



4/4/2018  
State of Indiana

# INDOT 2018 SAFETY and HEALTH MANUAL

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## Safety and Health Policy Manual Foreword

The INDOT Safety and Health Policy for 2018 is a guide for safe practices for you and your whole team. Compiled together over the course of the last year, this document seeks to provide resources to ensure you and your fellow employees go home in the same condition you came to work every day. While this guide is full of information, we've grouped the various policies topically for ease of use.

This document is a revision of INDOT's 2017 Safety Manual. The revised document builds upon the processes described in the previous manual and draws from the lessons learned since its creation. New information and techniques that reflect advances in safety and health, including tools and resources available to INDOT employees, are also presented.

The document emphasizes a team approach and the importance of careful planning, coordination, and communication throughout the work day. INDOT recognizes that effective safety and health processes often require the cooperation and coordination of full teams of individuals working towards a common goal.

INDOT is committed to updating the manual as new information becomes available. The agency welcomes comments from users of the document. Just click this link to send any suggestions you have for revising the [Safety and Health Policies](#).

INDOT is truly committed to Taking Care of What We Have. That's not just our roads, bridges, and equipment. By far, our most valuable asset is you. Help us do that together.



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Joseph McGuinness  
Commissioner  
Indiana Department of Transportation

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## INTRODUCTION

### RESPONSIBILITIES

#### EMPLOYEE RESPONSIBILITIES

All employees are responsible for their own safety. In addition, they have a responsibility to their family, fellow workers, the community and the State of Indiana to help ensure that everyone makes it home at the end of the work day. Therefore, they must observe safe practice rules and instruction relating to efficient performance of work. Safe and efficient operations are reached only when all employees are safety-conscious and keenly alert both mentally and physically. Employees are charged to:

- Comply with the supervisor's instructions.
- Be thoroughly knowledgeable with and comply with contents of this manual that relate to assigned duties.
- Work in a safe, productive manner and maintain safety awareness at all times.
- Properly operate and maintain assigned vehicles/equipment and report defects.
- Report all accidents and injuries immediately.
- Wear proper clothing and required protective clothing and equipment.
- Maintain themselves in proper physical condition to safely perform work.
- Use good common sense, both on and off the job. INDOT and families suffer in the case of accidents or injuries.

#### SUPERVISORY RESPONSIBILITIES

A supervisor is equally responsible for the safety of their employees and for their work. Supervisors will ensure that their employees have a thorough knowledge of the contents of this manual. **NO JOB IS SO IMPORTANT OR URGENT THAT TIME CANNOT BE TAKEN TO DO IT IN A SAFE MANNER.**

It is the supervisor's responsibility to ensure that vehicles and equipment are properly operated, maintained and that damage is minimized.

Equipment will not be used if its condition poses a hazard to any employee, the public or when continued use may cause further damage or is defective.

Supervisors will analyze work in advance to determine the safest and most economical way to perform each operation. They will also be responsible for ensuring that every effort is made to protect the safety of all INDOT employees.

It is the supervisor's responsibility to ensure that workers are properly trained and to assign qualified workers to jobs for which they have been trained, so that all tasks can be carried out in a productive and safe manner.



Supervisors will ensure that new employees assigned to unfamiliar work receive specific instructions regarding possible hazards that may be encountered and provide advice as to how to best deal with these situations and are thoroughly trained and documented.

It is the supervisor's responsibility to see that department safety regulations, as outlined in the Safety Policy and the Safety Manual, are complied with at all times.

When a supervisor feels that a particular assignment will expose his/her workers to unusual hazards, he/she will report the condition to his/her supervisor and make plans to reduce the hazards or increase the protection.

Supervisors who fail to provide a safe working environment or whose negligent actions result in injury or property damage, may face disciplinary action or termination of employment.



## **1. BLOODBORNE PATHOGENS**

### **1.1 GENERAL**

Safety shall educate all employees on how to protect themselves from on-the-job exposure to blood and other potentially infectious fluids. [1910.1030](#)

Employees shall take the precautions necessary to protect themselves against the risk of coming into contact with blood or other potentially infectious materials.

### **1.2 COVERED DISEASES**

Among the more common bloodborne diseases that employees could be exposed to on the job, the two most significant are hepatitis B and HIV.

### **1.3 TRANSMISSION OF VIRUSES**

The pathogens, which can transmit these diseases, may be present in the blood and other body fluids such as saliva, semen, vaginal secretions, and any other fluids contaminated with blood.

These pathogens can enter and infect the human body through openings in the skin including cuts, nicks, abrasions, dermatitis, or acne. Infection can also result from punctures or cuts caused by sharp contaminated objects such as needles, scalpels, broken glass, exposed ends of dental wires, or any other object that can puncture or cut skin. Infection can also gain access to the body through mucous membranes of the eyes, nose, and mouth when these areas are touched with contaminated hands or implements.

### **1.4 UNIVERSAL PRECAUTIONS**

Universal Precautions is an approach to infection control. According to the concept, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Universal Precautions provide the first line of defense against the risk of exposure to bloodborne pathogens. Universal Precautions shall be practiced at all times to reduce the risk of infectious disease in the event of exposure. Universal Precautions must be consistently used for all activities involving contact with blood, tissue, body fluids, and equipment or materials, which may have been contaminated by these substances.

As a minimum, the following standards of practice are required of all employees when attending to an injured worker or working with the equipment which may have been contaminated with infectious material, or in the implementation of Universal Precautions:



## **Work Practice Controls**

- Wash hands (or use antiseptic towelettes or hand sanitizer).
- Wear gloves.
- Wear impervious clothing.
- Wear a mask.
- Use mouthpieces and resuscitation masks.
- Handle sharp objects carefully.
- Post Universal Precaution signs.
- If contact occurs, flush mucous membranes in area of contact with water.

### **1.5 PERSONAL PROTECTIVE EQUIPMENT (PPE)**

Personal Protective Equipment includes, but is not limited to, gloves, gowns, laboratory coats, face shields, masks, eye protection, mouthpieces, resuscitation bags, pocket masks, or other ventilation devices, shoe covers, or boots.

Appropriate equipment does not permit blood or other potentially infectious material to pass through or reach the employee's work clothes, skin, eyes, mouth, or other mucous membranes under normal conditions and for the duration of use.

All affected employees shall use PPE to the extent judged appropriate based on any possibility of contracting an infection from bloodborne pathogens at work.

### **1.6 STANDARDS OF PRACTICE**

All Bloodborne Pathogen kits will contain: 1) latex gloves, 2) antiseptic towelettes, 3) mask, 4) impervious apron, 5) mouthpiece, and 6) a red biohazard bag to dispose of all waste generated at the scene.

When working with trash or waste, Universal Precautions shall be taken as the first line of defense against occupational exposure to bloodborne pathogens. Therefore, at a minimum, all biological waste and any non-biological waste collected from locations in which bleeding has occurred, shall be considered and handled accordingly:

- Gloves will be worn at all times when gathering, containerizing, transporting, or destroying waste which has any chance of having been exposed to blood, other human fluids, or tissues.
- Do not overfill bags such that they cannot be easily and tightly closed without stretching the bags.
- All bags will be tightly closed or sealed prior to being taken from the area in which the waste was generated. Sealed bags shall not be left in the area in which they were filled, but shall be moved promptly to designated storage areas to await timely transportation to an approved destruction facility.

In work areas where there is a reasonable likelihood of exposure to blood or other potentially infectious materials, employees are not to eat, drink, apply cosmetics, smoke, or handle contact lenses.



As a minimum, all INDOT facilities shall have a First Aid kit and a Bloodborne Pathogen kit. These items shall be included in INDOT vehicles used for litter pickup.

### **1.7 HEPATITS B VACCINATION**

An employee assigned to a job that has been classified as involving a risk or occupational exposure to bloodborne pathogens shall be advised of the risk regarding current U.S. Public Health Service recommendations concerning HBV vaccination and shall be offered an opportunity to receive a Hepatitis vaccination.

If an HBV vaccination is recommended, the employee may:

- Receive the vaccination series, at no cost, during normal work hours no later than 10 working days after initial assignment to the job.
- Waive the vaccination by signing a waiver form, understanding that HBV vaccination will be made available should the employee's decision change.



## **2. CONFINED SPACE ENTRY PROGRAM**

### **2.1 DEFINITIONS**

#### **Confined Space**

A space that is large enough, and so configured, that an employee can bodily enter and perform assigned work; and has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and is not designed for continuous employee occupancy. [1910.146](#)

#### **Non-Permit Confined Space**

A space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

#### **Permit Required Confined Space (PRCS)**

A confined space that has one or more of the following characteristics:

- Contains or has a potential to contain a hazardous atmosphere
- Contains a material that has the potential for engulfing an entrant
- Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section
- Contains any other recognized serious safety or health hazards

Prior to entering confined spaces, employees shall use the alternative procedures worksheet or reclassifying permit space worksheet. Worksheets shall be kept for a period of one year.

#### **Alternative Procedures**

OSHA regulations allow permit spaces with actual or potential hazardous atmospheres to use alternative procedures for entry. These alternative procedures do not require the implementation of a full PRCS program.

#### **Reclassifying Permit Space to Non-Permit Space**

OSHA regulations also allow permit spaces to be reclassified as non-permit spaces by the total elimination of hazards. A permit space can be reclassified as a non-permit space if there are no actual or potential atmospheric hazards and if all the other hazards within the space are eliminated without entry into the space.



## Prevention of Unauthorized Entry

Signs shall be posted on all permit confined spaces stating "NO ENTRY".

### 2.3 RESPONSIBILITIES

Employees shall not enter any Permit Confined Space that cannot be entered by alternative procedures or reclassified as a Non-Permit Confined Space.

#### INDOT Responsibilities with Contractors

When contractors are involved in permit space entry work at a worksite, the supervisor of the worksite will inform the contractor and safety of the following information:

- The location of the permit spaces at our facility and those entries into these spaces are only allowed through a permit space program, alternative procedures, or space reclassification.
- Our rationale for listing the space as a permit space which has any identified hazards and our experiences with the particular space.
- Precautions that we have implemented to protect employees working in or near the space.
- Safety Director and/or supervisors will debrief with the contractor at the completion of entry operation, or during if a need arises, and if any hazards were confronted or created during their work.

#### Contractor's Responsibilities with INDOT

When a contracting company is hired to perform work in a PRCS, the contracting company ensure the following tasks are performed:

- Will inform INDOT of the permit space program that will be utilized.
- Provide documentation that each member of the PRCS has received all required training for entrance into a PRCS.
- Provide documentation that each member of PRCS rescue team is appropriately trained and that at least one member is certified in first aid/CPR. If an outside service is used the contractor must provide INDOT with the following information:
  - Name of Rescue Service
  - Telephone Number
  - Location
  - Approximate Response Time
- Hold a debriefing conference at the completion of the entry operation or during the entry operation (if needed) to inform the host employer of any hazards confronted or created.

### 2.4 TRAINING

Training shall be given to each employee who has access or potential access to a confined space. The amount and type of training needed will depend on the individual's duty assignment. The overall intent of this training is to give employees the understanding, knowledge, and skills necessary for the safe performance of their assigned duties in relation to confined spaces.



### **3. ELECTRICAL**

#### **3.1 GENERAL**

Safety-related work practices shall be employed to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts when work is performed near or on equipment or circuits which are or may be energized. Electrical Safety awareness, work activities, and training shall be in accordance with the most current applicable state and federal Occupational Safety and Health Administration (OSHA) regulations - General. - 1910.303, National Fire Protection Association (NFPA) standards, National Electrical Code (NEC), and manufacturer recommendations.

Additionally, Lockout/Tagout requirements shall be in accordance with the INDOT facilities and equipment Lockout/Tagout policy and procedures.

Only qualified employees are permitted to work on or near exposed energized electrical parts.

#### **3.2 TRAINING**

Employees shall be trained and familiar with the safety-related work practices that pertain to their respective job requirements. [1910.332\(b\)\(2\)](#)

Employees who are qualified workers (i.e. those permitted to work on or near exposed energized parts) shall, at a minimum, be trained in, and familiar with, the following: [1910.332\(b\)\(3\)](#):

- The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment. [1910.332\(b\)\(3\)\(i\)](#)
- The skills and techniques necessary to determine the nominal voltage of exposed live parts. [1910.332\(b\)\(3\)\(ii\)](#)
- The procedures to follow when working on exposed live parts, or are near enough to them, to be exposed to any hazard they present. [1910.303\(g\)\(1\)\(iii\)](#)
- Portable electric equipment that does not have a three prong plug or is not double insulated shall be protected by GFCI. [1910.304\(b\)\(2\)\(iii\)](#)

#### **3.3 SAFEGUARDS FOR PERSONAL PROTECTION**

Employees working in areas where there are potential electrical hazards shall be provided with and shall use, personal protective clothing and equipment designed to keep them safe from electrical hazards.

[1910.335, NFPA 70E](#)

Protective equipment shall be maintained in a safe, reliable condition and shall be periodically inspected or tested. [1910.335](#)





## **4. ERGONOMICS**

### **4.1 GENERAL**

Ergonomics is the science of fitting the job to the worker. Employees are most likely to work efficiently and accurately when their work environment contributes to a natural positioning of the body.

Ergonomic improvements can help employees feel better while they are working and they can minimize the probability of developing a Cumulative Trauma Disorder (CTD).

INDOT employees will be trained to recognize situations that can contribute to cumulative problems, which will minimize the chances of developing them.

### **4.2 RISK FACTORS FOR CUMULATIVE TRAUMA DISORDERS (CTD)**

There are several factors that place employees at increased risk of developing a cumulative trauma disorder. They include:

- Repetitive Motion - doing a job that requires performing the same movement continually.
- Excessive Force - doing a task that places extra pressure and strain on a particular part of the body.
- Awkward Posture - performing a function that places your body in an unnatural position.

There are a number of ways employees can reduce chances of developing a CTD:

- Making sure wrists are in the best position when typing.
- Adjusting chairs, materials, and computer monitors correctly for employee height
- Knowing how to lift properly

Employees shall report any physical signs of ergonomic stress to their manager or supervisor. Physical signs are identified as the following:

- Numbness, burning, or tingling in fingers.
- Pain in wrists.
- Loss of grip, muscle weakness.
- Fatigue or abnormal tiredness.
- Pain in the back, legs, feet, neck, or shoulders.

### **4.3 OFFICE ERGONOMICS**

The following measures can be taken to help relieve the strain:

- Select a sturdy chair with a firm, padded back that adjusts vertically and horizontally.
- Use a chair that swivels to avoid unnecessary reaching and twisting.
- Sit close to the desk to avoid slouching while working.
- Use a lumbar cushion or rolled towel if the chair does not support the lower back.



### **Computer Monitors or Visual Display Terminals (VDT)**

Many employees suffer from neck and shoulder problems. Correct placement of the VDT can relieve stress on the neck and shoulders.

Eye strain can also be a problem. Adjusting your screen for the minimum amount of glare and the best contrast will reduce the amount of strain on the eyes.

#### **Monitor Position**

You should be able to read the screen with your head up and facing forward. In order to do that, the monitor should be in front of you, rather than to the side, and at eye level or a little lower.

If you wear bifocals, the monitor should be positioned low enough for you to be able to read the screen without tilting your head back.

The viewing distance to the monitor is also important. Position it so that you can read it easily, without leaning forward or back in order to focus. Sitting for long periods of time with your neck pushed forward or back is a major source of neck and shoulder issues.

#### **Minimizing Eye Strain**

The two (2) main sources of eye strain from working with a VDT are glare and poor contrast.

If there is a glare from lamps, repositioning will help. If the glare is from window light, close the blinds to shut out the light and/or reposition the monitor.

Whatever the source of glare on the screen, it can be reduced by turning the desk so the monitor is at an angle to the light source, or by attaching an anti-glare filter in front of the screen.

If working with a color monitor, never use more than two or three colors and choose the colors that have good contrast – a light color on a dark background or a dark color on a light background.

#### **Lifting**

Before attempting to lift by hand, employees shall determine whether or not additional help will be needed to safely lift the load. Always warm up the body before lifting any load. This is a good way to prevent muscle strains and pulls. Simple stretches are a good way to warm up the body.

The general rules for lifting are:

- Place one foot along the side of the object to be lifted and the other foot behind it. Stability will be optimal if both feet are comfortably spread, with the rear foot positioned for the upward thrust of the lift.
- Keep the back straight and use the sit-down position. Keep in mind that the back itself is straight, not necessarily vertical. A straight back keeps the spine, back muscles, and organs of the body in correct alignment. Compression to the spine is minimized.
- Keep the chin tucked in so the neck and head continue the straight line formed by the back. Tucking in the chin also helps keep the spine straight and firm.
- Extend the fingers and hands around the object being lifted. Since fingers alone have very little power, be sure to use the strength of the entire hand.



- Draw the load close to the body with the arms and elbows tucked into the side of the body. When the arms are held away from the body, they lose much of their strength and power. Keeping the arms tucked in also helps keep the body weight centered.
- Be sure that the weight of the body is centered over the feet. This provides a more powerful line of thrust and ensures better balance. Start the lift with a thrust of the rear foot.



## **5. EXCAVATING AND TRENCHING**

### **5.1 GENERAL**

All digging operations require calling 811 at least 2 full working days in advance and confirmation of markings. All trenches and excavations that are located so as to create a hazard to employees shall be safeguarded or supported as necessary to safeguard employees working in or around such conditions. [1926.65](#).

#### **Emergency Response Plan**

Have a plan in place for requesting assistance from the nearest rescue/emergency medical services. Time is critical in rescue of a trapped victim.

### **5.2 SPECIFIC REQUIREMENTS**

A soil classification must be conducted and its type identified in accordance with *OSHA*. The following requirements are for when working around or in excavations:

- The sides of all excavations and trenches more than five (5) feet deep shall be guarded by a shoring system, sloping of the ground, or other equivalent means.
- In every trench four (4) feet or more in depth, there shall be a means of egress (secured ladder, ramp, or stairway) located every twenty-five (25) feet.
- Where employees might be exposed to vehicular traffic, employees shall wear proper INDOT issued or approved Hi-Vis Safety Garments and personal protective equipment (PPE). Signs, signals, barricades and/or flagmen may be required.
- Employees are not permitted under elevated loads handled by earth-moving equipment.
- All materials, tools, and equipment shall be stored at least two (2) feet or more away from the edge of the excavation.
- Adequate precautions shall be taken to prevent exposure to hazardous materials in the air or dangerous environments.
- If working in a bell-bottom excavation, employees may be required to follow the work practices developed for confined spaces.
- Employees shall not work in excavations in which there is accumulated water, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation.
- Where the stability of adjoining buildings, walls or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning shall be provided to ensure the stability of such structures for the protection of employees.
- Employees who are not required to be involved in the excavation shall stay out of the excavated area.
- Remote excavations must be backfilled, covered or barricaded (wells, pits, etc.).



- Daily inspections of all excavations shall be made by a competent person. If there is any evidence of possible cave-in or slides, all work in the excavation site shall cease until the necessary precautions have been taken to safeguard the employees.
- All employees shall be provided with and required to use personal protective safety equipment such as: hard hats, safety goggles, ear plugs and any other required safety equipment.
- Extra shovels and other tools used for rescue shall be provided at the work site at all times.
- The trench shall be refilled as soon as possible after the needed work has been performed.
- Care shall be taken with the movement of equipment and individuals around the open trench.
- Individuals shall stay away from the open trench and at a safe distance from the edges of the trench and the equipment filling area, until the trench has been filled to a safe level.

### 5.3 PROTECTIVE SYSTEMS

Protective systems are used as a method of protecting employees from: cave-ins, material that could fall or roll into an excavation, or from the collapse of adjacent structures. Designing a protective system is a complex operation because of the factors involved. [OSHA 1926 Subpart P](#)

Some of the considerations that must be taken into account are:

- Soil classification
- Depth of cut
- Water content of soil
- Changes due to weather and climate
- Superimposed loads (heavy equipment and materials)
- Vibrations
- Other operations in the vicinity

#### Types of Protective Systems

- Sloping and Benching
- Shielding (Trench Boxes or Trench Shields)
- Shoring System



## **6. FACILITIES AND LABORATORIES**

### **6.1 FACILITIES**

The following procedures need to be adhered to:

- Employees using mail carts, furniture dollies, hand carts or building service cleaning carts should not leave them unattended in passageways. When it is necessary to park them in the halls, they will be parked close to the wall, but never close to a doorway or hall intersection.
- Employees shall report any broken, cracked or humped tile on floors or turned up corners on rugs, which constitute a hazard. The report should be made to the person in charge of building maintenance or their supervisors.
- Employees should be familiar with the location of first aid supplies and emergency alarm stations. It is recommended that employees know the locations of fire extinguishers and be instructed in their use.
- Use the handrail when using stairs. Keep stairways clean and clear. Nothing shall be kept in stairwells.

### **6.2 OFFICE MACHINES, FURNITURE, AND EQUIPMENT**

Employees shall not operate a machine until they have been thoroughly trained to operate it safely. All machine guards must be kept in place and employees must follow the safety instructions for the machine being operated:

- Read instructions carefully before operating unfamiliar equipment.
- Always check machinery for frayed or broken electrical cords before using the equipment.
- If machinery sends off sparks, strong odor, smoke or feels tingly to the touch, immediately de-energize the equipment and report the situation to your supervisor. Be sure to post a sign warning others not to use the machine under any circumstances and use proper Lockout/Tagout procedures.
- Don't overload the electrical outlets in your office. Never break off the third prong on a plug so that it will fit into a two-prong receptacle.
- Disconnect electrical equipment before repair or maintenance. Electrical machines shall be shut off and the electrical circuit disconnected before attempting to adjust or clean the machine. Only qualified personnel will make the adjustments.
- File drawers will not be left open while unattended. The heaviest drawers will be at the bottom to avoid tipping the files. Employees should avoid opening more than one file drawer at a time. Always use the handle when closing file drawers.
- Telephone and power cords should not be left loose on the floor, or in any other position that could cause someone to trip. Arrange to have them shortened or anchored to a desk or wall.
- Broken veneer surface on desks and chairs will be repaired at once.
- Swivel chairs, file drawers and other unstable office equipment will not be used as a means of climbing or reaching. Ask for help, if it is necessary to move office equipment or furniture or when it is beyond your physical ability.



- When working with certain chemicals such as toner, or photocopier chemicals, take great care not to rub eyes. The use of gloves or other protective clothing may be necessary. Read all labels, the chemicals Safety Data Sheets and ask your supervisor about any precautions that you should take before using these chemicals.
- Avoid eyestrain from working at computers or working closely with various materials. This is done by looking up from your work and focusing on far away objects so that you can give your eyes a rest.

### 6.3 LABORATORIES

The department shall ensure that the hazards of all chemicals, equipment, procedures and testing methods are identified, and that information concerning these hazards is conveyed to laboratory employees through the Hazardous Communication Plan and Chemical Hygiene Plan. [1910.1450/1910.1200](#)

- The Hazardous Communication Plan provides information and instructions which will prevent chemical overexposure and, therefore, protect employees from adverse effects of hazardous chemicals.
- Avoid working alone in the building. Do not work alone if the procedures or chemicals have been designated as hazardous.
- Adequate ventilation, either natural or forced, will be provided in areas where volatile or toxic gases exist. Keep hazardous gases and vapors confined inside hoods.
- Keep adequate protection between you and any apparatus in which there is a chance of a flash or explosion.
- Stand to one side when opening doors of ovens containing explosive or highly flammable materials.
- When Bunsen burners or electric heaters are used, tables will be covered with nonflammable tops.
- Where strong acid is used, tables will be covered with an acid-resistant coating. Appropriate gloves must be used.
- When handling liquid chemicals, an eyewash station must be available for an employee's use within the room. [1910.151 \(C\)](#)
- For corrosive liquids, an eyewash station and shower are required within the work area for immediate emergency use.
- A 15-minute supply of water is required for eyewash stations. When an eyewash station or eyewash/shower is required and running water is available in the building, the eyewash station or eyewash/shower must be permanently plumbed and connected to the running water.







## **8. FALL PROTECTION**

### **8.1 GENERAL**

INDOT shall provide and ensure that fall protection systems are available to all employees requiring protection from falls.

Training shall be conducted by a competent person for any employee who might be exposed to fall hazards.

All working/walking surfaces shall have the strength and structural integrity to safely support INDOT employees. [1910.23](#)

### **8.2 SPECIFIC REQUIREMENTS**

Employees shall be protected from falling by the use of guardrail systems, safety net systems, or personal fall protection systems when the work is at least six (6) feet above the adjacent level or less than six (6) feet above dangerous equipment during construction activities. [1926.501\(b\)\(1\)](#)

Fall protection shall be used when working four (4) feet above a lower level in all maintenance activities. [1910.23\(a\)\(7\)](#)

At a minimum, these systems should be used when working in the following situations:

- Unprotected sides and edges
- Leading edges
- Hoist areas
- Holes
- Ramps, runways and other walkways
- Excavations
- Roofing work on low-slope roofs and steep roofs
- Pre-cast concrete erection
- Building construction
- Wall openings
- Walking/working surfaces not otherwise addressed
- Work in Confined Spaces

### **8.3 TRAINING REQUIREMENTS**

INDOT shall provide a training program for each affected employee. Each employee shall be trained in the following areas:

- 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.

When there is reason to believe that an employee who has been trained does not have the understanding and skills required, that employee shall be retrained.

Verification of training shall be through a written certification record. It shall contain the identity of the employee trained, date of training, and the signature of the trainer.

### 8.4 FALL PROTECTION SYSTEMS

Fall Protection Systems shall be provided in accordance with the requirements of the OSHA Fall Protection Standards. Fall Protection Systems are as follows:

- Guardrail Systems [1910.29\(b\)](#)
- Personal Fall Arrest Systems [1926.502](#)
- Positioning Device Systems [1926.502\(e\)](#)

### 8.5 CARE AND INSPECTION

#### Care of Equipment

- All fall protection equipment shall be formally inspected by a “competent” person at a minimum of once a year. The results of the inspection shall be documented and kept on file.
- Employees are responsible for inspecting personal fall protection equipment every time they use it.
- If equipment shows signs of wear or deterioration, tag it out of service and report it to the Safety Director.



## **9. FIRE PROTECTION, PREVENTION, AND EXTINGUISHERS**

### **9.1 GENERAL**

All INDOT buildings and required vehicles will have adequate fire protection equipment. All personnel will comply with building evacuation procedures. Emergency evacuation plans shall be posted in all INDOT facilities. [1910.39](#)

### **9.2 BUILDINGS**

All areas shall be equipped with an adequate amount of fire extinguishers. Fire extinguishers shall be at least ten (10) lbs. and shall be mounted so that the travel distance to the extinguisher does not exceed fifty (50) feet. Extinguishers shall be mounted and carefully located so as to be accessible in the presence of a fire, without subjecting the employees to possible injury. [1910.157\(c\)](#)

Extinguishers will be clearly identified with a sign marking its location and shall be securely mounted on a wall bracket. The top of the extinguisher shall not be more than five (5) feet from the floor. [1910.157\(c\)\(2\)](#)

### **9.3 VEHICLES AND EQUIPMENT**

All vehicles and equipment used to transport flammable and hazardous materials will be equipped with at least one ten (10) pound extinguisher, rated 10 B:C or higher.

This extinguisher is required on, but not limited to, the following vehicles and equipment:

- Oil distributor trucks
- Oil distributor trailers
- Tar kettles
- Any equipment required by manufacturer operations manual.

One five (5) pound extinguisher rated 10 B:C or higher shall be on dump trucks and snow removal vehicles.

Extinguishers will be securely mounted in a bracket on or inside the vehicle/equipment. [1910.106\(f\)\(ix\)](#)

### **9.4 INSPECTION AND MAINTENANCE**

The best time to stop a fire is before it starts. Even though buildings should be properly designed and constructed with fire safety features, periodic inspections are required. Supervisors will include periodic self-inspections in fire safety program:

- Extinguishers will be inspected monthly to ensure that they are in their designated places, that they have not been activated or tampered with, and to detect any obvious damage, corrosion or other impairments. An extinguisher showing defects will receive a complete maintenance check. [1910.157\(c\)\(2\)](#)
- Extinguishers will be thoroughly examined annually and if necessary, recharged, repaired or replaced. [1910.157\(f\)](#)



- Extinguishers removed for maintenance will be replaced by spare extinguishers during the period that they are gone. [1910.157\(c\)\(4\)](#)
- Extinguishers will have a durable tag securely attached to show the inspection date and signature or initials of the person who performed this service. [1910.157\(f\)\(16\)](#)
- Dry chemical extinguishers will be equipped with a pressure gauge or an indicator which is clearly visible without removing the extinguisher from the bracket. [1910.161](#)

### 9.5 INSPECTION REQUIREMENTS

Trained personnel will perform monthly and annual fire extinguisher inspections for the facility, vehicles and equipment for which they are responsible.

Monthly inspections shall consist of the following:

- Proper location and accessibility
- Necessary labels and tags
- Operating instructions present on nameplate and legible
- General condition of cylinder or shell and hoses
- Seals and tamper indicators not broken or missing
- Handle assembly for damage (pin in place)
- Pressure gauge reading in operable range or position
- Hose assembly for leakage and tightness
- Date and initial

Annual inspections shall consist of the following:

- Proper location and accessibility
- Necessary labels and tags
- Operating instructions present on nameplate and legible
- General condition of cylinder or shell
- Seals and tamper indicators not broken or missing
- Handle assembly for damage (pin in place)
- Pressure gauge reading in operable range or position
- Hose assembly for leakage and tightness
- Displacement or reposition of dry powder
- Hydrostatic test date
- Remove outdated tags or labels
- Date and initial

*Note:* The fire extinguisher must be removed from service if any of the following are found [1910.157\(g\)\(1-3\)](#):

- Any deficiency in mechanical parts
- Any deficiency in extinguishing agent
- Any deficiency in expelling means



- Outdated if non-rechargeable (12 years)
- If questionable in any way
- Hydrostatic test is out of date

### 9.6 FIRE EXTINGUISHER CLASSIFICATION

Fire extinguishers are classified to indicate their ability to handle specific classes and sizes of fires.

Labels on extinguishers indicate the class type and relative size of fire that they can be expected to handle.

Use the right extinguisher for the type of fire for which it is intended. The wrong extinguisher may spread the fire and/or be dangerous to the extinguisher operator. The four (4) types of fire extinguishers and their uses are as follows:

- Class A Extinguishers – Used for ordinary combustibles such as wood, paper, some plastics and textiles where a quenching-cooling effect is required. [1910.157\(d\)\(3\)](#)
- Class B Extinguishers – Used for flammable liquid and gas fires such as oil, gasoline, paint and grease. [1910.157\(d\)\(4\)](#)
- Class C Extinguishers – Used for fires involving electrical wiring and equipment. Class C fires are essentially either Class A or Class B, but also involve energized electrical wiring and equipment; therefore, the coverage of the extinguisher must be chosen for the burning fuel. [1910.157\(d\)\(5\)](#)
- Class D Extinguishers – Used for fires in combustible metals such as magnesium potassium, powdered aluminum, zinc, sodium, titanium, zirconium, and lithium. Persons working in areas where Class D fire hazards exist must be aware of the dangers in using Class A, B, or C extinguishers on a Class D fire, as well as the correct way to extinguish Class D fires. These units are not classified by a numerical system and are intended for a special hazard protection only. [1910.157\(d\)\(6\)](#)



## **10. FIRST AID AND CPR**

### **10.1 GENERAL**

First aid/ CPR/ AED training is offered to all employees. Employees are not required to administer First Aid/ CPR/AED; if they volunteer to provide aid they are protected by the Good Samaritan Law. [1910.266](#), [1910.151](#), [1926.50](#).

### **10.2 WHAT TO DO IN AN EMERGENCY**

All emergency situations are not the same, there are basic procedures that will apply:

- Call 911
- Do not move a victim unless absolutely necessary. Moving the victim could cause further injury; however, if the victim's position poses a life threatening situation, they should be moved to safety.
- Maintain an open airway and restore breathing if necessary.
- Control bleeding.
- Treat victim for shock.
- If the victim is conscious, reassure them that aid is on the way. Information regarding the victim's condition should be left to qualified medical personnel.
- Make the victim as comfortable as possible while waiting for aid.
- Remain at the scene until emergency help arrives.
- Discuss details of the occurrence only with police or other qualified authorities. Give only factual information related to the accident.

When you call, or when you send someone to call for emergency aid, remember to give as accurate a location as possible – highway number and reference post, number of persons injured, type of injuries, etc.

### **10.3 FIRST AID KITS**

INDOT provides first aid supplies which are readily available to all employees. Managers shall be responsible for ensuring that first-aid kits are procured, inspected and maintained. First aid kits shall be placed in all INDOT facilities and vehicles. The size and the content of the kit shall be appropriate for the area.



## **11. FLAMMABLE GASES AND LIQUIDS**

### **11.1 GENERAL**

Flammable liquid means any liquid having a flashpoint at or below 199.4 °F (93 °C). Flammable liquids are divided into four (4) categories as follows: [1910.106\(a\)\(19\)](#)

- Category 1 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point at or below 95 °F (35 °C). [1910.106\(a\)\(19\)\(i\)](#)
- Category 2 shall include liquids having flashpoints below 73.4 °F (23 °C) and having a boiling point above 95 °F (35 °C). [1910.106\(a\)\(19\)\(ii\)](#)
- Category 3 shall include liquids having flashpoints at or above 73.4 °F (23 °C) and at or below 140 °F (60 °C). When a Category 3 liquid with a flashpoint at or above 100 °F (37.8 °C) is heated for use to within 30 °F (16.7 °C) of its flashpoint, it shall be handled in accordance with the requirements for a Category 3 liquid with a flashpoint below 100 °F (37.8 °C). [1910.106\(a\)\(19\)\(iii\)](#)
- Category 4 shall include liquids having flashpoints above 140 °F (60 °C) and at or below 199.4 °F (93 °C). When a Category 4 flammable liquid is heated for use to within 30 °F (16.7 °C) of its flashpoint, it shall be handled in accordance with the requirements for a Category 3 liquid with a flashpoint at or above 100 °F (37.8 °C). [1910.106\(a\)\(19\)\(iv\)](#)

When liquid with a flashpoint greater than 199.4 °F (93 °C) is heated for use to within 30 °F (16.7 °C) of its flashpoint, it shall be handled in accordance with the requirements for a Category 4 flammable liquid. [1910.106\(a\)\(19\)\(v\)](#)

Safety Data Sheets (SDS) shall be on site and available for all hazardous materials.

Many adhesives, accelerants and solvents pose hazards. All liquids should be considered flammable unless their label clearly indicates otherwise. Conditions can change rapidly that extreme care is necessary whenever flammable liquids or gases are being used.

When handling flammable liquids and gases the following shall apply:

- Flammable liquid and gas storage areas will be located where public fire protection has access to the site.
- The telephone number of the local fire department and other emergency numbers will be posted at all telephones.
- Storage areas for flammable liquids or gases shall be located away from equipment, materials, or other structures that could become involved if a fire breaks out in the storage area.
- Structures to be used for the storage of flammable liquids or gases shall be fire-resistant and located away from burning, welding, and other operations involving the generation of heat.
- Structures to be used for the storage of flammable liquids or gases shall be well ventilated.
- In every storage room, there shall be one clear aisle at least three (3) feet wide.
- Containers holding more than thirty (30) gallons shall not be stacked one upon the other.



- Motors, switches and other electrical equipment (including light fixtures and bulbs) within such storage areas will be approved for these areas.
- Suitable fire extinguishers will be located within the area and adjacent to it. The outside extinguishers will be sufficiently distant to assure accessibility if a fire is to break out, but near enough to be useful.
- Containers from which flammable liquids are dispensed shall be grounded.
- Flammable liquids and gases will be stored in containers providing positive identification of the contents. If there is any question as to the contents of a container, it should not be used until it has been positively identified and labeled.
- The storage of flammable liquids and gases should be kept to the minimum needed. When there are more than twenty-five (25) gallons of flammable or combustible liquids in any one building, it will be stored in approved nonflammable storage cabinets that are labeled "Flammable Liquids".
- Not more than sixty (60) gallons of Class I and Class II liquids, or more than one hundred twenty (120) gallons of Class II liquids, may be stored in storage cabinets.
- Personnel having access to storage areas shall be trained in the characteristics of such substances, the exposures such characteristics create and the precautions that must be taken to avoid accidents.
- Flammable liquids shall be stored in tanks, closed containers or approved safety cans.
- Containers used for storing and dispensing flammable liquids shall be approved for such use. Flammable liquids shall not be dispensed into containers that are not approved.
- If a container has once been used for one substance, it should not be used for another until it has been thoroughly purged. Pouring oil into containers that previously held gasoline has resulted in many fires.
- Containers, nozzles, and related dispensing equipment should be identified as to use, be of an approved type, stored to avoid damage, and inspected regularly.
- The distance between any two (2) flammable liquid storage tanks shall not be less than three (3) feet.
- All above-ground storage tanks shall have a pressure relief venting device that will relieve excessive internal pressure caused by exposure to fires.
- Pumps, containers and other dispensing equipment shall be kept clean and free of contaminants.
- Tools used in storage and dispensing equipment shall be kept clean and free of contaminants.
- The transfer or mixing of flammable liquids will only be done in well-ventilated areas. Employees engaged in the handling of flammable liquids must be made aware of the importance of insisting that no sources of ignition be brought within the designated area. Damaged or faulty dispensing equipment or containers will be replaced or repaired immediately.
- Materials that will react with water shall not be stored in the same room with flammable or combustible liquids.





## 11.2 USE OF FLAMMABLE LIQUIDS AND GASES

Use only approved solvents for cleaning operations. Never use gasoline. Never use flammable liquids in the presence of welding, burning or other operations involving open flames, sparks, or the generation of heat. Never use containers that do not positively identify the contents.

All heat producing equipment will be cleaned, inspected and kept in good working condition to prevent accidental ignition.

Dispose of wiping rags, etc. in approved containers. Containers of flammable liquids should be returned to proper storage areas at the close of each day.

Many petroleum products are toxic and flammable. Avoid any prolonged contact with the skin. Most flammable gases and liquids are asphyxiates.

Do not use solvents or gasoline to clean your skin. Use a cleaner that does not irritate skin and plenty of soap and water.

## 11.3 IF A FIRE SHOULD OCCUR

INDOT employees are not required to put out fires.

Notify others of a fire (pull fire alarm), go to "head count area", and then call 911.

INDOT employees may "Voluntarily Use," fire extinguisher and or fire hose and equipment, for small developing fire if employee has been properly trained on how to use fire equipment. If the fire has grown out of control (past the incipient stage), instead go to head count area and allow emergency personnel to respond. Employees are not permitted to re-enter the area until cleared by emergency personnel.

## 11.4 PURGING TANKS AND CONTAINERS

Tanks or containers that have contained flammable liquids or gases shall be thoroughly purged before any repair work is attempted. The proper purging of tanks that contained flammable liquids or gases requires adequate facilities and trained personnel.



## **12. HARD HAT**

INDOT shall ensure that employees wear a protective helmet when working in areas where there is a potential for injury to the head from falling, flying objects or electrical shock. [1910.135 \(a\)\(1\)\(2\)](#)

### **12.1 POLICY**

All employees shall wear head protection (hard hat/bump cap as appropriate) when they are:

- On a job site
- Actively working on a job site, in the lot, unit buildings or in field activities
- Operating equipment
- In the proximity of heavy equipment
- Observing a job site, work being done in the lot, unit buildings or in field activities
- Along the roadway or beyond the right of way
- Working inside wash bay

### **12.2 USAGE**

- Protective helmets will not be altered in any way. (No paint or stickers unless prior approval by District Safety Director).
- Helmets shall be inspected by employee regularly for cracks, chips, scratches and signs of wear exposure. Defective damaged or deteriorated helmets shall be disposed of immediately and replaced.
- Hard hats shall be replaced in accordance with manufactures recommendations.
- Hoodies/rain gear/stocking caps shall not be worn under a hard hat. It is generally acceptable to wear most tight-fitting fabric stocking caps (skull caps), weld caps, winger liners, etc. under any hard hat certified to meet the ANSI/ISEA Z89.1-2009 standard.

### **12.3 EXEMPTIONS**

Head protection is not required while inside equipment with a fully enclosed cab, a vehicle; car, truck, stake bed, dump truck and semi where risks from overhead hazards are minimal.

### **12.4 HARD HAT SELECTION**

Only approved, INDOT- issued hard hats may be used.

### **12.5 MAINTENANCE AND STORAGE**

Protective helmets shall not be placed in windows of vehicles where they will be exposed to sun or become projectiles during an accident.



## 12.6 BUMP CAPS

Bump caps are described as a lightweight head protection cap worn to prevent bumps and scrapes. Bump caps do not replace the requirements for wearing hard hats as outlined in this chapter.

All employees working under vehicles that are hoisted on a lift shall wear INDOT approved Bump caps as well as employees working in vehicle/equipment repair shops, personnel performing maintenance on or around equipment including sedans, trucks heavy equipment, etc.

This policy does not eliminate the need for all of us to use sound judgement. Situations will differ, and appropriate precautions should be taken to prevent exposure to potential injury.



## **13. HAZARD COMMUNICATION**

### **13.1 GENERAL**

It is the policy of INDOT to ensure that the hazards of all chemicals found in the workplace are identified and that information concerning these hazards is communicated to all INDOT employees and contractors. This policy is implemented through the Hazard Communication Program. All INDOT employees shall be trained on operations where exposure to the hazards of chemicals may occur and how employees can access this program, as well as labels and Safety Data Sheets (SDS). [1910.1200](#)

### **13.2 LIST OF CHEMICALS BY WORK AREAS**

A list of hazardous chemicals utilized at each INDOT facility will be the same as that on the container label and the Safety Data Sheet for that chemical. This list shall be maintained with Safety Data Sheets and made available for review at all times. [1910.1200 \(e\) \(1\) \(i\)](#)

### **13.3 SAFETY DATA SHEETS (SDS)**

Safety Personnel will be responsible for establishing and monitoring the SDS program. Copies of SDS for the hazards of all chemicals to which employees are exposed or are potentially exposed shall be kept in designated areas. Employees shall have access to SDS at all designated areas.

The worksite supervisor will be responsible for reviewing the SDS received for safety and health implications and initiating any needed changes in work place practices.

INDOT shall rely on the chemical manufacturers from whom it purchases chemical products to evaluate the hazards of the chemicals utilized at INDOT facilities. Safety Data Sheets, for chemicals used in the work place, are expected to be provided by all chemical manufacturers and/or distributors.

SDS for each hazardous chemical utilized at all INDOT facilities shall be maintained in the work area clearly marked and made readily available to all employees.

### **13.4 LABELING PROCEDURES AND OTHER FORMS OF WARNINGS**

Supervisors shall ensure that all containers of chemicals received for use and on the job site are properly labeled, including a product identifier, pictogram, hazard statement, signal word, precautionary statements and the suppliers contact information. (Name-address-phone number).

Supervisors in each work location or INDOT facility shall ensure that all secondary containers are labeled with the original suppliers label or with an alternative workplace label.

All containers of hazardous materials received at INDOT facilities must be accompanied by a manufacturer's label, including a product identifier, pictogram, hazard statement, signal word, precautionary statements, and manufacturer contact information. These labels will vary by manufacturer. Labels must contain information related to the critical components of hazard communication in terms of identity, health hazards, flammability ratings, reactivity, physical hazards, and personal protective equipment recommendations. Manufacturers' labels meeting these requirements are sufficient and are permissible for containers in INDOT facilities.



When materials are transferred from the (original) containers, or the manufacturer's label becomes defaced or mutilated, the following shall apply:

- All containers of hazardous materials at INDOT facilities that are originated through transfer from the original container to a secondary container, or containers in which the manufacturer's label becomes destroyed shall have alternatives such as third party systems e.g.: Employees shall have complete access to hazard information.
- INDOT will rely upon the manufacturer's labeling system as the primary labeling system.
- Upon receipt of the SDS for a chemical purchased from a retail supplier, the label information shall be compared to the information on the SDS. Inquiry shall be made by contacting the manufacturer and or distributor regarding any discrepancies and a record of all telephone and or e-mail inquiries shall be maintained.
- No INDOT employee shall purchase chemical products for use at a facility from local wholesale or retail establishments unless the immediate supervisor has approved the purchase in advance. A supervisor shall then inform the affected employees of the new hazardous chemical and review SDS and hazards with them.
- Labels shall be checked on a regular basis and any that are damaged or missing shall be replaced. [1910.1200 \(f\)](#)

### 13.5 NON-ROUTINE TASKS

A non-routine task is one for which employees have not received special training. In general, non-routine tasks are carried out on an infrequent basis. Examples include: mixing or applying hazardous chemicals, cleaning equipment which contained chemicals, etc.

When a non-routine task is to be performed, all information shall be conveyed to the employees regarding the hazards of the chemicals he or she may encounter during such activity. This information shall include specific chemical hazards, personal protective equipment, safe work practices and steps INDOT has taken to reduce the hazards. [1910.1200 \(e\) \(1\) \(ii\)](#)

### 13.6 PROCEDURES OF CONTRACTOR INFORMING OF WORKPLACE CHEMICAL HAZARDS

The contractor shall provide the INDOT Work Site Supervisor with the SDS information for the hazards of all chemicals being brought into the work area(s). Also, INDOT Work Site Supervisor shall provide the contractor SDS for the hazards of all chemicals that may be encountered by the contractor and contractor employees. [1910.1200](#)

### 13.7 PROCEDURES FOR INCIDENTAL SPILLS

Incidental spills shall be referred to as the release of a hazardous material on INDOT properties and INDOT knows the hazardous contents of the material and will have the means to safely clean up the spill.

Should an incidental spill occur, the SDS shall be consulted to determine the safest method to use for clean-up. Notify affected employees in the work area of the spill and Supervisor if necessary. If possible



use a spill kit to clean it up immediately. If more than an incidental spill, contact Supervisor, Safety Personnel, and Indiana Department of Environmental Management (IDEM) for appropriate clean-up.



## **14. HAZARDOUS MATERIAL ACCIDENTS/INCIDENTS**

The Indiana Department of Transportation (INDOT) will cooperate with other local, state, and federal governmental agencies and private emergency services organizations in accidents/incidents involving hazardous materials on the highways to minimize the loss of life, property, and environmental damage and to ensure that highways are safely opened to public traffic following the clean-up of the incident site.

### **14.1 PROCEDURE**

When INDOT employees approach the upwind direction of the scene of an accident/incident involving (or suspected of involving) hazardous materials:

- Stop at least 500 feet from the accident scene or, if closer when the accident is observed, retreat immediately to that distance and set up a roadblock to stop traffic.
- Using any means available, set up a roadblock on the downwind site to stop traffic at least one-quarter mile from the scene.

When INDOT employees approach from the downwind direction the scene of an accident/incident involving (or suspected of involving) hazardous materials:

- Stop at least one-quarter mile from the accident scene or, if closer when the accident is observed, retreat immediately to that distance and set up a roadblock to stop traffic.
- Using any means available, set up a roadblock on the upwind side to stop traffic at least 500 feet from the scene.

The "upwind" or downwind" crew which arrives first at the scene shall contact the next approaching crew and direct them to the opposite end of the accident. They both shall then size-up the scene to obtain as much of the following information as possible.

- Exact location
- Arrival time
- Identification of carrier and its telephone number.
- Shape of container
- Placards/labels/material identification (exact spelling)
- Physical hazards (fire, spill or leaks)
- Wind direction and other pertinent weather conditions
- What is at risk? People, property, or environment.
- Injuries
- Drains, sewers, or surface waters nearby



The roadblock crew shall transmit its recorded observations to the nearest INDOT District or Subdistrict facility.

- The District or Subdistrict facility receiving the report shall record the information and read it back to the roadblock crew for confirmation.
- The identification number shall be repeated and the name of the hazardous material spelled by both the roadblock crew member and the person at the District or Subdistrict receiving the report until confirmation of the number and the name of the hazardous material is confirmed as accurate.

The District or Subdistrict person receiving the report from the roadblock crew at the scene shall contact the following agencies by radio or telephone in the order they are listed below to report the information:

1. Indiana State Police (Motor Carrier Division) Nearest Post
2. Indiana Department of Environmental Management (IDEM)(888-233-7745)
3. County Sheriff's Office
4. Local Fire Department
5. District Safety Coordinator
6. District Environmental Coordinator

Roadblock crews will remain at their locations near the scene to await the arrival of local and/or state emergency response personnel.

When emergency response personnel arrive at the scene, INDOT employees shall, from their roadblock positions, assist by performing only the following functions:

- Continue the roadblocks in both directions or, if requested by emergency response personnel, partially remove the roadblock to permit traffic flow.

**It is the duty of the Incident Commander to determine a safe perimeter around the site as well as determine when it is safe to reopen the roadway. In no case will INDOT employees move from their roadblock position to locations closer to the accident scene until the Incident Commander deems the area safe.**

When an INDOT supervisor arrives at the scene they will assume supervisory authority for roadblock crew members and shall be responsible for discussions with the incident commander of the emergency response personnel. An incident commander is the person, normally the fire chief of the impacted area, who is in charge of the emergency response site. The INDOT supervisor is authorized to direct roadblock crew members to perform only the following function once the incident commander has established that the accident scene is safe for a closer approach:





- Transporting sand or other material to the scene and dumping or distributing sand or other material by truck or by hand, as long as no INDOT equipment or employee goes beyond the safety perimeter. Sand dikes shall be constructed at a safe distance from the area covered by or saturated with the spilled material.

No other functions are permitted to be performed by INDOT employees. **At no time shall any INDOT personnel go beyond the safety perimeter established by the incident commander.** INDOT employees or equipment shall not be used to:

Remove sand or other materials contaminated or assumed to be contaminated by the spilled hazardous material from the scene.

Remove drums, bags, boxes, or any other containers – with contents or empty – from the scene.

Remove accident victims – injured or not – from the scene.

Perform site clean-up of spilled materials or equipment used at the scene.

No INDOT facility or highway rights-of-way shall be used for the temporary storage of containers or piles of hazardous materials or contaminated diking materials or soil from rights-of-way collected from an accident scene clean-up or containers or materials abandoned in highway right-of-way or on other State of Indiana property.

If it is necessary to close the roadway, the party carrying the hazardous materials must act within a reasonable timeframe to initiate clean-up operations. If they cannot or fail to make such arrangements, the State of Indiana will call in a clean-up contractor to the scene. The State Police, Division of Motor Carriers, acting as this agent for the state, will be responsible for making this call after consulting with INDOT, Indiana Department of Environmental Management (IDEM), and the local Fire Department.

When material or containers are abandoned on highway right-of-way, the above procedure is to be followed where practical.

INDOT will request direction from the Indiana Department of Environmental Management (IDEM) for the clean-up and containment operations. INDOT shall coordinate with IDEM to ensure that the pavement, shoulders, drainage, traffic control devices, etc. are restored to acceptable INDOT standards. IDEM will provide assistance either through telephone communication or by on-scene assistance.

A record shall be made of all expenses incurred (wages, materials, vehicles, equipment) in these operations so that the appropriate company or individual will be billed. The district will prepare a memorandum to the Accounting and Control Division showing all expenses incurred and the name and address of the company or individual to be billed.



## **15. HOUSEKEEPING**

Good housekeeping is one of the most important factors in enhancing safety, efficiency and fire protection. Good housekeeping guidelines include the following: [1910.141](#)

- Walkways and working areas should be kept clean, dry and unobstructed.
- All spills should be cleaned up immediately.
- Aisles and exits should be free of unnecessary tools, parts and equipment.
- Extension cords and hoses (air, water, etc.) should be stored properly, when not in use.
- Materials and supplies should be stacked properly and only to a height that is stable.
- Stored items should not be stored so they overhang or protrude into work areas or aisles.
- In storage areas, items should not block heaters, exits, or fire extinguishers.
- Trash containers shall be labeled, emptied regularly, and not allowed to overflow.
- Oily rags must be kept in a labeled, covered, metal container to prevent fire hazards.
- Hand tools and other equipment should be stored so they will not fall or protrude into aisles or work areas.
- All containers shall be clearly labeled as to their contents and covered.
- All fire extinguishers, first aid kits, spill kits, breaker boxes, eye wash stations, emergency showers, and other safety related items must not be blocked or obscured and shall be clearly identified.



## 16. LOCKOUT/TAGOUT

### 16.1 GENERAL

This standard covers the servicing and maintenance of machines and equipment in which the unexpected energization or startup of the machines or equipment, or release of stored energy, could harm employees. This standard establishes minimum performance requirements for the control of such hazardous energy. Every employee has the responsibility to identify inadequate equipment. It is the employee's responsibility to then notify an "Authorized Employee." [1910.147](#)

### 16.2 ENERGY CONTROL PROCEDURES

Procedures specified in this written program shall be used by employees to control potentially hazardous energy when engaged in the activities covered in these procedures. The procedures clearly and specifically outline the scope, purpose, authorization, rules, and techniques to be utilized for the control of hazardous energy and the means to enforce compliance, including but not limited to the following:

[1910.147 \(c\) \(1\)](#)

- A specific statement of intended use of the procedure.
- Specific procedural steps for shutting down, isolating, blocking, and securing machines or equipment to control hazardous energy.
- Specific procedural steps for the placement, removal, and transfer of lockout or tagout devices and the responsibility for them.
- Specific requirements for testing machines or equipment to determine and verify the effectiveness of lockout devices, tagout devices and other energy control measures.
- Specific identifiable lockout or tagout devices shall indicate the identity of the employee who applied the devices.

### 16.3 TRAINING AND COMMUNICATION

#### Employee Training

Training will provided to ensure that the purpose and function of the energy control program is understood by employees, and that the knowledge and skills required for the safe application, usage, and removal of energy control devices are understood by the employees. The training shall include the following:

- Each authorized employee shall receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.
- Each affected employee shall be instructed in the purpose and use of the energy control procedure.
- All other employees whose work operations are, or may be, affected by this policy shall be instructed about the procedure and about the prohibition relating to attempts to restart or re-energize machines or equipment which are locked or tagged out.



### **Employee Re-training**

Re-training shall be provided for all authorized and affected employees whenever there is a change in their job assignments, a change in machines, equipment, or processes that present a new hazard, or when there is a change in the energy control procedures. Re-training shall also be conducted whenever a periodic inspection reveals, or whenever an authorized person has reason to believe, that there are deviations or inadequacies in the employee's knowledge or use of energy control procedures.

### **16.4 GROUP LOCKOUT/TAGOUT PROCEDURES**

When servicing and/or maintenance is performed by a crew, team, department or other group they shall utilize a procedure that affords the employee a level of protection equivalent to those provided by the implementation of a personal lockout/tagout device.

Group lockout/tagout devices(s) shall be used in accordance with the procedures required by INDOT, but not necessarily limited to the following specific requirements:

- Primary responsibility is vested in the authorized employee, for the set number of employees, working under the protection of a group lockout/tagout device.
- The authorized employee shall ascertain the exposure status of individual group members with regard to the lockout/tagout of the machine or equipment.
- When more than one crew, team, or department is involved assignment of overall job-associated lockout/tagout control responsibility will be made to an authorized employee designated to coordinate affected work force and ensure continuity of protection.

### **16.5 SHIFT OR PERSONNEL CHANGES**

Specific procedures shall be utilized during shift or personnel changes to ensure the continuity of lockout/tagout protection including provisions for the orderly transfer of lockout/tagout devices between off-going and on-coming employees to minimize exposure to hazards from the unexpected energization, start-up of the machine or equipment, or release of stored energy.



## **17. MACHINE GUARDING**

### **17.1 GENERAL**

Guarding shall be provided to protect the operator and other employees in the machine area from hazards such as those created by: rotating parts, ingoing nip points, point of operation, flying debris, and sparks. Unguarded moving parts and or equipment, when in motion are potentially hazardous to employees. Rotating members, reciprocating arms, moving belts, meshing gears, cutting teeth, and parts that impact or shear are all examples of the types of action and motion requiring guards. They are not peculiar to any one machine, but are basic to the mechanical devices used for productive purposes.

[1910.212 - 219](#)

Any rotating object is dangerous. Even smooth, slowly rotating shafts, belts or pulleys can grip clothing, hair, jewelry and through mere contact, can force an arm, hand or your body into a dangerous position.

Do not wear loose clothing or loose jewelry and long hair shall be pulled back or tucked up in hat or hair net when operating and or exposed to machinery and equipment with unguarded rotating parts such as but not limited to: drill press, lathes, etc.

Machine design should permit routine lubrication and adjustment without the removal of guards. But when guards must be removed and the machine serviced, the INDOT Lockout/Tagout procedures must be adhered to. No machine should be started and/or operated unless the guards are in place and in good condition.

### **17.2 TRAINING**

Safety training is necessary for new operators and maintenance personnel when any new or altered safeguards are put into service, or when workers are assigned to a new machine or operation.

Thorough operator training should involve instruction and hands-on training in the following, but not limited to the following:

- 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), and what to do (e.g., contact your supervisor) if a safeguard is damaged, missing, or unable to provide adequate protection.
- Follow the manufacturer's recommendations (read and follow the operator's manual).

### **17.3 SPECIFIC REQUIREMENTS**

#### **Abrasive Wheels on Bench Grinders**

Abrasive wheels shall be used only on machines provided with safety guards. The safety guard will cover the spindle end, not flange projections, and will be mounted to maintain proper alignment with the wheel. The strength of the fastening will exceed the strength of the guard. The exposed area of the



grinding wheel, and sides for the safety guards will not exceed more than one-fourth (1/4) of the entire wheel. Work rests should be kept adjusted close to the wheel, with a maximum distance of one-eighth (1/8) of an inch. Tongue guards shall be adjusted close to the wheel, with a maximum distance of one-fourth (1/4) of an inch. [1910.215](#)

### **Circular Saws**

Circular saws will be provided with a hood that covers the teeth of the saw at all times. The hood should adjust itself automatically to the thickness of, and remain in contact with, the material being cut. [1910.212](#), [1910.213](#)

### **Table Saws**

Table saws shall be provided with a hood that covers the teeth of the saw at all times. The hood should adjust itself automatically to the thickness of, and remain in contact with, the material being cut. A spreader and anti-kickback device shall be provided. The exposed part of the saw underneath the table will be guarded. Push sticks shall be used when materials being cut are too small to be held safely by hand. [1910.212](#), [1910.213](#)

### **Radial Arm Saws**

The upper hood shall completely enclose the upper portion of the blade, down to a point that will include the end of the saw. In addition to a hood enclosing the blade, an adjustable stop should be provided to prevent the forward travel of the blade beyond the position necessary to complete the cut. When used for ripping, a spreader and an anti-kickback device should be provided. [1910.212](#), [1910.213](#)

### **Drill Presses**

The V-belt of all drill presses, including usual front and rear pulleys, shall be guarded to protect the operator from contact or breakage. All drill presses shall be mounted securely to the floor. [1910.212](#), [1910.219](#)

### **Fan Blades**

All fan blades that are or may rotate (such as but not limited to: portable, mounted, and/or ceiling fan blades), lower than seven (7) feet in height or within working reach level shall be guarded. The guard will have openings no larger than one-half (1/2) of an inch. [1910.212\(a\)\(5\)](#), [1910.217](#)



## **18. MATERIAL HANDLING AND STORAGE**

### **18.1 GENERAL**

Materials should be segregated as to kind, size, and length. They should be placed in neat orderly stacks which are safe from falling, and well labeled. If the stacks are high, they should be stepped back as the height increases, and should be secured by cross piling or cross typing. Stacks of materials should be arranged to allow for passageways.

Materials placed on roads should be well guarded, have suitable warning signs in the day time, and have flashing lights on and around them at night. [1910.126](#)

When possible, work will be scheduled to avoid leaving materials on roads at night.

### **18.2 STACKING AND PILING**

Employees shall be trained on proper methods for stacking and piling of materials with machinery. The following is a list of requirements when stacking and piling materials.

- Each stack should have a firm foundation.
- Round objects shall be blocked or bracketed so that they cannot roll.
- Tiers shall be cross-piled or tied so that materials support each other, if possible.
- Material shall be piled only high enough for safe lifting, handling, and storage.
- Material shall be leaned away from aisles to prevent toppling.
- Stacks shall be broken down from the top, with step backs or taper maintained.
- Materials shall not be stored as to block aisles, fire escapes, fire protection equipment, electrical panels, and other safety equipment.
- When a mechanical lifting device is used, the load shall be secured and workers shall stay out from under the load as it is lifted.
- Employees shall watch for pinching conditions, splinters, slivers, and protruding nails.

### **18.3 STACK MATERIALS**

The following is a list of requirements in regards to sack materials.

- Sacked materials such as fertilizer, glass beads, calcium chloride, and cement should be carefully stacked when placed in storage and carefully removed so as to keep the stacks in a stable condition.
- Material will be stored so as not to create a hazard. Bags stored in tiers will be stacked, blocked, interlocked, and limited to height so that they are stable and secure against sliding or collapsing.
- When materials are removed from sacks and stored in a secondary container, the container shall be properly labeled.



## 18.4 BARRELS

The following is a list of requirements in regards to barrels.

- Barrels shall never be stacked more than two (2) barrels high.
- When removing the top of a barrel, a barrel cutter should be used instead of a cutting torch.
- When handling barrels with mechanical equipment, use appropriate barrel handling equipment.
- Full barrels shall never be stacked on top of empty barrels.
- Never use barrels to support equipment or heavy objects. Barrels used as secondary containers must be properly labeled.
- Empty barrels shall be stored on their sides with the bungs or lids replaced and properly blocked.

## 18.5 PIPE AND ROUND POST STORAGE

The following is a list of requirements in regards to round post storage.

- All pipes, round wood, or concrete posts will be carefully stacked and blocked at the end of the pile to prevent spreading or rolling.
- When removing pipe, round posts, or barrels from a stacked pile the top items will be removed first, and employees will do this while standing at the ends of the piles to safeguard themselves from injury in case the pile should roll.
- Concrete culvert pipe twelve (12) inches or more in diameter will be lifted and handled only by machinery. Persons guiding the pipe while it is in the air will not stand beneath the load or get into a position where the load could swing and crush them against a stationary object.
- Whenever possible, a pipe hook should be used for lifting culvert pipe 12 inches or more in diameter. The hook should be of the proper size for the pipe being handled.

## 18.6 CHAINS, ROPES, SLINGS, AND HOISTS

Special safety precautions apply to using and storing chains, ropes, slings, and hoists.

Chains shall be visually inspected to detect the following:

- Bent links.
- Cracks in weld areas, in shoulders, or in any other section of link.
- Traverse nicks and gouges.
- Stretching – If the total length of chain from hook to hook changes from original, take out of service immediately.
- Chains shall be used according to grade type and the approved working load limits.
- Alloy steel chain (Grade 80) is the only chain approved for overhead lifting. Carbon steel chains (Grade 30, 40, and 70) are used for many general utility purposes, but are not to be used for overhead lifting.
- Never use a chain that is twisted or kinked. Twisted or kinked chains shall be discarded.
- Never splice a chain by inserting a bolt between two links.
- Do not use a hammer to force a hook over a chain link.
- Do not use a chain over corners or edges if it can be avoided.





- Sudden shifts and overloading shall be avoided. The weight of objects should be known before lifting or pulling. Objects should be lifted or pulled smoothly and gradually.
- Chains not in use should be stored in a rack or other suitable container. Do not let them lie on the ground or floor where they can be damaged.

### Ropes-Wire

Wire rope (cable) shall be used according to working load limits, manufacturer's instructions and recommended safety procedures. Wire rope shall be lubricated and inspected according to manufacturer's instructions. The following is a list of requirements in regards to wire ropes.

- Leather-palmed gloves or puncture proof gloves shall be worn while handling wire rope and steel cable.
- Wire rope and cables shall be inspected before and after each use and replaced if they are frayed, damaged or show signs of excessive wear.
- Once a kink is formed in a cable it shall not be used for lifting, pulling, or hoisting purposes.
- The proper method of applying a clip to a cable is to always have the u-bolt over the short end and the clip over the part that carries the load. Clips shall be installed in accordance with manufacturer's recommendations. A thimble shall be used when wire rope or cable is to be looped.

### Ropes-Fiber

The following is a list of requirements in regards to fiber ropes:

- Ropes shall be inspected frequently for broken strands, cuts and worn or frayed spots. Unsafe rope shall be replaced.
- Do not overload a rope. Once a rope has been overloaded, it has weakened and shall not be used.
- Avoid shock-loading, jerking and over stressing rope.
- Do not drag a rope across the ground, rough or sharp objects, or constantly across another rope.
- Ropes should be dried thoroughly after use. Frozen or wet ropes should not be placed against a heat source for quicker drying.
- Rope shall be coiled and properly stored in a dry place when not in use.

### Slings

The following is a list of requirements in regards to slings:

- All alloy steel chain slings shall have a permanent ID tag stating size, grade, rated capacity and reach.
- All chain slings and chain sling components are required to be alloy steel (grade 80).
- Items to be lifted must not exceed the working load limit of the sling.
- The load shall be equally distributed between the legs of the sling. The sling assembly shall not be exposed to impact, rapid lifts or sudden stops.
- Slings used in a basket hitch shall have the loads balanced to prevent slipping.
- Employees shall be kept clear of loads being lifted and of suspended loads.
- When using slings, avoid pinch points with hands and fingers.



- Before using slings, they shall be inspected by a competent person. Additional inspections shall be performed during use, where service conditions warrant. A thorough inspection of alloy steel chain slings are required based on sling usage; however, the inspection interval shall not exceed 12 months. Written documentation of the thorough chain sling inspections shall be kept on file.
- Increasing the angle between the sling leg and vertical increases the stress on each leg of the sling even though the load remains the same. The recommended maximum angle is 45 degrees.

### Hooks

The following is a list of requirements in regards to hooks:

- Hooks shall be of the same or greater grade as the chain to which they are attached. Chains used for lifting shall be completely within a hook so that the chain cannot slip and the hook will not be bent. Do not place a load on the tip of the hook.
- Hooks with throat openings fifteen (15%) percent greater than original, or twisted 10 degrees out of line, shall be discarded and not used.
- Safety gates should be used on hooks to prevent roll-out.

### Hoists

The following is a list of requirements in regards to hoists:

- Scheduled, detailed inspection of all hoists, with special attention to load hooks, ropes, brakes, and limit switches, shall be performed each day before use. Additionally, hoists shall be inspected by a certified vendor annually and documentation kept on file at that location.
- The safe load capacity of each hoist should be shown on the hoist body of the machine.
- Loads should only be picked up only when it is directly under the hoist.
- Hoists shall not be used to lift, support or transport people.



## **19. MOBILE DEVICES**

The use of mobile devices while at work may present a hazard and/or distraction to the employee and fellow employees working in the same area.

Mobile devices are defined as portable computing and/or communication devices, including but not limited to cellular phones, smart phones, laptops, and tablets.

The use of mobile devices shall not pose a safety hazard or disrupt business operations. INDOT work activities, the safety of personnel, and safe operational procedures shall not be jeopardized by the use of mobile devices. Each work activity and work environment is unique and it is vital that employees evaluate the work activity and work environment for the safest possible locations to utilize a mobile device.

The use of mobile devices while driving is strongly discouraged. INDOT encourages all employees to use hands-free devices. If a hands-free device is not available, employees should pull over to the side of the road at the safest opportunity or pull into a rest stop or parking lot and stop the vehicle. Texting and/or reading text is not permitted while driving at any time. ([Indiana Code § IC 9-21-8-59](#))

Employees that are driving a Commercial Motor Vehicle (CMV) shall not use a hand-held, cellular phone. Driving means operating a commercial motor vehicle, including while temporarily stationary because of traffic, traffic control device, or other momentary delays. Using a hand-held mobile telephone is only permissible by drivers of a CMV when necessary to communicate with law enforcement officials or other emergency services. ([Federal Code 49 C.F.R 392.82](#))

Employees working on jobsites and/or within work zones shall find a “safe zone” for use. Employees shall not use mobile devices:

- While driving through work zones/jobsites
- While walking through work zones/jobsites
- Near moving vehicles and/or heavy equipment without a physical barrier

Employees are responsible for ensuring the safe use of mobile devices in accordance with agency, local, state, and federal laws. Failure of employees to comply may result in disciplinary action up to and including dismissal.

Supervisors and managers are responsible for ensuring employee compliance with agency, local, state, and federal laws. Failure of supervisors and managers to comply may result in disciplinary action up to and including dismissal.



## **20. OCCUPATIONAL HEALTH & ENVIRONMENTAL CONTROLS**

### **20.1 GENERAL**

Occupational health and environmental controls aimed at reducing employee exposure to airborne contaminants, materials or noise is of utmost importance in terms of employee safety and providing INDOT employees with a safe place in which to work.

### **20.2 SANITATION**

An adequate supply of potable drinking water shall be provided at all work places. Portable containers used to dispense drinking water shall be capable of being tightly closed and be equipped with a tap. Drinking water containers will be clearly marked "DRINKING WATER". Where single-service cups are supplied, they will be provided in a sanitary container.

Non-drinking water will be clearly marked "NON-POTABLE" to indicate that the water is unsafe and not to be used for drinking or washing purposes.

It will be the responsibility of employees engaged in the application of paints, coatings, herbicides and other contaminants to have at least five (5) gallons of potable water at the work site.

Hand sanitizer and or hand cleaner shall be available to work crews.

If restroom facilities are not readily available, employees will be allowed to travel to the nearest restroom facility. [1910.141](#)

### **20.3 NOISE EXPOSURE**

When employees are subject to sound levels exceeding those permitted by IOSHA, feasible engineering controls and or administrative controls (job rotation) will be utilized. If such controls fail to reduce noise exposure to permissible levels, personal protective equipment such as two different types of hearing protection will be offered and worn by employees. [1910.95](#)

### **20.4 GASES, VAPORS, FUMES, DUSTS, AND MISTS**

Employee exposures to hazardous chemicals above the IOSHA permissible exposure limit for hazardous airborne contaminants will be eliminated or reduced when feasibly possible. Engineering controls such as changing to less hazardous chemicals and or administrative controls (job rotation) will be utilized to control exposure first. When controls are not feasible, personal protective equipment will be used to keep exposure within acceptable limits. [1910.1000](#)

### **20.5 VENTILATION**

At times, dusts, fumes, mists, vapors, or gas exposures may occur (or are produced in the work place). When elimination or prevention of such hazards is not feasible, the hazards will be controlled by local exhaust ventilation or by general ventilation (or other effective means) to ensure employee exposure will not exceed OSHA permissible exposure limits. [1910.94](#)



### 20.6 SILICA DUST

Silicosis is a disease of the lungs in which the normal lung tissue is replaced by fibrous or scar tissue due to breathing air containing crystalline silica dust. Employees shall not be overexposed to silica dust beyond OSHA's permissible exposure limits. Silica dust may be produced by several maintenance operations. Recommended protective measures to follow:

- Use of a pre-wetting system should be utilized to minimize the exposure to silica dust.
- Approved respirators or air filtration equipment should be used when sandblasting.
- When cleaning the interior of shops, sheds, or other structures, use a HEPA vacuum to remove debris. Dust should not be blown into the air. When sweeping, floors should be wetted or a sweeping compound should be used.
- Approved respirator should be worn by jack hammer operators if excessive dust conditions exist. [1910.1000](#)

### 20.7 CARBON MONOXIDE

Exposure to carbon monoxide gas could be harmful if concentrations exceed OSHA's permissible exposure limits. Carbon monoxide gas is not easily detected because it is odorless, colorless, tasteless, and non-irritating. It gives no warning of its presence.

Common sources of carbon monoxide gas are internal combustion engine exhausts and fires. Areas in which carbon monoxide gas may be present shall have properly installed and functioning carbon monoxide detector(s) and also be kept well ventilated. When possible, exhaust ventilation units should be provided and carbon monoxide detectors should be provided. [1910.1000](#)

### 20.8 ASBESTOS [1910.1001](#) AND LEAD [1910.1025](#)

The hazards of asbestos exposure may be found in electrical wiring, acoustical plasters, thermal insulation (heating and cooling systems), and products that resist fire. Asbestos is taken into the body through the respiratory tract (nose & mouth) and through ingestion (mouth). Exposure to asbestos has also been associated with an increased rate of kidney, esophageal (throat), laryngeal, and other types of cancers.

The most effective way to protect employees is to minimize exposure through the use of engineering controls and good work practices. Employees will not be exposed beyond OSHA's permissible exposure limits.

Lead exposures can arise from removing paint from surfaces previously coated with lead-based paint, such as vehicles and bridges.

Recommended preventive measures:

- Whenever possible, use materials containing lead products in a moist condition to avoid inhalation of the dust.
- Care should be taken to avoid inhalation of lead fumes or dust formed on top of molten lead due to oxidation.



- Do not store food in a room containing lead products.
- Do not eat or drink on the job. Go a distance away, wash hands with soap and water and clean fingernails before eating.
- Practice personal cleanliness.

### 20.9 CHEMICALS (DERMATITIS)

When working with chemicals that can cause injury to the skin, proper precautions shall be taken. Solvents and other degreasing chemicals along with wet lime and cement particularly affect the skin.

Personal protective equipment shall be provided to minimize the worker's contact with these materials. If possible, keep the exposed parts of the body away from direct contact with any chemicals that could cause skin irritation.

When working with these materials, wash hands often and dry them thoroughly before returning to work. When the work is finished, wash the hands thoroughly with soap and warm water. Dry and apply ointment. [1910.132](#)

On cement work, surface finishers should be provided with kneepads that are impervious to moisture.

### 20.10 EPOXY RESINS

Epoxies are now being used in many operations such as bonding new concrete to old concrete. Epoxies are also used in splicing concrete pile sections, as a "cold-weld" system for joining structural steel components, and in many other applications where their peculiar attributes solve a repair or structural problem.

The use of epoxy materials often involves a mixture of compounds, many of which are toxic. The curing agent (particularly amines) and solvents are the principal health hazards, but resins are also toxic to a degree. Unless workers take proper precautions, they can develop skin rashes, severe itching, eye irritation, and respiratory ailments. Tolerance to contact varies with the individual worker, but each additional over exposure will increase sensitivity

The personal protective equipment needed by personnel working with toxic epoxy compounds varies with the epoxy and application. Trowelling with epoxy mortar may require only plastic or rubber glove protection. Workers using epoxies shall use proper personal protective equipment to limit exposure to skin.

Epoxies, particularly those containing solvents, should never be used without adequate ventilation. Confined fumes and solvent vapors could seriously irritate the eyes, lungs, and respiratory tract and may also cause a fire and explosion hazard.

Epoxies coming into contact with the skin should be washed off immediately with soap and water. One should not use a solvent to wash skin. Many solvents are irritants themselves and will not remove the epoxy. Solvents will thin the epoxy so that it covers a greater area of skin and penetrates more deeply.



Care should also be taken to see that other employees working adjacent to the mixing or application of epoxies are provided adequate personal protective equipment, or the operation should be isolated to minimize exposure to other workers.



## **21. PERSONAL PROTECTIVE EQUIPMENT AND WORK ATTIRE**

### **21.1 GENERAL [1910.132](#)**

Personal protective equipment (PPE) provided to INDOT employees shall be in accordance with the most current applicable state and federal regulations.

Work attire and personal protective clothing/PPE shall be worn and used as required. Employees operating machines, climbing ladders, handling material, or doing shop or manual labor shall wear clothes that are reasonably snug, particularly about the neck, wrists, and ankles. There should be no loose cuff flaps or strings. Operators may not wear loose sleeves, jewelry, watches, or loose hair; all of which may catch in power-driven or other equipment.

Employees assigned to shop and field activities shall wear long trousers and a shirt at all times.

Employees shall assess the work place to determine if hazards are present that necessitate use of required PPE and utilize INDOT approved PPE in accordance with the manufacturer's requirements for use, operation, and maintenance.

Supervisors are responsible for the proper training of INDOT issued PPE and ensuring employees are equipped with all required PPE. Training shall be provided for each employee required to use PPE. Each employee shall be trained to know the following:

- When PPE is necessary
- What PPE is necessary
- How to properly don, remove, adjust, and wear PPE
- The proper care, maintenance, useful life, and disposal of PPE

### **21.2 HEAD PROTECTION**

#### **Hard Hats and Bump Caps**

Reference Chapter 12.

### **21.3 EYE AND FACE PROTECTION**

Employees must use appropriate eye or face protection when exposed to hazards from flying particles, molten metal, liquid chemicals, acids or caustic liquids, chemical gases or vapors, or potentially injurious light radiation. [1910.133a](#)

Employees shall wear protective eye and face equipment when there is a reasonable probability of injury by use of equipment and/or activity.

Each employee who wears prescription lenses shall wear protection that can be worn without obstructing the sight of the employee while engaged in operations that involve eye hazards.





No employee shall wear contact lenses where gases, vapors or other harmful materials are present which, when absorbed by the contact lenses, may harm eyes. Specifically, contact lenses shall not be worn under the following conditions:

- Where arc welding is being performed
- Where electrical arcs are customarily encountered
- Anytime the employee is handling or is exposed to any material that is likely to injure or irritate the eyes
- Anytime an employee is handling hazardous materials

Eyewash / drench showers must be provided with the work area for emergency use if there is a possibility that an employee might be exposed to injurious, corrosive materials. [1910.151c](#)

### 21.4 FOOTWEAR

All field employees shall wear hard-toe, hard-soled, boots that cover the ankle and meet the American National Standards Institute's requirements, ANSI Z 41 or ASTM F2413. Approval must be found on the boot. Specifically excluded are tennis, fabric or similar materials. [1910.136](#)

### 21.5 GLOVES

Employees are required to wear the appropriate hand protection when their hands are exposed to hazards such as skin absorption of harmful substances, cuts or lacerations, abrasions, punctures, chemical burns, thermal burns, and harmful temperature extremes.

Employees working with drill presses, power saws, and similar rotating machinery **shall not** wear gloves.

The selection of the type of glove to be worn shall be based upon an evaluation of the hazards associated with the activity being performed and the conditions present. [1910.138](#)

### 21.6 HI-VIZ SAFETY APPAREL

INDOT approved high visibility ANSI Class 3 apparel along with INDOT approved hard hat gear shall be worn at all times while engaged in operations upon the right of way or in a construction area. Discretion should be utilized to ensure that the appropriate garment for the job is worn when working near equipment and there is a possibility that the garment can become entangled in the equipment.

### 21.7 HEARING PROTECTION

Hearing protection shall be worn by all employees when noise levels are above normal environmental conditions. Hearing protection shall be used when sound levels are above OSHA's exposure level which is 85 db or higher for 8 hours. [1910.95](#)

### 21.8 RESPIRATORS

Reference Respirator Protection Program [1910.134](#)



## 21.9 CHAPS

Full length, properly fitting chainsaw chaps shall be worn by all employees while operating a chainsaw. Defective or damaged chaps are not permitted for use. Employees shall wear full face masks, hard hats, and ear muffs during chainsaw activities. [1910.266](#)



## 22. POWER TOOLS

### 22.1 GENERAL

Only trained, competent, and authorized persons who are familiar with the regulations governing the use shall operate power-actuated tools. The tools shall be tested each day to see that safety devices are in proper working condition. The method of testing shall be in accordance with the manufacturer's recommended procedure. Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired. All tools shall be utilized according to the manufacturer's recommendations.

The majority of power tool injuries are caused by the improper handling and poor maintenance of equipment. The following applies to all types of power tools: [1926.302\(e\)](#)

- Safety equipment such as guards will be left in place.
- Hand, eye, face, ear and foot protection will be worn when needed.
- Only trained personnel will be permitted to operate power tools.
- Safety features will not be altered or removed.

### 22.2 CHAIN SAWS

All employees who operate a chain saw shall wear chaps constructed with cut-resistant material, such as ballistic nylon. The chaps shall cover the full length of the thigh to the top of the boot on each leg to protect against contact with a moving chain saw. Chain saw operators shall wear approved eye, hearing, hand, foot, and face protection as well as a hard hat. [1910.266\(d\)\(1\)\(iv\)](#)

Logging First Aid kit shall be on site when chain saws are in operation.

No one except the operator will be allowed within a ten (10) foot radius of a saw when it is in operation.

The engine shall be shut off when moving a chain saw from one location to another and the operator shall hold the handle with the cutter bar directed to the rear. Refueling shall be done in an area free from flammable materials. Chain saw operators shall not wear loose clothing.

Hot saws will be permitted to cool for two (2) or three (3) minutes, before refueling. A hot saw will be placed on a log, stump, or bare ground rather than on dry litter.

When cutting, always keep both hands on the handles. Do not cut anything above the level of the chest.

### 22.3 PNEUMATIC TOOLS

Pneumatic power tools will be secured to the hose or whip by some positive means to prevent the tool from becoming accidentally disconnected.

Safety clips or retainers on pneumatic impact tools will be securely installed and maintained to prevent attachments from being accidentally expelled.



Shut off the air supply and bleed the line before disconnecting any tools. The use of hoses for hoisting or lowering tools is not permitted.

All hoses exceeding one-half (1/2) of an inch in diameter will have a safety device at the source of the supply or branch line to reduce pressure in case of hose failure.

Operators of portable air tools such as jackhammers, air tamps, etc., shall wear required PPE.



## **23. REPORTS AND INVESTIGATIONS**

### **23.1 GENERAL**

Some of the most important and essential aspects of an effective Safety Program are:

- Properly defining crashes, illnesses, and injuries.
- Properly reporting all occurrences.
- Conducting root cause investigations.
- Taking necessary actions to prevent similar occurrences throughout the department.

Employees must notify their supervisor immediately of an occurrence. The supervisor must notify safety and human resources immediately during normal business hours. If after business hours the supervisor must notify safety and human resources within the first hour of normal business hours. If a serious crash or injury occurs outside of normal business hours the supervisor shall notify their Safety representative immediately.

Supervisors shall ensure original notification within Safety Occurrence System (SOS) within 24 hours. Supervisors shall enter all required data into the SOS.

Supervisors shall be responsible for conducting an investigation for each occurrence and defining the root cause and recommendations for preventability of future occurrences. Safety shall assist with all investigations resulting in a serious injury or serious accident.

Supervisors of the employee involved in the occurrence are responsible for categorizing the occurrence in accordance with the definitions of this policy.

District Safety Directors and Statewide Safety Director are responsible for ensuring compliance and accurate reporting of the definitions within this policy. All crashes, injuries, incidents, and near misses must be entered into the INDOT SOS.

An employee involved in a vehicle accident with private vehicles or persons shall not accept responsibility or blame on behalf of the department. Nor should the employee discuss it with anyone but their supervisor or a representative of the agency, nor shall information about the accident be given to persons other than proper law enforcement authorities or Attorney General Personnel.

Tort claim processing procedures shall be provided to private persons involved in crashes with department vehicles/equipment.



## 23.2 DEFINITIONS

### **Crash**

A crash is an occurrence, excluding vandalism and acts of nature, which results in monetary damage to any vehicle, property, or heavy equipment (inclusive of attenuators / arrow boards).

### **Serious Crash**

A crash that requires the vehicle or heavy equipment (inclusive of attenuators / arrow boards) to be towed from the scene and/or rendered inoperable.

### **Injury**

An injury is any occurrence when an INDOT employee must seek medical treatment from a professional medical center.

### **Serious Injury**

An injury that requires hospitalization of an employee.

### **Incident**

An incident is any occurrence when basic first aid is administered on the job site but employee does not seek professional medical treatment or when vehicle/heavy equipment makes contact with another state owned object and does not result in monetary damage.

### **Near Miss**

A near miss is any occurrence that almost resulted in injury and/or contact to a vehicle, heavy equipment or person as determined by INDOT employees through their direct supervisor and/or Safety Director.

### **Unsafe Act**

An unsafe act is any act that deviates from a generally recognized safe practice or specified method of doing a job and results in a crash, injury, incident, or near miss. It is unsatisfactory behavior that is significant in initiating the occurrence. Examples of unsafe acts include choosing short cuts, using defective equipment and lack of attention.

### **Preventable**

Any occurrence that could have been prevented by any INDOT employee (example: co-worker, supervisor), agency policy, facility hazards, faulty equipment, or maintenance. Examples of preventable occurrences are slip, trips, falls, strains, and sprains.

### **Non-Preventable**

Any occurrence that is unforeseen and unpredictable.

### **Occurrence**

An occurrence is a crash, injury, incident, or near miss.



### 23.3 ROOT CAUSE ANALYSIS

A root cause analysis is a process designed for use in investigating what, how, and why an occurrence happened. Conducting a root cause analysis identifies the underlying cause(s) of why the occurrence happened.

The immediate supervisor shall conduct a root cause analysis when investigating a safety occurrence. By identifying the underlying causes, the supervisor is able to develop recommendations that will assist in preventing reoccurrence.



## **24. RESPIRATORY PROTECTION**

### **24.1 GENERAL**

The Occupational Safety and Health Administration (OSHA) General Industry standard for respiratory protection requires that a written respiratory protection program be established by an employer. The following procedures are based on the requirements established by OSHA. [1910.134](#)

#### **Policy**

It is the policy of INDOT to provide its employees with a safe and healthful work environment. The guidelines in this program are designed to help reduce employee exposure to occupational air contaminants and oxygen deficiency. The primary objective is to prevent excessive exposure to these contaminants. This is accomplished as far as feasible by accepted engineering and work practice control measures. When effective engineering controls are not feasible, or while they are being implemented or evaluated, respiratory protection may be required to achieve this goal. In these situations, respiratory protection is provided at no cost to the employees.

#### **Responsibilities**

##### **1. Management**

It is the District Safety Director and or designees responsibility to determine what specific applications require the use of respiratory protective equipment. District Safety Director and/or designees must also provide proper respiratory protective equipment to meet the needs of each specific application. Employees must be provided with adequate training and instructions on all equipment.

##### **2. Management/Supervisory**

All INDOT management with direct reports of each area are responsible for ensuring that all personnel under their control are completely knowledgeable of the respiratory protection requirements for the areas in which they work. They are also responsible for ensuring that their subordinates comply with all facets of this respiratory protection program, including respirator inspection and maintenance.

##### **3. Employees**

It is the responsibility of the employee to have an awareness of the respiratory protection requires for their work areas (as explained by management and/or safety.) Employees are also responsible for wearing the appropriate respiratory protective equipment according to proper instructions and for maintaining the equipment in a clean and operable condition.





### **Program Administration**

The following individual has total and complete responsibility for the administration of the respiratory protection program:

Title: Statewide Safety Program Specialist

Department: Statewide Safety

This individual has the authority to act on any and all matters relating to the operation and administration of the respiratory protection program.

The following individual is responsible for monitoring or conducting an exposure assessment of the respiratory hazard, developing standard operating procedures for this program and may conduct program evaluations.

The following individual is responsible for contaminant identification and measurement, including technical support, air sampling, and laboratory analysis.

Title: Statewide Safety Program Specialist

Department: Statewide Safety

The following individuals are responsible for evaluating the medial evaluation and medical surveillance program.

Title: Statewide Workers Compensation & DOT Administrator, District Safety Director, District Human Resources Manager

Department(s): District Safety, Statewide Safety, District Human Resources

The following individual is responsible for directing and coordinating engineering projects which are directly related to respiratory protection.

Title: Statewide Safety Director, Statewide Facilities Director

Department: Statewide Safety, Statewide Facilities

The following individual is responsible for selection of all respirators used in collaboration with District Safety Directors.

Title: Statewide Safety Program Specialist

Department: Statewide Safety

The following individual is responsible for issuance, training, and fit testing of all respirators used, including record keeping and conducting annual report of respiratory program evaluation.

Title: District Safety Director

Department: District Safety



### Medical Evaluation

Every Employee who is being considered for inclusion in the Respiratory Protection Program must participate in a medical evaluation. A determination of the employee's ability to wear a respirator while working is made initially before fit testing. Future evaluations are made when there is a change in workplace conditions or information indicating a need for re-evaluation.

A mandatory medical evaluation questionnaire in 1910.134 must be used and reviewed by a physician or other licensed health care professional (PLHCP). The medical evaluation is provided at no cost to the employee. The purpose of the medical evaluation is to assure that the employee is physically and psychologically able to perform the assigned work while wearing respiratory protective equipment. If the PLHCP denies approval, the employee must receive a medical surveillance exam prior to participation in the Respiratory Protection Program. Medical evaluation must be completed before respirator training, fit testing or tight-fitting respirators, and use in the workplace.

At a minimum, INDOT shall provide additional medical evaluations and/or medical surveillance if:

- An employee reports medical signs or symptoms that are related to his/her ability to use a respirator;
- A PLHCP, supervisor, or the respiratory program administrator informs the employer that an employee needs to be re-evaluated;
- Information from the Respiratory Protection Program, including observations made during fit testing and program evaluation, indicates a need for employee re-evaluation; or
- A change occurs in workplace conditions (e.g., physical work effort, protective clothing, and temperature) that may result in a substantial increase in the physiological burden placed on an employee.

(Copies of the medical evaluation and questionnaire must be kept as a medical record in accordance with 29 CFR 1910.1020. A copy of the written medical determination must be kept in employee file)

[http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Medical\\_Evaluation\\_Program\\_Procedures.pdf](http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Medical_Evaluation_Program_Procedures.pdf)



## Respirator Selection

### 1) Work Area Monitoring

Exposure assessment may be warranted if engineering controls do not eliminate exposures. In order to determine the exposure level, air samples of the work place representative of the work period, exposure assessment based on analogous processes, or professional judgement may be used. Personal sampling equipment may be used in accordance with accepted industrial hygiene standards to sample work area. Results of these samples will pinpoint areas where respiratory protection is required, if engineering controls are not effective.

An exposure assessment may be performed prior to the task requiring respiratory protection. Periodically thereafter, as required by OSHA substance specific standards or at least every 12 months, a review of the exposure assessment will be made to determine if respiratory protection is still required. If respiratory protection is still necessary, respirator selections will be reviewed to assure their continued suitability.

INDOT’s exposures can be found at <http://intranet.indot.state.in.us/Safetyweb/chemnoise.asp>. If a chemical/air assessment is needed, contact local Safety Department and or Statewide Safety Department.

## Sample Forms

Exposure Assessment Record			
Respiratory Protection Program Administrator: _____			
Job: _____		Date: ____ / ____ / ____ (Month / Day / Year)	
Location: _____		Job Description: <input type="checkbox"/> Routine <input type="checkbox"/> Emergency	
Describe work performed and length of time involved: _____			
<b>Contaminants:</b>			
Concentration (Measured or Estimated)	Reference: (Report Number Survey, Sample)	OEL*	Hazard Ratio**

\* OEL – Occupational Exposure Limit PEL, TLV, REL, WEEL or other company specified occupational exposure limit.  
 \*\* The Hazard Ratio is the quotient of the measured or estimated concentration divided by the appropriate occupational exposure limit. Respiratory protection is required if this value is greater than one and all feasible engineering and work practice controls have been implemented to reduce the concentration to as low as possible.  
**Note: For those contaminants for which respiratory protection is desired, the information from Part II above must be transferred to the Respirator Selection Documentation form.**



## 2) Respirator Selection

Respirators are selected and approved for use by Statewide Safety Program Specialist. The selection is based upon the physical and chemical properties of the air contaminants and the concentration level likely to be encountered by the employee. The District Safety Director will make a respirator available immediately to each employee who is assigned to a job that requires respiratory protection if medically cleared. Replacement respirators/cartridges and filters will be made available as required.

The selection of the proper respirator type will be made following the procedures which are attached and or Statewide Safety Director along with Statewide Safety Program Specialist in collaboration with District Safety Directors will approve the selections.

Approved NIOSH Respirators

[http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Respirators\\_Approved\\_for\\_Purchase.pdf](http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Respirators_Approved_for_Purchase.pdf)

### Use of Respirators

All tight-fitting respirators (both negative and positive pressures) shall not be used with beards or other facial hair or any other condition that prevents direct contact between the face and the edge of the respirator or interferes with valve function. [1910.134\(g\)\(1\)](#)

Employees will be required to leave the contaminated area:

- Upon malfunction of the respirator.
- Upon detection of leakage of contaminant into the respirator.
- If increased breathing resistance of the respirator is noted.
- If severe discomfort in wearing the respirator is detected.
- Upon illness of the respirator wearer, including: sensation of dizziness, nausea, weakness, breathing difficulty, coughing, sneezing, vomiting, fever and chills.
- To wash face to prevent skin irritation.
- To change filter/cartridge elements or replace respirators whenever they detect the warning properties of the contaminant or increased breathing resistance.

## Respirator Training and Fitting

### 1) Training

Employees assigned to jobs requiring respirators will be instructed by safety, relative to their responsibilities in the respiratory protection program. They will also be instructed in the need, use, limitations, and care of their respirator.

Half Face Piece Respirator (Reusable)

[http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Care\\_and\\_Use\\_of\\_Respirator\\_3M\\_6500.pdf](http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Care_and_Use_of_Respirator_3M_6500.pdf)



Dust Mask (Two Straps) (Disposable)

[http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Care\\_and\\_Use\\_of\\_Respirator\\_3M\\_8511.pdf](http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Care_and_Use_of_Respirator_3M_8511.pdf)

**2) Fit Testing**

Employees will be properly fitted and tested for a face seal prior to use of the respirator in a contaminated area. Qualitative fit testing will be the method of fit testing. Safety will provide fit testing. Each District Safety Director has the Qualitative Fit Test Apparatus and procedures and shall be trained. The procedures were provided inside the 3M FT-30 Qualitative Fit Test Apparatus, Bitter – box.

[http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Qualitative\\_Fit\\_Testing\\_Procedure.pdf](http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Qualitative_Fit_Testing_Procedure.pdf)

Fit testing will be done initially upon employee assignment to an area where tight fitting respirators are required. Fit testing will be repeated at least every 12 months thereafter. All tight-fitting respirators (negative and positive pressure) will be tested. Positive pressure tight-fitting respirators will be fit tested in the negative pressure mode. (\*\*Note\*\* A loose-fitting respirator such as a loose fitting PAPR and or a loose fitting Abrasive Blasting Helmet, does NOT need to be fit tested).

Fit testing records, sample Qualitative Fit Test Record is provided below.

Qualitative Fit Test Record							
Name: _____		Date: ____ / ____ / ____ (Month / Day / Year)					
Employee ID/SSN: _____							
Respirator: _____				Size: _____			
Respiratory Hazards Encountered: _____							
<b>Sensitivity Test:</b>		<b>Results:</b>					
• Isoamyl Acetate (Banana Oil):					Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>
• Saccharin #Squeezes:		10 <input type="checkbox"/>	20 <input type="checkbox"/>	30 <input type="checkbox"/>	Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>
• Bitter Aerosol #Squeezes:		10 <input type="checkbox"/>	20 <input type="checkbox"/>	30 <input type="checkbox"/>	Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>
• Irritant Smoke:					Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>
<b>Fit Test Agent:</b>		<b>Filter/Cartridge:</b>		<b>Filter Results:</b>			
• Isoamyl Acetate		• Organic Vapor Cartridge		Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>	
• Saccharin		• Particulate Filter		Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>	
• Bitter Aerosol		• Particulate Filter		Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>	
• Irritant Smoke		• 100 Level Particulate		Pass <input type="checkbox"/>	Fail <input type="checkbox"/>	NA <input type="checkbox"/>	
Comments: _____							
Fit Test Repeated Before: _____		Test Conductor: _____		Employee Signature: _____			



Personal protective equipment such as but not limited to: corrective glasses or goggles will not be allowed to interfere with the seal of the face piece to the face of the user.

OSHA's CPL 2.120 defines the presence of facial hair to be "more than one day's growth." This implies the worker needs to be clean shaven in the face seal area within the last 24 hours.

Fit Testing will not be done on employees with facial hair that passes between the respirator seal and the face or interferes with valve function. Such facial hair includes stubble, beards and long sideburns prior to fit test.

**Note: If it is determined that an individual cannot obtain an adequate fit with any tight fitting respirator, a loose fitting powered air purifying (PAPR) or supplied air respirator may be required upon management approval and medical surveillance documents such is warranted.**

### **Maintenance and Storage**

Respirators must be properly maintained to retain their original effectiveness. The maintenance program will consist of periodic inspection, repair, cleaning and proper storage.

### **Respirator Inspection Cleaning and Storage**

Employees who wear a respirator will inspect it daily whenever it is used. Management will periodically spot check respirators for fit, usage, and condition.

The use of defective respirators is not permitted. If a defective respirator is found during inspection, it must be returned to the following individual: District Safety Director or designee.

#### **1) Repair**

During cleaning and maintenance, respirators that do not pass inspection will be removed from service and will be discarded or repaired. Repair of the respirator must be done with parts designed for the respirator in accordance with the manufactures instructions before reuse. No attempt will be made to replace components or make adjustments, modifications or repairs beyond the manufactures recommendation.

#### **2) Cleaning**

Respirators not discarded after one shift use, except filtering facepiece type, will be cleaned on a daily basis (or after each use if not used daily), according to the manufactures instructions. Facilities and supplies for cleaning these respirators are available.

#### **3) Storage**

Respirators not discarded after one shift use will be stored in a location where they are protected from sunlight, dust, heat, cold, moisture, and damaging chemicals. They shall be stored in a manner to prevent deformation of the facepiece and exhalation valve. Whenever feasible, respirators not discarded after one shift use will be marked and stored in such a manner to assure that they will be worn only by the assigned employee. If use by more than one employee is required, the respirator will be cleaned between uses.



Additional information for maintenance, storage, inspection, repair and cleaning.

[http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Inspection\\_Cleaning\\_Storage\\_Respirators.pdf](http://intranet.indot.state.in.us/safetyweb/pubs/respirators/Inspection_Cleaning_Storage_Respirators.pdf)

### **Compressed Air Systems**

Special precautions will be taken to assure breathing quality air when an airline respirator or SCBA is to be used. This air shall meet the specifications for Grade D Air established by the Compressed Gas Association as stated in Commodity Specification for Air (ANSI/CGA G-7.1), 1989. Cylinders of purchased breathing air must have a certificate of analysis from the supplier that the air meets Grade D requirements. Air supplied from an air compressor will be tested annually to assure that Grade D breathing air requirements are met.

### **Program Evaluation**

District Safety Directors shall review and evaluate at least every 12 months to ensure that the written respiratory protection program is being properly implemented and to consult employees to ensure that they are using the respirators properly. A written report will be made of each evaluation, summarizing the findings. For each deficiency identified, corrective action will be noted. Copies of the summary reports shall be attached to this program.

Link to form:

[http://intranet.indot.state.in.us/safetyweb/pubs/Respirator\\_Program\\_Evaluation\\_Checklist.pdf](http://intranet.indot.state.in.us/safetyweb/pubs/Respirator_Program_Evaluation_Checklist.pdf)



## **26. ROPE ACCESS PROGRAM**

### **26.1 GENERAL**

A person authorized by their employer to be responsible for managing the employer's rope access program, who is suitably knowledgeable, experienced, and qualified to manage the rope access program, including matters relating to safety, training, regulations, staffing, equipment selection, and management, and other program responsibilities as designated by the employer.

The Rope Access Program Administrator, the statewide safety technical specialist, shall be the main point of contact for matters relating to the safety, training, and regulatory aspects of the Rope Access Program.

Prior to an INDOT employee participating in any rope access work activity, the rope access program administrator shall be contacted for the proper training and approved rope access equipment list.

All employees interested in rope access and becoming an INDOT Rope Access Technician shall attend INDOT training sessions when held, including the week long yearly training held in the fall. During these training sessions employees will learn all the requirements of a level 1 technician listed below as well as general rope access safety concerns, JHAs, and up to date rope access regulations.

Once the employee is competent at conducting the below level 1 technician requirements and the INDOT rope access program administrator has approved the skill level of the employee, they shall attend a Society for Professional Rope Access Technicians (SPRAT) level 1 technician course to become certified. The program administrator will assist employees in what course and location the SPRAT course will be held.





## **27. SAFETY BRIEFINGS AND HAZARD REVIEWS**

The on-site leader of any field activity shall conduct a safety briefing and hazard review for each activity on a daily schedule.

At a minimum, the safety briefing and hazard review shall include:

- Proper PPE for each activity.
- All safety hazards associated with equipment and machinery.
- All hazards and precautions necessary for weather conditions.
- All safety hazards of roadway (curves, hills) and topography (trees, bushes, etc.).
- Review work zone requirements according to Indiana Manual of Uniform of Traffic Control Devices (IMUTCD) and Traffic Control Plan (TCP).

All employees shall participate in the brief and be held accountable for understanding the safety and hazards for their assigned activity.

The on-site leader of an activity shall ensure that the potential hazards associated with the activities have been identified and mitigated. A daily safety briefing and hazard review must be kept on file for at least one year.



## **28. TRAFFIC CONTROL**

### **28.1 GENERAL**

All work zone traffic control and devices shall conform to the provisions and specifications of the Indiana Manual on Uniform Traffic Control Devices (IMUTCD) and INDOT's Temporary Traffic Control (TTC) required procedures. The TTC procedures shall be a more amplified version of the IMUTCD standards that are condensed and tailored to the needs of INDOT in identifying various possible temporary work zone configurations.

Employees shall take every reasonable precaution to protect themselves and the public from accidents caused by work zone operations. TTC shall be utilized when any activity impedes the flow of traffic. TTC plans shall be documented and reviewed with all employees.

In situations where a vehicle with warning lights displayed parked on the shoulder or side of the roadway is the only required traffic control, the vehicle shall be parked in a manner to minimize surprise or disruption to the public. The vehicle shall act as a warning barrier between oncoming traffic and personnel. Personnel will position themselves far enough from the vehicle so to avoid being struck by the parked vehicle should it get hit.

At no time will personnel perform work on or near the traveled portion of the roadway without the appropriate traffic control.

Protection consists of two (2) phases:

- Advance warning to the public of something out of the ordinary
- Warning throughout the time that the hazardous condition exists

Warning and protective devices such as signs, channelizing devices, and barricades will be displayed before work begins and will be maintained throughout the job.

Unauthorized personnel and unauthorized vehicles shall not be permitted within the limits of the worksite.

All traffic control devices shall be kept clean and legible.

### **28.2 WARNING SIGNS**

Placement of Advanced Warning Signs shall be in accordance with TTC per INDOT requirements. The proper distance will vary based on the speed limit, type of roadway, and surface, grades, curvatures, and sight distance. When working on a hill or sharp curve, warning signs must be placed at the top of the hill, the point of curvature or right before the curve begins. This also applies to placement of flaggers.

Do not block the sight line vision of drivers with warning signs. Signs should be clearly visible and easy to read. If operations involve movement of employees or equipment along the roadway, move the signs with the work. Remove all warning signs when employees or equipment are not working, and when no obstruction or danger points exist.



Special problems in traffic control, along with the use of additional warning signs and/or if more specific instructions are needed, for setting up warning signs shall be discussed with the supervisory personnel. The results of this discussion shall be logged on the Job Safety Briefing. Signs needing repair, repainting, or re-lettering will be removed and replaced.

### 28.3 CHANNELIZING DEVICES

All Traffic Control channelizing devices shall meet the requirements per the IMUTCD and INDOT TTC

Channelizing devices include:

- Cones
- Tubular Markers
- Vertical Panels
- Drums
- Barricades
- Barriers

### 28.4 OTHER TRAFFIC CONTROL DEVICES

- Arrow Boards
  - Arrow boards in the arrow or chevron mode may be used to supplement signs and other devices for lane closures on multilane roadways.
  - Arrow boards in the "Caution Mode" shall be used only to close a shoulder and may be used on two-lane, two-way roads.
- Shadow Vehicles
  - A dump truck meeting the requirements of the INDOT TTC used to provide guidance of traffic and protection of the work crew from the traffic.

### 28.5 FLAGGERS

- Flaggers shall meet the requirements of the IMUTCD Part 6E. Flagger Control.
- All flaggers shall be INDOT Certified Flaggers.

Flaggers shall remain at the proper distance from the work in accordance with TTC. Flaggers will stand just outside of the approaching traffic lane, but near enough to the workers so that there is no doubt as to their purpose. This distance may vary depending upon road conditions, visibility, and location in regard to curves and hills. The flaggers shall position themselves so that approaching traffic can see them from a distance, and positioned with a stop-slow paddle visible from the traffic lane, but not jeopardizing their own safety. They shall have an escape route and must be ready to move clear if approaching traffic does not stop.

Flaggers shall use a portable radio, stop/slow paddle, or flag (if appropriate).

A flagger must never leave his/her post until properly relieved by another certified flagger.



Additional flaggers shall be assigned due to multiple intersections, sight distance issues or sight relay of flagging instructions due to communications failure or if emergency conditions arise.

Primary flagger shall be assigned and identified to make decisions on traffic movement rotation through the work zone. This does not relieve the supervisor in charge of the responsibilities of the work zone.

The assigned supervisor is responsible:

- To ensure flaggers are INDOT Certified
- For proper behavior of the flagger, regardless of the distance between the flag station and the work area
- For making sure the flaggers are performing their duties properly and are:
  - Alert
  - Properly attired
  - Courteous
  - Periodically relieved of their flagging duties

Flagging operations are required in the following traffic situations when:

- One lane is alternately used for both directions of travel.
- The roadway is closed for a short period of time to accommodate specific temporary operations.
- Supplementing traffic control devices is needed to reduce traffic speed.
- Inadequate motorist sight distance does not provide sufficient advance warning of highway work activities.
- Opposing traffic flow needs to be handled at an intersection.
- Installing and removing traffic control devices.
- Other situations where variable conditions require the exercise of judgment.

### **28.6 SLOW MOVING EMBLEM**

Slow moving vehicles will display a slow-moving vehicle emblem. These vehicles are described as those which are pulled, towed, self-propelled, or horse drawn. This includes all vehicles that are not under normal circumstances moved, operated, or driven at a speed greater than twenty-five (25) miles per hour. The emblem will be used in addition to any lighting devices.

Whenever a vehicle is moved, operated, or driven on a highway that is open for vehicular travel, the vehicle shall display a triangular slow-moving vehicle emblem mounted as near as is practicable to the center of mass and at an approximate height of not less than three (3) and not more than five (5) feet from level ground or pavement surface. The emblem shall be mounted so as to be entirely visible from the rear, day or night. The emblem and the emblem's position of mounting on the vehicle must meet the specifications established by rules adopted by the Indiana Criminal Justice Institute.

The use of this emblem is restricted to slow-moving vehicles as described. The use of the emblem on any other type of vehicle or stationary object on or along the highway is prohibited.



## 28.7 WARNING LIGHTS

The use of proper operating vehicle warning lights is very important to the safety of the motorist and department employees. Operation of warning lights, when not warranted reduces the effectiveness of the device, when actually needed.

Department employees shall stop or park vehicles and equipment beyond the edge of the roadway and off the shoulder whenever practical.

Operators of department equipment or vehicles shall use warning lights:

- Whenever it is necessary for any department vehicle to stop partially or entirely on the pavement surface or when a vehicle must park on the shoulders of the roadway or median for the purpose of warning motorists of possible work crews or personnel.
- When placing or taking down of Traffic Control Devices for work zones.
- When required by INDOT TTC.
- Whenever equipment is operated on rural interstate highways at speeds lower than 45 miles per hour and on other highways at speeds less than 35 miles per hour. Four-way hazard lights can be used to supplement but shall not replace the use of Warning Lights.
- All vehicular lighting shall conform to the INDOT Lighting procedure.



## **29. TOWING AND RECOVERY**

### **29.1 TOWING DISABLED INDOT VEHICLES AND EQUIPMENT OFF THE ROAD**

Towing a disabled vehicle is an extremely dangerous activity. Disabled INDOT vehicles or equipment shall not be towed over the road by any INDOT employee due to Indiana Towing Laws and Indiana Code Sec. 9.

Employees should use one of the two methods below to transport disabled vehicles and equipment back to an INDOT Facility:

1. Tow company shall be contacted.
2. Lowboy or other type of trailer capable of carrying a vehicle shall be used.

### **29.2 TOWING VEHICLES AND EQUIPMENT ON INDOT PROPERTY**

Equipment and vehicles can be towed no faster than 5 mph in an INDOT lot as long as the correctly rated synthetic webbing strap is used per the Working Load Limit (WLL). The WLL can be found on the synthetic webbing straps tag and is the maximum allowable load that can be applied to the strap and is not to be exceeded. This tag must be up to date on all yearly inspections. Chains shall not be used for any towing activities due to the extreme danger and risk of breaking.

### **29.3 HOOSIER HELPERS VEHICLES TOW/RELOCATION**

Hoosier Helper employees may tow/relocate a broken-down vehicle, a vehicle that has been involved in an accident, or a piece of equipment to a safe location out of the way of the traveling public for both the safety of the INDOT employee and the public. The towing/relocation shall not exceed 5 mph and all equipment to perform the tow/relocation shall be rated and tagged per the application's WLL it is being used for.

#### **Chains**

Chains are intended to be used at or below the WLL specified by the manufacturer in constantly increasing force applications under direct tension. Chains are only designed for a load with constant pressure applied to it (for example, to tie down a piece of equipment on a trailer, hoisting, and lifting).

#### **Chains and Slings Training (Hoisting)**

Anyone that is required to use a chain or sling must be trained. All chains/slides must be rated, tagged, and inspected regularly, once a year at a minimum, and before each use by a trained, competent person.

Slings shall not be made in-house.



## Recovery Equipment

- (WLL) 131,500 LBS used for dump trucks and large equipment
- (WLL) 52,300 LBS used for crew cabs and small equipment
- Any equivalent synthetic webbing strap

It is strongly suggested to use soft shackles rather than metal shackles due to the potential of breaking and the “sling shot” effect of a flying metal shackle.



## **30. VEHICLE AND EQUIPMENT OPERATIONS**

### **30.1 GENERAL**

Vehicles and equipment will be operated in compliance with the law and the directives of the agency. They will not be driven or road tested at speeds in excess of the established speed limits, nor at speeds greater than is reasonable and prudent under the existing conditions.

Only authorized operators shall operate INDOT vehicles and or equipment.

An authorized operator is defined as a person properly trained by INDOT or those that possess a license or certification that has been verified by INDOT.

If licenses and or certification cards are required for vehicle or equipment operation, employees shall carry corresponding documentation on their person. Completion of training and verification of qualification shall be documented and entered in the employees training folder. Copies of all licenses and or certification cards shall be retained in their personnel records.

Due to the various types of equipment, licenses, and/or certification, cards may not be feasible for each piece of equipment. A properly documented training outline along with the name of the trainer and trainee and their signatures shall be retained as a certification document.

Vehicle/equipment operators will reduce vehicle speed during periods of poor visibility caused by fog, smoke, rain, or snow and will turn on the headlamps of their vehicles as an added precaution. When visibility makes operations unsafe, the vehicle will be stopped and parked clear of the traffic lanes and remain there until driving can be safely resumed.

No operator will start, stop, slow down, turn, or back his/her vehicle without making certain that the movement can be done safely, using proper signals and agency policy.

Heavy equipment operators should shift into lower gear before descending steep hills and will not disengage the gears and coast at any time.

An employee will not start the engine on self-propelled equipment unless he/she is seated in the driver's seat and is certain that the gears are disengaged.

### **30.1 SEATBELTS**

All employees shall wear a seatbelt.

Approved seatbelts shall be installed by the manufacturer. All employees driving or riding as passengers in INDOT vehicles shall properly wear seatbelts whenever the vehicle/equipment is in motion as it is required by Indiana Law. All worn or damaged seatbelts shall be replaced immediately.

The driver of the vehicle shall not engage the vehicle until all passengers fasten their seatbelts.





The only exception to this requirement is that seatbelts will not be installed or worn on equipment not having Roll Over Protective Structures (ROPS). In cases where it is impossible to properly operate the equipment when wearing a seatbelt, i.e. grader, the belt may be temporarily unlatched.

### 30.3 PRE-TRIP INSPECTIONS

All vehicle operators shall perform a vehicle safety inspection prior to the initial dispatch of the vehicle before each shift.

The procedures followed in conducting the inspection shall conform to those set forth by the office of Fleet and Facilities Management. Operators shall report all safety defects or deficiencies to their supervisor. Supervisors shall enter all safety defects into the M5 system according to standard operating procedure. Vehicles with known safety defects or deficiencies shall not be operated.

### 30.4 SERVICE OF VEHICLE AND/OR EQUIPMENT

Motor vehicles, while being driven in or out of garages or storage buildings, shall be driven at a low rate of speed and shall stop at the doorway before entering or exiting the building.

Employees shall ensure that engines are not started and vehicles are not moved while they are working on vehicles by following the Lockout/ Tagout Policy and Procedures. Additionally, employees shall:

- Ensure that engines operate only when there is proper ventilation, and/or exhausts are vented to the outside to prevent carbon monoxide poisoning.
- Industry approved dump lock system shall be used underneath dump truck boxes for the protection of employees inspecting or repairing underneath.
- Vehicles and equipment shall be chocked whenever a vehicle is being serviced.

### 30.5 PARKING

No vehicles/equipment will stop or park on the traveled portion of the roadway when it is practical to stop or park off the roadway, unless doing so is required in the line of duty.

Vehicles/equipment will not stop or park where it may interfere with the movement of other vehicles or be in close proximity to working operations. Vehicles/equipment will not be parked or left adjacent to the roadway in such a manner as to constitute a traffic hazard, nor will they be parked on a curve or hill where they will obstruct sight distances or parked with buckets up. Operators will not park vehicles/equipment without first setting the brakes. Chocks may be placed under the wheels as an additional precaution. Any vehicle being loaded or unloaded at a dock, with a forklift or mechanical handling equipment, will have both rear wheels chocked.

When parking non-motorized equipment (trailers, air compressors, tar kettles, arrow boards, etc.) that do not have brakes, the wheels should be chocked to prevent any movement.



Vehicle doors will be kept closed while the unit is in motion and will not be left open while the vehicle is parked.

No one will open the door of a vehicle on the side available to moving traffic.

### 30.6 RIDING ON VEHICLES

Employees shall not ride in a truck bed unless using Fall Restraint System with proper Fall Protection training due to job requirements. Employees shall not sit on the edge of the truck bed, tailgate, or lift gate.

Employees shall not ride on the hood, running board, or fender of any vehicle/equipment. No one is permitted to get on or off a vehicle while it is in motion.

### 30.7 POWER INDUSTRIAL TRUCKS/TRAINING AND CERTIFICATION

All employees shall be trained and/or certified in accordance with state regulations and agency policies and procedures before operating all powered equipment. All employees must adhere to manufacturer operations manual. All training and certifications shall be documented and accessible on request. [1910.178](#)

Employees required to operate Powered Industrial Trucks must be certified by a competent trainer and evaluated at a minimum of every three (3) years. Documentation of certification must include the name of the operator, the date of the training, date of the evaluation, and identity of competent trainer.

Power Industrial Trucks are defined as fork trucks, tractors, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electrical motors or internal combustible engines.

### 30.8 BACKING SAFETY

Avoid backing whenever possible.

A ground guide shall be used if backing is required and there is obstructed vision to the rear. The only time it is permissible to back a vehicle with obstructed vision without a ground guide is when the driver is alone and backing is essential.

When ground guides are not available, all operators shall personally ensure that it is clear to back prior to beginning backward motion. For vehicles having obstructed vision immediately to the rear, i.e. dump trucks, pick-up trucks with sign racks in the bed and other large vehicles, this will involve the driver/operator physically moving to the rear of the vehicle and ensuring that all is clear. Prior to, and after backing has commenced, side view mirrors shall be constantly checked to ensure that conditions remain safe for backing. For vehicles not having obstructed vision to the rear, i.e. sedans, pickup trucks, etc., the operator shall turn around and check the complete area surrounding the vehicle to ensure that it is safe to back. In all cases, operators shall also check for people or traffic approaching from the side. Back as soon as possible after checking conditions in the rear. If there is a delay in backing, personally recheck the rear of the vehicle. In all cases, ensure it is clear just prior to backing. Always back slowly and cautiously.



Operators shall warn others who may be near a backing vehicle/equipment, by sounding the horn and/or radio contact. Vehicles equipped with backup alarms shall have alarms in an operational condition at all times.

Supervisors and operators of vehicles/equipment equipped with backup alarms are responsible for inspecting and reporting defective alarms.

### **30.9 GROUND GUIDES**

Supervisors shall see that all of their employees who may be called upon to act as ground guides for backing operations are instructed in the proper methods. Supervisors shall ensure that these methods be employed at all times.

The methods to be used follow:

Employees giving directions to the driver shall:

- Stand on the ground at the rear of the vehicle/equipment in clear view of the driver.
- Stand in full view of traffic, both vehicular and pedestrian.
- Stand in full view of the area where the vehicle is about to back.
- If all three conditions cannot be met, an additional guide shall be used.

Employees directing a truck in a backing operation must keep a safe distance between themselves and the backing vehicle so that they will not be struck by the vehicle they are directing. They must maintain a safe distance during the entire backing operation. They must stay in a path outside the width of the backing vehicle, where they are visible in the rear view or side mirror. They must also be mindful of oncoming traffic in both directions.

The ground guide must also consider the condition of the ground they are going to walk over. Plan to stop the backing vehicles several times during the backing maneuver. If there is any doubt in the mind of the employee providing the guidance to the driver about conditions in the area, the guide shall stop the driver and make them aware of the conditions.

The driver/operator will only back the vehicle as long as the ground guide is in sight and he/she understands the instructions being given by the guide. If for any reason the ground guide is no longer in view, or there is confusion regarding the instructions, the vehicle will be stopped immediately and problem area corrected.



## **31. WALKING AND WORKING SURFACES**

### **31.1 GENERAL**

Many slips, trips, and falls injuries are a direct result of non-compliance with OSHA and departmental guidelines for walking and working surfaces. All places of employment, passageways, storerooms, and service rooms shall be kept clean and orderly and in a sanitary condition. [1910.22\(a\)\(1\)](#)

The floor of every workroom shall be maintained in a clean and, so far as possible, dry condition. Where wet processes are used, drainage shall be maintained, and false floors, platforms, mats, or other dry standing places should be provided where practical. [1910.22\(a\)\(2\)](#)

To facilitate cleaning, every floor, working place, and passageway shall be kept free from protruding nails, splinters, holes, or loose boards. [1910.22 \(a\)\(3\)](#)

Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways, and wherever turns or passage must be made.

Aisles and passageways shall be kept clear and in good repair, with no obstruction across or in aisles that could create a hazard. [1910.22\(b\)\(1\)](#)

Permanent aisles and passageways shall be appropriately marked. [1910.22\(b\)\(2\)](#)

Covers and/or guardrails shall be provided to protect personnel from the hazards of open pits, tanks, vats, ditches, etc. [1910.22\(c\)](#)

In every building or other structure, or part thereof, used for mercantile, business, industrial, or storage purposes, the loads approved by the building official shall be marked on plates of approved design which shall be supplied and securely affixed by the owner of the building, or his duly authorized agent, in a conspicuous place in each space to which they relate. Such plates shall not be removed or defaced but, if lost, removed, or defaced, shall be replaced by the owner or his agent. [1910.22\(d\)\(1\)](#)

It shall be unlawful to place, cause, or permit to be placed, on any floor or roof of a building or other structure, a load greater than that for which such floor or roof is approved by the building official. [1910.22\(d\)\(2\)](#)

Every stairway floor opening shall be guarded by a standard railing. The railing shall be provided on all exposed sides (except at entrance to stairway). For infrequently used stairways where traffic across the opening prevents the use of fixed standard railing (as when located in aisle spaces, etc.), the guard shall consist of a hinged floor opening cover of standard strength and construction and removable standard railings on all exposed sides (except at entrance to stairway). [1910.23\(a\)\(1\)](#)

Every ladder way floor opening or platform shall be guarded by a standard railing with standard toe board on all exposed sides (except at entrance to opening), with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening. [1910.23\(a\)\(2\)](#)



Every hatchway and chute floor opening shall be guarded by one of the following:

- Hinged floor opening cover of standard strength and construction equipped with standard railings or permanently attached thereto so as to leave only one exposed side. When the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard railings.
- A removable railing with toe board on not more than two sides of the opening and fixed standard railings with toe boards on all other exposed sides. The removable railings shall be kept in place when the opening is not in use.
- Where operating conditions necessitate the feeding of material into any hatchway or chute opening, protection shall be provided to prevent a person from falling through the opening. [1910.23\(a\)\(3\)\(i-ii\)](#)
- Every skylight floor opening and hole shall be guarded by a standard skylight screen or a fixed standard railing on all exposed sides. [1910.23\(a\)\(4\)](#)
- Every pit and trapdoor floor opening, infrequently used, shall be guarded by a floor opening cover of standard strength and construction. While the cover is not in place, the pit or trap opening shall be constantly attended by someone or shall be protected on all exposed sides by removable standard railings. [1910.23\(a\)\(5\)](#)
- Every manhole floor opening shall be guarded by a standard manhole cover which need not be hinged in place. While the cover is not in place, the manhole opening shall be constantly attended by someone or shall be protected by removable standard railings. [1910.23\(a\)\(6\)](#)
- Every temporary floor opening shall have standard railings, or shall be constantly attended by someone. [1910.23\(a\)\(7\)](#)

Every floor hole that poses a hazard, shall be guarded by either:

- A standard railing with standard toe board on all exposed sides.
- A floor hole cover of standard strength and construction. While the cover is not in place, the floor hole shall be constantly attended by someone or shall be protected by a removable standard railing. [1910.23\(a\)\(8\)\(i-ii\)](#)
- Every floor hole into which persons cannot accidentally walk (on account of fixed machinery, equipment, or walls) shall be protected by a cover that leaves no openings more than 1 inch wide. The cover shall be securely held in place to prevent tools or materials from falling through. [1910.23\(a\)\(9\)](#)
- Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width to less than 20 inches. [1910.23\(a\)\(10\)](#)

Every wall opening from which there is a drop of more than 4 feet shall be guarded by one of the following: Rail, roller, picket fence, half door, or equivalent barrier.

- Where there is exposure below to falling materials, a removable toe board or the equivalent shall also be provided. When the opening is not in use for handling materials, the guard shall be



kept in position regardless of a door on the opening. In addition, a grab handle shall be provided on each side of the opening with its center approximately 4 feet above floor level and of standard strength and mounting. [1910.22\(b\)\(1\)\(i-ii\)](#)

- Extension platform onto which materials can be hoisted for handling, and which shall have side rails or equivalent guards of standard specifications.
- Every chute wall opening from which there is a drop of more than 4 feet shall be guarded by one or more barriers as required by the conditions.
- Every window wall opening at a stairway landing, floor, platform, or balcony, from which there is a drop of more than 4 feet, and where the bottom of the opening is less than 3 feet above the platform or landing, shall be guarded by standard slats, standard grill work, or standard railing.
- Where the window opening is below the landing, or platform, a standard toe board shall be provided. [1910.23\(b\)\(3\)](#)
- Where there is a hazard of materials falling through a wall hole, and the lower edge of the near side of the hole is less than 4 inches above the floor, and the far side of the hole more than 5 feet above the next lower level, the hole shall be protected by a standard toe board, or an enclosing screen of solid construction (or as specified in paragraph (e)(11) of section [1910.23\(b\)\(5\)](#))
- Every runway shall be guarded by a standard railing on all open sides 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toeboard shall also be provided on each exposed side.
- Runways used exclusively for special purposes (such as oiling, shafting, or filling tank cars) may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a runway of not less than 18 inches wide. Where persons entering upon runways become thereby exposed to machinery, electrical equipment, or other danger not a falling hazard, additional guarding than is here specified may be essential for protection. [1910.23\(c\)\(3\)](#)
- Every flight of stairs having four or more risers shall be equipped with standard stair railings or standard handrails, (as specified in paragraphs (d)(1)(i) through (v) of this section [1910.23\(d\)\(1\)](#)) the width of the stair to be measured clear of all obstructions except handrails.
- On stairways less than 44 inches wide having both sides enclosed, at least one handrail, preferably on the right side descending.
- On stairways less than 44 inches wide having one side open, at least one stair railing on the open side.
- On stairways less than 44 inches wide having both sides open, one stair railing on each side.
- On stairways more than 44 inches wide but less than 88 inches wide, one handrail on each enclosed side and one stair railing on each open side.
- On stairways 88 or more inches wide, one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing located approximately midway of the width.
- Winding stairs shall be equipped with a handrail offset to prevent walking on all portions of the treads having width less than 6 inches.



A standard railing shall consist of top rail, intermediate rail, and posts, and shall have a vertical height of 42 inches nominal from the upper surface of top rail to floor, platform, runway, or ramp level. The top rail shall be smooth-surfaced throughout the length of the railing. The intermediate rail shall be approximately halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard. [1910.23\(e\)\(1\)](#)

### Covers

Covers are used to prevent employees from falling through holes in floors, roofs, or other working surfaces.

Requirements for using covers are as follows:

- Roadway covers must support, without failure, at least two (2) times the maximum axle load of the largest vehicle that could cross the cover. [1926.502\(i\)\(1\)](#)
- Other covers must support, without failure, at least two (2) times the weight of workers, equipment and materials that could be placed on the cover at any given time. [1926.502\(i\)\(2\)](#)
- All covers must be secured so wind, equipment or workers cannot displace them. [1926.502\(i\)\(3\)](#)
- All covers (other than cast iron manhole covers or steel grates) must be color coded or marked with the word "HOLE" or "COVER". [1926.502\(i\)\(4\)](#)

### Protection from Falling Objects

OSHA protection from falling objects lists the requirements for toe boards, guardrails and canopies that are used to protect employees below from being struck by falling objects. Requirements for protection from falling objects are as follows:

Toe boards must be:

- Placed on the edge of the working surface (where workers, vehicles or equipment pass below) to catch tools or materials that may be dropped. [1926.502\(j\)\(1\)](#)
- At least three and one-half (3 1/2) inches high. [1926.502\(j\)\(3\)](#)
- Placed no more than one-fourth (1/4) of an inch above the working surface. [1926.502\(j\)\(3\)](#)
- Able to withstand a fifty (50) pound force from a downward or outward direction. [1926.502\(j\)\(2\)](#)

If tools or materials are piled higher than the toe board, paneling or screening shall be added from the toe board to the middle or top guardrail, whichever is best to protect the employees below. [1926.502\(j\)\(4\)](#)

Guardrail systems used as a protection from falling objects shall have openings small enough to prevent tools or materials from passing through. [1926.502\(j\)\(5\)](#)



## 31.2 LADDERS

### Types of Ladders

Always choose the right type of ladder for the job. One type of ladder will not suffice for all situations. The types of ladders and their uses are as follows:

- Use a stepladder for reaching items on shelves, changing light bulbs or whenever you're trying to reach something over your head. Stepladders shall be of three types:
  - Type I – Industrial stepladder, 3 to 20 feet for heavy duty, such as utilities, contractors, and industrial use.
  - Type II – Commercial stepladder, 3 to 12 feet for medium duty, such as painters, offices, and light industrial use.
  - Type III – Household stepladder, 3 to 6 feet for light duty, such as light household use
- Use a straight or extension ladder when the job allows you to anchor a ladder against a sturdy surface (e.g. a wall or roof).
- Use a nonconductive fiberglass ladder in areas where electrical safety is a concern.

### Guidelines

Ladders will be frequently inspected and maintained in good condition to ensure that the joints between the side rails, rungs, and steps are tight, all hardware and fittings are securely attached, and that the movable parts operate freely without binding or undue looseness.

Ladders with broken or missing rungs, broken steps, split side rails, or other faulty or defective construction shall not be used. When ladders with such defects are discovered they will be withdrawn from service, repaired, or destroyed. [1917.119\(1\)\(i-v\)](#)

Ladders shall be kept clean and free from dirt and grease which might conceal defects. Do not paint ladders.

Portable metal ladders will not be used around energized electrical equipment or near transmission lines, or where there is a chance of accidental contact with those lines. [1926.1053\(b\)\(12\)](#)

The upper end of fixed or portable ladders will extend no less than 36 inches (3 feet) above a platform floor or other landing surface. [1917.119\(f\)\(7\)](#)

Portable ladders will be equipped with non-slipping bases. The feet will be level to prevent tipping sideways. [1917.119\(f\)\(9\)](#)

Carry ladders with the front ends high enough to avoid striking anyone in front of you. Short ladders shall not be spliced to make longer ladders.

Ladders shall be placed so that the distance from the supporting surface to the base of the ladder is approximately one-fourth (1/4) of the length of the ladder to the support point.





Ladders will not be placed on boxes, barrels, or other unstable bases to obtain additional height. Be sure shoes are not greasy, muddy, or otherwise slippery before climbing ladders.

Supplies to be used at the top of the ladder shall be raised with a rope, block, and pulley, or by other means. Nothing will be carried which prevents the use of both hands in climbing or descending a ladder. Always face the ladder when climbing and descending. Use both hands to grip the side rails. Take ladder steps one at a time. Rings and jewelry should be removed to avoid snagging or catching on the ladder.

Reach only within safe limits. Do not reach out more than an arm's length from the side rail. Move the ladder if you cannot reach the desired work area normally.

Do not climb higher than the third rung from the top on a straight or extension ladder. Do not climb higher than the second step from the top on a stepladder. Never stand on the top rung of any ladder.

[1926.1053\(b\)\(13\)](#)

Two persons shall be used to raise a long ladder: one to brace the lower end, the other to lift the top.

Check the lock after the ladder is extended to be sure that the lock is properly seated.

Ample overlap shall be left between sections when the ladder is extended to avoid collapse because of stresses on lower sections. For two section ladders the following minimum overlaps are required:

- Up to 38 feet – three (3) feet
- 38 feet to 44 feet – four (4) feet
- 44 feet to 55 feet – five (5) feet

A ladder will not be placed in front of a doorway unless the door is locked, blocked, or guarded.

[1926.1053\(b\)\(8\)](#)

Ladders will be stowed so that they will not fall or be knocked over.

In order that defects may be readily discovered, wood ladders should not be painted but may be preserved with linseed oil, shellac, or other transparent preservatives that will not conceal the condition of the wood.

When not in use wood ladders should be stored at a location where they will not be exposed to extreme conditions of heat or moisture and where there is good ventilation. They will not be stored near radiators, stoves, steam pipes, etc.

Ladders stored in a horizontal position will be supported at a sufficient number of points to prevent sagging and permanent set.



### 31.3 SCAFFOLDS

Scaffolds are required for any work that cannot be safely done from the ground or by ladder. Front-end, loader buckets or any other equipment not designed to lift personnel shall not be used as a substitute for scaffolding or any other lifting device. [1910.28\(a\)\(1\)](#)

All scaffolds, ladders, machinery, equipment, and devices will be inspected at frequent and regular intervals while in use. Any scaffold found damaged or weakened will not be used until replaced, or repairs have been made. [1910.28\(a\)\(6\)](#)

Scaffolds will be constructed and maintained in conformance with Sections [1910.28](#) and [1910.29](#).

### 31.4 FLOORS AND STAIRWAYS

All floors shall be cleared of any projections such as nails, bolts, and cleats, which may be protruding. Floor openings shall be guarded by railings or barricades at exposed edges. While the cover is not in place, the pit or trap opening shall be constantly attended by someone, or shall be protected on all exposed sides by removable standard railings. [1910.23\(a\)\(5\)](#)

Floors in machine shops, repair garages, and maintenance shops shall be kept free from oil and grease.

Machines and equipment shall be placed to provide adequate and safe passageways. Hand tools, jacks, carts, creepers, and drop cords shall not be left lying around on floor areas, but shall be returned to their proper place.

Stairways will be kept clear of all material. Where it is necessary and advisable, stairways will be equipped with nonskid treads.

Employees should immediately report defective handrails, stair treads, or other hazards on stairways. Broken or split treads, or other serious hazardous treads on stairways, will be properly replaced or repaired.

Every stairway of four (4) risers or more will be railed. Railings will not be less than 30 inches or more than 34 inches high, measured vertically from the upper surface of the riser, and a center rail will be installed. Railings will be maintained in a firm and secure condition. Stairways having both sides open will have a railing along each side. [1910.23\(d\)\(1\)](#)



## **32. WEATHER HAZARDS**

### **32.1 GENERAL**

It is the employee's responsibility to wear proper clothing and maintain proper physical condition in order to safely perform during dangerous weather.

It is the supervisor's responsibility to analyze weather-related conditions prior to and throughout the work day. If any weather condition(s) arise that pose serious health hazards to employees, the supervisor shall determine the necessary measures to reduce and/or eliminate those hazards. These measures can be, but are not limited to:

- Increased number of breaks
- Planned activities according to weather

### **32.2 PREVENTION AND FIRST AID TREATMENT FOR WEATHER-RELATED EXPOSURES**

#### **Heat Exposure**

Sunburn is common during the summer. If you follow a few simple precautions, time lost to sunburn can be reduced by:

- Wearing a safety hard hat or bump cap.
- Wearing long sleeves and light colored clothing.
- Wearing lightweight, loose fitting clothes, except when loose fitting clothing could pose a hazard (i.e.: chipper and chain saw operation).
- Protecting exposed skin with sun block  $\geq$  SPF 30.

Beware and know the symptoms and treatment of, heat stroke, heat exhaustion, and heat cramps when involved in strenuous activity in hot environments.



	Symptom	Response
Heat Cramps	Painful muscle spasms in the legs, arms, or abdominal areas, heavy sweating.	Stop exertion and move into the shade or a cooler location. Drink sports drink, juice, or water. Gently stretch and massage muscles.
Heat Exhaustion	Fatigue, confusion, clammy skin, nausea, excessive sweating, weakness, headache, dizziness, thirst.	Move to a cool place with the legs elevated. Give sports drink, juice, or water. Remove clothing. Cool with water bath, spray, or fan. If condition does not improve, seek medical attention.
Heat Stroke	Extremely high body temperatures, hot, dry, flushed skin, fatigue, confusion, slurred speech, seizures, fast breathing and pulse, unresponsiveness.	Seek medical attention immediately and cool the body down as quickly as possible by immersing in water up to the neck or spraying, sponging, or showering with cool water. Place ice packs against the groin, armpits, and sides of the neck.

Take time to allow your body to adjust to high heat and high humidity environments before exertion.



Heat Index Chart (Temperature & Relative Humidity)

RH (%)	Temperature (° F)															
	90	91	92	93	94	95	96	97	98	99	100	101	102	103	104	105
90	119	123	128	132	137	141	146	152	157	163	168	174	180	186	193	199
85	115	119	123	127	132	136	141	145	150	155	161	166	172	178	184	190
80	112	115	119	123	127	131	135	140	144	149	154	159	164	169	175	180
75	109	112	115	119	122	126	130	134	138	143	147	152	156	161	166	171
70	106	109	112	115	118	122	125	129	133	137	141	145	149	154	158	163
65	103	106	108	111	114	117	121	124	127	131	135	139	143	147	151	155
60	100	103	105	108	111	114	116	120	123	126	129	133	136	140	144	148
55	98	100	103	105	107	110	113	115	118	121	124	127	131	134	137	141
50	96	98	100	102	104	107	109	112	114	117	119	122	125	128	131	135
45	94	96	98	100	102	104	106	108	110	113	115	118	120	123	126	129
40	92	94	96	97	99	101	103	105	107	109	111	113	116	118	121	123
35	91	92	94	95	97	98	100	102	104	106	107	109	112	114	116	118
30	89	90	92	93	95	96	98	99	101	102	104	106	108	110	112	114

*Note: Exposure to full sunshine can increase HI values by up to 15° F*



### **Frostbite**

When working in extreme cold, you expose yourself to frostbite. Frostbite is a great danger to the nose, cheeks, ears, toes, and fingers. Often, a victim of frostbite is not even aware of the damage being done; therefore, it is important to know the signs/symptoms and first aid treatment for frostbite.

#### **Signs/Symptoms of Frostbite**

The first sign of frostbite is reddening of the skin. It then turns blotchy white, gray, or yellow. Finally, the skin becomes completely white and blisters. The body part may feel very cold or numb. In advanced stages of frostbite, there is no feeling at all in the exposed skin.

Frostbite victims also suffer from hypothermia or loss of body heat. Some signs/symptoms include shivering, drowsiness, unresponsiveness, cold pale skin, and not caring about staying warm. Hypothermia victims need to get out of the cold immediately.

#### **Treating Frostbite**

Get help immediately. Remove any wet clothing and apply warm packs to neck, armpits and groin. If warm packs are not available, use your own body heat to warm victim. Do not rub the affected area. Do not re-warm with direct heat.

Stay with victim and keep them warm until help arrives. If victim must be moved, do so gently, keeping the victim in the horizontal position.

Keep the victim as warm and dry as possible. Bring the victim inside to a warm place as soon as you can. Warm the frozen body part by putting it in warm (not hot) water, damp cloths or, blankets. Check the water or cloth frequently to make sure it stays warm. Do not rub or move the frozen part. Place frostbitten part lower than the heart to increase blood flow.

Get medical attention as soon as possible.

#### **Avoiding Frostbite**

Maximum protection against cold is avoided by wearing at least three layers of clothing. The first layer next to the skin should be loose fitting wool, loose twill cotton, or quilted thermal underwear. The second layer should be a medium weave, medium weight, one or two piece garment--again, not tight fitting. The outer layer should be wind-resistant and include a hood. Mittens are good protection for the hands.

Also, when working in the cold, wiggle your toes and fingers. If they are beginning to lose feeling, are tingling or painful, come inside and warm up.

Protect the eyes from the bright snow/sky combination by wearing dark colored glasses.



Be prepared to protect your lungs with a facemask or scarf when subjected to prolonged breathing of extremely cold air.

### **Hypothermia**

When a person gets so cold that his or her body cannot warm up, it's called hypothermia. Hypothermia can be fatal, but its risks can be avoided and its effects minimized if you take precautions and use first aid quickly.

Dress warmly, stay dry, and bring along extra dry clothes when working outside in cold weather.

Mild Hypothermia	Severe Hypothermia
Shivering, loss of coordination, confusion.	No longer shivering, stumbling, irrational behavior, slow, irregular heartbeat, low body temperature.



Wind Chill Chart - F, wind in mph

Wind (mph)	Temperature (° F)												
	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25
5	31	25	19	13	7	1	-5	-11	-16	-22	-28	-34	-40
10	27	21	15	9	3	-4	-10	-16	-22	-28	-35	-41	-47
15	25	19	13	6	0	-7	-13	-19	-26	-32	-39	-45	-51
20	24	17	11	4	-2	-9	-15	-22	-29	-35	-42	-48	-55
25	23	16	9	3	-4	-11	-17	-24	-31	-37	-44	-51	-58
30	22	15	8	1	-5	-12	-19	-26	-33	-39	-46	-53	-60
35	21	14	7	0	-7	-14	-21	-27	-34	-41	-48	-55	-62
40	20	13	6	-1	-8	-15	-22	-29	-36	-43	-50	-57	-64

*Wind speeds above 40 mph have little additional chilling affect*

*Note:* In using the table above, values of wind chill below -10° F are considered bitterly cold. Values of wind chill below -20° F are extremely cold -- human flesh will begin to freeze within one minute!





## **33. WELDING, CUTTING, AND BRAZING**

### **33.1 GENERAL**

Employees engaged in Oxy-Fuel operations shall be knowledgeable in such operations, and shall keep in mind the safety of fellow employees, as well as their own safety, at all times. Only Qualified employees shall use the Oxy-Fuel system. Employees can be qualified by a certified welder. No one except a certified welder shall perform any structural welding activities. [1910.252](#)

Welders will warn other employees of the location of hot metals for their protection. When welding or cutting lead, zinc, cadmium-coated, lead-bearing, or other toxic materials, every effort shall be made for the removal of fumes (use of ventilation). If fumes continue to pose a health hazard, Positive Air Purifying Respirator (PAPR) shall be used if available. [1910.252©\(1\)](#)

### **33.2 DEFINITIONS**

#### **Certified**

Defined as an employee who has obtained welding certifications through an accredited source and permitted to perform all cutting, torching, metal heating, and welding fabrications.

#### **Qualified**

An employee who has demonstrated an understanding and ability to execute cutting, torching, welding, and metal heating work practices as determined by a certified welder and approved by the supervisor.

#### **Hot Work Permit**

A permit that is issued by an employee through a supervisor when welding, cutting, torching, and metal heating is performed outside of the designated area. [1910.252\(a\)\(2\)\(iv\)](#)

### **33.3 FIRE PREVENTION AND PROTECTION**

#### **Basic Precautions**

Prior to the start of any hot work, a Hot Work permit shall be filled out if not performing welding/torch activities in a designated welding bay Hot Work permit can be found on the safety web page under the policy and procedures tab. If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity shall be taken to a safe place. If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards shall be used to confine the heat, sparks, and slag in order to protect the immovable fire hazards. If the above requirements cannot be met, the welding and cutting shall not be performed.



## Special Precautions

Employee shall watch for fires for at least a one-half (1/2) hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires. [1910.252\(a\)\(2\)\(iii\)\(b\)](#)

## 33.4 PROTECTION OF PERSONNEL

### Personal Protective Equipment

Appropriate protective clothing is required for all welding operations and will vary with the size, nature and location of the work to be performed. Some suggested protective measures for welders and helpers are:

- Flame-resistant gauntlet gloves, aprons, jackets, trousers, or other protective garments shall be used as protection against heat and sparks.
- Clothing will be free of oil and grease. Shirts should have full sleeves, no pockets, and should be worn outside of trousers with the collar buttoned. Trousers should have no cuffs and extend well down to the safety shoe.
- High-quality welding helmets of glass fiber, vulcanized fiber, chromed leather, or other suitable material should be worn. Hand shields are generally substituted for helmets on light, intermittent work. Employees assisting welders will also wear protective lenses to protect eyes.
- Safety goggles or glasses shall be worn during chipping and cleaning.

### Welding in Confined Spaces

Confined spaces are dangerous enough without the added danger of welding. Always consult your District Safety Director to determine whether or not welding and/or entry should be attempted in confined spaces. [1910.252\(b\)\(4\)](#)

## 33.5 ARC WELDING

### Welding Equipment

Only standard electric arc-welding equipment such as generators, motor-generator units, transformers, rectifiers, etc., conforming to the requirements of the National Electrical Manufacturers' Association or the Underwriters' Laboratories, Inc. will be used.

Power circuits will be installed and maintained in accordance with the National Electrical Code. Check the voltage for which the machine is wired before connecting.

Electrode and ground cables will be supported so as not to create obstructions interfering with the safe passage of employees. [1910.252\(b\)\(1\)\(ii\)](#) The ground lead for the welding circuit will be mechanically strong and electrically adequate for the service required. An electrode holder of adequate rated current capacity, insulated against shock, shorting, or flashing when laid on grounded material, will be used. [1910.254\(c\)\(2\)\(v\)](#)



### Operation and Maintenance

Before starting operations, all connections to the machine shall be checked to make certain that they are properly made.

There shall be no leaks of cooling water, shielding gas or engine fuel. Report any equipment defects or safety hazards to your supervisor and discontinue the use of the equipment. [1910.254\(d\)\(4\)](#)

Machines that have become wet shall be thoroughly dried and tested before being used.

Cables with splices within 10 feet of the holder shall not be used. Welders should not coil or loop welding electrode cable around parts of their body.

Cables with damaged insulation or exposed bare conductors shall be replaced.

All foot switches shall be guarded to prevent accidental operation of the machine.

### 33.6 GAS WELDING AND CUTTING

Use only approved welding and cutting equipment. Flash arrest valves shall be used on both hoses. Some flash arrestors are installed within the head of the torch, check manufacture for details. Avoid oil contamination of gauge connections. Welding and cutting equipment will never be left unattended with the valves in the open position. All compressed gas cylinders shall be chained or securely fastened at all times. Personal protective equipment requirements identified in Section 3 of this chapter also apply to gas welding and cutting. [1910.253\(e\)\(3\)\(ii\)\(b\)](#), [1910.253\(e\)\(3\)\(ii\)\(c\)\(3\)](#)

#### Storing Cylinders

Compressed gas cylinders will be kept away from excessive heat and are not to be stored where they might be damaged or knocked over and will be stored at least 20 feet away from highly combustible materials. Where cylinders are designed to have a valve protection cap, the cap will be in place except when the cylinder is connected for use. Safety caps will always be in place when cylinders are being transported in a vehicle. [1910.253\(b\)\(2\)](#)

Compressed gas cylinders will be stored in a vertical valve-end-up position and shielded from the direct rays of the sun and protected from accumulations of ice and snow. [1910.253\(b\)\(3\)\(ii\)](#)

Oxygen cylinders shall be stored separately from gas fuel cylinders or combustible materials by a minimum distance of 20 feet or by a noncombustible barrier at least five (5) feet high. All compressed gas cylinders and storage areas must be properly labeled. [1910.253\(b\)\(4\)\(iii\)](#)

Cylinders shall be carefully stored so as to avoid possible destruction or obliteration of coloring, tags and other means of identifying the contents. [1910.253\(b\)\(1\)\(ii\)](#)

Empty cylinders shall have their valves closed and capped. [1910.253\(b\)\(5\)\(ii\)\(H\)](#)



### **Using Cylinders**

Cylinders will be placed in a rack, chained, or otherwise positively secured against tipping over when stored. They will be used in the order received from the supplier. When empty, the valve shall be closed, capped, and cylinder stored accordingly.

Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately to purge any debris from valve. The valve shall be opened while standing to one side of the outlet; never in front of it.

Compressed gas cylinder valves shall not be opened more than a half ( $\frac{1}{2}$ ) turn and preferably no more than three fourths ( $\frac{3}{4}$ ) of a turn.

Keep cylinders from contact with electric wires and shield them from sparks or flame from welding and cutting.

Do not allow storing of tools, materials, or anything else on top of cylinders. While in use the valve key will be kept in place on the valve spindle.

Cylinders shall be kept free from oily or greasy substances.

A hammer or wrench shall not be used to open cylinder valves.

### **Handling and Transporting Cylinders**

Whenever a cylinder is being transported, remove the regulator and be sure that the valve protection cap is in place. Never use valves or caps for lifting. For raising or lowering use a suitable sling, boat, cradle, or platform. Always handle carefully, do not drop or jar. Cylinders should be moved by tilting and rolling on the bottom edge, do not drag or slide. When moving with a truck, be sure that the cylinders are securely held in place in an upright position.