Back-up alarm (if equipped)
- Inch control (if equipped)
- Steering
- Tilt control: forward and back
- Attachment control
- Lights
- Hour meter

REPORTING

Employees/operators must report to their supervisor immediately:

- All defects, physical or operational, related to forklifts, including unusual noises or vibrations, leaks, broken parts, deficiencies in operation, etc.

Note: The defect must be fully repaired before the forklift is returned to service.

- All accidents or near misses, regardless of whether or not they were the cause of injury or death. A review of these incidents must take place, and employees must be instructed on safe operating procedures in order to prevent the same or similar events from happening again
- All damage to Company property or the property of others, including the forklift itself, buildings, trailers, rail cars, equipment, products or inventory, etc.

GASOLINE, DIESEL, AND LIQUID PETROLEUM GAS

Handling and Storage

Liquid petroleum gas: Liquid petroleum gas (LPG) is a commonly used fuel for forklifts. It is a safe fuel when handled properly. However, LPG is extremely flammable and extremely cold when exposed to atmosphere. When handled improperly, it can cause serious injury or death. Areas to refuel LPG-powered trucks must permit vapors to dissipate and must be away from heat sources. Only authorized personnel will replace LPG containers. LP gas must be used and stored as specified in 1910.110, “Storage and Handling of Liquefied Petroleum Gases.”

Gasoline and diesel fuel: Refueling with gasoline or diesel presents the potential hazard of exposure to explosive fumes. Handling and storage of gasoline and diesel fuel must adhere to the provisions in 1910.106, “Flammable and Combustible Liquids.”

Refueling

Refueling will be restricted to safe, designated locations that are posted as such, preferably outdoors, and not less than 25 feet from a source of open flame or spark. Safety fuel cans must be provided where forklifts are refueled with gasoline at any location other than a gas pump area.

Forklift operators will adhere to the following requirements and recommended practices:

- Stop the engine during refueling
- Don’t smoke while refueling, and do not check the fuel level with an open flame
- Don’t allow the forklift to become low on fuel or run out of fuel. Sediment or other impurities in the tank drawn into the fuel system can cause difficulties in starting and damage internal components
- Fill the fuel tank at the end of each day
- Don’t fill the tank to the top; it may overflow because fuel expands as it is heated
- Follow correct refueling procedures:
  - Park the forklift in the designated refueling area
  - Place the transmission in neutral
  - Lower the forks to the ground
  - Engage the parking brake
  - Shut off the engine
  - Open the filler cap
  - Fill the tank slowly (if spillage occurs, wipe off and wash area with water)
  - Close the filler cap

Employers must ensure that employees are protected from exposure to airborne contaminants created in exhaust gases (e.g., carbon monoxide) of fossil fuel forklifts when levels approach permissible exposure limits.

CHANGING AND CHARGING BATTERIES

The lead-acid batteries that power electric trucks require routine charging and infrequent changing. If battery-powered forklifts are used, the Safety Committee or the safety coordinator will work with the appropriate personnel to develop facility-specific safety procedures based on manufacturer’s recommendations and the following guidelines:

- The operator will position the truck and apply breaks before the battery may be changed or charged
- Appropriate lifting equipment must be used to lift the battery (a conveyor, overhead hoist, or equivalent), ensuring the safe handling and servicing of the battery
- An employee must not place their body under a forklift or its component(s) unless the truck or component(s) is supported by properly arranged blocks or jack stands capable of supporting, in total, a minimum of 1½ times the weight of the truck or component(s) that is above the employee

- Authorized personnel should only pour acid into water when charging batteries, never the other way around
- Care must be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) must be open to dissipate heat
- Individuals should remove metal jewelry before charging or servicing batteries, and keep all other metallic objects from the top of uncovered batteries
- Appropriate PPE should be worn
- Check the water level. Do not add water before recharging. Record in service log
- Check the voltage. If the battery has sealed vents, do not recharge with a current greater than 25 amperes
- Unplug and turn off the charger before connecting or disconnecting the clamp connections
- Attach the positive clamp (+, usually colored red) to the positive terminal first and then the negative clamp (–, usually colored black) to the negative terminal, keeping the proper polarity
- Turn off the charger if the battery becomes hot or the electrolyte fluid comes out of the vents. Restart charging at a lower charging rate
- Check water level after charging. Add distilled water or de-ionized water if water level is below level indicator. Record in service log
- Return battery to forklift with lifting beam and secure in place after charging
- Check the indicator on the hour meter to see if the battery is fully charged

A spreader bar or equivalent must be used with any overhead battery hoist so that the lifting stresses are vertical.

When a chain-type or hand hoist is used, the battery must be covered to prevent the cell connectors or terminals from shorting on the chain, or on other tools and metallic objects.

Under normal operating conditions, forklift batteries remain in service for 2,000 charge/discharge cycles. The battery maintenance program is designed to increase the life of the batteries and help protect employees.

Battery failure could lead to mechanical breakdowns and possible accidents involving forklift operators and/or other personnel. Therefore:

- Don’t continue a battery in service merely because it continues to deliver power
- Don’t exceed the service hours in the manufacturer’s recommendations
- Don’t overcharge or undercharge batteries
- Avoid discharging batteries beyond the manufacturer’s discharge level. This can result in permanent battery damage and shorten battery life considerably
- Observe and act upon the warning signs of a low battery, including slow starting, dim headlights, and the ammeter indicating discharge at high RPM
- Recycle or properly dispose of batteries. Spent batteries are a hazardous waste unless properly reclaimed at a lead smelter or battery recycler

Appropriate precautions to control the hazards from battery acid include personal protective equipment and a detailed safety procedure formulated by the safety committee to respond to an acid splash or spill.

Battery Charging and Changing Areas

Trained and authorized employees will charge and change batteries only in designated areas. Smoking and other ignition source are forbidden in battery charging areas, including but not limited to open flames, sparks or electric arcs.

Facilities will be provided as needed for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

Employers will assure that their properly equipped battery charging area will have:

- No smoking
- Warning signs posted
- Adequate fire protection
- Ample and readily available water supply for flushing and neutralizing spilled electrolyte
- Adequate protection from corrosive electrolyte solutions, if present, including: any necessary PPE such as eye protection, suitable facilities for the quick drenching or flushing of the eyes and body (an eyewash station should be able to provide a 15-minute flow, and large installations should include a plumbed drench shower) within the work area
- Any necessary PPE, as well as to provide protection from electrolyte solutions
- A phone or other means of communication in the event of an emergency
- Adequate ventilation to avoid the buildup of hydrogen gas during battery charging
- Soda ash or other neutralization materials in the immediate area
- A dry chemical, CO_2 or foam fire extinguisher
- Means to protect charging apparatus from damage from trucks
- Chock blocks, support blocks, or safety/jack stands, for use when there is a hazard from movement, or for support when forklifts are elevated by a hoist or chain

Other Maintenance Concerns

Following are requirements of OSHA regarding the maintenance of forklifts:

- Make repairs to forklifts only in designated locations, away from fire hazards, never in class I, II or III locations
- Replacement parts for trucks must be equivalent to the original parts in terms of safety and the truck’s configuration will not be altered
- Keep open flames away from batteries and fuel tanks and disconnect the battery before making any electrical system repair
- Any alteration, removal or addition of parts, or change in their configuration must be in accordance with manufacturer recommendations, and should generally not be undertaken
- The truck manufacturer must approve additional counterweighting of fork trucks
- Water mufflers must be filled daily or as frequently as is necessary to prevent depletion of the supply of water below 75 percent of the filled capacity
- Vehicles with mufflers having screens or other parts that may become clogged will not be operated while such screens or parts are clogged

- Personnel will immediately remove from service (and repair) any vehicle if:
  - It emits hazardous sparks or flames from the exhaust system
  - The service and parking brakes do not perform their intended function
  - The fuel system leaks
  - A lift cylinder of a load-engaging means allows a downward drift of the load-engaging means, loaded or unloaded, in excess of 5 inches in 5 minutes
  - A tilt cylinder of a mast allows a forward drift of the mast in excess of 2 degrees in 5 minutes with the mast in a vertical position and a capacity load on the fork or load engaging means
  - The steering mechanism allows free play of the steering wheel of more than ¼ turn on trucks capable of speeds up to 8 miles per hour and more than ⅛ turn on trucks capable of speeds over 8 miles per hour
  - A hydraulic system leaks and creates a hazard for employees or equipment in the area
  - It exhibits a part for which the temperature exceeds normal operating temperature (allow the part to cool)
  - It is found to have any part in need of repair, or if the truck exhibits any defect that would render it unsafe or unfit for efficient and capable use
- Employees must keep trucks in a clean condition, free of lint, excess oil and grease. Employees will use only noncombustible agents to clean trucks
- Industrial trucks approved for gasoline may be converted to use liquefied petroleum gas fuel provided the complete conversion results in a truck that embodies the features specified for LP or LPS designated trucks

TRUCK OPERATIONS

OSHA requires forklift operators of to safeguard other employees at all times and to adhere to the following rules to ensure safe operation.

- Don’t drive trucks up to anyone standing in front of a bench or other fixed object
- Don’t stand or pass under the elevated portion of any truck, whether loaded or empty
- Don’t permit unauthorized personnel to ride on forklifts. Regulations permit passengers only when there is a seat under an overhead guard
- Keep arms and legs away from between the uprights of the mast or outside the running lines of the truck
- Maintain a safe distance from the edge of ramps or platforms while on any elevated dock, or platform or freight car. Don’t use trucks to open or close freight doors
- Ensure that there is sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.
- Keep fire aisles, access to stairways, and fire equipment clear
- Don’t use a forklift to tow or push railroad cars, unless it is specifically designed for it. Don’t open or close freight car doors with a forklift unless it’s equipped with attachments designed for that purpose
- When operating a forklift in a hazardous area, only a truck specifically equipped for those types of operations will be used

Maneuvering and Traveling

- Observe all traffic regulations, including speed limits, and maintain a safe distance (approximately three truck lengths) from the truck ahead. Keep the truck under control at all times
- Yield right of way to ambulances, fire trucks, or other vehicles in emergencies
- Do not pass other vehicles traveling in the same direction at intersections, blind spots, or other dangerous locations
- Slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load obstructs forward view, the driver must travel with the load trailing
- Cross railroad tracks diagonally where possible. Park no closer than 8½ feet from the center of railroad tracks

SLOW YOUR ROLL!

Forklift operators must slowdown in the following situations:

- When approaching within three truck lengths of another truck
- At cross aisles and anywhere vision is obstructed
- On grades
- When going too fast to come to a safe stop
- On wet or slippery floors
- On dockboards or bridgeplates
- Approaching elevators
- Negotiating turns.

- Look in the direction of, keep a clear view of, and survey the path of travel before moving and stacking in order to` avoid obstacles
- Ascend or descend grades slowly
- When ascending or descending grades in excess of 10 percent, drive at a speed no more than 2 miles per hour
- When ascending or descending grades in excess of 10 percent, or if the grade exceeds the back-tilt of the mast, loads must face upgrade
- On grades, tilt back the load-engaging means and safely raise the load to clear the road surface
- Unloaded trucks must be driven, on all grades, with the load-engaging means downgrade, tilted back, and raised only as far as necessary to clear the floor or road surface
- Under all travel conditions, operate the truck at a speed that will permit it to be brought to a stop in a safe manner
- Don’t engage in stunt driving or horseplay
- Slow down for wet and slippery floors
- Drive over dockboard or bridgeplates carefully and slowly, maintaining a safe distance from the edges of ramps and platforms, especially on elevated docks
- Approach elevators slowly, entering them squarely only after the elevator car is properly leveled. Once on the elevator, neutralize controls, shut off power and set brakes. Ensure the weight of the load and truck does not exceed the load capacity of the elevator
- Avoid running over loose objects on the roadway surface

- While negotiating turns, reduce speed to a safe level by means of turning the hand steering wheel in a smooth, sweeping motion. Except when maneuvering at a very low speed, turn the hand steering wheel only at a moderate, even rate
- Motorized hand trucks must enter confined areas with load end forward

Load Handling

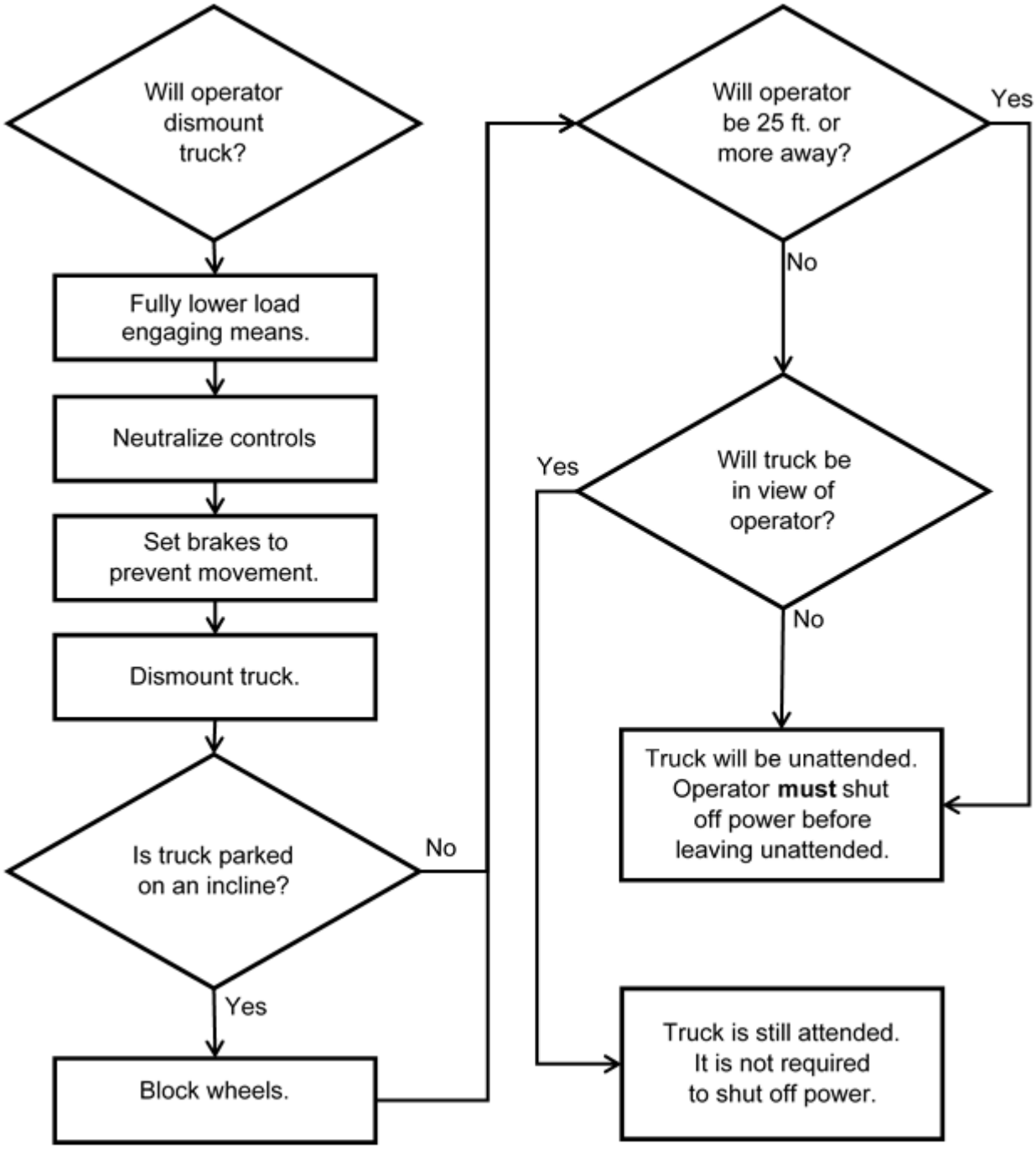
- All loads will be within the rated capacity of the truck. Never exceed rated capacity
- Handle only stable or safely arranged loads. Exercise caution when handling off-center loads which cannot be centered
- Long or high loads that may affect vehicle load capacity when lifted beyond a certain height must be handled with care. Divide the load into smaller quantities or use heavier equipment as necessary
- Ensure that operational safety is maintained when carrying larger loads
- When not handling a load, operate trucks with attachments as partially loaded trucks
- Place the load engaging means under the load as far as possible; carefully tilt the mast backward to stabilize the load
- Use extreme care when tilting the load forward or backward, particularly when high tiering. Don't tilt load-engaging means forward while elevated except to pick up a load. Don't tip an elevated load forward unless the load is in a deposit position over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load

Parking

A forklift operator will adhere to the following procedures (see Figure 1) to dismount the truck:

- A forklift is unattended when the operator is 25 ft. or more away from the vehicle in his view, or whenever the operator leaves the vehicle and it is not in his view
- When the operator of an industrial truck is dismounted and within 25 ft. of the truck still in his view, the load engaging means must be fully lowered, controls neutralized (shut off), and the brakes set to prevent movement. The wheels must be blocked if the truck is parked on an incline
- The parking brake must be capable of holding the truck on the maximum grade that the truck can negotiate with a rated load, or on a 15% grade, whichever is less

PARKING YOUR FORKLIFT



FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- Performance Evaluation for Forklift Operators
- Forklifts Training Record Sheet

PERFORMANCE EVALUATION FOR FORKLIFT OPERATORS

Employee		Date		Time	
Evaluator		Equipment Type			

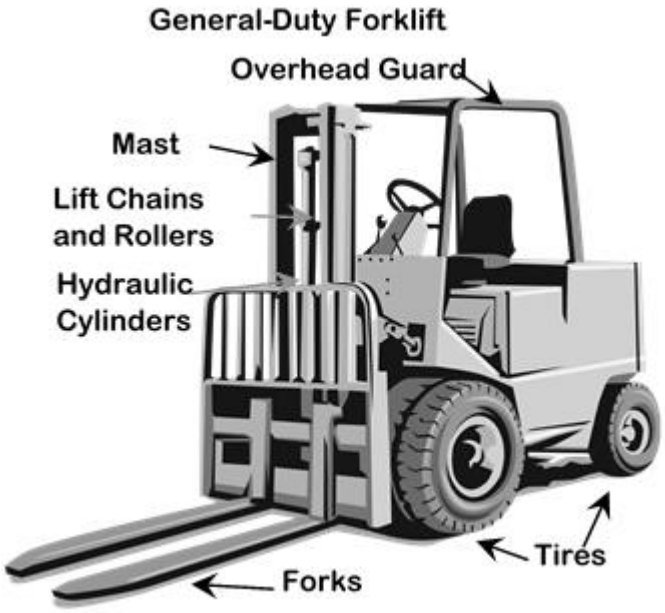
- ☐ Shows familiarity with truck controls.
- ☐ Gave proper signals when turning.
- ☐ Slowed down at intersections.
- ☐ Sounded horn at intersections.
- ☐ Obeyed signs.
- ☐ Kept a clear view of direction of travel.
- ☐ Turned comers correctly—was aware of rear-end swing.
- ☐ Yielded to pedestrians.
- ☐ Drove under control and within proper traffic aisles.
- ☐ Approached load properly.
- ☐ Lifted load properly.
- ☐ Maneuvered properly.
- ☐ Traveled with load at proper height.
- ☐ Lowered load smoothly/slowly.
- ☐ Stops smoothly/completely.
- ☐ Load balanced properly.
- ☐ Forks under load all the way.
- ☐ Carried parts/stock in approved containers.
- ☐ Checked bridge-plates/ramps.
- ☐ Did place loads within marked area.
- ☐ Did stack loads evenly and neatly.
- ☐ Did drive backward when required.
- ☐ Did check load weights.
- ☐ Did place forks on the floor when parked, controls neutralized, brake on set, power off.
- ☐ Followed proper instructions for maintenance—checked both at beginning and end.

Comments					
Total Rating	☐ Excellent	☐ Good	☐ Fair	☐ Poor	☐ Fair
Evalutor Signature			Date		
Operator Signature			Date		

DAILY INSPECTION CHECKLIST FOR FORKLIFTS

Key-Off Procedures

- ☐ Overhead guard
- ☐ Hydraulic cylinders
- ☐ Mast assembly
- ☐ Lift chains and rollers
- ☐ Forks
- ☐ Tires
- ☐ Gas gauge
- ☐ Check the engine oil level
- ☐ Examine the battery
- ☐ Inspect the hydraulic fluid level
- ☐ Check the engine coolant level



Key-On Procedures

- ☐ Front, tail, and brake lights
- ☐ Fuel gauge (if diesel)
- ☐ Windshield wiper
- ☐ Heater

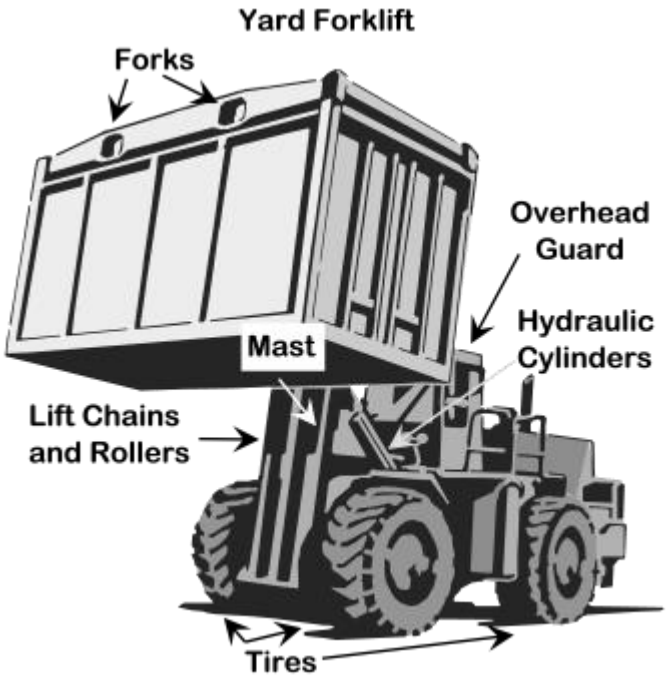
Engine Running Procedures

Gauges

- ☐ Oil pressure indicator lamp
- ☐ Ammeter indicator lamp
- ☐ Ammeter
- ☐ Hour Meter
- ☐ Water Temperature Gauge

Standard Equipment

- ☐ Steering
- ☐ Brakes
- ☐ Horn
- ☐ Safety seat (if equipped)
- ☐ Check the operation of load-handling attachments
- ☐ Check the transmission fluid level



FORKLIFT TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

This chapter covers the use of hand tools, portable electric tools, and fuel powered tools. This information complies with the requirements of OSHA 1910, Subpart P for general industry, or for the construction industry 1926, Subpart I. It does not cover hydraulic, pneumatic or powder-actuated tools; information on these tools are provided in separate chapters.

NOTE: This chapter does not cover electric or fuel powered lawn mowers, chainsaws, or other landscaping equipment. These are covered in separate chapters.

POLICY

The company, to ensure the safe use of tools, has created this policy. This policy is intended to ensure safety for employees who use power and hand tools, and must be followed.

EMPLOYER RESPONSIBILITIES

It is the company's responsibility to:

- Maintain all tools and equipment used by employees in safe, working condition
- Remove unsafe equipment from the worksite
- Ensure employees are properly trained in the safe use and operation of tools and equipment before using or operating the tools and equipment on the job
- Provide personal protective equipment to prevent injury and adverse health effects
- Select and use only tools with appropriate safety guards
- Ensure every job hazard analysis and safe job procedure considers the hazards introduced by power tools and hand tools

EMPLOYEE RESPONSIBILITIES

All company employees are expected to:

- Be aware of hazards presented by tools where they work
- Follow company safety policy and the instructions of the supervisor
- Comply with safe operating procedures for all equipment
- Properly use and maintain personal protective equipment
- Attend and participate in appropriate safety training
- Inspect tools and equipment daily to ensure they are in proper working order
- Report defective tools and equipment, and other safety concerns, and provide safety recommendations as appropriate

SAFE PRACTICES

- All hand and electrically power tools, whether furnished by the employer or the employee, will be maintained in a safe condition
- When power-operated tools are designed to have safety guards, the guards must be installed while the tool is in use

- Never carry a tool by its cord
- Never yank the cord of a tool to disconnect it from the receptacle
- Don’t raise or lower a power tool by its cord
- Keep cords away from heat, oil, and sharp edges
- Disconnect tools when not using them, before servicing and cleaning them, and when changing accessories such as blades, bits, and cutters
- Keep all people not involved with the work at a safe distance from the work area
- Secure work with clamps or a vise, freeing both hands to operate the tool
- Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool
- Maintain tools with care; keep them sharp and clean for best performance
- Follow instructions in the user’s manual for lubricating and changing accessories
- Be sure to keep good footing and maintain good balance when operating power tools
- Follow good housekeeping procedures to keep floors free of debris and hazards
- Don’t allow dust, shavings, or other scraps to accumulate on or near machines, causing an operational hazard
- Wear proper apparel for the task. Do not wear loose clothing, sleeves, neckties, scarves, and jewelry that can become caught in moving parts
- Sharp tools such as chisels, drill bits, and awls must be carried in one of the following ways: with the edges or points protected; in a tool tray; in a cart; in a sheath; in the hand with the sharp edges turned away from the body
- Sharp or pointed tools, when stored in a rack or bin, must have the sharp edges or points inward or otherwise protected or stored to prevent injury
- Anti-kickback aprons must be provided to employees at no expense to the employees, and must be used where material can be kicked back
- Gloves should not be worn while operating machines
- Stationary tools and machines must be located where there is enough space for workers to handle material without interference from, or to, employees or machines. Operators should never have to stand in an aisle while operating a machine unless protection is provided
- Machines designed for a specific location must be secured to a floor, foundation, bench, table, or stand of sufficient strength and design to prevent overturning or unintentional movement
- Tools and machinery must be located so that light with the intensity of at least 50-foot candles from both natural and artificial light falls on the work. Supplementary illumination at the point of operation must be provided where necessary
- Any tool or machine, or component of a tool or machine that is not in proper working order must be immediately removed from service
- Tools and machines must be inspected at regular intervals and will be repaired in accordance with the manufacturer’s specifications. Untrained or unauthorized people must not modify them, and they cannot be returned to service until properly repaired
- Utilize a machine only if it is appropriate for the given task

- Employers must ensure that the height of tables and working surfaces of machines, auxiliary tables, and supports are appropriate and promote the safety of the operator; tables and supports must be large enough so that unwieldy pieces can be handled safely
- All circular saws 20 inches or more in diameter must be etched or otherwise permanently marked to include the manufacturer's designated operating speed; a saw blade must not be operated at a higher speed than shown on the blade. When a marked saw blade is re-tensioned for a different speed, the marking must be corrected to show the new speed

Guards

The exposed moving parts of power tools must be safeguarded. All tools must be used with the correct shield, guard, or attachment recommended by the manufacturer. Belts, gears, shafts, pulleys, sprockets, spindles, drums, flywheels, chains or other reciprocating, rotating or moving parts of equipment must be guarded.

Guards, as appropriate, must be provided to protect the operator and others from the following:

- Point of operation
- In-running nip points
- Rotating parts
- Flying chips and sparks

Safety guards must never be removed or made inoperable when a tool is being used. Machines must not be used for operations of such variety as to necessitate the removal of safeguards.

Portable circular saws must be equipped at all times with guards. They must have guards above and below the base plate or shoe. The upper guard must cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard must cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard must immediately return to the covering position.

Switches and Controls

The following hand-held power tools must be equipped with a constant-pressure switch or control that shuts off the power when pressure is released:

- Drills
- Tappers
- Fastener drivers
- Disc sanders with discs greater than 2 inches
- Horizontal, vertical, and angle grinders with wheels more than 2 inches in diameter
- Belt sanders
- Reciprocating saws
- Saber saws, scroll saws, and jigsaws with blade shanks greater than ¼-inch wide
- Other similar tools

These tools also may be equipped with a “lock-on” control, provided it allows the worker to shut off the control in a single motion using the same finger or fingers.

The following hand-held power tools must be equipped with either a positive “on-off” control switch, a constant pressure switch, or a “lock-on” control:

- Grinders with wheels 2 inches or less in diameter
- Disc sanders with discs 2 inches or less in diameter
- Platen sanders, routers, planers laminate trimmers, nibblers, shears, and scroll saws
- Jigsaws, saber and scroll saws with blade shanks a ¼-inch (+/- .05 in.) or less in diameter

A constant-pressure control switch is the preferred device. Other hand tools such as the following hand-held power tools must be equipped with a constant-pressure switch:

- Circular saws having a blade diameter greater than two inches
- Chain saws
- Percussion tools with no means of holding accessories securely

PERSONAL PROTECTIVE EQUIPMENT

Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases must be provided with the particular personal protective equipment necessary to protect them from the hazard. All personal protective equipment (PPE) will meet NIOSH protective, maintenance requirements and OSHA regulations.

The required PPE when working with hand and power tools can include, but is not limited to:

- Snug-fitting clothing
- Hearing protection
- Eye and face protection
- Heavy-duty leather gloves
- Respiratory protection

HAND TOOLS

Wrenches, including adjustable, pipe, end and socket wrenches must not be used when jaws are sprung, cracked, or distorted to the point that slippage occurs. Impact tools, such as drift pins, wedges and chisels, must be kept free of mushroomed heads.

The wooden handles of tools must be kept free of splinters or cracks and must be kept tight in the tool. When hammering, use a hammer, not a tool designed for other purposes. All damaged or cracked tools, including saws, will be removed from service. Knives and scissors must be kept sharp.

When using saw blades, knives or other tools, direct tools away from aisle areas and other employees in close proximity.

Iron or steel hand tools may produce sparks that can ignite nearby flammable substances. Spark-resistant tools made of non-ferrous materials must be used where flammable gases, highly volatile liquids, and other explosive substances are stored or used.

- Try to avoid prying, pulling, wedging, or lifting at sharp angles or overhead
- Wear eye protection and, where necessary, face protection

Use the following safe practices when working with hand tools.

Axes and Hatchets

- Unless it has a striking face, don't use the hatchet as a hammer. The head or the wooden handle can crack and break
- Hatchets with striking faces will only be used for driving common nails, not for striking chisels, punches, drills, or other hardened metal tools
- Never use an axe or hatchet as a wedge or chisel and strike it with a hammer
- Most carpenters prefer a hatchet with a solid or tubular steel handle and a hammerhead with a slot for pulling nails

Claw Hammers

- Start with a good quality hammer of medium weight (16 ounces) with a grip suited to the size of your hand
- Rest your arm occasionally to avoid tendinitis. Avoid overexertion in pulling out nails. Use a crow bar or nail puller when necessary
- When nailing, start with one "soft" hit, that is, with fingers holding the nail. Then let go and drive the nail in the rest of the way
- Strike with the hammer face at right angles to the nail head. Glancing blows can lead to flying nails. Clean the face with sandpaper to remove glue and gum. Don't use nail hammers on concrete, steel chisels, hardened steel-cut nails, or masonry nails
- Discard any hammer with a dented, chipped, or mushroomed striking face or with claws broken, deformed, or nicked inside the nail slot

Crow Bars

The tools include pry bars, pinch bars and wrecking bars. Shorter ones usually have a curved claw for pulling nails and a sharp, angled end for prying. Loads levered, lifted, or shifted by bars can land on fingers and toes.

- Make sure to clear the area and maintain control of the load
- Have enough rollers and blocking ready
- Never put fingers or toes under the load

Cold Chisels

Cold chisels are used to cut or shape soft metals as well as concrete and brick. In time the struck end will mushroom. This should be ground off. Don't use chisels with mushroomed heads. Fragments can fly off and cause injury.

Hand Planes

- Use only a plane that is suited to the job, and keep the iron sharp

- For long surfaces like door edges, use a fore plane 18" long and 2 ⅜" wide or a jointer plane 24" long and 2 ⅝" wide
- Square cutting heads must not be used on jointers and planers
- For shorter surfaces, use a jack plane 15" long and 2 ⅜" wide or a smoothing plane 10" long and 2 ⅜" wide
- Remember that sharp tools require less effort and reduce the risk of fatigue, overexertion, and back strain
- Work can also be easier with a door jack and supports on your workbench

Hand Saws

- Select the right saw for the job
- A 9 point is not meant for crosscutting hardwood. It can jump up and severely cut the worker's hand or thumb. Use an 11 point (+) saw for this kind of work
- When starting a cut, keep your thumb up high to guide the saw and avoid injury
- For cutting softwood, select a 9 point (-). The teeth will remove sawdust easily and keep the saw from binding and bucking
- Ripping requires a ripsaw

Plumb Bobs

- Designed for use in windy conditions, a mercury-filled plumb bob has considerable weight in proportion to its surface area
- The weight and point of the bob can make it dangerous
- Ensure that all is clear below when you lower the bob
- Don't let it fall out of your pocket, apron, or tool bag

Screwdrivers

- Do not use screwdrivers for prying, scraping, chiseling, scoring, or punching holes
- Only use a screwdriver that fits or matches the fastener
- Do not hold an object being worked on with a screwdriver in your hand, in your lap, or under your arm, except when protection is afforded by the object or other means
- A screwdriver used for electrical work must be equipped with a nonconductive handle
- Always make a pilot hole before driving a screw. Power drivers present obvious advantages when screws must be driven frequently or repeatedly

Sledgehammers

- When using a sledgehammer to drive thick tongue-and-groove planking tightly together, use a block of scrap wood to prevent damage to the planks
- Use sledgehammers carefully, serious bruises and broken bones have been caused by sledgehammers off-target and out of control
- Always check handle and head. Make sure head is secure and tight. Replace damaged handles
- Always wear eye protection

Utility Knives

- Use knives with retractable blades only. If used, fixed-blade knives must be carried in a protective sheath or equivalent
- Always cut away from your body, especially away from your free hand. When you're done with the knife, retract or sheathe the blade at once. A blade left exposed is dangerous, particularly in a toolbox

Wood Chisels

- Keep your hand that holds the work behind, not in front of, the chisel
- Keep chisels sharpened
- Keep chisels stored in a toolbox with protective caps when not in use
- Never use a chisel for prying
- Repeatedly striking the chisel with the palm of your hand may lead to repetitive strain injury
- With chisels and other struck tools, always wear eye protection
- Gloves are recommended to help prevent cuts and bruises

ELECTRIC TOOLS

- Operate electric tools within their design limitations according to manufacturer's instructions
- Use gloves and appropriate safety footwear when using electric tools
- Store electric tools in a dry place when not in use
- Do not use electric tools in damp or wet locations unless they are approved for that purpose
- Keep work areas well lighted when operating electric tools
- Ensure that cords from electric tools do not present a tripping hazard
- Unplug the tool before making adjustments or changing attachments
- The use of electric cords for hoisting or lowering tools must not be permitted
- Remove all damaged portable electric tools from use and tag them: "Do Not Use"

Electric Safety Features

To protect the user from shock and burns, electric tools must have a three-wire cord with a ground and be plugged into a grounded receptacle, be double insulated, or be powered by a low-voltage isolation transformer. Three-wire cords contain two current-carrying conductors and a grounding conductor. Any time an adapter is used to accommodate a two-hole receptacle, the adapter wire must be attached to a known ground. The third prong must never be removed from the plug.

Double-insulated tools are available that provide protection against electrical shock without third-wire grounding. On double-insulated tools, an internal layer of protective insulation completely isolates the external housing of the tool.

In the construction industry, employees who use electric tools must be protected by ground-fault circuit interrupters (GFCI) or an assured equipment-grounding conductor program (AEGCP).

SAWS

The general safe practices listed below must be followed when operating any type of saw.

General Safety

The practice of inserting wedges between the saw disk and the collar to form what is commonly known as a wobble saw is prohibited.

Blade Guards

All portable, power-driven circular saws having a blade diameter greater than 2 in. must be equipped with guards above and below the base plate or shoe. The upper guard must cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard must cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard must automatically and instantly return to covering position.

Never operate an electric saw with the lower guard tied or wedged open. The saw may kick back and cut you, or another worker who uses the saw.

An exposed blade, still in motion, will force the saw to move, cutting anything in its path. Make sure that the lower guard returns to its proper position after a cut. Never operate a saw with a defective guard-retracting lever.

On most saws, the lower guard is spring-loaded and correct tension in the spring will automatically close the guard. However, a spring weakened by use and wear can allow the guard to remain open after cutting. Maintain complete control of the saw until the blade stops turning. Note: The guard may also be slow to return after 45° cuts.

Brake

An electric brake on some circular saws stops the blade from coasting once the switch is released. This greatly reduces the danger of accidental contact.

Trigger Safety

On some light-duty saws, a latch prevents the operator from accidentally starting the motor. The trigger on the inside of the handle cannot be pressed without first pressing a latch on the outside of the handle. On heavy-duty saws, a bar under the trigger switch helps to prevent accidental starting.

Clutch

Some worm-drive saws are equipped with a clutch to prevent kickback. Kickback occurs when a saw meets resistance and violently backs out of the work. The clutch action allows the blade shaft to continue turning when the blade meets resistance. The blade stud and friction washer can be adjusted to provide kickback protection for cutting different materials. Check friction washers for wear.

Blades

Understand the different designs, types and uses of blades, and only use blades suited for the job.

Blades should be sharpened or changed frequently. The teeth on a dull or abused blade will turn blue from overheating. Cutting will create a burning smell. Such blades should be discarded or reconditioned.

Re-sharpened blades can be substantially reduced in diameter. Make sure that the blade diameter and arbor diameter are right for the saw.

- Before changing or adjusting blades, disconnect the saw from the power source
- Ensure that arbor diameter and blade diameter are right for the saw
- Make sure it is clean and free of nails, concrete and other foreign objects. This precaution not only prolongs blade life but may also prevent serious injury
- Ensure that blades are installed in the proper rotational direction
- Do not strike metal when using a carbide-tipped blade. The tips can come loose and fly off, ruining the blade and injuring the operator. Inspect the blade regularly for cracked or missing tips

Changing, Adjusting, and Setting Blades: when changing blades, take the following precautions:

- Disconnect the saw from the power source
- Place the saw blade on a piece of scrap lumber and press down until the teeth dig into the wood. This prevents the blade from turning when the locking nut is loosened or tightened
- Make sure that keys and adjusting wrenches are removed before operating the saw

Proper adjustment of cutting depth keeps blade friction to a minimum, removes sawdust from the cut and results in cool cutting.

- The blade should project the depth of one full tooth below the material to be cut
- Carbide-tipped blades or miter blades should project only half a tooth below the material

If the blade is to run freely in the kerf (saw cut), teeth must be set properly, that is, bent alternate. The setting of teeth differs from one type of blade to another. Finer toothed blades require less set than rougher-toothed blades. Generally, teeth should be alternately bent ½ times the thickness of the blade. Sharp blades with properly set teeth will reduce the chance of wood binding. They will also prevent the saw from overheating and kicking back.

Safe Saw Practices

- Place the material to be cut on a rigid support such as a bench or two or more sawhorses
- Make sure that the blade will clear the supporting surface and the power cord
- The wide part of the saw shoe should rest on the supported side of the cut if possible
- Plywood is one of the most difficult materials to cut with any type of saw. The overall size of the sheet and the internal stresses released by cutting are the main causes of difficulty
    - Large sheets should be supported in at least three places, with one support next to the cut
    - Short pieces of material should not be held by hand. Use some form of clamping to hold the material down when cutting it

- NEVER use your foot or leg to support the material being cut
- Place the material to be cut with its good side down, so that if any splintering occurs, will be on the upper side
- Use just enough force to let the blade cut without laboring
- Never place a handheld saw in a fixed, upside-down position and feed material into it. Use a table saw instead
- When cutting, don't force the saw back onto line. Withdraw the blade and either start over on the same line or begin on a new line
- Keep the cord on the same side of your body as your cutting hand
- Stand to one side of the cutting line
- Never reach under the material being cut
- Always keep your free hand on the long side of the lumber and clear of the saw
- Maintain a firm, well-balanced stance, particularly when working on uneven footing

Plywood, wet lumber and lumber with a twisted grain tend to tighten around a blade and may cause kickback. Kickback occurs when an electric saw stalls suddenly and jerks back toward the operator. The momentarily exposed blade may cause severe injury.

Pocket Cutting

- Tilt saw forward
- Rest front of shoe on wood
- Retract lower guard
- Lower saw until front teeth almost touch wood
- Release guard to rest on wood
- Switch on the saw
- Keep the saw tilted forward, push it down, and forward with even pressure gradually lowering it until shoe rests flat on wood

DRILLS

Types

- Light duty drills are usually ¼ or ⅜ inch trigger-controlled variable speed drill
- Heavy duty drills are usually select the slower but more powerful one- or two-speed reversible ½ or ¼ inch drill
- Size of the drill is determined by the maximum opening of the chuck. For instance, a ⅜ inch drill will take only bits or attachments with a shank up to ⅜ inch wide
- For drywall screws, a drywall screw gun should be used. The driving bit should be replaced when worn

Attachments

Attachments such as speed-reducing screwdrivers, disk sanders and buffers can help prevent fatigue and undue muscle strain. A right-angle drive attachment is very useful in tight corners and other hard-to-reach places.

- Cutting and drilling attachments must be kept sharp to avoid overloading the motor
- Never crowd or push the tool beyond capacity
- Some attachments, such as hole saws, spade bits, and screwdrivers, require considerable control by the operator. If you do not feed the attachment slowly and carefully into the material, the drill can stop and severely twist or break your arm
- Stock should be clamped or otherwise secured to prevent it from moving
- Restrain the drill just before the bit or cutting attachment emerges through the material, especially when oversized spade bits are used
- Select the bit or attachment suitable to the size of the drill and the work to be done
- Make sure that the bit or attachment is properly seated and tightened in the chuck

Some operations require the use of an impact or hammer drill. For instance, drilling large holes in concrete or rock with a carboloy bit should be done with an impact drill

Follow manufacturer's instructions when selecting and using a bit or attachment, especially when working with drills or performing unfamiliar work.

SAFE DRILL PRACTICES

General Safety

Working with Small Pieces

- If a small piece starts to twist or spin with the drill, you can be injured
- Small work pieces should be properly secured and supported
- Never try to drill with one hand and hold a small piece of material with the other

Drilling from Ladders

- The top and bottom of the ladder must be secured to prevent the ladder from slipping or sliding
- Never reach out to either side. Overreaching can cause the ladder to slide or tip
- Never stand on the top step or paint shelf of a stepladder. Stand at least two steps down from the top
- When working from an extension ladder, stand no higher than the fourth rung from the top
- Never support yourself by holding onto a pipe or any other grounded object

Operation

- Always plug in the drill with the switch OFF
- Before starting to drill, turn on the tool for a moment to make sure that the shank of the bit or attachment is centered and running true
- Punch a layout hole or drill a pilot hole in the material so that the bit won't slip or slide when your start drilling. A pilot hole is particularly important for drilling into hard material such as concrete or metal
- With the drill OFF, put the point of the bit in the pilot hole or punched layout hole
- Hold the drill firmly in one hand or two hands, as necessary, at the correct drilling angle

- Turn on the switch and feed the drill into the material with the pressure and control required by the size of the drill and the type of material
- Don't enlarge a hole by reaming it out with the sides of the bit. Switch to a larger bit
- While drilling deep holes, especially with a twist bit, withdraw the drill several times with the motor running to clear the cuttings
- Never support material on your knee while drilling. Material should be firmly supported on a bench or other work surface for drilling
- Unplug the drill and remove the bit as soon as the work is finished
- When drilling into floors, ceilings, and walls, beware of wiring and plumbing
- Rotary and hammer drills generate extreme torque and must be handled with caution. Take occasional breaks to relax your arms and shoulders

Drilling Timbers

- When drilling timbers with a self-feeding auger bit, use a heavy-duty, low-rpm drill, ½ or ¼ inch in size
- Never attempt to drill heavy timbers by yourself, especially when working on a scaffold or other work platform

Other Materials

The main hazard in drilling materials other than wood is leaning too heavily on the tool. This can not only overload and burn out the motor but also cause injury.

- Always use a drill powerful enough for the job and a bit or attachment suited to the size of the drill and the nature of the work
- Punch a layout hole or drill a pilot hole can make the job safer and more efficient
- Use a drill press stand for drilling holes in metal accurately and safely
- Clamp small pieces in a vise and bolted to the table
- A drill press can also be used for cutting large holes in wood with a hole saw or speed bit

PLANES

Electric planes are available in various types and sizes, and are operated in similar ways. Depending on specific features, adjustments between models may differ.

Planes may be equipped with:

- Outfeed tables (back shoes) that are either fixed or movable
- Infeed tables (front shoes) that move straight up and down or move up and down on an angle to keep the gap between cutter head and table as small as possible
- Cutter heads with two or more straight blades (also called knives or cutter blades) or cutter heads with two curved blades

Never operate an electric plane while wearing a scarf, open jacket, or other loose clothing. Keep long hair tied up. Always wear eye protection and practice good housekeeping.

Standard Plane

- Hold with both hands to avoid contact with cutter blades
- Always keep both hands on the plane until motor stops
- Use the edge guide to direct the plane along the desired cut
- Never try to guide the plane with your fingers

Block Plane (Electric)

Designed for use on small surfaces, the block plane is operated with only one hand. It is more dangerous than the larger, standard plane. Keep your free hand well out of the way, in case the plane slips accidentally.

Plane Maintenance

- Make sure the work is free of obstructions: staples, nails, sand, or other foreign objects
- Keep blades in good condition and sharp
- Use a fine-grit oilstone when sharpening blades. Blades can be re-sharpened several times if they are not nicked or cracked

Changing Blades

Time and patience is required when raising or replacing cutter blades. Blades must be the same weight and seated at the same height to prevent the cutter head from vibrating. Any deviation can cause the head to run off balance. Blades can fly out and injure you or fellow workers.

Removing Blades

- Disconnect the plane from the power source. Turn the plane upside down and secure it in a fixed position
- Hold the cylinder head stationary by tapping a softwood wedge between the cutter head and the bearing (some tools are equipped with a locking device)
- Loosen all the screws and lift out one blade and throat piece. Turn the cutter head and repeat this procedure with other blades
- If necessary, clean parts thoroughly with recommended solvent

Installing Blades

- Replace one throat piece and blade. Tighten the two end screws lightly
- Take a hardwood straight edge and use the outfeed table (back shoe) as a gauge. Raise or lower the blade until both ends are level with the outfeed table at the blade’s highest point of revolution
- Tighten up the remaining screws. Set the rest of the blades in the same way. Turn the cylinder head and make sure that all blades are the same height
- Tighten up all the screws. Double-check the height of all blades. Tightening can sometimes shift the set. Double-check all the screws
- Turn the tool right side up and plug it in. Hold the tool in both hands with the cutter blades facing away from you and switch it on

Safe Plane Practices

- Always disconnect the plane from the power source before adjusting or changing blades or the cutter head
- For safe operation, make sure that blades (at their highest point of revolution) are exactly flush with the outfeed table
- Make sure to support work securely for safety and accuracy
- Use a jack (e.g. when planing doors and large pieces of plywood) to secure material and keep edges clear of dirt and grit
- When using an electric block plane, clamp or fasten the workpiece whenever possible. Keep your free hand well away from plane and material
- When using the standard power plane, adjust edge guide to desired guidance
- Adjust depth of cut to suit the type and width of wood to be planed
- To start a cut, rest the infeed table (front shoe) firmly on the material with cutter head slightly behind the edge of the material
- After finishing a cut, hold both hands on the plane until motor stops

RADIAL ARM SAWS

The motor and blade of the radial arm saw are suspended above the table. Because the motor and blade assembly can be locked in different positions, and can travel during the cut, you must pay special attention to keeping fingers and hands clear.

Injuries involving radial arm saws tend to be serious. By using appropriate guards and procedures, however, you can safely use the saw for crosscuts, miter cuts, ripping and dadoes.

Set-Up

- The saw must be adequately powered for the work
- Only use a radial arm saw in a well-lit area out of the way of traffic, with enough space to store and handle long lengths of wood
- Mark the floor with yellow warning lines to keep other personnel back from the saw
- Make sure all safety guards and devices are in place
- Choose the right blade for the job. A sharp tungsten carbide combination blade is good for both crosscutting and ripping without frequent re-sharpening

General Procedures

- Follow basic saw safety
- If you don’t have someone to help with long stock, use a roller stand or extension table to support the work
- Always return the motor head to the column stop
- When crosscutting or mitering, keep hands at least six inches away from the blade. Do not adjust length of cut until the motor is back at column
- Slope the tabletop back slightly to keep the blade at the column, to prevent it from contacting stock being placed in position

- Do not allow the blade to cut too quickly when crosscutting or mitering
- Avoid drawing the blade completely out of the cut. The cut piece, whether large or small, often moves. When the saw is rolled back towards the column, the teeth can grab the piece and shoot it in any direction
- Do not cut by pushing the saw away from you into the stock. The material can lift up and fly over the fence

Ripping and Crosscutting

- For regular ripping, turn the motor away from the column to the in-rip position. Feed stock into the saw from the right side
- To cut wide stock, change the saw to the out-rip position. Feed stock into the saw from the left side. Remember – the blade must turn up and toward you when feeding the stock
- Do not force the cut. Allow the blade through the wood at its own pace
- To avoid kickback, take the following precautions:
  - Maintain proper alignment of the blade with the fence
  - Adjust the anti-kickback device to ⅛ inch below the surface of stock being fed
  - Use a sharp blade, free of gum deposits and with teeth properly set
- When binding occurs, stop the saw and open the kerf with a wedge
- After completing the cut, remove the stock from the rotating blade to prevent overheating and possible kickback
- Always push the stock all the way through past the blade
- Do not leave the machine with the motor running
- Use a push stick when ripping narrow pieces. Have suitably sized and shaped push sticks for other jobs as well. See more information on push sticks and feather boards under “Table Saws”

Jigs

- Keep commonly used jigs on hand. Jigs such as those for making stair and doorframe wedges and tapers are designed to carry stock past the blade with the saw locked in the rip position
- When you are drawing the saw into the stock, clamp or nail jigs to the table to prevent slipping

Re-Sawing with Blade Horizontal

The rip fence on the radial arm saw is too low to support material to be re-sawn on edge. Therefore, the material must be placed flat on the table and the motor must be turned so the blade is parallel to the table. The closeness of the arbor requires an auxiliary tabletop and fence to re-saw thin stock.

Because the kickback fence can’t be used, and controlling stock is sometimes difficult, re-sawing on the radial arm saw can be hazardous.

- If no other equipment is available, rip the stock halfway through, then turn it around, and complete the cut
- On the second cut, be sure to push the two halves well past the blade once they have been cut apart. Push sticks and feather boards clamped to the table can reduce hazards

Dadoes

A dado head is an essential tool for cutting grooves, rabbets and dadoes. A groove is cut with the grain; a dado is cut across the grain; and a rabbet is a shoulder cut along the edge of a board.

- Dado heads do not run at the peripheral feed speed on a big radial arm saw. Which can result in either stopping the motor or lifting the work and throwing it back
- To prevent this, make several light passes, lowering the dado head ⅛ to ¼ inch each time
- Always make sure guards are in place before starting dado work
- Proper rotation of the teeth is up and toward you

Other Accessories

Rotary accessories of various types are advertised as turning the radial arm saw into a multi-function machine. Remember that the saw has its limitations.

Possible problems include the following:

- Shaper heads run too slowly for safe and smooth work. Templates, jogs, and fixtures that remove the operator's hands from the points of operation of shapers must be used when the nature of the work permits such use
- Grinding stones may run too fast or slow, and are not recommended
- Sanding drums tend to run too fast and may burn the wood

ROUTERS

A portable electric router can be used to cut dadoes, grooves, mortises, dovetail joints, moldings and internal or external curves. The router motor operates at very high speed (up to 25,000 rpm) and turns clockwise.

General Safety

- When starting a router with a trigger switch in the handle, keep both hands on the tool to absorb the starting torque
- When starting a router with a toggle switch on top of the motor, hold the router firmly with one hand and switch on power with the other, then put both hands on the tool for control and accuracy
- Always wear eye protection. Hearing protection may also be required. Remember, the speed and power of a router requires that it be operated with both hands
- The pulleys, spindles and cutting tools on routers must be guarded. Turn plates, jigs, and fixtures requiring the operator's hands to be removed from the point of operation may be used as a point of operation guard

Safe Router Practices

- Always support and secure the work with a vise or clamps. Never try to hold the work down with your hand or knee. Never rely on a second person to hold the material
- Make sure that the bit is securely mounted in the chuck and the base is tight

- Set the base on the work, template, or guide and make sure that the bit can rotate freely before switching on the motor
- Make sure that the cutting edge of the router bit contacts the material to the left of the cutting direction. Otherwise, the router will kick back or fly away from you
- Guide the router around the work counter-clockwise. Splinters left at corners by routing across the grain will be removed by the next pass with the grain
- Feed the router bit into the material at a firm but controllable speed appropriate to the type of material being cut

SABER, SCROLL AND JIGSAWS

The saber saw (or portable jigsaw) is designed for cutting external or internal contours. The saw should not be used for continuous or heavy cutting that can be done more safely and efficiently with a circular saw.

The reciprocating saw is a heavier type of saber saw with a larger and more rugged blade. This tool is often used by drywall and acoustical workers to cut holes in ceilings and walls. Equipped with a small swivel base, the saw can be used in corners or free hand in hard-to-reach places. The reciprocating saw must be held with both hands to absorb vibration and to avoid accidental contact.

Eye protection is required. Depending on conditions, you may also need respiratory protection.

Choosing the Proper Blade

Various blades, ranging from 7 to 32 teeth per inch, are available for cutting different materials. For the rough cutting of stock such as softwood and composition board, a blade with 7 teeth per inch will cut the fastest. For all-round work with most types of wood, a blade with 10 teeth per inch is satisfactory.

Safe Jigsaw Practices

Cutting

- Clamp the material as close to the cutting line as possible
- Before starting a cut, make sure that the saw will not contact the clamps, vise, workbench, or other support
- Never reach under the material being cut. Never lay down the saw until the motor has stopped
- Do not try to cut curves so tight that the blade will twist and break
- Always hold the base or shoe of the saw in firm contact with the material being cut

Note: When sawing into floors, ceilings, or walls, always check for plumbing and wiring.

External Cut

To start an external cut (from the outside in):

- Place the front of the shoe on the material
- Make sure that the blade is not in contact with the material or the saw will stall when the motor starts

- Hold the saw firmly and switch it on
- Feed the blade slowly into the material and maintain an even pressure
- When the cut is complete, do not lay down the saw until the motor has stopped

Inside Cuts

To start an inside cut (pocket cut):

- Drill a lead hole slightly larger than the saw blade
- With the saw switched off, insert the blade into the hole until the shoe rests firmly on the material
- Do not let the blade touch the material until the saw has been switched on

It is possible to start an inside cut without drilling a lead hole first — but only when it's necessary. To do this:

- Rest the front edge of the shoe on the material with the saw tipped backward. Keep the blade out of contact with the material
- Switch on the saw and slowly feed the blade into the material while lowering the back edge of the shoe
- When the shoe rests flat on the material and the blade is completely through, proceed with the cut
- Never try to insert a blade into, or withdraw a blade from, a cut or a lead hole while the motor is running
- Never reach under the material being cut

TABLE SAWS

The table saw most often used in construction is the 10-inch belt-driven tilting arbor saw. The dimension refers to the diameter of the saw blade recommended by the manufacturer.

General Safety

Basket Guards

- Basket guards may be fastened to the splitter, or hinged to either side of the saw on an L-shaped or S-shaped arm
- Keep the basket guard in place for normal operations such as straight and bevel ripping and miter cutting
- When the guard is removed to permit cutting of tenons, finger joints, rabbets, and similar work, use accessories such as feather boards, holding jigs, push sticks, and saw covers
- Some split basket guards have a see-through cover. Sheet metal baskets fastened to the splitter are less effective because you cannot see the saw blade

Kickback

To avoid kickback of the stock when cutting:

- Never stand directly behind the blade when cutting. Stand to one side. See that other workers stand clear as well

- Make sure the rip fence is aligned for slightly more clearance behind the blade than in front. This will help prevent binding
- Use a sharp blade with teeth properly set for the wood being cut. A dull or badly gummed blade will cause friction, overheating, and binding
- Install a splitter to keep the kerf (cut) open behind the blade. Also effective are anti-kickback fingers attached to the splitter

Splitters

Splitters prevent the kerf from closing directly behind the blade. Ideally, they should be slightly thinner than the saw blade and manufactured from high tensile steel. Splitters are not always needed with carbide-tipped saw blades, whose relatively wide kerf may provide the desirable clearance.

Disappearing splitters with anti-kickback fingers can be pushed down when in the way of a workpiece and pulled up if necessary after the machine has been shut off.

Roller Stand

A roller stand provides support when working with long pieces of stock. When using a roller stand:

- Adjust the height slightly lower than the saw table to allow for sagging of the material
- Set up the stand so the roller axis is at 90 degrees to the blade

Whatever the design, a support stand should be standard equipment in every carpentry and millwork shop. It can be used as an extension to a workbench, jointer or band saw and is especially important with the table saw.

Extensions

Made of wood or metal, tabletop extensions installed behind and to both sides of the machine can make the cutting of large sheets of plywood and long stock safer and more efficient.

In most cases, a space must be provided between extension and saw top for adjusting the basket guard and allowing scrap to fall clear.

Rip Fence

The rip fence is used mainly to guide the stock and maintain correct width of cut.

Adjust the fence slightly wider at the back to let the wood spread out behind the cut and reduce the risk of kickback.

You can add a piece of hardwood to the rip fence in order to rip thin pieces of wood and make dadoes and rabbets. The auxiliary fence can be set close to the cutters without the risk of contact between the blade and the steel fence.

Push Sticks and Feather Boards

Push sticks and feather boards are used when cutting narrow pieces of stock.

- Push sticks should be painted or otherwise marked to prevent loss

- The heel of the push stick should be deep enough to prevent it from slipping and strong enough to feed the stock through the saw
- A feather board clamped immediately in front of the saw blade will provide side pressure to the stock without causing binding and kickback. Use a push block to feed stock all the way through the saw

Safe Table Saw Practices

- Follow basic saw safety
- Keep the floor around the saw clear of scrap and sawdust to prevent slipping and tripping
- Always stop the machine before making adjustments. Before making major adjustments, always disconnect the main power supply
- Select a sharp blade suitable for the job
- Use the safety devices such as push sticks and feather boards
- Make sure nobody stands in line with a revolving blade
- Don't let anyone or anything distract you when you are operating the saw
- Keep your fingers folded in a fist rather than extended as you feed work into the saw
- Never reach around, over, or behind a running blade to control the stock
- Follow the manufacturer's recommendations in matching the motor size to the saw.
- Table saws must be properly grounded
- Check the power supply for ground and always use a ground fault circuit interrupter
- Extension cords must be of sufficient wire gauge for the voltage and amperage required by the saw and for the length of the run

JOINTERS

Jointers, also known as planers, used to make flat edges on boards are generally hand feed devices, and for that reason, use extreme care when feeding stock into or out of the cutting area.

Safe Jointer Practices

- Hand-fed planers and jointers with a horizontal or vertical head must have a cylindrical cutting head, and the knife projection must not extend more than 1/8-inch beyond the body of the head
- Square cutting heads must not be used on jointers and planers
- The opening in the jointer table must be kept as small as possible. The clearance between the edge of the rear table and the cutter head must not be more than 1/8 inch
- The table throat opening must not be more than 2½ inches when tables are set for zero cut
- A proper push block must be used when jointing short or narrow stock
- A hand-fed jointer with a horizontal or vertical cutting head must have an automatic guard covering all the sections of the cutting head on the working side of the fence or gauge; it must also have a guard covering the section of the head in back of the gauge or fence
- Each wood jointer with vertical head must have either an exhaust hood or other guard to enclose the revolving head, except for a slot wide enough for the application of the material to be jointed

- The minimum length of the piece jointed must not be less than four times the distance between the two tables. Neither half of the jointer table should be adjusted horizontally so that the clearance between the edge of the table and revolving knives is more than ¼ inch

QUICK-CUT SAWS

Hand-held portable circular cut-off saws are commonly known as “quick-cut saws.” They are widely used for cutting concrete, masonry products, sheet metal products (both steel and aluminum), and light steel sections such as angles and channels.

Hazards

Quick-cut saws are high-powered compared to similar tools. Hazards include high-speed blade rotation, blade exposure during operation, and exhaust from the internal combustion engine (the usual power source).

The saws create clouds of dust when dry-cutting masonry and showers of hot sparks when cutting metal products, especially steel.

These hazards can result in cuts, kickbacks, exposure to carbon monoxide fumes, exposure to dusts (silica from concrete and masonry products in particular), burns, flying particles hitting the eye, and other injuries from flying material when work is not secured for cutting or when blades fly apart.

These hazards can be controlled by:

- Using quick-cut saws properly and wearing the right protective equipment such as eye, hearing, and respiratory protection as well as face shields and gloves
- Securing work to keep it from shifting during cutting
- Being cautious around sharp edges left by cuts
- Keeping saws in good working condition, equipped with proper blades or disks, and used with all guards in place

A cut-off saw that strokes automatically without the operator’s control of each stroke must have a guard to keep the operator’s hands from coming in contact with a blade.

Care

- Quick-cut saws must be serviced and maintained in accordance with the manufacturers’ instructions
- Replacement parts should be those recommended by the manufacturer
- Cracked, broken, or worn parts should be replaced before the saw is used again
- Guards and air-intakes should be cleaned regularly and often
- Abrasive disks should be checked before installation and frequently during use
- Correct any excessive blade vibration before trying to make a cut
- In confined areas, make sure that ventilation is adequate

Safe Quick-Cut Saw Practices

Most of the following procedures are for gasoline-powered quick-cut saws.

Fueling

- Always shut off saw before fueling. Keep fuel container clear of work area
- Use caution when preparing the oil/gasoline mixture and when fueling the saw
- No smoking or ignition sources are allowed in the area where fuel is mixed or tanks are filled
- Fill the tank outdoors in a well ventilated space at least 10 feet from the area where the saw will be used. Spilled fuel should be wiped off the saw
- Avoid fueling the saw on or near formwork
- Don't overfill the saw or run it without securing the fuel tank cap
- Check the saw for leaks

Starting

- Start the saw in an area clear of people and obstacles
- Put the saw on a smooth hard surface for starting
- Set the guard for the type of cut before starting
- Assume a solid well-balanced stance
- Set one foot on the rear handle
- Put one hand on the top handle to lift the blade off the surface, and use the other hand to pull the starter cord
- Once the saw is running, release the throttle and make sure the engine drops to idle without the disk or blade moving
- Run the engine at full throttle and let the disk or blade run freely to make sure it turns on the arbor without wobbling or vibrating

Operation

One of the major hazards with quick-cut saws is failure to support and secure the work to be cut.

The saw is powerful enough to throw material around unless it is securely held and supported. Standing on material to hold it down is not recommended.

For repeated cuts of masonry or metal pieces, a jig is ideal for efficiency and safety. The jig should be designed and built to hold material in place after measurement without further manual contact.

Stance and Grip

- The quick-cut saw is a heavy, powerful tool that must be held by hand
- Operators need a secure stance with legs apart for balance and support
- Hold the saw at a comfortable, balanced location in front of you
- Grip the saw firmly with one hand on each handle
- Hold your forward arm straight to keep the saw from kicking back or climbing out of the cut

Cutting

- Support the material being cut so that the disk or blade will not bind
- Support heavy materials on both sides of the cut so the cut piece will not drop or roll onto the operator's foot
- Make cuts as close as possible to the supporting surface
- When cutting, keep the throttle wide open. Ease the blade down onto the cut line. Don't drop or jam the blade down hard. Move the saw slowly back and forth in the cut
- Hold the saw so that disk or blade is at right angles to the work and use only the cutting edge of the disk or blade
- Beware of blade run-on. The blade may continue to rotate after the cut and run away with a saw set down too soon
- Don't force the saw to one side of the cut. This will bend the disk or blade and cause it to bind, possibly to break
- Water cooling is recommended for cutting masonry materials
- Keep pressure on the saw reasonably light
- Don't carry the saw any distance with the engine running
- Stop the engine and carry the saw with the muffler away from you

Disks and Blades

Disks and blades for quick-cut saws are available in three basic types:

- Abrasive disks
- Diamond-tipped blades
- Carbide-tipped blades

Use only the disks and blades compatible with the saw and rated for its maximum rpm. Blades or disks may fly apart if their rpm is not matched to saw rpm. If you have any doubts, consult the operating manual or a reputable supplier.

ABRASIVE DISKS – TYPES AND USES

Type	Uses	Materials
Concrete	All-around use, most economical for cutting concrete and masonry. Water-cooling recommended to increase disk life and to reduce dust.	Concrete, stone, masonry products, cast iron, aluminum, copper, brass, cables, hard rubber, plastics
Metal	Primarily for steel, not suited for masonry products. Water-cooling is not recommended with metal abrasive disks	Steel, steel alloys, other hard metals such as cast iron

Diamond Disks and Blades – Types and Uses

Diamond disks are normally used with water-cooling. They are now available for dry cutting, which may be necessary to avoid staining some masonry products.

When dry cutting with a diamond blade, let the blade cool for 10-15 seconds every 40-60 seconds. This can be done simply by pulling the saw out of the cut.

DIAMOND DISKS AND BLADES — TYPES AND USES

Type	Uses	Materials
Diamond Abrasive Disk	Cuts faster than other abrasive disks and creates less dust. Water-cooling is necessary to prevent heat build-up that can make disk disintegrate.	Stone, all masonry and concrete products. Not recommended for metal
Dry-Cut Diamond Blade	Fast cuts, lots of dust, very expensive. Let blade cool for 10-15 seconds every 40-60 seconds. Continuous cutting will damage the blade.	Stone, all masonry and concrete products. Not recommended for metal.

Carbide-Tipped Blades

These blades must be used with care. If a carbide-tipped blade encounters material harder than what it is designed to cut, the tips may fly off.

A carbide-tipped blade used with a quick-cut saw must be designed for that purpose. It must also be used only to cut the materials specified by the manufacturer.

Inspection / Installation

- Inspect disks and blades before installing them
- Make sure that contact surfaces are flat, run true on the arbor, and are free of foreign material
- Check that flanges are the correct size and not warped or sprung
- Check the label to make sure that the disk or blade is approved for use on high-speed quick-cut saws and has a rated rpm suitable to the saw being used
- Inspect the disk or blade for damage. Abrasive disks tapped lightly with a piece of wood should ring true. If the sound is dull or flat, the disk is damaged and should be discarded
- Make sure that diamond or carbide tips are all in place. Do not use diamond or carbide-tipped blades or disks if any tips are missing
- Do not drop abrasive disks. Discard any disk that has been dropped
- Use the proper bushing on the arbor so that the disk runs true on the shaft without wobbling or vibrating
- Discard badly worn disks that are uneven or “out of round”

TRAINING

The company will ensure every employee who uses hand and power tools is provided proper training on those tools before using them on the job. This training will be provided during working hours at no cost to the employee.

Training Components

The company's safety coordinator will ensure every employee will be trained on, and adhere to the requirements of, the following minimum elements:

- Proper storage, maintenance and use of any tool the employee will use in his or her job
- A description and identification of the hazards associated with tools
- The safeguards, including PPE, to protect the employee from tools and the hazards for which they are intended
- How to use tool safeguards and why
- Safety precautions necessary for working with the tool
- How to inspect tools for damage and what to do (e.g., contact the supervisor) if a tool is damaged, missing safeguards or other pieces, or otherwise unable to provide adequate protection
- Limitations of tools being used and the how to select the right tool for the job
- How to replace blades, change accessories, lubricate, charge and other similar activities associated with using power tools
- Where to find the manufacturer's instructions for power tools the employee is expected to use

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

HAND AND POWER TOOLS SAFETY TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

Hazardous waste is any solid, liquid or gas that can harm humans, other living organisms or the environment. This chapter defines hazardous waste, the danger of handling it and the safe practices to use to avoid injury or illness. It also includes the HAZWOPER requirements based on the type of work being performed.

POLICY

This company has implemented this Hazardous Waste Operations and Emergency Response (HAZWOPER) policy to protect its employees from injury or illness when handling hazardous waste.

REGULATIONS

This policy will comply with the requirements of the Environmental Protection Agency rules 40 CFR 261.3 and 49 CFR 171.8 as well as any other applicable federal, state or local regulations.

CATEGORIES OF WORKERS

The Hazardous Waste Operations and Emergency Response standard, (HAZWOPER) applies to the following businesses and their employees:

Employer Category	Type of Site
Required **cleanup operations** involving hazardous substances (required by a government agency)	Uncontrolled hazardous-waste sites
Corrective actions involving cleanup operations	Sites covered by the Resource and Recovery Act (RCRA)
Voluntary cleanup operations	Uncontrolled hazardous waste sites
Operations at treatment, storage, and disposal facilities (TSDF)	TSDF sites licensed under RCRA
Emergency response operations (for releases of hazardous substances)	Any site

CLEAN-UP OPERATIONS

The activities a company does to clean up a site containing hazardous substances. There are three categories of clean-up operations:

- Cleanup required by a government agency
- Cleanup operation on sites covered by the Resource Conservation and Recovery Act (RCRA)
- Voluntary clean-up operations

“Voluntary” means that a government agency recognizes that a site contains hazardous substances that may pose a safety or health threat to workers or the environment until it is controlled.

A TSDF facility employs workers who treat, store or dispose of hazardous waste. TSDF facilities must comply with all EPA requirements; this category includes facilities that generate hazardous waste.

Municipal or other sanitary landfills are considered hazardous sites if the workers handle or clean up hazardous waste. Leaking underground storage tanks are also considered hazardous waste sites.

Companies engaged in required, corrective or voluntary operations must have a Written Safety and Health Program for Cleanup Operations that includes:

- Site Evaluation
- Comprehensive Work Plan
- Site-Specific Safety and Health Plan
- Medical Surveillance
- Air and Personnel Monitoring
- Handling Hazardous Materials
- Emergency Response
- Sanitation at Temporary Workplaces
- Organizational Structure
- Site Control
- Education and Training
- Hazard Control and PPE
- Informing Employees and Contractors
- Decontamination
- Illumination
- Evaluating New Technology

Program Elements

The table below shows the elements that your written Safety and Health Program must include. Use it as a guide to help you develop a new program or evaluate an existing one.

Program Element	Purpose
Site Evaluation	Before your employees begin work at a new site, a qualified person must evaluate the site to identify hazards and to determine how to control the hazards
Organizational Structure	Establishes the chain of command for directing site operations and defines employees' responsibilities at the site
Comprehensive Work Plan	Defines the work objectives, the employees' tasks and the resources employees need to accomplish the tasks
Site Control	Establishes procedures to control employee exposure to hazardous substances before cleanup work begins at the site
Site-Specific Safety and Health Program	Identifies risks associated with site-specific hazards and describes procedures for protecting employees from the hazards
Education and Training	Identifies who must be trained, training topics, frequency of training, and qualifications of trainers
Medical Surveillance	Describes the purpose of medical examinations, their frequency, what the examinations include, and required information for the physician and the employee

Program Element	Purpose
Hazard Control and PPE	Describes the engineering controls, work practices and personal protective equipment needed to protect employees
Air and Personnel Monitoring	Describes how and when air monitoring will be used to identify and quantify site-specific safety and health hazards
Informing Employees and Contractors	Informs employees and contractors about hazards they may encounter on the site
Handling Hazardous Materials	Describes appropriate methods for handling and transporting hazardous materials
Decontamination	Describes procedures for decontaminating employees exposed to hazardous substances
Emergency Response	Describes critical activities for dealing with site-specific emergencies
Illumination	Ensures that employees have enough sight to do their work safely
Sanitation at Temporary Workplaces	Provides for potable water, toilets, washing, and showering facilities at temporary workplaces
Evaluating New Technology	Describes policy for evaluating and adopting improved products to protect employees involved in clean-up operations

Site Evaluation

Before employees begin work at a new site, a qualified person must do a preliminary site evaluation to accomplish the following:

- Identify specific hazards to which employees may be exposed
- Determine what safety and health controls will protect employees from the hazards. Use the preliminary site evaluation to prepare and update your site-specific safety and health plan. Soon after employees begin working at the site, a qualified person should do a detailed site evaluation

Elements

A preliminary site evaluation should provide you with the following information:

- Site hazards, including the physical or chemical properties of hazardous substances, and how employees could be exposed to them
- Employee risks associated with exposure to the hazardous substances
- Where hazardous substances could leak or disburse
- Site location, size, topography, and access routes

- Employees' tasks and the time it will take them to complete the tasks
- Capabilities of emergency responders, including their availability and response times
- What personal protective equipment employees will wear

Informing Employees

You must inform employees about the chemical, physical and toxicological properties of hazardous substances to which they may be exposed before they begin work at the site.

Organizational Structure

This part of your program establishes the worksite chain of command and defines supervisors' and other employees' responsibilities.

Chain of Command

The chain of command includes responsibilities for the following individuals:

- A general supervisor, who directs site operations
- A site safety-and-health supervisor, who develops and implements the site-specific safety-and-health plan
- The personnel involved in hazardous-waste operations
- The personnel who will respond to emergencies

A site Safety & Health Supervisor must have the authority and knowledge necessary to develop and implement the site-specific safety-and-health plan and to ensure that it complies with requirements.

Comprehensive Work Plan

The comprehensive work plan defines your work objectives at the site, the employees' tasks and the resources your employees need to accomplish the objectives.

Plan Elements

The comprehensive work plan includes the following elements:

- Anticipated cleanup activities at the site
- The personnel needed to accomplish the work objectives at the site
- Training necessary for supervisors and other employees to accomplish their tasks
- How you will inform employees about hazards they may encounter at the site
- How you will implement medical surveillance for employees who work at the site

Site Control

Site control establishes procedures and safe practices to ensure that your employees will be protected from hazardous substances before they begin work on the site.

Procedures and Safe Practices

Site-control procedures and safe practices include the following:

- A map of the site
- Clearly identified work zones

- Procedures for a buddy system
- Procedures for warning employees about emergencies
- Standard operating procedures needed at the site
- The name of the nearest emergency-medical responder

This part of the Safety and Health Program requires a buddy system. What is a buddy system? Must both “buddies” work for the same employer?

A buddy system pairs workers so they can help one another if an emergency occurs. Buddies do not have to work for the same employer, but they must be similarly equipped, appropriately trained, and must know their responsibilities.

Site Specific Safety and Health Plan

This part of your written program identifies the hazards workers may encounter at the site and describes how you will protect them from those hazards. You need to explain the plan to employees before they begin work at the site.

Plan Elements

The site-specific Safety and Health Plan contains the following elements:

- A hazard analysis for each task identified in the comprehensive work plan
- Training assignments for those who need training before they begin work
- The personal protective equipment employees need
- Who will need medical surveillance
- The frequency and types of monitoring
- Methods for eliminating or controlling hazards
- Decontamination procedures
- Emergency-response procedures
- Confined-space entry procedures
- Spill-containment procedures

Can one site-specific Safety and Health plan cover all employees who work at the site even if they are not employed by the same contractor?

One site-specific plan is acceptable if it covers all tasks, operations, and employers on the site, and if the employees are trained to use the plan. However, each contractor or subcontractor at the site must comply with OSHA requirements.

Education and Training

Employees need to know about the site hazards they may be exposed to, how to recognize the hazards and how to control their exposure. The best way for them to gain this knowledge is through education and training.

All employees who work at the site must have appropriate training before they begin their work.

Training Elements

Appropriate hazardous-waste-operations training includes the following elements:

- The names of those responsible for the site-specific safety-and-health plan
- Worksite hazards
- How to use personal protective equipment
- How to minimize exposure risks
- How to use engineering controls and equipment
- Medical-surveillance requirements
- Decontamination procedures
- Emergency-response procedures
- Confined-space procedures
- Spill-containment procedures

Training Requirements

Employees at higher risk of exposure need more training than those doing lower-risk tasks. The following table summarizes their initial and refresher training requirements:

Employee Category	Initial Training	Refresher Training
General on-site employees work regularly in areas that may have health or safety hazards)	**Forty** hours off-site instruction and **three** days of field experience	**Eight** hours annual refresher training
Employees on site only occasionally to do a specific, limited task	**Twenty-four** hours off-site instruction and **one** day of field experience	
Employees who work regularly on site in areas with no health or safety hazards		
Supervisors of general on-site employees	**Forty** hours off-site instruction and **three** days of field experience	

Certification

Those who have successfully completed their training and field experience must receive a written certificate that says they have done so. They cannot begin hazardous-waste work without one.

Notes:

Visitors who won't be exposed above permissible exposure limits or published exposure levels must have 24 hours of off-site training and one day of field experience.

Equivalent training means that an employee has previous experience or training that meets OSHA requirements. Employees with equivalent training who are new to a site must still receive appropriate site-specific training and have appropriate supervised field experience at the new site.

Medical Surveillance

Medical surveillance consists of regular medical examinations and consultations for employees who may be overexposed to hazardous substances during their work. The purpose of examinations is to detect medical conditions that could harm employees because of their hazardous-waste-operations work.

The following table shows the employees who must have medical examinations and when the examinations are required:

Employee Category	When an Examination is Required
Employees who may be exposed to hazardous substances at or above permissible exposure limits or published exposure levels for those substances 30 or more days a year	• Prior to assignment. • Annually; more frequently if recommended by a physician. • At termination of employment or reassignment. • Immediately after reporting symptoms indicating overexposure
Employees who wear a respirator for 30 or more days a year.	
Members of HAZMAT teams.	
Employees who show symptoms of overexposure to hazardous substances.	• As soon as possible after an employee reports symptoms. • When a physician determines that an examination is necessary

Key points about the examination:

- The examination must be performed under the supervision of a licensed physician
- The physician must have information about the employee's duties, exposure levels, and personal protective equipment
- The employee must receive a copy of the physician's written findings
- You must keep a record of the examination, including the employee's name and the physician's written opinion regarding the employee's medical fitness to do hazardous waste work or to wear a respirator

Hazard Control and PPE

Your policy must include the methods for eliminating and controlling hazards using engineering controls, work-practice controls or personal protective equipment.

Hazard Controls

You can eliminate or control site hazards most effectively with engineering controls. Work- practice controls and personal protective equipment (PPE) are less effective. Your written Safety and Health Program should have a policy to eliminate and control hazards as follows:

- Use engineering controls and work-practice controls to keep employee exposure at or below permissible exposure limits
- If engineering and work-practice controls aren't feasible, use a combination of engineering controls, work practices, and personal protective equipment to keep employee exposure at or below permissible exposure limits
- Rotate employees to control their exposures only when there is no other way to keep the exposures at or below permissible exposure limits

About PPE

If you have employees who use personal protective equipment during hazardous-waste operations, you must have a policy that ensures the following:

- Equipment is selected to protect employees against site-specific hazards
- Employees maintain and store equipment properly
- Employees understand the equipment's limitations
- Equipment is decontaminated and disposed of properly
- Employees are trained to use, wear, and inspect equipment
- Equipment fits employees who use it

Air and Personnel Monitoring

Monitoring helps you determine when and how to protect employees who may be exposed to hazardous substances during hazardous waste operations.

The table below summarizes when and how to monitor employees involved in hazardous waste operations:

When to Monitor	How to Monitor
At initial entry	Monitor the air to identify any condition immediately dangerous to life and health (IDLH) or hazardous exposure levels
When an employee suspects a hazardous condition or hazardous atmosphere	Use personal sampling to monitor employees likely to have the highest exposures to hazardous substances
After the cleanup phase of a hazardous waste operation begins	

Informing Employees and Contractors

Your written program must include a process for informing employees and contractors about the site hazards they may be exposed to before they begin hazardous-waste work.

Handling Hazardous Materials

To minimize their risk of exposure, employees must handle hazardous materials appropriately. This includes how employees will handle, transport and dispose of hazardous materials.

Handling Drums and Containers

Employees must observe the following safe practices:

- Use only containers that meet federal and state regulations for the waste they contain
- Inspect containers for leaks or other signs of weakness before moving them
- Consider containers that aren't labeled to contain hazardous materials
- Store containers so that it is not necessary to move them frequently
- Do not make available a container known to have contained a hazardous substance unless the container has been thoroughly cleaned to remove all traces of any hazardous substance, except where the container is refilled with the same substance
- Be aware of the hazards of moving drums and containers
- Use explosion-resistant equipment to handle containers in flammable atmospheres
- Never stand on containers or use them as work platforms

Controlling Spills

Employees must know how to control container spills or leaks and must observe the following safe practices:

- Keep appropriate salvage containers and absorbents on hand
- Do not move containers that show signs of weakness, bulging, or swelling
- Do not handle containers that contain radioactive waste until the risks of exposure have been properly assessed
- Have appropriate fire extinguishers available

Opening Drums and Containers

Employees who open hazardous-waste containers improperly can endanger themselves and others. Your written program must ensure that employees observe the following safe practices:

- Those not involved in opening hazardous waste containers must be at a safe distance or be protected by a suitable shield
- Keep sensitive equipment controls behind an explosion-resistant barrier
- Use caution when opening containers with pressurized contents; open them from a remote location or use appropriate shielding

Shock-Sensitive Waste

Employees who handle shock-sensitive waste must observe the following safe practices:

- Keep nonessential persons away from the handling area
- Use handling equipment that has explosion-resistant shields or barriers
- Use an alarm to warn others before handling shock-sensitive materials
- Maintain clear communication with everyone involved in handling the material
- Permit only appropriately trained employees to open laboratory waste packs
- Consider any container shock-sensitive if crystalline material has formed on its outside

Drums and containers must be identified or organized by chemical hazard or class so that employees will know what precautions to take before handling them

If underground gasoline or oil tanks that have leaked have tank liners installed all OSHA requirements must be followed

Cleanup of a Superfund site where drums have been dug up, repacked, numbered and listed on a manifest must be labelled with information that tells employees how to handle them safely. Numbering them and listing them on a manifest is OK as long as the information includes the chemical hazard class

Decontamination

Employees who may be exposed to hazardous substances must know how to decontaminate themselves and decontaminate or dispose of contaminated equipment.

Employee Requirements

Your written program must ensure that employees know how to decontaminate themselves before they enter a contaminated area and that they do the following:

- Avoid handling contaminated substances or equipment
- Remove porous clothing wetted by a hazardous substance and shower immediately before leaving a contaminated area
- Keep PPE in change rooms unless they are authorized to remove it
- Follow decontamination procedures after leaving a contaminated area

Other Safe Practices

Your written program must ensure the following safe practices:

- Keep decontamination areas away from uncontaminated workers and equipment
- Inform commercial laundries about the harmful effects of hazardous substances on contaminated clothing they receive from your employees

Emergency Response

Your written program must include a plan that ensures employees know what to do when an emergency happens.

Plan Elements

Your emergency-response plan must address the following:

- Possible emergency situations at the site
- Personnel roles, lines of authority, training, and communication procedures
- Reporting to local, state, and federal agencies
- Emergency-response equipment
- Safe distances and places of refuge
- Emergency zones, safe distances, and evacuation areas
- Evacuation routes and procedures
- Emergency decontamination procedures
- Medical treatment and first-aid procedures
- Emergency communication procedures
- Emergency-response plan evaluation criteria

Illumination

The table below shows the minimum illumination intensities in foot-candles for typical areas at hazardous-waste operations:

Foot-candles (or lumens)	Work Area
5	General areas
3	Excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas
5	Indoors
5	Tunnels, shafts, and general underground work areas
10	General shops
30	First-aid stations, infirmaries, and offices
How much light is a foot-candle or lumen? A foot-candle is equal to one lumen incident per square foot. The simplest definition is this one: A foot-candle is the illumination produced by one candle at a distance of one foot	

Sanitation at Temporary Workplaces

Your written program must describe your policy for providing appropriate sanitary facilities for employees at temporary workplaces.

Drinking Water

Employees must have an adequate supply of drinking water. Non-potable water outlets must clearly identify that the water is not to be used for drinking, washing or cooking.

- Drinking water must be supplied from closed portable containers, equipped with taps
- Drinking-water containers must be clearly labeled and not used for any other purpose
- If you supply disposable cups, employees must take them from a sanitary container and dispose of them in a separate container

Toilet and Washing Facilities

Toilet facilities must be available for employees at the workplace (one per 20 employees for construction projects), and they must be kept in sanitary condition. Hazardous waste sites that do not have sanitary sewers must have chemical, recirculating, combustion, or flush toilets. Doors to toilets must have locks that can be controlled from the inside.

Washing facilities must also be available, and the employer must provide suitable cleaning agents/towels for the removal of hazardous and other substances.

Shower Facilities

If employees do on-site hazardous-waste cleanup work for at least six months during which they may be exposed to hazardous substances, they must have shower facilities and change rooms.

- Showers must meet OSHA sanitation requirements
- Change rooms must meet OSHA sanitation requirements

- Showers and change rooms must be in areas with exposures below permissible exposure limits and published exposure levels
- Employees must shower at the end of their work shifts or before they leave the site

Evaluating New Technology

"New technology" refers to new products and equipment introduced by manufacturers to protect workers during hazardous-waste cleanup operations. Your written program should have a policy that directs employees to evaluate the benefits of new-technology products when they replace existing products or purchase new ones.

TSDF FACILITIES

Companies operating Treatment, Storage and Disposal Facilities (TSDF) must have a The Written Safety-and-Health Program that includes:

- Site Evaluation
- Hazard Identification and Control
- Hazard Communication
- Medical Surveillance
- Material Handling
- Decontamination
- Education and Training
- Emergency response
- New technologies
- Written Safety & Health Program for TSDF Facilities

About the Program

You must develop and implement a written safety-and-health program that will protect your employees involved in hazardous-waste operations. If you already have a written workplace safety-and-health program, you don't need to write a new one just for your hazardous-waste operations, as long as your existing program ensures that you and your employees accomplish the following:

- Identify, evaluate, and control safety and health hazards at your facilities
- Respond promptly and appropriately to hazardous-waste operation emergencies

The table below shows the elements that your written safety-and-health program should include and describes why they are important. Use it as a guide to help you develop a new program or evaluate an existing one.

Program Element	Purpose
Site Evaluation	If your employees begin work at a new site, a qualified person must first evaluate the site to identify hazards and to determine how to control the hazards
Hazard Identification & Control	Describes the engineering controls, work practices and personal protective equipment needed to protect workers
Hazard Communication	Ensures that employees are informed about the hazardous chemicals to which they may be exposed
Medical Surveillance	Describes the purpose of medical examinations, their frequency, what the examinations include and required information for the physician and the employee
Handling Hazardous Materials	Describes appropriate methods for handling and transporting hazardous materials
Decontamination	Describes procedures for decontaminating employees exposed to hazardous substances
Education and Training	Identifies who must be trained, training topics, frequency of training, and qualifications of trainers
Emergency Response	Describes critical activities and specific plan elements for dealing with site-specific emergencies
New Technologies	Describes your policy for evaluating and adopting improved products for protecting employees involved in hazardous-waste clean-up operations

Site Evaluation

If your employees begin work at a site other than your facility, a qualified person must do a preliminary site evaluation to accomplish the following:

- Identify the specific hazards to which employees may be exposed
- Determine what safety and health controls will protect employees from the hazards

Soon after employees begin working at the site, a qualified person should do a detailed site evaluation.

Site Evaluation Elements

A preliminary site evaluation should provide you with the following information:

- Site hazards including the physical or chemical properties of hazardous substances and how employees could be exposed to them
- The risks to employees associated with exposure to hazardous substances
- Where hazardous substances could leak or disburse

- Site location, size, topography, and access routes
- Employees' tasks and the time it will take them to compete the tasks
- What personal protective equipment employees will wear
- Capabilities of emergency responders, including their availability and response times

Informing Employees

You must inform employees about the chemical, physical and toxicological properties of hazardous substances to which they may be exposed before they begin work at the site.

Hazard Identification and Control

Your written program must include your policy for identifying worksite hazards and for eliminating or controlling them by using engineering controls, work-practice controls or personal protective equipment.

Identifying Hazards

There are many ways to identify hazards. For example, many small-business owners may only need to walk around their workplaces and look for them. However, because TSDF facilities handle hazardous substances, you may need to do a comprehensive survey.

Controlling Hazards

Your written safety-and-health program should have a policy to eliminate or control hazards as follows:

- Use engineering controls and work-practice controls to keep employee exposure at or below permissible exposure limits
- If engineering and work-practice controls aren't feasible, use a combination of engineering controls, work practices, and personal protective equipment to keep employee exposure at or below permissible exposure limits
- Rotate employees to control their exposures only when there is no other way to keep exposures at or below permissible exposure limits

About PPE

If you have employees who use personal protective equipment during hazardous-waste operations, you must have a policy that ensures the following:

- Equipment is selected to protect employees against site-specific hazards
- Employees maintain and store equipment properly
- Employees understand the equipment's limitations
- Equipment is decontaminated and disposed of properly
- Employees are trained to use, wear, and inspect equipment
- Equipment fits employees who use it

Hazard Communication

Your written program must have a policy that ensures employees know about worksite chemical hazards and how to protect themselves from those hazards. The policy does not apply to hazardous waste as defined by the Solid Waste Disposal Act and amended by the Resource Conservation and Recovery Act of 1976.

Requirements

Your hazard communication policy must meet the requirements of the Hazard Communication Standard, which includes the following:

- **Hazard determination:** Identify and list all hazardous substances at the site, including hazardous substances to which employees may be exposed during their routine or non-routine tasks, and hazardous substances in unlabeled pipes
- **SDS:** A Safety Data Sheet for each hazardous chemical present on site must be on file and available to all employees. Safety Data Sheets have 16 distinct sections
- **Labeling:** Label on-site containers of hazardous chemicals with:
  - Product identifier
  - Pictogram(s)
  - Signal word(s)
  - Hazard statement(s)
  - Precautionary statement(s)
  - Supplier identification
  - Any additional, applicable information
- **Compliance and enforcement:** Provide support for employee compliance with, and management's enforcement of, the program
- **Safe work environment:** Ensure that proper safeguards are in place to ensure the safety of personnel working with or around hazardous chemicals
- **Employee training:** Inform and train employees who work with hazardous chemicals prior to their assignments, and whenever their assignments or work processes change with regard to new hazards, including chemicals. Ensure every employee is provided training that covers the hazard communication program/policy
- **Evaluation of the program:** Review the HCP at least annually to evaluate the effectiveness of the program

See the "Hazard Communication" chapter for more specific details.

Medical Surveillance

Medical surveillance consists of regular medical examinations and consultations for employees who may be overexposed to hazardous substances during their work. The purpose of the examinations is to detect medical conditions that could harm employees because of their hazardous-waste-operations work.

The table below shows which employees must have medical examinations and when the examinations are required:

Employee Category	When the Examination is Required
Employees who may be exposed to hazardous substances at or above permissible exposure limits or published exposure levels for those substances 30 or more days a year	• Prior to assignment. • Annually; more frequently if recommended by a physician. • At termination of employment or reassignment. • Immediately after reporting symptoms indicating overexposure
Employees who wear a respirator for 30 or more days a year.	
Members of HAZMAT teams.	
Employees who show symptoms of overexposure to hazardous substances.	• As soon as possible after an employee reports symptoms. • When a physician determines that an examination is necessary

Key points about the examination:

- The examination must be performed under the supervision of a licensed physician
- The physician must have information about the worker's duties, exposure levels, and personal protective equipment
- The employee must receive a copy of the physician's written findings
- You must keep a record of the examination, including the employee's name and the physician's written opinion regarding the employee's medical fitness to do hazardous waste work or to wear a respirator

Handling Hazardous Materials

To minimize their risk of exposure, employees must handle hazardous materials appropriately. This part of your written program describes how employees will handle, transport and dispose of hazardous materials.

Handling Drums and Containers

Employees must observe the following safe practices when they handle drums and containers:

- Use only containers that meet federal and state regulations for the waste they contain
- Inspect containers for leaks or other signs of weakness before moving them
- Assume unlabeled containers contain hazardous materials
- Store containers so that it is not necessary to move them frequently
- Be aware of the hazards of moving drums and containers
- Always use explosion-resistant equipment to handle containers in flammable atmospheres
- Never stand on containers or use them as work platforms
- Keep appropriate salvage containers and absorbents on hand to control leaks

Material-Handling Equipment

Material-handling equipment used to move containers must be selected and operated to minimize igniting vapors released from those that may be damaged or ruptured. Observe the following safe practices to control leaks and spills:

- Keep appropriate salvage containers and absorbents on hand
- Do not move containers that show signs of weakness, bulging, or swelling
- Do not handle containers that contain radioactive waste until the risks of exposure have been properly assessed
- Have appropriate fire extinguishers available
- Shipping and Transporting Containers

Employees must observe the following safe practices when they ship and transport containers:

- Identify and classify containers before shipping them
- Limit the number of container staging areas and make sure they are accessible
- Put hazardous wastes in bulk containers only after determining it is safe to do so

Decontamination

Employees who may be exposed to hazardous substances must know how to decontaminate themselves and decontaminate or dispose of contaminated equipment.

Employee Requirements

Your written program must ensure that employees know how to decontaminate themselves before they enter a contaminated area, and that they do the following:

- Avoid handling contaminated substances or equipment
- Remove porous clothing wetted by a hazardous substance and shower immediately before leaving a contaminated area
- Keep PPE in change rooms unless they are authorized to remove it
- Follow decontamination procedures after leaving a contaminated area

Other Safe Practices

Your written program must ensure the following safe practices:

- Keep decontamination areas away from uncontaminated workers and equipment
- Inform commercial laundries about the harmful effects of hazardous substances on contaminated clothing they receive from your employees

Education and Training

Your employees need to know about the site hazards to which they may be exposed, how to recognize the hazards and how to control their exposure. The best way for them to gain this knowledge is through education and training.

All employees who work on the site must have appropriate education and training before they begin their work.

Training Elements

Appropriate education and training addresses the following elements:

- How to identify and control worksite hazards
- How to use personal protective equipment
- How to minimize exposure risks

- How to use engineering controls and equipment
- Medical surveillance requirements
- Decontamination procedures
- Emergency-response procedures

Training Requirements

The table below summarizes initial and refresher training requirements for new employees, current employees and trainers:

Employee Category	Initial Training	Refresher Training
New Employees	**Twenty-four** hours	**Eight** hours annually
Current Employees	None required if previous work experience and training is equivalent to the twenty-four hours for new employees	**Eight** hours annually
Trainers	Satisfactory completion of a training course for subjects they are expected to teach and competent instructional skills	None required

Employees not engaged in hazardous-waste operations or emergency responses do not need the initial or refresher training listed above.

Emergency Response

You cannot predict emergencies, but you can respond to them effectively if you plan for them. Your written program must include a plan that ensures employees know what to do when an emergency happens.

Plan Requirements

The requirements for your emergency-response plan depend on whether employees will remain on the site during the emergency or if they will assist in responding to the emergency.

Required Plan Elements

If your employees will remain on site during an emergency or if they assist in responding to the emergency, your emergency-response plan must address the following elements:

- Planning and coordinating with off-site responders
- Personnel roles, lines of authority, and communication procedures
- Emergency situations and how to prevent them
- Safe distances and places of refuge
- Site control and security
- Evacuation routes and procedures
- Emergency decontamination procedures
- Emergency medical treatment and first aid

- Emergency communication procedures
- Necessary emergency equipment, including PPE
- Emergency-response plan evaluation criteria

Training Requirements

Emergency-response training must be certified in writing and cover the following topics:

- Elements of the emergency-response plan
- Procedures for handling emergencies
- Personal protective equipment necessary for emergencies
- How to recognize hazards that may endanger responder's employees

You do not need to train every employee at the facility if you satisfy one of the following conditions:

- You have trained a smaller number of employees to control emergencies and all other employees know how to recognize emergencies, summon the trained responders, and evacuate the affected area
- A trained off-site team will respond promptly to an emergency, and on-site employees know how to recognize emergencies and summon the responders

Emergency-response training is necessary for chemical facility employees who manufacture, use, store or handle hazardous materials only if their activities could cause an emergency.

Incidental releases of hazardous substances that employees can control quickly are not emergencies. However, these employees should have training covering the emergency-action plan, hazard communication and respiratory protection.

New Technologies

"New technology" refers to new products and equipment introduced by manufacturers to protect workers during hazardous-waste cleanup operations. Your written program should have a policy that directs employees to evaluate new-technology products when they replace existing products or purchase new ones.

HAZARDOUS RELEASES

Employers who respond to hazardous substances releases at any site must have a written Emergency-Response Plan that includes:

- Incident-command System
- Training
- Medical Surveillance
- Chemical-protective Clothing

If you are an employer who takes action to control releases of hazardous substances, no matter where they occur, you must have a written emergency-response plan that applies the elements and practices described in this section.

If you are already using a local or state emergency-response plan, you don't need to create another one; however, it must address the elements and components below.

- Planning and coordinating with off- site responders
- Personnel roles, lines of authority, and communication procedures
- Emergency situations and how to prevent them
- Safe distances and places of refuge
- Site control and security
- Evacuation routes and procedures
- Emergency decontamination procedures
- Emergency medical treatment and first aid
- Emergency communication procedures
- Necessary emergency equipment, including PPE
- Plan-evaluation criteria

Critical Components

In addition to the above elements, your plan must include safe-practice procedures that address the following:

Plan Component	Purpose
Incident Command System (ICS)	The system for controlling and managing operations during an emergency
Training	Identifies who needs training, types of training needed, and training hours required
Medical Surveillance	Describes medical surveillance requirements for those who may be exposed to hazardous substances
Chemical-Protective Clothing	Describes requirements for using chemical-protective clothing
Post-Emergency-Response Operations	Describes requirements for removing hazardous substances after an emergency

Incident Command System

The Incident Command System is a set of procedures for controlling and managing operations during an emergency. One person — the individual in charge — coordinates all emergency-response activities through the incident command system.

Individual in Charge

The senior emergency-response official responding to an emergency becomes the individual in charge. This person coordinates all emergency responders' activities through the incident command system and has the following responsibilities:

- Identifying hazardous substances or conditions at the site
- Designating a safety officer to assist in identifying and evaluating hazards at the site
- Enforcing incident command system procedures and ensuring that responders wear appropriate personal protective equipment

- Determining when responders can remove positive-pressure self-contained breathing apparatus
- Keeping others away except those actively performing emergency operations
- Implementing appropriate decontamination procedures after emergency operations are finished

Training

Your emergency-response plan must ensure that those who will respond to an emergency are appropriately trained before they participate in an actual incident.

Training Requirements

The table below summarizes the minimum training required for emergency responders:

Responder Category	Responder Tasks	Minimum Training Required
Skilled Support Personnel	Skilled equipment operators needed to perform emergency-support work	• Initial briefing covering hazards, PPE, and duties at the scene
Specialist Employees	Provide technical assistance on specific hazardous substances	• Annual refresher training, or demonstrate competency in their specialty
LEVEL 1 **First responder, awareness level**	Likely to witness or discover a hazardous substance release and initiate the emergency-response process	• Training to identify emergencies and initiate the response process. • Additional **LEVEL 1** competency. • Annual refresher training.
LEVEL 2 **First responder, operations level**	Responds to releases of hazardous substances; protects nearby persons, property, or the environment from the effects of the release	• **Eight** hours of training that includes **LEVEL1** awareness training or the equivalent relevant experience. • Additional **LEVEL 2** competencies. • Annual refresher training
LEVEL 3 **HAZMAT Technician**	Responds to releases of hazardous substances; attempts to stop the release	• Twenty-four hours of **LEVEL 2** training. • Additional **LEVEL 3** competencies. • Annual refresher training
LEVEL 4 **HAZMAT Specialist**	Supports the HAZMAT Technician	• Twenty-four hours of **LEVEL 3** training. • Additional **LEVEL 4** competencies. • Annual refresher training
On-scene Incident Commander	Implements the incident command system and the emergency-response plan	• Twenty-four hours of **LEVEL 2** training. • Additional on-scene incident commander competencies. • Annual refresher training
Trainers	Instructs any of the above employees	• Satisfactory completion of courses in the subjects they will teach

Medical Surveillance

Medical surveillance consists of regular medical examinations for employees who may be exposed to hazardous substances during their work. The purpose of the examinations is to detect medical conditions that could harm employees because of their hazardous-waste- operations work.

The table below shows which employees must have medical examinations and when the examinations are required:

Employee Category	When an Examination is Required
HAZMAT Specialists	• Prior to assignment • Annually; more frequently if recommended by a physician. • Termination of employment or reassignment. • Immediately after reporting symptoms indicating overexposure
Members of HAZMAT teams	
Employees who show symptoms of overexposure to hazardous substances	• As soon as possible after an employee reports symptoms. • When a physician determines an examination is necessary

Key points about the examination: It must be performed under the supervision of a licensed physician. The physician must know about the worker's duties, exposure levels and personal protective equipment.

- The employee must receive a copy of the physician's written findings
- The employer must keep a record of the examination, including the employee's name and the physician's written opinion regarding the employee's medical fitness to do hazardous-waste work or to wear a respirator

Chemical-Protective Clothing

Your emergency-response plan must ensure that employees will be protected from the chemical, physical or biological hazards that they may be exposed to during their work.

Requirements

Chemical-protective clothing ranges from items such as gloves and face shields to fully encapsulating chemical-protective suits. If your employees use chemical-protective clothing, your emergency-response plan must ensure the following:

- The clothing is selected to protect employees against site-specific hazards
- Employees maintain and store the equipment properly
- Employees understand the equipment's limitations
- The equipment is decontaminated or disposed of properly
- Employees are trained to use, wear, and inspect the equipment
- The equipment fits employees who use it

Chemical Protective Suits

Employees who may be exposed to substances that could cause immediate death, serious illness or injury must wear fully encapsulating chemical-protective suits. The suits must provide the following level-A protection:

- Positive pressure, full-facepiece self-contained breathing apparatus (SCBA) or positive-pressure supplied-air respirator with escape SCBA approved by the National Institute for Occupational Safety and Health (NIOSH)
- Inner and outer chemically resistant gloves
- Chemically resistant boots with steel toe and shank
- Disposable protective suit, gloves, and boots (depending on suit construction, may be worn over totally encapsulating suit)

Post-Emergency Response Operations

Your emergency-response plan must ensure the protection of responders who may be involved in cleanup operations involving hazardous substances after an emergency.

Requirements

If your employees are involved in cleanup operations after responding to an emergency, you must have a written safety-and-health program that meets HAZWOPER requirements for employers engaged in hazardous waste cleanup operations.

When does an emergency-response incident become a post-emergency operation?

A post-emergency response operation begins when the emergency-response team declares the emergency-response activity finished; any remaining cleanup is a post-emergency operation.

Your plan need only address the requirements that apply to the cleanup work your employees do.

SCOPE

This chapter covers the requirements and safe practices for providing our employees with hearing protection. It complies with OSHA regulations 1926.101 and 1910 .95, whichever is applicable.

POLICY

This Company is committed to ensuring a safe, healthy work environment. This commitment includes monitoring the workplace for noise levels that may damage hearing and includes protecting the hearing of those who work in high-noise environments and implementing a hearing conservation program (HCP) if necessary.

EMPLOYER RESPONSIBILITIES

This Company will:

- Protect employees from work-related hearing loss
- Use engineering and/or administrative controls to keep noise levels below the OSHA action level (AL) and permissible exposure level (PEL) whenever possible
- Implement an HCP when necessary

EMPLOYEE RESPONSIBILITIES

Company employees are expected to:

- Participate in training
- Wear hearing protection devices when appropriate
- Report any problems or concerns about noise levels
- Report any injuries or loss of hearing to appropriate supervisor

NOISE CONTROL

When employees are exposed to noise level above the PEL of 90 dBA or more over an 8-hour time weighted average, noise controls must be in place.

Before requiring hearing protection for workers, other control systems using engineering and administrative controls need to be in place to reduce exposure to hazardous noise levels.

Noise Measurement

Where noise exposure levels are reasonably expected to be above the OSHA action level of 85 dBA, over an 8-hour time weighted average, exposure measurements will be taken to determine the extent of hearing protection necessary and identify tools or processes where sound abatement opportunities exist.

Identifying high-noise activity, tools and equipment at a work site is the first step to lowering site-wide noise levels and reducing noise exposure.

Engineering Controls

Engineering controls can abate noise hazards whenever practicable. Examples include, but are not limited to the following:

- Low-noise tools and machinery
- Appropriate maintenance of all equipment
- Barriers between noise sources and employees
- Enclosure or isolation of noise sources

Strategy Overview

Applying effective, practical, affordable engineering controls to a noise problem is challenging because there are no ready-to-order solutions. You are more likely to find an engineering-control solution when you have accomplished the following:

- Understand what is causing the noise
- Determine how the noise is reaching the listener
- Identify the most appropriate point, or points, at which to control the noise: at the source, along the sound path, or at the listener
- Establish acoustical enclosures and barriers around generators
- Use sound absorbing material and vibration isolation systems on hand tools
- Quiet work practices — use rubber mallets to erect and dismantle formwork

Administrative Controls

Administrative controls also can reduce worker exposure to noise. Examples of such controls include, but are not limited to:

- Scheduling regular maintenance activities
- Operating noisy machines in shifts when fewer workers are present
- Limiting time employees are exposed to a noise

Administrative and work-practice controls are usually less expensive to carry out than engineering controls; that is because there are no significant capital costs involved in changing or modifying equipment. In some cases, administrative controls have reduced employee exposure to noise and increased productivity by rotating employees through a demanding, noisy task. Work-practice controls also improve employee performance by emphasizing safe work practices.

On the other hand, administrative controls and work-practice controls usually are not as effective as engineering controls because they don’t control the noise source. Noisy machines are still noisy and the hazard is still present.

Applying Administrative Controls

Examples of administrative and work-practice controls include the following:

- Reducing the time employees spend working in noisy areas — for example, rotating two or more employees so that each is exposed to noise levels less than 85 decibels, averaged over an eight-hour day

- Shutting down noisy equipment when it is not needed for production
- Ensuring that employees maintain their equipment to keep it running smoothly and quietly
- Ensuring that employees know how to perform tasks and operate equipment at safe noise levels
- Using warning signs to identify work areas where noise exceeds safe levels
- Teaching employees appropriate methods for eliminating or controlling noise
- Encouraging employees to report noise hazards to supervisors

SAFE PRACTICES

Any workplace sound that is not wanted is noise. Workplace noise may be present in a number of ways, each of which has a different potential impact on workers' hearing, and demands different controls to prevent damage to hearing.

TABLE 1: PERMISSIBLE NOISE EXPOSURE

Duration per day, hours	Sound level dBA slow response
8	90
6	92
4	95
3	97
2	100
1½	102
1	105
½	110
≤ ¼	115
Footnote: When the daily noise exposure is composed of two or more periods of noise exposure of different levels, their combined effect should be considered, rather than the individual effect of each.	

Unacceptable levels of noise that may warrant a hearing conservation program are often present on construction sites. OSHA mandates an effective hearing conservation program when sound levels exceed the values shown in table 1.

If a worker needs to raise his voice for someone within arm's reach to hear, the site is probably noisy enough to require workers to wear hearing protection.

Further, exposure to impulsive or impact noise needs to stay below 140 dB peak sound pressure level.

The following trades are routinely overexposed to noise and should practice hearing protection as a matter of course: carpenters, plumber pipefitters, sprinkler installers, mobile equipment operators, welders/fabricators, sandblasters, drillers, electricians, steel erectors, drywallers shooting tracks or boarding.

Engineering and administrative noise controls should be implemented to reduce sound sufficiently. Where such controls fail to sufficiently reduce sound levels, The Company will provide appropriate personal protective equipment for hearing.

HEARING CONSERVATION PROGRAM

If an acceptable noise level can't be maintained through engineering and/or administrative controls, this Company will implement an HCP that will include noise monitoring, the use of hearing protection devices (HPD) and audiometric testing.

- Ensure employee participation in hearing protection training program
- Ensure proper initial fitting of hearing protection devices
- Make hearing protectors available, and replace them as necessary
- Ensure hearing protectors are worn
- Notify employees exposed to high-noise activities and equipment
- Employ an audiologist, otolaryngologist or physician if audiometric evaluations and follow-up are provided
- Maintain and retain all records necessary for proper implementation of the HCP
- Review the hearing protection program according to changes in workplace noise levels, personnel changes and technological changes to ensure that the hearing protection program is providing the most possible protection to employees

Noise Monitoring

Sound level measurement and dosimetry are valuable tools to measure possible exposure over the course of the day and for specific equipment, but they have their limitations on a construction site.

Attaching the sound level information for a piece of equipment onto the equipment itself can help inform workers about the hazards they face when working with or around that equipment.

Sound monitoring should be repeated when there has been a change that may increase noise exposures and:

- More employees may be exposed
- Hearing protectors in use may no longer provide adequate protection to hearing

Sound Level Meter and dosimeter can be used to perform exposure monitoring according to manufacturer's instructions should be calibrated to ensure accuracy, and operators should follow manufacturer's instructions to conduct sampling.

Hearing Protection

HPDs are the least preferred option to control problematic noise exposure. HPDs will be used in the time it takes to establish engineering or administrative noise controls, or if these controls fail to provide sufficient protection.

This Company will provide and replace HPDs at no cost to all employees who work in the following situations:

- Where other controls fail to reduce noise exposure below an 8-hour TWA of 90 dBA
- Where employees are exposed to noise at or above an 8-hour TWA of 85 dBA, and have experienced hearing loss

In-ear protective devices may not be plain cotton and must be fitted or determined by a competent person to ensure adequate fit.

When using hearing protectors it is important that workers not overprotect. Devices shouldn't lower noise levels below 70 dBA to ensure workers can hear instructions and ambient sounds to ensure safety.

There are many types of hearing protection. Each type is designed for certain noise conditions. However, remember – unless worn properly and all the time in high noise areas, the devices will not be effective. The Company will consider the "three c's" of hearing protection selection — comfort, convenience and compatibility — to ensure the devices will be worn correctly 100% of the time when needed.

Hearing protectors available on the market will be labeled with a noise reduction rating (NRR), which indicates how much noise the protective device can block according to laboratory testing. Workers in trades subject to more noise should wear a HPD with a higher NRR.

Audiometric Testing

Audiometric testing monitors an employee's hearing over time. It also provides an opportunity for employers to educate employees about their hearing and the need to protect it.

Although OSHA does not require it for construction activities, all employees exposed to an 8-hour TWA of 85 Db or more should have free audiometric testing as part of the hearing conservation program.

The difficulty in establishing a baseline hearing threshold level and tracking hearing over time for employees in the construction industry, even with the availability of mobile testing facilities, is a well-known challenge in the construction industry. Still, preventing damage to the hearing of employees is of paramount importance, and all appropriate steps should be taken to provide employees the protection they need.

A licensed or certified audiologist, otolaryngologist or other physician should be responsible for the audiometric testing program and oversee all aspects of such testing. Trained technicians may conduct testing without immediate physician oversight if they are appropriately qualified to conduct such tests and they are accountable to an audiologist, otolaryngologist or physician.

Audiogram

A baseline audiogram should be established for each employee within 6 months of his or her first exposure at or above the 85-dBA 8-hour TWA action level.

Baseline audiograms should be preceded by 14 hours free of workplace noise exposure (or hearing protector use) and be conducted according to NIOSH or OSHA guidelines by a competent technician or doctor. Audiometric testing should be performed in an appropriate setting with a calibrated, ANSI-approved audiometer.

Evaluation

A physician or appropriate technician should compare each employee's annual audiogram to that employee's baseline audiogram to determine if the audiogram is valid and if a standard threshold shift has occurred.

A standard threshold shift according to OSHA is a change in hearing threshold relative to the baseline audiogram of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear (excepting an allowance for age as specified by OSHA in 1910.95 Appendix F: Calculation and Application of Age Correction to Audiograms). However, guidelines that are more stringent may also be followed.

The audiologist, otolaryngologist or physician will review problem audiograms and shall determine whether there is a need for further evaluation.

Audiogram Evaluation Follow-Up

This Company will inform the employee in writing within 21 days of an annual audiogram indicating a standard threshold shift to the baseline audiogram.

Unless a physician determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the Company shall ensure the following steps when a standard threshold shift occurs:

- Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them
- Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary
- We will refer the employee for a clinical audiological evaluation or an otological examination as appropriate if additional testing is necessary or if the employer suspects a medical pathology of the ear is caused or aggravated by the wearing of hearing protectors
- Inform the employee of the need for an otological examination with suspicion of a medical pathology of the ear unrelated to the use of hearing protectors

If later audiometric testing of an employee whose exposure to noise is less than an 8-hour TWA of 90 decibels indicates that a standard threshold shift is not persistent, the Company:

- Shall inform the employee of the new audiometric interpretation
- May discontinue the required use of hearing protectors for that employee

An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or physician who is evaluating the audiogram:

- The standard threshold shift revealed by the audiogram is persistent
- The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram

RECORDKEEPING

The Company should maintain accurate records of employee exposure measurements and audiometric test records pursuant to this policy. This audiometric test record should include the following:

- Name and job classification of the employee
- Date of the audiogram
- Examiner's name
- Date of the last acoustic or exhaustive calibration of the audiometer
- Employee's most recent noise exposure assessment

The following records will be maintained for at least the following periods:

- Noise exposure measurement records for two years
- Audiometric test records for the duration of the affected employee's employment

All HCP records should be maintained for the duration of the affected worker's employment and be provided upon request to employees, former employees, representatives designated by the individual employee, and any authorized government official.

If the Company ceases to do business, it will transfer HCP records to the successor employer.

Record a hearing loss on the OSHA 300 log if the following are true:

- A standard threshold shift is indicated by an audiometric examination
- The employee's overall hearing level is at 25 dB or more above audiometric zero averaged at 2000, 3000 and 4000 Hz in the affected ear(s)
- The hearing loss is work related

TRAINING

The Company will ensure every employee is provided training on hearing protection. This training will be provided at no cost to the employee during working hours.

The Company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of employees.

Training will be repeated annually with an updated training program that reflects changes in protective equipment and work processes.

Training Components

The Safety Coordinator will ensure that every employee will be trained in the following minimum elements:

- Use and care of all hearing protectors provided
- Effects of noise on hearing
- Purpose of hearing protectors, advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use and care
- The purpose of audiometric testing and an explanation of test procedures (if offered)
- Steps an employee can take in the workplace and outside of the workplace to protect hearing

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

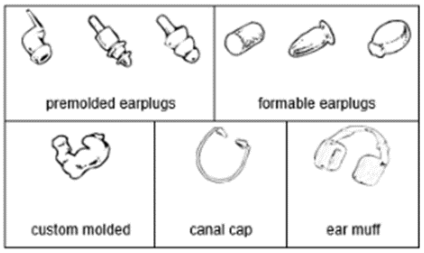
- Audiometric and Identification Information
- Hearing Conservation Program Employee Enrollment
- Hearing Protection Training Record Sheet

AUDIOMETRIC AND IDENTIFICATION INFORMATION

Name						
ID#		Birth Date			Gender	
Test Date		Time		Time since last exposure		hrs
Exposure Level	dBA	**Hearing Protection Devices Used (choose)**				

Hearing Protector Activity

☐ Issue
☐ Reissue
☐ Training
☐ Retraining



Hearing Protector Activity

☐ Medical history	☐ Hobby/Military	☐ Additional Information
☐ Diabetes	☐ Hunt/Shoot	☐ Noisy 2nd Job
☐ Ear Surgery	☐ Car Racing	☐ Noisy past job
☐ Head Injury	☐ Motorcycles	☐ Exposure to Solvents
☐ High Fever	☐ Other Loud Vehicles	☐ Exposure to Metals
☐ Measles	☐ Loud Music/Band	☐ Difficulty Hearing
☐ Mumps	☐ Power Tools	☐ Hearing Aid
☐ Hypertension	☐ Other Noisy Hobbies	☐ Recent Change in Hearing
☐ Ringing in Ears	☐ Military Service	☐ See Physician about Ears
☐ Ear Infection	☐ Other:	☐ Other:
☐ Other:		

Audiogram

Test Frequency	500	1000	2000	3000	4000	6000	8000
Right Ear							
Left Ear							

Audiometer		Serial Number	
Exhaustive Cal. Date		Biological Cal. Date	
Tester ID		Test Reliability	☐ Good ☐ Fair ☐ Poor
Review ID		Audiogram Classification	
Comments			

HEARING CONSERVATION PROGRAM EMPLOYEE ENROLLMENT RECORD

Employee Name	Date enrolled	Reason for Enrolling		Date Audiometric Testing First Offered	Date of Initial Conservation Training	Removal from Hearing Conservation Program	
		Noise exposure at or above action level	Enrolled w/o exposure monitoring			Date Employee Removed from HCP	Date of Employee Separation

HEARING PROTECTION TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

OSHA does not have its own heat illness regulation but has interpretations that refer to the General Duty Clause and a technical manual (OTM Sect. III Ch. 4) that has heat illness information and guidelines.

Employers that have work environments with recognizable heat-related hazards can be cited for ignoring a recognized hazard like heat illness. This chapter provides information on Cal/OSHA's heat illness prevention program, which is recognized as an industry standard across the country

POLICY

Operations, indoor and outdoor, that involve working where there are high air temperatures, radiant heat sources, high humidity, direct physical contact with hot objects, or strenuous physical activities, have a high potential for causing heat-related illness.

This policy is the written plan to establish, implement, and maintain heat illness protection. It will be available at the worksite so that any employee can see it upon request.

This policy has been developed to address these issues. All employees will receive training relating to the causes and effects of, the personal and environmental factors that may lead to, and the prevention measures to fight, heat-related illnesses.

STANDARDS AND REGULATIONS

This company will ensure that all procedures and safe work practices adhere to the following applicable rules and regulations:

- OSHA General Duty Clause, Section 5(a)(1)
- OSHA sanitation regulation CFR 1926.51
- Title 8 of California Code of Regulations Section 3395

RESPONSIBILITIES

Preventing heat-related illness is a cooperative effort between this company and its employees.

This policy incorporates Cal/OSHA's updates of its heat-related illness regulations effective May 1, 2015 and addresses: training, shade, water, preventative breaks, first-aid response, acclimatization, and emergency procedures.

. The following provides appropriate steps for both employers and employees.

General Responsibilities – Employer

It is the responsibility of the company to:

- Conduct a risk assessment for all worksites to identify heat risks and safe work procedures
- Establish and implement safe work practices to lessen the effects of heat stress as much as reasonably practical

- Establish and implement supervisor and employee training so everyone can recognize and respond to heat illness symptoms
- Ensure that all relevant risk factors, health, first aid, and emergency response procedures are communicated to all employees and supervisors
- Adjust work practices as necessary when workers complain of heat illness
- Use engineering controls as the primary means of limiting employees' exposure to high heat conditions wherever possible;
- Oversee heat illness prevention training and acclimatization for new workers and for workers who have been off the job for a while
- Establish and implement emergency communication procedures to ensure quick access to first aid and emergency responders

Employee Responsibilities

Employees are expected to:

- Follow established safe work policy and procedures
- Know about and recognize initial heat illness symptoms in yourself and others
- Know how to appropriately respond to heat illness symptoms
- Participate in all required training
- Find out whether any prescription medications you are required to take can increase the risk of heat illness
- Get adequate rest and sleep
- Drink small amounts of water regularly to maintain fluid levels and avoid dehydration
- Report signs and symptoms of heat-related illness to supervisor immediately

HAZARDS

The body regulates its temperature through sweat and circulating blood to the skin; however, high temperatures and high humidity make this process more difficult. As the body’s ability to cool itself decreases, it must store the excess heat, raising the body’s core temperature. If the body’s temperature becomes too high, it ceases to be able to regulate itself which could result in death.

This company will ensure that all relevant risk factors, health, first aid, and emergency response procedures are communicated to all employees and supervisors. These include, but are not limited to, heat illness prevention (drinking fluids, rest, acclimatization, heat stress factors) and heat illness symptoms; procedures (high heat procedures).

Employees are expected to report symptoms to their supervisor, designated first aid responder, or outside emergency response personnel.

Risk Factors

Many factors determine the total risk a worker faces from excessive heat while at work. At the core of temperature-related risk factors is the basic question of how hot a worker feels. The factors that must be considered when assessing a worker's risk of heat illness include:

- **Temperature -** The apparent temperature can be affected by:
  - The season
  - Reflected heat
  - Heat from equipment
  - Working in direct sunlight

Keeping track of the temperature at the workplace is a critical element of any program to prevent heat-related illness

- **Humidity -** As humidity rises, sweat tends to evaporate less. As a result, body cooling decreases and body temperature increases.
- **Air Movement -** As long as the air temperature is less than the worker's skin temperature, air movement can help workers stay cooler by increasing both the rate of evaporation and the heat exchange between the skin and the air.
- **Job-specific Exertion –** The body generates more heat during heavy physical work. Heavy physical work requires careful evaluation, even at temperatures as low as 75° F, to prevent heat disorders. This is especially true for workers who are not acclimated to the heat
- **Clothing and PPE -** Heat illness can be caused or aggravated by wearing PPE such as fire or chemical retardant clothing. Coated and non-woven materials used in protective garments block the evaporation of sweat and can lead to substantial heat stress. The more or heavier clothing worn, the longer it takes evaporation to cool the skin
- **Time -** Working for long stretches of time and during the heat of the day exposes workers to a higher risk of heat illness. Workers should cycle through light work and heavy work, taking breaks as necessary.

Work According to Level of Exertion	
Light Work	Using a table saw Some walking about Operating a crane, truck, or other vehicle Welding
Moderate Work	Laying brick Walking with moderate lifting or pushing Hammering nails Tying rebar Raking asphalt Sanding drywall
Heavy Work	Carpenter sawing by hand Shoveling dry sand Laying block Ripping out asbestos Scraping asbestos fireproofing material
Very Heavy Work	Shoveling wet sand Lifting heavy objects

Equipment and Processes

Equipment and processes at the work site contribute greatly to the heat stress a worker faces.

Hot engines and work that involves high temperature processes can significantly raise temperature and put workers at risk. Contact with hot surfaces can also present the danger of burns.

Personnel-Specific

It is difficult to predict who will be affected by a heat illness and when, because individual susceptibility varies. There are, however, certain physical conditions that can reduce the body's natural ability to withstand high temperatures.

Age

As the body ages, its sweat glands become less efficient. Workers over the age of 40 may therefore have trouble with hot environments. Acclimatization to the heat and physical fitness can offset some age-related problems.

Weight

Workers who are overweight lose heat less efficiently and are more easily subject to heat-related illness.

Skin Pigmentation

Persons with lighter complexions are at a higher risk of sunburn and heat illnesses than those with higher levels of skin pigmentation, because skin with less pigmentation absorbs approximately 20% more heat.

Fitness

Being physically fit increases your ability to cope with the increased demands that heat places on your body.

Caffeine and Alcohol

Alcohol consumption within 24 hours of work leads to dehydration and increased risk of heat illness. While recent research suggests that caffeine may not be as detrimental to hydration as formerly believed, in large amounts it does act as a diuretic and can contribute to dehydration.

Medical Conditions

In order to pump blood to the skin and cool the body, the heart rate increases. This can cause stress on the heart, which is particularly hazardous to those with heart disease or high blood pressure.

Certain medications may cause heat intolerance by reducing sweating or increasing urination. People who work in a hot environment should consult their physician or pharmacist before working while taking certain medications.

Workers with recent illnesses involving diarrhea, vomiting, or fever have an increased risk of dehydration and heat illnesses because their bodies have lost salt and water.

HEAT ILLNESS HAZARDS

There are varying degrees of heat related illness and all company employees and supervisors will be trained on the symptoms of them and the procedures to follow in case of an emergency.

The effects of heat illnesses can range from mild discomfort to life threatening and consist of the following types. All company employees will be trained to recognize the symptoms of each.

Sunburn

Although sunburn is not classified as a heat illness, it can make it more difficult for the body to release heat in addition to causing pain and discomfort. A severe sunburn can cause blistering and become infected. Sunscreen and appropriate clothing can prevent sunburn.

Heat Rash

Heat rash is a skin irritation caused by excessive sweating during hot, humid weather.

Workers experiencing heat rash should:

- Try to work in a cooler, less humid environment when possible
- Keep the affected area dry
- Dusting powder may be used to increase comfort

Heat Cramps

Heat cramps usually affect workers who sweat a lot during strenuous activity. This sweating depletes the body's salt and moisture levels. Low salt levels in muscles causes painful cramps. Heat cramps may also be a symptom of heat exhaustion.

Workers with heat cramps should:

- Stop all activity, and sit in a cool place
- Drink clear juice or a sports beverage
- Not return to strenuous work for a few hours after the cramps subside because further exertion may lead to heat exhaustion or heat stroke
- Seek medical attention if any of the following apply:
  - The worker has heart problems
  - The worker is on a low-sodium diet
  - The cramps do not subside within one hour

Heat Syncope

Heat syncope is a fainting (syncope) episode or dizziness that usually occurs in a warm environment when the body's blood pressure drops while attempting to dissipate heat. The result is less blood to the brain, causing light-headedness and fainting when a person stands up quickly or stands for a long period. Those who perform strenuous work outside in warm climates are at particular risk.

Workers with heat syncope should:

- Sit or lie down in a cool place when they begin to feel symptoms
- Slowly drink water, clear juice, or a sports beverage

Heat Exhaustion

Heat exhaustion is the body's response to an excessive loss of the water and salt, usually through excessive sweating. Workers most prone to heat exhaustion are those that are elderly, have high blood pressure, and those working in a hot environment.

Heat Stroke

Heat stroke is the most serious heat-related disorder. It occurs when the body becomes unable to control its temperature, the body's temperature rises rapidly, the sweating mechanism fails and the body is unable to cool down. When heat stroke occurs, the body temperature can rise to 106 degrees Fahrenheit or higher within 10 to 15 minutes. Heat stroke can cause death or permanent disability if emergency treatment is not given.

Take the following steps to treat a worker with heat stroke:

- Call 911 and notify their supervisor
- Move the sick worker to a cool shaded area
- Cool the worker by either:
  - Soaking their clothes with water
  - Spraying, sponging, or showering them with water
  - Fanning their body

HEAT ILLNESS SYMPTOMS

Symptoms of Sunburn

Typically, there is initial redness, followed by varying degrees of pain, depending on the duration and intensity of exposure. Other symptoms can include swelling, itching, peeling skin, rash, nausea, fever, chills and fainting. Sunburns may be first or second degree burns.

Symptoms of heat rash include:

- A red cluster of pimples or small blisters
- More likely to occur on the neck and upper chest, in the groin, under the breasts, and in elbow creases

Symptoms of Heat Cramps Include:

- Muscle pain or spasms usually in the abdomen, arms, or legs
- Severe, sometimes disabling, cramps that typically begin suddenly in the hands, calves, or feet
- Hard, tense muscles

Symptoms of Heat Syncope Include:

- Light-headedness
- Dizziness
- Fainting

Symptoms of Heat Exhaustion Include:

- Heavy sweating and/or cold, clammy skin
- •Excessive thirst
- •Nausea
- Pale or flushed complexion
- Slightly elevated body temperature
- Chills
- High body temperature
- Extreme weakness or fatigue
- Dizziness, confusion, or hallucinations
- Slowed or weakened heartbeat
- Muscle aches and cramps
- Fast and shallow breathing
- Throbbing headache
- Slurred speech

NOTE: Pesticide poisoning has similar symptoms as heat exhaustion.

Symptoms of Heat Stroke Include:

- Nausea and vomiting
- Dizzyness and fainting
- Hot, flushed, dry skin
- Decreased sweating
- Decreased urination
- Increased body temperature (104 to 106ºF)
- Convulsions
- Headache
- Fatigue
- Rapid or slowed heart rate
- Shortness of breath
- Blood or urine in stool
- Confusion, delirium, loss of conciousness

Heat stroke can occur suddenly, without any symptoms of heat exhaustion. If a person is experiencing any symptoms of heat exhaustion or heat stroke, GET MEDICAL CARE IMMEDIATELY. Any delay could be fatal.

Emergency Response

The company will provide emergency medical services as quickly as possible if a worker suffers from heat illness.

All employees may contact 9-1-1 when necessary, but at least one accessible person for each crew will be designated responsible for initiating an emergency response. The emergency response can include immediate first aid, continued monitoring, contacting 9-1-1 and transporting the victim to emergency responders. An appropriately trained and equipped first aid provider at the worksite can decide on the appropriate response. If that person does not exist, then 9-1-1 will be called for any employee showing heat related illness symptoms.

A risk assessment will be conducted for all worksites that consider heat illness a risk factor: if 9-1-1 can be accessed from the worksite, whether the work site is served by the 9-1-1 system, and ensure emergency responders can access any victims. All employees will have access to a map of their location or clear, detailed and precise directions.

Employees and supervisors will know the basic first aid to stop the progression of heat illness.

REQUIREMENTS

Access to Shade

- When the outdoor temperature in the work area is expected to exceed 80 degrees Fahrenheit, the company must provide and maintain one or more shaded areas for employees that are either open to the air or supplied with ventilation or cooling. The amount of shade present must be at least enough to accommodate all of the employees on rest or recovery periods, allowing them to sit in a normal posture, fully in the shade, without being in physical contact with each other. The shaded area will be located as close as practicable to the employees work area
- Shaded areas must also be available during meal periods and be capable of accommodating all employees on meal periods who remain onsite
- When the outdoor temperature in the work area does not exceed 80 degrees, employers will either provide shade or provide timely access to shade if requested by an employee
- Employees will be allowed and encouraged to take a preventative cool-down rest in the shade when they feel the need to do so to protect themselves from overheating. Access to shade must be permitted at all times
- Employees who take a preventative cool-down rest will be:
  - Monitored and asked if they are experiencing any symptoms of heat illness
  - Encouraged to remain in the shade
  - Not ordered back to work until any signs of heat illness have subsided, or for at least five minutes once they have accessed the shade
- Employees who exhibit or report signs or symptoms of heat illness will take a cool-down period and will be provided with the necessary first aid or emergency response

- Exceptions
  - Where the company can demonstrate that it is infeasible or unsafe to have a shade structure, or otherwise to have shade present on a continuous basis, the employer may utilize alternative equivalent procedures for providing access to shade
  - Except for employers in the agricultural industry, cooling measures other than shade (e.g., use of misting machines) may be provided instead of shade if the employer can demonstrate that these measures are at least as effective as shade in allowing employees to cool

High-Heat Procedures

The company will implement high-heat procedures when the temperature equals or exceeds 95 degrees Fahrenheit. These procedures will include the following:

- Observing employees for alertness and signs or symptoms of heat illness by one of the following:
  - Having a supervisor or designated person observe employees for groups of 20 or less
  - Implementing a mandatory buddy system
  - Having regular communication with an employee by radio, phone, or other reliable method
- Authorizing at least one employee at the worksite to summon emergency services if no qualified first aid provider is available
- Reminding employees throughout the work shift to drink plenty of water
- Conducting pre-shift meetings before the start of work to review the high heat procedures with employees, including the need to drink water frequently and the right to take cool-down rests

Potable Water

An adequate supply of potable water will be provided continuously in all places of employment, along with single-service cups (unless the source is a drinking fountain). The water should be kept cool or cold if supplied in a hot environment. Potable water is defined as water that meets the drinking water standards of the state or local authority having jurisdiction, or water that meets the quality standards prescribed by the EPA’s drinking water regulations.

Fluid Intake

In a day's work in the heat, a worker may produce as much as 2 to 3 gallons of sweat. Because so many heat disorders involve excessive dehydration of the body, it’s essential that water intake during the workday be about equal to the amount of sweat produced. Most workers exposed to hot conditions drink less than needed because of an insufficient thirst drive.

A worker, therefore, should not depend on thirst to signal when and how much to drink. Instead, the worker should drink 5 to 7 ounces of fluids every 15 to 20 minutes to replenish the necessary fluids in the body. There is no optimum temperature of drinking water, but most people tend not to drink warm or very cold fluids as readily as they will cool ones. Whatever the temperature of the water, it must be agreeable and readily available to the worker. Individual drinking cups should be provided, unless a drinking fountain is used. OSHA sanitation standards prohibit the use of a common drinking cup.

Heat acclimatized workers lose much less salt in their sweat than do workers who are not adjusted to the heat. The average American diet contains sufficient salt for acclimatized workers even when sweat production is high. If, for some reason, salt replacement is required, the best way to compensate for the loss is to add a little extra salt to the food. Salt tablets **should not** be used.

Number and Duration of Exposures

Rather than be exposed to heat for extended periods during the course of a job, workers should, wherever possible, be permitted to distribute the workload evenly over the day and incorporate work-rest cycles. Work-rest cycles give the body an opportunity to rid itself of excess heat, slow down the production of internal body heat, and provide greater blood flow to the skin.

Workers employed outdoors are especially subject to weather changes. A hot spell or a rise in humidity can create overly stressful conditions. The following practices can help reduce the risk of heat illness:

- Postponement of nonessential tasks
- Permit only those workers acclimatized to heat to perform the more strenuous tasks
- Provide additional workers to perform the tasks keeping in mind that all workers should have the physical capacity to perform the task and that they should be accustomed to the heat

Engineering Controls

A variety of engineering controls can be introduced to minimize exposure to heat. For instance, improving the insulation on a furnace wall can reduce its surface temperature and the temperature of the area around it. In a laundry room, exhaust hoods installed over those sources releasing moisture will lower the humidity in the work area. In general, the simplest and least expensive methods of reducing heat and humidity can be accomplished by:

- Opening windows in hot work areas
- Using fans
- Using other methods of creating airflow such as exhaust ventilation or air blowers

Rest

Providing cool rest areas in hot work environments considerably reduces the stress of working in those environments. There is no conclusive information available on the ideal temperature for a rest area. However, a rest area with a temperature near 76° F appears to be adequate and may even feel chilly to a hot, sweating worker, until acclimated to the cooler environment.

The rest area should be as close to the workplace as possible. Individual work periods should not be lengthened in favor of prolonged rest periods. Shorter but frequent work-rest cycles are the greatest benefit to the worker.

The revised Cal-OSHA heat Illness regulation requires agricultural employers to ensure that employee takes a minimum ten minute net preventative cool-down rest period every two hours when temperatures reach 95 degrees or above.

Acclimatization

A supervisor or designee will closely observe employees who have been newly assigned to a high heat area or job for the first 14 days of the employee's employment

When exposed to heat for a few days, the body will adapt and become more efficient in dealing with raised environmental temperatures. This process is called acclimatization. Acclimatization can take from 4 to 14 days, depending on the individual, of working at least two hours a day in the heat.

Acclimatization may be lost in as little as three days away from work. Employees, and supervisors, who return to work after a holiday or long weekend, need to understand this. Workers should be allowed to re-acclimatize to work conditions gradually.

PROCEDURES

This policy is the written plan to establish, implement and maintain heat illness protection. This policy will also be made available at the worksite so that any employee, who requests to, can see it.

Each worksite will have procedures in place that document how to provide:

- Enough refreshing, pure, and cool drinking water for all employees
- Available shade to encourage preventative cool down rests
- Acclimatization in high heat
- Weather condition monitoring and associated safety precautions
- Adjustments needed in high temperatures
- Training employees and supervisors
- Communicating this policy
- First Aid
- Emergency response
- Specific knowledgeable person(s) designated to implement these procedures

HIGH-HEAT PLANNING

The National Weather Service issues heat-related notifications that can help ensure work planning includes appropriate controls and processes to prevent heat-related illness and treat them as they arise:

Excessive Heat Outlook

Excessive Heat Outlooks are issued when the potential exists for an excessive heat event in the next 3-7 days.

Excessive Heat Watch

Excessive Heat Watches are issued by the National Weather Service when the heat is expected to be in excess of 105º F during the day combined with nighttime low temperatures of 80º F or higher are forecast to occur for two consecutive days.

Excessive Heat Warning and Advisories

Excessive Heat Warning/Advisories are issued within 12 hours of when the heat index is expected to be at least 105° F for more than 3 hours per day for 2 consecutive days, or more than 115° F for any length of time. These notices are issued when an excessive heat event is occurring, is imminent or has a very high probability of occurring. The warning is used for conditions posing a threat to life or property. An advisory is for less serious conditions that cause significant discomfort or inconvenience and, if caution is not taken, could lead to a threat to life and/or property.

Outdoor Working Procedures

When employees are working outdoors during high heat periods, steps will be taken to limit the effects of heat exposure when temperatures exceed an action level depending on the type of clothing being worn.

All other clothing	89° F
Double-layer woven clothes including coveralls, jackets and sweatshirts	77° F
Non-breathing clothes including vapor barrier clothing or PPE such as chemical resistant suits	52° F

These steps include

- Supplying at least one quart of drinking water per employee per hour throughout the shift
- Encouraging workers to frequently drink water and other hydrating beverages
- Monitoring workers for heat illness symptoms
- Hold pre-shift meeting to remind workers of high heat hazards

Workers with heat related illness symptoms will be relieved from duty and given a way to reduce their body temperature and monitored to determine if they need medical attention.

Workers are considered to be working outdoors when they are outside for more than 15 minutes in an hour. Work environments are considered outdoors when the factors affecting the temperature are not managed by engineering controls (e.g. air conditioning). Some examples include vehicle cabs, sheds, and tents.

Heat Protection

Employees working in areas that present heat hazards should follow these recommendations:

- When working in the heat, clothing should be loose fitting, lighter color to reflect sun, and should contain as much cotton as possible.
- Wear sunscreen
- Wear a hat
- Use UV eye protection (if possible)
- Change out of wet clothing when working in high humidity conditions

PPE

Employees who are required to wear specific types of PPE in high heat environments should consider the use of the following additional equipment:

- Cooling pad inserts for hardhats
- Insulated gloves
- Insulated suits
- Reflective clothing
- Infrared reflecting face shields

For extremely hot conditions, thermally conditioned clothing is available. One such garment carries a self-contained air conditioner in a backpack, while another is connected to a compressed air source that feeds cool air into the jacket or coveralls through a vortex tube. Another type of garment is a plastic jacket that has pockets that can be filled with dry ice or containers of ice.

Employees should discuss these options with their supervisor to determine if the provision of the items by the company is warranted.

BUDDY SYSTEM

A worker may not recognize his own signs and symptoms of heat-related illness. Workers should be encouraged to look after each other to ensure the team stays safe and healthy. A buddy system assigns each worker to one other worker to ensure there is at least one other person monitoring the heat health of every worker.

ACTIONS TO PREVENT HEAT-RELATED ILLNESS BASED ON TEMPERATURE

OSHA-Suggested Heat Index Thresholds		
Temperature	**Risk Level**	**Protective Measures**
<91° F	Lower Caution	Basic heat safety and planning
91° F – 103° F	Moderate	Implement precautions and heighten awareness
103° F – 115° F	High	Additional precautions to protect workers
>115° F	Very high/Extreme	Even more aggressive measures

As temperatures rise, managers and supervisors need to take responsibility for ensuring appropriate procedures are being followed to reduce the ill effects of heat on workers.

Lower Caution

- Adequate drinking water
- Available medical services
- Acclimatize new and returning workers who perform strenuous work
- Check forecast regularly

- Encourage workers to wear sunscreen and use other protections from direct sunlight
- Depending on site conditions, take actions for moderate risk conditions

Moderate Caution

- Follow “Lower Caution” precautions.
- Alert workers to index, identify additional precautions necessary
- Remind workers to drink small amounts of water through the day
- Respond to heat-related illnesses and medical emergencies immediately
- Review heat-related illness symptoms and signs and the established site- specific precautions
- Schedule frequent breaks in cool, shaded areas
- Acclimatize new and returning workers
- Set up a buddy system
- Instruct supervisors to watch workers for signs of heat-related illness

High Caution

- Follow “Moderate” precautions
- Have a knowledgeable person onsite to modify work activities and the work/rest schedule as necessary
- Establish and enforce work/rest schedules
- Adjust work activities
- Take extra precautions for workers in clothing that may add to a heat hazard
- Maintain effective communication with crew

Very High to Extreme

- Follow “High” precautions
- Reschedule non-essential outdoor work
- Move essential outdoor work to coolest part of work shift
- Stop work if necessary

EMERGENCY RESPONSE PROCEDURES

Our company has implemented heat illness emergency response procedures that include:

- Ensuring there is reliable communication method between employees and supervisors and/or emergency services in the event assistance for heat illness is needed
- Responding to the signs and symptoms of heat illness, including the procedures for providing first aid and additional emergency services as needed. These procedures will include:
    - Authorizing qualified supervisors or designated employees to provide first aid and/or contact emergencies services
    - Implement emergency procedures in cases of severe heat illnesses
    - Monitoring any employee displaying the signs and symptoms of heat illness, and not leaving them unattended or releasing them to leave the worksite without offering to provide first aid or emergency services

- Contacting emergency medical services, and/or transporting the employee to a medical provider or facility
- Ensuring that the personnel responsible for contacting emergency services are capable of providing the responders with clear and precise directions to the worksite

TRAINING

We will ensure every employee is provided training on preventing heat-related illness. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Elements

Training will be provided to employees and supervisors before being assigned to any outdoor work for the first time and then at least annually on the following topics:

Employee Training Components

The safety coordinator will ensure all employees are trained in the following minimum elements:

- Heat related illness environmental factors
- Personal factors that increase susceptibility (e.g. age, acclimatization, medical conditions, water consumption, alcohol, caffeine, nicotine, and medical conditions)
- The company's heat illness procedures including but not limited to:
  - The company's methods of providing water, shade, cool-down rests and access to first aid
  - The employees right to request heat illness relief without fear of retaliation
- The importance of frequent consumption of small quantities of water, up to four cups per hour, when the work environment is hot and employees are likely to be sweating more than usual in the performance of their duties
- The importance of acclimatization (the body's ability to adjust to high temperatures over time), how it is developed, and how worksite procedures address it
- Symptoms of types of heat related illness, and the treatment for them
- The procedures that can be taken to prevent heat-related illness
- The importance of removing heat retaining PPE during breaks
- The importance of immediately reporting to the employer/supervisor, symptoms or signs of heat illness in themselves, or in co-workers
- The danger of rapid progression of heat illness form mild to life threatening
- The employer's procedures for responding to symptoms of possible heat illness, including how emergency medical services will be provided should they become necessary
- The employer's procedures for contacting emergency medical services, and if necessary, for transporting employees to an emergency medical service provider
- The employer's procedures for ensuring that, in the event of an emergency, clear and precise directions to the work site will be provided as needed to emergency responders. These procedures must include designating a person to be available to ensure that emergency procedures are initiated when appropriate

Supervisor Training

Supervisor training will cover:

- What employees need to know
- Procedures to implement this program
- Emergency response procedures (e.g. transportation, reaching an emergency medical service provider)

When it's reasonable to expect that workers will be exposed to the risk of heat illness, supervisors will be trained on the following topics before being permitted to supervise those workers.

- The information required to be provided to employees in the section immediately above
- The procedures the supervisor is to follow to implement the applicable provisions in this chapter
- The procedures the supervisor is to follow when an employee exhibits symptoms of possible heat illness, including emergency response procedures
- How to monitor weather reports and how to respond to hot-weather advisories

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

Please find the following document on the pages below:

- Heat Illness Training Documentation

This form may be reproduced for the purposes of implementing and maintaining a safety and health program.

HEAT ILLNESS TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

This chapter provides information on the safe practices when working with ladders and/or stairs. The policy and procedures covered where will comply with the requirements of the OSHA ladder and stairway regulations in 1926 Subpart X and/or 1910 Subpart D, whichever is applicable.

It does not address working at elevations or fall protection, those items are addressed in separate chapters.

POLICY

Ladders are valuable tools, but they present a range of hazards that workers need to understand in order to use them safely. This Company has created this policy to ensure employees understand how to use ladders safely, how to select the right ladder for a job, how to store and maintain ladders and how to recognize ladders that may be hazardous.

EMPLOYER RESPONSIBILITIES

This Company is responsible for:

- Making sure all ladders meet safety requirements and are maintained in safe, working condition
- Selecting ladders to purchase according to needs of operations
- Ensuring employees are trained in safe ladder selection and use
- Removing ladders from service when they are no longer safe to be used
- Requiring employees use ladders as safely as possible

EMPLOYEE RESPONSIBILITIES

Employees will:

- Participate actively in ladder safety training
- Recommend safety improvements and report safety hazards to supervisor, safety team or other appropriate personnel
- Report damaged or otherwise unsafe ladders
- Follow safe practices when using ladders
- Transport and store ladders according to best safe practices

HAZARDS

Most ladder falls involve portable ladders that move, tilt or shift while a worker is climbing or descending. Unstable or slippery base surfaces are the primary reasons ladders fail. Other reasons include a misstep or a slip of the foot, loss of balance, an overreach and being struck by a vehicle or another object.

LADDER TYPES

Portable Ladders

Workers can reduce ladder fall risks by doing the following:

- Frequently inspecting and maintaining ladders
- Matching tasks to appropriate ladders
- Setting up ladders correctly
- Climbing and descending ladders properly

Any portable ladder used during construction activities: must be meet the following specifications

- Non-self-supporting and self-supporting portable ladders must support at least four times the maximum intended load; extra heavy-duty type 1A metal or plastic ladders must be able to support 3.3 times the maximum intended load. The ability of a self-supporting ladder to sustain loads must be determined by applying the load to the ladder in a downward vertical direction. The ability of a non-self-supporting ladder to sustain loads must be determined by applying the load in a downward vertical direction when the ladder is placed at a horizontal angle of 75.5 degrees
- The minimum clear distance between side rails for portable ladders must be 11.5 inches
- The rungs and steps of portable metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material, or treated to minimize slipping

Non-Self-Supporting Ladders

Single Portable or Straight Ladders

The single portable or straight ladder is indispensable for general use. It is the most common type of portable ladder and has the widest range of applications. When used on slippery surfaces, this ladder must have slip-resistant feet or be secured to prevent it from sliding.

Rubber or neoprene ladder shoes are recommended for smooth, dry surfaces, and spikes are recommended for snow or ice. Single portable ladders must not be longer than 30 feet and be used by only one worker at a time.

Extension or Section Ladder

Extension ladders consist of two or more sections that travel in guides or brackets, allowing adjustable lengths. The sections must be assembled so that the sliding upper section is on top of the lower section. Each section must overlap its adjacent section a minimum distance, based on the ladder’s overall length. See Table 2.

The overall length of an extension ladder is determined by adding the lengths of the individual sections, measured along the side rails.

Note: Install positive stops on individual ladder sections to ensure the required overlap.

TABLE 1

Number of Sections for metal ladders	Maximum Length (in feet)
one section (or any section of a multiple-section ladder)	30
two-section ladder	48
more than two sections	60

TABLE 2

Normal Length of Ladder (in feet)	Overlap (in feet)
Up to and including 36	3
Over 36, up to and including 48	4
Over 48, up to 60	5

Extension ladders are made of wood, metal, or reinforced fiberglass. Wood ladders cannot have more than two sections and must not exceed 60 feet. Metal and fiberglass ladders can have as many as three sections; however, the overall length must not exceed 72 feet. See Table 1. Individual sections of any extension ladder must not be longer than 30 feet.

Extension ladders are for use by only one person at a time.

Make sure extension ladders have non-slip bases if there is a chance the ladder can slip. Cord-face ladder shoes are recommended for wet surfaces, rubber or neoprene ladder shoes for smooth dry floor surfaces, and steel spikes for ice or snow. Be careful if you use an extension ladder on oily, metal or concrete surfaces. Place the ladder securely and tie it off to prevent it from slipping.

Self-Supporting Ladders

Standard Stepladder

The standard stepladder, a general-purpose ladder, has flat steps and a hinged back. It is self-supporting and nonadjustable. An industrial model, designed for heavy service demands, has oversize back legs, heavy-duty flat steps, and knee braces that increase rigidity and durability.

Standard stepladders should be used only on surfaces that offer firm, level footing such as floors, platforms and slabs. They are available in metal, wood, or reinforced fiberglass versions, and are intended to support only one worker at a time. Remember not to stand on, or work from, the top step. The ladders must have a metal spreader or locking arms. They cannot be longer than 20 feet, measured along the front edge of the side rails.

Two-Way Stepladder

The two-way stepladder is similar to the industrial standard stepladder; however, each side of this ladder has a set of steps. The extra set of steps offers convenience and versatility: One person can work from either side or two people can work from the ladder at the same time — one on each side.

Platform Ladder

The platform ladder is a special-purpose ladder that has a large stable platform from which you can work at the highest standing level. The ladder's length is determined by the length of the front edge of the side rail from the bottom of the ladder to the base of the platform. The length of a platform ladder cannot exceed 20 feet.

Trestle Ladder

A trestle ladder is a self-supporting portable ladder that has two sections hinged at the top, forming equal angles with the base. A variation of the trestle ladder, the extension trestle ladder, includes a vertically adjustable single ladder that can be locked in place. (The single extension section must lap at least three feet into the base section.) Trestle ladders are used in pairs to support planks or staging. The rungs are not intended to be used as steps.

The angle of spread between open front and back legs must be 5 ½ inches per foot of length. The length cannot be more than 20 feet, measured along the front edge of the side rails. Rails must be beveled at the top and have metal hinges to prevent spreading. Metal spreaders or locking devices are also required to keep the rails in place.

Ladder Storage

The storage area should be well ventilated. Wood ladders should not be exposed to moisture or excessive heat. Avoid storing ladders near stoves, steam pipes or radiators.

Store straight or extension ladders in flat racks or on wall brackets. Make sure there are enough brackets to support the ladder so that it does not sag. If the ladder rails have a lateral curve, the wall brackets should match the curve.

Store stepladders vertically, in a closed position, to reduce the risk of sagging or twisting. Secure stored ladders so that they will not tip over if they are struck.

Store ladders, especially wood ladders, promptly after using them. Exposure to moisture and sun will shorten the life of a wood ladder.

Transporting Ladders

When you hand-carry a ladder, keep the front end elevated, especially around blind corners, in aisles, and through doorways. You will reduce the chance of striking another person with the front of the ladder.

When you transport a ladder in a truck or trailer, place it parallel to the bed. Avoid tossing, throwing or dropping it in the bed. If you transport a long ladder on a short truck bed over long distances, support the ladder so it will not sag or bend.

Drive slowly over rough terrain. Tie the ladder securely to eliminate nicking, gouging, chafing and road shock.

Fixed Ladders

A fixed ladder must be capable of supporting at least two loads of 250 pounds each, concentrated between any two consecutive attachments. Fixed ladders also must support added anticipated loads caused by ice buildup, winds, rigging and impact loads resulting from the use of ladder safety devices.

Individual rung/step ladders must extend at least 42 inches above an access level or landing platform, either by the continuation of the rung spacing as horizontal grab bars, or by providing vertical grab bars that must have the same lateral spacing as the vertical legs of the ladder rails.

Each step or rung of a fixed ladder must be capable of supporting a load of at least 250 pounds applied in the middle of the step or rung.

The minimum clear distance between the sides of individual rung/step ladders and between the side rails of other fixed ladders must be 16 inches.

The rungs of individual rung/step ladders must be shaped to prevent slipping off the end of the rungs. The rungs and steps of fixed metal ladders must be corrugated, knurled, dimpled, coated with skid-resistant material or treated to minimize slipping.

The minimum perpendicular clearance between fixed ladder rungs, cleats and steps, and any obstruction behind the ladder must be 7 inches, except that the clearance for an elevator pit ladder must be 4.5 inches.

The minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats and steps, and any obstruction on the climbing side of the ladder must be 30 inches. If obstructions are unavoidable, clearance may be reduced to 24 inches, provided a deflection device is installed to guide workers around the obstruction.

The step-across distance between the center of the steps or rungs of fixed ladders and the nearest edge of a landing area must be no less than 7 inches and no more than 12 inches. A landing platform must be provided if the step-across distance exceeds 12 inches.

Fixed ladders must have cages, wells, ladder safety devices or self-retracting lifelines where the length of climb is less than 24 feet but the top of the ladder is at a distance greater than 24 feet above lower levels. Fixed ladders without cages or wells must have at least a 15-inch clear width to the nearest permanent object on each side of the centerline of the ladder.

If the total length of a climb on a fixed ladder equals or exceeds 24 feet, at least one of the following items is required:

- Ladder safety devices
- Self-retracting lifelines, and rest platforms at intervals not to exceed 150 feet
- A cage or well, and multiple ladder sections, each ladder section not to exceed 50 feet in length, these ladder sections must be offset from adjacent sections, and landing platforms must be provided at maximum intervals of 50 feet

The side rails of through or side-step fixed ladders must extend 42 inches above the top level or landing platform served by the ladder. For a parapet ladder, the access level must be at the roof if the parapet is cut to permit passage through it; if the parapet is continuous, the access level is the top of the parapet.

Steps or rungs for through-fixed-ladder extensions must be omitted from the extension; and the extension of side rails must be flared to provide between 24 inches (61 cm) and 30 inches clearance between side rails.

When safety devices are provided, the maximum clearance between side rail extensions must not exceed 36 inches.

Cages for Fixed Ladders

Horizontal bands must be fastened to the side rails of rail ladders, or directly to the structure, building or equipment for individual-rung ladders.

Vertical bars must be on the inside of the horizontal bands and must be fastened to them.

The inside of the cage must be clear of projections.

Horizontal bands must be spaced at intervals not more than 4 feet apart measured from centerline to centerline.

The bottom of the cage must be between 7 feet and 8 feet above the point of access to the bottom of the ladder.

The top of the cage must be at least 42 inches above the top of the platform, or the point of access at the top of the ladder.

Wells for Fixed Ladders

- Wells must completely encircle the ladder
- Wells must be free of projections
- The inside face of the well on the climbing side of the ladder must extend between 27 inches and 30 inches from the centerline of the step or rung
- The inside width of the well must be at least 30 inches
- The bottom of the well above the point of access to the bottom of the ladder must be between 7 feet and 8 feet

SAFE PRACTICES

Anytime there is a break in elevation of 19 inches or more, and no ramp, runway, embankment or hoist is provided, the Company will provide either a stairway or a ladder.

The point of access between levels must always allow free passage. If there is work being performed that limits free access, another point of access must be provided.

All employees will use the following safe practices when working with or on ladders:

- Inspect ladders for damage or wear before use
- Ladders must be maintained free of oil, grease, and other slipping hazards

- Ladders will not be loaded beyond the maximum intended load or the manufacturer's rated capacity
- Ladders may only be used for the purpose for which they were designed
- If a work area for 25 or more employees can be accessed only by a ladder (or anytime two-way traffic relies on a ladder), the Company will provide either a double-cleated ladder or two or more separate ladders to serve two-way traffic
- Ladder rungs, cleats and steps must be parallel, level, and uniformly spaced when the ladder is in position for use
- Ladders must not be tied or fastened together to create longer sections unless they are specifically designed for such use
- A metal spreader or locking device must be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used
- When splicing side rails, the resulting side rail must be equivalent in strength to a one-piece side rail made of the same material
- Two or more separate ladders used to reach an elevated work area must be offset with a platform or landing between the ladders, except when portable ladders are used to gain access to fixed ladders
- Ladder components must be constructed to prevent injury from punctures or lacerations, and prevent snagging of clothing
- Wood ladders must not be coated with any opaque covering, except for identification or warning labels, which may be placed only on one face of a side rail
- Ladders with conductive metal sides will be marked with the words "WARNING — Do not use around energized electrical equipment" and must not be used around energized electrical equipment.
- Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder. Wood job-made ladders with spliced side rails must be used at an angle where the horizontal distance is one-eighth the working length of the ladder
- Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the backside of the ladder
- Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement
- Ladders may not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces
- Ladders placed in areas such as passageways, doorways, or driveways, or where they can be displaced by workplace activities or traffic, must be secured to prevent accidental movement, or a barricade must be used to keep traffic or activities away from the ladder
- The area around the top and bottom of the ladders must be kept clear
- The top of a non-self-supporting ladder must be placed with two rails supported equally unless it is equipped with a single support attachment
- Ladders must not be moved, shifted, or extended while in use

- Ladders must have nonconductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment
- The top or top step of a stepladder must not be used as a step
- Cross bracing on the rear, section of stepladders must not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.
- Ladders must be inspected by a competent person for visible defects on a periodic basis and after any incident that could affect their safe use
- Single-rail ladders must not be used
- When ascending or descending a ladder, the worker must face the ladder
- Each worker must use at least one hand to grasp the ladder
- A worker on a ladder must not carry any object or load that could cause the worker to lose balance and fall

Structural Defects of Ladders

Portable ladders with structural defects-such as broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components-must immediately be marked defective, or tagged with "Do Not Use" or similar language and withdrawn from service until repaired.

Fixed ladders with structural defects-such as broken or missing rungs, cleats, or steps, broken or split rails, or corroded components-must be withdrawn from service until repaired. Ladder repairs must restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.

Defective fixed ladders are considered withdrawn from use when they are:

- Immediately tagged with "Do Not Use" or similar language
- Marked in a manner that identifies them as defective
- Blocked (such as with a plywood attachment that spans several rungs)

STAIRWAYS

Landings for stairways that will not be a permanent part of the structure must be at least 30 inches in the direction of travel and extend at least 22 inches in width at every 12 feet or less of vertical rise.

Stairs will be installed between 30 deg. and 50 deg. from horizontal. Riser height and tread depth shall be uniform within each flight of stairs, including any foundation structure used as one or more treads of the stairs. Variations in riser height or tread depth shall not be over ¼-inch in any stairway system.

Where doors or gates open directly on a stairway, a platform must be provided, and the swing of the door cannot reduce the width of the platform to less than 20 inches.

Metal pan landings and metal pan treads, when used, will be secured in place before filling with concrete or other material.

All parts of stairways must be free of hazardous projections, such as protruding nails.

Slippery conditions on stairways must be eliminated before the stairways are used to reach other levels.

Temporary Service

Except during construction of the actual stairway, stairways with metal pan landings and treads will not be used where the treads and/or landings have not been filled in with concrete or other material, unless the pans of the stairs and/or landings are temporarily filled in with wood or other material. All treads and landings must be replaced when worn below the top edge of the pan.

Except during construction of the actual stairway, skeleton metal frame structures and steps must not be used (where treads and/or landings are to be installed later) unless the stairs are fitted with secured temporary treads and landings. Temporary treads must be made of wood or other solid material and installed the full width and depth of the stairs.

Stair Rails

Stairways having four or more risers, or rising more than 30 inches in height, whichever is less, must have at least one handrail. A stair rail also must be installed along each unprotected side or edge. When the top edge of a stair rail system also serves as a handrail, the height of the top edge must not be more than 37 inches nor less than 36 inches from the upper surface of the stair rail to the surface of the tread.

- Winding or spiral stairways must be equipped with a handrail to prevent using areas where the tread width is less than 6 inches
- Stair rails must not be less than 36 inches in height
- Screens or mesh, when used, must extend from the top rail to the stairway step, and along the opening between top rail supports
- Intermediate vertical members, such as balusters, when used, must not be more than 19 inches apart
- Other intermediate structural members, when used, must be installed so that there are no openings of more than 19 inches wide

Handrails

- Handrails and the top rails of the stair rail systems must be capable of withstanding, without failure, at least 200 pounds of weight applied within 2 inches of the top edge in any downward or outward direction, at any point along the top edge
- The height of handrails must not be more than 37 inches nor less than 30 inches from the upper surface of the handrail to the surface of the tread
- The height of the top edge of a stair rail system used as a handrail must not be more than 37 inches nor less than 36 inches from the upper surface of the stair rail system to the surface of the tread
- Stair rail systems and handrails must be surfaced to prevent injuries such as punctures or lacerations and to keep clothing from snagging

- Handrails must provide an adequate handhold for employees to grasp to prevent falls
- The ends of stair rail systems and handrails must not have dangerous projections such as rails protruding beyond the end posts of the system
- Temporary handrails must have a minimum clearance of 3 inches between the handrail and walls; stair rails systems, and other objects
- Unprotected sides and edges of stairway landings must have a standard 42-inch guardrail system

Midrails

Midrails, screens, mesh, intermediate vertical members or equivalent intermediate structural members must be installed between the top rail and stairway steps of the stair rail system.

Midrails, when used, must be located midway between the top of the stair rail system and the stairway steps.

TRAINING

The Company will ensure every employee receives training on ladder and stair safety. This training will be provided at no cost to the employee during working hours.

This Company will use only training material that is appropriate in content and vocabulary to the educational level, literacy, and language of its employees.

Training Components

Our safety coordinator will ensure that employees receive training from a competent person in the following:

- Nature of fall hazards in the work area
- Correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used
- Proper construction, use, placement, and handling of stairways and ladders;
- Maximum load-carrying capacities of ladders used. In addition, retraining must be provided for each employee, as necessary, so that the employee maintains the understanding and knowledge acquired through compliance with the standard

Training Records

Training records will include the following information:

- Dates of the training sessions
- Contents or a summary of the training sessions
- Names and qualifications of persons conducting the training
- Names and job titles of all persons attending the training sessions

The Company will maintain all employee training records for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following document(s):

- General Ladder Setup Procedure
- Ladders and Stairs Safety Training Documentation

GENERAL LADDER SETUP PROCEDURE

- Move the ladder near your work. Get help if it is too difficult to handle alone
- Make sure there are no electrical wires overhead
- Carefully “walk” the ladder up until it is vertical. Keep your knees bent slightly and your back straight
- The ladder should be closed. Position the ladder with the base section on top of the fly section. Block the bottom of the ladder against the base of the structure
- Set up the ladder on a secure, level surface or secure it so that it can’t be displaced
- Firmly grip the ladder, keep it vertical and carefully move back from the structure about one quarter the distance of the ladder’s working length. This allows you to place it at the correct angle against the structure.
- Lock the spreaders on a stepladder. Secure the lock assembly on extension ladders
- Use traffic cones or other barriers to protect the base of the ladder if vehicles or pedestrians could strike it
- Make sure that a non-self-supporting ladder extends at least three feet above the top support point for access to a roof or other work level

1. Raise the fly section. After the bottom rung of the fly section clears the bottom rung of the base section, place one foot on the base rung for secure footing
2. Lean the ladder against the structure. The distance from the base of the ladder to the structure should be one quarter the distance of the ladder’s working length. Both rails should rest firmly and securely against the structure.

Quick tip — 4:1 Ladder Setup

A non-self-supporting ladder should have a set-up angle of about 75 degrees — a 4:1 ratio of the ladder’s working length to setback distance.

Here’s how to achieve it: Stand at the base of the ladder with your toes touching the rails. Extend your arms straight out in front of you. If the tips of your fingers just touch the rung nearest your shoulder level, the angle of your ladder has a 4:1 ratio.

LADDERS AND STAIRS SAFETY TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

(Retain at least 3 years)

SCOPE

This chapter provides the safe practices and regulations regarding the transportation of cargo on all highways and thoroughfares. It covers the practices to be followed for securing loads on commercial vehicles. These practices will comply with the Department of Transportation (DOT) and Federal Motor Carrier Safety Administration (FMCSA) Subpart 393.100. This chapter does not address the operation, inspection or maintenance of commercial vehicles.

POLICY

This Company has developed this policy to ensure that all employees work safely when loading, securing and transporting cargo on a commercial motorized vehicle (CMV). The Safety Coordinator is responsible for implementing and enforcing this policy.

EMPLOYER RESPONSIBILITIES

This Company will:

- Verify that all CSV operators and employees responsible for loading and securing cargo are trained on the safe practices to be used
- Provide all necessary securement equipment as necessary

EMPLOYEE RESPONSIBILITIES

All employees involved with the loading, unloading and securing of cargo on commercial vehicles will:

- Follow all Company safe practices regarding load securement
- Demonstrate a working knowledge on the proper use of securement equipment
- Inspect and report any unsafe or overweight cargo loaded by others
- Report all unsafe conditions or acts immediately

HAZARDS

Improperly or unsecured loads can result in:

- Citations/fines to driver/carrier
- Loss of load
- Damage to the cargo
- Damage to the vehicle
- A crash
- The vehicle being placed Out-of-Service
- Loss of life

SECUREMENT SYSTEMS

A securement system will be used to keep the cargo stationary and must be done carefully to protect the truck operator and the motorists traveling on the same roadway.

Cargo securement devices and systems will be designed, installed and maintained to ensure that the maximum forces acting on the devices or systems don't exceed the working load limit (WLL) for the devices.

Vehicle structures, floors, walls, decks, tiedown anchor points, headerboards, bulkheads, stakes, posts and associated mounting pockets used to contain or secure articles of cargo must not have any cracks or cuts, and must be strong enough to meet the performance criteria. These items will not have any damaged or weakened components that will adversely affect their performance for cargo securement purposes, including reducing the WLL.

A securement system is a securement method that uses one or a combination of the following elements:

- Vehicle structure
- Securing devices
- Blocking and bracing equipment

VEHICLE STRUCTURE

The vehicle portion of a securing system can consist of any or all of the following:

- Floors
- Tiedown anchor points
- Stakes
- Walls
- Headboards
- Posts
- Decks
- Bulkheads
- Anchor points

Trucks should be provided with headboards (headache racks) to protect the driver from the load moving forward, and a tailboard to protect other drivers from loose material.

Generally, the cab shield is not part of the cargo-securement system. However, a front-end structure could be used to provide some restraint against forward movement if the cargo is in contact with it.

Anchor Points

All elements of the vehicles structure and anchor points must meet the requirements of the FMCSA standard.be strong enough to withstand the forces listed below:

If loads are not contained within the vehicle, the securement system must provide a downward force equivalent to at least 20 percent of the weight of the article of cargo. If the article is fully contained within the vehicle, it can be secured by securement equipment of adequate strength, dunnage or dunnage bags, shoring bars, tiedowns or a combination of these.

All elements of the vehicle structure and anchor points must be in good working order and have no signs of:

- Obvious damage
- Weakened parts
- Distress
- Weakened sections

SECURING DEVICES

Securing devices include a variety of specifically manufactured equipment used to attach or secure cargo to a vehicle or trailer. These are often grouped under the category called tiedowns and can consist of:

- Synthetic webbing
- Manila rope
- Clamps and latches
- Grab hooks
- Winches
- Pocket
- Friction mat
- Chain
- Synthetic rope
- Blocking
- Binders
- Stake pockets
- Webbing ratchet
- Wire rope
- Steel strapping
- Front-end structure
- Shackles
- D-rings
- Bracing

TIEDOWNS

The cargo securement system used to restrain loads against movement must meet the requirements for the minimum number of tiedowns. This requirement is in addition to the rules concerning the minimum WLL.

Tiedowns are used to:

- Attach cargo to, or restrain cargo on, a vehicle
- Attach to anchor point(s)

Tiedown Assemblies

Tiedown assemblies (including chains, wire rope, steel strapping, synthetic webbing and cordage) and other attachment or fastening devices must conform to the following applicable standards:

Assembly Component Materials	Must Conform to
Steel strapping 1,2	Standard Specifications for Strapping, Flat Steel, and Seals, American Society for Testing and Materials (ASTM) D3953-97
Chain	National Association of Chain Manufacturers' Welded Steel Chain Specifications
Webbing	Web Sling and Tiedown Association's Recommended Standard Specification for Synthetic Web Tiedowns, WSTDA-T1
Wire rope 3	Wire Rope Technical Board's Wire Rope User's Manual
Cordage	Cordage Institute rope standard: • PETRS-2, Polyester Fiber Rope, 3-Strand and 8-Strand Constructions • PPRS-2, Polypropylene Fiber Rope, 3-Strand and 8-Strand Constructions • CRS-1, Polyester/Polypropylene Composite Rope Specifications, 3-Strand and 8-Strand Standard Construction • NRS-1, Nylon Rope Specifications, 3-Strand and 8-Strand Standard Construction • C-1, Double Braided Nylon Rope Specifications
1. Steel strapping not marked by the manufacturer with a WLL will be considered to have a WLL equal to ¼ of the breaking strength listed in ASTM D3953-97. 2. Steel strapping 1 inch or wider must have at least two pairs of crimps in each seal and, when an end-over-end lap joint is formed, must be sealed with at least two seals. 3. Wire rope not marked with a WLL by the manufacturer will be considered to have a WLL equal to ¼ of the nominal strength listed in the manual.	

When an article of cargo is not blocked or positioned to prevent movement in the forward direction, the number of tiedowns needed depends on the length and weight of the articles. There must be one tiedown for articles 5 ft. or less in length, and 1,100 lbs. or less in weight and two tiedowns if the article is:

- 5 ft. or less in length and more than 1,100 lbs. in weight
- Greater than 5 ft. but less than 10 ft., regardless of weight

When an article of cargo is not blocked or positioned to prevent movement in the forward direction, and the item is longer than 10 ft. in length, it must be secured by two tiedowns for the first 10 ft. of length, and one additional tiedown for every 10 ft. of length, or fraction thereof, beyond the first 10 ft.

If an article is blocked, braced or immobilized to prevent movement in the forward direction by a headerboard, bulkhead, other articles that are adequately secured, it must be secured by at least one tiedown for every 10 ft. of article length, or fraction thereof.

Exceptions to The Minimum Tiedown Requirements

Vehicles carrying one or more articles of cargo such as machinery, steel or concrete beams, crane booms or girders and trusses may need to be fastened by special methods. However, any article of cargo carried on that vehicle must be securely fastened to the vehicle.

Attaching Tiedowns

Tiedown placement

- Place the tiedown as close as possible to the spacer
- Position the tiedowns as symmetrically as possible over the length of the article
- Position the tiedowns to preserve the integrity of the article

Tiedowns can be used in two ways:

- Attached to the cargo
  - Tiedowns attached to the vehicle and attached to the cargo
  - Tiedowns attached to the vehicle, pass through or around an article of cargo, and then are attached to the vehicle again
- Pass over the cargo
  - Tiedowns attached to the vehicle, passed over the cargo, and then attached to the vehicle again

Tiedowns Attached to The Cargo

- Tiedowns attached to the cargo work by counteracting the forces acting on the cargo
- The angle where the tiedown attaches to the vehicle should be shallow, not deep (ideally less than 45°
- To counteract forward movement, attach the tiedown so it pulls the cargo toward the rear of the vehicle
- To counteract rearward movement, attach the tiedown so it pulls the cargo toward the front of the vehicle
- To counteract movement to one side, attach the tiedown so it pulls the cargo toward the opposite side of the vehicle

Tiedowns That Pass Over the Cargo

- Tiedowns that pass over the cargo work by increasing the effective weight of the cargo (make the cargo seem heavier). This increases the pressure of the cargo on the deck or friction mat and keeps the cargo from shifting
- Tension these tiedowns to as high an initial tension as possible
- The steeper the tiedown angle, the less shifting (ideally more than 45)

Tiedown Construction and Maintenance

Except for steel strapping, tiedowns must be designed, constructed and maintained so that the driver can tighten it.

All components of a tiedown must be in proper working order and have no:

- Knots and obvious damage
- Weakened parts
- Distress
- Weakened sections

Tiedown Use

All tiedowns and other components of a cargo securement system used to secure loads on a trailer equipped with rub rails must be located inboard of the rub rails whenever practical. This requirement does not apply when the width of the load extends to or beyond the rub rails.

If a tiedown is repaired, it must be repaired according to the applicable standards or the manufacturer's instructions.

Edge Protection

Edge protection must be used if a tiedown could be cut or torn when touching an article of cargo. The edge protection itself must also resist crushing, cutting and abrasion.

BLOCKING AND BRACING EQUIPMENT

Equipment in this category can include:

- Dunnage
- Cradles
- Blocking and bracing
- Chocks
- Shoring bars

Material used as dunnage or dunnage bags, chocks, cradles, shoring bars or used for blocking and bracing, must not have damage or defects that would compromise the effectiveness of the securement system.

The material used for blocking or bracing, and as chocks and cradles, must be strong enough to withstand being split or crushed by the cargo or tiedowns.

This requirement also applies to any material used for dunnage.

If wood is used:

- Hardwood is recommended
- It should be properly seasoned
- It should be free from rot or decay, knots, knotholes, and splits
- The grain should run lengthwise when using wood for blocking or bracing

LOADING CARGO PROPERLY

When articles of cargo are placed beside each other and secured by side-to-side tiedowns, they must either be placed in direct contact with each other or prevented from shifting toward each other during transit by using blocking, friction mats or filling the space with dunnage or other cargo.

Articles of cargo that are likely to roll must be restrained by chocks, wedges, a cradle, or other equivalent means to prevent rolling. The means of preventing rolling must not be capable of becoming unintentionally unfastened or loose while the vehicle is in transit.

Containing, Immobilizing, And Securing Cargo

To correctly contain, immobilize or secure cargo, you need to know about:

- The three ways to transport cargo
- Loading cargo properly
- Restraining the cargo correctly
- Using adequate securing devices
- The Aggregate WLL

These requirements cover all types of cargo except:

- Commodities in bulk that lack structure or fixed shape (for example, liquids, gases, grain, sand, gravel, aggregate, liquid concrete)
- Commodities that are transported in the structure of a commercial motor vehicle, such as a tank, hopper, or box

The FMCSA standard identifies specific securement requirements for certain loads. When transporting these commodities, you must use the specific requirements for that commodity.

- Logs
- Metal coils
- Concrete pipe loaded crosswise on a platform vehicle
- Flattened or crushed vehicles
- Large boulder
- Dressed lumber and similar building products
- Paper rolls
- Autos, light trucks, and vans, heavy vehicles, equipment, and machinery
- Roll-on/roll-off and hook-lift containers

Three Ways to Transport Cargo

All types of cargo that are transported must meet one of three conditions:

- Condition 1: The cargo is fully contained by structures of adequate strength
  - Cargo cannot shift or tip
  - Cargo is restrained against horizontal movement by vehicle structure or by other cargo. Horizontal movement includes forward, rearward, and side to side
- Condition 2: Cargo is immobilized by structures adequate in strength, or a combination of structure, blocking, and bracing, to prevent shifting or tipping
- Condition 3: To prevent shifting or tipping, the cargo is secured on or within a vehicle by tiedowns along with:
  - Blocking
  - Bracing
  - Friction mats
  - Other cargo
  - Void fillers
  - Combination of these

Transporting Compressed Gas Cylinders

If employees are required to transport compressed gas cylinders, the Company will determine that the cylinders are in a safe condition by performing a visual inspection. Visual and other inspections are required by the Hazardous Materials Regulations of the Department of Transportation. Where those regulations are not applicable, visual and other inspections will be conducted according to the Compressed Gas Association requirements.

- When transporting cylinders in a horizontal position, special compartments, racks or adequate blocking must be provided to prevent cylinder movement. Regulators must be removed or guarded before a cylinder is transported unless the cylinders are secured on a special truck
- Cylinders must not be dropped, struck, or permitted to strike each other violently
- All portable cylinders used for the shipment of compressed gases must be constructed and maintained according to the U.S. Department of Transportation regulations
- When loading or moving cylinders by crane or derrick, a cradle or suitable platform must be used, slings or electric magnets must not be used for this purpose
- Valve-protection caps must not be used for lifting cylinders from one vertical position to another. Bars must not be used under valves or valve-protection caps to pry cylinders loose when frozen to the ground or otherwise fixed. The use of warm (not boiling) water is recommended
- Valves of all cylinders, whether empty and full, must be closed before moving cylinders
- Never use cylinders as rollers or supports, whether full or empty

Cargo articles that have a tendency to tip must be secured by bracing.

ADEQUATE SECURING DEVICES

WLL for Cargo Securement Devices and Systems

The aggregate WLL of any securement system used to secure a load against movement must be at least one-half the weight of the article or group of articles.

WLL for Tiedowns

The WLL of a tiedown, associated connector, or attachment mechanism is the lowest WLL of any of its components (including tensioner), or the WLL of the anchor points to which it is attached, whichever is less.

The WLL of tiedowns can be determined either by using the tiedown manufacturer’s markings or by using the tables contained in the FMCSA regulations.

The WLL listed in the tables are to be used when the tiedown material is not marked by the manufacturer.

Synthetic cordage (e.g., nylon, polypropylene and polyester) that’s not marked or labeled will be considered to have a WLL equal to that for polypropylene fiber rope.

Welded steel chain that is not marked will be considered to have a WLL equal to that for grade 30 proof coil chain.

Wire rope that is not marked by the manufacturer will be considered to have a WLL equal to ¼ of the nominal strength listed in the Wire Rope User's Manual.

Wire that is not marked or labeled with its construction type will be considered to have a WLL equal to that for 6 x 37-fiber core wire rope.

Manila rope that is not marked by the manufacturer will be considered to have a WLL based on its diameter.

Friction mats not marked with their rating will be considered to provide a resistance to horizontal movement equal to 50 percent of the weight placed on the mat.

Stanchion pins suitable to the load must be placed in the rail-post pockets to guard against sideways movement.

Trucks used to transport steel will have a catwalk that has grab rails between the cab and the headboard to provide a safe vantage point to direct loading and unloading operations.

Chains used to secure the load and tiedown the steel material for transport must be properly load rated.

WLL for Blocking Systems

The WLL of all components used to block cargo from forward movement must be 50% (or more) of the weight of the article being blocked.

WLL Unmarked Components

Any securing device, not marked by the manufacturer, is considered to have a WLL equal to that of grade 30 proof coil, and other types of unmarked tiedowns are considered to have a WLL equal to the lowest rating for that type in the table of WLLs in the FMCSA regulations.

This Company will purchase and use components that are rated and marked by the manufacturer, so that driver, shipper and inspector can all verify that the proper equipment is being used for the job.

SAFE PRACTICES

The Company will ensure that all personnel involved in the loading of trucks are trained in the procedures for safe loading, and securing loads using binders, chains, straps and accessories.

- Do not load heavy equipment on transports unless trained to operate the particular loading machine
- Tie-down methods used must provide adequate means to prevent the load from moving during transit
- Chains or binding straps must not be thrown over the load until personnel are clear
- Ensure that the binder is firmly locked in the secured position before releasing the extension
- Do not use a binder with a bent handle, which may prevent it from locking down
- Binder handles should be wired in the locked position when transporting loads
- Cargo should have at least one tie-down every 10 feet of length. At least two tie-downs are required on all loads

- If securing a load over 27 feet long, such as pipe or logs, a minimum of 4 equally spaced binders must be used, with two bindings near the ends of the load
- Machines must be loaded, secured, and unloaded so they do not create a hazard for personnel
- Within 15 minutes of leaving the loading area with a bound load, the operator should recheck the binders, chains, or straps, to ensure that the load is secure and no shifting of the load or loosening of the bindings has occurred. Bindings should be checked regularly in transit to ensure the security of the load
- Ensure that hooks, shackles, and other accessories used to secure loads are not bent, gapped, or cracked
- The combined strength of all tie-downs must be strong enough to lift 1 ½ times the weight of the load being hauled
- Do not exceed the rated weight limit for accessories, chains, straps, or binders

Requirements for chains and binding straps:

- Do not use straps that have broken stitching, are frayed, or show any signs of wear, damage, or deterioration
- Ensure that all straps used are rated to handle the weight of load they are securing
- Chains used in securing loads must be inspected before initial use and weekly thereafter
- Chains must be normalized or annealed periodically as recommended by the manufacturer
- If at any time any 3-foot length of chain is found to have stretched one-third the length of a link it must be discarded
- Bolts or nails must not be placed between two links to shorten or join chains
- Broken chains will not be spliced by inserting a bolt between two links with the head of the bolt and nut sustaining the load, or by passing one link through another and inserting a bolt or nail to hold it
- Required chains or straps and binders must be in place and hooked prior to tightening any of the binders

Proper Securement Requirement

- Cargo must be restrained in all directions (forward, side-to-side, rearward, vertically) using a minimum of four (4) tiedown systems
- Tie-downs attached to the cargo must be attached at the front and rear of the vehicle, or at mounting points on the cargo
- Accessory equipment (blades, buckets, etc.) must be completely lowered to the deck and secured with a separate system
- Articulated vehicles must be secured with a separate system that prevents articulation while in transit
- Accessories that are not attached must also be properly secured to the deck with a separate system
- Any tiedown system used to secure heavy equipment must have a minimum WLL of at least 4,700 lbs.
- Tiedowns preventing forward movement must be strong enough to restrain 80% of the cargo's weight

- The calculated aggregate WLL of all systems used to secure cargo against movement during transit must be at least 50% of the weight of the cargo
- Direct Attachment (vehicle to cargo) calculates at 50% of the WLL of the tiedown system used
- Indirect Attachment (vehicle to cargo to opposite-side vehicle) calculates at 100% of the WLL of the tiedown system used
- At least 80% of a transported vehicle's tire or track must be supported on the transporting vehicle, utilizing deck wideners or extensions for proper support as necessary

INSPECTIONS

The driver is responsible for the following cargo-securement inspection activities.

Driver Action Required	Pre-Trip	Within first 50 mi	When Duty Status of Driver Changes	At 3-Hour Intervals or Every 150 mi, Whichever Is First
Inspect Cargo and Securing Devices	Yes	Yes	Yes	Yes
Inform Carrier if Packaging Is Not Adequate	Yes			
Adjust Cargo and/or Securing Devices	As Necessary	As Necessary	As Necessary	As Necessary
Add Additional Securing Devices	As Necessary	As Necessary	As Necessary	As Necessary

These inspection rules do not apply to the driver of a sealed commercial motor vehicle who has been ordered not to open it to inspect its cargo, or to the driver of a commercial motor vehicle that has been loaded in a manner that makes inspection of its cargo impracticable.

Pre-Trip

- Make sure that cargo is properly distributed and adequately secured
- Make sure that all securement equipment and vehicle structures are in good working order and used consistent with their capability
- Stow vehicle equipment
- Make sure that nothing obscures front and side views or interferes with the ability to drive the vehicle or respond in an emergency
- Inform carrier if packaging is not adequate. For example:
  - Banding is loose or not symmetrical on package
  - Banding attachment device(s) are inefficient
  - Wrapping is broken or ineffective
  - Pallets are broken

Periodic Inspections During Transit

- Inspect cargo and securing devices
- Adjust cargo or load securement devices as necessary to ensure that cargo cannot shift on or within, or fall from, the commercial motor vehicle
- As necessary, add more securing devices

NOTE: Failure to follow instructions and warnings, and/or proper use, care and inspection criteria may result in cargo damage, severe personal injury or death. The Safety Coordinator will ensure that all employees responsible for loading, securing or transporting cargo have an understanding of the risks involved.

Never unload material with the transport truck parked on an uneven surface. If the facilities at the destination are not suitable for unloading, the driver should notify supervision and ensure that safe arrangements can be made for unloading.

When unloading steel, especially pipe or coil, stanchion pins should be left in place and binders loosened slowly, one at a time, but not entirely removed, until all binding chains are loosened and there are no signs that shifting of the load has occurred. While unloading, material should be re-secured between lifts to prevent load-shift hazards.

Chains

- Inspect the entire chain before each use. Do not use the chain if it is elongated or has nicks, cracks, and gouges in any link
- Do not expose the chains to temperatures outside the -40 °F to 400 °F temperature range or to chemically active environments such as acids and corrosive liquids
- Remove the chain from service if the material thickness at any location of the chain link is less than the minimum thickness listed in the National Association of Chain Manufacturers (NACM) welded-chain specifications
- Each chain is only as strong as its weakest link, including the point of attachment
- Never exceed the WLL

Load Binders

Load-binding systems store energy that can release suddenly, causing serious injury or death. Stay clear of binders, as they may suddenly release with force.

- Inspect before use. Remove from service if cracked, worn or deformed. Do not repair or attempt to repair; immediately remove the binder from service
- Do not use binder components for overhead lifting
- Operate only by hand from a firm standing point
- Operate handle cautiously. Stay clear of handle path. Handle may release suddenly. Secure handle down with a positive retaining method. Release handle/load with extreme care. Make sure everyone is clear. Lever binder handle can snap back over center. Use open palm under handle and push up
- Follow DOT Federal Motor Carrier Safety Regulations S392.9, S393.100 and S393.102.

- Do not operate with anyone on the load
- Always apply binder in a straight-line, hook-to-hook manner without bending, and such that handle goes down when securing load
- Tighten binders before moving and re-check frequently
- Follow manufacturer's instructions
- Select the load binder that meets the WLL, grade of the chain, grab hook, and anchor point intended to be used with the binder
- Do not use lever bars, "cheater bars" or extenders when tightening chain binders. Hand tightening will load the binder to its specified WLL
- Load binders must be secured in a manner that prevents them from becoming loose, opened, or released while vehicle is in transit. Latches, chain wrap, or other means should be used to secure the load binder handle
- Periodically clean and lubricate all moving parts of the chain binder

Overhead Lifting Slings

- Synthetic slings can fail if damaged, misused or overloaded. Inspect slings before each use. Slings are NOT for use by untrained personnel
- Synthetic slings can be cut if contacted by load edges. Use padding or protection of sufficient strength and thickness to protect the sling from damage
- Do not use slings to pull on objects in a snagged or constrained condition
- Keep your body out of the path between the sling and the load. Stand clear of suspended loads
- Never use slings when the load may possibly slip or slide. This loss of control can result in sling failure, serious injury or death. Always control the load
- Do not use if the red core warning yarns or any inner core fibers are visible. Do not use if cuts, abrasions, knots, or other defects are present
- Never overload the sling beyond the WLL. Always take into account the effect that angles have on reducing sling capacity
- Never expose slings to alkalis, acids, caustics, or temperatures above 194 ° F or below -40 ° F
- Do not expose slings to extensive sunlight or ultraviolet light. Store slings in a cool and dry place when not in use
- Do not use slings if the attached fittings are damaged, stretched, distorted or corroded

Rubber or EPDM Tarp Straps

Tarp straps are designed solely to hold tarps in place. Tarp straps must not be used for restraining or securing cargo.

- Do not use tarp straps for any lifting, raising, or lowering applications
- Discard all tarp straps with nicks, cuts, cracks or if the "S" hooks are bent, damaged, or corroded
- Eye protection during connection and disconnection of tarp straps is required. Keep both feet firmly on the ground and position body out of the potential strap rebound path
- Tarp strap should not be stretched to more than 50% of the original length. Over tensioning may cause the tarp strap to break, causing serious injury, or death

- Do not anchor tarp straps around sharp edges or pulled over any abrasive surfaces
- Sudden rupture or sudden disconnection of a tarp strap while it is in the stretched position may cause serious personal injury or death
- Protect tarp straps from exposure to heated environments and hot surfaces
- Always fasten tarp straps to a load in a clear space that is free of any moving vehicles or objects

Tracks

To achieve optimal WLL of a complete tie-down system that includes a sliding winch track, the track must be attached to a structurally sound frame element.

Webbing Strap Assemblies

Inspect webbing strap assemblies before each use. Do not use if hardware is defective; if webbing is burnt, melted, cut, frayed, abraded or altered; or if any damage to assembly is seen.

NOTE: Do not exceed the WLL. Do not use for lifting, towing or personal restraint.

- Ratchets, buckles cams, or other tensioning or locking devices must be closed and in locked position when used
- Strength is significantly reduced if load path is not in a straight line
- Avoid sharp edges. Use corner protectors per federal law
- Protect webbing from heat, hot surfaces and acids. Do not store in sunlight
- Do not repair webbing, hardware or stitching. Remove from service immediately if any damage or defect is discovered
- Anchor points must be rated equal to or greater than the cargo control assembly strength
- Do not use 'cheater bars' or lever bars on hardware when tensioning
- The aggregate WLL of tiedowns used to secure an article or group of articles against movement must be at least one-half times the weight of the article or group of articles

Winch Bars

- Inspect winch, chain binder and winch bar for defects and damage before each use. Do not use if defective, broken, worn, cracked, or deformed. Do not repair; remove from service immediately
- Never extend or alter the winch bar. Position the body properly and keep both feet flat on ground during use
- Refer to the applicable federal, provincial, state, and local regulations for loading and transportation procedures and requirements

Using A Winch Bar with Winches

- Winch bar must be properly engaged or the winch bar point must be inserted through two holes in the winch cap during use. Failure to properly engage the winch bar or insert the winch bar point through two holes may cause damage or failure of the winch or winch bar

- Position the body out of the rotation path in case of winch bar slippage. Maintain control of the winch bar to keep bystanders out of the winch bar handle rotation path
- During tightening and before releasing the tiedown assembly, the winch pawl must be checked for correct engagement

Using A Winch Bar with Optional Chain Binder Cradle with Chain Binders

- Follow chain binder manufacturer's recommendations
- Chain binder handle must be fully inserted and securely locked in winch bar cradle. Failure to properly secure chain binder handle in the winch bar may cause damage or failure of the winch bar or chain binder
- Position the body out of the winch bar handle rotation path in case of winch bar slippage

Winches

Winches will be installed so the pawl can readily be seen, to ensure proper engagement. Do not install winches where the user must hold the pawl to engage the gear/sprocket tooth. All winches except bolt on, portable and slider winch designs must be welded to the trailer frame or sound structural element. Minimum welding requirements are 1/4- inch fillet weld, 4 inches long on both sides of the winch frame and 1/8-inch penetration.

To ensure user safety when tightening or loosening winches, always keep a firm grip on the winch-tightening bar. Never release a winch bar from its leveraged position without checking the pawl to make sure it’s fully engaged into the gear/sprocket teeth. Releasing a winch bar without the pawl being properly engaged can cause serious injury to the user or bystanders.

Use a slip-resistant handle winch bar to tighten or loosen winches. Winches should never be used as pulling or lifting devices.

All binders should be checked frequently during cargo transit and re-tensioned as required by DOT Regulations, 49 CFR Part 392.9(b) and the FMCSA Part 396 396.3.

GENERAL DRIVER SAFETY

- Stay alert when driving. Make sure there is enough room ahead and behind to pass or stop safely. Leave enough space between you and the vehicle ahead of you to allow for a sudden stop. If you are following too closely, you may not be able to stop in time
- Remember, you can help the driver behind you maintain a safe following distance by driving at a constant speed and using your signaling maneuvers in advance
- Inspect each vehicle prior to performing any transporting operations and ensure that it is maintained in serviceable condition. Repair any defect or damage or replace the vehicle before use. Check the brakes, lights, signal indicators and tires daily before heading out on the road
- Position the transport vehicle to provide working clearance between the vehicle and the deck
- Ensure that only the loading, or unloading machine operator, and other necessary personnel, are in the loading, or unloading work area
- Vehicle operators will not remain in the cab during loading and unloading where loads are moved over the truck cab, unless the employer demonstrates that it is necessary for the operator to do so

- If the transport vehicle operator remains in the cab, the employer must provide the operator protection, such as cab reinforcement
- Determine that the operating and maintenance instructions are available in each vehicle
- All operators and maintenance employees will follow the operating and maintenance instructions
- All vehicle operators must have a valid license for the class of vehicle being operated
- These safety requirements apply to all vehicles used to transport any employee for job purposes, including any vehicle provided by an employee
- Inspect vehicles for functioning audible warning signals and, where practicable, spark arrestors
- Inspect vehicles that operate at night to make sure they're equipped with working head and tail lights
- All vehicles operating where overhead hazards exist will be equipped with an overhead guard
- Where the operator is exposed to hazards from backing the vehicle into objects, a platform guard must be provided, and so arranged, so that it doesn't impede the exit of the driver from the vehicle
- Never operate a vehicle with loads exceeding its safe load capacity. Check the brakes before proceeding down any steep incline
- Make sure all loads are positioned to prevent slippage, or loss, during handling and transport. (Stakes and chocks used to trip loads must be built so that the tripping mechanism is activated on the side opposite the release of the load)
- Verify that each tiedown is tight before transporting the load. While en-route, the operator shall check and tighten the tiedowns whenever there is reason to believe that the tiedowns have loosened, or the load has shifted

TRAINING

This Company will ensure that all employees engaged in cargo loading, unloading and securement have been trained on the following:

- How to determine the WLL of securing equipment
- How to determine load placement and balancing requirements
- The safe installation and removal on securing devices
- The methods of securement to be used based on the type of load being transported

SCOPE

This Company is committed to protecting the safety and health of all employees, and to complying with OSHA 1910.147 (The control of hazardous energy) and all applicable state and/or local regulatory requirements, laws and industry best practices in the effort to provide an accident, injury and illness free workplace.

POLICY

Accordingly, the Company has adopted this Lockout/Tagout Program (also referred to as Hazardous Energy Control) to establish engineering controls and work practices to prevent the unintentional release of hazardous energy during maintenance and servicing of machinery and equipment.

EMPLOYER RESPONSIBILITIES

This Company will:

- Establish a program for affixing lockout or tagout devices to energy isolating devices and otherwise disable equipment to prevent unexpected release of energy
- Ensure the use of safe lockout/tagout procedures by authorized employees
- Provide all hardware for isolating, securing or blocking equipment from energy sources
- Conduct and certify inspections of the lockout/tagout procedures at least annually
- Provide training to ensure the purpose and function of the lockout/tagout program are understood by employees and the knowledge and skills required for the safe application, use, and removal of the energy controls are acquired by authorized employees
- Ensure training includes limitations of tags in the energy control program (if applicable)
- Inform outside employers who may have employees engaged in activities involving hazardous energy about the lockout or tagout procedures
- Certify that employees complete and repeat training as needed

EMPLOYEE RESPONSIBILITIES

Authorized employees (employees who perform maintenance or servicing on equipment that must be locked out or tagged out) are expected to:

- Participate in training related to lockout/tagout procedures
- Comply with all lockout/tagout procedures when maintaining or servicing equipment that requires such controls
- Review lockout/tagout procedure with inspector during periodic evaluation

Affected employees (employees who operate or use equipment for which maintenance and servicing requires lockout or tagout) must participate and comply with the following:

- Training on the purpose and use of the lockout/tagout procedure
- Training about the procedure and the prohibition to attempt to restart or reenergize equipment that has been locked out or tagged out

SAFE PRACTICES

Intended Use of Procedure

This procedure establishes the minimum requirements for the lockout of energy-isolating devices on machines or equipment. Any main electrical power disconnect that controls a source of power or material flow must be locked out with a lockout device when employees are maintaining, cleaning, adjusting, or servicing machinery or equipment, if the disconnect is not in clear sight of the employee. Employees must also affix a "Do Not Start" tag to all operating controls.

The process stops, isolates from potentially hazardous energy sources, and locks out equipment before employees proceed with their work. It also prevents unexpected the start-up or energizing of the machine or equipment from causing injury.

All employees are required to comply with the restrictions and limitations imposed upon them during the use of lockout. Authorized employees must perform the lockout in accordance with this procedure. No employee will attempt to start, energize or use a piece of locked out equipment.

These procedures do not apply when servicing or maintaining equipment during normal production operations unless:

- The activity involves removing guards or other safety devices
- An employee places him/herself in an area where work is actually being performed
- An employee places him/herself in a dangerous area during the normal operating cycle

Authorized Employees

Any employee whose job requires him or her to perform lockout/tagout to service or maintain a piece of equipment is an “authorized employee” and must comply with all expectations of authorized employees regarding safe lockout/tagout procedures.

Other employees who use equipment that require lockout/tagout for maintenance and service, work in areas where such work is being performed, or will be affected by lockout/tagout procedures will require training regarding lockout/tagout procedures, but are forbidden to perform the work of an authorized employee. They may not implement lockout/tagout procedures without appropriate training authorized by management.

Lockout/Tagout Procedures

See Figure 1 for an outline of the lockout/tagout procedure.

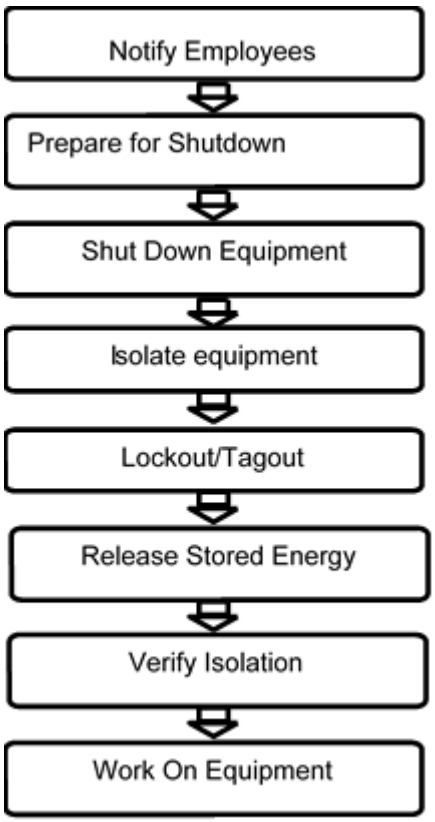


Figure 1

Notify Employees

Before an authorized employee applies lockout or tagout devices, he or she must notify affected employees to prevent unexpected changes to work conditions that could introduce needless risk and to allow affected employees to clear areas that may be hazardous.

Prepare for Shutdown

Before any employee turns off any equipment, the authorized employee will be aware of the type and magnitude of the energy, the hazards of the energy and the means to control it.

Authorized personnel will review lockout/tagout procedures for the piece of equipment and all the possible hazardous energy sources to help ensure an understanding of the controls that are necessary to prevent an injury.

The authorized employee will be especially mindful of energy that can be stored or accumulated after a shutdown.

Equipment Shutdown

Shutdown of machinery and equipment must occur in an orderly manner using the shutdown procedures on the lockout/tagout procedures associated with each machine or piece of equipment.

Equipment Isolation

All energy isolation devices necessary to control energy to the equipment will be located and operated to completely de-energize the equipment and isolate it from energy sources. The authorized employee or team leader will verify operation of each energy isolation device.

- Disconnect or shut down engines or motors
- De-energize electrical circuits
- Eliminate the pressure from the line and lock out the valve holding back the activating substance in hydraulic or pneumatic systems
- Block machine parts against motion

Lockout/Tagout

The authorized employee will affix a lockout and tagout device to each energy-isolating device. Lockout devices will hold the energy-isolating device in a “safe” position, and the authorized employee must affix tag-out devices to indicate the prohibition on moving energy isolating devices from a safe position. If it is possible to lock the device, but only tags are used, attach the tag where the lock would have been; otherwise, locate the tag as close as possible so that it is clear to anyone who might want to operate the equipment.

OSHA has stated that companies must have adequate lockout/tagout procedures for each specific machine or piece of equipment. These should be written procedures that are on site and readily available to employees. Training must be provided on lockout/tagout to both authorized and affected employees. Interlocks may not be used as lockout or as equivalent lockout protection.

Release Stored Energy

Immediately after applying lockout or tagout devices, the authorized employee will ensure all potentially hazardous stored or residual energy is relieved, disconnected, restrained and otherwise rendered safe.

- Discharge capacitors
- Block, clamp, secure in position, or totally relieve the compression or tension in applicable mechanisms
- Lower to the lowest position all suspended mechanisms or parts that normally cycle to a lower position, and clamp, block, or otherwise secure the mechanism or parts in position
- Vent fluids from pressure vessels, tanks, or accumulators — but never vent toxic, flammable, or explosive substances directly into the atmosphere

If stored energy can be re-accumulated, the authorized employee will verify that the energy is isolated until maintenance is complete or the energy no longer exists.

Verify Isolation

The authorized employee will verify the machinery or equipment is actually isolated and de- energized before starting work on locked out or tagged out equipment.

Steps for Release from Lockout/Tagout

See Figure 2 for an outline of the steps to release equipment from lockout/tagout.

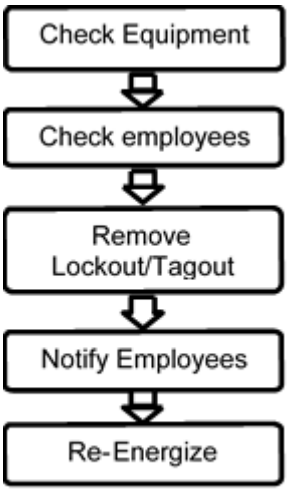


Figure 2

Check Equipment

Make sure machinery or equipment is properly re-assembled. Inspect machinery or equipment to ensure removal of nonessential items.

Check Employees

Make sure all employees are safely outside danger zones. Notify affected employees about the removal of lockout/tagout devices and that energy is going to be re-applied.

Remove Devices

Only the authorized employee who applied the lockout/tagout device may remove the device.

Notify Employees

The authorized employee will notify all affected employees that the lockout or tagout devices have been removed from the equipment.

SPECIAL CASES

Employee Leaves Before Releasing Lockout/Tagout Device

If the authorized employee isn't available to remove their lockout/tagout device, another authorized employee may begin the following procedure:

1. Verify that authorized employee who applied the device is off premises
2. Make all reasonable efforts to inform them that their lockout or tagout device has been removed
3. Ensure the authorized employee is aware of the removal of the device before they resume work

Temporary Lockout/Tagout Removal

Whenever authorized employees remove lockout/tagout devices to test or position machines and equipment, or their components, the authorized employee will complete the following procedures in the sequence presented:

- Clear the machine or equipment of tools and materials
- Remove employees from danger zones
- Remove lockout/tagout devices
- Energize and proceed with testing or positioning
- De-energize all systems and re-apply lockout/tagout devices

Outside Personnel

Employees of another Company engaged in servicing or maintenance of equipment that requires lockout or tagout will follow lockout/tagout procedures that provide at least as much protection as our Company's established procedures for that equipment. To ensure safety, management from our Company and representatives from the outside employer will inform one another of their respective lockout or tagout procedures.

The owner also will ensure employees understand and comply with contracted personnel lockout/tagout procedures as appropriate.

Group Lockout/Tagout

When a group performs servicing, the group will use a procedure that provides protection equivalent to the protection provided by the personal lockout or tagout.

Shift Changes

Procedures during shift changes or changes to personnel will provide for an orderly transfer of lockout or tagout device protection and minimize exposure to hazards from the unexpected energizing or start-up of the machine or equipment, or the release of stored energy for both the oncoming and off-going personnel.

PROTECTIVE MATERIALS

Employees will be provided with any device or hardware for isolating, securing or blocking equipment from energy sources. If a device is altered, damaged or destroyed in a way that compromises its ability to protect the authorized employee, the authorized employee will inform a supervisor immediately and not attempt to use the device.

Singularly Identified

Devices used in lockout and tagout procedures will not be used for any purpose other than for isolating, securing or blocking equipment from energy sources, and no devices other than those specified in the lockout/tagout procedure will be used to that end.

Durable

The devices used for lockout/tagout will be able to withstand the environmental and weather conditions present during use. Tagout devices need to remain legible and not deteriorate regardless of weather conditions or corrosive environments.

Standardized

At the worksite, devices used to isolate, secure or block equipment from energy sources will be consistent in color, shape or size. Tagout devices will have a standardized design.

Substantial

Lockout devices must have structural integrity to require excessive force or specialized tools to remove them. Tagout devices and their means of attachment need to prevent inadvertent removal. The means of attachment will not be reusable, and need to have an unlocking strength of at least 50 lbs. The general design and basic characteristics of tagout attachment means will be at least equivalent to a one-piece, all environment-tolerant nylon cable tie.

Identifiable

Any device used to isolate, secure or block equipment from energy sources will indicate the identity of the employee applying the device.

PERIODIC INSPECTIONS AND PROGRAM REVIEW

The safety coordinator, or designee, will conduct regular inspections of the lockout/tagout procedure to ensure the employees are following procedure and meeting all applicable standards. If the safety coordinator uses the inspected energy control procedure, another authorized employee who does not use the energy control procedure will perform the inspection.

The inspector will review with each authorized employee that employee's responsibilities under the lockout/tagout procedure and correct any identified deviation or inadequacy in the procedure.

Where tagout systems are used, the review will include a detail of the limitations of tags relative to locks in hazardous energy control.

Certification

Each periodic inspection must be certified. The certification shall identify the following:

- The machine or equipment on which the Lockout/Tagout procedure was used
- The date of the inspection
- The employees included in the inspection
- The person performing the inspection

TRAINING

Every employee will be trained on lockout/tagout procedures as appropriate to the employee's duties at no cost to the employee during working hours.

All training material will be appropriate in content and vocabulary to the educational level, literacy and language of employees.

Training Components

Employees whose work operations are in an area where energy control procedures may be used must be trained in the following minimum elements:

- The purpose and function of the lockout/tagout program
- The prohibition of attempts to restart or reenergize locked out or tagged out equipment
- When tag-out systems are used, the following limitations of tags for hazardous energy control must be considered:
  - Tags are essentially warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock
  - When a tag is attached to an energy isolating means, it is not to be removed without authorization of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated
  - Tags must be legible and understandable by all authorized employees, affected employees, and all other employees whose work operations are or may be in the area, in order to be effective

  - Tags and their means of attachment must be made of materials which will withstand the environmental conditions encountered in the workplace
  - Tags may evoke a false sense of security, and their meaning needs to be understood as part of the overall energy control program
  - Tags must be attached securely to energy isolating devices so that they cannot be inadvertently or accidentally detached during use

Training for employees authorized to service and maintain equipment will include the following:

- The recognition of hazardous energy sources
- The type and magnitude of energy available in the workplace
- The methods and means necessary for energy isolation and control

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment

Retraining

Retraining will reestablish proficiency and introduce new or different control measures whenever the following occur:

- A change in job assignment, equipment or process present a new hazard
- There is a change in the lockout/tagout procedures
- A periodic inspection reveals deviations from or inadequacies in employee knowledge or use of the lockout/tagout procedures

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Lockout/Tagout Procedure
- Lockout/Tagout Inspection Certification Form
- Lockout/Tagout Training Record Sheet

These forms may be reproduced freely for the purposes of implementing and maintaining a safety and health program.

LOCKOUT/TAGOUT (PAGE 1 OF 2)

Company:	This procedure establishes the minimum requirements for the lockout of energy isolating devices whenever maintenance or servicing is done on machines or equipment. It shall be used to ensure that the machine or equipment is stopped, isolated from all potentially hazardous energy sources, and locked out before employees perform any servicing or maintenance where the unexpected energization or start-up of the machine or equipment or release of stored energy could cause injury.
Equipment:	

1. Notify Employees: Notify all affected employees that servicing or maintenance is required on a machine or equipment and that the machine or equipment must be shut down and locked out to perform the servicing or maintenance. (Document name or job title of authorized and affected employees)

Authorized Employees	Affected Employees	

2. Prepare for Shutdown: The authorized employee shall refer to the Company procedure to identify the type and magnitude of the energy that the machine or equipment utilizes, shall understand the hazards of the energy, and shall know the methods to control the energy.		3. Equipment Shutdown: If the machine or equipment is operating, shut it down by the normal stopping procedure (depress the stop button, open switch, close valve, etc.).
Type(s) of Energy	Magnitude	Type of Operating Controls:
□ Mechanical		
□ Potential		Location of Operating Controls:
□ Electrical		
□ Thermal		Shutdown Procedure:
□ Chemical		

4. Equipment Isolation: Set the energy isolating device(s) so that the machine or equipment is isolated from the energy source(s).		5. Lock out the energy isolating device(s) with individual locks
Type(s) of energy isolating device(s)	Location(s) of energy isolating device(s)	

LOCKOUT/TAGOUT (PAGE 1 OF 2)

Company	Equipment
6. Release Stored Energy: Stored or residual energy (such as that in capacitors, springs, elevated machine members, hydraulic systems, etc.) must be dissipated or restrained by methods such as grounding, repositioning, blocking, bleeding down, etc.	
Type(s) of Energy	Method(s) to dissipate or restrain
☐ Mechanical	
☐ Potential	
☐ Electrical	
☐ Thermal	
☐ Chemical	
7. Verify Isolation: Ensure that the equipment is disconnected from the energy source(s) by first checking that no personnel are exposed, then verify the isolation of the equipment by operating the push button or other normal operating control(s) or by testing to make certain the equipment will not operate.	
Method to verify isolation:	
Caution: Return operating control(s) to neutral or "off" position after verifying the isolation of the equipment.	
8. The machine or equipment is now locked out.	

RESTORING EQUIPMENT TO SERVICE

When the servicing or maintenance is completed and the machine or equipment is ready to return to normal operating condition, the following steps will be taken:

1. **Check the machine or equipment** and the immediate area around the machine to ensure that nonessential items have been removed and that the machine or equipment components are operationally intact
2. **Check the work area** to ensure that all employees have been safely positioned or removed from the area
3. **Verify** that the controls are in neutral
4. **Remove the lockout devices** and reenergize the machine or equipment

Note: The removal of some forms of blocking may require re-energizing of the machine before safe removal

5. **Notify affected employees** that the servicing or maintenance is completed and the machine or equipment is ready for use

LOCKOUT/TAGOUT INSPECTION CERTIFICATION

I certify that _____ was inspected on this date using lockout/tagout procedures. The inspection was performed while working on _____.

Authorized Employee (Print)	Signature	Date
Inspector (Print)	Signature	Date

LOCKOUT/TAGOUT TRAINING RECORD SHEET

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This chapter covers the requirements machine guarding and complies with the OSHA Machine and Machinery Guarding regulations in 1910 Subpart O. It does not address safeguards for hand held power tools or lockout/tagout procedures, which are covered in other chapters of this manual.

POLICY

It is the policy of this Company to ensure safe operation of machines and equipment. The following policy provides the safe practices and procedures to protect employee's safety through hazard identification and evaluation, safeguarding and training.

EMPLOYER RESPONSIBILITIES

This Company will:

- Correct identified safety hazards with appropriate engineering and administrative controls
- Provide all affected employees with training on machine safe operating methods, based on each of their job duties
- Encourage employees to perform their jobs with safety and health as their priority
- Conduct periodic hazard analyses of work areas to assess equipment safety
- Establish and follow a program of periodic and regular inspections of all machine guards, parts and auxiliary equipment are in safe operating condition properly adjusted, maintained and repaired or replaced as needed
- Maintain records of inspections and maintenance

EMPLOYEE RESPONSIBILITIES

Employees are expected to:

- Be aware of hazards presented by equipment and machinery where they work
- Follow Company safety policy and the instructions of the supervisor
- Comply with safe operating procedures for all equipment
- Attend and participate in appropriate safety training
- Report safety concerns and provide safety recommendations as appropriate

HAZARDS

Moving machine parts have the potential to cause severe workplace injuries, such as crushed fingers or hands, amputations, burns, or blindness. Safeguards are essential for protecting workers from these preventable injuries. Any machine part, function or process that could cause injury must be safeguarded.

Hazardous Motions

A wide variety of mechanical motions and actions can present hazards to workers. These can include the movement of rotating members, reciprocating arms, moving belts, meshing gears, cutting teeth and any parts that impact or shear.

Rotating motion can be dangerous; even smooth, slowly rotating shafts can grip clothing or skin and force an arm or hand into a dangerous position. Injuries due to contact with rotating parts can be severe.

Collars, couplings, cams, clutches, flywheels, shaft ends, spindles, meshing gears and horizontal or vertical shafting are examples of common rotating mechanisms that may be hazardous. The danger increases when projections such as setscrews, bolts, nocks, abrasions, and projecting keys or setscrews are exposed on rotating parts.

Hazardous Actions

A wide variety of mechanical actions can present hazards to the worker. These can include:

- Cutting
- Punching
- Shearing
- Bending

These different types of hazardous mechanical actions are basic in varying combinations to nearly all machines, and recognizing them is essential to protecting workers from the dangers they present

Where Mechanical Hazards Are Present

Three basic areas requiring safeguarding:

- Point of Operation: The point of operation is where the work is actually done on the material. The type of work being done can include the following:
  - Cutting
  - Shaping
  - Grinding
  - Forming
  - Turning
  - Shearing
  - Punching
  - Boring
  - Bending
  - Drilling
- Power Transmission Apparatus: The power transmission apparatus includes components of mechanical systems that transmit energy to parts of the machine including the following:
  - Flywheels
  - Pulleys
  - Belts
  - Couplings
  - Cams
  - Spindles
  - Chains
  - Cranks
  - Gears
  - Sprockets
  - Shafts
  - Rods

Other Moving Parts: there are ranges of parts in a mechanical system that may move during operation. These parts include moving parts that feed material, reciprocate, rotate or move transversely

Non-Mechanical Hazards

Machines obviously present a variety of other hazards that cannot be ignored. Remember that things other than safeguarding moving parts can affect the safe operation of machines.

All power sources for machines are potential sources of danger. When using electrically powered or controlled machines, for instance, the equipment as well as the electrical system itself must be properly grounded. Replacing frayed, exposed or old wiring will also help to protect the operator and others form electrical shocks or electrocution. High-pressure systems also need careful inspection and maintenance to prevent possible failure from pulsation, vibration or leaks. Such a failure could cause, among other things, explosions or flying objects.

Machines often produce noise that can result in a number of hazards to workers. Noise can startle and disrupt concentration and interfere with communications, thus hindering the worker's safe job performance.

Engineering controls such as the use of sound-dampening materials can help control the harmful effects of noise. In addition, administrative controls that involve removing the worker from the noise source can be an effective measure when feasible.

Because some machines require the use of cutting fluids, coolant, and other potentially harmful substances, operators, maintenance workers, and others in the vicinity may need protection. These substances can cause ailments ranging from dermatitis to serious illnesses and disease. Specially constructed safeguards, ventilation, and protective equipment and clothing are possible temporary solutions to the problem of machinery-related chemical hazards until these hazards can be better controlled or eliminated from the workplace.

PROTECTIVE CLOTHING AND PPE

When engineering controls are not available or are not fully capable of protecting employees from hazards, protective clothing or PPE will be used.

To provide adequate protection, the protective clothing and equipment selected must always be:

- Appropriate for the particular hazards
- Maintained in good condition
- Properly stored when not in use, to prevent damage or loss
- Kept clean, fully functional, and sanitary

The necessary PPE can include, but is limited to:

- Hardhats
- Face shields, safety goggles or glasses
- Hearing protection
- Coveralls, jackets, vests, aprons, full-body suits
- Special sleeves and gloves
- Safety shoes and boots or other acceptable foot guards

It’s important to note that protective clothing and equipment can create hazards. A protective glove can become caught between rotating parts, or a respirator face-piece can hinder the wearer's vision, for example, require alertness and continued attentiveness whenever they are used.

Other parts of the worker's clothing may present additional safety hazards. For example, loose-fitting shirts might possibly become entangled in rotating spindles or other kinds of moving machinery. Jewelry, such as bracelets and rings, can catch on machine parts or stock and lead to serious injury by pulling a hand into the danger area.

SAFE PRACTICES

Safeguards are essential for protecting workers from preventable injuries. Remember, any machine part, function or process that could cause an injury must be safeguarded. When the operation of a machine or accidental contact with it can injure the operator or others nearby, the hazards must be either controlled or eliminated.

This information describes the various hazards of mechanical motion and describes some techniques for protecting workers from these hazards. General information includes where mechanical hazards occur, the hazards created by different kinds of motions and the requirements for effective safeguards, as well as a brief discussion of non-mechanical hazards.

Installation of Machines

- Electrically powered machines must be grounded as prescribed in the National Electrical Code
- A machine must be placed so that the operator or other employee tending the machine doesn’t need to stand in an aisle
- A machine must be located so that there’s enough space for the operator to handle the material and run the machine without interference to or from another employee or machine
- A machine installed on a bench, table or stand must be secured to prevent unintentional movement or tipping
- A stationary machine must be anchored or provided with anti-slip pads to prevent unintentional movement

In-running nip point hazards are caused by the rotating parts on machinery. There are three main types of in-running nips.

Parts can rotate in opposite directions while their axes are parallel to each other. These parts may be in contact or in close proximity. In the latter case, the stock fed between the rolls produces the nip points. This danger is common on machines with intermeshing gears, rolling mills and calendars.

Nip points are also created between rotating and tangentially moving parts. Some examples would be the point of contact between a power transmission belt and its pulley, a chain and a sprocket, and a rack and pinion.

Nip points can occur between rotating and fixed parts that create a shearing, crushing or abrading action. Examples are spoked handwheels or flywheels, screw conveyors or the periphery of an abrasive wheel and an incorrectly adjusted work rest.

- Reciprocating: Reciprocating motions may be hazardous because, during the back-and-forth or up-and-down motion, a worker may be struck by or caught between a moving and a stationary part
- Transverse: Transverse motion (movement in a straight, continuous line) creates a hazard because a worker may be struck or caught in a pinch or shear point by the moving part

SAFEGUARD REQUIREMENTS

Safeguards must meet these minimum general requirements:

- Prevent contact: The safeguard must prevent hands, arms, and any other part of a worker's body, from making contact with dangerous moving parts. A good safeguarding system eliminates the possibility of the operator or another worker placing parts of their bodies near hazardous moving parts
- Secure: Workers should not be able to easily remove or tamper with the safeguard, because a safeguard that can easily be made ineffective is no safeguard at all. Guards and safety devices should be made of durable material that will withstand the conditions of normal use. They must be firmly secured to the machine
- Protect from falling objects: The safeguard should ensure that no objects could fall into moving parts. A small tool that is dropped into a cycling machine could easily become a projectile that could strike and injure someone
- Create no new hazards: A safeguard defeats its own purpose if it creates a hazard of its own such as a shear point, a jagged edge, or an unfinished surface that can cause a laceration. The edges of guards, for instance, should be rolled or bolted in such a way that they eliminate sharp edges
- Create no interference: Any safeguard that impedes a worker from performing the job quickly and comfortably might soon be overridden or disregarded. Proper safeguarding can actually enhance efficiency since it can relieve the worker's apprehensions about injury
- Allow safe lubrication: If possible, one should be able to lubricate the machine without removing the safeguards. Locating oil reservoirs outside the guard, with a line leading to the lubrication point, will reduce the need for the operator or maintenance worker to enter the hazardous area

Machine Controls

Engineering controls, which eliminate the hazard at the source and don’t rely on the worker's behavior for their effectiveness, offer the best and most reliable means of machine safeguarding. Therefore, engineering controls must be the employer's first choice for eliminating machine hazards.

- Powered electrical equipment must have an on-off switch
- When unexpected motion would cause injury, an actuating machine control, except for an emergency device for a powered fixed or transportable machine must be guarded or located to prevent accidental actuation
- Unless its function is self-evident, each operating control device must be identified as to its function

- A powered machine that is attended by more than one employee must be equipped with an actuation device for each employee who is exposed to a point-of-operation hazard. The machine will activate only after concurrent use of all actuation devices
- When unexpected motion would cause injury, precautions must be taken to prevent a machine from automatically restarting upon the restoration of power after a power failure
- Where a machine workstation is remotely located from the machine controls, either a red emergency stop device must be provided at the machine workstation if a hazard exists that could cause an injury, or the actuation of the controls must require continuous depression during the hazardous portion of the machine cycle
- Equipment that is operated in series so that one piece of equipment automatically supplies another must be interlocked so that when any equipment in the series is stopped for any reason, the initial stopping causes the upstream equipment to stop if continued operation would create a hazard
- Reactivation must require a separate positive action by the employee who initiated the stop

MACHINE SAFEGUARDING

There are many ways to safeguard machines. The type of operation, the size or shape of stock, the method of handling, the physical layout of the work area, the type of material and production requirements or limitations will help to determine the appropriate safeguarding method for the individual machine. As a rule, power transmission apparatus is best protected by fixed guards that enclose the danger areas. For hazards at the point of operation, where moving parts actually perform work on stock, several kinds of safeguarding may be possible. One must always choose the most effective and practical means available. Safeguards can be grouped under five general classifications:

- Guards
- Devices
- Location/Distance
- Feeding/Ejection Mechanisms

GUARDS

Guards prevent access to danger areas. There are four general types of guards:

- Fixed: As its name implies, a fixed guard is a permanent part of the machine. It is not dependent upon moving parts to perform its intended function. It may be constructed of sheet metal, screen, wire cloth, bars, plastic or any other material that is substantial enough to withstand whatever impact it may receive and to endure prolonged use. This guard is usually preferable to all other types because of its relative simplicity and permanence
- Interlocked: When this type of guard is opened or removed, the tripping mechanism and/or power automatically shuts off or disengages and the machine cannot cycle or be started until the guard is back in place. An interlocked guard may use electrical, mechanical, hydraulic or pneumatic power or any combination of these. Interlocks should not prevent "inching" by remote control if required. Replacing the guard should not automatically restart the machine. To be effective, all movable guards should be interlocked to prevent occupational hazards

- Adjustable: Adjustable guards are useful because they allow flexibility in accommodating various sizes of stock
- Self-Adjusting: The openings of these barriers are determined by the movement of the stock. As the operator moves the stock into the danger area, the guard is pushed away, providing an opening that is only large enough to admit the stock. After the stock is removed, the guard returns to the rest position. This guard protects the operator by placing a barrier between the danger area and the operator. The guards may be constructed of plastic, metal or other substantial material. Self-adjusting guards offer different degrees of protection

REQUIRED GUARDING

Method of Feeding Machine	Safeguarding Required
A. Automatic feed • Automatic roll feed • Automatic push pull • Transfer • Dial feed	Fixed barrier guard, or die enclosure guard, or gate or moveable barrier device, or interlocked press barrier, or an operating device that assures machine action will be stopped before the operator can reach into the point of operation.**
B. Semiautomatic feed Chute feed (both gravity and follow feed) Slide or push feed Dial feed Sliding dies Revolving dies	Fixed barrier guard, or die-enclosure guard, or gate or moveable barrier device, or 2-hand control.
C. Manual feed	Fixed barrier guard, or die-enclosure guard, or gate or moveable barrier device, or sweep device, or pullout device, or restraint device, or electronic control device, or two-hand control.
** Where two or more machines are used in inline operations, with automatic loading and unloading equipment, either the safeguards required in “A” above, or an interlocked enclosure, must be used in conjunction with each machine.	

Guard Construction

Many builders of single-purpose machines provide point-of-operation and power transmission safeguards as standard equipment. However, not all machines in use have built-in safeguards provided by the manufacturer.

Guards designed and installed by the builder offer two main advantages:

- They usually conform to the design and function of the machine.
- They can be designed to strengthen the machine in some way or to serve some additional functional purposes.

User-built guards are sometimes necessary for a variety of reasons. They have these advantages:

- Often, with older machinery, they are the only practical safeguarding solution
- They may be the only choice for mechanical power transmission apparatus in older plants, where machinery is not powered by individual motor drives
- They permit options for point-of-operation safeguards when skilled personnel design and make them
- They can be designed and built to fit unique and even changing situations
- They can be installed on individual dies and feeding mechanisms
- Design and installation of machine safeguards by plant personnel can help to promote safety consciousness in the workplace

However, they also have disadvantages:

- User-built guards may not conform well to the configuration and function of the machine
- There is a risk that user-built guards may be poorly designed or built

Point-of-Operation Guards

Although point-of-operation safeguarding is complicated by the number and complexity of machines, and by the different uses for individual machines, it is still extremely important.

Poorly designed, built or installed guards may create a hazard rather than eliminating one. To be effective, the guards must safeguard the employee while allowing the work to continue with minimum disruption to the production process.

Where operator exposure exists, machines must be equipped and operated with a point-of-operation guard or a point-of-operation protection device for every operation performed, except where the point of operation is limited to an opening of ¼ inch or less.

Point-of-operation guards must:

- Be reliable in construction, application, and adjustment
- Be attached to the machine, die, etc. (check stability of mounting)
- Not introduce any hazards
- Be designed, constructed, and located to facilitate inspection
- Minimize the possibility of removing or misusing essential parts

A barrier guard may have feed holes for the stock, which must be of such size and distance from the die as to prevent entry of a hand or finger of the operator into the point of operation or other nip points.

All guards must be installed, maintained and adjusted to provide safe operation.

Mechanical Power Transmission Apparatus Guarding

A significant difference between power transmission guards and point-of-operation guards is that the former type needs no opening for feeding stock. The only openings necessary for power transmission guards are those for lubrication, adjustment, repair and inspection. These openings should be provided with interlocked covers that cannot be removed except by using tools for service or adjustment.

Power transmission guards will cover all moving parts so that no part of the operator's body can be exposed to them.

Die-Enclosure and Fixed Barrier Guards

- A die-enclosure guard must be attached to the machine in a fixed position and must be so designed and constructed that the operator cannot reach over, under, or around the guard and into the point of operation
- At least a 1-inch clearance must be provided between the top edge of the guard and the slide or any projection thereon, to prevent a shearing hazard caused by slide travel. The guard must extend at least 1 inch above the bottom of the slide at the top of the stroke in order to prevent a shearing hazard
- The guard must afford at least 50% visibility where visibility is necessary for proper placement of materials, and permit easy feeding of the stock through openings. Where rods are used, they must be vertical
- A fixed barrier guard must enclose the point of operation and must be secured to the machine by fasteners that would discourage removal by unauthorized personnel

Interlocked Press-Barrier Guards

An interlocked press-barrier guard, when utilized, must enclose the die space or work area and be interlocked such that the slide cannot be actuated unless the guard or hinged or movable section is in position.

Guard Material

Under many circumstances, metal is the best material for guards. Guard framework is usually made from structural shapes, pipe, bar, or rod stock. Filler material generally is expanded, perforated or solid sheet metal or wire mesh. It may be feasible to use plastic or safety glass where visibility is required.

Guards made of wood generally are not recommended because of their flammability and lack of durability and strength. However, in areas where corrosive materials are present, wooden guards may be the better choice.

Fans

Blades of a fan, located within 7 feet of a floor or working level and used for ventilation or the cooling of an employee, must be guarded with a firmly affixed or secured guard. Any opening in the guard must not have any of its dimensions more than 1 inch, and the distance to the blade must be at least as shown in Table 1.

TABLE 1 FANS: SAFETY-RELATED DIMENSIONS

Smallest Dimension in Guard	Minimum Distance from Guard to Blade
Greater than 0 up to ¼ inclusive	½ inch
Greater than ¼ up to ⅜ inclusive	1 ½ inches
Greater than ⅜ up to ½ inclusive	2 ½ inches
Greater than ½ up to ¾ inclusive	4 inches
Greater than ¾ up to 1 inclusive	6 times the smallest dimension

A fan used for cooling whose blade is less than 7 feet above the floor or working level must meet the distance requirements of Table 2 below. Where the openings are larger than those shown in the table, the distance from the guard to the blade must prevent any part of the employee's body from making contact with the blade.

TABLE 2: FANS: SAFETY-RELATED DIMENSIONS

Distance of Opening from Point-of-Operation Hazard (Inches)	Minimum Width Opening (Inches)
½ to 1½	¼
1½ to 2½	⅜
2½ to 3½	½
3½ to 5½	⅝
5½ to 6 ½	¾
6½ to 7½	⅞
7½ to 12½	1 ¼
12½ to 15½	1 ½
15½ to 17½	1 ⅞
17½ to 31½	2 ⅛

Powered Rotating Equipment

Saws and other powered rotating equipment must be guarded unless state standards supersede them. The worker must be protected from contact with all points of operation. See the "Hand and Power Tools" chapter for more information on saw operation.

If a machine or tool with rotating parts or components exposes employees to dust or particles, it must be connected to an exhaust/ventilation system.

Pinch Points

When an employee is exposed to a hazard created by a pinch point other than point of operation, the hazard must be guarded or the employee otherwise protected.

Machines with Cylinders

An extractor, parts washer, or tumbler, manually controlled and equipped with an inside revolving cylinder, must be equipped with a cover or door interlocked in such a manner as to prevent opening the door when the inside cylinder is in motion, and to prevent power operation of the inside cylinder when the cover or door is open. An inch control or constant pressure control that bypasses the interlock may be used to aid loading and unloading.

Avoiding Crushing Accidents

Employees will not place their body beneath equipment, such as vehicles, machines, or materials, supported only by a jack, overhead hoist, chain fall, or any other temporary single supporting means, unless safety stands, blocks, or other support system capable of supporting the total imposed weight is used to protect the employee in case of failure of the supporting system.

DEVICES

A safety device may perform one of several functions.

- Stop the machine if a hand or any part of the body is inadvertently placed in the danger area
- Restrain or withdraw the operator's hands from the danger area during operation
- Require the operator to use both hands-on machine controls, thus keeping both hands and body out of danger
- Provide a barrier that is synchronized with the operating cycle of the machine in order to prevent entry to the danger area during the hazardous part of the cycle

Devices must not create a hazard to the operator.

Presence Sensing

A presence-sensing device must be designed and installed so that, when the operator’s hands or any other part of his body, disturb the sensing field, the downward travel of the machine’s cycle is prevented or stopped. This type of device must not be used as a tripping means. In addition, to protect all areas of entry to the point of operation not protected by the presence-sensing device, a partial enclosure must be used that does not create a pinch point or shear hazard.

The photoelectric (optical) presence-sensing device uses a system of light sources and controls that can interrupt the machine's operating cycle, if the light field is broken, the machine stops and will not cycle. This device must be used only on machines that can be stopped before the worker can reach the danger area. Equipment must be installed so that failure of the light/photoelectric relay/other energy source makes the machine inoperative. The design and placement of the device depends upon the time it takes to stop the mechanism and the speed at which the employee's hand can reach across the distance from the guard to the danger zone.

The radiofrequency (capacitance) presence-sending device uses a radio beam that is part of the machine control circuit. When the capacitance field is broken, the machine will stop or will not activate. Like the photoelectric device, this device will only be used on machines that can be stopped before the worker can reach the danger area. This requires the machine to have a friction clutch or other reliable means for stopping.

The electromechanical sensing device has a probe or contact bar that descends to a predetermined distance when the operator initiates the machine cycle. If there is an obstruction preventing it from descending its full-predetermined distance, the control circuit does not actuate the machine cycle.

Pull-back/Pull-out Devices: This type of device is primarily used on machines with stroking action. The pull-back/pull-out device must include attachments for the operator’s hands or arms. The attachments must be connected to the machine so that the operator’s hands or fingers are removed from the point of operation as the machine cycles.

Authorized personnel must be trained on, and responsible for, proper adjustment of the device for each setup and operator change. If more than one operator is required, a set of pullout devices must be provided for each operator.

Each pullout device used must be visually inspected and checked for proper adjustment at the start of each shift, following a new set-up, and when operators are changed. Necessary maintenance or repair, or both, must be completed and documented before the machine is operated.

Restraint: The restraint (holdout) device generally utilizes cables or straps that are attached to the operator's hands and a fixed point. The cables or straps must be adjusted to let the operator's hands travel within a predetermined safe area. There is no extending or retracting action involved. Consequently, hand-feeding tools are often necessary if the operation involves placing material into the danger area.

Safety Trip Controls

Safety trip controls provide a quick means for deactivating the machine in an emergency. A pressure-sensitive body bar, when depressed, will deactivate the machine. If the operator or anyone trips, loses balance or is drawn toward the machine, applying pressure to the bar will stop the operation.

The positioning of the bar, therefore, is critical. It must stop the machine before a part of the employee's body reaches the danger area.

When pressed by hand, the safety deactivates the machine. Because the trip-rod has to be actuated by the operator during an emergency situation, its proper position is also critical.

Safety tripwire cables are located around the perimeter of or near the danger area. The operator must be able to reach the cable with either hand to stop the machine.

Two-Hand Controls

The two-hand control requires an operator to provide constant, concurrent pressure on both controls to activate a machine. Pressure must be maintained by both hands, which are located a safe distance from the danger area and any pinch points, until the machine completes its cycle. Otherwise, the machine stops or returns to its starting position.

Two-hand control devices must be the anti-tie down type and located in a manner to prevent bridging. If repeating would cause an injury, an anti-repeat device must be incorporated into the control system. This kind of control requires a part-revolution clutch, brake, and a brake monitor if used on a power press.

Controls for more than one operating station must be able to be activated and deactivated in complete sets of two-hand controls per operating station, and must be capable of being supervised by the employer.

Two-hand controls for single-stroke operation will be designed to require release of all operator’s hand controls before a second stroke can be initiated.

If foot control is provided, the selection method between hand and foot control must all be separated from the stroking selector, and must be designed so that the selection may be supervised by the employer.

A two-hand control may be a mechanically, pneumatically, or electrically controlled system.

Two-Hand Trips

The two-hand trip requires concurrent application of both the operator's control buttons to activate the machine cycle, after which the hands are free. This device is usually used with machines equipped with full-revolution clutches. The trips must be placed far enough from the point of operation to make it impossible for the operator to move his or her hands from the trip buttons or handles into the point of operation before the first half of the cycle is completed. The distance from the trip button depends upon the speed of the cycle and the band speed constant.

To be effective, both two-hand controls and trips must be located so that the operator cannot use two hands or one hand and another part of his/her body to trip the machine. Thus, the operator's hands are kept far enough away to prevent them from being placed in the danger area prior to the slide/ram or blade reaching the full "down" position.

Gates

A gate is a moveable barrier that protects the operator at the point of operation; the gate must be interlocked so that the machine will not begin a cycle unless the gate guard is in place, and in the closed position. A gate or movable barrier device must enclose the point of operation before power can be transmitted to the machine. In many instances, gates are designed to be operated with each cycle.

This type of guard can be used where the gate is a component of a perimeter safeguarding system. Here the gate may provide protection not only to the operator but to pedestrian traffic as well.

Point-of-Operation Devices

A point-of-operation device differs from a guard in that it allows the operator access to the point of operation for loading and unloading the die in a press operation. It prevents actual operation either until the hands are removed, or removes the hands from the point of operation as the press slide descends. A point of operation device may be a barrier device.

A point-of-operation device must be designed, constructed and located so that it prevents, during normal operations, an employee's hands or fingers from remaining within the point of operation during the downward movement of the slide/cycle.

Adjustable Press-Barrier Devices

An adjustable press-barrier device must be attached to the frame of the press or die shoe and must have front and side sections adjustable for dies or jobs of any size.

Adjustments must be verified by qualified and authorized personnel before the press is returned to production. With the use of an adjustable press-barrier device, authorized personnel must be instructed regarding proper adjustments of the device and that these adjustments are an important part of their jobs. An operator must not be allowed to make any change in the adjustments without approval of supervisory personnel.

Where the adjustable press-barrier device cannot be adjusted to give sufficient clearance (for example, for the insertion or removal of an irregularly shaped piece), mechanical feeds, ejectors and/or other point-of-operation devices must be used.

Holdout and Restraint Devices

A holdout or restraint device must be securely anchored and adjusted so that the operator is restrained from reaching into the point of operation. A set of restraints must be provided for each operator if more than one operator is required for the machine.

LOCATION AND DISTANCE

The examples mentioned below are a few of the numerous applications of the principle of safeguarding by location/distance. A thorough hazard analysis of each machine and particular situation is essential before attempting this safeguarding technique.

To consider a part of a machine to be safeguarded by location, the dangerous moving part of a machine must be positioned so that those areas are not accessible or do not present a hazard to a worker during the normal operation of the machine.

This may be accomplished either by locating a machine so that the hazardous parts of the machine are located away from operator workstations or other areas where employees walk or work, or by positioning a machine with its power transmission apparatus against a wall and leaving all routine operations conducted on the other side of the machine. Additionally, enclosure walls or fences can restrict access to machines. Another possible solution is to have dangerous parts located high enough to be out of the normal reach of any worker.

The feeding process can be safeguarded by location if a safe distance can be maintained to protect the worker's hands. The dimensions of the stock being worked on may provide adequate safety.

For instance, if the stock is several feet long and only one end of the stock is being worked on, the operator may be able to hold the opposite end while the work is being performed. An example would be a single-end punching machine. However, depending upon the machine, protection might still be required for other personnel.

The positioning of the operator's control station provides another potential approach to safeguarding by location. Operator controls may be located at a safe distance from the machine if there is not a reason for the operator to tend it.

Slide-Lock Devices

When a slide-lock device or block is used, an additional point of operation guard or device must be used to protect the operator before the slide lock device is in position and secures the slide from closing. Visual indication of the operation of the slide lock device must be provided.

FEEDING AND EJECTION

Hand-feeding tools, such as but not limited to, pushers, pliers, pinchers, tweezers, suction discs or magnets, are intended for placing and removing materials in order to permit safe feeding of material by the operator.

Many feeding and ejection methods do not require the operator to place his or her hands in the danger area. In some cases, no operator involvement is necessary after the machine is set up. In other situations, operators can manually feed the stock with the assistance of a feeding mechanism. Properly designed ejection methods do not require any operator involvement after the machine starts to function.

Some feeding and ejection methods may even create hazards themselves. For instance, a robot may eliminate the need for an operator to be near the machine but may create a new hazard itself by the movement of its arm.

These feeding and ejection methods must not be accepted in lieu of other guards or devices. Guards and devices must still be used where they are necessary and where they can serve to provide protection from exposure to hazards.

Types of Feeding and Ejection Methods

Automatic Feed: Automatic feeds reduce the exposure of the operator during the work process, and sometimes do not require any effort by the operator after the machine is set up and running.

Semi-automatic Feed: With semi-automatic feeding, as in the case of a power press, the operator uses a mechanism to place the piece being processed under the ram at each stroke. The operator does not need to reach into the danger area, and the danger area is completely enclosed.

Automatic ejection: Automatic ejection may employ either an air-pressure or a mechanical apparatus to remove the completed part from a press. It may be interlocked with the operating controls to prevent operation until part ejection is completed. This method requires additional safeguards for full protection of the operator.

Semi-automatic Ejection: Semi-automatic ejection employs mechanical means initiated by the operator to remove the completed part from a press.

Robot: Essentially, robots perform work that would otherwise have to be done by an operator. They are best used in high-production processes requiring repeated routines where they prevent other hazards to employees. However, they may create hazards themselves, and if they do, appropriate guards must be used.

Hand-Operated Levers

A hand lever-operated press or machine must be equipped with a spring latch on the operating lever to prevent premature, accidental tripping. The operating lever on a hand-tripped machine having more than one operating station must be so interlocked as to prevent operation of the press except by concurrent action of all levers. A guard or device must be used in conjunction with the hand-operated lever to safeguard the point of operation, or the lever must be located so that the operator cannot reach into the point of operation.

Foot Pedals and Protection

All foot pedals must be guarded or otherwise protected to prevent unintended operation from falling or moving objects, or by accidental stepping onto the pedal.

Mechanical pedal return springs must be the compression type operated on a rod or guided within a hole or tube. If operated on a rod, the inside diameter of the spring must be no greater than the diameter of the rod, plus ⅛ inch. If guided within a hole or tube, the inside diameter of the hole or tube shall be no greater than the outside diameter of the spring coil, plus ⅛ inch. A spring, in its initial compressed position, must be wound so that the space between coils is less than the diameter of the wire.

A pedal counterweight, if provided, must have the path of the travel of the weight enclosed or guarded. A mechanical foot pedal must be securely mounted on a press leg where the pedal is an integral part of the press.

Applications

While these aids do not give complete protection from machine hazards, they may provide the operator with an extra margin of safety. Sound judgment is needed in their application and usage. Following are several examples of possible applications:

- Awareness Barriers: An awareness barrier does not provide physical protection, but serves to remind a person that he or she is approaching the danger area. Generally, awareness barriers are not considered adequate when continual exposure to the hazard exists
- Although the barrier does not physically prevent a person from entering the danger area, it calls attention to it. For an employee to enter the danger area an overt act must take place, that is, the employee must either reach or step over, under or through the barrier
- Miscellaneous Protective Shields: Shields, another aid, may be used to provide protection from flying particles, splashing cutting oils, or coolants
- Holding Fixtures and Hand-Feeding Tools: Although special hand tools may be used to place or remove stock, particularly from or into the point of operation of a machine, hand tools must not be substituted for the required guarding or point-of-operation devices. Where hand tools are used for placing materials into and removing them from a point of operation, the employer will ensure the tools are designed so that the operator is not required to place a hand within the point of operation

Exceptions:

- A bending operation on a press brake involving less than 25 pieces of 1 bend, if not guarded, will use of a hand tool when the operator must hold the work piece within 4 inches of the point of operation, and a conspicuous sign must be posted on the machine stating: “Hand tools must be used to hold stock.”
- A guard or device for the point of operation of a non-production arbor press or straightening press is not required if the machine is equipped with a hand control that is designed to stop the ram action or return the ram to the up position when released.
- A push stick or block may be used when feeding stock into a saw blade.

MACHINERY MAINTENANCE AND REPAIR – LOCK-OUT/TAG-OUT

If possible, machine design should permit routine lubrication and adjustment without removal of safeguards. However, when safeguards must be removed, and the machine serviced, the Company lockout/tagout procedure must be followed. The maintenance and repair crew must never fail to replace the guards before the job is considered finished and the machine released from lockout.

If maintenance or repair workers would be exposed to electrical elements or hazardous moving machine parts in the performance of the job, all power sources must be shut off and locked out before work begins. Warning signs or tags are inadequate insurance against the untimely energizing of mechanical equipment.

Please refer to the Lockout/Tagout chapter of this manual for specific lockout/tagout requirements and procedures.

TRAINING

We will ensure every employee is provided training on machine and equipment safety. This training will be provided at no cost to the employee during working hours.

Training will use only training material that is appropriate in content and vocabulary to educational level, literacy, and language of employees.

Training Components

The safety coordinator will ensure every employee is trained in the following minimum elements:

- A description and identification of the hazards associated with particular machines
- The safeguards themselves, how they provide protection, and the hazards for which they are intended
- How to use the safeguards and why
- How and under what circumstances safeguards can be removed, and by whom (in most cases, repair or maintenance personnel only)
- What to do (e.g., contact the supervisor) if a safeguard is damaged, missing, or unable to provide adequate protection

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions
- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be maintained for 3 years from the date on which the training occurred.

FORMS AND ATTACHMENTS

Please find the following documents on the pages below:

- Machine Guarding Checklist
- Machine Guarding and Equipment Safety Training Documentation

These forms may be reproduced for the purposes of implementing and maintaining a safety and health program.

MACHINE GUARDING CHECKLIST (PAGE 1 OF 3)

Answers to the following questions will help determine the safeguarding needs of the workplace by drawing attention to hazardous conditions or practices requiring correction.

Yes	No	Requirements for All Safeguards
☐	☐	Do the safeguards provided meet the minimum OSHA requirements?
☐	☐	Do the safeguards prevent workers' hands, arms, and other body parts from making contact with dangerous moving parts?
☐	☐	Are the safeguards firmly secured and not easily removable?
☐	☐	Do the safeguards ensure that no objects will fall into the moving parts?
☐	☐	Do the safeguards permit safe, comfortable and relatively easy operation of the machine?
☐	☐	Can the machine be oiled without removing the safeguard?
☐	☐	Is there a system for shutting down the machinery before safeguards are removed?
☐	☐	Can the existing safeguards be improved?
Yes	No	Point of operation:
☐	☐	Is there a point-of-operation safeguard provided for the machine?
☐	☐	Does it keep the operator's hands, fingers and body out of the danger area?
☐	☐	Is there evidence that the safeguards have been tampered with or removed?
☐	☐	Could you suggest a more practical, effective safeguard?
☐	☐	Could changes be made on the machine to eliminate the point-of-hazard?
Yes	No	Power transmission apparatus:
☐	☐	Are there any unguarded gears, sprockets, pulleys or flywheels on the apparatus?
☐	☐	Are there any exposed belts or chain drives?
☐	☐	Are there any exposed setscrews, key ways, collars, etc.?
☐	☐	Are starting and stopping controls within easy reach of the operator?
☐	☐	If there is more than one operator, are separate controls provided?

MACHINE GUARDING CHECKLIST (PAGE 2 OF 3)

Yes	No	Other moving parts:
☐	☐	Are safeguards provided for all hazardous moving parts of the machine, including auxiliary parts?
Yes	No	Non-mechanical Hazards
☐	☐	Have appropriate measures been taken to safeguard workers against noise hazards?
☐	☐	Have special guards, enclosures, or personal protective equipment been provided, where necessary, to protect workers from exposure to harmful substances used in machine operation?
Yes	No	Electrical Hazards
☐	☐	Is the machine installed in accordance with National Electrical Code requirements?
☐	☐	Are there loose conduit fittings?
☐	☐	Is the machine properly grounded?
☐	☐	Is the power supply correctly fused and protected?
☐	☐	Do workers occasionally receive minor shocks while operating any of the machines?
Yes	No	Training
☐	☐	Do operators and maintenance workers have the training on how to use the safeguards and why?
☐	☐	Have operators and maintenance workers been trained in where the safeguards are located, how they provide protection and what hazards they protect against?
☐	☐	Have operators and maintenance workers been trained in how and under what circumstances guards can be removed?
☐	☐	Have workers been trained in the procedures to follow if they notice guards that are damaged, missing or inadequate?
Yes	No	Protective Equipment and Proper Clothing
☐	☐	Is protective equipment required?
☐	☐	If protective equipment is required, is it appropriate for the job, in good condition, kept clean and sanitary, and stored carefully when not in use?
☐	☐	Is the operator dressed safely for the job (i.e., no loose-fitting clothing or jewelry)?

MACHINE GUARDING CHECKLIST (PAGE 3 OF 3)

Yes	No	Machinery Maintenance and Repair
☐	☐	Have maintenance workers received up-to-date instruction on the machines they service?
☐	☐	Do maintenance workers lock out the machine from its power sources before beginning repairs?
☐	☐	Where several maintenance persons work on the same machine, are multiple lockout devices used?
☐	☐	Do maintenance persons use appropriate and safe equipment in their repair work?
☐	☐	Is the maintenance equipment itself properly guarded?
☐	☐	Are maintenance and servicing workers trained in the requirements of lock-out/tag-out hazard, and do the procedures for lock-out/tag-out exist before they attempt their tasks?

Evaluator's Name	Signature	Date

MACHINE GUARDING AND EQUIPMENT SAFETY TRAINING

Trainer (include qualifications):	
Date:	
Content of Training:	
Attendees	
Print Name	**Signature**

SCOPE

This Silica Dust policy meets the new Silica regulation requirements for both General Industry and Construction work, including the compliance timetables from 2016 up to 2021.

The policy covers occupational risk, health effects, and symptoms training for employees to understand how to take control of their own health.

Also covered are the permissible exposure levels (PEL) with air monitoring and medical surveillance to identify hazards and employee exposure.

Engineering and administrative controls along with safe work practices to be employed to protect workers such as: dust reduction, restricted areas and personal hygiene. Also included are personal protective equipment (PPE) steps, especially respiratory protection to be used when necessary, along with: first aid, spill and disposal procedures, recordkeeping requirements, and the table to control common construction tasks without monitoring workers' silica exposure.

POLICY

This company policy implements the necessary procedures for employees, safety personnel and supervisors to provide the OSHA required protection for employees who could be exposed to an unsafe level of airborne silica.

EMPLOYER RESPONSIBILITIES

- Prevent employees from being exposed to an airborne silica level above the Permissible Exposure Level (PEL) of 50 (µg/ m^3) Establish a written exposure control plan to identify high exposure tasks and protection methods.
- Designate a competent person to implement the written exposure control plan
- Enforce housekeeping practices that limit workers silica exposure.
- Offer medical exams—including chest X-rays and lung function tests—every three years for workers who are required by the standard to wear a respirator for 30 or more days per year
- Appropriately train workers and supervisors before starting work.
- Keep records of workers' silica exposure and medical exams

EMPLOYEE RESPONSIBILITIES

- Attend all silica exposure training
- Follow all safe practices established by the company
- Use and maintain all necessary PPE provided by the company
- Report any unsafe conditions or acts immediately

SILICA INFORMATION

Crystalline silica, also called alpha silica or free silica, is silicon dioxide (SiO_2). In pure, natural form, SiO_2 crystals are tiny, very hard, translucent and colorless. The most common types of crystalline silica encountered in industry are quartz and cristobalite.

Quartz content can vary greatly among different rock types. Granite can contain anywhere from 10 to 40% quartz; shales have been found to average 22%, and sandstone averages almost 70% quartz.

Silicates, composed of SiO_2, are also a source of silica. Silicates include mica, soapstone, talc, tremolite and Portland cement.

OCCUPATIONAL RISK

Silica is present in almost every process where natural minerals are handled. In construction work, employees who are handling rock, brick, sand or drilling, quarrying or tunneling through the earth's crust may be exposed to silica.

In general industry work, employees are exposed to silica dusts from cleaning, etching, polishing or the manufacture of asphalt or cement.

HEALTH EFFECTS

Silicosis: Silicosis is lung damage caused by breathing dust containing fine particles of crystalline silica that become embedded in the lungs, causing the lungs to develop fibrotic nodules and scarring. The scar tissue makes the lungs hard and stiff. The scarring can greatly reduce the function of the lungs making it difficult and sometimes painful to breathe.

Silica also reduces the body's ability to fight off infections making workers more susceptible for developing other lung illnesses and infections. If workers smoke, silica exposure may greatly increase the risk of developing lung cancer. The incidence of tuberculosis is high among silicosis victims.

Silica dust can also irritate a worker's eyes. Goggles or safety glasses should be worn if eye irritation is a problem.

SYMPTOMS

Early stages of the disease may go unnoticed, but symptoms can include: shortness of breath during physical exertion; fever; occasionally bluish skin at the ear lobes or lips.

Progression of silicosis can lead to:

- Fatigue
- Labored breathing
- Loss of appetite
- Pain in the chest
- Respiratory failure, which may cause death

In severe cases, fibrous tissue can hinder the flow of blood in vessels of the lung, and the heart can enlarge in an effort to pump more blood.

Types of Silicosis

Chronic silicosis: The most common form of the disease; may go undetected for years in the early stages. Chest x-rays may not reveal an abnormality until after 15 or 20 years of exposure. If you believe you are overexposed to silica dust, visit a doctor who knows about lung diseases. The progress of silicosis can only be stopped; but cannot be cured.

Accelerated silicosis: A form of silicosis that shows symptoms within five to 10 years.

Acute silicosis: A form of silicosis that develops in workers exposed to very high levels of crystalline silica. Symptoms may appear within only a few weeks of an initial exposure.

EXPOSURE LEVELS

On June 23, 2016 two new OSHA regulations, (1910.1053 for General Industry work and 1926.1153 for Construction work) and exposure limits took effect.

This new silica regulation establishes the following provisions:

- Establishes an action level for airborne respirable crystalline silica of 25 micrograms per cubic meter of air (µg/ m^3) averaged over an 8-hour shift
- Reduces the permissible exposure limit (PEL) for respirable crystalline silica to 50 (µg/ m^3), averaged over an 8-hour shift
- Requires employers to: use engineering controls (such as water or ventilation) to limit worker exposure to the PEL; provide respirators when engineering controls cannot adequately limit exposure; limit worker access to high exposure areas; develop a written exposure control plan, offer medical exams to highly exposed workers, and train workers on silica risks and how to limit exposures
- Requires medical exams to monitor highly exposed workers and gives them information about their lung health

After this date, companies will have one to five years to comply with most requirements, based on the following schedule:

Construction - June 23, 2017, one year after the effective date.

General industry and maritime - June 23, 2018, employers must comply with all requirements of the standard, except for the following:

- Medical surveillance must be offered to employees who will be exposed at or above the action level for 30 or more days a year starting on June 23, 2020. (Medical surveillance must be offered to employees who will be exposed above the PEL for 30 or more days a year starting on June 23, 2018.)

Hydraulic Fracturing - June 23, 2018, two years after the effective date for all provisions except

- Engineering Controls, which have a compliance date of June 23, 2021

PERSONAL PROTECTIVE EQUIPMENT

Personal Protective Equipment (PPE) will only be used when engineering and administrative controls do not provide adequate worker protection and reduce to at least the PEL. PPE is the last line of defense for limiting silica exposure and may include:

- Hardhats
- Gloves
- Coveralls

- Eye Protection
- Safety Shoes or Boots
- Dust Masks or Respirators

Respiratory Protection

Only when all engineering or administrative controls have been implemented, and the level of respirable silica still exceeds the PEL, may an employer rely on a respirator program to protect workers.

When respirators are required to protect employees for silica dust exposure the company's Respirator Program will be strictly followed.

Copies of the Respirator Program will be made available to all employees upon request.

- The respirator program will comply with the OSHA standards for respiratory protection, this includes proper respirator selection, medical evaluations, fit testing, cleaning and maintenance procedures, and training
- The company must select and provide an appropriate respirator that will effectively protect their employees
- Respirators must be approved by NIOSH for protection against the silica PEL and provide the require APF
- When abrasive blasting is done, the type C supplied-air, positive pressure, demand type abrasive blasting respirator will be worn
- An abrasive-blasting respirator must cover the wearer's head, neck, and shoulders to protect from rebounding abrasives

EMERGENCY FIRST AID

Eye Exposure

If crystalline silica dust gets into the eyes, wash immediately with large amounts of water, lifting the lower and upper lids occasionally.

If irritation is present after washing, get medical attention.

Portable eyewashes will be kept at jobsites in the field away from the company locations.

Breathing

- If a person breathes in large amounts of crystalline silica dust, move the exposed person to fresh air immediately
- If breathing has stopped, perform chest compressions (if trained)
- Keep the person warm and at rest
- Get medical attention as soon as possible

SPILL AND DISPOSAL PROCEDURES

If crystalline silica is spilled or released in hazardous concentrations, the following steps will be taken:

- Ventilate the area
- Wear respirators during clean-up
- Collect spilled material in the most convenient and safe manner for reclamation or disposal in a secured sanitary landfill

RECORDKEEPING

Training, medical records, air monitoring, engineering control maintenance records, and injury records will be kept by the company and made available upon request.

The site safety coordinator or their designee is responsible for the recordkeeping program.

CONTROL OF SILICA DUST IN CONSTRUCTION WORK

The table below lists some of the most common construction tasks and dust control methods, so employers know exactly what they need to do to limit worker exposures to silica. The dust control measures listed in the table include methods known to be effective, like using water to keep dust from getting into the air or using ventilation to capture dust. In some operations, respirators may also be needed.

Employers who follow the recommendations shown in Table 1 (below) correctly do not need to monitor workers' silica exposure and get it below the PEL.

TABLE 1: JOB/TASK SPECIFIC SILICA EXPOSURE CONTROL METHODS

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Stationary masonry saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld power saws (any blade diameter)	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.		
	When used outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10
Handheld power saws for cutting fiber- cement board (with blade diameter of 8 inches or less)	For tasks performed outdoors only: Use saw equipped with commercially available dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency.	None	None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Walk-behind saws	Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions		
	When used outdoors	None	APF 10
	When used indoors or in an enclosed area	APF 10	APF 10
Drivable saws	For tasks performed outdoors only: Use saw equipped with integrated water delivery system that continuously feeds water to the blade. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Rig-mounted core saws or drills	Use tool equipped with integrated water delivery system that supplies water to cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
Handheld and stand-mounted drills (including impact and rotary hammer drills)	Use drill equipped with commercially available shroud or cowling with dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	None	None
Dowel drilling rigs for concrete	For tasks performed outdoors only: Use shroud around drill bit with a dust collection system. Dust collector must have a filter with 99% or greater efficiency and a filter-cleaning mechanism. Use a HEPA-filtered vacuum when cleaning holes.	APF 10	APF 10
Vehicle-mounted drilling rigs for rock and concrete	Use dust collection system with close capture hood or shroud around drill bit with a low-flow water spray to wet the dust at the discharge point from the dust collector. OR Operate from within an enclosed cab and use water for dust suppression on drill bit.	None None	None None

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Jackhammers and handheld powered chipping tools	Use tool with water delivery system that supplies a continuous stream or spray of water at the point of impact.		
	When used outdoors.	None	APF 10
	When used indoors or in an enclosed area.	APF 10	APF 10
	OR Use tool equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the tool manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism.		
	When used outdoors.	None	APF 10
	When used indoors or in an enclosed area.	APF 10	APF 10
Handheld grinders for mortar removal (i.e., tuckpointing)	Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.	APF 10	APF 25
Handheld grinders for uses other than mortar removal	For tasks performed outdoors only:	None	None
	Use grinder equipped with integrated water delivery system that continuously feeds water to the grinding surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. OR Use grinder equipped with commercially available shroud and dust collection system. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide 25 cubic feet per minute (cfm) or greater of airflow per inch of wheel diameter and have a filter with 99% or greater efficiency and a cyclonic pre-separator or filter-cleaning mechanism.		
	When used outdoors.	None	None
	When used indoors or in an enclosed area.	None	APF 10

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Walk-behind milling machines and floor grinders	Use machine equipped with integrated water delivery system that continuously feeds water to the cutting surface. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions.	None	None
	OR		
	Use machine equipped with dust collection system recommended by the manufacturer. Operate and maintain tool in accordance with manufacturer's instructions to minimize dust emissions. Dust collector must provide the airflow recommended by the manufacturer, or greater, and have a filter with 99% or greater efficiency and a filter-cleaning mechanism. When used indoors or in an enclosed area, use a HEPA-filtered vacuum to remove loose dust in between passes.	None	None
Small drivable milling machines (less than half-lane)	Use a machine equipped with supplemental water sprays designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None	None
Large drivable milling machines (half-lane and larger)	For cuts of any depth on asphalt only: Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions.	None	None
	For cuts of four inches in depth or less on any substrate:	None	None
	Use machine equipped with exhaust ventilation on drum enclosure and supplemental water sprays designed to suppress dust. Operate and maintain machine to minimize dust emissions.		None
	OR		
	Use a machine equipped with supplemental water spray designed to suppress dust. Water must be combined with a surfactant. Operate and maintain machine to minimize dust emissions.	None	

Equipment / Task	Engineering and Work Practice Control Methods	Required Respiratory Protection and Minimum Assigned Protection Factor (APF)	
		≤ 4 hours /shift	> 4 hours /shift
Heavy equipment and utility vehicles used to abrade or fracture silica-containing materials (e.g., hoe-ramming, rock ripping) or used during demolition activities involving silica-containing materials	Operate equipment from within an enclosed cab. When employees outside of the cab are engaged in the task, apply water and/or dust suppressants as necessary to minimize dust emissions.	None None	None None
Heavy equipment and utility vehicles for tasks such as grading and excavating but not including: demolishing, abrading, or fracturing silica-containing materials	Apply water and/or dust suppressants as necessary to minimize dust emissions. OR When the equipment operator is the only employee engaged in the task, operate equipment from within an enclosed cab.	None None	None None

The key to preventing silicosis is preventing silica dust from being in the air. Employers are required to provide and assure the use of appropriate controls for dusts containing crystalline silica.

When implementing the control measures specified in Table 1 above, the company will ensure:

- Tasks performed indoors or in enclosed areas have an exhaust method that minimizes the accumulation of visible airborne dust
- Tasks performed using wet methods will have enough water at flow rates to minimize release of visible dust
- Methods used for work performed in a cab or booth will:
  - Be maintained as free as practicable from settled dust
  - Have door seals and closing mechanisms that work properly
  - Have gaskets and seals that are in good condition and working properly
  - Be maintained with by continuous delivery of fresh air
  - Have intake air that is filtered through an approved filter
  - Have heating and cooling capabilities

If the company does not use the control methods in the above table, they must:

- Measure the amount of silica that workers are exposed to if it may be at or above an action level of 25 µg/ m^3 averaged over an eight-hour day
- Protect workers from respirable crystalline silica exposures above the permissible exposure limit of 50 µg/ m^3, averaged over an eight-hour day

- Use dust controls to protect workers from silica exposures above the PEL
- Provide respirators to workers when dust controls cannot limit exposures to the PEL

If employees use a respirator 30 or more days a year, they will need to be offered a medical exam.

The company will reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, or when the employer has any reason to believe that new or additional exposures at or above the action level have occurred.

CONTROLLING SILICA DUST IN GENERAL INDUSTRY WORK

The Table below lists some of the most common general industry businesses where employees may be exposed to silica dust

- Abrasive blasting
- Cement/Concrete product manufacturing
- Foundries
- Mineral Processing
- Pottery manufacturing
- Refractories
- Asphalt Paving Products
- Cut Stone
- Glass work
- Paint and Coatings
- Railroads
- Shipyard work
- Asphalt Roofing Materials
- Dental Laboratories
- Jewelry
- Porcelain Enameling
- Ready Mix Concrete
- Structural Clay

These tasks generally involve the use of pressurized abrasives, grinders, drills and saws. The dust control methods include the use of dust collection, ventilation, wetting methods (streaming water and misting), and if necessary respirators.

Where it can be shown that the action level will not be exceeded, no respiratory protection is required. When working in an enclosed area or when the length of exposure exceeds 4 hours, respiratory protection with an Assigned Protection factor (APF) of 10 may be required. This can be provided by a NIOSH approved N95 dust mask or another respirator type.

When performing general industry work, the company will use air monitoring test results to determine the level of respiratory protection necessary.

The key to preventing silicosis is to develop and enforce controls to prevent airborne silica dust.

When implementing a silica exposure program the company must:

- Measure the amount of silica that workers are exposed to if it might be at the action level of 25 µg/ m^3.
- Protect workers from respirable crystalline silica exposures above the PEL (50 µg/ m^3)
- Enforce controls to protect workers from silica exposures above the PEL
- Provide respirators to workers when dust controls cannot limit exposures to the PEL

If employees use a respirator 30 or more days a year, they will need a medical exam.

The company will reassess exposures whenever a change in the production, process, control equipment, personnel, or work practices may reasonably be expected to result in new or additional exposures at or above the action level, and when any exposure at or above the action level have occurred.

SILICA DUST EXPOSURE CONTROL PROGRAM

The Occupational Silica Dust Control Program includes the following parts:

- Hazard Identification
- Worksite Air Monitoring
- Respiratory Protection
- Engineering Controls
- Administrative Controls
- Safe Work Practices
- Medical Examinations and Evaluation
- Training and Informing Workers on Hazards of Silica Dust
- Personal Protective Equipment
- Recordkeeping
- Emergency First Aid Procedures for Silica Dust
- Spill and Disposal Procedures

HAZARD IDENTIFICATION

When a task presents a potential silica exposure hazard, the Safety Coordinator, or designee, is responsible for identifying silica dust exposure hazards and controls prioritizing feasible engineering and then administrative controls.

WORKSITE AIR MONITORING

When a silica dust hazard is identified, the process and the workers' breathing zone will be monitored for silica dust concentrations. Employee exposure measurements will represent actual breathing zone exposure conditions for a representative sample of each affected job description.

Hazardous tasks identified will be monitored at least every four months and whenever a change is made to the process. Engineering controls will be monitored for efficacy immediately after implementation and quarterly thereafter.

The company will ensure that all monitoring equipment is maintained in good working order, and that any analyzing laboratory meets OSHA regulations.

Employees will be able to view all air monitoring records; copies of the records can be obtained from the Safety Coordinator upon request.

Employees should be monitored, as necessary or required, to enforce developed administrative controls and safe work practices.

RESPIRATORY PROTECTION

When implementing respiratory protection measures, we will ensure:

- Tasks performed indoors or in enclosed areas have an exhaust method that minimizes the accumulation of visible airborne dust

- Wet method controls have enough water to minimize visible dust.
- Work performed in a cab or booth will:
  - Be maintained as free as practicable from settled dust
  - Have door seals and closing mechanisms that work properly
  - Have gaskets and seals in good condition and working properly
  - Have a continuous supply of fresh air
  - Have intake air filtered through an approved filter
  - Have heating and cooling capabilities

ENGINEERING CONTROLS

The company will use engineering controls whenever possible to control silica dust exposures. The company will not use abrasives that contain more than 1% crystalline silica during blasting.

The Safety Coordinator is responsible for inspecting and maintaining engineering controls at all jobs/tasks where silica exposure hazards have been identified.

Substitute with less hazardous materials: Do not use silica sand or other substances containing more than 1% crystalline silica as abrasive blasting materials.

Dust-reduction systems: When using powered tools or equipment to cut, grind, core, or drill concrete or masonry materials, a dust-reduction system will be used to effectively reduce airborne particulate. Exceptions include operations where it can be shown the PEL is not exceeded, roofing operations with tile, pavers or similar materials; and during the first 24 hours of an emergency operation.

Dust Extraction: Wherever possible, concrete cutting and drilling equipment should be fitted with collection devices to eliminate dust at the source. A vacuum with a high-efficiency particle air (HEPA) filter can be used to clean dust from work areas. Wear an appropriate respirator when exposure approaches PELs.

Wet work: Where dust extraction is not practical, airborne silica dust can be minimized or reduced by using water in the process Such as using saws and drills that provide water to the point of action. A respirator may still need to be worn during wet work.

Wet clean up may also be used to remove dust. Waste material will be stored at designated, clearly marked location and will be removed at least weekly.

Isolation: Use containment methods such as blast-cleaning cabinets when sandblasting. Cabs of vehicles or machinery cutting or drilling through rock that might contain silica should be enclosed and sealed.

Ventilation: Use local exhaust systems to remove silica dust from industrial processes at the point of operation. Dilution ventilation may be used to reduce the silica dust concentration to below the PEL in large areas.

Adequate measures will be taken to ensure that discharge does not produce health hazards to the outside environment. A dust collector will be set up so that accumulated dust can be removed without contaminating work areas.

- Ventilation systems will be inspected and maintained by a designated competent person
- Ventilation systems will be checked at least weekly to determine if they are functioning properly

ADMINISTRATIVE CONTROLS

Air Monitoring

Air monitoring is used to determine exposures, evaluate engineering controls, select respiratory protection, evaluate the efficacy of safe work practices, and determine the need for medical surveillance.

- Exposure measurements should be made in the employee's breathing zone
- Long-term or short-term respirable samples can be used
- Total sampling time must be at least 7 hours
- Monitoring should be repeated at least quarterly

Restricted Areas

- Post warning signs in areas where silica exposure already exists or is possible restricting unauthorized employees
- Warning signs should contain one of the following:
  - WARNING SILICA DUST HAZARD: RESPIRATOR REQUIRED
  - SILICA DUST CAN CAUSE SILICOSIS: RESPIRATOR REQUIRED

SAFE WORK PRACTICES

Whenever practical, working where silica dust may be created should be done:

- In non-enclosed areas
- Downwind from other employees
- In regulated/restricted areas
- When other workers are not around

Housekeeping Procedures

Dry sweeping and using compressed air are prohibited for removing dust in jobs/tasks identified with silica exposure hazards.

Supervisors are responsible for ensuring that work areas are dust free at the end of each shift.

- Remove dust on overhead ledges, floors and equipment before it becomes airborne due to traffic, vibration and random air current
- Gentle wash down of surfaces is preferable if practical
- Never dry sweep or use compressed air for cleanup of dust that may contain silica
- Use wet methods or vacuums with a HEPA filter for clean-up

Personal Hygiene

Employees working at hazardous jobs/tasks will practice good personal hygiene to avoid unnecessary exposure.

- Hand-washing facilities will be conveniently located throughout a worksite.
- Lockers will be provided for employees to store uncontaminated street clothes. Eating/lunch areas will be located away from exposure areas
- Employees will eat, smoke, or use smokeless tobacco in designated areas only
- Workers should park their cars where they will not be contaminated with silica
- Workers should shower (if possible) and change out of work clothes contaminated with silica dust before they leave the jobsite
- Work clothes must not be cleaned by blowing or shaking. They should be vacuumed with a HEPA filter vacuum before removal

Contaminated clothing will be vacuumed with a HEPA filter vacuum to remove silica dust.

Lockers or containers will be provided to store clean clothes at the jobsite. Employees are required to wash their hands and shower (when feasible) before leaving the worksite.

When worksites are located in the field away from normal operation the Company will provide water in portable containers to hand washing

MEDICAL SURVEILLANCE

Employees who will work in hazardous jobs will be given free and reasonably convenient medical exams by an approved health care provider.

Initial Testing

An initial medical examination to establish a baseline will be given within 30 days of assignment unless they have received an acceptable examination within the last three years.

This examination will include:

- A medical and work history regarding exposure to respirable crystalline silica, dust, and other agents affecting the respiratory system
- A history of respiratory system dysfunction, including signs and symptoms of respiratory disease history of tuberculosis; and smoking status and history
- A physical examination with special emphasis on the respiratory system
- A chest X-ray
- A pulmonary function test
- Testing for latent tuberculosis infection
- Any other tests deemed appropriate by the health care provider

Periodic Testing

Employees who use a respirator for at least 30 days a year will have a medical examination when they start the job, and then every three years.

Medical examinations will include:

- Chest X-rays
- Pulmonary function tests
- Tuberculosis evaluation

Employees whose chest X-rays show the development of silicosis will be transferred or removed from the hazardous situation. Input from the attending physician will be considered in making this decision.

Medical records will be given to employees or their representatives who ask for them.

Silicosis cases will be reported to state health departments and recorded on OSHA logs.

TRAINING

Employees working in hazardous jobs will be trained to understand and recognize the risks of airborne silica exposure and how to control those risks by following safe work procedures before starting the work and then at least annually.

Training for Occupational Silica Dust Exposure Will Include the Following Topics:

- Health hazards of silica dust exposure (including signs and symptoms of silicosis, lung cancer, chronic obstructive lung disease (COPD) and decreased lung function)
- Operations and materials that can produce silica dust exposures
- Engineering and work practice controls used to protect employees from exposures
- The importance of proper use and maintenance of equipment, including dust-reduction systems, and other controls
- The importance of good personal hygiene and housekeeping practices when working near dust from concrete, cleaning up appropriately before eating, cleaning clothes appropriately, avoiding other activities that could cause exposure to airborne dusts
- Additional safe work practices and procedures, including: safe handling and disposal procedures; the safe use of hazardous substances; fire protection; emergency and first aid procedures; electrical safety; safety in confined spaces; and other training required under hazard-specific regulations
- Proper use of respirators and the respirator standard
- Recognition of poorly ventilated areas and confined spaces
- The details of the Occupational Silica Dust Exposure Program

In addition, supervisors must be trained:

- To know and understand the employee-related information outlined above in this section
- To identify tasks that may result in employee exposure to dust or other hazards, and, as necessary, initiate procedures that reduce employee exposure to dust or other hazards

Training will be performed by a competent person. Records of attendance, dates of training, and training material will be documented and retained by the company.

Additional training or reference material on silica dust exposure will be given to employees who ask for them.

ATTACHMENTS

The following page contains an agreement form that must be completed by all affected employees indicating their commitment to this program. Completed copies of this document will be retained by the Company for the length of employment.

EMPLOYEE AGREEMENT

I have read and understand the requirements of this Silica safety program and will participate in all training and safety precautions.

Employee Signature	Employee Signature
Employee Signature	Employee Signature
Employee Signature	Employee Signature
Employee Signature	Employee Signature
Date	Time

SCOPE

This chapter provides the safe work practices and requirements for performing rigging operations, and complies with OSHA regulations 1910.184, 1926.251, and 1926.753 as applicable. This chapter does not cover crane use or operator certification, which are covered in a separate chapter.

POLICY

This Company has implemented the following policy to protect its employees from the hazards of working with and/or around slings, rigging, and hoisting equipment.

EMPLOYER RESPONSIBILITIES

This Company will:

- Ensure that cranes and crane operators are certified and qualified for the work being performed
- Verify that employees performing rigging operations are trained
- Enforce all rigging and lifting safe practices
- Provide all employees with the necessary PPE

EMPLOYEE RESPONSIBILITIES

- Follow all safe practices
- Use all required PPE
- Report any unsafe conditions or acts immediately

HAZARDS

The primary hazards associated with rigging and lifting operations include:

- Falling loads
- Electrocution from overhead power lines

PPE

All employees engaged in rigging and lifting operations will wear the necessary PPE, which will include:

- Hardhats
- Steel toes safety shoes or boots
- Heavy duty leather gloves
- Safety glasses or goggles
- Approved clothing

EQUIPMENT

This section provides information on the use of the tools and equipment associated with rigging and lifting operations.

LIFTING DEVICES

Cranes, derricks, hoists and other lifting devices will only be operated by trained qualified personnel.

Chain Falls and Hoist and Pullers

A chain fall or hoist and puller must be used at not more than its rated capacity, which must be permanently labeled or marked on it. An accessory, such as a chain or cable used to secure or support a chain fall or hoist and puller, will have a capacity of not less than the chain fall or hoist and puller. An object subject to a lift or pull by a chain fall will have the capacity to absorb the lift or pull without creating a hazard to an employee in the area.

A chain fall or hoist and puller must be secured to an anchorage, and the load must be attached to the chain fall or hoist and puller in a manner that will prevent inadvertent disengagement. When a chain fall or hoist and puller are under the tension of a load, a positive action must be required to release the tension.

In addition, the chain fall or hoist and puller must be visually inspected for observable defects before each shift by the employee using the tools. A hoist and puller lever handle must not be operated with an extension handle except as furnished by the manufacturer.

SLINGS

This Company will determine that all employees involved with rigging and lifting operations are trained on the proper use of sling and hitches before being allowed to their assigned tasks.

Cranes, derricks and hoists rely upon slings to hold their suspended loads; slings are the most commonly used materials-handling apparatus. This section provides information on the proper selection, maintenance and use of slings.

Slings can be made of chain, wire rope, metal mesh, natural fiber rope, synthetic fiber rope or synthetic web. In general, use and inspection procedures tend to place these slings into three groups: chain, wire rope and mesh, and fiber rope web. Each type has its own particular advantages and disadvantages. The determination of what sling to use for a lift will be based on the size, weight, shape, temperature and sensitivity of the material to be moved, as well as the environmental conditions under which the sling will be used.

Chain Slings

Alloy steel chain slings will have permanently affixed durable identification stating size, grade, rated capacity and reach.

Sling Use

Chain slings will be used because of their strength and ability to adapt to the shape of the load. Care must be taken, however, when using alloy chain slings because sudden shocks will damage them. Misuse of chain slings can damage the sling, resulting in sling failure and possible injury to an employee.

Alloy steel chain slings will not be used with loads in excess of the rated capacities. Slings will be used according to the manufacturer's recommendations.

Safe Operating Temperatures

Alloy steel chain slings will be permanently removed from service if they are heated above 1000° F. When exposed to service temperatures in excess of 600° F, the maximum working load limits will be reduced according to manufacturer's recommendations.

Inspection

Chain slings must be inspected before each use for stretching, binding, wear, or nicks and gouges. If a sling has stretched more than three percent of its original length, it is unsafe and must be discarded.

In addition to the regular inspection, a thorough periodic inspection of alloy steel chain slings in use will be made based on the frequency of use, the severity of service conditions the nature of lifts being made and the experience gained on the service life of slings used in similar circumstances. These periodic inspections will be conducted at least annually, and a record of the most recent inspection will be kept, and made available for examination upon request.

Deformed Attachments

- Steel chain slings with cracked or deformed master links, coupling links or other components will be removed from service
- Slings will be removed from service if hooks are cracked, have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook

Repairing and Reconditioning Steel Chain Slings

- Worn or damaged chain slings or attachments will not be used until repaired
- When welding or heat testing is performed, slings will not be used unless repaired, reconditioned and proof tested by the sling manufacturer or an equivalent entity
- Mechanical coupling links or low carbon steel repair links will not be used to repair broken lengths of chain

Attachments

- Hooks, rings, oblong links, pear shaped links, welded or mechanical coupling links or other attachments will have a rated capacity at least equal to that of the alloy steel chain with which they are used or the sling will not be used in excess of the rated capacity of the weakest component
- Makeshift links or fasteners formed from bolts or rods, or other such attachments, will not be used

Proof Testing

The employer will verify that each new, repaired or reconditioned alloy steel chain sling, including all welded components in the sling assembly, will be proof tested by the sling manufacturer or equivalent entity according to the ASTM Specification A391-65 and/or ANSI G61.1 before use. The employer will retain a certificate of the proof test and will make it available for examination.

Wire Rope

A second type of sling is made of wire rope. Wire rope is made of individual wires that have been twisted to form strands. Strands are then twisted to form a wire rope. Wire ropes with a fiber core are more flexible but are less resistant to environmental damage. Conversely, a core that is made of a wire rope strand has a greater strength and is more resistant to heat damage.

Sling Use

Wire rope slings will not be used with loads in excess of the rated capacities. Slings will be used according to the manufacturer's recommendations.

Minimum Sling Lengths

- Cable laid and 6 x 19 and 6 x 37 slings will have a minimum clear length of wire rope 10 times the component rope diameter between splices, sleeves or end fittings
- Braided slings will have a minimum clear length of wire rope 40 times the component rope diameter between the loops or end fittings
- Cable laid grommets, strand laid grommets and endless slings will have a minimum circumferential length of 96 times their body diameter

Safe Operating Temperatures

Fiber core wire rope slings of all grades will be permanently removed from service if they are exposed to temperatures exceeding 200° F. When non-fiber core wire rope slings of any grade are used at temperatures above 400° F or below minus 60° F, recommendations of the sling manufacturer regarding use at that temperature will be followed.

Safety Factors

- The designed safety factor for the hoisting cable on:
  - A hot metal crane must not be less than 8
  - Any other crane must not be less than 5

End Attachments

- Welding of end attachments, except covers to thimbles, will be performed before the assembly of the sling
- Welded end attachments will not be used unless proof tested by the manufacturer or equivalent entity at twice their rated capacity prior to initial use. The employer will retain a certificate of the proof test, and make it available for examination

Requirements

- Wire rope for a crane bent to form an eye will be equipped with a metal thimble
- An eye in a wire rope sling must not be formed by using a knot. Michigan prohibits the use of wire rope clips to form an eye in a wire rope sling. Check state and local standards for specific provisions
- A wire rope end fitting must be a clamp, swage or a zinc or equivalent poured socket

- Before cutting wire rope, seizings must be placed as follows:
  - 1 seizing on each side of the cut on preformed wire rope
  - 2 seizings on each side of ⅞ inch size or smaller non-preformed wire rope
  - 3 seizings on each side of 1 inch or larger size non-preformed wire rope
- Wire rope that has an independent wire rope core must be used on all molten metal applications and in areas where the environmental atmosphere will cause deterioration of a hemp center
- The unreeling or uncoiling of wire rope must be done as recommended by the rope manufacturer and with care to avoid kinking or inducing a twist
- Rope clips attached with U-bolts must have the U-bolts on the dead or short end of the rope. The spacing and number of all types of clips must adhere to manufacturer recommendations. Clips must be dropforged steel in all sizes manufactured commercially. When a newly installed rope has been in operation for an hour, all nuts on the clip bolts must be retightened
- If a load is supported by more than one part of rope, then the tension in the parts must be equal

Removal from Service

Wire rope slings will be immediately removed from service (and not used again for load-carrying service) if any of the following conditions are present:

- In running ropes, there are 6 randomly distributed broken wires in 1 lay, or 3 broken wires on 1 strand in 1 lay
- In rotation-resistant ropes, 2 randomly distributed broken wires in 6 rope diameters or 4 randomly distributed broken wires in 30 rope diameters
- In standing ropes, there are more than 2 broken wires in 1 lay in sections beyond end connections or more than 1 broken wire at an end connection
- There are reductions from nominal diameter of more than the following:
  - One sixty-fourth of an inch for a diameter to and including 5/16 of an inch
  - One thirty-second of an inch for a diameter ⅜ of an inch to and including ½ of an inch
  - Three sixty-fourths of an inch for a diameter 9/16 of an inch to and including ¾ of an inch
  - One sixteenth of an inch for a diameter ⅞ of an inch to and including 1⅛ inches
  - Three thirty-seconds of an inch for a diameter 1¼ inches to and including 1½ inches
  - Wear or scraping of one-third the original diameter of outside individual wires
  - Kinking, crushing, bird caging or any other damage resulting in distortion of the running portion of the wire rope structure
  - Evidence of heat damage
  - Corrosion of the rope or end attachments
  - End attachments that are cracked, deformed, or worn
  - Hooks that have been opened more than 15 percent of the normal throat opening measured at the narrowest point or twisted more than 10 degrees from the plane of the unbent hook

Wire Rope Sling Inspection

Wire rope slings must be visually inspected before each use. The operator and/or rigger will check the twists or lay of the sling. If ten randomly distributed wires in one lay are broken, or five wires in one strand of a rope lay are damaged, the sling must not be used. End fittings and other components will also be inspected for any damage that could make the sling unsafe.

Field Lubrication

Although every rope sling is lubricated when manufactured, it also must be lubricated in the field to increase the sling's useful service life. There is no set rule on how much or how often this should be done. It depends on the conditions under which the sling is used. The heavier the loads, the greater the number of bends, or the more adverse the conditions under which the sling operates, the more frequently lubrication is required.

Storage

Wire rope slings will be stored in a well-ventilated, dry building. To avoid corrosion and rust, never store wire rope slings on the ground or allow them to be continuously exposed to the elements. If it is necessary to store wire rope slings outside, make sure that they are kept off the ground and protected.

Discarding Slings

Wire rope slings can provide a margin of safety by showing early signs of failure. The following factors indicate when a wire sling needs to be discarded:

- Severe corrosion
- Localized wear (shiny worn spots) on the outside
- A one-third reduction in outer wire diameter
- Damage or displacement of end-fittings by overload or misapplication
- Distortion, kinking, bird caging or other evidence of damage to the wire rope structure
- Excessive broken wires

Wire rope slings, like chain slings, must be cleaned before inspections because they are subject to damage hidden by dirt or oil. In addition, they must be lubricated according to manufacturer's instructions. Lubrication prevents or reduces corrosion and wear due to friction and abrasion. Before applying any lubricant, however, make sure the sling is dry. Applying lubricant to a wet or damp sling traps moisture against the metal and hastens corrosion.

Corrosion may be indicated by pitting, but it is sometimes hard to detect. If a wire rope sling shows any sign of significant deterioration, that sling must be removed until it can be examined by a person who is qualified to determine the extent of the damage.

Many operating conditions affect wire rope life. They are bending, stresses, loading conditions, speed of load application (jerking), abrasion, corrosion, sling design, materials handled, environmental conditions and history of previous usage.

In addition to the above operating conditions, the weight, size and shape of the loads to be handled also affect the service life of a wire rope sling. Flexibility also is a factor, use ropes when smaller radius bending is required. Less flexible ropes will be used when the rope must move through or over abrasive materials.

Metal Mesh Slings

Metal mesh slings will be used for lifting objects with sharp edges, such as sheet metal. Metal mesh slings also make it easier to balance loads because of their wide load bearing surfaces.

Sling Marking

Each metal mesh sling will have permanently affixed to it a durable marking that states the rated capacity for vertical basket hitch and choker hitch loadings.

Handles

Handles will have a rated capacity at least equal to the metal fabric and exhibit no deformation after proof testing.

Attachments of Handles to Fabric

The fabric and handles will be joined so that:

- The rated capacity of the sling is not reduced
- The load is evenly distributed across the width of the fabric
- Sharp edges will not damage the fabric

Sling Coatings

Coatings that diminish the rated capacity of a sling will not be applied.

Sling Testing

No new and repaired metal mesh slings, including handles, will be used unless proof tested by the manufacturer or equivalent entity at a minimum of 1½ times their rated capacity. Elastomer impregnated slings will be proof tested before coating.

Proper Use of Metal Mesh Slings

Metal mesh slings will not be used to lift loads in excess of their rated capacities based on the manufacturer's recommendations.

Safe Operating Temperatures

Metal mesh slings that are not impregnated with elastomers may be used in a temperature range from minus 20° F to plus 550° F without decreasing the working load limit.

Metal mesh slings impregnated with polyvinyl chloride or neoprene may be used only in a temperature range from zero degrees to plus 200° F. For operations outside these temperature ranges or for metal mesh slings impregnated with other materials, the sling manufacturer's recommendations will be followed.

Repairs

- Metal mesh slings that have been repaired will not be used unless repaired by a metal mesh sling manufacturer or an equivalent entity
- Once repaired, each sling will be permanently marked or tagged, or a written record maintained, to indicate the date and nature of the repairs and the person or organization that performed the repairs
- Records of repairs will be made available for examination

Removal from Service

Metal mesh slings will be immediately removed from service if any of the following conditions are present:

- A broken weld or broken brazed joint along the sling edge
- Reduction in wire diameter of 25 percent due to abrasion or 15 percent due to corrosion
- Lack of flexibility due to distortion of the fabric
- Distortion of the female handle so that the depth of the slot is increased more than 10 percent
- Distortion of either handle so that the width of the eye is decreased more than 10 percent
- A 15 percent reduction of the original cross-sectional area of metal at any point around the handle eye
- Distortion of either handle out of its plane

Fiber Rope Web Slings

Fiber rope and synthetic web slings are used primarily for temporary work, such as construction and painting jobs, and in marine operations. They also are the best choice for use on expensive loads, highly finished parts, fragile parts and delicate equipment.

Fiber rope deteriorates on contact with acids and caustics. Fiber rope slings will not be used around these substances unless the manufacturer recommends them for that use.

Sling Use

- Fiber rope slings made from conventional three strand construction fiber rope will not be used with loads in excess of their rated capacities
- Fiber rope slings will have a diameter of curvature meeting at least the minimums specified
- Slings will be used only according to the manufacturer's recommendations

Sling Operating Temperatures

Natural and synthetic fiber rope slings, except for wet frozen slings, may be used in a temperature range from minus 20° F to plus 180° F without decreasing the working load limit. For operations outside this temperature range and for wet frozen slings, the sling manufacturer's recommendations will be followed.

Splicing

- Spliced fiber rope slings will not be used unless they have been spliced according to the following minimums:
  - In manila rope, eye splices will consist of at least three full tucks, and short splices will consist of at least six full tucks, three on each side of the splice center line
  - In synthetic fiber rope, eye splices will consist of at least four full tucks, and short splices will consist of at least eight full tucks, four on each side of the center line
  - Strand end tails will not be trimmed flush with the surface of the rope immediately adjacent to the full tucks. This applies to all types of fiber rope and both eye and short splices.
  - For fiber rope under one inch in diameter, the tail will project at least six rope diameters beyond the last full tuck.

  - For fiber rope one inch in diameter and larger, the tail will project at least six inches beyond the last full tuck.
  - Where a projecting tail interferes with the use of the sling, the tail will be tapered and spliced into the body of the rope using at least two additional tucks (which will require a tail length of approximately six rope diameters beyond the last full tuck)
- Fiber rope slings will have a minimum clear length of rope between eye splices equal to 10 times the rope diameter
- Knots will not be used in lieu of splices
- Clamps not designed specifically for fiber ropes will not be used for splicing
- For all eye splices, the eye will large enough to provide an included angle of less than 60 º at the splice when the eye is placed over the load or support requirements, and according to any additional recommendations of the manufacturer

End Attachments

Fiber rope slings will not be used if end attachments in contact with the rope have sharp edges or projections.

Removal from Service

Natural and synthetic fiber rope slings will be immediately removed from service if any of the following conditions are present:

- Abnormal wear
- Powdered fiber between strands
- Broken or cut fiber
- Variations in the size or roundness of strands
- Discoloration or rotting
- Distortion of hardware in the sling

Repairs

Only fiber rope slings made from new rope will be used. Use of repaired or reconditioned fiber rope slings is prohibited.

Inspection

When inspecting a fiber rope sling, look first at its surface. Look for cuts, gouges or worn surface areas; dry, brittle, scorched or discolored fibers; or melting or charring of any part of the sling. If any of these conditions are found, the supervisor must be notified and a determination made regarding the safety of the sling. If the sling is found to be unsafe, it must be discarded.

Next, check the sling’s interior. It should be as clean as when the rope was new. A buildup of powder-like sawdust on the inside of the fiber rope indicates excessive internal wear and that the sling is unsafe.

Synthetic Web Slings

Each sling will be marked or coded to show the rated capacities for each type of hitch and type of synthetic web material.

Webbing

Synthetic webbing will be of uniform thickness and width and selvage edges will not be split from the webbing's width.

Fittings

Fittings will be:

- Of a minimum breaking strength equal to that of the sling
- Free of all sharp edges that could in any way damage the webbing

Attachment of End Fittings to Webbing and Formation of Eyes

Stitching will be the only method used to attach end fittings to webbing and to form eyes. The thread will be in an even pattern and contain a sufficient number of stitches to develop the full breaking strength of the sling.

Sling Use

Synthetic web slings will not be used with loads in excess of the rated capacities.

Environmental Conditions

When synthetic web slings are used, the following precautions will be taken:

- Nylon web slings will not be used where fumes, vapors, sprays, mists or liquids of acids or phenolics are present
- Polyester and polypropylene web slings will not be used where fumes, vapors, sprays, mists or liquids of caustics are present
- Web slings with aluminum fittings will not be used where fumes, vapors, sprays, mists or liquids of caustics are present

Safe Operating Temperatures

Synthetic web slings of polyester and nylon will not be used at temperatures in excess of 180° F. Polypropylene web slings will not be used at temperatures above 200° F.

Repairs

- Synthetic web slings that have been repaired will not be used unless repaired by a sling manufacturer or an equivalent entity
- Each repaired sling will be proof tested by the manufacturer or equivalent entity to twice the rated capacity prior to its return to service. The employer will retain a certificate of the proof test and make it available for examination
- Slings, including webbing and fittings, which have been repaired in a temporary manner will not be used

The most commonly used synthetic web slings are made of nylon, polypropylene and polyester. They have the following properties in common:

- Strength – can handle a load of up to 300,000 pounds

- Convenience – can conform to any shape
- Safety – will adjust to the load contour and hold it with a tight, non-slip grip
- Load protection – will not mar, deface, or scratch highly polished or delicate surfaces
- Long life – are unaffected by mildew, rot, or bacteria; resist some chemical action; and have excellent abrasion resistance
- Economy – have a low initial cost plus a long service life
- Shock absorbency – can absorb heavy shocks without damage
- Temperature resistance – are unaffected by temperatures up to 180˚ Fahrenheit

Because each synthetic material has unique properties, it must be used according to the manufacturer's instructions, especially when dealing with chemically active environments.

Synthetic web slings must be removed from service if any of the following defects exist:

- Acid or caustic burns
- Melting or charring of any part of the surface
- Snags, punctures, tears, or cuts
- Broken or worn stitches
- Wear or elongation exceeding the amount recommended by the manufacturer
- Distortion of fittings

Fiber ropes and synthetic webs are generally discarded rather than service or repaired. Operators must always follow the manufacturer's recommendations.

Hitches

Hitches are used to attach slings to the load to be lifted. There are three basic type of hitches vertical, choker and basket.

The type of hitch used will affect the working load limit (WLL) of the sling. The WLL is the maximum weight that the sling can handle, and is determined by the angle of the sling in reference to the load line.

Vertical: A vertical hitch is a single sling that attaches directly from the load line to the load. This hitch provides a lifting capability that matches the WLL of the sling, and is used for loads that have secure attachment points.

Choker: A choker hitch wraps around the load and through itself. The must be tightened around the load before the lift is attempted. Due to the stress created at the choke point, slings rigged with a choker hitch can only handle about 75% of their WLL.

Basket: Basket hitches can be used as a single or double lifting device. The cradle configuration of this hitch allows the two extending ends (legs) of the sling to function as if they were two separate slings. The capacity of the sling in this hitch is twice that of the same sling in a vertical hitch, but only if the sling angle of each leg is 90°. Lifting with both legs at 90° would normally require two lifting devices or a spreader bar.

Reduction Factor (RF)	Angle From Horizontal	Tension Factor (TF)
1.000	90°	1.000
0.996	85°	1.004
0.985	80°	1.015
0.966	75°	1.035
0.940	70°	1.064
0.906	65°	1.104
0.866	60°	1.155
0.819	55°	1.221
0.766	50°	1.305
0.707	45°	1.414
0.643	40°	1.555
0.574	35°	1.742
0.500	30°	2.000

When slings or sling legs are used at an angle during a lift, the sling capacity is reduced. How much it is reduced depends on the sling angle (see table.

Note that the rated capacity of a 30° Basket is only one half that of a 90° Basket. Sling angles below 30° will not be used. A sling angle of 60° or more is preferred

GENERAL SAFE PRACTICES

Cranes being used in steel erection activities will be visually inspected prior to each shift by a competent person, the inspection will include observation for deficiencies during operation.

If any deficiency is identified, an immediate determination will be made by the competent person as to whether the deficiency constitutes a hazard. If the deficiency is determined to constitute a hazard, the hoisting equipment will be removed from service until the deficiency has been corrected

Whenever there is any doubt as to safety, the operator will have the authority to stop and refuse to handle loads until safety has been assured.

- A qualified rigger will inspect the rigging prior to each shift
- The headache ball, hook, or load will not be used to transport personnel
- Cranes or derricks may be used to hoist employees on a personnel platform provided that all provisions are met
- Safety latches on hooks will not be deactivated or made inoperable except:
  - When a qualified rigger has determined that the hoisting and placing of purlins and single joists can be performed more safely by doing so
  - When equivalent protection is provided in a site-specific erection plan

Working Under Loads

Routes for suspended loads will be pre-planned to ensure that no employee is required to work directly below a suspended load except for:

- Employees necessary for the hooking or unhooking of the load
- When working under suspended loads, the following criteria will be met:
  - Materials being hoisted will be rigged to prevent unintentional displacement
  - Hooks with self-closing safety latches or their equivalent will be used to prevent components from slipping out of the hook
  - All loads will be rigged by a qualified rigger

Multiple Lift Rigging Procedure

A multiple lift will only be performed if the following criteria are met:

- A multiple lift rigging assembly is used
- A maximum of five members are hoisted per lift
- Only beams and similar structural members are lifted
- All employees engaged in the multiple lift have been trained in these procedures
- No crane will be used for a multiple lift unless approved by the manufacturer's specifications

The components of the multiple lift rigging assembly will be designed and assembled with a maximum capacity for total assembly and for each individual attachment point. This capacity, certified by the manufacturer or a qualified rigger, will be based on the manufacturer's specifications with a 5-to-1 safety factor for all components.

The total load will not exceed:

- The rated capacity of the hoisting equipment specified in the hoisting equipment load charts
- The rigging capacity specified in the rigging rating chart

SAFE OPERATING PRACTICES

The operator and rigger will select slings based on their intended use, the size and type of load and the environmental conditions of the workplace. All slings must be inspected before use.

- Slings that are damaged or defective will not be used
- Slings will not be shortened with knots or bolts or other makeshift devices
- Sling legs will not be kinked
- Slings will not be loaded in excess of their rated capacities
- Slings used in a basket hitch will have the loads balanced to prevent slippage
- Slings will be securely attached to their loads
- Slings will be padded or protected from the sharp edges of their loads
- Suspended loads will be kept clear of all obstructions
- All employees will be kept clear of loads about to be lifted and of suspended loads
- Hands or fingers will out from between the sling and its load while the sling is being tightened
- Shock loading is prohibited
- A sling will not be pulled from under a load when the load is resting on the sling

SAFE LIFTING PRACTICES

There are four primary factors to consider when safely lifting a load:

- The size, weight, and center of gravity to the load
- The number of legs and the angle the sling makes with the horizontal line
- The rated capacity of the sling
- The history of the care and usage of the sling

Size, Weight, and Center of Gravity of the Load

The center of gravity of an object is that point where the entire weight is considered balanced. To make a level lift, the crane hook must be directly above this point. While slight variations are usually permissible, if the crane hook is too far to one side of the center of gravity, dangerous tilting will result causing unequal stresses in the different sling legs. This imbalance must be compensated for at once. No lift will be performed if the load angle is more than 10º.

Number of Legs and Angle with the Horizontal

As the angle formed by the sling leg and the horizontal line decreases, the rated capacity of the sling also decreases. In other words, the smaller the angle between the sling leg and the horizontal, the greater the stress on the sling leg and the smaller (lighter) the load the sling can safely support. Larger (heavier) loads can be safely moved if the weight of the load is distributed among more sling legs.

Rated Capacity of the Sling

The rated capacity of a sling varies depending upon the type of sling, the size of the sling and the type of hitch. Operators must know the capacity of the sling. Charts or tables that contain this information generally are available from sling manufacturers. The values given are for new slings. Older slings must be used with additional caution. Under no circumstances will a sling's rated capacity be exceeded.

Sling Care and Usage

The mishandling and misuse of slings are the leading cause of sling-related accidents. The majority of injuries and accidents, however, can be avoided by becoming familiar with the essentials of proper sling care and use.

Proper care and use are essential for maximum service and safety. Slings must be protected with cover saddles, burlap padding or wood blocking as well as from unsafe lifting procedures such as overloading to prevent sharp bends and cutting edges.

Before making a lift, check that the sling is properly secured around the load and that the weight and balance of the load have been accurately determined. If the load is on the ground, do not allow the load to drag along the ground. This could damage the sling. If the load is already resting on the sling, make sure there's no sling damage before making the lift.

Make sure the hook is positioned directly over the load, and seat the sling squarely within the hook bowl. This will prevent bending of the hook or overstressing the sling.

Wire rope slings are subject to damage from contact with sharp edges of the loads being lifted. These edges can be blocked or padded to minimize damage to the sling.

After the sling is properly attached to the load, use these lifting techniques.

- Make sure that the load is not lagged, clamped or bolted to the floor
- Guard against shock loading by taking up the slack in the sling slowly. Apply power cautiously to prevent jerking at the beginning of the lift, and slowly accelerate or decelerate
- Check the tension on the sling. Raise the load a few inches, stop and check for proper balance and that all items are clear of the path of travel
- Keep all personnel clear while the load is being raised, moved or lowered. Crane or hoist operators must watch the load at all times when it is in motion

- Never allow more than one person to control a lift or give signals to a crane or hoist operator except to warn of a hazardous situation
- Never raise the load higher than necessary
- Never leave the load suspended in the air
- Never work under a suspended load or allow anyone else to

Once the lift has been completed, clean the sling, check it for damage and store it in a clean, dry, airy place. It is best to hang it on a rack or wall.

Remember, damaged slings cannot lift as much weight as new or older well cared for slings. Proper and safe use and storage of slings will increase their service life.

If using load blocks, they must be enclosed and guarded against rope jamming during normal operations.

Never allow anyone to ride on the hook or load. A hook must be equipped with a latch, unless the application makes the use of a latch impractical as determined by a qualified person. When required, a latch must be provided to bridge the throat opening of the hook for the purpose of retaining slings, chains, or other equipment, under slack conditions.

INSPECTIONS

Each day before being used, the sling and all fastenings and attachments will be inspected for damage or defects by a competent person designated by the employer. Additional inspections will be performed during sling use, where service conditions warrant. Damaged or defective slings will be immediately removed from service.

TRAINING

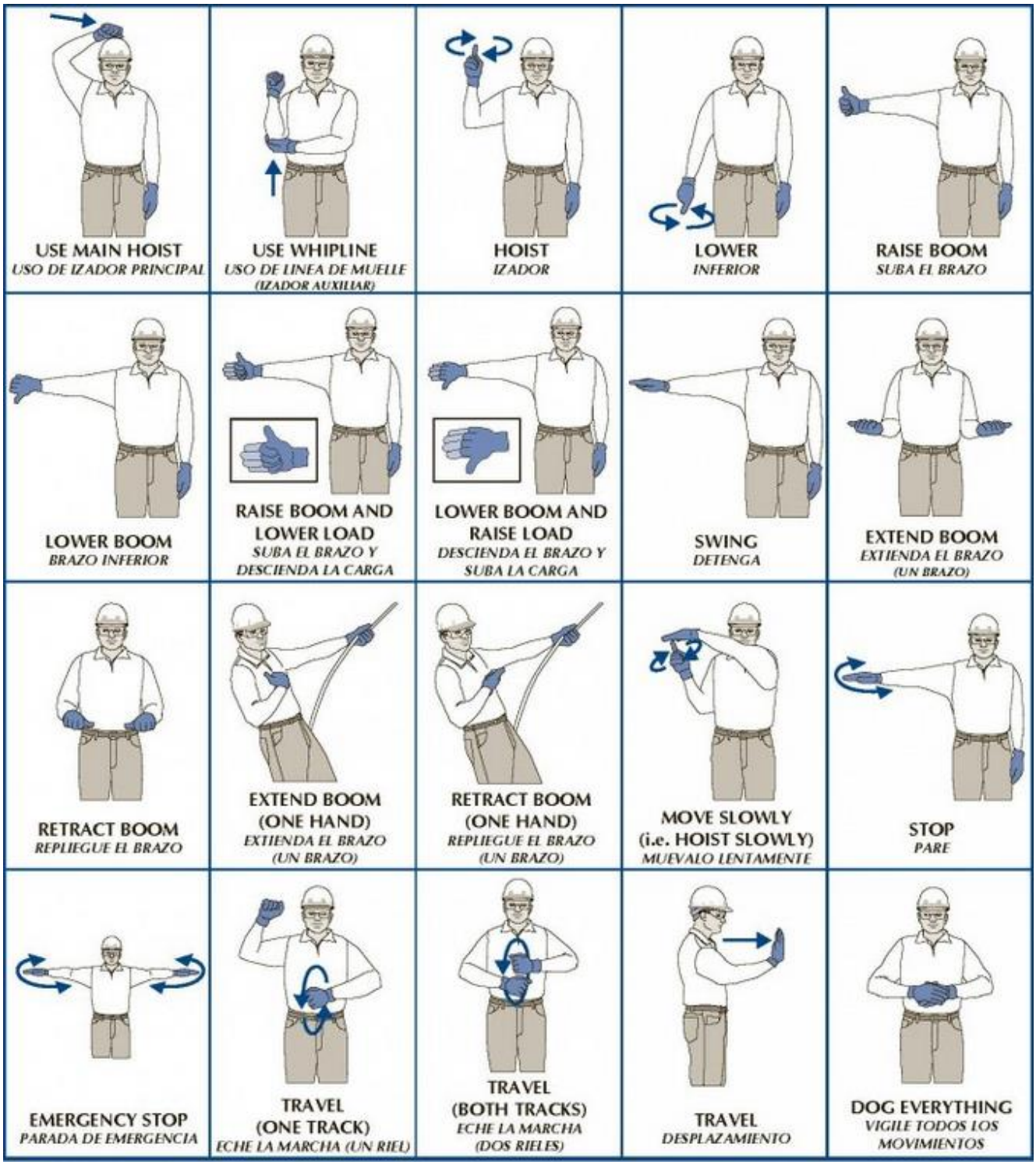
This Company will ensure that all employees engaged in rigging and lifting operations understand:

- The use of approved hand signals (see attachment)
- How to perform hook inspections
- The basics of weight capacity
- The different sling types
- The types of hitches and their use
- The use of padding
- The basics of sling and load angles

ATTACHMENTS

The following page illustrates the recommended hand signals for controlling cranes and other lifting devices.

RECOMMENDED HAND SIGNALS FOR CONTROLLING CRANE OPERATIONS



SCOPE

This chapter provides information on the hazards of slips, trips and falls, as well as the safe practices that will be used to prevent them. These practices will comply with the parts of OSHA Walking and Working Surfaces regulation 1910 Subpart D that apply to slip, trip and fall hazards. This chapter does not specifically cover working at elevations or fall protection systems; please refer to the Fall Protection and Walking and Working Surfaces chapters for information on those policies and safe practices.

POLICY

This company has established the following policies and practices to reduce the number of injuries and deaths due to slips, trips and falls.

EMPLOYER RESPONSIBILITIES

- Owners, managers, and supervisors must make a commitment to prevent accidental slips, trips, and falls
- Regular, frequent inspections of working and walking areas will be conducted to identify environmental and equipment hazards that could cause slips, trips, and falls. Special attention will be given to the working and walking surfaces, housekeeping, lighting, vision, stairways and ladders. Immediate corrective action will be taken to correct any problems that are identified
- Safety training on the prevention of slips, trips, and falls will be provided for all new employees
- Regular retraining will be provided for all employees
- Special attention will be given to proper techniques for walking, carrying loads, climbing and descending stairways, using ladders, mounting and dismounting vehicles and other equipment, etc. Unsafe practices will be corrected immediately
- All slips, trips, and falls, with or without injury, will be recorded and thoroughly investigated. Corrective action to prevent repeat occurrences will be taken immediately

EMPLOYEE RESPONSIBILITIES

- Are required to wear proper footwear for their work and environment whether in the office or field
- All slips, trips, and falls, with or without injury, must be reported immediately
- Will use proper tools, hand trucks, dollies, carts and hoists to lift and move heavy objects. Do not exceed the rated capacity of a hoist or lifting device
- Inspect items to be handled for slivers, jagged edges, burrs, and rough or slippery surfaces. Wear protective gloves
- Wipe off oily, wet, slippery or dirty items before trying to handle them. To adjust your grip, set the object down
- Never carry an object they cannot see over or around, plan your route of travel and be sure it is clear of obstacles
- When moving items on dollies or hand trucks, push rather than pull whenever possible
- Will avoid extreme and awkward postures by using adjustable fixtures and rotating tables, workstations, and delivery bins

SLIPS, TRIPS, AND FALLS

Slips and trips can happen anywhere, can result in falls, possible disability or death and can be very costly to both the company and the worker.

Slips, trips and falls are a leading cause of general industry accidents, ranking second behind motor vehicle accidents. Listed below are some basic definitions of slips, trips and falls.

Slips

Slips occur when there is too little friction or traction between feet (footwear) and a walking/working surface, resulting in loss of balance. Most slips are caused by:

- Wet product or spills on smooth floors or walking surfaces
- Dry product or spills making walking surfaces slippery
- Highly-polished or freshly waxed floors
- Transitioning from one surface to another such as carpet to vinyl or grid to smooth concrete
- Loose, irregular surfaces such as gravel
- Sloped, uneven or muddy terrain
- Weather hazards
- Leaves, pine needles and other plant debris (wet or dry)

Trips

Trips occur when a worker's foot or lower leg hits an object and their upper body continues moving, resulting in loss of balance. Trips can be caused by:

- Uncovered hoses, cables, wires or extension cords across aisles or walkways
- Clutter, obstacles in aisles, walkway and work areas
- Open cabinet, file or desk drawers and doors
- Changes in elevation or levels
- Unmarked steps or ramps
- Rumpled or rolled-up carpets/mats or carpets with curled edges
- Irregularities in walking surfaces, such as thresholds or gaps
- Missing or uneven floor tiles and bricks
- Damaged steps
- Non-uniform, improper or irregular steps
- Debris, accumulated waste materials
- Trailing cables, pallets, tools in gangways
- Objects protruding from walking surface
- Sidewalk/curb drops
- Speed bumps
- Tire bumpers
- Wheelchair ramps and curbs
- Driveways

Falls

A fall occurs when a worker's body becomes too far off its center of balance. There are two basic types of falls, same-level falls and elevated falls.

- Same-level falls: high frequency and low severity
- Elevated falls: lower frequency and high severity

Same-level falls are generally slips or trips. Injuries result when the individual hits a walking or working surface or strikes some other object during the fall.

Same-Level Falls

The force that allows you to walk without slipping is commonly referred to as traction or friction. The coefficient of friction (COF) is a measure of the traction workers have when working. Common experience shows that dry concrete sidewalks have good traction, while icy surfaces or freshly waxed floors can have low traction. A higher COF means more friction, and therefore more traction. The COF depends on two things, the quality of both the walking surface and the soles of your shoes. Slips are primarily caused by a slippery surface and compounded by wearing the wrong footwear. In normal walking, two types of slips occur:

- The first of these occurs as the heel of the forward foot contacts the walking surface. Then, the front foot slips forward, and the person falls backward
- The second type of fall occurs when the rear foot slips backward. The force to move forward is on the sole of the rear foot. As the rear heal is lifted and the force moves forward to the front of the sole, the foot slips back and the person falls
- To prevent slips and falls, a high COF between the shoe and walking surface is needed. On icy, wet and oily surfaces, the COF can be as low as 0.10 with shoes that are not slip-resistant. A COF of 0.40 to 0.50 or more is needed for good traction. To put these figures in perspective, a brushed concrete surface and a rubber heel will often show a COF greater than 1.0. Leather soles on a wet, smooth surface, such as ceramic tile or ice, may have a COF as low as 0.10
- Shoes with soft, rubber soles and heels with rubber cleats provide a high COF
- Providing dry walking and working surfaces, and slip-resistant footwear, will prevent slips and their resultant falls and injuries. In work areas where the walking and working surface is likely to be slippery, non-skid strips or floor coatings will be used. If the working surface is very slippery, no footwear will provide a safe COF
- "Fall-trips" occur when a worker's front foot strikes an object and suddenly stops. The upper body is then thrown forward, and a fall occurs
- As little as a 3/8" rise in a walkway can cause a person to "stub" their toe, resulting in a trip and fall. The same thing can occur when going up a flight of stairs: only a slight difference in the height of subsequent steps, and a person can trip and fall
- Another type of working and walking surface fall is the "step and fall". This occurs when the front foot lands on a surface lower than expected, such as when unexpectedly stepping off a curb in the dark. In this type of fall, the person normally falls forward. A second type of "step and fall" occurs when a person steps forward or down, and either the inside or outside of the foot lands on an object higher than the other side. The ankle turns and one tends to fall forward and sideways

Elevated Falls

Most elevated falls occur when employees working on ladders or scaffolds lose their balance. More than 60 percent of elevated falls are from less than 10 feet.

Elevated falls, or falls from height, are normally due to:

- A lack of, or improper use of, fall protection
- Poor housekeeping practices
- Improper PPE
- Improper climbing techniques
- Accidental contact with objects or electricity

These accidents are avoidable if safe work practices are used.

Falls from Ladders

Ladders may be fixed or portable. They may be straight, extension or stepladders, and may be made of wood, metal, plastic or fiberglass. They can be light, medium, heavy or extra heavy-duty.

The materials from which ladders are constructed have advantages and disadvantages in weight, durability, flexibility, conductivity and strength. The intended use of the ladder should determine the type purchased, and only American National Standards Institute (ANSI)-approved ladders will be used.

Don’t use metal ladders in locations where the ladder or its user could contact electrical equipment or circuits.

The lower ends of the siderails will be equipped with slip-resistant pads, particularly if the ladder is to be used on hard surfaces. The same is true for the upper ends of the siderails if they are to rest against a surface.

Ladders will be set at a 4:1 angle, or as near to that angle as possible. For each four feet of rise from the base to the upper resting edge of the ladder, the base should be one foot out from a vertical line from the upper resting edge of the ladder to the working surface.

The base of the ladder must be set so that it won’t slip or settle into soft ground. The resting edge of the ladder will have both siderails in contact with the supporting wall. Whenever there’s any question about the stability of the ladder, additional precautions will be taken to stabilize the ladder as it’s being climbed. Tying the top of the ladder to the supporting structure can also keep the ladder from slipping or sliding.

Ladders must be inspected before use: check for cracks, loose rungs, slivers and sharp edges.

Never paint ladders, as the paint can hide potentially dangerous conditions. Wooden ladders can be coated with linseed oil or an oil-based wood preservative to keep them from drying out and cracking. Allow ladders to dry thoroughly before using them or the rungs will be slippery.

The rungs and siderails of ladders must be kept free of oil, grease, and mud and must be kept dry.

Since the shoe has limited contact with the rung or step of a ladder, it is very important that both rungs and shoes have a high COF. Only shoes with heels may be worn when climbing ladders; users should be taught that the rung or step of the ladder should be just in front of the heel, under the arch of the foot. Stepping or standing on a ladder with the front part of the shoe is inviting a slip and fall. Always face the ladder when climbing or descending.

Falls from Vehicles and Equipment

Death or serious injury is a frequent result of extra riders falling from the bed of a truck.

Far too many injuries occur in the simple process of getting in and out of trucks or truck beds. When the steps are metal, there is a low COF which becomes even lower if they are wet, muddy, or oily. Keep the steps clean and dry.

Whenever mounting or climbing on a vehicle or machine, have a good handhold before stepping up. Pulling yourself up reduces the force between your shoe and the step and reduces the danger of a slip. As with a ladder, the foot should be placed on the step or rung just in front of your heel, under the arch.

Always face the vehicle or equipment when mounting and dismounting. When stepping down backward, one steps down on the ball of the foot, which is best; when stepping down forward, however, one lands on the heel, thus increasing the chances of falling, twisting an ankle or knee, or suffering some other injury.

Practice the "Three-Point System". This system can significantly reduce the chances of injuring yourself through a slip or fall while climbing ladders or while entering or exiting a vehicle. The Three-Point System means that three of your four limbs are in contact with the ladder or vehicle at all times, either one hand and two feet, or two hands and one foot, only one limb is in motion at any one time.

Falls from Loading Docks

- Loading docks and ramps are dangerous areas. They are frequently congested, heavy- traffic areas, and working and walking surfaces are often wet. Metal dock plates can wear smooth and become very slippery; in particular, the edge of a dock plate invites trips and falls
- Accidental backward steps can result in a fall from the dock. Portable railings, which can be easily removed from the edge of the dock, could prevent many dangerous falls. They are removed when a truck is at the dock, and replaced as soon as the truck or trailer leaves
- Proper housekeeping, well-designed traffic patterns, and the use of abrasive, skid-resistant surface coatings will reduce the risk of slips, trips, and falls
- Ramps and gangplanks have hazards similar to loading docks. The slopes should be as gradual as possible, as wide as possible, and as dry as possible. They should also have skid-resistant surfaces

Falls on Stairs

Stairwells will be well lighted, with sturdy handrails on both sides. Persons using the stairwell should have one hand free to be able to use the handrail.

All the steps will have the same rise and depth, with visible edges. They must be kept free of grease, oil and obstacles that could cause slips and trips. Avoid carrying heavy or bulky objects that obscure your vision and/or require the use of both hands. Carry smaller, lighter loads, and make more trips, or obtain help with the load.

Fixed Ladders

Fixed ladders are mounted on buildings and other tall structures that require workers to climb to high levels to perform some functions. Such ladders must be securely attached to the structure and be capable of supporting a minimum of 250 pounds of concentrated live weight. The rungs should be a minimum of 16 inches wide and a maximum of 12 inches apart. There will be seven inches of toe space between the rung and the structure to which it is attached. Fixed ladders extending more than 20 feet above the ground or floor level will be surrounded by a cage, beginning at 7 to 8 feet above the ground.

If a catwalk or working area is provided at the top of the ladder, it must have a protective railing at least 42 inches high. A toeboard, four-inches high, around the edge of the work area will be provided.to reduce the risks of a person stepping off the edge or having tools fall from the work area.

Workers climbing or descending a fixed ladder must have both hands free. Small tools can be carried in a tool belt; rope and pulleys or some other mechanical system must raise other tools and materials.

INJURIES

The most common injuries resulting from slips trips and falls are:

- Sprains and strains
- Bruises and contusions
- Fractures
- Abrasions and lacerations

These injuries usually occur to workers:

- Knee, ankle and/or foot
- Wrist and /or elbow
- Back and /or shoulder
- Hip
- Head

ENVIRONMENTAL FACTORS

Proper housekeeping in work and walking areas can contribute to safety and the prevention of falls. Not only is it important to maintain a safe working environment and walking surface, these areas must be kept free of obstacles that can cause slips and trips. One method that promotes good housekeeping in work environments is the painting of yellow lines to identify working and walking areas. Objects of any kind should never obstruct these areas.

Adequate lighting to ensure proper vision is also important in the prevention of slips and falls. Moving from a light to a dark area, or vice versa, could cause temporary vision problems that might cause a person to slip on an oil spill, or trip over a misplaced object.

Carrying an oversized object can also obstruct one's vision and result in a slip or a trip. This is a particularly serious problem on stairs.

HUMAN FACTORS

Slips, trips and falls can also be caused by a number of physical factors such as:

- Failing eyesight and /or visual perception
- Age
- Physical condition and fatigue
- Stress or illness
- Medications, alcohol and drug effects

BEHAVIORS THAT LEAD TO FALLS

In addition to wearing the wrong footwear, there are specific behaviors that can lead to slips, trips and falls.

- Walking too fast or running can cause major problems. In normal walking, the most force is exerted when the heel strikes the ground, but in fast walking or running, one can land harder on the heel of the front foot and push harder off the sole of the rear foot; thus, a greater coefficient of friction (COF) is required to prevent slips and falls. Rapid changes in direction create a similar problem
- Other problems that can lead to slips, trips and falls are: distractions, not watching where one is going, carrying materials that obstruct the view of the pathway, wearing sunglasses in low-light areas, and failure to use handrails. These and other behaviors, caused by lack of knowledge, impatience, or bad habits developed over time, can lead to falls, injuries, or even death

SAFE PRACTICES

All Company employees are expected to follow these safe practices to avoid slip, trip and fall injuries:

- Wear footwear that is appropriate for the conditions inside and outside. On smooth or wet surfaces, wear slip-resistant soles. On snowy, icy, and rainy days, wear boots to work and change after arriving
- Clean footwear of mud, snow, etc., when entering a building
- Be aware of changes in elevation and changes in walking surfaces. When moving from carpet to tile or dry tile to wet tile, etc., the friction (grip) between the sole of the shoe and the floor surface lessens. Alter your stride to take shorter, slower steps
- Walk; don’t run through work areas. When possible, stay on marked travel aisles and paths. Don’t take shortcuts around machinery and equipment. Avoid areas that are cluttered or dimly lit
- When carrying a load, make sure you can see over and around it. Scan the area ahead and plan your travel path. Get help to carry heavy or awkward objects. Use carts or other mechanical aids

- Clean up, correct, remove or report unsafe conditions such as spills, electric cords, frayed carpets, worn stairs and other hazards that could result in a slip/trip/fall injury
- Warn others that a hazard exists by placing signs or cones, or by isolation with caution tape or barricades
- Do not allow equipment, tools, materials or other obstacles to accumulate in aisles or walkways. Never store or place items on stairs
- Keep desk and file cabinet drawers closed when they are not being used, or when unattended
- Always use a ladder or step stool. Never stand on a chair, desk, shelf, crate, box or any other unstable items to try to reach something. If you must routinely reach items in high locations, purchase a ladder or steps to allow it to be done safely
- Walk erect using even strides and good balance. Always use handrails when available
- Use “three-point positioning” when entering or exiting trucks, equipment, or construction vehicles. Maintain three points of attachment at all times, both hands and one foot or both feet and one hand
- Enter and exit equipment while facing it. Use all of the steps, never jump
- Keep floors clean and free of water, oil or grease. Areas such as mechanics bays may be periodically steam-cleaned. Tiled floors that have been worn or filled smooth can be etched to restore a rougher surface
- Apply non-slip surfacing such as adhesive-backed sheets, anti-slip paint, open-spaced grates, or mats to ramps, docks, platforms, or stairways recognized as hazardous
- Paint edges where elevation changes occur with “caution-yellow” paint. Post signs to warn of dangerous areas
- During winter months, remove snow and ice, and apply sand and salt before work and frequently after work begins. Note areas that drain poorly, retain snow, or are habitually slippery, and initiate permanent changes to eliminate the hazard

Safe Climbing

Workers will have both hands free to hold the ladder's siderails, not the rungs, when climbing or descending. Small tools can be carried in a tool belt, but a better choice is to raise tools and supplies with a rope. Never raise or lower power tools by the cord or while they are plugged into an electrical source.

Makeshift ladders, chairs, boxes and barrels may not be used as substitutes for a ladder.

SLIP, TRIP AND FALL PROTECTION

Our Company will take all practical measures to protect employees from slip, trip and fall hazards depending on the environment and the type of work being performed.

Signs and Markings

Safety signs of slip, trip and fall hazards will be posted to remind workers of the hazards, particularly where hazards cannot be removed or corrected.

Yellow striping to identify walking and working areas will be installed. Striped areas will indicate that no objects may be placed in these areas. Dropped and spilled materials must be removed immediately.

Slip-Resistant Materials

Slip resistant coatings will be applied to concrete, metal and wood surfaces to increase the COF and reduce the risks of slips and falls. These materials can consist of:

- Abrasive coatings formulated to resist grease, oil, water, and other chemicals
- Skid-resistant products for use on stair treads, ramps, and other hazardous walking and working surfaces
- Rubber or rubber-like mats

Fall Protective Devices

Workers at high elevations, such as ladders, platforms or catwalks, will be protected from falling by a fall protective device. This can be a protective cage, a lifeline, lanyard or safety harness.

The system will provide maximum protection, but will also be reasonably comfortable and not restrict a worker's necessary work activity. This Company will also provide instruction on the safe use of this protective equipment.

For additional information on the use of fall protection equipment, please refer to the Fall Protection chapter of this manual.

Shoes and Boots

It is very important to wear the proper footwear for your work and environment. Shoes or boots should provide three major types of protection:

- The soles and heels should be slip-resistant
- The toe of the shoe should resist crushing injuries
- The shoe should support the ankle

ANSI sets standards for shoes and boots. Never purchase work shoes that don’t meet these standards. A typical ANSI rating could be 1-75 C-25. This means the toe will withstand 75-foot pounds of impact and 2,500 pounds of compression.

Chevron-pattern or cleat-designed soles are best for slippery situations because of the suction or squeezing action they provide. The softer soles are better for slippery indoor conditions; the harder, more rugged cleat-type sole is preferred for tough outdoor use.

Leather that covers the foot and ankle portion of the foot is preferred in most work environments. Rubber is satisfactory for wet conditions, but not with pesticides or petroleum However, when working in wet environments or around chemicals, oils, greases or pesticides, boots made of polyvinyl chloride (PVC), a blend of PVC and polyurethane, or neoprene will be used.

LEARNING HOW TO FALL

Naturally, the goal is not to slip, trip, and fall; however, the possibility of a fall still exists. There are correct ways to fall.

Recommended procedures are:

- Tuck your chin in, turn your head and throw an arm up/out. It is better-to land on your arm than on your head
- While falling, twist or roll your body to the side. It is better to land on your buttocks and side than on your back
- Keep your wrists, elbows and knees bent. Do not try to break the fall with your hands or elbows. When falling, the objective is to have as many square inches of your body contact the surface as possible, thus, spreading out the impact of the fall

SAFE LIFTING

Manually moving material can often be the cause of slips and falls. Attempting to move heavy or awkward shaped items can alter your center of gravity and result in slips or falls. These types of accidents often result in painful back injuries. In order to avoid these problems always follow safe lifting techniques.

SCOPE

This chapter provides the safe practices and requirements for performing welding, cutting and brazing, also known as hotwork. Our safe practices will comply with OSHA regulations 1910.254 and/or 1926.350, whichever is applicable. This chapter does not include information about the installation and/or maintenance of gas distribution piping and manifold systems.

POLICY

We are committed to preserving the safety of employees and maintaining a place of employment free from recognized hazards. Accordingly, only properly trained employees, authorized to perform such operations may perform welding, cutting, brazing, grinding and other hotwork. If it is impossible to eliminate fire hazards from such work, appropriate control steps will be taken to ensure the safety of workers, including engineering and administrative controls and personal protective equipment.

This welding, cutting and brazing program is designed to protect life and property from fire, atmospheric contaminants and other associated hazards during these operations, and will be enforced rigorously.

EMPLOYER RESPONSIBILITIES

It is our responsibility to:

- Ensure the safe use of cutting and welding equipment on site, including the use of required PPE
- Establish areas for cutting and welding and establish procedures based on the fire potentials of facilities
- Designate a person to authorize cutting and welding operations if they are done outside of designated areas
- Ensure that cutters, welders and their supervisors are trained to operate their equipment according to safe processes; rules and instructions covering the operation and maintenance of oxygen or fuel-gas supply equipment, including generators, and oxygen or fuel-gas distribution piping systems, must also be readily available
- Inform contractors of fire hazards

SUPERVISOR RESPONSIBILITIES

Supervisors of employees who must perform welding are expected to:

- Be responsible for the safe handling and use of equipment to cut or weld
- Determine fire hazards and combustibles that are or may arise at the work location
- Prevent ignition of combustibles by the following:
  - Move work away from combustibles or install guards to prevent fire hazards
  - Ensuring cutting or welding work is done at a time when nearby operations will not expose combustibles to ignition from such work
  - Secure authorization from management before any cutting or welding is begun

- Ensure the cutter or welder does not go ahead without approval of safe conditions;
- Determine that fire protection and extinguishing equipment are located at the site
- Ensure the availability of a fire watch as required

EMPLOYEE RESPONSIBILITIES

Employees who, as part of their work responsibilities engage in welding, brazing, cutting, grinding or any other activity that can produce spark, heat or atmospheric toxicants are expected to:

- Perform only job activities for which they are trained and competent
- Perform hotwork in designated, appropriately ventilated areas unless authorized otherwise
- Refrain from welding or other hotwork without appropriate authorization
- Refrain from tampering with safety devices
- Follow all other safe work practices as outlined in this policy

HAZARDS

The hazards associated with welding cutting and brazing include:

- Fire
- Burns
- Vision Hazards
- Respiratory hazards
- Falls (if working at heights)

PERSONAL PROTECTIVE EQUIPMENT

Employers must provide all of the following to protect employees from injuries likely to be caused by the assigned task of welding, cutting and hotwork (more specific information is provided later in this document):

- Face and eye protection, such as safety glasses or face shields
- Foot protection
- Additional necessary clothing or equipment, such as gloves, aprons, hearing protection devices, respirators, lifelines, safety belts, lanyards, and curtains
- Ventilation, where necessary to protect an employee against toxic materials
- Except for long-sleeve shirts required to protect the employee from ultraviolet rays to the arms, and ankle length trousers, clothing and equipment will be provided without expense to employees

Effective safeguards will protect workers on platforms, scaffolds or other spaces that present a falling hazard. Welding cable and equipment will remain clear of passageways, ladders and stairways to ensure safe travel.

After welding operations are completed, the welder will mark the hot metal or provide some other means of warning other workers.

Eye Protection

Welders must use helmets or hand shields during all arc welding or arc cutting operations, excluding submerged arc welding. The Company also will provide helpers or attendants with proper eye protection.

Goggles or other suitable eye protection must be worn during all gas welding or oxygen cutting operations. Employees may use spectacles without side shields, with suitable filter lenses during gas welding operations on light work, for torch brazing or for inspection.

All operators and attendants of resistance welding or resistance brazing equipment must use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required. The Company will provide eye protection in the form of suitable goggles where needed for brazing operations other than arc welding and brazing, or resistance welding or brazing.

Welding Operation	Shade No.
Shielded metal-arc welding - 1/16-, 3/32-, 1/8-, 5/32- inch electrodes	10
Gas-shielded arc welding (nonferrous) - 1/16-, 3/32-,	11
Gas-shielded arc welding (ferrous) - 1/16-, 3/32-, 1/8-	12
Shielded metal-arc welding:	
3/16-, 7/32-, 1/4-inch electrodes	12
5/16 -, 3/8-inch electrodes	14
Atomic hydrogen welding	10-14
Carbon arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, 6 inches and over	5 or 6
Gas welding (light) up to 1/8 inch	4 or 5
Gas welding (medium) 1/8 inch to 1/2 inch	5 or 6
Gas welding (heavy) 1/2 inch and over	6 or 8

NOTE: In gas welding or oxygen cutting where the torch produces a high yellow light, it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation.

Welders must use helmets or hand shields during all arc welding or arc cutting operations, excluding submerged arc welding. The Company also will provide helpers or attendants with proper eye protection.

Goggles or other suitable eye protection must be worn during all gas welding or oxygen cutting operations. Employees may use spectacles without side shields, with suitable filter lenses during gas welding operations on light work, for torch brazing or for inspection.

All operators and attendants of resistance welding or resistance brazing equipment must use transparent face shields or goggles, depending on the particular job, to protect their faces or eyes, as required.

The Company will provide eye protection in the form of suitable goggles where needed for brazing operations other than arc welding and brazing, or resistance welding or brazing.

The specifications for such protectors are as follows:

- Helmets and hand shields must be made of material that insulates for heat and electricity

- Helmets, shields, and goggles must be not readily flammable and must be capable of withstanding sterilization
- Helmets and hand shields must be arranged to protect the face, neck, and ears from direct radiant energy from the arc
- Helmets must be provided with filter plates and cover plates designed for easy removal
- All parts must be constructed of a material that will not readily corrode or discolor the skin
- Goggles must be ventilated to prevent fogging of the lenses as much as practicable
- All glass for lenses must be tempered, substantially free from air bubbles, waves and other flaws. Except when a lens is ground to provide proper optical correction for defective vision, the front and rear surfaces of lenses and windows must be smooth and parallel
- Lenses must bear some permanent distinctive marking by which to identify the source and shade
- Filter lenses must meet the test for transmission of radiant energy prescribed by any of the following consensus standards:
  - ANSI Z87.1, "American National Standard Practice for Occupational and Educational Eye and Face Protection"
  - ANSI Z87.1, "American National Standard Practice for Occupational and Educational Eye and Face Protection"
  - ANSI Z87.1, "American National Standard Practice for Occupational and Educational Eye and Face Protection”
- Where work permits, enclose the welder in an individual booth painted with a finish of low reflectivity such as zinc oxide and lampblack or enclose with noncombustible screens similarly painted. Booths and screens must permit circulation of air at floor level
- Protect workers or other persons adjacent to the welding areas from the rays by noncombustible or flameproof screens or shields or must be required to wear appropriate goggles

Protective Clothing

Protect employees exposed to the hazards created by welding, cutting or brazing operations with personal protective equipment as required to ensure safety and meet regulatory requirements. Appropriate protective clothing required for any welding operation will vary with the size, nature and location of the work.

SAFE PRACTICES

All employees engaged in welding, cutting and brazing are expected to follow these safe practices.

Fire Prevention and Protection

Cutting or welding may only occur in fire-safe areas.

If the object to be welded or cut cannot be moved, movable fire hazards need to be moved at least 35 feet away. If it is impossible to move them, safeguards to confine heat, sparks and slag must protect the immovable fire hazards.

Where combustible materials are on the floor, employees must sweep the floor clean for a radius of 35 feet. Combustible floors must be kept wet (protect welder form shock if arc welding), covered with damp sand, or protected by fire-resistant shields.

Floor openings or cracks in the floor that cannot be closed, as well as holes in walls, open doorways and open or broken windows must be guarded to prevent sparks from reaching readily combustible material. Employees must shutdown ducts that could carry sparks to combustibles, or emplace appropriate safeguards before hotwork.

Fire extinguishing equipment appropriate to the present hazard will be ready for instant use during hotwork.

An inspector will inspect the worksite and designate precautions before granting authorization to proceed with cutting or welding in the form of a written permit.

Fire Watch

Firewatchers must be present for welding or cutting in locations where an unplanned flame might develop or when any of the following is true:

- Appreciable combustible material is within 35 feet to the point of operation
- Sparks may easily ignite appreciable combustibles more than 35 feet away
- Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas (including concealed spaces in walls or floors)
- Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation

Welding and cutting by gas utility firms on live mains is exempt from this rule when the main if is filled under positive pressure with natural or manufactured gas and air movers are used to ventilate areas where fumes might accumulate.

Firewatchers must have fire-extinguishing equipment readily available and training in its use. They must be familiar with facilities for sounding an alarm in the event of a fire and will watch for fires in all exposed areas. Firewatchers must try to extinguish flames only when within the capacity of the equipment available. Otherwise, they must sound the alarm.

The fire watch will continue for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

Prohibited Areas

Cutting or welding is prohibited in the following situations:

- In areas not authorized by management
- In sprinklered buildings where the sprinkler’s ability to stop fire have been impaired
- In explosive atmospheres, including those that may develop inside uncleaned or improperly prepared spaces that contained explosive materials, or where there is an accumulation of combustible dusts
- In an area nearer than 35 feet to the storage of large quantities of exposed, readily ignitable materials such as bulk sulfur, baled paper, or cotton

- In a metal partition, wall, ceiling or roof that has a combustible covering or walls of sandwich-type construction
- In pipes or other metal near enough to combustible walls, partitions, ceilings, or roofs to ignite them by conduction

Containers

Welding or cutting must not be performed on drums, barrels, tanks, or other containers until they have been cleaned of all flammable combustible or toxic materials or fumes.

All pipelines or other connections to drums, barrels or tanks must be disconnected or blanked.

Hollow spaces or cavities must be vented and either filled with water or purged with an inert gas before preheating, cutting, or welding.

An opening must be maintained during welding and cutting to vent gases or vapors.

Confined Spaces

Ventilation is required to work in any confined space.

Leave gas cylinders and welding machines outside of confined spaces. Before starting operations, block the wheels of heavy portable equipment to prevent movement.

A welder will only enter a confined space with Company-provided means to be removed in case of emergency. When using safety belts and lifelines for this purpose, they need to be attached to the welder's body so that his body cannot be jammed in a small exit opening.

As with any work done in a hazardous confined space, the worker will have an attendant stationed outside with a preplanned rescue procedure. The attendant must be able to observe and/or communicate with the welder at all times and put rescue plans promptly into effect.

See the “Confined Spaces” chapter for specific information on working in those areas.

Health Protection and Ventilation

The factors that govern the amount of contamination to which welders may be exposed are the dimensions of the workspace, the number of welders working, and the evolution of hazardous fumes, gases or dust.

When the welding area is screened on all sides, the screens need to be arranged to allow sufficient ventilation — mounted about 2 feet from the floor, unless the work being done is near enough to the ground to require them to be lower to prevent harm to nearby workers.

Ventilating systems must ensure toxic fumes, gases, or dusts remain under permissible levels for all workers.

First-aid equipment remains available according to the emergency action plan. Report all injuries immediately. Trained personnel will provide first aid until professional medical attention is available.

Precautionary Labels

Fluxes, coatings, coverings and filler metals used in welding and cutting may employ potentially hazardous materials, including, but not limited to the following:

- Fluorine compounds
- Lead
- Beryllium
- Mercury
- Zinc
- Cleaning compounds
- Cadmium
- Chlorinated hydrocarbons

Appropriate ventilation or respirator equipment must control hazards presented by these chemicals and oxygen cutting stainless steel. Find more detail on controlling hazards these chemicals present in CFR 1910.252.

Welding material suppliers are responsible for determining hazards associated with a given material used for welding or cutting. Materials used in hotwork must be labeled with safety warnings according to the hazards the materials present and all workers must understand what the warnings mean.

Ventilation for General Welding and Cutting

Mechanical ventilation for welding or cutting on metals other than those listed above and any of the following is true:

- The space is less than 10,000 cubic feet per welder
- The room has a ceiling height of less than 16 feet
- The space is confined
- The welding space has structural barriers that significantly obstruct cross ventilation

Natural ventilation is sufficient for welding or cutting operations where these restrictions are not present.

Ventilation will be at least 2,000 cubic feet per minute per welder, except where workers have local exhaust hoods and booths or have airline respirators approved for such purposes.

Mechanical local exhaust ventilation may be by means of either of the following:

- Freely movable hoods near the work provided with a rate of airflow in the direction of the hood of 100 linear feet per minute in the zone of welding when the hood is at its most remote distance from the point of welding. The rates of ventilation required to accomplish this velocity using a 3-inch wide flanged suction opening are shown in table 0-2
- A fixed enclosure with a top and at least two sides that surround the welding or cutting operations with a rate of airflow sufficient to maintain a velocity away from the welder of at least 100 linear feet per minute

Welding Zone	Minimum air flow cubic feet / minutes	Duct Diameter, inches
4 to 6 inches from arc or torch	150	3
6 to 8 inches from arc or torch	275	3 ½
8 to 10 inches from arc or torch	425	4 ½
10 to 12 inches from arc or torch	600	5 ½

Confined Spaces Ventilation

Adequate ventilation for all welding and cutting operations in confined spaces must prevent the accumulation of toxic materials or oxygen deficiency. This applies not only to the welder but also to helpers and other personnel in the immediate vicinity. All air replacing used for ventilation must be clean and respirable.

If such ventilation can't be provided, the Company will provide airline respirators or hose masks approved by the National Institute for Occupational Safety and Health (NIOSH) for this purpose.

Areas immediately hazardous to life require a full-facepiece, pressure-demand, self-contained breathing apparatus or a combination full-facepiece, pressure-demand supplied-air respirator with an auxiliary, self-contained air supply approved by NIOSH.

Where welding operations occur in confined spaces requiring hose masks, hose masks with blowers, or self-contained breathing equipment, a worker stationed on the outside of such confined spaces will ensure the safety of those working within.

Never use oxygen for ventilation.

See the Confined Spaces chapter for specific information on working in those areas.

Industrial Applications

Observe OSHA requirements where field shop operations are involved for fabrication of fittings, river crossings, road crossings and pumping and compressor stations.

Special protection against electric shock for arc welding will be provided in wet conditions, or under conditions of high humidity.

In pressure testing of pipelines, protect workers and the public against injury by blowing out closures or other pressure restraining devices. Ensure protection against expulsion of loose dirt trapped in the pipe.

Employees will follow the appropriate standard for the following welding applications:

- Conduct the welded construction of transmission pipelines in accordance with the Standard for Welding Pipe Lines and Related Facilities, API Std. 1104
- The connection, by welding, of branches to pipelines carrying flammable substances must be performed in accordance with Welding or Hot Tapping on Equipment Containing Flammables, API Std. PSD No. 2201
- The use of X-rays and radioactive isotopes for the inspection of welded pipeline joints must be carried out in conformance with the American National Standard Safety Standard for Non-Medical X-ray and Sealed Gamma-Ray Sources, ANSI Z54.1

OXYGEN-FUEL GAS WELDING AND CUTTING

Mixtures of fuel gases and air or oxygen may be explosive and require appropriate guards.

Mixing air or oxygen with flammable gases will occur only at the burner or in a standard torch. Unapproved attachments or devices to mix air and fuel gasses are forbidden.

Acetylene may not be generated, piped (except in approved cylinder manifolds), or used at a pressure in excess of 15 psi. Liquid acetylene is also forbidden.

Only approved apparatus such as torches, regulators or pressure-reducing valves, acetylene generators, and manifolds must be used.

Anyone in charge of the oxygen or fuel-gas supply equipment, and oxygen or fuel-gas distribution piping systems must be instructed and judged competent by their employers before being left in charge.

Rules and instructions covering the operation and maintenance of oxygen or fuel-gas supply equipment including generators, and oxygen or fuel-gas distribution piping systems must be readily available

CYLINDERS AND CONTAINERS

Marking

All portable cylinders used for the storage and shipment of compressed gases must be constructed and maintained according to the regulations of the U.S. Department of Transportation, 49 CFR Parts 171-179.

Compressed gas cylinders must be legibly marked, with either the chemical or the trade name of contents. The cylinder marking must not be readily removable. Whenever practical, the marking will be located on the shoulder of the cylinder. Unlabeled cylinders will not be used. Cylinders must be marked as empty at the time of depletion.

Compressed gas cylinders connections must will ANSI B57.1 requirements.

All cylinders with a water weight capacity of over 30 pounds must be equipped with means of connecting a valve protection cap or with a collar or recess to protect the valve.

Storage

Keep cylinders away from radiators and other sources of heat and at least 20 feet from combustible materials. Do not store cylinders in areas where the temperature is excess of 125° F.

Cylinders stored inside of buildings must be in a well-protected, well-ventilated and dry location. Keep cylinders out of unventilated areas such as lockers, cupboards, basements or pits unless approved ventilation is provided to keep the area purged of any accumulation of gases.

Keep cylinders in designated spaces away from elevators, stairs or gangways. The storage spaces must be located where cylinders will not be knocked over or damaged by passing or falling objects.

Storage must be set up to ensure first-in, first-out usage.

A cylinder storage area must be posted with the names of the individual gases stocked, and the different gases must be grouped by type. Groupings must separate the flammable gases from the oxidizing gases.

Store cylinders in a secure area, with a warning posted against tampering by unauthorized individuals.

Empty cylinders must have their valves closed. Valve protection caps, where a cylinder accepts a cap, must always be in place, hand-tight, except when cylinders are in use or connected for use.

Fuel-Gas Cylinder Storage

Cylinders, except those in actual use or attached ready for use, stored inside a building, must be limited to a total gas capacity of 2,000 cubic feet or 300 pounds of liquefied petroleum gas.

When storing cylinders in excess of 2,000 cubic feet total gas capacity of cylinders or 300 pounds of liquefied petroleum gas inside of a building, a separate room or compartment must be used with the following specifications:

- Noncombustible construction having a fire resistance rating of at least one hour
- Walls or partitions continuous from floor to ceiling and securely anchored
- At least one wall must be an exterior wall

Special buildings, rooms or compartments used to store cylinders, must not have any open flames and must be well ventilated. They may also be used for storage of calcium carbide in quantities not to exceed 600 pounds, when contained in metal containers with the following specifications:

- Of sufficient strength to prevent rupture
- With a screw top or equivalent
- Water- and air-tight
- No solder used in a manner that the package would fail in a fire. Acetylene cylinders must be stored valve end up

Oxygen Storage

Oxygen cylinders must not be stored near highly combustible material, especially oil and grease; or near reserve stocks of carbide and acetylene or other fuel-gas cylinders, or near any other substance likely to cause or accelerate fire; or in an acetylene generator compartment.

Oxygen cylinders stored in outside generator houses must be separated from the generator or carbide storage rooms by a noncombustible partition having a fire-resistance rating of at least 1 hour. This partition must be without openings and must be gastight.

Oxygen cylinders in storage must be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

If a liquid oxygen system is used to supply gaseous oxygen for welding or cutting and the system stores more than 13,000 cubic feet of oxygen connected in service or ready for service, or more than 25,000 cubic feet of oxygen, including unconnected reserves on hand at the site, it must comply with the provisions of NFPA No. 566.

Handling Procedures

- A chain, bracket, or other restraining device must be used at all times to prevent cylinders from falling

- Cylinders, cylinder valves, couplings, regulators, hose and apparatus must be kept free from oily or greasy substances. Oxygen cylinders or apparatus must not be handled with oily hands or gloves. A jet of oxygen must never be permitted to strike an oily surface, greasy clothes, or enter a fuel oil or other storage tank
- When transporting cylinders by a crane or derrick, a cradle, boat, or suitable platform must be used. Slings or electric magnets must not be used for this purpose. Valve- protection caps, where cylinder is designed to accept a cap, must always be in place
- Cylinders must not be dropped, struck, or permitted to strike each other violently
- Valve-protection caps must not be used for lifting cylinders from one vertical position to another. Bars or another force must not be used under valves or valve-protection caps to pry cylinders loose when frozen to the ground or otherwise fixed. A frozen or ice-clogged valve must be thawed by either warm air or use of warm water, and dried, before using. Boiling water or a flame must not be used. Valve-protection caps are designed to protect cylinder valves from damage
- Unless cylinders are secured on a special truck, regulators must be removed and valve-protection caps, when provided for, must be put in place before cylinders are moved
- Cylinders not having fixed hand wheels must have keys, handles, or nonadjustable wrenches on valve stems while these cylinders are in service. In multiple cylinder installations, only one key or handle is required for each manifold
- Cylinder valves must be closed before moving cylinders
- Cylinder valves must be closed when work is finished
- Valves of empty cylinders must be closed
- Cylinders must be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them, or fire-resistant shields must be provided
- Cylinders must not be placed where they might become part of an electric circuit
- Contacts with third rails, trolley wires, etc., must be avoided. Cylinders must be kept away from radiators, piping systems, layout tables, etc., that may be used for grounding electric circuits such as for arc welding machines. Any practice such as the tapping of an electrode against a cylinder to strike an arc must be prohibited
- Cylinders must never be used as rollers or supports, whether full or empty
- The numbers and markings stamped into cylinders must not be tampered with
- No person, other than the gas supplier, must attempt to mix gases in a cylinder. No one, except the owner of the cylinder or person authorized by him, must refill a cylinder
- No one must tamper with safety devices in cylinders or valves
- Cylinders must not be dropped or otherwise roughly handled
- Unless connected to a manifold, oxygen from a cylinder must not be used without first attaching an oxygen regulator to the cylinder valve. Before connecting the regulator to the cylinder valve, the valve must be opened slightly for an instant and then closed. Always stand to one side of the outlet when opening the cylinder valve
- A hammer or wrench must not be used to open cylinder valves. If valves cannot be opened by hand, notify the supplier

- Do not tamper with cylinder valves and do not attempt to repair them. If trouble is experienced, send the supplier a report promptly indicating the character of the trouble and the cylinder's serial number. Follow the supplier's instructions
- A cylinder's regulator, gauge, or hose must never be interchanged between fuel gas, oxidizing gas, or inert gas
- Complete removal of the stem from a diaphragm-type cylinder valve must be avoided
- Fuel-gas cylinders must be placed with valve end up whenever they are in use. Liquefied gases must be stored and shipped with the valve end up
- Cylinders must be handled carefully. Rough handling, knocks, or falls are liable to damage the cylinder, valve, or safety devices and cause leakage
- Before connecting a regulator to a cylinder valve, the valve must be opened slightly and closed immediately. The valve must be opened while standing to one side of the outlet, never in front of it. Never crack a fuel-gas cylinder valve near other welding work or near sparks, flame, or other possible sources of ignition
- Before a regulator is removed from a cylinder valve, the cylinder valve must be closed and the gas released from the regulator
- Nothing must be placed on top of a cylinder when in use which may damage the safety device or interfere with the quick closing of the valve
- If cylinders are found to have leaky valves or fittings that cannot be stopped by closing of the valve, the cylinders must be taken outdoors away from sources of ignition and slowly emptied
- Place a warning tag on cylinders having leaking fuse plugs or other leaking safety devices not to approach them with a lighted cigarette or other source of ignition. Notify the supplier promptly and follow his instructions as to their return
- Safety devices must not be tampered with
- Fuel-gas must never be used from cylinders through torches or other devices equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold
- The cylinder valve must always be opened slowly
- An acetylene cylinder valve must not be opened more than one and one-half turns of the spindle, and preferably no more than three-fourths of a turn
- Where a special wrench is required, it must be left in position on the stem of the valve while the cylinder is in use so that the fuel-gas flow can be quickly turned off in case of emergency. In the case of manifolded or coupled cylinders, at least one such wrench must always be available for immediate use

ARC WELDING AND CUTTING

Workers designated to operate arc-welding equipment must have been properly instructed and qualified to operate such equipment.

Application of Arc Welding Equipment

Arc welding equipment will comply with the National Electrical Manufacturers Association (NEMA) EW-1 requirements, or the ANSI C33.2 and Underwriters' Laboratories.

Environmental conditions

Standard machines for arc welding service must carry their rated load with rated temperature rises where the temperature of the cooling air does not exceed 104° F and where the altitude does not exceed 3,300 feet. Arc welding machines must be suitable for operation in atmospheres containing gases, dust and light rays produced by the welding arc.

Unusual service conditions may exist, and in such circumstances, machines must be especially designed to meet the requirements of the service. Chief among these conditions are:

- Exposure to unusually corrosive fumes
- Exposure to excessive oil vapor
- Exposure to abnormal vibration or shock
- Exposure to weather
- Exposure to steam or excessive humidity
- Exposure to flammable gases
- Exposure to excessive dust
- Exposure to unusual seacoast or shipboard conditions

Voltage

When an arc-welding machine is operated without being connected to a load, the open circuit voltage must not exceed the values shown in the table below when rated voltage is applied to the primary winding or when a generator type arc-welding machine is operating at maximum rated no-load speed.

Welding Current	**Max. Open Circuit (no-load) Voltage**	
	Manual and Semiautomatic Machines	**Automatic Machines**
AC	80 rms	100 rms
DC > 10% ripple voltage	80 rms	100 average
DC > 10% ripple voltage	100 average	100 average

When special welding and cutting processes require values of open circuit voltages higher than the ones shown above, adequate insulation or other means must be provided to prevent the operator from making accidental contact with the high voltage.

For AC welding under wet conditions or warm surroundings where perspiration is a factor, the use of reliable automatic controls for reducing no load voltage is recommended to reduce the shock hazard.

Design

A controller that is part of an electric motor driven welder must have the capacity for carrying rated motor current and be capable of making and interrupting stalled rotor current of the motor. It may serve as the running overcurrent device if provided with the number of overcurrent units as approved.

On all types of arc welding machines, control apparatus must be enclosed except for the operating wheels, levers or handles.

Input power terminals, tap change devices and live metal parts connected to input circuits must be completely enclosed and accessible only by using tools.

Terminals for welding leads must be protected from accidental electrical contact by personnel or by metal objects i.e., vehicles, crane hooks, etc. Protection may be obtained by use of: Dead- front receptacles for plug connections; recessed openings with non-removable hinged covers; heavy insulating sleeving or taping or other equivalent electrical and mechanical protection. If a welding lead terminal that is intended to be used exclusively for connection to the work is connected to the grounded enclosure, a conductor at least two AWG sizes smaller than the grounding conductor must be used and the terminal must be marked to indicate that it is grounded.

No connections for portable control devices such as push buttons to be carried by the operator must be connected to an AC. circuit of higher than 120 volts. A grounding conductor in the control cable must ground exposed metal parts of portable control devices operating on circuits above 50 volts. Autotransformers or AC reactors must not be used to draw welding current directly from any AC power source having a voltage exceeding 80 volts.

Installation of Arc Welding Equipment

Installation including power supply must be in accordance with the requirements of OSHA electrical regulations. In addition, a welding cable must be protected against damage, entanglement or contact with power supply or high-tension wires.

Grounding

The frame or case of the welding machine (except engine-driven machines) must be grounded according to the methods prescribed in OSHA electrical regulations.

- Conduits containing electrical conductors must not be used for completing a work-lead circuit
- Pipelines must not be used as a permanent part of a work-lead circuit, but may be used during construction, extension or repair providing current is not carried through threaded joints, flanged bolted joints, or caulked joints, and that special precautions are used to avoid sparking at connection of the work-lead cable
- Chains, wire ropes, cranes, hoists and elevators must not be used to carry welding current
- Where a structure, conveyor or fixture is regularly employed as a welding current return circuit, joints must be bonded or provided with adequate current collecting devices
- All ground connections must be checked to determine that they are mechanically strong and electrically adequate for the required current

Supply Connections and Conductors

A disconnecting switch or controller must be provided at or near each welding machine that is not equipped with such a switch or controller mounted as an integral part of the machine. The switch must be in accordance with OSHA electrical regulations. Overcurrent protection must be provided as specified in OSHA electrical regulations. A disconnect switch with overload protection or equivalent disconnect and protection means, permitted by OSHA electrical regulations, must be provided for each outlet intended for connection to a portable welding machine.

For individual welding machines, the rated current-carrying capacity of the supply conductors must be not less than the rated primary current of the welding machines.

For groups of welding machines, the rated current-carrying capacity of conductors may be less than the sum of the rated primary currents of the welding machines supplied. The conductor rating must be determined in each case according to the machine loading based on the use of each welding machine and the allowance permissible in the event that not all the welding machines supplied by the conductors will be in use at the same time.

In operations involving several welders on one structure, DC welding process requirements may require the use of both polarities; or supply circuit limitations for AC welding may require distribution of machines among the phases of the supply circuit. In such cases, no load voltages between electrode holders will be 2 times normal in DC or 1, 1.41, 1.73, or 2 times normal on AC machines. Similar voltage differences will exist if both AC. and DC welding are done on the same structure.

- All DC machines must be connected with the same polarity
- All AC machines must be connected to the same phase of the supply circuit and with the same instantaneous polarity

Operation

Workers assigned to operate or maintain arc-welding equipment must be acquainted with the requirements for safe arc welding and cutting.

Before starting operations all connections to the machine must be checked to make certain they are properly made. The work lead must be firmly attached to the work; magnetic work clamps must be freed from adherent metal particles of spatter on contact surfaces. Coiled welding cable must be spread out before use to avoid serious overheating and damage to insulation.

Grounding of the welding machine frame must be checked. Special attention must be given to safety ground connections of portable machines.

There must be no leaks of cooling water, shielding gas or engine fuel. A welder must not let live electrodes or holders touch his or her bare skin or damp clothing. When arc welding is performed in wet conditions or under a condition of high humidity, the welder must be protected against electric shock.

It must be determined that proper switching equipment for shutting down the machine is provided. Printed rules and instructions covering operation of equipment supplied by the manufacturers must be strictly followed.

Electrode holders not in use must be placed so they cannot make electrical contact with persons, conducting objects, fuel, or compressed gas tanks. Electrode holders must not be cooled by immersion in water. Cables with splices within 10 feet of the holder must not be used. The welders must not coil or loop welding electrode cable around parts of his body.

A welding machine must be disconnected when moved and turned off when not in use.

Maintenance

The operator will report any equipment defect or safety hazard to his supervisor and the use of the equipment must be discontinued until its safety has been assured. Repairs must be made only by qualified personnel.

Machines that have become wet must be thoroughly dried and tested before being used.

Spliced welding cable must not be used within 10 feet of an arc-welding machine.

Cables with damaged insulation or exposed bare conductors must be replaced. Joining lengths of work and electrode cables must be performed by using a connecting means that is specifically intended for the purpose. The connecting means must have insulation adequate for the service conditions.

RESISTANCE WELDING

All equipment must be installed by a qualified electrician in conformance with regulatory requirements. There must be a safety-type disconnecting switch or a circuit breaker or circuit interrupter to open each power circuit to the machine, conveniently located at or near the machine, so that the power can be shut off when the machine or its controls are to be serviced.

Ignition tubes used in resistance welding equipment must be equipped with a thermal protection switch.

Workers designated to operate resistance-welding equipment must have been properly instructed and judged competent to operate such equipment.

Controls of all automatic or air and hydraulic clamps must be arranged or guarded to prevent the operator from accidentally activating them.

Spot and Seam Welding Machines

An external weld initiating control circuit for a non-portable spot or seam welding machine must operate at not more than 120 volts for stationary equipment and not more than 36 volts for portable equipment.

Stored energy or capacitor discharge type of resistance welding equipment and control panels involving high voltage (over 550 volts) must be suitably insulated and protected by complete enclosures, all doors of which must be provided with suitable interlocks and contacts wired into the control circuit (similar to elevator interlocks). Such interlocks or contacts must be designed to interrupt power and short circuit all capacitors when the door or panel is open. A manually operated switch or suitable positive device must be installed, in addition to the mechanical interlocks or contacts, as an added safety measure assuring absolute discharge of all capacitors.

All doors and access panels of all resistance welding machines and control panels must be kept locked and interlocked to prevent access by unauthorized persons to live portions of the equipment. A door or access panel will be considered locked if a key or wrench is required to open it.

All press welding machine operations, where there is a possibility of the operator's fingers being under the point of operation, must be effectively guarded by the use of a device such as an electronic eye safety circuit, two hand controls. Adequate guards must protect all chains, gears, operating bus linkage and belts. One or more safety emergency stop devices must be provided on all multi-spot welding machines with a minimum of one stop device at each operator position.

The hazard of flying sparks must be eliminated, wherever practical, by installing a shield guard of safety glass or suitable fire-resistant plastic at the point of operation. Additional shields or curtains must be installed as needed to protect passing persons from flying sparks.

All foot switches must be guarded to prevent accidental operation of the machine.

Two or more safety emergency stop buttons must be provided on all special multi-spot welding machines, including 2-post and 4-post weld presses.

On large machines, four safety pins with plugs and receptacles (one in each corner) must be provided so that when safety pins are removed and inserted in the ram or platen, the press becomes inoperative.

Where technically practical, the secondary of all welding transformers used in multi-spot, projection and seam welding machines must be grounded. This may be done by permanently grounding one side of the welding secondary current circuit. Where not technically practical, a center tapped grounding reactor connected across the secondary or the use of a safety disconnect switch in conjunction with the welding control are acceptable alternates. Safety disconnect must be arranged to open both sides of the line when welding current is not present.

Portable Welding Machines

All portable welding guns must have suitable counterbalanced devices for supporting the guns, including cables, unless the design of the gun or fixture makes counterbalancing impractical or unnecessary.

All suspended portable welding gun equipment, except the gun assembly, must be equipped with a safety chain or cable capable of supporting the total shock load in event of failure of any component of the supporting system.

When a trolley is used to support a portable welding machine with a clevis for attachment to a safety chain, the clevis must be made of wrought or forged steel and capable of supporting the shock load if the trolley fails.

All initiating switches, including retraction and dual schedule switches, located on the portable welding gun must be equipped with suitable guards capable of preventing accidental initiation through contact with fixtures, operator's clothing, etc. Initiating switch voltage must not exceed 24 volts.

The movable holder, where it enters the gun frame, must have sufficient clearance to prevent the shearing of fingers carelessly placed on the operating movable holder.

The secondary and case of all portable welding transformers must be grounded. Secondary grounding may be by center tapped secondary or by a center tapped grounding reactor connected across the secondary.

Flash Welding Equipment

Flash welding machines must be equipped with a hood to control flying flash. In cases of high production, where materials may contain a film of oil and where toxic elements and metal fumes are given off, ventilation must be provided.

For the protection of the operators of nearby equipment, fire-resistant curtains or suitable shields must be set up around the machine and in such a manner that the operators' movements are not hampered.

Maintenance

Periodic inspection must be made by qualified maintenance personnel, and a certification record maintained. The certification record must include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, for the equipment inspected. The operator must be instructed to report any equipment defects to his supervisor and the use of the equipment must be discontinued until safety repairs have been completed.

TRAINING

Hotwork training for employees, appropriate to their duties, and the related hazards will be provided at no cost to the employee and will be conducted during working hours.

Training material will be appropriate in content and vocabulary to the educational level, literacy and language of employees.

Training Components

Employees who work with or around welding, brazing, cutting or similar operations will be trained in the following minimum elements:

- Compressed gas hazards and cylinder safety and storage
- Fire hazards in the workplace
- The roles and responsibilities for a fire watch while welding
- Location and use of fire extinguishers
- Housekeeping efforts around welding
- Personal protective equipment selection, fitting and use;
- Welding in confined spaces
- Basic rules for any welding technique used at work
- Protective devices like valves, backflow preventers, etc.
- Hazards associated with chemicals used in welding
- Hazards associated with light and non-visible spectrum radiation in welding

Training Records

Training records will include the following information:

- The dates of the training sessions
- The contents or a summary of the training sessions

- The names and qualifications of persons conducting the training
- The names and job titles of all persons attending the training sessions

Employee training records will be retained for the length of their employment.

FORMS AND ATTACHMENTS

On the following pages, please find the following documents:

- Welding, Cutting and Brazing Checklist
- Ventilation Requirements for Welding and Cutting
- Sample Hotwork Permit
- Welding, Cutting and Brazing Training Record Sheet

These forms may be reproduced freely for the purposes of implementing and maintaining a safety and health program.

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 1 OF 5)

(A negative answer to any question indicates an area of safety or health concern.)

Company Name		Date / Time	
Supervisor		Inspector	
Physical Address of Worksite			

Installation and Operation of Oxygen-Fuel Gas Systems for Welding and Cutting

Yes	No	N/A	Date Corrected	Question
				Is acetylene generated, piped or used at a pressure of 30 p.s.i. or less?
				Have personnel in charge of the oxygen or fuel gas supply equipment been instructed and judged competent before being left in charge?
				Is the gas content of compressed gas cylinders marked with either the chemical or the name of the gas?
				Are cylinders stored away from radiators and other sources of heat?
				Are cylinders stored inside kept in a well-ventilated, dry location at least 20 feet from highly combustible material?
				Are cylinders stored in assigned places away from elevators, stairs, or gangways and where they will not be knocked over or damaged?
				Are the valves of empty cylinders kept closed?
				Are valve protection caps in place and hand-tight except when in use or connected for use?
				Are fuel gas cylinders except those in use or attached for use, which are stored inside a building, limited to a total gas capacity of 2,000 cubic feet or 300 pounds of liquefied petroleum gas?
				Are acetylene cylinders stored valve end up?
				If oxygen cylinders are stored in outside generator houses, are they separated from the generator or carbide storage rooms by a gastight, noncombustible partition having a fire-resistance rating of at least one hour?
				Are stored oxygen cylinders separated from fuel gas cylinders or combustible material by a minimum of 20 feet, or by a noncombustible barrier at least five feet high with a fire-resistance rating of at least one-half hour?
				Are cylinders, cylinder valves, couplings, regulators, hose and apparatus kept free from oily or greasy substances?
				Do you ensure that cylinders are not dropped, struck or permitted to strike each other violently?
				Do you ensure that valve-protection caps are not used for lifting cylinders from one vertical position to another?
				Do you ensure that cylinders that do not have fixed hand wheels, have keys, handles or nonadjustable wrenches on the valve stems while the cylinders are in service?
				Are cylinder valves closed before moving a cylinder, and when work is finished?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 2 OF 5)

				Are cylinders kept away from sparks, hot slag, or flames produced by welding or cutting operations, or are fire-resistance shields provided?
				Are cylinders placed where they will not become part of an electric circuit?
				Do you insure that cylinders are not used as rollers or supports, and that only proper tools are used to open cylinder valves?
				Are fuel gas cylinders placed valve end up while in use?
				Are cylinders with leaky valves or fittings taken outdoors and slowly emptied?
				Are warning signs posted which prohibit open flame or other sources of ignition near cylinders with leaking fuse plugs or other leaking safety devices, and are the cylinders tagged?
Manifold Systems				
Yes	No	N/A	Date Corrected	Question
				Do you ensure that oxygen manifolds are not located in an acetylene generator room?
				Do you ensure that portable outlet headers are used indoors only for temporary service where conditions preclude a direct supply from outlets located on the service piping system?
				Is each outlet on the service piping which supplies a portable outlet header equipped with a readily accessible shutoff valve?
				Are master shutoff valves for both oxygen and fuel gas provided at the entry end of the portable outlet header?
				Are portable outlet headers provided with frames to support the equipment securely in the correct operating position?
				When acetylene cylinders are coupled in a manifold, are flash arresters installed between each cylinder and the coupler block?
				In service piping systems, are distribution lines installed and maintained in a safe operating condition?
				Are emergency gas cocks or valves provided for all buildings?
				Is underground pipe and tubing and outdoor ferrous pipe and tubing protected against corrosion?
General Requirements				
Yes	No	N/A	Date Corrected	Question
				Is flashback protection provided by an approved device that will prevent flame from passing into the fuel gas systems?
				Are hoses showing defects repaired or replaced?
				Are pressure-reducing regulators used only for the gas and pressures for which they are intended?
				Is the repair of regulators performed by properly instructed, skilled mechanics?
				Are gauges on oxygen regulators marked “USE NO OIL”?
				Are union nuts and connections on regulators inspected before use to detect faulty seats?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 3 OF 5)

Acetylene Generators (if applicable)				
Yes	No	N/A	Date Corrected	Question
				Is ample space provided around the generator for operation and maintenance?
				Are generators placed where water will not freeze, and is the use of sodium chloride to prevent freezing prohibited?
				Are portable generators located at a safe distance from the welding position?
				Are the walls, floors and roofs of outside generator houses constructed of noncombustible materials?
				Are exit doors readily accessible in case of emergency?
				Are generators installed inside buildings enclosed in a separate room?
				Are the walls, partitions, floors, and ceilings of inside generator rooms of noncombustible construction with a fire-resistance rating of at least one hour?
				Are generator rooms or buildings well ventilated with vents located at floor and ceiling levels?
				Do generator rooms or buildings have natural light during daylight hours or artificial light restricted to electric lamps installed in a fixed position?
				Are operating instructions posted in a conspicuous place near the generator or available for ready reference?
				Is the generator room electrically wired in accordance with 1910.307 (hazardous locations)?
				Do you ensure that the water-carbide residue mixture drained from the generator is not discharged into sewer pipes or stored in areas near open flames?
				Do you ensure that calcium carbide is kept in metal packages strong enough to prevent rupture?
				Are the packages marked “Calcium Carbide - Dangerous If Not Kept Dry”?
				Do you ensure that the calcium carbide stored indoors does not exceed 600 pounds and that the storage area is dry, waterproof and well-ventilated?
				Are carbide containers that are stored outside periodically examined for conditions that could affect water or air tightness?
Application, Installation and Operation of Arc welding and Cutting Equipment				
Yes	No	N/A	Date Corrected	Question
				Have employees who are designated to operate arc-welding equipment been properly instructed and qualified?
				Are open circuit (no load) voltages of arc welding and cutting machines as low as possible, consistent with satisfactory welding?
				When open circuit voltages must be higher, are means provided to prevent the operator from making accidental contact with the higher voltages?
				Is control apparatus enclosed on all types of arc welding machines?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 4 OF 5)

				Are terminals for welding leads protected from accidental electrical contact by personnel or metal objects?
				Do you ensure that no connections for portable control devices, such as push buttons carried by the operator, are connected to an AC. circuit of higher than 120 volts?
				Is the frame or case of the welding machine effectively grounded and the grounding checked?
				Is a separate disconnecting switch or controller provided at or near each welding machine?
				Are electrode holders placed so that they cannot make electrical contact with persons, conducting objects, fuel, or compressed gas tanks?
				Has the operator been instructed to report any equipment defect or safety hazard to his supervisor, and is use of the equipment discontinued until repaired by qualified personnel?
				Are work and electrode lead cables frequently inspected for wear and damage, and are cables with damaged insulation or exposed bare conductors replaced?
Installation and Operation of Resistance Welding Equipment				
Yes	No	N/A	Date Corrected	Question
				Have personnel who are designated to operate resistance-welding equipment been properly instructed and judged competent to operate such equipment?
				Are all doors and access panels of all resistance-welding machines and control panels kept locked and interlocked?
				Has a shield guard of safety glass or suitable fire-resistant plastic been installed at the point of operation?
				Are foot switches guarded to prevent accidental operation of the machine?
				Are two or more safety emergency stop buttons provided on all special, multisport welding machines, including 2-post and 4-post weld presses?
				Are flash welding machines equipped with hoods to control flying flash?
				Are periodic inspections of the machines made by qualified maintenance personnel, and are records of the inspections maintained?
Fire Prevention and Protection				
Yes	No	N/A	Date Corrected	Question
				Is suitable fire extinguishing equipment maintained in a state of readiness for instant use?
				Are fire watches on duty whenever welding or cutting is performed in locations where a major fire might develop?
				Before cutting or welding is permitted, is the area inspected by the individual responsible for authorized cutting and welding operations?
				Where practicable, are all combustibles relocated at least 35 feet from the work site?
				Does management recognize its responsibility for the safe usage of cutting and welding equipment on its property?

WELDING, CUTTING AND BRAZING CHECKLIST FOR GENERAL INDUSTRY (PAGE 5 OF 5)

				Do supervisors recognize their responsibilities in the safe management of welding and cutting operations?
				Are welders or helpers who are working on platforms, scaffolds, or runways protected against falling by railings, safety belts or lifelines?
				Is welding cable and other equipment kept clear of passageways, ladders and stairways?
				Are helmets, hand shields and goggles worn during all arc welding or cutting operations?
				Has a hazard assessment been performed to determine if hazards are present or likely to be present?
				Are employees who are exposed to the hazards created by welding, cutting, or brazing operations protected by personal protective equipment as?
				When welding or cutting is being performed in any confined space, are gas cylinders and welding machines left outside?
				Before operations are started, is heavy, portable, wheel-mounted equipment securely blocked to prevent accidental movement?
Health Protection and Ventilation				
Yes	No	N/A	Date Corrected	Question
				Where a welder must enter a confined space through a manhole or other small opening, have means been provided for his quick removal in case of emergency?
				Are ventilation or respiratory protective devices provided where necessary and do they meet OSHA requirements?
				Are employees trained to render first aid, and is first aid equipment available at all times?

VENTILATION REQUIREMENTS FOR WELDING AND CUTTING

Metal Compound	Requirements Confined Space	Requirements Indoors	Requirements Outdoors
Fluorine Compound	Air replacement or airline respirator or self-contained breathing apparatus needed	Air sample tests to determine if exhaust hood, booth, and airline respirator are required	Same as indoors
Lead Zinc (Galvanized Metals)	Air replacement or airline respirator or self-contained breathing apparatus	Exhaust hood or booth	Combination particulate and vapor and gas removing type respirator if tests indicate need
Beryllium	Exhaust hood or booth and airline respirator if air sample tests indicate need	Exhaust hood or booth and airline respirator if air sample tests indicate need	Exhaust hood or booth and airline respirator if air sample tests indicate need

- Airline or self-contained breathing apparatus are required in confined areas that are immediately hazardous to life.
- Local exhaust hoods or booths must provide airflow of 100 linear feet per minute.
- Mechanical ventilation at 2,000 cubic feet of air per minute per welder is required when:
  - Welding or cutting on metals other than described above
  - When there is less than 10,000 cubic feet of space per welder
  - Where the ceiling height is less than 16 feet
  - In confined spaces or where structural barriers such as partitions or balconies significantly obstruct cross ventilation

Note: Mechanical ventilation is necessary when an exhaust hood or fixed booth provide for a rate of airflow sufficient to maintain a velocity away from the welder or not less than 100 linear feet per minute.

HOTWORK PERMIT

This permit is required for operations that involve open flames or that produce sparks or heat outside of designated areas, including, but not limited to brazing, cutting, welding and grinding.

Date	
Task	
Location	
Person doing Hotwork	

Precautions have been taken to prevent fire and to control hazards present in the above location for the job described, and hotwork may commence.

Authorizing Individual (sign please)

Person Doing Hotwork (sign please)

Fire Watch (sign please)

Start Date:	Start Time:
Finish Date:	Finish Time:

OK	PRECAUTION	N/A
	Area is fire safe	
	Moveable fire hazards moved	
	Unmoveable fire hazards guarded	
	Openings, cracks, doorways, windows guarded or closed	
	Fire extinguisher available	
	Fire watch	
	Floors clean for 35' radius	
	Combustible floors wetted or	
	In authorized area	
	Ducts and conveyer systems to	
	Worker trained appropriately	
	Contractors informed of hazards	
	Containers cleaned and ventilated	
	Pipelines to containers disconnected or blocked	
	PPE available and used	
	Hot metal warning sign	
	Ventilation provided	
	Confined spaces permit	
	Other:	

Fire Watch Signoff

Work was fire safe through the entire watch period. The area was monitored for _____minutes (at least 30) to ensure fire safety.

Fire Watch (sign please

SCOPE

This chapter provides the requirements and safe practices regarding working near overhead power lines when performing construction, tree trimming, communication tower work or any other work where elevating work platforms or scaffolds are used near power lines. These practices will comply with OSHA regulations 1910.333 and/or 1926.964 as applicable.

This information does not include the installation and/or maintenance of overhead lines, which are covered in the electrical Safety and/or Electrical Power Generation chapters. The following policy has been adopted to minimize the hazards to employees performing non-electrical work near overhead power lines.

POLICY

All employees of this Company who work in the proximity of overhead lines will conform to our Overhead Powerline Proximity Policy.

Note: “Working near the proximity” is defined as working within a distance from any overhead power line that is less than combined length of the lifting device, the associated load length and the required minimum clearance distance.

EMPLOYER RESPONSIBILITIES

The Company is responsible for:

- Authorizing all work near overhead power lines within the defined distance for working near overhead power lines
- Ensuring that only qualified personnel are authorized to work within the minimum clearance distances of live power lines
- Inspecting the worksite before work starts
- Notifying the local power provider of the planned work
- Obtaining all necessary permits allowing work to proceed

EMPLOYEES RESPONSIBILITIES

All Company employees will:

- Be trained to recognize the hazards associated with overhead power lines and to understand the provisions of this standard
- Be properly trained on the operation of any mobile equipment such as cranes, boom trucks and earthmovers
- Know the purpose and limitations of any safety devices used during the job
- Use all required PPE
- Follow all safe work practices defined by this overheard power line policy

Supervisors are responsible for:

- Complying with this policy during field activities

- Stopping work if the conditions of the planned work changes
- Notifying the safety coordinator of any work stoppage and reason for it
- Re-briefing the work crew if the changes to planned work allow the job to proceed safely

Qualified personnel are responsible for:

- Attending all scheduled training
- Performing work in compliance with the live-line barehand work near overhead lines policy

Unqualified personnel are responsible for:

- Performing this work only when being trained by a qualified person or trainer
- Under the direct supervision of a qualified person or trainer

HAZARDS

Working of near overhead power lines presents the risk of electrical shock or burns, and can contribute to additional hazards such as fires, falls and even death. All employees are required to use safe practices when working near power lines, and observe the established safe distance limits established by all applicable regulations.

Using Mobile Equipment Near Power Lines

Where aerial lifts, cranes, boom devices, dump trucks or other elevating devices will operate near overhead power line, and there is potential for proximity or contact with the lines or other electrical equipment, work will not begin until a safety meeting is conducted and appropriate steps taken to identify, mark and warn against accidental contact. The supervisor will review operations daily to ensure compliance.

All equipment covered under this policy will comply with the following requirements when being moved near power lines or energized transmitters, unless the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work.

These requirements do not apply if insulating barriers, which are not a part of (or an attachment to) the equipment or machinery, have been erected to prevent physical contact with the lines:

- For lines rated 50 kV or below, minimum clearance between the lines and any part of the crane or load will be 10 feet
- For lines rated over 50 kV, minimum clearance between the lines and any part of the crane or load will be 10 feet plus 0.4 inch for each 1 kV over 50 kV, or twice the length of the line insulator, but never less than 10 feet
- In transit with no load and boom lowered, the equipment clearance will be a minimum of 4 feet for voltages less than 50 kV, and 10 feet for voltages over 50 kV, up to and including 345 kV, and 16 feet for voltages up to and including 750 kV
- A person will be designated to observe clearance of the equipment and give warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means
- Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices will not alter the requirements of any other regulation of this part even if such device is required by law or regulation

- Any overhead wire will be considered to be energized, unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded
- Prior to work near transmitter towers where an electrical charge can be induced in the equipment or materials being handled, the transmitter will be de-energized or tests will be made to determine if electrical charge is induced on the crane. The following precautions will be taken when necessary to dissipate induced voltages:
  - The equipment will be provided with an electrical ground directly to the upper rotating structure supporting the boom
  - Ground jumper cables will be attached to materials being handled by boom equipment when electrical charge is induced while working near energized transmitters. Crews will be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load
- Combustible and flammable materials will be removed from the immediate area prior to operations

SAFE WORK PRACTICES

Our Overhead Power Line Policy applies to all employees and contractors working near energized power line, regardless of voltage. The Company will:

- Ensure employees are not placed near overhead power lines
- Inform employees of the hazards and precautions when working near Overhead lines
- Post warning decals on cranes and similar equipment regarding **10-foot minimum clearance**
- Ensure that when equipment is working near overhead lines a 'spotter' is designated and observes for safe working clearances around all overhead lines and directs the operator accordingly
- Use warning cones as visible indicators of the **10-foot safety zone** when working near overhead power lines
- Notify the local power provider at least 24 hours before any work begins that requires the provider to identify voltages and clearances, or de-energize, apply safety grounds, or relocate lines

General

Before starting operations where potential contact with overhead electrical systems is possible, the safety coordinator, supervisor, head operator or person leading the work will identify overhead lines or equipment, and reference their location to prominent physical features, or physically mark the area directly in front of the overhead lines with safety cones, survey tape or other means.

Electrical line location will be discussed at a pre-work safety meeting of all employees on the job. All Company employees and contractors must attend this meeting.

New/transferred employees will be informed of electrical hazards and proper procedures during orientations. On construction projects, overhead electrical lines or equipment will be conspicuously marked and workers will be reminded of their location by the project supervisor. New employees will be informed of electrical hazards and proper precautions and procedures.

Where there is potential for proximity or contact with overhead electrical systems, the local area power provider will be called to decide the need to de-energize, safety ground, remove, or otherwise protect against accidental contact.

Where there is a suspicion of low wires (under 20 feet), the local area power provider will be notified to verify, and take appropriate action. All electrical contact incidents, including 'near-misses', must be reported to the local area safety coordinator.

All Heavy Equipment, or similar equipment, will display a warning decal regarding electrical contact. Independent truck drivers delivering materials to field locations will be cautioned about overhead electrical wires before beginning work, and a properly trained Company employee will assist in the loading/offloading operation. Trucks that have emptied their material may not leave the work location until the boom, lift or box is down and safely secured.

- Any overhead line must be considered energized until the owner, owner representative, or utility indicates otherwise and the line has been visibly grounded, and the owner, owner representative, or utility must be notified and provided with all pertinent information of the job before the commencement of operations near electrical lines
- Where an equipment operator or delivery driver's visibility is impaired, a spotter is required to guide the operator. Predefined hand signals will be used and clearly understood between operator and spotter
- When visual contact is impaired, the spotter and operator will be in radio contact. Aerial lifts, cranes and boom devices will have appropriate warning decals, and will use warning cones or similar devices to indicate the location of overhead lines and identify the 10-foot minimum safe working boundary
- Except as prescribed, or where insulating barriers not a part of or an attachment to the aerial device have been erected to prevent physical contact with the lines, an aerial device must maintain the distances from energized distribution and transmission power lines and equipment prescribed in Table 1
- No equipment or vehicles are permitted to move under electrical lines without a 4' clearance unless the line is removed, de-energized, safety grounded, or otherwise protected
- The local area power provider must issue a general permit detailing the specific measures employed to ensure safe operations

TABLE 1: MINIMUM CLEARANCE DISTANCES FOR EQUIPMENT

Voltage	Clearance with Boom Raised	Clearance Boom Lowered and no Load in Transit
To 50kV	10 feet	4 feet
Over 50kV	10 feet + .4 inch per each 1 kV over 50 kV	10 feet
50 to 345kV		10 feet
346 to 750 kV		15 feet

The clearance requirements of this rule do not apply to the following situations:

- Where work is performed from an insulated aerial device that is insulated for the work, and the work is performed according to the provisions of construction "Power Transmission and Distribution" and "Telecommunications" safety standard
- Where the owner, authorized representative, or utility representative have ensured that the conductor is insulated for the system voltages and the task will not compromise the insulation of the conductor and/or cause an electrical hazard
- Where the electric power transmission or distribution lines have been de-energized and visibly grounded at the point of work or where insulating barriers that are not a part of an attachment to the aerial work platform have been erected to prevent physical contact with the line
- Where work is being performed by qualified electricians on equipment up to .5kV. Two qualified electricians will be required for work within the minimum clearance on equipment over .5kV
- The insulated bucket, gloves, and sleeves used to comply must be rated at more than the voltage to be worked on, or that with which they might come into contact

TABLE 2: MINIMUM WORKING DISTANCES FOR QUALIFIED LINE CLEARANCE TREE TRIMMERS AND QUALIFIED LINEMEN

Voltage Range Phase to Phase (KV)	Minimum Working Distance
2.1 to 15.0	2´0˝
15.1 to 35.0	2´4˝
35.1 to 46.0	2´6˝
46.1 to 72.5	3´0˝
72.6 to 121.0	3´4˝
138.0 to 145.0	3´6˝
161.0 to 169.0	3´8˝
230.0 to 242.0	5´0˝
345.0 to 362.0	7´0˝
550.0 to 552.0	11´0˝
700.0 to 765.0	15´0˝
***NOTE**: For 345 — 362 kV., 500 — 552 kV., and 700 — 765 kV., the minimum working distance and the minimum clear hot stick distance may be reduced that such distances are not less than the shortest distance between the energized part and a grounded surface.	

TABLE 3: MINIMUM APPROACH DISTANCES FOR QUALIFIED TELECOMMUNICATIONS EMPLOYEES

Voltage Range (Nominal Phase to Phase)	Minimum Approach Distances
300 V and less	12″
Over 300 V, not over 750 V	18″
Over 750 V, not over 2 kV	24″
Over 2 kV, not over 15 kV	36″
Over 15 kV, not over 37 kV	42″
Over 37 kV, not over 87.5 kV	48″
Over 87.5 kV, not over 121 kV	54″
Over 121 kV, not over 140 kV	--″

- A qualified lineman or a qualified line clearance tree trimmer, working on or near an exposed power transmission or distribution line from an aerial lift, must maintain distances prescribed in Table 2, unless the employee is insulated or guarded from the energized part by gloves or gloves and sleeves, or insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee
- A qualified telecommunications employee must maintain the distances prescribed in Table 3 when working from an aerial lift, unless the employee is insulated, isolated, or guarded from any other conductive part or the energized part is insulated from the employee

EMERGENCY RESPONSE

If an overhead line falls or is contacted:

- Keep everyone at least 10 feet away
- Use flagging to protect motorists, spectators and other individuals from fallen or low wires
- Call the local area Electrical Department or utility immediately
- Place 'guards' around the area
- Do not attempt to move the wire(s)
- Do not touch anything that is touching the wire(s)
- Be alert to water or other types of conductors present
- Crews will have emergency numbers readily available. These numbers will include local area electrical, utility, police/fire and medical assistance
- If an individual becomes energized, **DO NOT TOUCH** the individual or anything in contact with the person. Call for emergency medical assistance and the local area electrical power provider immediately. If the individual is no longer in contact with the energized conductors, CPR, rescue breathing or first aid should be administered immediately, but only by a trained person. It is safe to touch the victim once contact is broken or the source de-energized

- Wires that contact vehicles or equipment will cause arcing, smoke, and possibly fire. Occupants should remain in the cab, and wait for utility or rescue personnel. Should it become necessary to exit the vehicle, leap, with both feet, as far away from the vehicle as possible, without touching the vehicle, jumping free of the vehicle is the last resort
- If operating equipment and an overhead wire is contacted, stop the equipment immediately and if safe to do so, jump free and clear of the equipment. Maintain your balance, keep your feet together and either shuffle or bunny hop away from the vehicle another 10 feet or more. Do not return to the vehicle or allow anyone else to return to the vehicle for any reason until the local area electrical utility has removed the power line from the vehicle and has confirmed that the vehicle is no longer in contact with the overhead lines

TRAINING

All Company employees who are required to work near overhead power lines will receive specialized electrical safety training. This training will be provided before employees are permitted to work near power lines.

Training Components

The Company's safety coordinator will ensure that every employee will be trained in the following minimum elements:

- Hazards of working near overhead power line
- Required Personal Protective Equipment
- Minimum safe working distances
- Procedures for operating elevated work equipment near power lines
- Emergency response and first aid for electrical injuries

Retraining

Employees will be retrained on the safe work practices of working around power lines at least annually, or as often required by applicable regulations. Additionally, employees will be required to attend retraining if observed violating the Company's' safe work practices.

Training Records

Training records will be kept for each employee to certify their completion of training and evaluation and will include the following information:

- The dates of the training sessions and evaluation
- A written description of the training program
- The names and qualifications of persons conducting the training or evaluation
- The names and job titles of all persons attending the training sessions
- Where the employee received safety training

These employee records will be retained for the length of their employment.

DISCLAIMER

OSHA's "Safety and Health Regulations" are continuously being reinterpreted. Therefore, Safety Services Company is unable to completely guarantee the exactness of the information conveyed in this publication. Safety Services Company assumes no responsibility and shall be held harmless for any inaccuracies or omissions contained within this pocket manual and shall not be held liable to any extent or form for any injury or loss resulting from the manner in which this information is interpreted and/or applied.

Careful effort has been dedicated in order to provide a simplified, understandable explanation of OSHA regulations based on currently available information. This "Injury & Illness Prevention Program" is distributed with the agreement that Safety Services Company is not employed in providing legal or other specialized business services. Should expert assistance be required, retain the services of a competent professional.

NOTES

NOTES

EMPLOYEE SIGNOFF

This is to certify that I have received a copy of the Company Injury & Illness Prevention Manual.

I have read these instructions, understand them, and will comply with them while working for the Company.

I understand that failure to abide by these rules may result in disciplinary action and possible termination of my employment with Bannister Electric LLC of West Monroe

I also understand that I am to report any injury to my foreman or superintendent immediately and report all safety hazards.

I further understand that I have the following “Safety Rights”:

- I am not required to work in any area I feel is not safe.
- I am entitled to information on any hazardous material or chemical I am exposed to while working.
- I will not be discriminated against for reporting safety concerns.

Employee Name	Signature	Date

Supervisor Name	Signature	Date

cc: Employee File