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The Purpose and Design of the Study Guide

U.S. OSHA created the Outreach Training Program for the purpose of expanding the knowledge base of employers and employees across the country relative to their standards and guidelines, thereby enhancing safety and health in the American workplace. OSHA requires specific topics to be included in every program.

The purpose of this study guide is to provide a thorough review of the OSHA 30 Hr. General Industry Training Program. Each lesson corresponds to those in the series and contains bulleted highlights, as well as note taking sections.
Module 1A:

Introduction to OSHA and the OSH Act

The purpose of this two-hour course is to provide workers with introductory information about OSHA. The module is comprised of the following six lessons:

- Why is OSHA important to you?
- What rights do you have under OSHA?
- What responsibilities does your employer have under OSHA?
- What do the OSHA standards say?
- How are OSHA inspections conducted?
- Where can you go for help?

This section provides basic knowledge of OSHA’s history and mission, worker rights under OSHA, employer responsibilities under OSHA, OSHA standards, OSHA inspections, and safety and health resources, including how to file an OSHA complaint. This part will prove beneficial for those who are directly or indirectly involved with OSHA and the OSH Act.

Key Terms

Material Safety Data Sheet (MSDS): A document that contains hazard-related information about a specific chemical or formulation.

OSHA: Occupational Safety and Health Administration

Personal Protective Equipment (PPE): All types of protective equipment such as hard hats, gloves, boots, and eye protection, along with respiratory aids.

Lesson 1:

Why Is OSHA Important to You?
Key Points

- OSHA began because, until 1970, there were no national laws for safety and health hazards.

- Since then, workplace fatalities have been cut by more than 60 percent and occupational injury and illness rates have declined 40 percent.

- State plan programs respond to accidents and employee complaints and conduct unannounced inspections just like federal OSHA.

- Some states have OSHA-approved plans that cover only state and local government workers.

- OSHA approves and monitors all state plans. The state plans must be at least as effective as federal OSHA requirements.

- Twenty-two states and territories operate complete plans and four cover only the public sector.

- Some statistics:
  - On average, 15 workers die every day from job injuries.
  - Over 5,600 Americans die from workplace injuries annually.
  - Each year, over 4 million non-fatal workplace injuries and illnesses are reported.

- The estimated cost of occupational injuries and illnesses ranges from $145 billion to $290 billion a year for direct and indirect costs. (See Handout 1)

Study Questions

1. The OSH Act is also known by what other name?
2. Which occupational groups do not come under OSHA coverage?

3. Name three actions OSHA uses to carry out its mission.

4. Which states have developed public sector state plans?

Lesson 2:

What Rights Do You Have under OSHA?

Key Points

- The right to review the injury and illness log includes former employees, their personal representatives, and authorized employee representatives. (See Handout 2)

- OSHA regulations protect workers who complain to their employer about unsafe or unhealthful conditions in the workplace. (See Handout 3)

- You cannot be transferred, denied a raise, have your hours reduced, be fired, or punished in any other way because you have exercised any right afforded to you under the OSH Act.

- Since you are often closest to potential safety and health hazards, you have a vested interest in reporting
problems so that the employer gets them fixed. If the hazard is not corrected, you should then contact OSHA. (See Handout 4)

- The OSH Act prohibits employment retaliation against an employee who complains to an employer, files a complaint related to workplace safety or health conditions, initiates a proceeding, contests an abatement date, requests information from OSHA, or testifies under the Act. In certain circumstances, an employee may refuse to work under seriously threatening health or safety conditions. (See Handout 5)

- Other required training includes lockout-tagout, bloodborne pathogens, noise, confined spaces, fall hazards in construction, personal protective equipment, and a variety of other subjects.

- Under OSHA’s standard 1910.1020, you have the right to examine and copy exposure and medical records, including records of workplace monitoring or measuring a toxic substance. This is important if you have been exposed to toxic substances or harmful physical agents in the workplace, as this regulation may help you detect, prevent, and treat occupational disease.

- If you file a complaint, you have the right to find out OSHA’s action on the complaint and request a review if an inspection is not made. (See Handout 6)

- You have the right to talk to the inspector privately. You may point out hazards, describe injuries, illnesses or near misses that resulted from those hazards and describe any concern you have about a safety or health issue.

- You also have the right to find out about inspection results and abatement measures, and get involved in any meetings or hearings related to the inspection. You may also object to the date set for the violation to be corrected and be notified if the employer files a contest.
"Good faith" means that even if an imminent danger is not found to exist, the worker had reasonable grounds to believe that it did. Since the conditions necessary to justify a work refusal are very stringent, refusing work should be an action taken as a last resort. If time permits, the condition should be reported to OSHA or the appropriate government agency.

- If you believe you have been punished for exercising your safety and health rights, you must contact OSHA within 30 days. (See Handout 7)

Study Questions

1. OSHA requires that each employer post certain materials in a prominent location at the workplace. What materials are these?

2. If an employer disagrees with the results of the OSHA inspection, he or she may submit a written objection to OSHA, called what?

3. Workers’ safety and health responsibilities include what six?

Lesson 3:

What Responsibilities Does Your Employer Have under OSHA?
Key Points

- Employers are required to determine if PPE should be used to protect their workers.

- The first and best strategy is to control the hazard at its source.

- The basic concept behind engineering controls is that, to the extent feasible, the work environment and the job itself should be designed to eliminate hazards or reduce exposure to hazards.

- If PPE is to be used, a PPE program should be implemented. This program should address the hazards present; the selection, maintenance, and use of PPE; the training of employees; and monitoring of the program to ensure its ongoing effectiveness. (See Handout 8)

Study Questions

1. Employer recordkeeping responsibilities involves not only setting up a reporting system and providing copies of logs upon request, but also posting annual summaries and what else?

2. What types of workplaces are exempt from recordkeeping requirements?

3. Which general industry workers are among those most exposed to lead?
4. OSHA also requires that employers pay for most required PPE, except for what types that may be worn off the job?

Lesson 4:

What Do the OSHA Standards Say?

Key Points

OSHA Standards are organized in the following way:

- The CFR is divided into Titles. OSHA's standards are in Title 29.
- Under each Part, such as Part 1926, major blocks of information are broken into subparts. For example, Subpart C is named General Safety and Health Provisions. Subpart C contains sections 1926.20 through 1926.35.
- All OSHA standards are available on OSHA’s Web site. You can look them up by the standard number or do a search by topic. (See Handout 9)

Study Questions

1. What four categories do OSHA standards fall into?

2. OSHA issues standards for a wide variety of workplace hazards, including what seven?
Lesson 5:

How are OSHA Inspections Conducted?

Key Points

- OSHA conducts inspections without advance notice, except in rare circumstances (for example, when there is a report of an Imminent Danger). In fact, anyone who tells an employer about an OSHA inspection in advance can receive fines and a jail term.

- Referrals usually are from a government agency, such as NIOSH or a local health department. They are handled the same way as complaints.

- A follow-up is made to see if violations cited on an earlier inspection were fixed.

- Monitoring inspections are made to make sure hazards are being corrected and workers are protected whenever a long period of time is needed for a hazard to be fixed.

- The CSHO may also interview workers, take photographs or video, and monitor worker exposure to noise, air contaminants, or other substances. The CSHO will conduct all worker interviews in private, although workers may request that a union representative be present.

- Citations are sent in the mail at a later date (no later than six months after the inspection).

- The CSHO takes the findings back to the office and writes up a report. The Area Director reviews it and makes the final decision about any citations and penalties.

- OSHA may adjust a penalty downward depending on the gravity of the violation, the employer's good faith
(efforts to comply with the Act), history of previous violations, and size of the business.

- Although employers and workers each have rights to disagree with (or appeal) parts of an OSHA citation, the employer has more rights than workers related to citations.

- Employers may request an informal conference with OSHA to discuss a case. They can also reach a settlement agreement with OSHA that adjusts citations and penalties in order to avoid prolonged legal disputes.

- Workers may also contest the abatement time for any violation and an employer's petition for modification of abatement (PMA), but they cannot contest citations or penalties. If you, as a worker, plan to contest an abatement time, you should provide information to support your position.

- Both workers and the employer have the right to participate in the hearing and request a further review of the judge’s decision by the commission.

- If a violation or abatement date is contested by the employer, the situation does not have to be fixed until there is a final legal order; however, if only the penalty is contested, the violation must be fixed by the date in the citation.

**Study Questions**

1. What are the four priority categories of OSHA inspection?

2. What are four major stages of an OSHA inspection and what occurs during each?
3. In the opening conference, what does the CSHO do?

4. Citations inform the employer and employees of what four matters?

5. How are willful, serious, other-than-serious, and repeat violations defined?

Lesson 6:

Where Can You Go for Help?

Key Points

- OSHA standards such as those for hazard communication, egress, confined space and Bloodborne Pathogens require labels and signs. The employer must make sure that each sign or label posted can be understood by all workers, so the signs must be bilingual if workers do not understand or read English.

- Orientation manuals and training materials about your job should include information about how to work safely. (See Handout 10)

- If you have questions about a new job or task, or a job or task that has changed, be sure to ask for the written procedures and for additional training on them.
• If you are discussing a health concern with your health care provider, try to provide them with as much information about the chemical or substance as possible. For example, if you are getting headaches at work, try to get the names and MSDSs or labels of the chemicals to which you are exposed. (See Handout 11)

• Remember that discrimination for health and safety activity is illegal. If you are a union representative, you may wish to have your name on the complaint. (See Handout 12)

Study Questions

1. OSHA considers some jobs and tasks very hazardous, such as what?

2. What are QuickCards?

3. What can a worker request if he or she is currently an employee at a workplace of concern (meaning, where workers are getting sick from an unknown cause or are exposed to an agent or working condition that is not regulated by OSHA), if he or she has obtained the signatures of two other workers?
Module 1B:

Basic Safety Orientation

Employees may be exposed to many safety and health hazards while on the job. These include chemical hazards, fire hazards, electrical hazards, confined space hazards, etc. This part aims to present an overview of some basic workplace hazards and how employees can protect themselves from them.

Key Terms

Bloodborne pathogens: Infectious microorganisms found in human blood that can cause diseases such as Hepatitis B and C and the Human Immunodeficiency Virus (HIV).

Guardrail: A protective railing enclosing an elevated platform.

Hazardous chemical: A chemical that can cause physical harm or be a health hazard.

Material Safety Data Sheet (MSDS): A document that contains hazard-related information about a specific chemical or formulation.

Oxygen deficient atmosphere: An atmosphere containing less than 19.5 percent oxygen by volume.

Personal Protective Equipment (PPE): All types of protective equipment such as hard hats, gloves, boots, and eye protection, along with respiratory aids.

Scaffold: A temporary platform on which workers can sit or stand when performing tasks at heights above the ground.

Lesson 1:

Hazard Communication and Protective Equipment

Key Points

OSHA 30-Hr General Industry Study Guide
- Employers must inform all employees about the hazardous chemicals present at the worksite and how to handle them and themselves safely.

- All employers must evaluate the chemicals used at the worksite in order to determine the type of equipment that should be worn by their employees. Also, employers must train employees to properly handle and use PPE.

- Employees are required to read and understand the warnings written on labels before they handle the containers and their contents. If employees do not understand what is written on the labels, they must ask their supervisors before proceeding with the assigned tasks.

- An MSDS contains information on physical and chemical properties of the material, its acute or chronic health effects, along with exposure limits and handling instructions. At a worksite, there must be an MSDS for each hazardous chemical present and these must be immediately accessible to all employees.

- It must be noted that an employee’s prescription glasses are not safety glasses and should not be used as a substitute.

- Face protection can be acquired by using a face shield. Shoulder-length chemical splash hoods are also used in order to get better protection from splashes.

- In some cases, personnel may require the use of specially designed hardhats. Electricians, for instance, require specially designed hardhats that can protect them from electrical shock.

- For electrical work, rubber gloves provide the best protection. Gloves made of neoprene or latex can protect the hands from some chemicals.
• Foot protection can be obtained through steel toe boots, metatarsal guards, and chemical resistant boots.

• All protective clothing must be puncture-and wear-resistant. It must be noted that torn or ripped clothing does not provide full protection against hazardous materials.

• Employers must train all employees how to safely wear a respirator. Also, employees must be medically evaluated, and fit-tested with each type of respirator that they are required to wear.

• In environments that are extremely noisy, with volume rising above the action level of 85 dB, the creation and implementation of a formal hearing conservation program is required.

Study Questions

1. Respiratory protection can be obtained through two basic types of respirators; name them and describe their functions.

2. Of these two types of respirators, which one is further broken down into its own two types?

3. Based on their names, what functions would you think these two types serve?

Lesson 2:

OSHA 30-Hr General Industry Study Guide
Workplace Hazards and Protection

Key Points

- If employees are required to work near energized electrical equipment, they must be made aware of the general electrical safety guidelines. For instance, they must stay at least 10 feet from electric lines with voltages of 50 kilovolts or less.

- Because in general industry, falls are the second leading cause of accidental workplace deaths, personal fall arrest systems provide the highest level of protection from falling as they are designed for each individual employee.

- Workers must always position themselves on a ladder so that at least three limbs are in contact with it at all times. Workers must face the ladder when climbing up or down.

- Those scaffolds that have been approved should be marked with green tags. Yellow tags are used if there are any limitations associated with the scaffold. Scaffolds unsuitable for use should be marked with red tags.

- Employees who are required to work on or near energized parts must ensure that these parts are properly locked out and tagged out. Only authorized personnel may affix locks and tags on energy sources.

- Before employees enter a confined space, they must disconnect or block all piping. Also, it is necessary for them to check the atmosphere inside the confined space to ensure that it is not hazardous.

- In case an employee detects a fire, he or she must immediately report it, hit the alarm, and then follow the procedures specified in the facility's Emergency Action Plan and call for help. Employees must only try to extinguish the fire in its early stage and then only when
it is safe to do so and when they have been trained to do it.

- If a victim is in a state of shock, immediately call for help.

- Unless victims may have a spinal injury, they should be laid on their backs with their legs raised and supported approximately 8-12 inches off the ground. They should also be kept warm, and it is very important to keep them calm. A supervisor should be alerted and asked to call for medical assistance.

- For second- and third-degree burns, medical assistance should be sought.

- Victims who have fractured their bones or who have sustained head and neck injuries must not be moved.

- Employees must make sure that they never come in contact with any blood or body fluids. If they have to handle any such fluids, they must wear PPE, especially gloves and safety glasses.

- Heat stress can cause various disorders, including heat exhaustion, heat cramps, and heat stroke. Due to the severity of the consequences of heat stress, employees must regularly monitor their workplaces and take preventive measures to avoid it.

- If employees experience heat cramps, they should first be taken to a shelter that is either air-conditioned or fanned and given water to drink. Medical attention should immediately be sought if the employee starts vomiting.

- If not treated immediately, heat stroke can be fatal.

**Study Questions**

1. What does a personal fall arrest system include?
2. What three types of ladders can be found at a worksite?

3. How many inches must a guardrail be in height, and how many rails must each one have?

4. When entering a confined space, aside from first blocking piping, checking the atmosphere, and wearing the proper PPE, what must a person also do?

5. List five characteristics of heat stress.

6. What disorder besides frostbite is caused by extreme cold? Hint: If employees experience this, they must immediately be covered with dry blankets.

7. Employees with frostbite must not move or rub the affected area, but must instead warm it slowly to avoid causing what?
Module 2:

Walking and Working Surfaces

Every walking–working surface in the workplace can be potentially hazardous to workers. Hazardous surfaces include loose carpets, ramps, stairways, ladders and scaffolds, as well as slippery floors resulting from liquid or other spills. Resulting slips, trips, and falls can cause cuts and bruises, sprains and strains, broken bones, and various injuries to internal organs. They can also result in fatalities.

This part alerts participants to the hazards of walking–working surfaces and provides information about workplace action needed to eliminate or control these hazards.

Key Terms

Floor hole: This is an opening in the floor, platform or pavement that measures less than 12 inches, but more than 1 inch, and through which materials—but not people—may fall.

Floor opening: An opening in the floor, platform, or pavement measuring 12 inches or more in its least dimension through which persons may fall.

Standard railings: These consist of a top rail, mid rail and posts. The height from the upper surface of the top rail to the floor level is 42 inches. Mid rail height is one-half as high as the top rail (or 21 inches).

Standard toeboard: A standard toeboard blocks an opening along the base/floor of stairs or other walking or working surfaces where materials or body parts might otherwise inadvertently fall through. It should be 4 inches high, with not more than 1/4-inch clearance above the floor.

Wall opening: An opening in a wall or partition that is at least 30 inches high and 18 inches wide through which persons may fall.
Lesson 1:

Wall and Floor Openings and Holes

Key Points

- Slips, trips, and falls account for just over one-third of all recordable general industry injuries. They cause 15% of all accidental deaths in the workplace, and are second only to motor vehicles as a cause of fatalities.

- Where wet working conditions exist, provide gratings, mats, raised platforms, or other engineering controls to avoid the potential for slips.

- For floor loading protection, load ratings must be marked on plates and be conspicuously posted, and the load-rating limit must not be exceeded.

- For infrequently used stairways, where traffic across the opening prevents the use of a fixed standard railing, the guard shall consist of a hinged floor opening cover of standard strength and construction along with removable standard railings on all exposed sides, except at the stairway entrance.

- Floor openings may be covered rather than guarded with rails. When the floor opening cover is removed, a temporary guardrail shall be in place or an attendant shall be stationed at the opening to warn personnel.

- While a cover is not in place, the floor hole shall be constantly attended by someone or shall be protected by a removable standard railing.

- Employers should have Site-specific Safety Plans addressing potential hazards that could lead to injury or death.

- Every ladderway floor opening or platform shall be guarded by a standard railing with standard toeboard 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.

- Aisles must be sufficiently wide where mechanical handling equipment is used.

**Study Questions**

1. What are the three major elements of the guarding floor and wall openings and holes section?

2. Provide standard railing with a standard toeboard on the open sides wherever what three conditions are true?

3. Improper aisle widths coupled with poor housekeeping and vehicle traffic can cause what three complications?

**Lesson 2:**

**Stairs, Ladders, and Scaffolds**

**Key Points**

- Never use ladders in a horizontal position as scaffolds or work platforms.

- Always remember that fixed ladders, with a length of more than 20 feet to a maximum unbroken length of 30 feet must be equipped with cages or a ladder safety device.
• When fixed ladders are used to ascend to heights exceeding 20 feet (except on chimneys), landing platforms shall be provided for each 30 feet of height or fraction thereof.

• Repair damaged or weakened scaffolds immediately, and do not use them until repairs have been completed.

• A safe means must be provided to gain access to the working platform level through the use of a ladder, ramp, or other device.

• Overhead protection must be provided for personnel on a scaffold exposed to overhead hazards.

• Employers must ensure that no extensions or auxiliary parts are added to scaffolds unless designed and approved by a competent person.

Study Questions

1. When inspecting the condition of stairways in a workplace, you should inspect what in particular?

2. A non self-supporting portable ladder adjustable in length may not exceed how many feet?
Module 3:

Emergency Action Plan

Every year workers are injured or die because of nonexistent or inappropriate exit routes. Too often, inadequate emergency action plans are responsible for more casualties and fatalities than the actual emergency.

This module gives you a basic understanding of means of exit, emergency action plans, and fire protection plans. Familiarity with these plans in any workplace can save lives.

Key Terms

Exit: The portion of a route that is generally separated from other areas to provide a protected way of travel to the discharge space.

Exit access: The portion of an exit route that leads to an exit.

Exit discharge: The part of an exit route that leads directly outside or to a street, walkway, refuge area or public access way.

Exit route: A continuous and unobstructed path of exit travel from any point within a workplace to any place of safety.

High-hazard: Contents/materials that can burn rapidly, or explosions or poisonous fumes that can escalate the severity of a fire.

Lesson 1:

Exit and Its Standards

Key Points

- A means of exit refers to both horizontal and vertical ways of travel; this includes corridors, hallways, ramps, stairs, yards, doorways, lobbies, escalators, balconies, courts, passageways, and enclosures.
Exit routes must meet the following requirements:

- Every exit route must be a part of the workplace.
- Exit route must be at least 28 inches wide at all points.
- An exit route must be designed using fire resistant materials.
- There must be an adequate number of exit routes to accommodate the number of employees needing access to them.
- Exit routes must be remote from each other so that if one route is inaccessible, employees can use an alternate route.
- Depending on the size of the facility and number of employees, local fire codes may require more than two exits. (Frequently, local code is more stringent, thereby superseding OSHA.)

The outdoor exit route must not lead to a dead-end and should have a safe path with a smooth and solid surface.

Whenever the exit route is not clearly identified, use signs, markings, and/or symbols similar to exit signs in such a way as to provide proper directional information.

If passages, stairways, and doors could be mistaken for exits, then these routes should be clearly marked “Not an Exit” in plain, legible letters and/or with a symbol that conveys the message to workers.

Exit signs must be illuminated with auxiliary power so that they continue to work in case of an electrical failure.

Study Questions

1. The refuge area is a fire- and smoke-protected space within a building along an exit route. The refuge area must have a fire-resistance rating of at least how much?
Lesson 2:

The Plans

Key Points

• The Emergency Action Plan (EAP) must include:
  
  o Evacuation procedures and exit routes.
  o First-aid and rescue duty assignments.
  o Methods of reporting emergencies by any employee.
  o Procedures for employees who remain behind.
  o Procedures for an accurate accounting of all employees after an evacuation or during a “shelter-in-place” emergency.
  o Procedures for critical operation shutdown.
  o Clear identification of the person in charge of the EAP and the chain-of-command.

• If audible alarms are used to initiate the EAP, the sound must be a unique sound; one different from any other sound an employee might hear during normal operation. The sound can only mean the EAP has been initiated.

• The EAP informs all employees of the type of evacuation procedure to follow in the event of an emergency, and which exit routes will be used.

• It is the employer’s responsibility to ensure that every employee is familiar with his or her role (if any) in the Fire Prevention Plan, and that this role is reviewed.
Study Questions

1. When must the plan be reviewed with each employee?

2. What seven elements must be included in a Fire Protection Plan?

Lesson 3:
Fire Detection and Extinguishing Systems—General

Key Points

- Flame detectors are best for protecting:
  - Areas with high ceilings and open-spaces, such as warehouses and auditoriums.
  - Outdoor or semi-enclosed areas, where winds or draughts can prevent smoke from reaching a heat or smoke detector.
  - Areas where rapidly developing flaming fires can occur, such as petrochemical production, fuel storage areas, paint shops, and solvent areas.
  - Environments which are unsuitable for other types of detectors.

- Do not delay alarms or devices actuated by fire detectors for more than 30 seconds, unless the delay is necessary for the safety of employees.

- If the alarm or signaling device is used on a total flooding system, it must also:
o Alarm before the system discharges, to give employees sufficient time to exit the space safely.
o Be connected to an approved fire detection device that automatically activates the pre-discharge alarm before the system discharge.
o Be addressed in an emergency action plan in accordance with each area that is protected.

- If your workplace is equipped with a fixed suppressant system, there must be at least one manual station for each protected area.

Study Questions

1. Typical elements and components of a “fixed extinguishing system” include what eight?

2. What two specific workplace hazards does carbon dioxide share with halon?

3. What additional workplace hazards does halon pose?
Module 4:

Hazardous Materials

Hazardous materials are considered any substance or compound that has a capability of producing adverse effects on the health and safety of humans. Every year, thousands of workers get injured or killed because of fatal chemicals or other toxic hazards. OSHA and other authorities have provided many rules and regulations to prevent hazards and perform safe operations at the workplace.

It is very important to know how we can save lives at a workplace. This part gives you a basic understanding of how to deal with hazardous materials and how we can protect ourselves from their lethal hazards to prevent injury, illness, and/or death.

Key Terms

**Chemical:** For the purposes of this module, an element or a compound meeting the definition of a hazardous material in 49 CFR 172.101.

**Combustible:** A material having a flash point above 100 degrees Fahrenheit (F).

**Flammable:** A material having a flash point below 100 degrees F.

**Inhalation:** Breathing in airborne substances that may be in the form of gases, fumes, mists, vapors, dusts, or aerosols.

**NFPA:** National Fire Protection Association

**OSHA:** Occupational Safety and Health Administration

Lesson 1:

Introduction to Hazardous Materials

Key Points

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• Flammable materials require more care than combustible materials because they can burn at room temperature.

• It is important to remember that it is vapor and not the liquid itself that is more easily ignited.

• Flammable or combustible liquids must be stored in a closed container or tank made of metal that is vented.

• A grounding wire should always be used to ground any static charge that might exist in an employee’s body or the containers of materials being worked with.

• A material’s evaporation rate must be taken into consideration when addressing storage and disposal issues regarding hazardous materials.

Study Questions

1. Distinguish between the three subclasses of Class I liquids.

2. Distinguish between the two classes of combustible liquids. Which of these two classes is further subdivided?

3. Contrast the subdivisions of this further subdivided combustible.
Lesson 2:

Handling, First Aid, Precautions, and Training

Key Points

- Suitable fire control devices, such as portable fire extinguishers, must be available at locations where flammable or combustible liquids are stored.

- The warmer a flammable liquid becomes, the greater the potential for evaporation and the generation of vapor.

- Leaking tanks or containers must be removed immediately from the storage area where practical, but in such an event, the contents must be transferred to a stable container or the entire container placed in a DOT-approved overpack.

- Used rags must be disposed of or stored in a self-closing oil rag waste can.

- The guidelines for immediate first aid are as follows:
  
  o Call 911 or any other local emergency number immediately for medical care.
  o Do not begin treating an accident victim until the hazardous substance has been identified and the respective authorities give approvals/signs to go near the victim; otherwise, it could be very harmful. After getting permission, you may move the victim to fresh air.
  o Remove the contaminated clothing and shoes from the victim, and place them in a clean, plastic bag.
  o Clean the victim affected by chemicals by instantly pouring cold running water on their skin and eyes for at least 15 minutes, unless the respective authorities direct you not to use water for that particular chemical.
  o Try not to inhale gas, fumes, and smoke in the hazardous accident area. If possible, use an
appropriate respirator while within and/or leaving the area.

- If you do not know what to do in case of an emergency or are in doubt, contact your supervisor or call 911.

**Study Questions**

1. What must you do if you discover a fire in your workplace?

2. What information is mandatory for the label of every chemical container?
Module 5:
Hazwoper

Hazwoper stands for Hazardous Wastes Operation and Emergency Response. Hazardous wastes are major sources of workers’ injuries and fatalities in workplaces. This part gives you a basic understanding of OSHA standards and OSHA’s role in the prevention and elimination of workers' injuries and fatalities due to hazardous wastes present in workplaces.

Key Terms

Clean-up operation: An operation where hazardous substances are removed, contained, incinerated, neutralized, de-stabilized, cleared-up, or in any other manner processed or handled with the ultimate goal of making the site safer for people or the environment.

Decontamination: The removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

Emergency response: A response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence that results or is likely to result in an uncontrolled release of a hazardous substance.

Health hazard: A chemical, mixture of chemicals, or a pathogen for which there is statistically significant evidence (based on at least one study conducted in accordance with established scientific principles) that acute or chronic health effects may occur in exposed employees.

Immediately Dangerous to Life or Health (IDLH): An atmospheric concentration of any toxic, corrosive, or asphyxiating substance that poses an immediate threat to life or would interfere with an individual's ability to escape from a dangerous atmosphere.
**Oxygen deficiency:** Concentration of oxygen by volume below which level atmosphere-supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

**Post emergency response:** An emergency response performed after the immediate threat of a release has been stabilized or eliminated and cleanup of the site has begun.

**Qualified person:** This is an individual with specific training, knowledge, and experience in the area for which the person has the responsibility and the authority to control.

**Lesson 1:**

**Programs, Site Characterization, and Medical Surveillance**

**Key Points**

- Being a worker or an employer, it is a need and a right to know how workers can perform safe operations and protect themselves from hazards in their workplace.

- A qualified person must perform a preliminary evaluation before the entry of employees in order to ensure that adequate protective measures are taken.

- It is important that employers inform the contractor or subcontractor, or their representatives on the site, about emergency response procedures and other hazards that have been identified by the employer’s information program of the hazardous waste operation.

- It is imperative to evaluate hazardous waste sites before and after the commencement of operations. Proper evaluation and analysis help to determine the proper safety and health control procedures required to protect employees from these identified hazards.

- All potentially dangerous conditions that could pose inhalation or skin absorption hazards that are
immediately dangerous to life or health (IDLH), or other conditions that may cause death, must be identified in a preliminary survey and should be evaluated in a detailed survey.

- Training must be provided to all employees and their supervisors who are exposed to hazardous substances, health hazards, or safety hazards.

**Study Questions**

1. It is the responsibility of employers to develop and implement a written safety and health program for their employees associated with hazardous waste operations. The program must be designed to do what?

2. It is the employer’s responsibility to provide medical examinations and consultations to each employee. How often must these be conducted?

3. To whom should a safety and health program be made available?

4. What does the hazard communication program cover?

5. Name four examples of IDLH hazards.
Lesson 2:
Sanitation and Emergency Response

Key Points

- For external worksites:
  - An adequate supply of potable water shall be provided onsite.
  - Water shall not be dipped from containers.
  - Portable containers used to dispense drinking water must be capable of being tightly closed and equipped with a tap.
  - Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.
  - Where single service cups (to be used only once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

- Those drums and containers that cannot be inspected due to storage conditions (i.e., buried beneath the earth, stacked behind other drums, stacked several tiers high in a pile, etc.) must be transferred to the location where they can be inspected properly.

- If pressure cannot be relieved from a remote location, appropriate shielding should be placed between the employee and the drums or containers to reduce the risk of employee injury.

- Those containers and drums that contain radioactive wastes cannot be handled until their hazard to employees is properly assessed.

- When working with shock sensitive wastes, all non-essential employees must be evacuated from the immediate area. Furthermore, material handling
equipment and other safety measures must be taken in order to perform operations safely.

- Drums and containers showing evidence of bulging and swelling should not be operated or moved until proper containment procedures have been applied.

- At the time of shipping, drum and container safety measures must be taken in accordance with OSHA standards and DOT regulations.

- All employees leaving a contaminated area must be appropriately decontaminated. It is vital to dispose of or decontaminate the equipment and clothing adequately; otherwise, it could seriously harm the employees.

- Employees whose permeable clothing becomes wet with hazardous substances shall immediately remove that clothing and proceed to the shower. The clothing should be disposed of or decontaminated before it is removed from the work zone.

- Unauthorized employees are not allowed to remove protective clothing or equipment from change rooms.

- To handle the real emergency situations effectively, training for emergency response employees must be completed before any emergency situation arises.

**Study Questions**

1. Unlabeled drums and containers must be assumed to contain what?

2. What eleven points must be included in the emergency response plan?
Module 6:

Personal Protective Equipment

This module will provide employers and employees alike with knowledge concerning the proper selection, care, and use of personal protective equipment. They also will be informed of the requirements for compliance with OSHA requirements.

Key Terms

Brazing: This means joining brass to metal by filling the joint with a different, melted metal at temperatures over 840 degrees Fahrenheit.

Contaminated: Infected by contact or association.

PPE: Personal Protective Equipment

Toxic: Poisonous

Ventilation: Allow fresh air to circulate through.

Welding: Unite by heating, hammering, or pressing.

Lesson 1:

Introduction to PPE (Personal Protective Equipment)

Key Points

- PPE should be stored carefully and kept clean to prevent damage. Contaminated PPE that cannot be decontaminated should be disposed of properly.

- Employees are responsible to:
  - Attend all required training sessions regarding PPE.
  - Wear PPE as required.
  - Clean, maintain, and care for PPE as required.
- Report potential hazards they identify to their supervisors.
- Inform the supervisors or safety managers of the need to repair or replace PPE.
- Follow ALL warnings and precautions.
- Listen and follow the directions that they may be given by their supervisors or safety managers.

**Study Questions**

1. The employer shall provide training to each employee using PPE. Each employee shall be trained in at least what five areas?

2. When PPE is required to protect employees, it must be provided by the employer at no cost to employees, except for specific items, such as what four?

**Lesson 2:**

**Eye, Face, and Respiratory Protection**

**Key Points**

- Every day an estimated 1,000 eye injuries occur in American workplaces.

- The BLS reports that nearly three out of every five workers injured were not wearing eye protection at the time of their accidents.

- Most of the particles were said to be traveling faster than hand-thrown objects when accidents occurred.

- Chemicals caused one-fifth of the injuries.
• Miscellaneous accidents were caused by objects swinging from a fixed or attached position—like tree limbs, ropes, chains, or tools pulled into an eye while a worker was using them.

• Potential eye hazards can be found in nearly every industry, but BLS reported that more than 40% of injuries occurred among craft workers, like mechanics, repairers, carpenters, and plumbers.

• Workers injured while not wearing protective eyewear most often said they believed it was not required by the situation. Even though the vast majority of employers furnished eye protection at no cost to employees, about 40% of the workers received no information on when and what kind of eyewear should be used.

• Tinted shields will be provided to protect workers’ eyes and face from infrared or radiant light burns, flying sparks, metal spatter and slag chips encountered during welding, brazing, soldering, resistance welding, bare or shielded electric arc welding and oxyacetylene welding and cutting operations.

• Tinted lenses are available in several shades or degrees of tinting, and it’s the employer’s responsibility to provide the appropriate lenses for the hazard to be encountered.

• Because many substances that are health hazards can become airborne, knowing how to protect one’s person is very important.

• It should be noted that before an employer provides any employee with a respirator to use in a workplace, the employer must have created a formal written respiratory protection program and have every employee who will wear a respirator medically evaluated by a licensed healthcare professional.

• If you find anything wrong with your respirator, do not use it. Have it repaired or replaced immediately.

• You must be able to demonstrate proper donning of the respirator to your supervisor or safety professional.
Study Questions

1. According to this study, approximately how many injured workers were wearing some form of eye protection when the accident occurred but not the correct eye protection for the job being done?

2. The BLS found that almost how many of the accidents studied resulted from flying or falling objects or sparks striking the eye?

3. If employees accidentally get something into their eyes, they must go directly to the eyewash station and flush their eyes with water for how long?

4. In general, what are four safe work practices employees should use?

5. What are the four basic methods of controlling breathing hazards and what do they include?

6. What four basic questions must be answered in choosing the proper respirator?
7. To properly inspect a respirator before using it, what six things should one look for?

Lesson 3:

Head, Hand, Face, and Foot Protection

Key Points

- Toxic liquids such as acids, caustics, and molten metal can irritate and burn the eyes and skin.

- Remember the four “P”s of hearing loss: It’s Painless, Permanent, Progressive and usually, Preventable.

- When an employer determines the “Action Level” of 85 dBs has been reached, they must create a formal written hearing conservation program.

- If your foam earplugs become soiled, torn, or stiff or if your PVC earplugs become torn or brittle, discard them and ask your supervisor or safety manager for a new pair.

- Always inspect your earmuffs for cracks around the foam cups. If your earmuffs are damaged, have them repaired immediately or request a new pair.

- Poorly maintained machinery, tools, sloppy work areas, and cluttered aisles all contribute to hand injuries.
Study Questions

1. Repetitive motion problems often appear as a numb or tingling sensation accompanied by what else?

2. What are the instructions for the removal of contaminated gloves? Hint: There are seven steps.
Module 7:

Confined Spaces and Permit Required Confined Spaces

This module is intended for all employees who are required to enter into confined or enclosed spaces. This part deals with the safety issues concerned with entering permit-required confined spaces.

Key Terms

**Acceptable entry conditions**: Conditions that must exist in the permit space in order to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

**Attendant**: An individual stationed outside a permit space who monitors the authorized entrants and who performs all duties assigned in the employer's permit space program.

**Authorized entrant**: This is an employee who is authorized by the employer to enter a permit space.

**Emergency**: Any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

**Entry**: The action by which any part of a person passes through an opening into a permit-required confined space.

**Entry permit (or simply, permit)**: The written or printed document that is created by the employer to allow and control entry into a permit space and that contains the information specified in paragraph (f) of the OSHA standard.

**Entry supervisor**: The person (such as the employer, foreman, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this section.
**Hot work permit:** The employer’s written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

**Isolation:** The process by which a permit space is protected against the release of energy and material into the space by such means as: blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

**Oxygen enriched atmosphere:** An atmosphere containing more than 23.5 percent oxygen by volume.

**Permit system:** The employer’s written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

**Rescue service:** The personnel designated to rescue employees from permit spaces.

**Lesson 1:**

**Introduction to Confined Spaces**

**Key Points**

- OSHA estimates that almost 2.1 million workers enter confined spaces annually. In order to reduce the workers’ chances of becoming victims in confined spaces, OSHA has specified certain regulation contained in 29 CFR 1910.146 that must be followed by all employees.

- The first step toward conducting a safe confined space entry is to identify the space as potentially dangerous.

- Some examples of non-permit confined spaces are attics, walk-in freezers or refrigerators, certain air plenums, and certain pipe chases.

- Entering confined spaces without proper equipment and training increases the inherent danger. It has also
been noticed that confined spaces cause multiple fatalities as rescuers often jump right in and become victims themselves.

- OSHA’s accident data reveals that most of the confined space deaths and injuries are caused by asphyxiants, flammables, and toxics.
- Sometimes, the oxygen level in a confined space can be reduced due to the displacement of oxygen by other gases.

**Study Questions**

1. What order of testing a confined space follows the OSHA standard?

2. An atmosphere that contains less than how much oxygen is considered to be oxygen deficient?

3. At what level of oxygen content would one tire quickly and not think clearly?

4. According to OSHA, an atmosphere is classified as oxygen-enriched if it contains an oxygen concentration greater than how much?
5. What three components cause the atmosphere to become flammable?

Lesson 2:

OSHA Standard

Key Points

- If any spaces are found to be permit-required spaces, all employees should be informed of their existence, location, and the danger they pose.

- OSHA standard lays all the responsibilities of identifying, labeling, and listing the permit-required confined spaces on the employer. OSHA also requires the employer to identify and assess the hazards associated with each confined space.

- All the hazards that have been identified and evaluated must be clearly stated in the organization’s written confined space entry program.

- All the procedures and practices required for permit-required confined space entry must be in writing, and must include:
  - Conditions that are acceptable for entry
  - Information for isolating the permit space
  - Information for inerting, purging, flushing, or ventilating the permit-required space as necessary to protect entrants from hazards
  - Information about pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards
  - Verification of the conditions in the permit space that are acceptable for entry throughout the duration of an authorized entry
Name of at least one attendant who is to be stationed outside the permit-required space throughout the duration of an authorized entry

- In cases when there are changes in their use or configuration, OSHA requires employers to reevaluate all non-permit confined spaces and reclassify them.

- Before a permit-required space is entered, a confined space entry permit must be completed and signed by the entry supervisor.

- The permit must verify that all pre-entry preparations have been carried out and that the space is safe to enter. The permit must then be posted at entrances or otherwise made available to entrants before they enter a permit space.

- The OSHA standard also requires the employer to keep all canceled entry permits for at least one year to facilitate a review of the effectiveness of the confined space entry program.

- OSHA is very particular about its requirement to train confined space entry personnel. Before work is started, the employer is required to provide proper training to all employees who are supposed to work in permit-required spaces.

- OSHA also requires employers to train all employer-based rescue team members. They must be provided with cardiopulmonary resuscitation and first-aid training.

- Employees are required to make their certificates available for inspection by authorized representatives whenever required.

- OSHA advises employers to conduct practice rescue exercises annually and allow rescue personnel to enter permit-required spaces so that they can practice rescue operations. Rescuers should also be made aware of all the hazards of the permit space.
The employers are also required to provide all rescuers with personal protective equipment needed to perform confined space rescues safely. Rescuers should wear a chest or full body harness that has a retrieval line attached to the center of their backs near shoulder level or above their heads.

OSHA allows the use of wristlets, but only if employers can demonstrate that the use of a chest or full body harness is not feasible or creates a greater hazard.

If a permit-required space is more than five feet deep, a mechanical device must be used to retrieve personnel.

OSHA also requires employers to keep a Material Safety Data Sheet (MSDS) or other similar written information in case an injured entrant is exposed to a hazardous substance.

Study Questions

1. When are employers required to provide additional training?

2. Attendants are responsible for those workers in confined spaces. What are five of their duties?

Name four duties of entry supervisors.
3. Who is responsible for performing non-entry rescues?

4. Who is responsible for conducting pre-planning meetings with all employees who may be involved in permit-required confined space entries?
Module 8:

Lockout/Tagout

This module is designed to inform employees about the requirements for lockout/tagout during servicing and maintenance of machines or equipment. Also covered are the requirements of the OSHA Control of Hazardous Energy, or Lockout/Tagout Standard, procedures for the application of locks and tags, and a discussion of the types of energy these procedures are designed to control.

Key Terms

Affected employee: An employee whose job requires him/her to operate or use a machine or equipment on which servicing or maintenance is being performed under lockout or tagout, or whose job requires him/her to work in an area in which such servicing or maintenance is being performed.

Authorized employee: This is a person who locks out and tags out machines or equipment in order to perform servicing or maintenance on that machine.

Energized: Machines and equipment are energized when they are connected to an energy source or they contain residual or stored energy.

Normal production operations: Utilization of a machine or equipment to perform its intended production function.

Servicing and/or maintenance: Workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, maintaining and/or servicing machines or equipment, including lubrication, cleaning or unjamming of machines or equipment, and making adjustments or tool changes, where employees could be exposed to the unexpected energization or startup of the equipment or release of hazardous energy.

Lesson 1:

Introduction to Lockout/Tagout
Key Points

- Any machines or equipment, whose unexpected energization or startup could harm people when that equipment is under repair, replacement, renovation, modification, or adjustment, must be locked or tagged out.

- If any hazardous conditions are present due to the energization of any machine or equipment, a warning message must be included.

- The equipment used for lockout must be strong enough to prevent involuntary or accidental removal.

- The tag must be constructed in a way that the message printed on it does not get affected when exposed to harsh weather. Also, the message on the tag should not fade away and become illegible when placed in wet or humid locations.

- The lockout equipment must not deteriorate in areas where corrosive substances, such as acid and alkali chemicals, are present.

- The means of attachment for a tagout device must not be reusable.

Study Questions

1. What other energy sources aside from electricity pose potential hazards?

2. Energy isolation devices include what types?
3. What protective materials and hardware must be provided by the employer for isolating, securing, or blocking machines or equipment from energy sources?

Lesson 2:

Energy Control and Lockout/Tagout

Key Points

- Before an authorized or affected employee turns off a machine or equipment, the authorized employee must have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

- When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under the direction of the employer, provided that specific procedures and training for such removal have been developed, documented, and incorporated into the employer's energy control program.

- In some circumstances, employees need to temporarily restore energy to a machine or piece of equipment during servicing or maintenance to test and/or reposition the machine or piece of equipment. Lockout or tagout devices may be removed temporarily in order to perform these tasks.

- Exiting employees must inform oncoming employees of any problems or concerns regarding the service and maintenance of the machinery or equipment.

- All employees expected to work under a tagout system must undergo extensive training and retraining programs to ensure that all operational energy control procedures and regulations are properly understood.
• When tagout systems are used, employees shall also be trained in the limitations of tags.

• Retraining shall also be conducted whenever a periodic inspection reveals, or whenever the employer has reason to believe, that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures.

• The employer shall certify that employee training has been accomplished and is being kept up to date. The certification shall contain each employee's name and dates of training.

Study Questions

1. What sequence of actions must occur in the temporary removal of the lockout/tagout devices?

2. What procedures must be followed that will offer group employees the same protection that is provided to individual employees?

3. Authorized employee shall receive training in the recognition of what three areas?

4. Retraining shall be provided for all authorized and affected employees whenever there is a change in what?
5. What is the intent of the requirement for the employer to conduct periodic inspections?

6. What triggers the retraining requirements for employees?
Module 9:

Materials Handling and Storage

Many injuries in industry occur while employees move materials. In every day operations, workers handle, transport, and store materials. They may do so by hand, or with manually operated or power operated equipment.

This part specifies the materials handling and storage procedures developed by the Occupational Safety and Health Administration (OSHA) to reduce injuries resulting from mishandling or improper storage.

Key Terms

**Barrier:** A fence, border, or obstacle placed between a single piece rim wheel and an employee during tire inflation to contain the rim wheel components.

**Multi-piece rim wheel:** Assemblage of a multi-piece wheel with the tire tube and other components.

**Multi-piece wheel:** A vehicle wheel consisting of two or more parts, one of which is a side or locking ring designed to hold the tire on the wheel by interlocking components when the tire is inflated.

**Restraining device:** An apparatus such as a cage, rack, assemblage of bars and other components that will constrain all rim wheel components during an explosive separation of a multi-piece rim wheel, or during the sudden release of the contained air of a single piece rim wheel.

**Rim manual:** A publication containing instructions from the manufacturer or a qualified organization for correct mounting, demounting, maintenance, and safety precautions peculiar to the type of wheel being serviced.

**Rim wheel:** An assemblage of tire, tube and liner (where appropriate), and wheel components.

**Single-piece rim wheel:** The assemblage of single-piece rim wheel with the tire and other components.
Single piece wheel: A vehicle wheel consisting of one part, designed to hold the tire on the wheel when the tire is inflated.

Trajectory: Any potential path or route that a rim wheel component may travel during an explosive separation, or the sudden release of the pressurized air.

Wheel: Portion of a rim wheel that attaches the assembly to the axle of a vehicle and also contains the inflated portion of the assembly.

Lesson 1:

Material Handling Essentials

Key Points

- To prevent creating hazards when storing materials, employers must do the following:
  - Keep storage areas free from accumulated materials that cause tripping, fires, or explosions, or that may contribute to the harboring of rats and other pests.
  - Place stored materials inside buildings that are under construction and at least 6 feet from hoist ways, or inside floor openings, and at least 10 feet away from exterior walls.
  - Equip employees who work on stored grain in silos, hoppers, or tanks with lifelines and safety belts.

- Falling materials and collapsing loads can crush or pin workers, causing injuries or death. To help prevent injuries when stacking materials, workers must do the following:
  - Stack lumber no more than 16 feet high if it is handled manually, and no more than 20 feet if using a forklift.
  - To avoid creating a hazard to passersby when removing supplies, do not store pipes and bars in racks that face main aisles.
- Stack bags and bundles in interlocking rows to keep them secure.
- Stack bagged material by stepping back the layers and cross-keying the bags at least every ten layers (to remove bags from the stack, start from the top row first).

- 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 should be kept clear and in good repair, without any obstruction that could create a hazard.

- Permanent aisles and passageways should be properly marked.

- Material storage should not create a hazard. Bags, containers, bundles, etc., stored in rows should be stacked, blocked, interlocked, and limited in height so that they do not slide or collapse.

- Clearance signs should be used to warn employees about clearance limits.

- The training program must include all the topics in the rim manual.

- The employer must provide a restraining device for inflating tires on multi-piece wheels and single piece wheels, unless the rim wheel will be bolted onto a vehicle during inflation.

- Restraining devices or barriers removed from service shall not be returned to service until they are repaired and re-inspected.

- The employer must insure that an air line assembly consisting of the following components is being used for inflating tires:
  - A clip-on chuck
o An in-line valve with a pressure gauge or a preset regulator; and
o A sufficient length of hose between the clip-on chuck and the in-line valve if one is used, to allow the employee to stand outside the trajectory.

- Current charts or rim manuals containing instructions for the type of wheels being serviced must also be available in the service area.

- The employer should furnish and assure that only tools recommended by the rim manual for the type of wheel being serviced are used.

- Multi-piece wheel components should only be interchanged as recommended by the appropriate rim manual.

- If a tire on a vehicle is under-inflated but has more than 80% of the recommended pressure, the tire may be inflated while the rim wheel is on the vehicle provided remote control inflation equipment is used, and no employees remain in the trajectory during inflation.

- No attempt must be made to correct the seating of side and lock rings by hammering, striking, or forcing the components while the tire is pressurized.

- Whenever a rim wheel is in a restraining device, the employee must not rest or lean any body part or equipment on or against the restraining device.

- After tire inflation, the tire and wheel components should be inspected while still within the restraining device to make sure that they are properly seated and locked. If further adjustment to the tire or wheel components is necessary, the tire should be deflated by removing the valve core before the adjustment is made.

- Single-piece rim wheel tires must be inflated within a restraining device, positioned behind a barrier or bolted on the vehicle with the lug nuts fully tightened.

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- Employees must stay out of the trajectory when inflating a tire.

- Tires shall not be inflated to more than the inflation pressure stamped in the sidewall to seat tire bead firmly against the rim flange unless a higher pressure is recommended by the manufacturer.

- Cracked, broken, bent, or otherwise damaged wheels should not be reworked, welded, brazed, or otherwise heated.

**Study Questions**

1. To prevent injury from oversized loads, workers should seek help in what situations?

2. When picking up items with a powered industrial truck, workers must do what?

3. The restraining device or barrier must be removed immediately from service if any of which defects are noticed?

4. Tires must be completely deflated before demounting by removing the valve core, particularly in the event of what two instances?
Lesson 2:
Commercial and Industrial Vehicles (a)

Key Points

- Employers must train employees in the proper use and limitations of the equipment they operate. In addition to powered industrial trucks, this includes knowing how to safely and effectively use equipment such as conveyors, cranes, and slings.

- Workers may get their hands caught in nip points where the conveyor medium runs near the frame or over support members or rollers.

- Workers also may be struck by material falling off the conveyor, or they may get caught in the conveyor and drawn into the conveyor path as a result.

- Prohibit employees from riding on a materials-handling conveyor.

- Provide guards where conveyors pass over work areas or aisles to keep employees from being struck by falling material. (If the crossover is low enough for workers to run into it, mark the guard with a warning sign or paint it a bright color to protect employees.)

- Cover screw conveyors completely except at loading and discharging points. (At those points, guards must protect employees against contacting the moving screw. The guards are movable, and they must be interlocked to prevent conveyor movement when the guards are not in place.)

- Workers who handle and store materials often use fork trucks, platform lift trucks, motorized hand trucks, and other specialized industrial trucks powered by electrical motors or internal combustion engines. Employers must make these workers aware of the
safety requirements pertaining to the design, maintenance, and use of these trucks.

- Approved trucks must bear a label or some other identifying mark indicating approval by the testing laboratory.

- No modifications or additions, which affect capacity and safe operation, shall be made without the manufacturer’s written approval.

- Nameplates and markings must be in place and in legible condition.

- When operating or maintaining powered industrial trucks, employers and their employees must consider the following safety precautions:
  
  o Fit high-lift rider trucks with an overhead guard, if permitted by operating conditions.
  o Equip fork trucks with vertical load backrest extensions according to manufacturers’ specifications, if the load presents a hazard.
  o Locate battery-charging installations in designated areas.
  o Provide facilities for flushing and neutralizing spilled electrolytes when changing or recharging batteries to prevent fires, to protect the charging apparatus from being damaged by the trucks, and to adequately ventilate fumes in the charging area from gassing batteries.
  o Provide conveyor, overhead hoist, or equivalent materials-handling equipment for handling batteries.
  o Provide auxiliary directional lighting on the truck where general lighting is less than two lumens per square foot.

- Provide personnel on the loading platform with the means to shut off power to the truck whenever a truck is equipped with vertical only (or vertical and horizontal) controls elevatable with the lifting carriage or forks for lifting personnel.
- Secure dockboards or bridge plates properly so they won’t move when equipment moves over them.

- Disconnect batteries before repairing electrical systems on trucks.

- The D designated units are diesel-powered units having minimum acceptable safeguards against inherent fire hazards.

- These designated units are diesel-powered units that are provided with additional safeguards to the exhaust, fuel, and electrical systems, which are these?

- The E designated units are electrically powered units that have minimum acceptable safeguards against inherent fire hazards.

- The G designated units are gasoline-powered units having minimum acceptable safeguards against inherent fire hazards.

- The LP designated unit uses liquefied petroleum gas as fuel having minimum acceptable safeguards against inherent fire hazards.

- On piers and wharves handling general cargo, any approved power-operated industrial truck designated as Type D, E, G, or LP may be used.

- Battery charging installations shall be located in areas designated for that purpose.

- Facilities shall be provided for flushing and neutralizing spilled electrolyte, for fire protection, for protecting charging apparatus from damage by trucks, and for adequate ventilation for dispersal of fumes from gassing batteries.

- A conveyor, overhead hoist, or equivalent material handling equipment shall be provided for handling batteries.

- Reinstalled batteries shall be properly positioned and secured in the truck.
• When charging batteries, acid shall be poured into water; water shall not be poured into acid.

• Trucks shall be properly positioned and brake applied before attempting to change or charge batteries.

• Care shall be taken to assure that vent caps are functioning. The battery (or compartment) cover(s) shall be open to dissipate heat.

• Smoking shall be prohibited in the charging area.

• Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas.

• Tools and other metallic objects shall be kept away from the top of uncovered batteries.

• Tell workers to take additional precautions and exercise extra care when operating around power lines.

• Teach workers that outriggers on mobile cranes must rest on firm ground, on timbers, or be sufficiently cribbed to spread the weight of the crane and the load over a large enough area. (Some mobile cranes cannot operate with outriggers in the traveling position.)

• Ensure that all cranes are inspected frequently by persons thoroughly familiar with the crane, the methods of inspecting the crane, and what can make the crane unserviceable. Crane activity, the severity of use, and environmental conditions should determine inspection schedules.

• Make sure that the crane does not accidentally energize itself during maintenance by controlling the release of hazardous energy through lockout/tagout. The equipment must be de-energized before performing the maintenance and repair operation.
• Carrying loads over personnel is never allowed under any circumstance. A load should not be left suspended.

Study Questions

1. Some powered industrial trucks are designed, constructed, and assembled for use in atmospheres containing flammable vapors or dusts. These include powered industrial trucks equipped with what?

2. Employers must also conduct an evaluation as well as refresher training if one of what five conditions applies?

Lesson 3:

Commercial and Industrial Vehicles (b)

Key Points

• Any overhead wire must be considered energized unless the electrical utility verifies that the wires are not energized.

• If the area inside the swing radius of the rear of the crane is accessible, this area should be barricaded to prevent employees from being struck or crushed by the crane accidentally.

• All cab windows should be made of safety glass. Ensure that there are no distortions on the windscreen that may hinder visibility.
• For rigging, a ladder or steps should be made available to provide easy access to the cab roof.

• The platforms should have anti-skid surfaces to prevent an employee from accidentally slipping and getting injured.

• A crane, which has been idle for a period of one month or more but less than six months, should be inspected thoroughly before putting it back in service.

• Avoid sudden crane acceleration and deceleration when moving suspended loads.

• If any of the following conditions are found during inspection, a sling should be removed from service:
  - Ten random broken wires in one rope lay.
  - Five broken wires in one strand.
  - Wear or scraping of 1/3 original diameter of the outside wires.
  - Kinking, crushing, bird caging.
  - Heat related damages.
  - Damage to end attachments.
  - Hook throat is opened more than 15 percent of normal.
  - Hook is twisted more than 10 degrees from normal.
  - Corrosion is detected.

• Make sure that handles have at least the same rated capacity as that of the metal fabric. Handles must be placed so that they distribute the load evenly across the sling and do not diminish its rated capacity.

• Natural and synthetic fiber rope slings must never be used over their rated capacities.

• The following items require frequent inspection for proper functioning:
  - Control mechanism
  - Chords and lacing
  - Plumb of the mast
  - Hydraulic systems
  - Tension in guys

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o Hooks
o Rope reeving
o Hoist brakes, clutches, and operating levers
o Electrical apparatus

- If the load needs to be suspended for a considerable amount of time, a dog, pawl, and/or ratchet should be used in conjunction with the brake to hold the load.

**Study Questions**

1. Metal mesh slings must be removed from service if an employee notices reduction in wire diameter of 25 percent due to abrasion, or how much due to corrosion?

2. Fiber rope slings must be immediately removed from service if any of what six conditions are true?

3. Remove synthetic web slings from service if any of what five conditions occur?
Module 10:

Machine Guarding Safety

There seem to be as many hazards created by moving machine parts as there are types of machines. Safeguards are essential for protecting workers from needless and preventable injuries. Any machine part, function, or process that may cause injury must be safeguarded. When the operation of a machine or accidental contact with it can injure the operator or others in the vicinity, the hazard must be controlled or eliminated.

This section will help instruct workers to protect themselves from moving machinery. After completion of this part, workers will be able to properly apply the OSHA Machine and Machine Guarding requirements to their day-to-day work activities.

Key Terms

**Dadoing**: To cut a groove or rectangular section for receiving the end of a board.

**Grooving**: This is the process of creating a long, narrow cut or indentation in a surface such as a cut in a board to receive another board (tongue-and-groove joint).

**Jointer**: Any tool used to prepare, make, or simulate joints, such as a plane for smoothing surfaces prior to joining them.

**Mortising**: The process of creating a notch, hole, groove, or slot in a piece of wood or the like, to receive a tenon of the same dimensions.

**Nip points**: Hazardous spots where loose clothing or body parts could be caught and squeezed in rotating parts.

**Nonkickback fingers or dogs**: An anti-kickback device used to hold material being cut in place on circular table saws.

**Point of operation**: The point where the movement of a machine meets the work to be done, such as cutting, grinding, shaping, etc.
**Rabbeting**: Forming a deep notch in or near one edge of a board, framing timber, etc. so that something else can be fitted into it.

**Reciprocating motion**: Back-and-forth or up-and-down motion.

**Tenoning**: This is the process of creating a projection at the end of a piece of wood or the like, used for insertion into a mortise of the same dimensions.

**Treadle**: A lever or the like worked by continual action of the foot to impart motion to a machine.

## Lesson 1:

### Introduction to Machines and Machine Guarding

**Key Points**

- Rotating motion can be dangerous; even smooth, slowly rotating shafts can grip clothing, and even the slightest skin contact can force an arm or hand into a dangerous position.

- A good safeguarding system eliminates the possibility of the operator or other workers placing parts of their bodies near hazardous moving parts.

- Workers should not be able to easily remove or tamper with the safeguard, because a safeguard that can easily be removed or made ineffective is not one at all.

- A small tool that is dropped into a cycling machine could easily become a projectile that could strike and injure someone.

- A safeguard defeats its own purpose if it creates a hazard of its own, such as a shear point, a jagged edge, or an unfinished surface which can cause a laceration.
• Proper safeguarding can actually enhance efficiency since it can relieve the worker's apprehensions about injury.

• If possible, one should be able to lubricate the machine without removing the safeguards.

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

Study Questions

1. What are the three basic areas that need safeguarding from dangerous moving parts?

2. Thorough operator training should involve instruction or hands-on training in what five points?

Lesson 2:

OSHA Requirements

Key Points

• In operations where power failures are a possibility, provisions shall be made to prevent machines from automatically starting upon restoration of power. This will reduce the incidence of injury from motors restarting unexpectedly. If a machine was not manufactured with a restart switch, one can be added on “inline,” requiring it to be reset upon restoration of power.
• All woodworking machinery such as table saws, swing saws, radial arm saws, band saws, jointers, tenoning machines, boring and mortising machines, shapers, planers, lathes, sanders, veneer cutters, and other miscellaneous woodworking machinery must be effectively guarded to protect operators and other employees from hazards inherent to their operation.

• The sides of a radial saw blade’s lower exposed portion shall be guarded to the full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock and remain in contact with the stock being cut.

• Radial arm saws used for ripping shall have non-kickback fingers or dogs.

• Installation shall be completed so that the front end of the unit will be slightly higher than the rear. This will cause the cutting head to return gently to the starting position when released.

• Feed rolls and blades of self-feed circular saws shall be protected by a hood or guard to prevent the hand of the operator from coming into contact with the in-running rolls at any point.

• Each swing or sliding cut-off saw shall be provided with an effective device to return the saw automatically to the back of the table when released at any point of travel.

• Inverted sawing or swing cut-off saws shall be provided with a hood that covers the part of the saw protruding above the top of the table or material being cut.

• A substantial guard should be placed over the treadle on foot-operated presses.

• Machines using full revolution clutches must all incorporate a single stroke mechanism.
All pulleys, belts, sprockets and chains, flywheels, shafting and shaft projections, gears, and couplings, or other rotating or reciprocating parts, or any portion thereof within seven feet of the floor or working platform shall be effectively guarded.

Study Questions

1. When the periphery of the blades of a fan is less than seven feet above the floor or working level, the blades should be guarded with a guard having openings no larger than how much?

2. All point-of-operation injuries must be reported to OSHA or the state agency within how many days?

3. The guard shall extend at least how many inches above the belt where both runs of horizontal belts are seven feet or less from the floor or working surface?
Module 11: Welding, Cutting, and Brazing

This section is intended to provide an overview of the hazards associated with welding, cutting, and brazing and the protective measures necessary to assure the work is performed safely. It is specifically designed to help workers meet OSHA compliance regarding welding, cutting, and brazing.

Key Terms

Approved work location: This means any location approved for hot work, including welding, cutting, and brazing.

Manifolding: This is a process of gathering multiple-line fluid inputs into a single intake chamber.

Site evaluation: Evaluation of physical and chemical hazards performed at the work-site by PPPL Industrial Hygiene (IH).

Schedule 40 pipe: A standard black iron pipe that has a working pressure of up to 125 psi.

Lesson 1: General Requirements

Key Points

- The OSHA standard’s basic preventive measures for fire in welding, cutting, and brazing focus on eliminating fire hazards. For instance:
  - Before an object is welded or cut, it must be moved to a safe place.
  - If the object to be welded or cut cannot be moved, then the area must be cleared of all moveable fire hazards.
  - If certain fire hazards cannot be removed from the area, then workers are required to use guards to
protect the immovable fire hazards from heat, sparks, and slag.
- If, however, the requirements mentioned above cannot be met, then employees must not perform any welding and cutting tasks.

- Cutting or welding is not allowed in:
  - Buildings that have damaged sprinkler systems.
  - Areas that are not authorized by management.
  - Locations that have explosive atmospheres due to the presence of mixtures of flammable gases, liquids, or dusts in the air.
  - Areas where there is a risk of explosive atmospheres. These include areas inside unclean or improperly prepared tanks and areas with an accumulation of flammable gasses, vapors, liquids, or combustible dusts.

- If arc welding is suspended for a long period of time, such as during lunch or overnight, all electrodes must be removed from the holders. The holders must be placed carefully so that accidental contact does not occur. Also, the machine must be disconnected from the power source when not in use.

- When an operation is suspended, all torch valves must be closed so that no gas escapes through the nozzle. Whenever the torch is not to be used for a long period of time, the gas supply to the torch must be properly shut off at a point outside the confined area. If possible, the hose and torch must also be removed from the confined space.

- OSHA does not require personnel to wear helmets and hand shields while involved in submerged arc welding.

- It is preferable for welders to be enclosed in an individual booth while conducting welding or cutting operations.

- People in the vicinity of the area where welding or cutting operations are being carried out must be provided with non-combustible screens, shields, or goggles if necessary.
- All personnel involved in welding, cutting, or brazing operations must be provided with personal protective equipment to protect themselves from burns and fires.

- Employers must provide Personal Protective Equipment materials that are designed to provide maximum protection from hot metal and sparks.

**Study Questions**

1. The OSHA standard requires the fire watch to be maintained for at least how long after the welding or cutting task has been completed?

2. If the work does not permit an individual booth, then why should workers work behind a non-combustible screen that has been painted with a substance of low reflectivity, such as zinc oxide?

3. Some materials that are used in welding operations can be extremely hazardous even if precautionary measures have been taken. What materials are these that must be removed by proper ventilation?

**Lesson 2:**

**Oxygen-fuel Gas Welding and Cutting**

**Key Points**
- Acetylene cylinders are required to be stored with the valve end up. If these cylinders are stored on their side, acetone may leak out and create a hazardous condition.

- A regulator must always be attached to a compressed gas cylinder before it is used, except when connected to a manifold. It is important to ensure that the regulator being used is compatible with the gas in the cylinder and its service pressure. The regulator used must be clean with a clean filter installed.

- The use of a seal cap ensures that the outlet pipe thread will remain free from oil or grease and not be damaged. Damaged pipe threads can result in leaky connections.

- All service piping systems being utilized must be designed and installed according to the safety requirements specified by OSHA. The pipes to be used should be at least Schedule 40, and all fittings must be of standard weight in sizes up to and including 6-inch nominal. Schedule 40 pipe has a working pressure of up to 125 psi, and it should always be tested before use.

- The OSHA standard requires employers to ensure that the service pipe system is always protected against the build-up of excessive pressure and leaks. Protection may be provided using pressure relief devices, protective equipment, regulators, and hoses.

- Oxygen must be tested by only using oil-free and non-combustible materials. Under no circumstances are personnel allowed to use flames to detect leaks.

- All piping must be installed in a way that it runs as directly as possible. Some space should be allowed for expansion, contraction, jarring, and vibration. This will help ensure that the pipes are not damaged. Pipes that have to be laid underground must be located below the frost line, and protective measures must be taken to prevent or protect against corrosion.
Before a regulator is attached, the protective cap must be removed from the cylinder and the valve opened slightly for an instant, and then closed immediately. This practice ensures that the cylinder valve is cleared of any dust or dirt that may have accumulated during storage.

The valve of a cylinder containing acetylene should not be opened more than one and a half turns of the spindle and preferably no more than three-fourths of a turn.

The OSHA standard specifies that, except for temporary service where conditions preclude a direct supply, portable outlet headers must never be used indoors.

Hoses that are burnt, worn, or have other defects must be replaced or repaired before any operations are performed. OSHA also prohibits personnel from using leaky hoses.

When inspecting hoses, you should look for charred sections close to the torch. These may have been caused by flash-back. Also check that hoses are not taped up to cover leaks.

**Study Questions**

1. After installing the piping systems, they must be tested to ensure that they are gas-tight at how much times the maximum operating pressure?

2. It must be ensured that no oily surface or greasy clothing is exposed to what?

3. After installation, the piping has to be blown out with what to remove any foreign materials?
Lesson 3:

ARC Welding and Resistance Welding

Key Points

- For alternating current machines, the voltage should not exceed the limit of 80 volts for manual and 100 volts for automatic arc welding and cutting.

- For direct current machines, the voltage must not exceed the limit of 100 volts for both manual and automatic arc welding and cutting.

- If certain special welding and cutting processes are carried out that require values of the voltages higher than the specified limits, OSHA mandates employers provide all personnel with adequate insulation or other means that would ensure their safety.

- If arc welding and cutting operations are being carried out at a location where the surroundings are warm and humid, or where perspiration is a factor, OSHA recommends the use of reliable automatic controls for reducing no-load voltage to reduce the shock hazard.

- Some of the older AC machines do not have automatic controls and are on load all the time.

- OSHA requires personnel to ensure that the frame or case of the welding machine (except with engine-
driven machines) is properly grounded before it is used.

- Special precautions must be taken to avoid sparking at the connection of the work-lead cable.

- The rated current-carrying capacity of the supply conductors for individual welding machines must not be less than the rated primary current of the welding machines.

- OSHA mandates the replacement of all cables that have damaged insulation or exposed bare conductors. Work and electrode cables must only be joined by using means that are particularly designed for that purpose.

- OSHA requires all doors and access panels for the resistance welding machines and control panels to be kept locked and interlocked in order to prevent unauthorized persons from coming in contact with the live portions of the equipment.

- Where there is a possibility of the operator's fingers being under the point of operation, all press welding machine operations shall be effectively guarded by the use of a device such as an electronic eye safety circuit, two hand controls, or protection similar to that prescribed for punch press operation.

- Wherever practical, a shield guard of safety glass or suitable fire-resistant plastic must be installed at the point of operation to avoid the hazard of flying sparks. Also, protective shields should be installed to prevent flying sparks from harming passing persons.

- All foot switches that may be present on the machine must be guarded so that the machine does not get started accidentally.

**Study Questions**

1. While carrying out welding operations, all personnel are required to protect the terminals for welding leads from accidental contact by workers or by metal objects.
such as hooks, vehicles, cranes, etc. To achieve this, OSHA specifies the use of what?

2. For all non-portable spot and seam welding machines, all external circuits must not operate on a voltage higher than what?

3. On special multi-spot welding machines, including 2-post and 4-post weld presses, there must be at least how many safety emergency stop buttons?
Module 12:

Electrical Safety

Every year tens of thousands of people are injured or killed from electrical shocks/contacts in the United States. Employees are exposed to dangers such as electric shock, electrocution, burns, fires and explosions. It is essential to understand how electricity is potentially lethal for us and how we can save lives. This part gives a basic understanding of how to prevent or eliminate work-related injuries.

Key Terms

**AWG:** American wire gauge (AWG)

**Amps:** The volume or intensity of the electrical flow

**Circuit:** Complete path of the current; it includes electricity source, a conductor, and the output device or load (such as a lamp, tool, or heater).

**Conductors:** Substances, like metals, with little resistance to electricity, thus allowing electricity to flow

**Current:** Electrical movement (measured in amps)

**Electric shock:** When a body becomes a part of the circuit

**GFCI:** Ground-Fault Circuit Interrupter; a device that will interrupt the flow of electricity when it senses a loss of proper grounding or very small electrical leaks, reducing the likelihood of injury or death.

**Grounding:** A conductive connection to the earth (at zero volts) that acts as a protective measure.

**Insulators:** Substances with high resistance to electricity—like glass, porcelain, plastic, and dry wood—that prevent electricity from getting to unwanted areas

**Resistance:** Restriction to electrical flow

**Volts:** Unit of measurement for electrical force

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**Wire gauge:** Device that measures wires ranging in size from number 36 to 0.

**Lesson 1:**

**Electricity, Hazards and Safety, and Tools and Equipment**

**Key Points**

- Electricity is considered one of the most serious workplace hazards; it exposes employees to electric shock, burn, electrocution, fires, and explosion.

- In severe shock, breathing becomes difficult—a sign of possible respiratory arrest—and the heart stops pumping.

- Remember that low voltage does not mean low hazard.

- Pure water is a poor conductor, but small amounts of impurities, like salt and acid (both in perspiration), make it a ready conductor.

- Burns are the most common type of shock-related injuries. They occur when your body touches a live wire or electric current.

- Electric shocks can also be responsible for indirect injuries such as falls.

- Consider the following points for safe use of tools:
  
  o Inspect tools before use.
  o Use the correct tool for the job and use it properly.
  o Store tools in a safe manner.
  o Use double insulated tools.
  o Use tools and equipment according to the instructions provided by the manufacturer.
  o Visually inspect all electrical equipment before use. Remove from service any equipment with frayed...
- cords, missing ground prongs, cracked tool casings, etc.
  - Apply a warning tag to any defective tool and do not use it until the problem has been corrected.

- Do not suspend temporary lights by cords unless they are designed to do so.

- Tagging should identify the worker and the equipment or circuits being worked on.

- Extensions cords may only be used in a properly grounded outlet.

- Hard hats are required when performing electrical work. An ANSI specification “Class B” Electrical Utility type hard hat protects against falling objects and high-voltage shocks and burns.

**Study Questions**

1. Safety-related work practices include what three?

2. Electrical shocks, fires, or falls result from specific hazards, name five.

3. What are five major causes of electrical accidents?

4. Burns caused by electrical incidents can be classified into three types: name and describe them.
5. Overload circuits can be very dangerous when any of what three conditions is true?

6. If a ground fault is detected, how quickly does GFCI shut off electricity?

7. To properly ground tools and equipment you must consider what elements?

8. A typical industrial extension cord grounding system has what four components?

9. Two kinds of grounds are required by the standard. Name and discuss them.

Lesson 2:

Lines and Wires, First Aid, and Training

Key Points
• In case of contact between power lines and equipment, remember the following guidelines:
  o Never touch equipment and the ground at the same time. Touching anything in contact with the ground could be lethal.
  o Immediately warn everyone not to touch the equipment or its load.
  o Ask someone to call 911 or a local electricity utility for help. Give complete details of the incident to the utility so that they can check wires that could fall later.

• Essential points for the safe use of cords and wires follow.
  o Use only insulated wires.
  o Check before use.
  o Use only cords that are 3-wire type.
  o Use only cords rated for the anticipated usage.
  o Use only cords, connection devices, and fittings connected to circuits equipped with fuses or breakers.
  o Remove cords from receptacles by pulling on the plugs, not the cords.
  o Cords not rated for the anticipated load, or which have been modified, must be taken out of service immediately.

• Always consider the following points when using electrical wires.
  o Use and test GFCIs when necessary.
  o Check switches and insulation.
  o Use three prong plugs.
  o Use extension cords only when necessary and ensure that they are in acceptable condition and rated for the job to be done.
  o Use correct connectors.

• An electrical hazard exists when wire is too small a gauge for the current it will carry.

• If a worker’s clothing should catch fire and an extinguisher is not available, wrap or smother the
victim with blankets or towels. Water may be used if there is no danger of exposure to electrical hazards.

**Study Questions**

1. To minimize the risk of accidents, remember what four guidelines?

2. In case of contact between power lines and equipment, what three three-word phrases can remind a person of what steps to take to help save lives?

3. Flexible cords must not be used in what four specific ways?

**Lesson 3:**

**Introduction to NFPA 70E**

**Key Points**

- This standard addresses electrical safety requirements for employee workplaces (including jobsites) that are necessary for the practical safeguarding of employees during activities such as the installation, operation, maintenance, and demolition of electric equipment, etc.

- Even though OSHA does not mandate compliance with NFPA 70E itself, it considers NFPA 70E to be an effective how-to manual for OSHA regulation compliance.
• An employer and others may be cited by OSHA against the requirements of NFPA 70E.

• In lieu of detailed specifications, OSHA recognizes, and in some cases refers to, industry consensus standards such as NFPA 70E as a tool for assisting with regulatory compliance.

Study Questions

1. How is incident energy defined?

2. Incident energy is usually measured in what type of units?

Lesson 4:

Electrical Safety Program

Key Points

• The electrical safety program must contain hazard or risk evaluation procedures that should be used before any work is started on or near live parts (limited approach boundary) operating at 50 volts or more.

• In addition, the electrical safety program should require that job briefings be held for those workers involved prior to working on or near live parts operating at 50 volts or more.

• Parts that could become energized must be put into an electrically safe work condition before any employee is
permitted to work on or near them—this constitutes a limited approach boundary.

- In general, if a part or circuit operating at 50 volts or more cannot be put into an electrically safe work condition, an electrical hazard analysis must be performed to determine the electrical hazards that do exist and what must be done to protect the employee from these hazards.

- An electric shock from as little as 50VAC for as little as 1 sec can disrupt the heart's rhythm, causing death in a matter of minutes.

**Study Questions**

1. The two types of electrical hazard analysis that must be performed if energized parts operating at 50 volts or more cannot be put into an electrically safe work condition are?

2. Name and describe the five levels of electric shock.

3. A shock hazard analysis must determine what three factors?

4. What happens in an arc flash incident?
5. An arc flash can only occur if an arc between what occurs?

Lesson 5:
Energized Electrical Work Permit

Key Points

- Replacement of defective parts is recommended. Taping over damaged leads is not considered a safe repair.
- Integrity must be maintained in meter test leads and probe insulation.
- Flexible cords may not be fastened in place with staples or hung in a way that could damage the outer insulation jacket.
- Flexible cords that are used with equipment that requires grounding must be equipped with an equipment grounding conductor.
- Adapters that serve to interrupt the continuity of the equipment grounding conductor must not be used.
- Running or operating equipment should be stopped before opening disconnecting devices to avoid arcing within the device, especially on large loads that demonstrate relatively high current flow levels.
- If the disconnecting means is a draw-out type circuit breaker, NFPA 70E says that you should visibly verify that the circuit breaker is properly withdrawn to its fully disconnected position.
- Once all disconnecting devices have been opened or withdrawn and verified, it is now time to apply an
approved lockout/tagout device according to a documented and established policy.

- Remember that just because an electrical supply has been presumably opened and locked and/or tagged out, the circuit or equipment must still be considered as energized (and all required PPE used) until a test has been made using an adequately rated voltage meter to verify the absence of voltage.

**Study Questions**

1. What are the procedures for testing a circuit for the absence of voltage?

2. In what cases, should grounding straps be connected from the conductor to an effective grounding point?
Module 13:

Hazard Communication

The Hazard Communication Standard (HCS) provides information to workers and employers about various chemical hazards that exist in the workplace, and what protective measures they can take in order to prevent the adverse effects of such hazards.

This part gives you a basic understanding of how to deal with hazardous chemicals and how workers can prevent and protect themselves from chemical hazards.

Key Terms

**Chemical**: An element or a compound produced by chemical reactions on a large scale for direct industrial and consumer use or for reaction with other chemicals.

**HazCom**: Hazard Communication Standard

**MSDS**: Material Safety Data Sheet, a document containing the chemical hazard and safe handling information pertaining to a specific chemical or compound and which is prepared in accordance with the OSHA Hazard Communication Standard.

**Training**: A course of study in which employees are trained to identify and work safely with hazardous materials.

Lesson 1:

Introduction to the Hazard Communication Standard

Key Points

- Implementation of HCS for all those companies who import, produce, distribute or use hazardous chemicals in the United States is mandatory.
- Combustible liquids are those that have a flashpoint at or above 100 °F (37.8 °C).

- Immediate use means that the hazardous chemical will be under the control of and used only by the person who transfers it from a labeled container and only within the work shift in which it is transferred.

- Unstable (reactive) means a chemical that in its pure state, or as produced or transported, will vigorously polymerize, decompose, condense, or become self-reactive under conditions of shocks, pressure, or temperature.

**Study Questions**

1. When you inhale a toxic chemical, the dose you receive depends on what four factors?

2. Water-reactive means a chemical that reacts with water to release a gas that is one of what two characteristics?

**Lesson 2:**

**Labels, MSDSs, Symbols, Hazards, and Training**

**Key Points**

- The following information must be included on all labels:
  - Complete chemical name or names, no abbreviations; formula may be used as an option.
o A warning statement (symbol or message) conveying hazardous substances contained.
o The manufacturer’s name, address, and contact information.

- The following colors are used on a voluntary label to represent different types of hazards:
  - Blue is used to show the chemical contains some degree of health hazard.
  - Red shows that the chemical may be flammable.
  - Yellow represents that there may be some reactivity characteristic in the material.
  - The white field is used to display any other special symbols such as to indicate the material is an oxidizing agent or is water reactive.

- Although it can also be stored electronically, an MSDS must always be immediately available for review for all affected employees.

- Remember, it is the employer’s responsibility to ensure that each employee who handles or uses any hazardous material knows where MSDSs are located and how to read and understand them.

- Gases are used in various manufacturing processes. Because these gases are bottled under great pressure, misuse or unsafe handling could lead to an accident.

- Employers are responsible for informing and training their employees about the hazards that exist in their workplaces.

**Study Questions**

1. In general, what two terms are used in order to understand the nature of health hazards?

2. What are three manifestation examples of chronic effects?
3. What three symbols are used to identify various kinds of health hazards?

4. Health hazards can affect a body through what four routes of entry?
Module 14:

Hazardous Substances and Industrial Hygiene

This section introduces the contents of 29 CFR 1910 Subpart Z, which deals with toxic and hazardous substances.

This part focuses on the aspects of Subpart Z, which deal with keeping hazardous chemicals and materials from negatively affecting your health. This includes the use of personal protective equipment, decontamination procedures in the event of exposure to hazardous materials, and the procedures in place for conducting first aid and recording an incident of exposure in the workplace.

Key Terms

**Latency**: The time between exposure and the first appearance of an effect.

**Local effect**: Substance causes damage when and where it comes into contact with a body.

**Odor threshold**: The lowest concentration of a substance in air that can be smelled. For a given chemical, different people usually have very different odor thresholds.

**Olfactory fatigue**: The rapid loss of the ability to smell due to a substance with a strong odor.

**Permissible Exposure Limits (PELs)**: Limits that are established by OSHA to control the permissible levels of exposure to a substance. Exposure limits are usually expressed in terms of a maximum concentration of a substance in the air in relation to a period of time of exposure.

**Potentiation**: The existence of one chemical may not lead to any harmful effects, but the existence of a second chemical can enhance its potential to harm the individual.
**Synergism:** The interaction of two or more chemicals leading to an effect that is greater than the sum of their individual effects.

**Systematic effect:** Substance is absorbed by the body and enters the bloodstream, eventually causing damage to internal organs.

**Lesson 1:**

**Exposure to Toxic Substances**

**Key Points**

- For a toxic substance, inhalation is the most common form of exposure to the body. Inhaled materials can be deposited in the lungs and can have numerous harmful effects on the body.

- If the inhaled substance is an irritant, it may lead to nose and throat irritation, or may also cause coughing and chest pains if it comes in contact with the bronchi.

- Some substances are caustic; they can chemically burn the skin.

- If the skin is cracked or cut, substances can be absorbed and passed into the bloodstream more easily.

- In some cases the substance in contact with the eye may be absorbed into the bloodstream.

- As a general rule, if you can smell a substance, then you are inhaling it. However, many substances are odorless, so odor cannot be used as a steadfast criterion in determining whether or not a chemical is being inhaled.

- An individual should not depend on smell alone to provide sufficient warning as to whether they have been exposed to a chemical. One individual’s sense of smell will differ from another’s; what one person may be able to smell, another may not.
• If coworkers in your work area begin showing symptoms known to be from exposure to a toxic substance, then it is likely that you have been exposed yourself.

• If you find any dust which has settled on clothes or in your general surroundings, it is also likely that you have inhaled it.

• An employer has the responsibility to inform, and employees have the right to be informed, of any hazardous substances that they may be exposed to in the workplace, as well as the damage their bodies may suffer as a consequence of that exposure.

**Study Questions**

1. If you are exposed to a chemical that emits a strong odor for a long period of time, it is likely that your nose will simply "shut-down," which effectively reduces your ability to smell that particular odor. This is known as what?

2. Employers are required to inform employees of the hazards of the chemicals they use and how to protect themselves in the workplace through the use of what?

3. The Material Safety Data Sheet (MSDS) also provides the exposure to material an individual may experience without suffering any permanent damage; this time period is known as what?
Lesson 2:
The Effects of Toxic Substances on the Body and How to Reduce Exposure

Key Points

- As a general rule, any chemicals that lead to health complication in a pregnant woman are likely to have the potential to damage the fetus.

- In the case of males, some chemicals can reduce sperm count, cause infertility, sterility, and a reduction in sex drive.

- The individual chemicals in a reaction may be harmless to the individual, but when they come into contact with one or more chemicals, the result may be toxic.

- The interaction of more than one chemical may lead to synergism. That is, the interaction of two or more chemicals will lead to an effect that is greater than the sum of their individual effects.

- Some individuals can and will tend to be more sensitive to the toxic effects of a substance than others. As a result, they will be susceptible to the toxic effects of a substance at lower levels of exposure.

- In some cases the use of creams to coat the face and skin may be used to reduce exposure, particularly where the nature of the work prevents the use of gloves or facemasks.

- Chronic exposure to a toxic substance can usually be observed only after the individual has been exposed to it for a period usually measured in years, or sometimes in decades.
• Heavy physical work will lead workers to breathe in more air at a greater frequency, meaning that they may inhale more of a substance than is usual.

• Exposure limits do not take into account the possible interactions of two or more chemicals or the possibility of exposure through the skin or ingestion.

• When the existence of certain toxic substances in the air rises above a certain level, by law biological sampling is required. Biological sampling is carried out by way of stool, blood, and urine tests.

**Study Questions**

1. When and where a toxic substance comes in contact with and causes damage to the body is known as what?

2. In the case of what type of effect is the substance absorbed by the body and the bloodstream?

3. What is meant by potentiation?
Module 15:
Bloodborne Pathogens

This training section is designed to provide a basic understanding of bloodborne pathogens, common modes of their transmission, methods of prevention, and other pertinent information such as what requirements of the OSHA standard should be met in the handling and proper disposal of such materials. Employers are to implement written Exposure Control Programs to address what duties employees are to perform on a daily basis to keep their work areas and their persons safe.

Key Terms

**Blood:** Human blood, human blood components, and products made from human blood.

**Clinical laboratory:** A workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

**Contaminated:** This is the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

**Contaminated laundry:** For our purposes this means items which have been soiled with blood or other potentially infectious materials or may contain sharps.

**Contaminated sharps:** Any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

**Decontamination:** Use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

**Engineering controls:** Controls such as sharps disposal containers, self-sheathing needles, safer medical devices,
e.g., sharps with engineering that isolates or removes the bloodborne pathogens hazard from the workplace.

**Exposure Control Plan:** OSHA’s name for an employer’s overall plan to minimize the likelihood of an employee experiencing a BBP occupational exposure incident.

**Lesson 1:**

**Introduction to Bloodborne Pathogens**

**Key Points**

- HBV is the most common infectious bloodborne hazard facing healthcare workers. It infects approximately 8,700 healthcare workers a year, resulting in more than 200 deaths.

- It is important to know the ways exposure and transmission are most likely to occur in your particular situation, be it through providing first aid to a fellow student, handling blood samples in the laboratory, or cleaning up blood spilled in a hallway.

- In most healthcare or laboratory situations, transmission is most likely to occur because of:
  - Accidental puncture from contaminated needles, broken glass, or other sharps
  - Contact between broken or damaged skin and infected body fluids or
  - Contact between mucous membranes and infected body fluids

- If someone infected with HBV cuts his or her finger on a piece of glass, and then you cut yourself on the now-infected piece, it is possible that you could contract the disease. Anytime there is blood-to-blood contact with infected blood or body fluids, there is the potential for transmission.
• Infected blood can enter your system through any of the following means:
  
  o Open sores
  o Cuts
  o Abrasions
  o Acne
  o Any sort of damaged or broken skin, such as sunburn or blisters

Study Questions

1. Signs and symptoms of HBV can include what 10?

2. Bloodborne pathogens such as HBV and HIV can be transmitted through contact with infected human blood and other potentially infectious body fluids such as what nine?

3. Bloodborne pathogens such as HBV and HIV can be transmitted through contact with infected human blood and other potentially infectious body fluids such as what five?

Lesson 2:

Prevention

Key Points

• Employers having employees with reasonably anticipated skin, eye, mucous membrane, or parenteral
contact with blood or other potentially infectious materials that may result from the performance of an employee’s duties shall have a written Exposure Control Program.

- An Exposure Control Program shall be updated annually and whenever necessary to reflect new/modified tasks, etc. Employers are required to solicit employee input to the plan.

- As well, the employer shall ensure that a copy of the Exposure Control Program is accessible to employees.

- Universal precautions resolve this uncertainty by requiring you to treat all human blood and bodily fluids as if they were known infected.

- Do not bend, break, or recap needles by hand. If recapping is necessary, use a one-handed method to do so.

- Place leaking or punctured sharps containers inside a secondary container to prevent leakage. Also, notify the personnel responsible for handling the containers that the container has been punctured.

- Always use a utensil (tongs, dustpan, etc.) to pick up contaminated broken glass, needles, or other sharps.

- Assume all used needles and other sharps are contaminated.

- If you should come in contact with infectious materials, wash the exposed area immediately in order to lessen the chance of becoming infected.

- Never pipette or suction by mouth!

- Always use gloves before touching or if likely to come in contact with blood, bodily fluids, non-intact skin, mucous membranes, or if performing venipuncture.

- Clean and decontaminate your workspace at the end of each shift.
• Replace protective coverings on equipment.

• If your occupation has the potential for HBV exposure, your employer will offer the hepatitis B vaccine to you at no cost.

• If the employee initially declines hepatitis B vaccination but at a later date while still covered under the standard decides to accept the vaccination, the employer shall make available hepatitis B vaccination at that time.

• The employer shall assure that employees who decline to accept hepatitis B vaccination offered by the employer sign the statement declining the vaccination. There is a specific form for this required by OSHA.

• Regulated waste should be double-bagged to guard against the possibility of leakage if the first bag is punctured.

• Labels should display the universal biohazard symbol.

• In the event of an exposure incident an employee should:
  o Immediately initiate first aid at the work site.
  o Notify his or her supervisor or someone else who can notify his or her supervisor.
  o Seek further medical treatment as necessary.
  o Ensure the incident is reported to the employer.

• Your employer will pay for all treatments of work-related injuries, so do not use your personal insurance.

Study Questions

1. What are the five major tactics to help reduce your risk of exposure and infection?
2. In laboratory and patient care areas you should wash your hands whenever you engage in what four actions?

3. What specific rules must be followed for glove removal?
Module 16:

Recordkeeping and Reporting

This section is designed to assist employers in identifying and fulfilling the requirement to post certain records, maintain records of illnesses and injuries, and report specific cases to OSHA. Students who successfully complete this part will be able to identify the OSHA requirements for recordkeeping.

Key Terms

Asbestosis: An incurable restrictive lung disease often linked to occupational exposure.

BLS: Bureau of Labor Statistics

HCP: Healthcare Professional

PLHCP: Physician or other Licensed Healthcare Professional

Silicosis: An occupational lung disease, this is a respiratory disease caused by the inhalation of silica.

TB: Tuberculosis

Lesson 1:

Recordkeeping

Key Points

- Recording/reporting a work-related injury, illness, or fatality does not mean the employer or employee was at fault, an OSHA rule has been violated, or that the employee is eligible for workers’ compensation or other benefits.

- OSHA injury and illness recordkeeping and workers’ compensation are independent of each other.
All employers covered by OSHA are covered by the 29 CFR 1904 regulations. However, most employers do not have to keep OSHA injury and illness records unless OSHA or the Bureau of Labor Statistics (BLS) informs the employers, in writing, that they must keep records.

Employers that are partially exempt from recordkeeping requirements because of their size or industry must continue to comply with the following requirements:

- Reporting fatalities and hospitalization incidents of three or more employees.
- Annual OSHA injury and illness survey (if specifically requested to do so by OSHA).
- BLS annual survey (if specifically requested to do so by BLS).

The following are some size exemptions:

- If a company had 10 or fewer employees at all times during the last calendar year, it does not need to keep the injury and illness records unless surveyed by OSHA or BLS.
- The size exemption for the company is based on the number of employees in the entire company.
- Temporary employees, who are supervised on a day-to-day basis in the count, also should be included.

A case is considered work-related if an event or exposure in the work environment either caused or contributed to the resulting condition, or if an event or exposure in the work environment significantly aggravated a pre-existing injury or illness. However there must be a discernable cause for it to be work-related.

If a medical opinion exists, the employer must follow that opinion whether or not the employee follows that recommendation.

Restricted work activity occurs when:
An employee is unable to perform one or more routine functions (work activities the employee regularly performs at least once per week) of his or her job.

An employee is unable to work a full workday.

A physician or other licensed healthcare professional (PLHCP) recommends either of the above.

The following can be referred to as first aid treatment:

- Using nonprescription medication at nonprescription strength
- Tetanus immunizations
- Cleaning, flushing, or soaking surface wounds
- Wound coverings (bandages), butterfly bandages, or Steri-Strips
- Hot or cold therapy
- Non-rigid means of support
- Temporary immobilization device used to transport accident victims

All work-related cases involving loss of consciousness must be recorded.

An employer must record a case where an employee is occupationally exposed to someone with a known case of active tuberculosis and subsequently develops a TB infection.

**Study Questions**

1. A pre-existing injury or illness is significantly aggravated when an event or exposure in the work environment results in what type of circumstances, which otherwise would not have occurred?

2. Work-relatedness exemptions occur in cases where injury or illness results from voluntary participation in a wellness program or in a medical, fitness, or recreational activity such as what six?
3. An injury or illness must be recorded if it results in one or more of what six outcomes?

Lesson 2:
Reporting

Key Points

- Employers must enter each recordable case on reporting forms within seven calendar days of receiving information that a recordable case has occurred.

- At the end of each calendar year an employer must:
  - Review the OSHA Form 300 for completeness and accuracy and correct any deficiencies.
  - Create an annual summary of injuries and illnesses recorded on the OSHA Form 300A.
  - Certify the summary.
  - Post the summary in a conspicuous place or places where notices to employees are customarily posted no later than February 1 of the year following the year covered by the records and keep the posting in place until April.

- An employer must save all of the following forms for five years (from the end of the calendar year covered by the reports):
  - The OSHA 300 Form
  - Any privacy case list(s)
  - The Annual Summary
  - OSHA 301 Incident Report forms
• State-Plan states must have the same requirements as Federal OSHA for determining which injuries and illnesses are recordable and how they are recorded.

• An employer must avoid discriminating against an employee for reporting a work-related fatality, injury, or illness.

• Employers must report orally, within eight hours, any work-related fatality or incident involving three or more in-patient hospitalizations to the area office of OSHA, U.S. Department of Labor, nearest to the site of the incident by telephone or in person.

• An employer must provide copies of records within four business hours when requested by an authorized government representative such as:
  o A representative of the Secretary of Labor conducting an inspection or investigation under the Act
  o A representative of the Secretary of Health and Human Services conducting an investigation under section 20(b) of the Act
  o A representative of a State agency responsible for administering a State plan approved under section 18 of the Act

**Study Questions**

1. What sorts of injuries or illnesses must be considered privacy concern cases?

2. Employees and their representatives must be involved in the recordkeeping system in what three ways?
Module 17:

Workplace Violence

This section attempts to highlight the problems of violence in the workplace. It identifies the various kinds and what constitutes workplace violence. It then goes on to explain the potential costs of ignoring workplace violence and the methods that can be utilized to minimize and/or eliminate it from the workplace.

Key Terms

**Type I violence**: Violence committed by strangers with no formal relationship with the workplace or the employees. This is usually the case with robberies.

**Type II violence**: Violence committed by customers or clients such as an individual who received or has received goods and/or services from the workplace

**Type III violence**: Violence committed by co-workers, colleagues, subordinates, and superiors

**Type IV violence**: Violence committed by acquaintances and relations of employees of an organization

**Workplace Violence Prevention Program (WVPP)**: The amalgamation of all the preventative measures that an organization can undertake placed within one, all-encompassing, corporate policy.

Lesson 1:

Violence in the Workplace

Key Points

- It is estimated that over two million American workers are victims of workplace violence every year, with the
costs to both employees and employers reaching billions of dollars.

- Though homicides by co-workers seem to get the most media coverage, they represent only a small portion of all workplace homicides, the bulk occurring during robberies, usually at the hands of a total stranger.

- Though most victims tend to be female, many men are also victims of sexual abuse (perpetrators can be men or women).

- Verbal abuse may include making insulting, degrading, or discriminatory comments. Furthermore, verbal abuse may also include threats of physical harm to you, friends, or loved ones.

- Ironically, verbal abuse has the potential of being more harmful than physical violence. Whereas purely physical acts of violence may only result in physical harm that can, in most cases, heal with time, verbal abuse will tend to affect the psyche of the victim.

- Emotional abuse is much more subtle than the other forms of violence, and though it tends to be ignored, it is potentially the most dangerous form of abuse.

- The emotionally abused person’s performance and/or productivity may suffer, which just goes to prove the point of the abuser, making it a self-fulfilling prophecy.

- In a worst-case scenario, where the violence has resulted in death or maiming, those who witnessed the incident have been known to suffer from trauma, depression, and paranoia.

**Study Questions**

1. Summarize the four types of violence as outline in this part.
2. How does emotional abuse usually occur?

Lesson 2:
Understanding and Combating Workplace Violence

Key Points

- It must be noted that the loss in productivity that is directly caused by physical abuse is minimal when compared with the potential loss in productivity caused by the emotional and psychological effects of the abuse.

- Studies have shown that co-workers, even those that have been relatively unaffected by abuse, will tend to display lower levels of productivity after a violent incident. Much of the loss is due to higher levels of absenteeism, lack of concentration, and de-motivation.

- The theory is that co-workers would attempt to avoid the location where an acquaintance was exposed to a violent event; this is even more apparent in cases of homicide, where the entire workforce may feel that they are in danger.

- Depression, paranoia, and distraction are only some of the possible effects of violence. In extreme cases, the victim may even turn to violence him/herself. In a majority of cases the victim will only suffer from psychological disturbances for a short period of time, up until, for example, the assailant or perpetrator has been exposed or caught.

- Psychological effects can result in lower productivity, absenteeism, and communication problems.

- Even the most minor wounds will invariably lead to lower productivity levels by the victim, absenteeism, or
even an inability to continue working depending on the nature of the job.

- There is a potential for goodwill to suffer as a result of violence or an abuse case, especially if customers or clients were involved or affected by the incident. This reduction in goodwill can lead to a reduction in sales and, subsequently, revenues.

- Goodwill is especially vulnerable if a customer is the victim of a worker or happens to be on the premises while a robbery is taking place and gets injured in the process.

- It is essentially a foregone conclusion that workplace violence will result in some financial and monetary losses, no matter how minute.

**Study Questions**

1. Employers and supervisors must ensure that when terminating an employee, certain steps are undertaken to minimize the likelihood of a violent reaction. What steps are these?

2. It has been argued that a fired employee should not be allowed to return to his/her work area once terminated. Why?

**Lesson 3:**

**Workplace Violence Prevention Programs**

**Key Points**

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A Workplace Violence Prevention Program (WVPP) is basically the amalgamation of all the preventative measures that an organization can undertake placed within one, all-encompassing corporate policy.

Furthermore, it is an indisputable statement of the management’s commitment to the prevention of violence in the workplace.

The committee must assess the risks of workplace violence and the strengths and weaknesses of the organization’s existing preventative policies.

The policy should state, in no unclear terms, that the organization has zero tolerance for violence and abuse of any kind and in any form.

The WVPP will also include the procedures for the hiring and termination of employees. This includes what must be checked before any individual is hired, regardless of position. Furthermore, when terminating employment, it is to account for what procedures are undertaken to minimize or prevent a violent incident.

The WVPP must also include specific information concerning acceptable behavior in the workplace and the methods of discipline should these standards be broken.

Discipline must be positive and not retaliatory to the extent possible. If termination becomes the only option available, ensure that it is carried out in accordance with the written policies of the WVPP.

If the organization seeks to make the WVPP as effective as possible, a training program must be formulated to instruct employees on the content of the policy. Training should also include the various methods by which employees can report and prevent workplace violence in their own way.

It is important that the organization maintain training records to ensure that all employees have been appropriately instructed.
• Crisis-response plans are essential in minimizing harm and damage in a worst-case scenario.

Study Questions

1. Acceptable behavior will include the prohibition of what in the workplace?

2. It is imperative that the top-level management be involved in the WVPP at all times, and especially during training programs. Why?
Module 18:

Safety and Health Programs

Have you ever been injured on the job? Do you know what steps to take in the event of sickness, injury, or death solely due to your workplace environment? More importantly, do you know how to protect yourself, as well as others, and help promote healthy working conditions? Every year, more than 50,000 workers die from exposure to various hazards in the workplace. The Occupational Safety and Health Administration (OSHA) is committed to saving lives, preventing injuries, and protecting the health of workers all across America. This part will show you how to identify workplace hazards and become involved with ensuring healthy and safe working environments.

Key Terms

SHARP: Safety and Health Achievement Recognition Program

VPP: Voluntary Protection Program

Lesson 1:

Effective Safety and Health Program Elements

Key Points

- Management commitment provides the motivating force and resources for organizing and controlling activities within an organization.

- Employee involvement provides the means through which workers develop and express their own commitment to safety and health protection.

- Recommended actions:
  - Clearly state a worksite safety and health policy.

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o Establish and communicate a clear goal and objective for the safety and health program.

o Provide visible top management involvement when implementing the program.

o Encourage employee involvement in the program and in decisions that affect safety and health.

o Assign and communicate responsibility for all aspects of the program.

o Provide adequate authority and resources to responsible parties.

o Hold managers, supervisors, and employees accountable for meeting their responsibilities.

o Review program operations at least annually to evaluate, identify deficiencies, and revise as needed.

- Effective management actively analyzes the work and the worksite to anticipate and prevent harmful occurrences.

- Recommended actions:
  o Provide for regular site safety and health inspections.
  o Involve the facility’s Safety Committee in periodic, but regular, site inspections.
  o Provide a reliable system for employees, without fear of reprisal, to notify management about apparent hazardous conditions and to receive timely and appropriate responses.
  o Provide for investigation of accidents and “near miss” incidents, so that their causes and means for prevention are identified.
  o Analyze injury and illness trends over time, so that patterns with common causes can be identified and addressed with an eye towards prevention.

- Where elimination of the hazard is not feasible, control hazards to prevent unsafe and unhealthful exposure.
  o Provide for facility and equipment maintenance.
  o Plan and prepare for emergencies by conducting training and drills, not less than annually.
  o Establish a medical program consisting of first aid on site and the structure to access nearby physician and emergency medical care.
Study Questions

1. It has been found that effective management of worker safety and health programs has what three benefits?

2. An effective safety and health program does what two things?

3. An effective occupational safety and health program will include what four elements?

4. In addition to the points given, what should be done in order to identify all of the safety and health hazards?

5. Establish procedures for timely prevention, correction, or control of hazards, including what three, in addition to the points given?

6. Ensure that supervisors carry out their safety and health responsibilities, including what three?
Lesson 2:

OSHA Safety and Health Programs

Key Points

- States and territories with their own OSHA-approved occupational safety and health plans must adopt and enforce standards identical to, or at least as effective as, the federal standards, and provide extensive programs of voluntary compliance and technical assistance, including consultation services.

- There is a Federal Education Center in each of the 10 Federal Regions.

- OSHA awards grants to nonprofit organizations through its Susan Harwood Training Grant Program in order to provide safety and health training and education to employers and employees in the workplace.

- Grants are awarded for one year, and may be renewed for an additional 12 to 24 month period, depending on whether or not the grantee has performed satisfactorily.

Study Questions

1. OSHA’s Strategic Partnerships are voluntary, cooperative relationships between OSHA, employers, employee representatives, and others, namely who?

2. Grants focus on programs that will educate workers and employers in small business, meaning those with fewer than how many employees?
Module 19: 

Ergonomics

Employees who work in non-office environments are routinely required to carry out tasks that involve movement and physical exertion. These forceful exertions associated with such tasks may lead to fatigue, musculoskeletal disorders, and other serious injuries.

This part is designed to help employees identify work-related problems and learn to apply the principles of ergonomics in order to make their jobs less physically demanding, thereby increasing their overall efficiency.

Key Terms

**Administrative controls:** Those procedures and policies that are set up by the employer in order to reduce exposure to risk factors by changing the means by which jobs are performed; examples of administrative improvements include job rotation, job enlargement, and adjustment of work pace.

**Awkward posture:** The position of a body while performing work is called posture. An unnatural position of the body, particularly the joints, while performing a job is called awkward posture. Working in an awkward posture can increase the risk of injury and damage to the body.

**Biomechanics:** The study of the mechanics of a living body, especially of the forces exerted by muscles and gravity on the skeletal structure.

**Engineering controls:** Physical changes to jobs that control exposure to risk; engineering improvements are focused on eliminating the causes of hazards and reducing employee exposure to the risks without depending on the employee to take self-protective measures. Examples of engineering improvements include using lightweight tools, changing the handle angle of a tool, and providing adjustable chairs and work surfaces.

**Lighting system:** This is the equipment required to illuminate the workplace; poor lighting can lead to visual symptoms of

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eye stress, eye coordination abnormalities, eye focusing breakdown, and eye fatigue while performing certain tasks that require visual concentration.

**Musculoskeletal Disorders (MSD):** Injuries and disorders of the muscles, nerves, ligaments, tendons, cartilage, joints, and spinal discs; examples of MSDs include rotator cuff tendonitis, carpal tunnel syndrome, and tension neck syndrome.

**Occupational biomechanics:** This is a study of the mechanical behavior of musculoskeletal tissues when physical work is performed.

**Lesson 1:**

**Ergonomics in the Workplace**

**Key Points**

- Ergonomics, also known as human engineering, is the practice of designing machines, products, and places to better accommodate people.

- It is very important for workers to take short pauses in between tasks that require forceful exertions.

- Exposure to continuous, high-intensity vibration can cause damage if uncontrolled.

- Exposure to excessive heat can cause various disorders, including sunburns, heat exhaustion, heat cramps and heat stroke.

- Cold stress results in the decrease of the worker’s body temperature, causing shivering, unconsciousness, pain and inadequate circulation of the blood.

- Cold stress may also cause the worker to lose his ability to grasp due to the decrease in body strength, and cold temperatures combined with the risk factors may increase the chances of musculoskeletal disorders.
• Continuous, unwanted sound in the workplace can cause severe damage to a worker's hearing.

**Study Questions**

1. What type of employee behavior may indicate the presence of ergonomics-related problems?

2. Some body parts are at a greater risk, as nerves, blood vessels, and tendons are present just under the skin in certain areas. What are six examples of such body parts?

3. Name six postures to avoid.

4. What are six motions to avoid?

5. What are the symptoms of heat stress?

6. Continued exposure to high noise levels may also result in what possible consequences?
Lesson 2:
Improving the Workplace

Key Points

- Install work tables with work surfaces that can be raised or lowered according to the employee's body size and position. This can reduce bending, reaching, and awkward postures that can contribute to body damage.

- Cutout work surfaces should be used that allow employees to adjust their distance from the work table. This can help reduce the amount of visual effort along with awkward postures.

- By allowing employees to reposition their work, their bending and reaching efforts can be reduced.

- Modifying the work surface according to the task can reduce the effort needed to complete the task.

- Ladders, scaffolds, or preferably work platforms must be provided to employees who are required to reach a surface high off the ground to retrieve packages or containers.

- If employees are required to place packages and containers on surfaces high off the ground, certain mechanical lifting devices can be used to lift them.

- Employers should provide adjustable equipment that allows employees to accomplish tasks in a comfortable, upright working posture.

- All materials, products, and tools that have to be used frequently must be stored in a place that can be accessed easily without requiring the worker to reach high or adopt awkward postures.
• Installing proper lighting systems in the workplace, including all storage facilities, can help reduce eye strains and headaches.

• Supervisors should encourage employees to work in a comfortable position and shift their positions or stretch often.

• There should be no cluttering in the workspace, as clutter can force employees to reach, bend, or twist their bodies while handling different objects.

• Employers must ensure that workspaces comply with the following points:
  o All floor surfaces must be kept dry and free of any obstacles. This can help ensure that there is no hazard of slipping or tripping in the work area. Problems related to overexertion can be avoided by carrying out regular maintenance of all tools and equipment.
  o All handles and padding on vibrating tools are not broken or worn and are used to help reduce vibration and awkward postures while tasks are being performed.
  o All moving or mechanical parts on carts and pulleys are properly greased so as to reduce the amount of force required to move them.

• It is common knowledge that those individuals who are in good physical condition are more productive and sustain fewer injuries.

• Employees should also be notified of workplace changes, instructed on using new equipment, and notified of new work procedures.

• An effective training program includes a mix of both theoretical and practical ways in which employees can develop their skills to work safely.

• The initial training program should incorporate the following:
- How to use, handle, and maintain all tools, machinery, and equipment that have to be used as a part of the job
- How to use the special tools, if any, associated with a particular job
- How to use safety equipment and guards along with personal protective equipment to ensure safety
- How to properly lift heavy objects

**Study Questions**

1. Ergonomic improvements can be divided into what three categories?

2. Administrative controls for improving worker efficiency may include what six?

3. What specific groups of workers must an ergonomics training program include?
Module 20:

Hazards of Asbestos in the Workplace

Asbestos is a substance that has been used for centuries. Its heat-resistant properties make it almost indestructible; due to this property, asbestos has been widely used in the construction industry, especially for pipe and boiler insulation and also in vehicle brakes. Before 1973, asbestos was sprayed onto different surfaces for fire protection, but this practice was banned due to its hazardous nature. Furthermore, it is no longer used for insulating pipes and boilers.

However, asbestos can still be found in many older buildings. Those who work in construction, repair, demolition, and renovations are at a greater risk of contracting asbestos-related diseases such as asbestosis, lung cancer, and mesothelioma. There is no safe level for exposure to asbestos.

This part introduces students to the hazards of asbestos in the workplace and provides information about the measures that must be taken in order to minimize the effects of exposure to asbestos.

Key Terms

Asbestos: Naturally occurring mineral silicates whose crystals form long, thin fibers.

Asbestos-Containing Material (ACM): Those materials that contain more than 1% asbestos by weight.

Demolition: Intentionally destroying, taking apart, or burning a building or a structure.

Encapsulation: Covering asbestos-containing material with a material that binds together and prevents the release of asbestos fibers.
Enclosure: An airtight, leak-proof barrier that is placed around asbestos-containing material to prevent the fibers from entering the surrounding uncontaminated area.

Friable Material: A material that can be crumbled or reduced to powder by applying hand pressure.

Lesson 1:

Asbestos in the Workplace

Key Points

- Asbestos has been determined to be a hazardous substance because its fiber masses break easily into tiny dust particles that get airborne and adhere to clothes. These fibers, when inhaled or swallowed, can cause serious health problems.

- The fibrous or fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed.

- Materials such as vinyl-asbestos floor tile or roofing felts are considered nonfriable and generally do not emit airborne fibers unless subjected to sanding or sawing operations.

- Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut or sawed, or if they are broken during demolition operations.

- Although physicians are uncertain about why people develop these diseases, it has been demonstrated that the greater the exposure to asbestos fiber, the greater the risk of developing an illness.

- Construction workers who work on and disturb asbestos-containing materials in buildings are at a greater risk of coming in contact with additional asbestos fibers.
• Exposure to asbestos fibers often adversely affects the lungs.

• Asbestos-related diseases include asbestosis, lung cancer, mesothelioma, and some other cancers.

• The latency period for mesothelioma is often 15 to 50 years.

• Cancer of the gastrointestinal tract can also be caused by asbestos. The latency period for cancer is often 15 to 30 years.

• The most common symptoms of lung cancer are coughing and a change in breathing. Other symptoms include shortness of breath, persistent chest pains, hoarseness, and anemia.

• Mesothelioma is a rare form of cancer that is found in the thin lining (membrane) of the lung, chest, abdomen, and heart and almost all cases are linked to exposure to asbestos.

**Study Questions**

1. The most common application of asbestos-containing building material (ACBM) includes use in what three materials?

2. The main factors that determine the likelihood of developing an asbestos-related disease include what three?

**Lesson 2:**

**Protection against Asbestos**

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Key Points

- The employer shall inform all employees concerning the availability of self-help smoking cessation program material.

- Employees must get respirator training and medical clearance to use respirators.

- Insofar as practicable, asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers.

- Employers are required to identify and clearly label all areas where asbestos-containing materials are present. Employers must also ensure that all workers are properly trained to handle asbestos-containing materials.

- Workers are required to put on suitable protective equipment and clothing. The material of the clothing must not allow penetration of asbestos fibers. Torn or defective clothing must be replaced immediately. A respirator with an appropriate filter must also be worn.

- If a worker suspects the presence of friable asbestos on any surface in the work area, he must wipe it off with a damp cloth.

- Workers must make sure to wipe the surface of each container or bag before it is removed from the work area.

- After completion of the tasks, all polyethylene sheets and work area barriers should be sprinkled with water. They should then be folded carefully in order to contain any remaining dust. After that, they should be placed in bags or containers and properly sealed. The bags should be disposed of as asbestos waste.

- The work area must be enclosed with polyethylene sheets that are at least 0.006 inches thick in order to
contain the asbestos fibers. If the work area cannot be enclosed, a notice must be provided to all workers, specifying alternative work procedures that can minimize the risk of asbestos exposure.

- In order for the contaminated air to remain in the enclosed area, it must be ensured that the air pressure in the work area is lower than the surrounding area. This low pressure should be maintained until all work has been completed.

- Stairways and elevators must be sealed off using polyethylene sheets and duct tape.

- The air heating and ventilation system in the work area must be shut down and all ducts should be sealed off with polyethylene sheets.

- All non-removable devices and fixtures should be covered with polyethylene sheets.

- All enclosures must be inspected on a regular basis in order to ensure that there are no breaks, tears, or leaks.

- In order to ensure that workers do not carry any contaminants outside the work area, they must be decontaminated in a designated space inside the work area.

- A light spray of water should constantly be applied near workers who are performing asbestos-related tasks.

- Finally, the air inside the enclosure must be decontaminated before taking apart the enclosure.

- The materials should be sprayed with water to ensure that no asbestos fibers will be released during the collection process, and the workers must disturb the least amount of material possible.

- If protective clothing gets damaged or torn, it must be replaced immediately.
• All contaminated clothing and equipment must be taken off and kept in the equipment room or work area so that the contaminants do not enter the clean area.

• Before entering the work area, workers must put on their respirators, make sure that they fit properly, and check that there are no gaps from which asbestos fibers may enter.

Study Questions

1. The floor of the work area must be covered with polyethylene sheets and extended at least how many inches up the wall?

2. High-risk activities require special measures for what five specific tasks?

3. What are the two types of supplied-air respirators and how do they work?

4. The employer must, within how many working days after the receipt of the results of any monitoring performed under this section, notify each affected employee of these results either individually in writing or by posting the results in an appropriate location that is accessible to affected employees?
Module 21:

Lead Safety in the Workplace

Lead is a very toxic substance. People who are exposed to lead or lead compounds may become ill or even die due to lead poisoning. Usually, our bodies remove lead from our systems at a slow rate; however, inhaling even small doses of lead for a long period of time can result in lead poisoning. Workers who are required to work at or near sites that are contaminated with lead are at a greater risk of developing lead poisoning.

This part focuses on the health risks associated with exposure to lead and how workers can protect themselves against lead poisoning.

Key Terms

**Action level:** The amount of lead particulates present in the air that require close monitoring so that the PEL is not approached. The action level for lead is 30 micrograms per cubic meter (ug/m$^3$) for a time-weighted average over eight hours.

**Permissible Exposure Limit (PEL):** The maximum amount of lead particles in air that is acceptable for normal workplace exposure. The PEL for lead is 50 micrograms per cubic meter (ug/m$^3$).

**Toxic Substance:** Those chemicals present in the workplace that are capable of causing harm. In this sense, the term chemical includes dusts, mixtures, and common materials such as paints, fuels, and solvents.

Lesson 1:

Lead in the Workplace

Key Points
• When lead enters the body, it circulates in the bloodstream and accumulates in various organs causing irreversible harm to body tissues. Although the body gets rid of most of the absorbed lead, some still remains in the blood and tissues. With increased exposure, the stored amount of lead keeps on increasing and eventually leads to lead poisoning, which may cause death.

• Lead can enter the body through inhalation or ingestion. Lead is usually not absorbed through the skin.

• If workers do not follow specific work guidelines and hygiene practices, they may take contaminants home, causing harm to the whole family.

• Lead can cause anemia as it hinders the formation of hemoglobin in the blood. It may also cause damage to the cells in the kidneys causing kidney failure. Lead has also been found to reduce sperm count in men and decrease their fertility.

• If a pregnant woman is exposed to lead, the lead particles can pass from the mother to infant through the placenta.

• Lead may cause severe damage to the body even before the symptoms appear.

• Persons who have a blood lead level of 40 ug/100g must be tested at least every other month until their blood lead level goes below 40 ug/100g for two consecutive blood samples.

• If any employee’s blood lead level is at or above 60 ug/100g, they shall be removed from any area that is at or above the action level.

• Each employer who has a workplace or work operation covered by this standard shall determine if any employee may be exposed to lead at or above the action level. The employer shall assure that no employee is exposed to lead at concentrations greater
than fifty micrograms per cubic meter of air (50 ug/m(3)) averaged over an 8-hour period.

- Measurements need not be repeated except:
  - Whenever there has been a production, process, control, or personnel change that may result in new or additional exposure to lead.
  - Whenever the employer has any other reason to suspect a change that may result in new or additional exposures to lead.

- If the initial determination or subsequent monitoring reveals employee exposure to be at or above the action level but below the permissible exposure limit, repeat monitoring at least every six (6) months at the required frequency until at least two consecutive measurements taken at least seven (7) days apart are below the action level.

- The employer may discontinue monitoring for that employee except:
  - Whenever there has been a production, process, control, or personnel change that may result in new or additional exposure to lead.
  - Whenever the employer has any other reason to suspect a change that may result in new or additional exposures to lead.

**Study Questions**

1. What is the most common route of lead absorption into the body?

2. Workers may be exposed to lead while performing certain tasks, name five.
3. Operations that can generate lead dust and fumes include what five?

4. Early signs of lead poisoning can be overlooked as everyday medical complaints. These may include several, name nine.

5. You should receive initial medical surveillance if you are exposed to lead at or above the action level for more than how many days per year?

6. How often are companies required to perform biological monitoring?

7. Employees are required to be notified in writing within how many days of the test if their blood lead level exceeds 40 ug/100g?

8. The employer is required to notify all employees of the assessment results within how many working days of their receipt?
Lesson 2:

Exposure Reduction and Employee Protection

Key Points

- Each employer shall establish and implement a written compliance program to reduce exposures to or below the permissible exposure limit, and interim levels if applicable, solely by means of engineering and work practice controls.

- Engineering control measures that could be adopted to reduce your exposure to lead include exhaust ventilation, encapsulation, substitution, process modification, and isolation.

- Your employer is required to maintain a negative pressure inside the enclosures in order to prevent lead particles from contaminating areas outside the enclosure.

- Your employer is responsible for ensuring that the minimum amount of lead is released into the air during maintenance or demolition.

- Using the right brush and attachment for the right surface will reduce the amount of lead dust emitted into the air.

- Employees must NEVER wear work clothes away from the work site. They should not be taken home for washing under any circumstances. Only professionals should launder them. Disposable clothing must be properly disposed of according to federal, state, and local laws.

- If you do not shower and change into clean clothing before leaving the worksite, you may contaminate your vehicle and home with lead dust. This additional
amount of lead contamination could harm your family members.

- Your employer is required to provide workers with adequate washing facilities that are located near the worksite. These washing facilities must be equipped with water, soap, and clean towels so that employees can thoroughly remove lead contamination from their skin.

- Contaminated water from all showers and washing facilities must be disposed of according to the local, state, or federal laws.

- If you are required to perform lead-related tasks, your employer must provide you with clean, dry protective clothing and equipment free of cost.

- If there are no laundering services available, your employer should provide you with disposable clothes and shoe covers. You must change into clean non-disposable coveralls every day.

- Before you take off your work clothes and respirator, you must clean all loose particles on your clothing by using high-efficiency particulate air (HEPA) filter vacuum equipment.

- All protective clothes worn must fit you properly. All seams of the clothing should be reinforced using duct tape.

- All contaminated clothes that have to be laundered, cleaned, or disposed of should be placed in closed containers and sealed off. These containers must be labeled with a warning sign that advises workers not to remove dust by blowing or shaking.

- Your employer is required to initiate a respiratory protection program in order to train all employees about the usage of their respirators.

- Before entering the work area, you must test your respirator by putting it on and making sure that it fits
properly and that there are no gaps through which lead fibers may enter.

Study Questions

1. At the end of the workday, you must follow certain procedures to minimize your exposure to lead. These procedures include what four?

2. Clothing that should be worn at lead containing work sites includes what four items?

3. Minimum requirements of a respiratory protection program include what five components?

4. What are the two types of supplied-air respirators? Name and describe them.
Module 22:
Ionizing and Non-ionizing Radiation Safety

Personnel working in areas where they could be exposed to radiation need to be aware of the associated hazards and preventive or control measures. This section covers information about radiation, kinds of radiation found in workplaces, effects of radiation on human health, and the preventive measures that could be adopted to control radiation in work areas. This part will be helpful for those who are directly or indirectly involved with radiation in their workplaces.

Key Terms

Chronic: A term used to describe a disease of long duration or one with frequent recurrence.

Contamination: Radioactive material deposited or dispersed in materials or places where it is not wanted.

Crystallography: The science of crystal structure and phenomena.

Dosimetry: An accurate measurement of dosage, specifically with regard to radiation.

Gamma ray: An electromagnetic wave or photon emitted from the nucleus.

GM meter: A survey meter designed for measuring wide range gamma radiation fields.

Ionizing radiation: Radiation that has enough energy to remove electrons from substances it passes through, forming ions.

MASER: This is an acronym for Microwave Amplification by Stimulated Emission of Radiation.
Non-ionizing radiation: Radiation that carries enough energy to excite an atom or molecule, but not enough energy to remove an electron from the atom or molecule.

Radiation: Energy that is radiated or transmitted in the form of rays, waves, or particles.

Radioactivity: The spontaneous disintegration of an atomic nucleus with the emission of energy.

Lesson 1:

Radiation and Effects

Key Points

- Gamma rays are a part of the electromagnetic spectrum that originates in the nucleus. They have a great penetrating power, so they can easily pass through the human body.

- Although alpha particles travel only a few centimeters in the air and have little penetrating power, they can cause more biological damage than other types of radiation if they manage to enter the human body via breathing or swallowing.

- Infrared radiation, on the other hand, is detectable as heat.

- Lasers, broadly speaking, are devices that generate or amplify light, just as transistors generate and amplify electronic signals at audio, radio, or microwave frequencies.

- The annual occupational dose limit for the whole human body is 5 REM; the limit for the eye is 15 REM and for the skin is 50 REM.

- Those cells which multiply rapidly are more sensitive to radiation.

- Cells can be affected by radiation exposure in any of the following ways:
- No cell damage.
- Cells repair the damage and operate normally and/or cannot multiply.
- Cells are damaged and operate abnormally.
- Cells die as a result of the damage.

- In the early stages of differentiation, a developing embryo has increased chances of being affected by radiation, and a fetus is more sensitive to radiation exposure in the first trimester than in later trimesters.

- Radiation affects each person differently based on factors such as total exposure, exposure rate, type of radiation, area of the body that is exposed, cell sensitivity, individual sensitivity, age, medical history, and physical and mental condition of the exposed person.

- When a person is exposed to a low level of radiation for a long period of time that means he or she is exposed to chronic radiation. Exposure to chronic radiation can increase one’s chances of developing a debilitating condition such as cancer or cataracts.

- There are possible genetic effects (damage to sperm or egg cells), which can cause birth defects. Genetic effects can be somatic or hereditary.

- When a person is exposed to a high level of radiation for a short period of time, it means that he or she has been exposed to acute radiation.

- Non-ionizing radiation’s most targeted organs are the eyes and skin.

- When microwaves or radio waves are absorbed by body tissues, localized or spot heating can occur. The increased temperatures can damage tissues, especially those with poor temperature control such as the lens of the eye.

- Microwave radiation is absorbed near the skin, whereas RF radiation may be absorbed in deep body organs.
• If a person is exposed to infrared radiation for years, he or she can experience negative effects to his or her eyes, such as gradual but irreversible opacity of the lenses.

• If a person frequently comes in contact with laser beams, he or she can experience eye and skin damage. Exposure to high level lasers may cause depigmentation, severe burns, and possible damage to underlying organs.

Study Questions

1. The most common sources of radiation are what five?

2. The most radiosensitive cells are what five types?

3. The least radiosensitive cells are which?

4. Distinguish between somatic and hereditary genetic effects.

5. Because frequent exposure to UV radiation can result in skin inflammation, what may happen if exposure occurs in excess?
Lesson 2:

Radiation Control

Key Points

- Personnel can minimize their time of contact with radiation in order to reduce the amount of radiation absorbed into their bodies.

- The greater the distance from the radiation source, the lesser the chances of exposure to radiation released from an operation.

- Shielding is any barrier between the worker and the source of radiation that protects him by absorbing the radiation. The greater the shielding around the radiation source, the smaller the exposure.

- Radiation detectors, such as dosimeters, can be used to measure the radiation dosage received by an individual.

Study Questions

1. Describe the behavior of x-rays and gamma rays, alpha particles and beta particles, as well as neutron particles.

2. Radiation detectors, such as what type, can be used to measure the radiation dosage received by an individual?
3. Personnel can be saved from laser risks by doing what?
Module 23:

Formaldehyde Awareness

This section addresses the possible hazards involved in working with materials that may contain formaldehyde. This part will highlight the materials and processes that will likely expose a worker to formaldehyde, the symptoms and effects of formaldehyde exposure, and measures that can be taken to minimize the harmful effects of formaldehyde on the body.

Key Terms

**Action Level (AL):** A concentration of formaldehyde of 0.5 parts formaldehyde per million parts of air (0.5ppm) calculated as an 8-hour time-weighted average (TWA) concentration.

**AIDS:** Acquired Immuno-Deficiency Syndrome

**Authorized person:** This is any person required by work duties to be present in regulated areas.

**Formaldehyde:** The chemical substance, HCHO. The precise hazards associated with exposure depend both on the form (solid, liquid, or gas) of the material and the concentration present. 37%–50% solutions of formaldehyde used in preserving specimens present a much greater hazard to the skin and eyes due to splashes than solutions containing less than 1%.

**Initial monitoring:** All employees who may be exposed at or above the action level or at or above the short-term exposure limit (STEL) should be identified and the formaldehyde exposure of each employee should be determined. Initial monitoring should be repeated each time there is a change in production, equipment, process, personnel, or control measures that may result in new or additional exposures to formaldehyde.

**Methods of compliance:** Engineering and Administrative Controls, and good work practices implemented to reduce and maintain employee exposures to formaldehyde at or below the TWA and the STEL.

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**Periodic monitoring:** Employees shown by initial monitoring to be at or above the action level or at or above the STEL should be periodically monitored. If the last monitoring showed the employee exposure at or above the action level, then repeat monitoring of the employee should be performed at least once a year under worst-case conditions.

**Permissible Exposure Limit (PEL):** The allowable exposure that an employee can be exposed to over an 8-hour time-weighted average (TWA). For formaldehyde, the limit is 0.75 parts per million (ppm).

**Regulated areas:** These are areas where the concentration of airborne formaldehyde exceeds the PEL or STEL. All entrances and access ways should be posted with a sign as indicated in the plan.

**Sensitization:** An allergic reaction to a chemical agent due to previous contact with that material.

**Short-term Exposure Limit (STEL):** A limit of 2 ppm of formaldehyde, averaged over a 15-minute period.

**Time-Weighted Average (TWA):** The average exposure to formaldehyde an individual receives for a full eight-hour day.

**Lesson 1:**

**Formaldehyde Awareness**

**Key Points**

- The Occupational Safety and Health Administration (OSHA) estimates that annually approximately 2.2 million workers are exposed to formaldehyde.

- Formaldehyde is easily absorbed through the skin.

- Long-term respiratory exposure to formaldehyde is associated with an increased risk of cancer of the nose and accessory sinuses and nasopharyngeal and oropharyngeal cancer in humans.
• The Permissible Exposure Limit (PEL) is based on a time-weighted average (TWA) concentration for a normal 8-hour workday and a 40-hour workweek to which nearly all workers may be repeatedly exposed, day after day, without adverse effects.

• If exposures exceed the action level, specific portions of the formaldehyde standard will come into effect. As levels of exposure increase to the PEL or STEL, additional parts of the standard will become effective as well.

• Initial monitoring should be conducted for all employees who may be exposed at or above the action level of 0.5 parts per million (ppm) in an 8-hour shift (Time Weighted Average, TWA); or, the Short Term Exposure Limit (STEL) of 2.0 ppm averaged over any 15-minute period during the work shift.

• If the results from two consecutive sampling periods taken at least seven days apart indicate employee exposure below the action level and the STEL, monitoring may be discontinued unless there is a change in the product or process.

• Formaldehyde irritates mucous membranes including the eyes, nose, throat, and respiratory tract. Exposures to formalin and other formaldehyde-containing solutions can also irritate the skin, resulting in varying degrees of burns or rashes.

• Repeated exposures to low levels (or a few exposures to high concentrations) of formaldehyde can lead to sensitization.

• Once sensitized, the allergic reaction is often more severe than after the initial contact, and may not be limited to the site of exposure. Typical allergic reactions to formaldehyde include headache, skin rashes, and irritation of the eyes, nose, and upper respiratory system.

• Once a person has become sensitized to formaldehyde, lower exposures can bring on health
effects similar to those previously caused by higher exposures.

- Airborne concentrations from 25–50 ppm may cause tissue damage and serious respiratory tract injury such as pneumonitis.

- Airborne concentrations from 50–100 ppm may cause pulmonary edema/inflammation—severe lower airway effects.

- Airborne concentrations above 100 ppm could result in death.

- Mean fatal dose of formaldehyde in humans is 1–2 ounces of a 37% solution.

- Repeated ingestion of small amounts of formaldehyde may cause gastrointestinal irritation, vomiting, and dizziness.

- In previously exposed individuals, subsequent exposures may result in a sensitization dermatitis characterized by the sudden eruption of blisters on the eyelids, face, neck, scrotum, and arms.

- The dermatitis resulting from chronic exposure to formaldehyde may be either a sudden blistering reaction, or may be delayed several years with eruptions starting on the digital areas, wrists, and other parts of the body.

- Aqueous solutions’ effects will range from transient, minor injury and discomfort to severe, permanent corneal pacification and loss of sight.

- Employees will immediately report to their manager or other supervisory personnel the development of any adverse signs or symptoms suspected of being related to formaldehyde exposure.

- Formaldehyde gas, all mixtures or solutions composed of greater than 0.1 percent formaldehyde, and materials capable of releasing formaldehyde into the
air at concentrations reaching or exceeding 0.1 ppm are considered a health hazard.

- Employers should comply with the requirements of 29 CFR 1910.1200 regarding hazardous materials (The Hazard Communication Standard) and 29 CFR 1910.1048 specifically, regarding the formaldehyde standard.

- All containers with formaldehyde that constitute a health hazard must be labeled.

- All employees who are assigned to workplaces where there is exposure to formaldehyde at or above 0.1 ppm shall participate in a training program.

- Training shall be provided at least annually for employees exposed to formaldehyde concentrations at or above the action level or STEL.

- Regulated areas should be established where airborne formaldehyde concentrations exceed either the TWA or STEL.

- Respirator cartridges must be replaced every three hours or at the end of the work shift, whichever comes first.

- Supervisors must ensure that protective equipment is properly used to minimize formaldehyde exposure.

- Employers must know the expected service life of PPE and replace it as necessary. Gloves, for example, will provide protection for only specific periods of time before the contaminant eventually permeates through the glove material and breakthrough occurs.

- Contaminated clothes and equipment shall be cleaned before reuse.

- In a laboratory application, the eyewash station must be available in each room where formaldehyde is used.
• Employers who have employees working with formaldehyde or formaldehyde-containing solutions, must have a conveniently located quick-drench shower, and ensure that exposed employees can immediately use the shower at all times.

**Study Questions**

1. Small amounts of formaldehyde can be found in many common consumer products. What are five such products?

2. People who are exposed to small quantities of formaldehyde over long periods of time could potentially develop any of what four conditions?

3. What is sensitization?

4. Exposure to high levels of formaldehyde can cause what seven reactions?

5. For containers without a manufacturer's label, a substitute label must state what information?
6. The employer will provide a copy of the physician’s written opinion to an affected employee within how many days of its receipt?
Module 24:  

Process Safety Management of Highly Hazardous Materials

The primary concern of process safety management (PSM) of highly hazardous chemicals is to protect exposed employees from unwanted releases of hazardous chemicals.

Process safety management is basically the proactive identification, evaluation, and mitigation or prevention of chemical releases that could occur as a result of failures in process, procedures, or equipment. This part gives you a basic understanding of OSHA standards regarding process safety management (PSM) of highly hazardous chemicals.

Key Terms

**Atmospheric tank:** A storage tank which has been designed to operate at pressures from atmospheric through 0.5 p.s.i.g. (pounds per square inch gauge).

**Catastrophic release:** A major uncontrolled emission, fire, or explosion, involving one or more highly hazardous chemicals that presents serious danger to employees in the workplace.

**Facility:** The buildings, containers, or equipment that contain a process.

**Highly hazardous chemical:** A substance possessing toxic, reactive, flammable, or explosive materials/chemicals.

**Hot work:** Work involving electric or gas welding, cutting, brazing, or similar flame or spark-producing operations.

**Normally unoccupied remote facility:** A facility which is operated, maintained, or serviced by employees who visit the facility only periodically to check its operation and to perform necessary operating or maintenance tasks.
Lesson 1:

Introduction to Process Safety Management

Key Points

- Many incidents resulting from the unexpected release of toxic, reactive, or flammable liquids and gases in processes involving the use of highly hazardous chemicals occur in various industries each year. To eliminate or minimize these incidents, OSHA sets standards that are called Process Safety Management (PSM) standards.

- The employer shall document that equipment complies with recognized and generally accepted good engineering practices.

- Employers also have to determine and document that any existing equipment that may have been designed and constructed in accordance with codes or practices that are no longer in standard use are designed and used, maintained, inspected, tested, and operated in a safe manner.

- Process hazard analysis is a systematic approach for identifying and evaluating the hazards of processes involving hazardous chemicals. The employer is required to perform an initial process analysis on all processes covered by this standard.

- The process hazard analysis must be appropriate to the complexity of the process and should identify, evaluate, and control the hazards involved in the process.

- The analysis must be updated and revalidated regularly, at least every five years.

- A team with expertise in engineering and process operations will perform the best process hazard analysis. An inspection team must include at least one
employee with experience and knowledge about the process being evaluated and another having knowledge about the specific process hazard analysis methodology used.

- The analysis must be updated and revalidated at least every five years by a team meeting the standard’s requirements to assure that the hazard analysis is consistent with the current process.

- Furthermore, employers must keep a copy of the analysis and make it available to OSHA on request.

- Employers must develop and implement written operating procedures that take the process safety information into consideration and clearly communicate this information to employees, so that workers are as safe as possible when engaged in processes covered by the procedures.

- Any type of change that could affect the process must be reported and updated in the written operating procedures.

- Safe work practices apply to both employees and contract employees.

- Process safety management requires that each employee who is engaged in operating a process be trained to work safely and that, before being assigned to a new process, employees be trained in an overview and the operating procedures of that process.

- Those employees already trained and previously engaged in operating a process may not need to complete initial training before resuming work on that process. Instead of providing initial training for these experienced employees, the employer may certify in writing that these employees possess all the required knowledge, skills, and abilities to perform their assigned tasks safely during the operating process.

- To assure that employees understand and adhere to the current procedure of the process, refresher training is required at least once every three years, or more
frequently if necessary, for each employee engaged in operating a process.

- Employees engaged in operating the process and the employer must mutually decide the appropriate frequency of refresher training.

- Documenting all training is also an important task. It is the responsibility of the employer to assure each employee involved in the operation of a process has received and understands their training, and to prepare and maintain records to that effect.

**Study Questions**

1. The priority order for conducting a process hazard analysis must be based on considerations such as what four?

2. The employer must use one or more of what seven methods, as appropriate, to determine and evaluate the hazards of the process being analyzed?

3. Because there must be a system in place that addresses the team's findings and recommendations, it is important the employer assure that what five actions take place?

4. Operating procedures must address at least what three major areas?
5. Training documentation records must contain what information?

Lesson 2:

Contractors, Mechanical Integrity, Management of Chain, and Emergency Planning

Key Points

- PSM provides special provisions for contractors and all of their employees, emphasizing the importance of protecting those employees who may work for another employer. However, PSM standards need not specifically apply to contractors providing incidental services whose work does not influence process safety.

- PSM applies to contractors performing maintenance or repair, turnaround, major renovation, or specialty work on or adjacent to a covered process.

- It is the operating employer’s responsibility to:
  - Inform the contract employers about potential fire, explosion, or toxic release hazards related to the contractor’s work or process.
  - Explain the provisions of the emergency action plan to the contract employer.
  - Develop and implement safe work practices to control the presence, entrance, and exit of contract employers and contract employees in covered process areas.
  - Periodically evaluate the performance of contract employers in fulfilling their obligations.
o Maintain a contract employee injury and illness log related to the contractor’s work in the process areas.

The contract employer must:

o Assure that contract employees are trained in the work practices necessary to perform their job safely.

o Assure that contract employees are instructed in the known potential fire, explosion, or toxic release hazards related to their job and the process, and in the applicable provisions of the emergency action plan.

o Document that each contract employee has individually received and understood the training required under the standard by preparing a record that contains the identity of the contract employee, the date of training, and the means used to verify that the employee understood the training.

o Assure that each contract employee follows the safety rules of the facility, including the safe work practices required in the operating procedures section of the standard.

o Advise the operating employer of any unique hazards presented by or found during the contract employer’s work.

The PSM requires the employer to perform a safety review for new facilities and for modified facilities.

Before the introduction of a highly hazardous chemical to a process, the pre-startup safety review must confirm the following:

o Construction and equipment are in accordance with design specifications.

o Safety, operating, maintenance, and emergency procedures are in place and are adequate.

o A process hazard analysis has been performed for new facilities and recommendations have been resolved or implemented before startup, and modified facilities meet the management of change requirements delineated.
• Training of each employee involved in operating a process has been completed.

• Employees must be well aware of the hazards involved.

• Inspections and tests must be scheduled in accordance with the manufacturer’s recommendations, good engineering practices, and prior operating experience.

• Equipment deficiencies outside the acceptable limits defined by the process safety information must be corrected before further use.

• Checks and inspections must be performed to assure proper installation and consistency with both design specifications and manufacturer’s instructions.

• Hot work permits are essential for hot work operations conducted on or near a covered process.

• The date(s) authorized for hot work and the object on which the hot work is to be performed must also be included on the permit and the permit must be kept on file until hot work is completed.

• An emergency action plan must be developed and implemented in accordance with the OSHA standards for the entire plant. Furthermore, the emergency action plan must include the procedure for handling small releases of hazardous chemicals.

• Incident investigation standards require the employer to investigate as soon as possible (but no later than 48 hours after) incidents that did result or could have resulted in catastrophic releases of covered chemicals.

• Employers must address and document their responses to report findings and recommendations and review findings with affected employees and contractor employees.
Study Questions

1. PSM mechanical integrity requirements apply to what equipment?

2. Each test and inspection must be documented, and documentation should include what five items?

3. It is important that employers provide all information necessary for compliance to the persons responsible for audits and what five other procedures or processes?
Supplements
Weekly Fatality/Catastrophe Report

This table contains the weekly summaries of fatalities and catastrophes resulting in the hospitalization of three or more workers. Employers must report these incidents to OSHA within eight hours. The summaries below include only preliminary information, as reported to OSHA Area Offices or to States which operate OSHA-approved State Plans. The fatalities listed here include only those that initially appear to be work-related, but excludes fatalities that do not appear to be work-related, such as an apparent heart attack of a sedentary worker. OSHA investigates all work-related fatalities and catastrophes. After OSHA’s investigation is complete, these reports will be updated with inspection results and citation information.

<table>
<thead>
<tr>
<th>Date of Incident</th>
<th>Company and Location</th>
<th>Preliminary Description of Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/17/2009</td>
<td>Manton &amp; Associates, Inc., Brandonburg, KY 40108</td>
<td>Two workers were doing road surveying each on either side of the road. A civilian driver came over the hill and suddenly applied his brakes, even though no person, equipment, or car was in the road. This caused his car to spin off the road, running over one of the workers.</td>
</tr>
<tr>
<td>12/17/2009</td>
<td>TBM, Inc., Visalia, CA 93277</td>
<td>Worker fell from a ladder while working inside an airplane.</td>
</tr>
<tr>
<td>12/18/2009</td>
<td>Pro-Tech Contracting of Georgia LLC, Lawrenceville, GA</td>
<td>Worker was securing tarp on a roof (not wearing fall protection, although it was available) and fell 35 feet to lower level.</td>
</tr>
<tr>
<td>12/18/2009</td>
<td>Sonome Compost Company, LLC, Petaluma, CA 94952</td>
<td>Worker was on ground when he was run over by a front loader.</td>
</tr>
<tr>
<td>12/19/2009</td>
<td>Auto Zone Store, Oakland, CA 94603</td>
<td>Security guard worker was shot three times during robbery. The assailant took his weapon.</td>
</tr>
<tr>
<td>12/20/2009</td>
<td>Gatesco, Newberry Park, CA 91360</td>
<td>Worker, who is the owner, was doing electrical work and fell through the skylight. (No inspection planned)</td>
</tr>
<tr>
<td>12/20/2009</td>
<td>Express Asphalt and Masonry, Inc., Coram, NY 11727</td>
<td>Worker was found inside vehicle with engine running, carbon monoxide exposure.</td>
</tr>
<tr>
<td>12/21/2009</td>
<td>County of Los Angeles: Office of Education, Downey, CA 90242</td>
<td>Worker was found unconscious in her cubicle by a janitor. (Inspection planned)</td>
</tr>
<tr>
<td>12/21/2009</td>
<td>Country Club Auto Repair, Inc., Lake Charles, LA 70605</td>
<td>Worker was repairing a roof insulation and fell 14 feet to the ground.</td>
</tr>
<tr>
<td>12/21/2009</td>
<td>Estes Express Lines, Groton, MA 06340</td>
<td>Worker was crushed between the forklift he was operating and a concrete knob next to the loading dock door after stepped off the forklift</td>
</tr>
<tr>
<td>12/21/2009</td>
<td>Kanvelm, Inc. d/b/a KE Beal Company, Cape Coral, FL 33919</td>
<td>Worker was part of a four man tree trimming crew and was in the process of cutting down a 25-foot palm tree. Worker walked into the path of the falling tree and was struck by the tree.</td>
</tr>
<tr>
<td>12/22/2009</td>
<td>3 ML Construction Company, Inc., Methuen, MA</td>
<td>Worker was installing shingles and moving planks on a roof and fell 20’ 6” from the roof to a driveway below.</td>
</tr>
</tbody>
</table>
## Weekly Fatality/Catastrophe Report

### Weekly Summary (Federal and State data tabulated week ending Dec 25, 2009)

<table>
<thead>
<tr>
<th>Date of Incident</th>
<th>Company and Location</th>
<th>Preliminary Description of Incident</th>
</tr>
</thead>
<tbody>
<tr>
<td>12/22/2009</td>
<td>ANF Engineering, Inc.</td>
<td>Worker was cleaning up on side of the road and was run over by a dump truck backing up.</td>
</tr>
<tr>
<td>12/22/2009</td>
<td>South Dakota Wheat Growers Association, McLaughlin, SD 57642</td>
<td>Worker entered a storage bin through a track side access hole that was 15 feet above ground and was engulfed by sunflower seeds.</td>
</tr>
<tr>
<td>12/23/2009</td>
<td>Golden Empire Concrete Products, Inc., Bakersfield, CA 93311</td>
<td>Worker, a Quality Control Manager, was found lying face down. (Inspector planned)</td>
</tr>
<tr>
<td>12/23/2009</td>
<td>I.C. Express Electric, New Braunfels, TX 78130</td>
<td>Worker was being elevated from a track box on a forklift to reach a light pole. The track box and worker fell to the parking lot.</td>
</tr>
<tr>
<td>12/23/2009</td>
<td>Storage Battery Systems, Inc., Altop, IL 60903</td>
<td>Worker was working beneath an elevated hydraulic platform and the platform failed, crushing the worker.</td>
</tr>
<tr>
<td>12/23/2009</td>
<td>Walls Contractors, Inc., Newport, AR 72112</td>
<td>Worker was preparing drywall to be painted and found a coil of wire hanging from the ceiling. He attempted to throw the coil over a beam in the ceiling. The coil of wires struck the beam and fell back down. The wires contacted the worker and he was electrocuted.</td>
</tr>
<tr>
<td>12/25/2009</td>
<td>Stark Excavation, Inc., Normal, IL 61760</td>
<td>Worker was operating a track hoe to remove columns lodged against a building. The columns were rigged with a nylon strap and were attached to the track hoe. While hoisting the façade from the building, the strap broke and the concrete façade fell on the cab of the track hoe, fatally injuring the worker.</td>
</tr>
<tr>
<td>12/26/2009</td>
<td>Tomcat Drilling, LLC, Ames, OK 73718</td>
<td>Worker on a derrick board fell with the collapsing mast. The derrick board broke loose from the mast and the worker was thrown against a metal structure on the ground.</td>
</tr>
</tbody>
</table>

### CATASTROPHES - MULTIPLE WORKERS HOSPITALIZED (None Reported)

**NOTES:**

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### OSHA Form 300 Log of Work-Related Injuries and Illnesses

<table>
<thead>
<tr>
<th>Employee Name</th>
<th>Date of Injury</th>
<th>Description</th>
<th>Category</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Tammy Newcomer</td>
<td>1/5</td>
<td>Blinding injury, cut</td>
<td>Chemical</td>
<td>X</td>
</tr>
<tr>
<td>2 Pat James</td>
<td>4/4</td>
<td>Minimizing Dept.</td>
<td>Electrical</td>
<td>X</td>
</tr>
<tr>
<td>3 Joe Ortega</td>
<td>5/5</td>
<td>3rd Fl. South wing</td>
<td>CAV</td>
<td>X</td>
</tr>
<tr>
<td>4 Georgia Gonzalez</td>
<td>5/6</td>
<td>Welding Area</td>
<td>Welder</td>
<td>X</td>
</tr>
<tr>
<td>5 Mark Hernandez</td>
<td>5/7</td>
<td>Triang. Dept.</td>
<td>Triang. Area</td>
<td>X</td>
</tr>
<tr>
<td>6 Priya Casey</td>
<td>5/4</td>
<td>3rd Fl. North wing</td>
<td>Welder</td>
<td>X</td>
</tr>
<tr>
<td>7 Ellen Davis</td>
<td>5/6</td>
<td>Heating. Dept.</td>
<td>Heating. Dept.</td>
<td>X</td>
</tr>
</tbody>
</table>
Job Safety and Health
It's the law!

EMPLOYEES:

• You have the right to notify your employer or OSHA about workplace hazards. You may ask OSHA to keep your name confidential.

• You have the right to request an OSHA inspection if you believe that there are unsafe and unhealthful conditions in your workplace. You or your representative may participate in that inspection.

• You can file a complaint with OSHA within 30 days of retaliation or discrimination by your employer for making safety and health complaints or for exercising your rights under the OSH Act.

• You have the right to see OSHA citations issued to your employer. Your employer must post the citations at or near the place of the alleged violations.

• Your employer must correct workplace hazards by the date indicated on the citation and must certify that these hazards have been reduced or eliminated.

• You have the right to copies of your medical records and records of your exposures to toxic and harmful substances or conditions.

• Your employer must post this notice in your workplace.

• You must comply with all occupational safety and health standards issued under the OSH Act that apply to your own actions and conduct on the job.

EMPLOYERS:

• You must furnish your employees a place of employment free from recognized hazards.

• You must comply with the occupational safety and health standards issued under the OSH Act.

This free poster available from OSHA – The Best Resource for Safety and Health

Free assistance in identifying and correcting hazards or complying with standards is available to employers, without citation or penalty, through OSHA-supported consultation programs in each state.

1-800-321-OSHA
www.osha.gov

OSHA 30-Hr General Industry Study Guide
Navigating the OSHA Website

http://www.osha.gov

The elements of this valuable source of occupational safety and health information are featured:
Refusing to Work because Conditions are Dangerous

Workers have the right to refuse to do a job if they believe in good faith that they are exposed to an imminent danger. "Good faith" means that even if an imminent danger is not found to exist, the worker had reasonable grounds to believe that it did exist.

The United States Supreme Court, in the Whirlpool case, issued the landmark ruling which more clearly defined a worker’s right to refuse work where an employee has reasonable apprehension that death or serious injury or illness might occur as a result of performing the work. However, as a general rule, you do not have the right to walk off the job because of unsafe conditions.

**Refusing Work is Protected IF:**
Your right to refuse to do a task is protected if **ALL** of the following conditions are met:

- Where possible, you have asked the employer to eliminate the danger, and the employer failed to do so; and
- You refused to work in "good faith." This means that you must genuinely believe that an imminent danger exists. Your refusal cannot be a disguised attempt to harass your employer or disrupt business; and
- A reasonable person would agree that there is a real danger of death or serious injury; and
- There isn’t enough time, due to the urgency of the hazard, to get it corrected through regular enforcement channels, such as requesting an OSHA inspection.

**Conditions Are Met, Next Steps:**
When all of these conditions are met, you take the following steps:

- Ask your employer to correct the hazard;
- Ask your employer for other work;
- Tell your employer that you won’t perform the work unless and until the hazard is corrected; and
- Remain at the worksite until ordered to leave by your employer.

The table below offers a few “IF/THEN” scenarios to follow.

<table>
<thead>
<tr>
<th>IF</th>
<th>THEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>You believe working conditions are unsafe or unhealthful.</td>
<td>Call your employer’s attention to the problem.</td>
</tr>
<tr>
<td>Your employer does not correct the hazard or disagrees with you about the extent of the hazard.</td>
<td>You may file a complaint with OSHA.</td>
</tr>
<tr>
<td>Your employer discriminates against you for refusing to perform the dangerous work.</td>
<td>Contact OSHA immediately.</td>
</tr>
</tbody>
</table>

Filing an OSHA Complaint – Tips for Completing the OSHA-7 Form

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

Here are tips for completing the form:
1. Be specific and include appropriate details: The information on the complaint form may be the only description of the hazard that the inspector will see before the inspection. The inspector will base his or her research and planning on this information.
2. Establishment Name, Address, & Type of Business. Be thorough and specific. The inspector’s research on the company and the industry’s hazards will be based on this information.
3. Hazard Description/Location: The hazard description is the most important part of the form. Your answer should explain the hazards clearly. If your complaint is about chemicals, identify them whenever possible and attach copies of labels or MSDSes if you can. Identify the location so the inspector will know where to look.
4. Has this condition been brought to the attention of the employer or another government agency? You should indicate on the form if you have tried to get the employer to fix the hazard before filing the complaint. Also, if another agency, such as a local fire or building department, has been notified of these hazards, OSHA may want to consult with them.
5. Do NOT reveal my name: OSHA will keep your name off the complaint, if you wish. Remember that discrimination for health and safety activity is illegal. If you are a union representative, you may wish to have your name on the complaint.
6. Signature and address: It is important to sign the complaint if you want OSHA to conduct an onsite inspection. Also, your address will allow OSHA to send copies of inspection related materials to you.
General Industry Complaint Scenario

Use the following scenario to determine what information should be put on an OSHA complaint form. Is any additional information needed?

You have worked at Ben Brothers Woodworking for 8 years as a janitor. Ben Brothers is located at 88 Wren Street, Anytown, USA, 40001. The company makes and refinishes office furniture. You usually work the second shift, but come in early sometimes. You and at least 3 of your co-workers have been getting headaches when you are working in the warehouse and the propane-operated forklift is running. You have had headaches over the past two months, at least twice a week.

The forklift operator told you that there are a lot of problems with the forklift and it needs to be replaced. You reported your headaches to your supervisor. She told you to go outside until you felt better and that there was nothing more she could do. You did some research and found out that exposure to propane in a confined, unventilated area can cause headaches, dizziness, difficulty breathing and unconsciousness. There is no monitoring of the air in the warehouse. There is no union at the facility. You decide to file a complaint with OSHA.

NOTES:

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

Notice of Alleged Safety or Health Hazards

For the General Public:

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

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

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

For Federal Employees:

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

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

INSTRUCTIONS:

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

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

NOTE: It is unlawful to make any false statement, representation or certification in any document filed pursuant to the Occupational Safety and Health Act of 1970. Violations can be punished by a fine of not more than $10,000, or by imprisonment of not more than six months, or by both. (Section 11(g))

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

OSHA Approval # 2215-0054; Expires: 03-31-2011
Do not send the completed form to this Office.
## Notice of Alleged Safety or Health Hazards

- **Establishment Name**
- **Site Address**
  - Site Phone
  - Site FAX
- **Mailing Address**
  - Mail Phone
  - Mail FAX
- **Management Official**
  - Telephone
- **Type of Business**

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

---

**Has this condition been brought to the attention of:**
- ☐ Employer
- ☐ Other Government Agency (specify)

**Please indicate Your Desire:**
- ☐ Do NOT reveal my name to my Employer
- ☐ My name may be revealed to the Employer

**The Undersigned believes that a violation of an Occupational Safety or Health standard exists which is a job safety or health hazard at the establishment named on this form:**
- ☐ Employee
- ☐ Federal Safety and Health Committee
- ☐ Representative of Employees
- ☐ Other (specify)

**Complainant Name**
- **Address (Street, City, State, Zip)**
- **Telephone**

**Signature**
- **Date**

**If you are an authorized representative of employees affected by this complaint, please state the name of the organization that you represent and your title:**
- **Organization Name:**
- **Your Title:**
Filing an OSHA Complaint – Tips for Completing the OSHA-7 Form

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

Here are tips for completing the form:

1. Be specific and include appropriate details: The information on the complaint form may be the only description of the hazard that the inspector will see before the inspection. The inspector will base his or her research and planning on this information.

2. Establishment Name, Address, & Type of Business: Be thorough and specific. The inspector’s research on the company and the industry’s hazards will be based on this information.

3. Hazard Description/Location: The hazard description is the most important part of the form. Your answer should explain the hazards clearly. If your complaint is about chemicals, identify them whenever possible and attach copies of labels or MSDSs if you can. Identify the location so the inspector will know where to look.

4. Has this condition been brought to the attention of the employer or another government agency? You should indicate on the form if you have tried to get the employer to fix the hazard before filing the complaint. Also, if another agency, such as a local fire or building department, has been notified of these hazards, OSHA may want to consult with them.

5. Do NOT reveal my name: OSHA will keep your name off the complaint, if you wish. Remember that discrimination for health and safety activity is illegal. If you are a union representative, you may wish to have your name on the complaint.

6. Signature and address: It is important to sign the complaint if you want OSHA to conduct an onsite inspection. Also, your address will allow OSHA to send copies of inspection related materials to you.
Construction Complaint Scenario

Use the following scenario to determine what information should be put on an OSHA complaint form. Is any additional information needed?

You are a construction worker for ABC, Inc, 1000 Sweet Road, Anytown, USA, 40001. ABC does non-residential plumbing, heating and air-conditioning work. You have worked for ABC for 3 years. You, along with 7 co-workers, have been installing sheetmetal ductwork in the lower level of the Anytown Shopping Mall, which is undergoing renovation, for the past few weeks. The site is located in the Northwest quadrant, in the basement of the anchor store, located at 555 Times Drive, in Anytown. One of your co-workers has been operating a 65-horsepower concrete cutting saw in the same area. The saw is being run in the propane mode. You and several co-workers get headaches from the fumes whenever the saw is used and have told your supervisor about the problem. The supervisor said that nothing could be done, because the General Contractor, CAB Management, has control over the site and this job will be complete in another month. You did some research and found out that exposure to propane in a confined, unventilated area can cause headaches, dizziness, difficulty breathing and unconsciousness. There is no ventilation or monitoring of the air in the area.

After talking to your union representative, you decide to file a complaint with OSHA.

NOTES:

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Notice of Alleged Safety or Health Hazards

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

For Federal Employees:

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INSTRUCTIONS:

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

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Notice of Alleged Safety or Health Hazards

<table>
<thead>
<tr>
<th>Establishment Name</th>
<th>Complaint Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Address</td>
<td>Site Phone</td>
</tr>
<tr>
<td>Mailing Address</td>
<td>Mail Phone</td>
</tr>
<tr>
<td>Management Official</td>
<td>Telephone</td>
</tr>
<tr>
<td>Type of Business</td>
<td></td>
</tr>
</tbody>
</table>

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

Has this condition been brought to the attention of:  
- Employer  
- Other Government Agency (specify)

Please Indicate Your Desire:  
- Do NOT reveal my name to any Employer  
- My name may be revealed to the Employer

The undersigned believes that a violation of an Occupational Safety or Health standard exists which is a job safety or health hazard at the establishment named on this form. (Mark “X” in ONE box)  
- Employee  
- Federal Safety and Health Committee  
- Representative of Employees  
- Other (specify)

Complainant Name:  
Address (Street, City, State, Zip)

Signature:  
Date:  

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

Organization Name:  Your Title
Filing an OSHA Complaint — Tips for Completing the OSHA-7 Form

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

Here are tips for completing the form:

1. Be specific and include appropriate details: The information on the complaint form may be the only description of the hazard that the inspector will see before the inspection. The inspector will base his or her research and planning on this information.

2. Establishment Name, Address, & Type of Business: Be thorough and specific. The inspector’s research on the company and the industry’s hazards will be based on this information.

3. Hazard Description/Location: The hazard description is the most important part of the form. Your answer should explain the hazards clearly. If your complaint is about chemicals, identify them whenever possible and attach copies of labels or MSDSs if you can. Identify the location so the inspector will know where to look.

4. Has this condition been brought to the attention of the employer or another government agency? You should indicate on the form if you have tried to get the employer to fix the hazard before filing the complaint. Also, if another agency, such as a local fire or building department, has been notified of these hazards, OSHA may want to consult with them.

5. Do NOT reveal my name: OSHA will keep your name off the complaint, if you wish. Remember that discrimination for health and safety activity is illegal. If you are a union representative, you may wish to have your name on the complaint.

6. Signature and address: It is important to sign the complaint if you want OSHA to conduct an onsite inspection. Also, your address will allow OSHA to send copies of inspection related materials to you.
Maritime Industry Complaint Scenario

Use the following scenario to determine what information should be put on an OSHA complaint form. Is any additional information needed?

You are a longshoreman who operates a propane-operated forklift truck for ABC, Inc, 1000 Pier Street, Anytown, USA, 40001. ABC is involved in terminal operations and warehousing. You have worked for ABC for 3 years. For the past week, you have been transporting rolls of coiled steel from a storage area to a different section of the longshoring terminal, due to hurricane damage to another part of the terminal. As a result, you have been working inside the terminal more than you usually do. The area you are working in is somewhat confined and crowded due to extra storage. You have noticed that you are getting headaches and feeling dizzy. Two other co-workers working with you are also having the same symptoms. You are concerned that the forklift needs maintenance, and have asked your supervisor to have it checked out, but he looked it over and said it didn’t need service. You and your union representative requested air monitoring of the area, but your supervisor did not agree. There is limited ventilation in the area. You did some research and found out that exposure to propane in a confined, unventilated area can cause headaches, dizziness, difficulty breathing and unconsciousness.

After talking to your union representative, you decide to file a complaint with OSHA.

NOTES:
____________________________________________________________________________________
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____________________________________________________________________________________
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____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________
____________________________________________________________________________________

OSHA 30-Hr General Industry Study Guide
Notice of Alleged Safety or Health Hazards

For the General Public:

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

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

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

For Federal Employees:

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

The Secretary of Labor may conduct unannounced inspection of agency workplaces when deemed necessary if an agency does not have occupational safety and health committees established in accordance with Subpart F, 29 CFR 1960, or in response to the reports of unsafe or unhealthful working conditions upon request of such agency committees under Sec. 1-3, Executive Order 12186; or in the case of a report of imminent danger when such a committee has not responded to the report as required in Sec. 1-201(b).

INSTRUCTIONS:

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

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

NOTE: It is unlawful to make any false statement, representation or certification in any document filed pursuant to the Occupational Safety and Health Act of 1970. Violations can be punished by a fine of not more than $10,000, or by imprisonment of not more than six months, or by both. (Section 11(g))
Notice of Alleged Safety or Health Hazards

<table>
<thead>
<tr>
<th>Establishment Name</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Address</td>
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<td>Management Official</td>
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</tr>
<tr>
<td>Type of Business</td>
<td></td>
</tr>
</tbody>
</table>

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

---

Has this condition been brought to the attention of:  
☐ Employer  ☐ Other Government Agency (specify)

Please Indicate Your Desire:  
☐ Do NOT reveal my name to my Employer  
☐ My name may be revealed to the Employer

The Undersigned believes that a violation of an Occupational Safety or Health standard exists which is a job safety or health hazard at the establishment named on this form:  
☐ Employee  ☐ Federal Safety and Health Committee  
☐ Representative of Employees  ☐ Other (specify)

<table>
<thead>
<tr>
<th>Complainant Name</th>
<th>Telephone</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address (Street, City, State, Zip)</td>
<td></td>
</tr>
<tr>
<td>Signature</td>
<td>Date</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Organization Name</th>
<th>Your Title</th>
</tr>
</thead>
</table>

OSHA 30-Hr General Industry Study Guide
Your Rights as a Whistleblower

You may file a complaint with OSHA if your employer retaliates against you by taking unfavorable personnel action because you engaged in protected activity relating to workplace safety and health, commercial motor carrier safety, pipeline safety, air carrier safety, nuclear safety, the environment, asbestos in schools, corporate fraud, SEC rules or regulations, railroad carrier safety or security, or public transportation agency safety or security.

Whistleblower Laws Enforced by OSHA

Each law requires that complaints be filed within a certain number of days after the alleged retaliation.

You may file complaints by telephone or in writing under the:
- Occupational Safety and Health Act (30 days)
- Surface Transportation Assistance Act (180 days)
- Asbestos Hazard Emergency Response Act (90 days)
- International Safe Container Act (60 days)
- Federal Rail Safety Act (180 days)
- National Transit Systems Security Act (180 days)

Under the following laws, complaints must be filed in writing:
- Clean Air Act (30 days)
- Comprehensive Environmental Response, Compensation and Liability Act (30 days)
- Energy Reorganization Act (180 days)
- Federal Water Pollution Control Act (30 days)
- Pipeline Safety Improvement Act (180 days)
- Safe Drinking Water Act (90 days)
- Sarbanes-Oxley Act (90 days)
- Solid Waste Disposal Act (30 days)
- Toxic Substances Control Act (30 days)
- Wendell H. Ford Aviation Investment and Reform Act for the 21st Century (90 days)

Filing a Complaint

If you believe that your employer retaliated against you because you exercised your legal rights as an employee, contact your local OSHA office as soon as possible, because you must file your complaint within the legal time limits. OSHA conducts an in-depth interview with each complainant to determine whether to conduct an investigation. For more information, call your closest OSHA Regional Office:

- Boston (617) 565-9600
- New York (212) 337-2370
- Philadelphia (215) 861-9900
- Atlanta (404) 562-2300
- Chicago (312) 335-2220
- Dallas (972) 650-4145
- Kansas City (816) 293-0745
- Denver (720) 381-8660
- San Francisco (415) 626-2647
- Seattle (206) 563-5530

Addresses, fax numbers and other contact information for these offices can be found on OSHA’s website, www.osha.gov, and in local directories. Some complaints must be filed in writing and some may be filed verbally (call your local OSHA office for assistance). Written complaints may be filed by mail (we recommend certified mail), fax, or hand-delivered during business hours. The date postmarked, faxed or hand-delivered is considered the date filed.

Unfavorable Personnel Actions

Your employer may be found to have retaliated against you if your protected activity was a contributing or motivating factor in its decision to take unfavorable personnel action against you. Such actions may include:
- Firing or laying off
- Blacklisting
- Demoting
- Denying overtime or promotion
- Disciplining
- Denying benefits
- Failing to hire or rehire
- Intimidation
- Reassignment affecting promotion prospects
- Reducing pay or hours

OSHA 30-Hr General Industry Study Guide
Health Act covers only private sector employees, state plans also cover state and local government employees. For details, see http://www.osha.gov/iso/sp/index.html.

How OSHA Determines Whether Retaliation Took Place
The investigation must reveal that:
• The employee engaged in protected activity;
• The employer knew about the protected activity;
• The employer took an adverse action; and
• The protected activity was the motivating factor (or under some laws, a contributing factor) in the decision to take the adverse action against the employee.

If the evidence supports the employee's allegation and a settlement cannot be reached, OSHA will issue an order requiring the employer to reinstate the employee, pay back wages, restore benefits, and other possible remedies to make the employee whole.

Limited Protections for Employees Who Refuse to Work
You have a limited right under the OSHA Act to refuse to do a job because conditions are hazardous. You may do so under the OSHA Act only when (1) you believe that you face death or serious injury and the situation is so clearly hazardous that any reasonable person would believe the same thing; (2) you have tried to get your employer to correct the condition, and there is no other way to do the job safely; and (3) the situation is so urgent that you do not have time to eliminate the hazard through regulatory channels such as calling OSHA.

Regardless of the unsafe condition, you are not protected if you simply walk off the job. For details, see http://www.osha.gov/as/opa/worker/refuse.html. OSHA cannot enforce union contracts or state laws that give employees the right to refuse to work.

Whistleblower Protections in the Transportation Industry
Employees whose jobs directly affect commercial motor vehicle safety are protected from retaliation by their employers for refusing to violate or for reporting violations of Department of Transportation (DOT) motor carrier safety standards or regulations, or refusing to operate a vehicle because of such violations or because they have a reasonable apprehension of death or serious injury.

Similarly, employees of air carriers, their contractors or subcontractors who raise safety concerns or report violations of FAA rules and regulations are protected from retaliation, as are employees of owners and operators of pipelines, their contractors and subcontractors who report violations of pipeline safety rules and regulations. Employees involved in international shipping who report unsafe shipping containers are also protected. In addition, employees of railroad carriers or public transportation agencies, their contractors or subcontractors who report safety or security conditions or violations of federal rules and regulations relating to railroad or public transportation safety or security are protected from retaliation.

Whistleblower Protections for Voicing Environmental Concerns
A number of laws protect employees who report violations of environmental laws related to drinking water and water pollution, toxic substances, solid waste disposal, air quality and air pollution, asbestos in schools, and hazardous waste disposal sites. The Energy Reorganization Act protects employees who raise safety concerns in the nuclear power industry and in nuclear medicine.

Whistleblower Protections When Reporting Corporate Fraud
Employees who work for publicly traded companies or companies required to file certain reports with the Securities and Exchange Commission are protected from retaliation for reporting alleged mail, wire, or bank fraud; violations of rules or regulations of the SEC, or federal laws relating to fraud against shareholders.

More Information
To obtain more information on whistleblower laws, go to www.osha.gov, and click on the link for “Whistleblower Protection.”

This is one in a series of informational fact sheets highlighting OSHA programs, policies or standards. It does not impose any new compliance requirements. For a comprehensive list of compliance requirements of OSHA standards or regulations, refer to Title 29 of the Code of Federal Regulations. This information will be made available to sensory impaired individuals upon request. The voice phone is (202) 693-1999; TTY: (877) 889-5627.

For more complete information:

U.S. Department of Labor
www.osha.gov
(800) 321-OSHA
DEP 11/2007
Employers Must Provide and Pay for PPE

Personal Protective Equipment (PPE)

The Occupational Safety and Health Administration (OSHA) requires that employers protect you from workplace hazards that can cause injury or illness. Controlling a hazard at its source is the best way to protect workers. However, when engineering, work practice, and administrative controls are not feasible or do not provide sufficient protection, employers must provide personal protective equipment (PPE) to you and ensure its use.

PPE is equipment worn to minimize exposure to a variety of hazards. Examples include items such as gloves, foot and eye protection, protective hearing protection (earplugs, muffs), hard hats and respirators.

<table>
<thead>
<tr>
<th>Employer Obligations</th>
<th>Workers should:</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Performing a &quot;hazard assessment&quot; of the workplace to identify and control physical and health hazards.</td>
<td>✓ Properly wear PPE</td>
</tr>
<tr>
<td>✓ Identifying and providing appropriate PPE for employees.</td>
<td>✓ Attend training sessions on PPE</td>
</tr>
<tr>
<td>✓ Training employees in the use and care of the PPE.</td>
<td>✓ Care for, clean and maintain PPE, an</td>
</tr>
<tr>
<td>✓ Maintaining PPE, including replacing worn or damaged PPE.</td>
<td>✓ Inform a supervisor of the need to repair or replace PPE.</td>
</tr>
<tr>
<td>✓ Periodically reviewing, updating and evaluating the effectiveness of the PPE program.</td>
<td></td>
</tr>
</tbody>
</table>

Employers Must Pay for Personal Protective Equipment (PPE)

On May 15, 2008, a new OSHA rule about employer payment for PPE went into effect. With few exceptions, OSHA now requires employers to pay for personal protective equipment used to comply with OSHA standards. The final rule does not create new requirements regarding what PPE employers must provide.

The standard makes clear that employers cannot require workers to provide their own PPE and the worker's use of PPE they already own must be completely voluntary. Even when a worker provides his or her own PPE, the employer must ensure that the equipment is adequate to protect the worker from hazards at the workplace.

Examples of PPE that Employers Must Pay for Include:

- Metatarsal foot protection
- Rubber boots with steel toes
- Non-prescription eye protection
- Prescription eyewear inserts/lenses for full face respirators
- Goggles and face shields
- Fire fighting PPE (helmet, gloves, boots, proximity suits, full gear)
- Hard hats
- Hearing protection
- Welding PPE
Employers Must Provide and Pay for PPE

Payment Exceptions under the OSHA Rule

Employers are not required to pay for some PPE in certain circumstances:

- Non-specialty safety-toe protective footwear (including steel-toe shoes or boots) and non-specialty prescription safety eyewear provided that the employer permits such items to be worn off the job site. (OSHA based this decision on the fact that this type of equipment is very personal, is often used outside the workplace, and that it is taken by workers from jobsite to jobsite and employer to employer.)
- Everyday clothing, such as long-sleeve shirts, long pants, street shoes, and normal work boots.
- Ordinary clothing, skin creams, or other items, used solely for protection from weather, such as winter coats, jackets, gloves, parkas, rubber boots, hats, raincoats, ordinary sunglasses, and sunscreen
- Items such as hair nets and gloves worn by food workers for consumer safety.
- Lifting belts because their value in protecting the back is questionable.
- When the employee has lost or intentionally damaged the PPE and it must be replaced.

OSHA Standards that Apply

<table>
<thead>
<tr>
<th>OSHA General Industry PPE Standards</th>
<th>OSHA Construction PPE Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1910.132: General requirements and payment</td>
<td>1926.28: Personal protective equipment</td>
</tr>
<tr>
<td>1910.133: Eye and face protection</td>
<td>1926.95: Criteria for personal protective equipment</td>
</tr>
<tr>
<td>1910.134: Respiratory protection</td>
<td>1926.96: Occupational foot protection</td>
</tr>
<tr>
<td>1910.135: Head protection</td>
<td>1926.100: Head protection</td>
</tr>
<tr>
<td>1910.136: Foot protection</td>
<td>1926.101: Hearing protection</td>
</tr>
<tr>
<td>1910.137: Electrical protective devices</td>
<td>1926.102: Eye and face protection</td>
</tr>
<tr>
<td>1910.138: Hand protection</td>
<td>1926.103: Respiratory protection</td>
</tr>
</tbody>
</table>

There are also PPE requirements in shipyards and marine terminals and many standards on specific hazards, such as 1910.1030: Bloodborne pathogens and 1910.148: Permit-required confined spaces.

OSHA standards are online at www.osha.gov.

Sources:
- Employers Must Provide and Pay for PPE, New Jersey Work Environment Council (WEC) Fact Sheet
- OSHA Standards, 1910.132(h) and 1926.95(d)
- Employer Payment for Personal Protective Equipment Final Rule, Federal Register: November 15, 2007 (Volume 72, Number 220)
How to Read the OSHA Standards
29 CFR 1910 – General Industry

**Under Title 29, Chapter XVII, the OSHA regulations are broken down into parts.** Part 1910, for example, is commonly known as the OSHA General Industry standards. Part 1926 covers OSHA construction standards and Parts 1915, 1917 and 1918 include the OSHA standards for the maritime industry.

### Subparts
Under each part, such as Part 1910, major blocks of information are further broken into subparts. The major subparts in 1910 standards include:

<table>
<thead>
<tr>
<th>Subpart</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>Walking-Working Surfaces</td>
</tr>
<tr>
<td>E</td>
<td>Means of Egress</td>
</tr>
<tr>
<td>F</td>
<td>Powered Platforms, Manlifts, and Vehicle-Mounted Work Platforms</td>
</tr>
<tr>
<td>G</td>
<td>Occupational Health and Environmental Control</td>
</tr>
<tr>
<td>H</td>
<td>Hazardous Materials</td>
</tr>
<tr>
<td>I</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>J</td>
<td>General Environmental Controls</td>
</tr>
<tr>
<td>K</td>
<td>Medical and First Aid</td>
</tr>
<tr>
<td>L</td>
<td>Fire Protection</td>
</tr>
<tr>
<td>M</td>
<td>Compressed Gas and Compressed Air Equipment</td>
</tr>
<tr>
<td>N</td>
<td>Materials Handling and Storage</td>
</tr>
<tr>
<td>O</td>
<td>Machinery and Machine Guarding</td>
</tr>
<tr>
<td>P</td>
<td>Hand and Portable Powered Tools</td>
</tr>
<tr>
<td>Q</td>
<td>Welding, Cutting and Brazing</td>
</tr>
<tr>
<td>R</td>
<td>Special Industries</td>
</tr>
<tr>
<td>S</td>
<td>Electrical</td>
</tr>
<tr>
<td>Z</td>
<td>Toxic and Hazardous Substances</td>
</tr>
</tbody>
</table>

### Sections
Each Subpart is further broken down into sections. For example, Subpart D – Walking-Working Surfaces has sections 1910.21 through 1910.30.

- 1910.21 – Definitions.
- 1910.22 – General requirements.
- 1910.23 – Guarding floor and wall openings and holes.
- 1910.25 – Portable wood ladders.
- 1910.26 – Portable metal ladders.
- 1910.27 – Fixed ladders.
- 1910.28 – Safety requirements for scaffolding.
- 1910.29 – Manually propelled mobile ladder stands and scaffolds (towers).
- 1910.30 – Other working surfaces.

### Example: Reading OSHA Standards – Breaking Down the Numbers

**Standard:** 29 CFR 1910.110(b)(13)(ii)(b)(7)(iii)

Portable containers shall not be taken into buildings except as provided in paragraph (b)(6)(i) of this section.

**Numbers:**

<table>
<thead>
<tr>
<th>Code of Fed. Reg.</th>
<th>Part</th>
<th>Section</th>
<th>Lower Case Alpha</th>
<th>Arabic Number</th>
<th>Lower Case Roman</th>
<th>Italicizer*</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>1910</td>
<td>.110</td>
<td>(b)</td>
<td>(13)</td>
<td>(ii)</td>
<td>(b)(7)(iii)</td>
</tr>
</tbody>
</table>

*For Standards promulgated prior to 1979, italics are used to list the fourth set of parentheses. After 1979, a capital/upper case letter is used in this space.*
How to Read the OSHA Standards
29 CFR 1926 – Construction

Under Title 29, Chapter XVII, the OSHA regulations are broken down into Parts. Part 1926, for example, is commonly known as the OSHA Construction Standards. Part 1910 covers OSHA General Industry Standards and Parts 1915, 1917 and 1918 include the OSHA standards for the Maritime Industry.

Subparts

Under each part, such as Part 1926, major blocks of information are further broken into Subparts. The major Subparts in 1926 Standards include:

<table>
<thead>
<tr>
<th>Subpart</th>
<th>General Safety and Health Provisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subpart D</td>
<td>Occupational Health and Environmental Controls</td>
</tr>
<tr>
<td>Subpart E</td>
<td>Personal Protective and Life Saving Equipment</td>
</tr>
<tr>
<td>Subpart F</td>
<td>Fire Protection and Prevention</td>
</tr>
<tr>
<td>Subpart G</td>
<td>Signs, Signals and Barricades</td>
</tr>
<tr>
<td>Subpart H</td>
<td>Materials Handling, Storage, Use, and Disposal</td>
</tr>
<tr>
<td>Subpart I</td>
<td>Tools – Hand and Power</td>
</tr>
<tr>
<td>Subpart J</td>
<td>Welding and Cutting</td>
</tr>
<tr>
<td>Subpart K</td>
<td>Electrical</td>
</tr>
<tr>
<td>Subpart L</td>
<td>Scaffolds</td>
</tr>
<tr>
<td>Subpart M</td>
<td>Fall Protection</td>
</tr>
<tr>
<td>Subpart N</td>
<td>Cranes, Derricks, Hoists, Elevators, and Conveyors</td>
</tr>
<tr>
<td>Subpart O</td>
<td>Motor Vehicles, Mechanized Equipment, and Marine Operations</td>
</tr>
<tr>
<td>Subpart P</td>
<td>Excavations</td>
</tr>
<tr>
<td>Subpart Q</td>
<td>Concrete and Masonry Construction</td>
</tr>
<tr>
<td>Subpart R</td>
<td>Steel Erection</td>
</tr>
<tr>
<td>Subpart S</td>
<td>Underground Construction, Caissons, Cofferdams, and Compressed Air</td>
</tr>
<tr>
<td>Subpart T</td>
<td>Demolition</td>
</tr>
<tr>
<td>Subpart U</td>
<td>Blasting and the Use of Explosives</td>
</tr>
<tr>
<td>Subpart V</td>
<td>Power Transmission and Distribution</td>
</tr>
<tr>
<td>Subpart W</td>
<td>Roll-off Protective Structures; Overhead Protection</td>
</tr>
<tr>
<td>Subpart X</td>
<td>Ladders</td>
</tr>
<tr>
<td>Subpart Y</td>
<td>Commercial Diving</td>
</tr>
<tr>
<td>Subpart Z</td>
<td>Toxic and Hazardous Substances</td>
</tr>
</tbody>
</table>

Sections

Each Subpart is further broken down into Sections. For example, Subpart C – General Safety and Health Provisions, has sections 1926.20 through 1926.35.

- 1926.20 – General safety and health provisions.
- 1926.21 – Safety training and education.
- 1926.22 – Recording and reporting of injuries.
- 1926.23 – First aid and medical attention.
- 1926.24 – Fire protection and prevention.
- 1926.25 – Housekeeping.
- 1926.26 – Illumination.
- 1926.27 – Sanitation.
- 1926.28 – Personal protective equipment.
- 1926.29 – Acceptable certifications.
- 1926.30 – Shipbuilding and ship repairing.
- 1926.31 – Incorporation by reference.
- 1926.32 – Definitions.
- 1926.33 – Access to employee exposure and medical records.
- 1926.34 – Means of egress.
- 1926.35 – Employee emergency action plans.

Notes:

Example: Reading OSHA Standard Numbers

Standard: 29 CFR 1926.152(d)(l)(C)

Tanks built of materials other than steel shall be designed to specifications embodying principles recognized as good engineering design for the material used.

Breaking down the number:

<table>
<thead>
<tr>
<th>Title</th>
<th>Code of Reg.</th>
<th>Part</th>
<th>Section</th>
<th>Lower Case Alpha</th>
<th>Arabic Number</th>
<th>Lower Case Roman</th>
<th>Capital/Upper Case Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>29</td>
<td>CFR</td>
<td>1926</td>
<td>.152</td>
<td>(d)</td>
<td>(I)</td>
<td>(I)</td>
<td>(C)</td>
</tr>
</tbody>
</table>

*For Standards promulgated after 1979, a capital/upper case letter is used in the fourth set of parentheses. Prior to 1979, the fourth set of parentheses are italicized.
How to Read the OSHA Standards

Under Title 29, Chapter XVII, the OSHA regulations are broken down into Parts. Parts 1915, 1917, and 1918 include the OSHA standards for the maritime industry. Part 1910 covers OSHA General Industry standards and Part 1926 is commonly known as the OSHA Construction standards.

Subparts of 29 CFR 1915

Under each part, such as part 1915 Occupational Safety and Health Standards for Shipyard Employment, major blocks of information are further broken into subparts. The major subparts in 1915 standards include:

<table>
<thead>
<tr>
<th>Subpart</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>General Provisions</td>
</tr>
<tr>
<td>B</td>
<td>Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment</td>
</tr>
<tr>
<td>C</td>
<td>Surface Preparation and Preservation</td>
</tr>
<tr>
<td>D</td>
<td>Welding, Cutting and Heating</td>
</tr>
<tr>
<td>E</td>
<td>Scaffolds, Ladders and Other Working Surfaces</td>
</tr>
<tr>
<td>F</td>
<td>General Working Conditions</td>
</tr>
<tr>
<td>G</td>
<td>Gear and Equipment for Rigging and Materials Handling</td>
</tr>
<tr>
<td>H</td>
<td>Tools and Related Equipment</td>
</tr>
<tr>
<td>I</td>
<td>Personal Protective Equipment</td>
</tr>
<tr>
<td>J</td>
<td>Ship’s Machinery and Piping Systems</td>
</tr>
<tr>
<td>K</td>
<td>Portable, Unfired Pressure Vessels, Drums and Containers, Other Than Ship’s Equipment</td>
</tr>
<tr>
<td>L</td>
<td>Electrical Machinery</td>
</tr>
<tr>
<td>M, N, O</td>
<td>[Reserved]</td>
</tr>
<tr>
<td>P</td>
<td>Fire Protection in Shipyard Employment</td>
</tr>
<tr>
<td>Q, R, S, T, U, V, W, X, Y</td>
<td>[Reserved]</td>
</tr>
<tr>
<td>Z</td>
<td>Toxic and Hazardous Substances</td>
</tr>
</tbody>
</table>

Sections

Each subpart is further broken down into sections. For example, Subpart B – Confined and Enclosed Spaces and Other Dangerous Atmospheres in Shipyard Employment, has sections 1915.11 through 1915.16 with appendices.

- 1915.11 – Scope, application, and definitions applicable to this subpart.
- 1915.12 – Precautions and the order of testing before entering confined and enclosed spaces and other dangerous atmospheres.
- 1915.13 – Cleaning and other cold work.
- 1915.14 – Hot work.
- 1915.15 – Maintenance of safe conditions.
- 1915.16 – Warning signs and labels.
- 1915 Subpart B App A – Compliance Assistance Guidelines for Confined and Enclosed Spaces and Other Dangerous Atmospheres
- 1915 Subpart B App B – Reprint of U.S. Coast Guard Regulations Referenced in Subpart B, for Determination of Coast Guard Authorized Persons.

Example: Reading OSHA Standard Numbers

<table>
<thead>
<tr>
<th>STANDARD</th>
<th>BREAKING DOWN THE NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>1915.7(b)(2)(iii)(B)</td>
<td><strong>THE ROOSTER SHALL CONTAIN, AS A MINIMUM, THE DATE THE EMPLOYEE WAS TRAINED AS A COMPETENT PERSON.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Title</th>
<th>Code of Fed. Reg.</th>
<th>Part</th>
<th>Section</th>
<th>Lower Case Alpha</th>
<th>Arabic Number</th>
<th>Lower Case Roman</th>
<th>Capital/Upper Case Alpha*</th>
</tr>
</thead>
<tbody>
<tr>
<td>29 CFR</td>
<td>1915</td>
<td>.7</td>
<td>(b)</td>
<td>(2)</td>
<td>(iii)</td>
<td>(D)</td>
<td></td>
</tr>
</tbody>
</table>

*For standards promulgated after 1979, a capital/upper case letter is used in the fourth set of parentheses. Prior to 1979, the fourth set of parentheses are italicized.
How to Read the OSHA Standards

SUBPARTS OF 29 CFR 1917

Under each part, such as Part 1917 Marine Terminals, major blocks of information are further broken into subparts. The major subparts in 1917 standards include:

- Subpart A: Scope and Definitions
- Subpart B: Marine Terminal Operations
- Subpart C: Cargo Handling Gear and Equipment
- Subpart D: Specialized Terminals
- Subpart E: Personal Protection
- Subpart F: Terminal Facilities
- Subpart G: Related Terminal Operations and Equipment

SUBPARTS OF 29 CFR 1918

Under each part, such as Part 1918 Safety and Health Regulations for Longshoring, major blocks of information are further broken into subparts. The major subparts in 1918 standards include:

- Subpart A: Scope and Definitions
- Subpart B: Gear Certification
- Subpart C: Gangways and Other Means of Access
- Subpart D: Working Surfaces
- Subpart E: Opening and Closing Hatches
- Subpart F: Vessel’s Cargo Handling Gear
- Subpart G: Cargo Handling Gear and Equipment Other Than Ship’s Gear
- Subpart H: Handling Cargo
- Subpart I: General Working Conditions
- Subpart J: Personal Protective Equipment

SECTIONS

Each subpart is further broken down into sections. For example, Subpart G – Related Terminal Operations and Equipment, has sections 1917.151 through 1917.158.

- 1917.151 – Machine guarding.
- 1917.152 – Welding, cutting and heating (hot work)
- 1917.153 – Spray painting
- 1917.154 – Compressed air
- 1917.155 – Air receivers
- 1917.156 – Fuel handling and storage
- 1917.157 – Battery charging and changing
- 1917.158 – Prohibited operations

NOTES:

- 
- 
- 

EXAMPLE: READING OSHA STANDARD NUMBERS

<table>
<thead>
<tr>
<th>STANDARD: 29 CFR 1917.43(a)(2)(i)(C)</th>
<th>BREAKING DOWN THE NUMBER:</th>
</tr>
</thead>
<tbody>
<tr>
<td>THE DRIVE CHAIN SHALL BE ENCLOUSED TO A HEIGHT OF EIGHT FEET (2.44 M) EXCEPT FOR THAT POSITION AT THE LOWER HALF OF THE LOWER SKIDDOCK.</td>
<td>CODE OF FED. REG.</td>
</tr>
<tr>
<td>29 CFR 1917</td>
<td>.43</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>STANDARD: 1918.66(a)(14)(iii)(A)</th>
<th>BREAKING DOWN THE NUMBER:</th>
</tr>
</thead>
<tbody>
<tr>
<td>MOLDED BRAKES TO HAVE 72.5 PERCENT WHEN USED WITH AN OTHER THAN MECHANICALLY CONTROLLED BRAKING MEANS.</td>
<td>CODE OF FED. REG.</td>
</tr>
<tr>
<td>29 CFR 1918</td>
<td>.66</td>
</tr>
</tbody>
</table>

*For standards promulgated after 1979, a capital/upper case letter is used in the fourth set of parentheses. Prior to 1979, the fourth set of parentheses are italicized.
Safety & Health Resources

Government Resources

OSHA: http://www.osha.gov/
Contact the OSHA Office nearest you or contact the toll free number:
1-800-321-OSHA (6742)

NIOSH: http://www.cdc.gov/niosh/
Phone NIOSH at 1-800-CDC-INFO (1-800-232-4636)
or Email at: cdcinfo@cdc.gov

NIOSH is a part of the Centers for Disease Control and Prevention (http://www.cdc.gov/).
CDC has extensive information on health and safety topics.

COSH GROUPS

COSH groups are private, non-profit coalitions of labor unions, health and technical professionals, and others interested in promoting and advocating for worker health and safety. If you don’t see a COSH group in your area, check the NATIONAL COSH website for local COSH groups.

NATIONAL COUNCIL FOR OCCUPATIONAL SAFETY & HEALTH National COSH is a federation of local and statewide “COSH” groups:
http://www.coshnetwork.org/

CACOSH – Chicago Area Committee on Occupational Safety and Health:
http://www.cacosh.org/

MASSCOSH – Massachusetts Coalition on Occupational Safety and Health:
http://www.masscosh.org/

NYCOSH – New York Committee for Occupational Safety and Health:
http://www.nycosh.org/

PHILAPOS – Philadelphia Area Project for Occupational Safety and Health:
http://www.philapos.org/
Prevention (http://www.cdc.gov/).

Universities

CORNELL UNIVERSITY
School of Industrial and Labor Relations:
http://www.ilr.cornell.edu/healthSafety/

LABOR OCCUPATIONAL HEALTH PROGRAM, University of California at Berkeley:
http://www.lohp.org/

NATIONAL LABOR COLLEGE, George Meany Center:
http://www.nlc.edu/

UCLA, Labor Occupational Safety and Health (UCLA-LOSH):
http://www.losh.ucla.edu/

Unions

The following is a sample list of unions with links to useful health and safety information.

AF-L-CIO: http://www.aflcio.org/issues/safety/

AFSCME: http://www.afscme.org/issues/73.cfm

eLCOSH – The Electronic Library of Construction Safety and Health is a collection of information on construction safety and health developed by CPWR – Center for Construction Research and Training, with funding by NIOSH: http://www.elcosh.org/

SEIU (Service Employees International Union) Health and Safety Department:

UAW Health and Safety Department: http://www.uaw.org/hs/
Section 1 – PRODUCT AND COMPANY INFORMATION

Manufacturer
IMS Company
10373 Stafford Road
Chagrin Falls, OH 44023-5296
WEB  imscompany.com

Emergency Phone 600-624-5300
Prepared by Product Safety Advisor
Prepared/Revised April 19, 2006
E-mail sales@imscompany.com

Item Number
107320 2 ounce jar
107439 14 ounce cartridge
105998 16 ounce jar
107526 8 pounds, 1 gallon pail
107433 42 pounds, 5 gallon pail

Former Item Number
SAG1-OB500-2
SAG1-OB500-14C
SAG1-OB500-16
SAG1-OB500-1G
SAG1-OB500-5G

Hazardous Material Information System

Health 1 Flammability 1 Reactivity 1 Protection X
0 Normal use Material 0 Will Not Burn 0 Stable X = Consult the
1 Slight Hazard (temporary) 1 Possible to Burn 1 Unstable if Heated
2 Health Affected (lengthy) 2 Burns if Heated 2 Violent Chemical Change
3 Extreme Danger 3 Easily Burns 3 Shock and Heat Sensitive
4 Severe or Fatal 4 Very Easily Burns 4 May Explode
* Chronic (Accumulates)

NOTE: The HMIS may not be enough hazard information for this chemical in all workplaces. The HMIS system requires employee training about the system and about information in this MSDS.

Section 2 – INGREDIENTS INFORMATION

<table>
<thead>
<tr>
<th>#</th>
<th>Chemical/Common Name</th>
<th>CAS Number</th>
<th>%</th>
<th>PEL-OSHA</th>
<th>TLV-ACGIH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1-Decene homopolymer</td>
<td>68037-01-4</td>
<td>70 to 90</td>
<td>5mg/m²</td>
<td>5mg/m³</td>
</tr>
<tr>
<td>2</td>
<td>Organophlic clay</td>
<td>68953-58-2</td>
<td>5 to 25</td>
<td>10 mg/m³</td>
<td>0.1 mg/m³</td>
</tr>
<tr>
<td>3</td>
<td>Polytetrafluoroethylene</td>
<td>9002-84-0</td>
<td>0.1 to 10</td>
<td>(f)</td>
<td>(f)</td>
</tr>
<tr>
<td>4</td>
<td>Methylene bis dithiocarbonate</td>
<td>10254-57-6</td>
<td>0.1 to 10</td>
<td>(f)</td>
<td>5 mg/m³</td>
</tr>
<tr>
<td>5</td>
<td>Zinc oxide (d)</td>
<td>1314-13-2</td>
<td>0.1 to 10</td>
<td>5mg/m³</td>
<td>5mg/m³</td>
</tr>
</tbody>
</table>

(f) Not Established
(f) Subject to SARA Title III Section 313 reporting requirements.
(1) Manufacturer’s exposure level is 5mg/m² for respirable dust.
(2) As respirable quartz.

This product Does Not Contain carcinogens according to NTP, IARC, or OSHA.

Section 3 – HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW Small amount (very thick material) is not expected to cause any emergency condition.

HEALTH EFFECTS (Acute and Chronic)

Nose  No vapors expected. Vapors from elevated temperatures may cause respiratory irritation, harmful if aspirated into lungs. Vapors from over 400°F (204°C) may cause “Fume Fever.”

Mouth May be harmful if swallowed. Possible irritation, nausea, or diarrhea.

Eyes  Minimal irritation, tearing, reddening, or swelling. Avoid prolonged contact.

Skin  May irritate skin. Avoid long-term contact. Prolonged contact may result in defattting, drying which may lead to irritation, dermatitis, allergic reaction. If injected under skin (with a high pressure grease gun), necrosis could result.

Chronic  Not available

PRIMARY ROUTES OF ENTRY Skin, Eye

MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE Preexisting skin, and eye disorders could be aggravated by exposure to this type of product.
Section 4 – FIRST AID MEASURES

NOTE: If irritation persists after any kind of body exposure, get medical help.

Breathing: Vapors are not likely to injure, unless the product is heated. Get to fresh air if symptoms appear. If breathing has stopped, administer artificial respiration and get medical attention.

Eating: **Get Medical Help at once**. Do not induce vomiting.

Eye Contact: Immediately flush eyes thoroughly with plenty of water for at least 15 minutes. Remove contact lenses. Hold eyelids open to irrigate fully. Get medical attention if irritation persists.

Skin Contact: Remove contaminated clothing. Wash exposed area with soap and water. Wash contaminated clothing before re-use. If irritation persists, or if contact has been prolonged, get medical attention.

Medical: Notes: Treat symptomatically

Section 5 – FIRE FIGHTING MEASURES

Flash Point (estimated) ........420° F (215° C) Flammable Limits ..............LEL = NA ... UEL = NA
Autoignition temperature ........580° F (310° C)

Extinguishing Media: Water spray, alcohol-type foam, or all-purpose-type foam, for large fires. Carbon dioxide or dry chemical for small fires.

Special Fire Fighting Procedures: Material will not burn unless preheated. Cool exposed containers with water. Do not direct a solid stream of water or foam into hot, burning pools; this may cause frothing and increase fire intensity. Firefighters should wear full Turnout garb, self-contained, positive-pressure breathing apparatus, and protective clothing.

Unusual Fire and Explosion Hazards: Streams of water are likely to spread fire. Use water spray only to cool containers. Will not flash spontaneously. Stable at ambient temperatures and pressures. Toxic fumes may be evolved on burning or exposure to heat.


Section 6 – ACCIDENTAL RELEASE MEASURES

Steps to be Taken in Case Material is Released or Spilled: May burn, although not readily ignitable. Wear appropriate personal protective equipment according to the conditions, such as respirator and protective clothing. Small spills can be collected or absorbed with appropriate absorbing materials. Soak up residue with an absorbent such as clay, sand, or other suitable material. Dispose of properly. Flush area with water to remove trace residues, but do not let product or contaminated water get to drains, sewers, or rainfall. All spill response should be carried out in accordance with Federal, State, County/Provincial, and local requirements.

Section 7 – HANDLING AND STORAGE

Precautions to be Taken in Storage: Product will burn. Eliminate open flames, strong oxidizers, and other sources of ignition from the storage area. Keep containers closed to avoid contamination from airborne dust and moisture. Observe applicable fire codes. Store in accordance with good industrial practices. These include store in cool, dry area out of direct sunlight (below 120° F, 49° C). Do not puncture or burn containers.

Handling: Thoroughly wash after handling and before eating, drinking, or using tobacco products.

Maintenance Precautions: Do not remove or deface label. Keep container closed.

Other Precautions: As per any petroleum-based products, read and follow directions and cautions on the container label.

Section 8 – EXPOSURE CONTROLS – PERSONAL PROTECTION

Ventilation: Usually not specifically required. No local exhaust required. General (mechanical) room ventilation may be adequate to maintain product and its components below TLV/PEL, if handled at ambient temperatures or in covered equipment. Local exhaust ventilation or other engineering controls may be required, if ambient temperatures are exceeded or if used in operations that may produce mist, aerosol, or vapor.

Respiratory Protection: Usually none. If personnel exposure exceeds exposure limit at any time, select respiratory protection equipment in accordance with 29 CFR 1910.134. NIOSH approved atmosphere-supplying respirator or a NIOSH approved air-purifying respirator with organic vapor cartridge and dust/mist pre-filter is recommended.
Section 8 – EXPOSURE CONTROLS – PERSONAL PROTECTION (cont)

Protective Gloves If needed to avoid long-term or repeated contact, natural rubber, neoprene, nitrile (NBR), and butyl are recommended materials.

Other Protective Equipment Safety glasses or goggles, and face shield, as appropriate for exposure.

Other Engineering Controls To determine exposure levels, monitoring should be performed. Eye bath and safety shower station should be available.

Work Practices Avoid long-term or repeated contact. Stained clothing should be removed and laundered before reuse. Sudden release of hot vapor or mist from process equipment operating at elevated temperature and pressure, or sudden ingress of air into hot equipment under vacuum, may result in ignition without the presence of obvious ignition sources. Autoignition temperature values cannot be treated as safe operating temperatures in chemical processes without analysis of the actual process conditions. Any use of this product in elevated-temperature processes must be thoroughly evaluated to establish and maintain safe operating conditions.

Avoid contact with eyes. Wear chemical goggles if there is likelihood of contact. Avoid prolonged or repeated contact with skin. Wear chemical resistant gloves and other clothing as required to minimize contact.

Ventilation should maintain the concentration of the components below their TLV/PEL values.

Hygienic Practices Avoid contact with skin and avoid breathing vapors. Do not eat, drink, or smoke in work area. Wash hands before eating, drinking, or using restroom after using this or any chemical product. Launder contaminated clothing before reuse. Product can contaminate tobacco, causing flu-like sickness (in inhaling product’s polytetrafluoroethylene component heated in tobacco smoke or ingested from handling tobacco and/or food products). After using this, or any chemical product, wash thoroughly before eating or smoking.

Section 9 – PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boiling Point</td>
<td>NA</td>
</tr>
<tr>
<td>Vapor Pressure at 68°F (20°C)</td>
<td>NIL</td>
</tr>
<tr>
<td>Vapor Density (Air=1)</td>
<td>NIL</td>
</tr>
<tr>
<td>Vapor Density (Air=1)</td>
<td>NIL</td>
</tr>
<tr>
<td>VOC</td>
<td>NIL</td>
</tr>
<tr>
<td>Solubility in Water</td>
<td>NIL</td>
</tr>
<tr>
<td>Melting point</td>
<td>NA</td>
</tr>
</tbody>
</table>

Appearance and Odor Information Light tan to off-white paste, sticky, almost odorless.

Section 10 – STABILITY AND REACTIVITY

Incompatibility (Materials to Avoid) Strong oxidizers

Will Hazardous Polymerization Occur? No

Conditions to Avoid for Polymerization See Incompatibility

Is the Product Stable? Yes

Conditions to Avoid for Stability Temperatures above 352°F (200°C), See Incompatibility

Section 11 – TOXICOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Component #</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not listed in NTP, IARC, OSHA, Prop 65, and SARA 313. Is listed as a component of non-food article intended for use in contact with food or as a lubricant added to food directly as a result of incidental contact with container or equipment.</td>
</tr>
<tr>
<td>2</td>
<td>AKA Di (tallow alkyl) dimethyl ammonium benzilate, a quaternary compound</td>
</tr>
<tr>
<td>3, 4, 5</td>
<td>Not listed in NTP, IARC, OSHA, Prop 65, and SARA 313.</td>
</tr>
</tbody>
</table>

Section 12 – ECOLOGICAL INFORMATION

<table>
<thead>
<tr>
<th>Component #</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1, 2, 3, 5</td>
<td>No ecological or environmental effects known</td>
</tr>
<tr>
<td>4</td>
<td>Considered toxic to aquatic life</td>
</tr>
</tbody>
</table>
Section 13 – DISPOSAL CONSIDERATIONS

Waste Disposal Methods: Consult Federal, State, County/Provincial, and Local regulations. Product is readily reclaimed from many applications; reclamation from spent fluids is encouraged where possible. At low concentrations in water, this product is biodegradable in a biological wastewater treatment plant. Where reclamation is not practical, this product may be incinerated where permitted under Federal, State, County/Provincial, and Local regulations, but only if the facility is capable of scrubbing out HF and other acid products. Never dispose by means of public sewers or drainage. Empty containers should be recycled or disposed of through an approved waste management facility.

Section 14 – TRANSPORT INFORMATION

COMPONENT #  COMMENTS
1, 2, 3, 4, 5..........Not regulated

Section 15 – REGULATORY INFORMATION

<table>
<thead>
<tr>
<th>Component</th>
<th>Component 1</th>
<th>Component 2</th>
<th>Component 3</th>
<th>Component 4</th>
<th>Component 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>AIHA</td>
<td>N</td>
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</tr>
<tr>
<td>ANSI</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>Canada - DSL</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>CFC</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>DOT listed</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>EINECS listed</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>EPA - CAA, CAW</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>EU rating #s</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>HCFC</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>OSHA listed</td>
<td>Y</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>PROP 65 listed</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>RCRA listed</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
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<tr>
<td>SARA 313 list</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
<tr>
<td>TSCA listed</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>WHMIS-other</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Section 16 – OTHER INFORMATION

CAUTION: Intentional misuse of this chemical product, as with any industrial chemical in contact with the body, can be harmful or fatal. This includes such things as deliberately breathing, placing in mouth, swallowing, placing on skin, or any other body contact, or repeated, or continuous contact.

IMS provides this information in good faith, but makes no representation as to its comprehensiveness or its accuracy. This document is offered as a guide to a trained person, for appropriate precautionary handling. Persons using the product and receiving the information must exercise independent judgment in determining the appropriateness of the use and the safety information for their particular purpose. IMS MAKES NO REPRESENTATIONS OR WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE WITH RESPECT TO THIS INFORMATION OR TO THE PRODUCT. ACCORDINGLY, IMS WILL NOT BE RESPONSIBLE FOR DAMAGES RESULTING FROM USE OF OR RELIANCE ON THIS INFORMATION.

ACGIH: American Conference of Governmental Hygienists
AKA: Also Known As, Synonym
CAS: Chemical Abstract Service
IARC: International Agency for Research of Cancer
mg/m³: milligrams per Cubic Meter
N: Not None. Not listed
NA: Not Applicable, Not Available
ND: Not Determined
NIL: Not measurable, significant, noticeable, or an affect
NTP: National Toxicology Program
OSHA: Occupational Safety and Health Administration
ppm: parts per million
Y: Yes, Does Exists, Is Listed.
# Identifying Safety and Health Problems in the Workplace

Identifying health and safety problems can be as easy as answering basic questions. To determine if there are health and safety problems that need to be addressed in your workplace, use these questions:

- Do you or your co-workers have injuries or health complaints? If so, what types?
- Who has been hurt or is having symptoms?
- When do you or your co-workers feel these symptoms?
- Where in the workplace are safety or health problems occurring?
- What are the conditions that are causing problems?

## Health Hazards

<table>
<thead>
<tr>
<th>Common types of health hazards in the workplace are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical (asbestos, solvents, chlorine)</td>
</tr>
<tr>
<td>Biological (tuberculosis, HIV, hepatitis, molds)</td>
</tr>
<tr>
<td>Physical (noise, heat and cold, radiation, vibration)</td>
</tr>
<tr>
<td>Ergonomics or Repetitive Strain Injuries (carpal tunnel syndrome, back injuries)</td>
</tr>
<tr>
<td>Psychological (stress)</td>
</tr>
</tbody>
</table>

## Safety Hazards

<table>
<thead>
<tr>
<th>Common types of safety hazards in the workplace are:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slips, trips and falls</td>
</tr>
<tr>
<td>Being caught in or struck by moving machinery or other objects</td>
</tr>
<tr>
<td>Fire and explosions</td>
</tr>
<tr>
<td>Transportation and vehicle-related accidents</td>
</tr>
<tr>
<td>Confined spaces</td>
</tr>
<tr>
<td>Violence</td>
</tr>
</tbody>
</table>

## How health hazards enter your body:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Breathing (inhalation)</td>
</tr>
<tr>
<td>Swallowing (ingestion)</td>
</tr>
<tr>
<td>Skin (absorption)</td>
</tr>
<tr>
<td>Cuts (injection)</td>
</tr>
</tbody>
</table>

## The harm caused by health hazards depends on:

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Strength, potency, of the agent.</td>
</tr>
<tr>
<td>Amount of the agent that is present.</td>
</tr>
<tr>
<td>How long you are exposed to the agent.</td>
</tr>
<tr>
<td>Part of your body that is exposed.</td>
</tr>
</tbody>
</table>

## Types of health effects:

<table>
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<tbody>
<tr>
<td>Acute: the effect shows up right away.</td>
</tr>
<tr>
<td>Chronic: problems show up after a long period of exposure and/or long after the exposure ends.</td>
</tr>
<tr>
<td>Local: only the part of the body that was exposed is affected.</td>
</tr>
<tr>
<td>Systemic: an agent enters the body and affects other parts of the body.</td>
</tr>
</tbody>
</table>

## Cancer

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Cancer is a term for many diseases in different parts of the body.</td>
</tr>
<tr>
<td>Carcinogens are agents that cause cancer.</td>
</tr>
<tr>
<td>There is no totally safe level of exposure to something that causes cancer.</td>
</tr>
<tr>
<td>Cancer from a workplace exposure may develop 10, 20 or more years after the exposure.</td>
</tr>
</tbody>
</table>

## Reproductive effects

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Both men and women can be affected by reproductive hazards at work.</td>
</tr>
<tr>
<td>Reproductive hazards cause miscarriages and birth defects.</td>
</tr>
</tbody>
</table>

## Sensitization

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</tr>
</thead>
<tbody>
<tr>
<td>You may become allergic or sensitive to some agents you work with. Sensitization can develop over time.</td>
</tr>
<tr>
<td>For example, a health care worker may develop a serious allergic reaction to latex used in gloves.</td>
</tr>
</tbody>
</table>

## Caught In or Struck By Moving Machinery/Objects

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Machinery can cause injuries in different ways:</td>
</tr>
<tr>
<td>You can get parts of your body caught in or struck by exposed moving parts if machines are not properly guarded, or not locked out when being repaired.</td>
</tr>
<tr>
<td>You can be struck by flying objects from machines without protective guards.</td>
</tr>
</tbody>
</table>

## Fire and Explosions

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<tbody>
<tr>
<td>Improper labeling, handling or storage of certain materials can pose a risk of fire or explosion.</td>
</tr>
<tr>
<td>Every workplace should have an evacuation plan for getting people out of a building in case of fire and an alarm or alert system to quickly inform employees of an emergency.</td>
</tr>
<tr>
<td>Every worker should be trained on what to do in case of an emergency.</td>
</tr>
</tbody>
</table>

## Transportation and Vehicle-Related Accidents

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<thead>
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<tbody>
<tr>
<td>Operators of vehicles and equipment can be injured or cause injury to pedestrians if equipment is unsafe or if adequate training has not been provided.</td>
</tr>
<tr>
<td>You can be seriously injured or killed after being hit by a vehicle while repairing roads or doing other work in traffic zones. This danger exists when traffic is not properly routed and/or adequate barriers are not placed between the workers and the traffic.</td>
</tr>
</tbody>
</table>

## Confined Spaces

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<tbody>
<tr>
<td>A confined space is an area with small openings for a worker to enter and exit and is not designed for regular work. Examples of confined spaces include manholes, sewer digestors and silos. There are many hazards in confined spaces.</td>
</tr>
<tr>
<td>Workers can become unconscious and die from a lack of oxygen.</td>
</tr>
<tr>
<td>There may be too much oxygen, or other chemicals that can catch fire or explode.</td>
</tr>
<tr>
<td>Poisonous gases and vapors, such as hydrogen sulfide or carbon monoxide, may also build up in a confined space.</td>
</tr>
<tr>
<td>Confined spaces can also pose physical hazards. They can be very hot or cold, very loud, or slippery and wet.</td>
</tr>
<tr>
<td>Grain, sand or gravel can bury a worker.</td>
</tr>
</tbody>
</table>

## Violence

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</thead>
<tbody>
<tr>
<td>Violence on the job is a growing problem.</td>
</tr>
<tr>
<td>Homicides are the second leading cause of workplace fatalities. Workplace violence includes physical assault as well as near misses, verbal abuse and sexual harassment.</td>
</tr>
</tbody>
</table>