29 CFR 1910.38(b) - Fire Prevention Plan

Fire Protection

Preparation

1. Read Applicable Background information and related Company Policy Chapter.
2. Make _____ Copies of this Lesson Plan for Personnel
3. Make Transparency, procure transparency pens, etc.
4. Coffee, tea, snacks

Material

1. Fire Extinguisher

Objective

By the end of this session, personnel shall be able to describe:
In this section, the attendee will be able to:

1) Discuss the Company's Fire Prevention Program
2) Explain the concept of a fire triangle
3) Explain why fire burns.
4) Identify the 4 classes of fires.
5) Identify major causes of fires.
6) Identify fire protection equipment found at the Company
7) Identify fire fighting techniques.
8) Demonstrate how to use a fire extinguisher.
9) Discuss the limitations of fire extinguishers.
10) Describe Emergency Fire Evacuation Procedures

Background

Each year, fire-related losses in the United States are considerable. There are about 1 million fires involving structures, about 8,000 deaths each year and the total annual property loss is about $7 billion. Only about one-fourth of the deaths are due to burns. Nearly two-thirds of all fire related deaths result from inhalation of carbon monoxide, smoke, toxic gases and asphyxiation.

The primary requirements for a successful fire prevention program include continuous training in fire-safe work practices, regular inspections of work areas, and proper evacuation procedures.

Notes

Lesson

Company Fire Prevention Program

Our first line of defense against fire is to prevent it in the first place. It is the responsibility of all employees to prevent fires. All employees will be appraised of the potential fire hazards in their work area and will be trained in safe work procedures and practices. Employees are expected to follow proper procedures to prevent fires and to notify their supervisor or other management personnel if they observe any condition that could lead to the ignition of a fire or could increase the spread of a fire.

Anatomy of a Fire

Fire is a chemical reaction of organic matter with atmospheric oxygen at a high temperature. In this reaction, great energy is released in the form of heat and light. Such reactions are said to be exothermic. Every ordinary fire results when a substance (fuel) in the presence of air (oxygen) is heated to a critical temperature, called its "ignition temperature". In the early days of fire fighting, the mechanisms of a fire were best depicted by the **fire triangle**.

The three sides of the triangle represent the three components of a fire; heat, fuel, and oxygen. If these three components exist in their proper concentrations, then the fire will continue to burn. Take one of the components away, and the fire can be extinguished. When scientists began to answer questions about the very high efficiency of chemical extinguishing agents, it was evident that a fourth side to the triangle needed to be added. This fourth side represents the chemical reaction needed to keep the fire burning. What was developed was a triangular pyramid, or a **fire tetrahedron**. So now the four components needed to keep a fire burning include; heat (ignition source), oxygen (oxidizer), fuel, and a chemical reaction.

Notes

Causes of a Fire

If the right amount of fuel, oxygen, and heat exist, there is a great chance that a fire will start. Below are some of the more common causes of fires in an industrial setting:

· Faulty electrical equipment.
· Friction between mechanical parts.
· Flammable liquids and gases.
· Explosive dusts.
· Plastics, paper and wood products.
· Welding, cutting, and other types of hot work.
· Hot surfaces (such as hot plates).
· Static electricity.

Fire Prevention

The following are some general fire prevention practices and procedures that will be followed:

- All ignition sources (i.e., open flames, cutting torches, spark producing equipment, electric motors, heating equipment, etc.) will be controlled. All contact of ignition sources with combustible and flammable materials will be avoided. All employees will keep all combustible materials at least five feet from such ignition sources and all flammable liquids at least twenty feet away.
- Extensive use of electrical extension cords should be avoided. Any damaged or frayed electrical wiring, equipment cords, extension cords, etc. will be removed from service immediately and replaced or repaired.
- Any use of flammable liquids will be done in a manner that prevents spills, and prevents the flammable liquid or its vapor or spray from coming into contact with any ignition source. All flammable liquids will be stored in proper flammable liquid storage containers and kept in the proper storage cabinets
- Smoking is restricted to designated areas. Make sure that fire protection equipment is working Do not block automatic sprinkler systems or fire extinguishers.
- Reduce the use of portable heaters. If they must be used, make sure they are turned off at the end of the day.

Notes

Fire Protection Equipment

Fires can be extinguished by exhausting the fuel source, by manual fire fighting, or by fixed fire-fighting systems. Fire protection equipment can consists of the following:

- Automatic sprinkler systems.
- Fire alarms.
- Fire extinguishers.

Automatic sprinkler systems are present at the Company. The sprinkler systems are actuated by fire detection systems. The fire detection systems are heat and smoke detectors. Obviously, a good fire protection program includes fire extinguishment. Whenever a fire breaks out, there should be a sequence of procedures used by everyone:

- Sound the fire alarm right away, no matter how small the fire is.
- If you are able, attempt to extinguish or control the fire using appropriate fire extinguishing equipment.
- Relay all pertinent information to fire fighting personnel when they arrive.

The Company's fire alarm system is directly connected to the local fire department for immediate response. Whenever alarm systems are use, building occupants should be instructed on how, when, and where to report a fire. Also, building evacuation routes should be established and building evacuations should be practiced periodically.

Fire Fighting Techniques

According to the fire tetrahedron there are four ways to extinguish a fire:

- Reduce or remove the oxygen source by smothering (for example, by shutting the lid over a tank of burning solvent or by covering it with foam).
- Remove or seal off the fuel source (i.e., shut off the valve to a leaking pipe).
- Cool the fire source below its ignition temperature with a suitable cooling agent (water).
- Interrupt the chemical reaction of the fire by using dry chemical or halon agents.

Notes

The characteristics of a fire can vary depending on the material being burned. The type of material being burned also impacts the selection of a fire extinguishing media. There are four classes of fires including:

Class A include fires in combustible materials such as paper, wood, cloth, and many plastics.

Class B include fires in flammable liquids, oil, grease, tars, lacquers, and similar materials. The extinguishing media usually includes a dry chemical which smothers the fire by reducing the oxygen or interrupts the chemical reaction.

Class C include fires in electrical wires or equipment. The extinguishing media is a non-conductive material. Sometimes with Class C fires, Class A and B materials may also be burning because of insulating or conductive materials associated with electrical equipment.

Class D includes fires that occur in combustible metals, such as magnesium, lithium, and sodium. Special extinguishing agents are needed for these types of fires.

Note: Easy way to remember the four classes of fires:

A - Paper
B – Oils ***P O E M***
C - Electric
D - Metal

Fire Extinguishers

Each area of the Company will have a full complement of the proper type of fire extinguisher for the fire hazards present. All fire extinguishers will be inspected annually by a fire protection equipment company and tagged with the date of inspection. If a fire extinguisher is used or discharged for any reason, it will be removed from service and replaced with another properly charged fire extinguisher while it is being recharged.

Employees who are expected or anticipated to use fire extinguishers will be instructed on the hazards of fighting fires, how to properly operate the fire extinguishers available, and what procedures to follow in alerting others to the fire emergency. These employees will only attempt to extinguish small incipient fires.

Notes

Fire Extinguishers (continued)

If a fire cannot be immediately and easily extinguished with a fire extinguisher, the employees will evacuate the building. They will not try to fight the fire! All employees who are not trained and designated to fight fires are to immediately evacuate the premises at the first sign of fire or initiation of the fire alarm and are prohibited from using an extinguisher and re-entering the premises.

There are fire extinguishers for class A, B, and C fires at the Company. If you are involved in a project using combustible metals, contact the Safety and Health Manager to obtain a Class D extinguisher.

Fire extinguishers should be selected based on the potential fire hazards in your work area. The laboratory has available dry chemical and Halon fire extinguishers. The dry chemical extinguishers are designed for class A, B, and C fires. Halon fire extinguishers dispense a non-combustible gas that smothers the fire. Halon should be used on class C electrical fires. Using Halon on electrical systems fires allows the fire to be extinguished without the extinguishing agent causing any damage to the system. Using dry chemical extinguishers on an electrical fire will result in a significant effort to remove the powder. Fire extinguishers are placed in areas that are readily accessible and are visually inspected monthly. They should never be obstructed.

Location and Marking of Extinguishers

Extinguishers will be conspicuously located and readily accessible for immediate use in the event of fire. They will be located along normal paths of travel and egress. Wall recesses and/or flush-mounted cabinets will be used as extinguisher locations whenever possible.

Extinguishers will be clearly visible. In locations where visual obstruction cannot be completely avoided, directional arrows will be provided to indicate the location of extinguishers and the arrows will be marked with the extinguisher classification.

If extinguishers intended for different classes of fire are located together, they will be conspicuously marked to ensure that the proper class extinguisher selection is made at the time of a fire. Extinguisher classification markings will be located on the front of the shell above or below the extinguisher nameplate. Markings will be of a size and form to be legible from a distance of 3 feet.

Notes

Condition of Fire Extinguishers

Portable extinguishers will be maintained in a fully charged and operable condition. They will be kept in their designated locations at all times when not being used. When extinguishers are removed for maintenance or testing, a fully charged and operable replacement unit will be provided.

Mounting and Distribution of Extinguishers

Extinguishers will be installed on hangers, brackets, in cabinets, or on shelves. Extinguishers having a gross weight not exceeding 40 pounds will be so installed that the top of the extinguisher is not more than 3-1/2 feet above the floor.

Extinguishers mounted in cabinets or wall recesses or set on shelves will be placed so that the extinguisher operating instructions face outward. The location of such extinguishers will be made conspicuous by marking the cabinet or wall recess in a contrasting color which will distinguish it from the normal décor.

Extinguishers must be distributed in such a way that the amount of time needed to travel to their location and back to the fire does not allow the fire to get out of control. OSHA requires that the travel distance for Class A and Class D extinguishers not exceed 75 feet. The maximum travel distance for Class B extinguishers is 50 feet because flammable liquid fires can get out of control faster that Class A fires. There is no maximum travel distance specified for Class C extinguishers, but they must be distributed on the basis of appropriate patterns for Class A and B hazards.

Inspection and Maintenance of Extinguishers

Once an extinguisher is selected, purchased, and installed, it is the responsibility of the Safety and Health Manager to oversee the inspection, maintenance, and testing of fire extinguishers to ensure that they are in proper working condition and have not been tampered with or physically damaged.

Notes

Using Portable Fire Extinguishers

When using a fire extinguisher, the following word may help you remember how to operate the extinguisher - P.A.S.S:

- Pull the safety pin on the extinguisher before use. Most extinguishers require you to pull a pin which allows you to depress the handle. Make sure the extinguisher is on the ground before pulling pin to avoid static discharge.
- Aim low at the base of the fire.
- Squeeze the handle and release the extinguishing material.
- Sweep from side to side and keep spraying a continuous flow of extinguishing agent at the base of the fire.

Emergency Evacuation Procedures

Every employee must be familiar with the evacuation route from their work area. Familiarize yourself with the locations of exits from your work area. Once you have left your work area, follow the route to the nearest building exit. Always have an alternate route in the event your primary evacuation route is blocked. Use the following guidelines when evacuating the Company:

- Never open a door without feeling it first. Use the back of your hand to determine if the door is hot. Never open a hot door.
- After leaving a room, close the door but do not lock it.
- Do not use elevators.
- Find the nearest exit.
- If there is smoke in the building, stay low and even crawl along the floor if you have to. There should be less smoke near the floor.

After exiting the building, everyone should meet in the front parking lot outside the main entrance

Closure

The purpose of the Fire Safety Plan is to prevent potential injuries and deaths, and to protect the Company's property from damage or loss due to fire. This plan includes fire prevention, building exits, fire extinguishing, emergency evacuation, and employee training.

This plan will be reviewed with all new employees when they begin their job and with all employees when the plan is changed.

What questions do you have?

Notes