

Lesson: Fire Protection and Prevention

- Lesson Objectives:**
- Explain the essential elements of fires and list four types of fuel sources.
 - Identify seven common hazards associated with fire.
 - Describe the proper control mechanisms associated with using and handling the following: electrical equipment, welding, fueling and refueling, storage, heating device, and LPG (i.e. Propane).
 - Describe the proper handling of flammable or combustible liquids including the storage requirements, the transferring requirements, and the requirements of use.
 - Discuss four different types of fire extinguishers, their ratings, and their agents for the different classifications of fire.
 - Describe the step-by-step process of using fire extinguishers.
 - Differentiate between a fire prevention plan (FPP) and an emergency action plan (EAP).
 - List situations when you shouldn't fight the fire.

- Topics**
- General Information
 - Fire Basics
 - Fire Hazards and Prevention
 - Handling Flammable or Combustible Liquids
 - Fire Protection Plan (FPP)

Topic: General Information

This topic introduces general information about OSHA's fire protection standards. Having completed this topic, you should be able to:

- Name two recent construction fires that have resulted in serious casualties
- Describe the relationship between OSHA, the state, and local fire protection agencies
- Describe responsibilities of both employers and employees in terms of fire safety

Topic summary:

Please take a moment to review these major points before you continue with the next topic.

- The Ybor City Apartment Complex fire in Tampa, Florida, and the Old Cotton Mill fire in Atlanta, Georgia, are two recent construction fires.
- An integrated structure of fire safety standards and regulations by local, state, and federal government agencies is in place to supervise workplace fire safety.
- OSHA standards establish minimum requirements for fire prevention, for workplace evacuation in the event of fire, and for protection of workers who may become involved in firefighting in the workplace.
- According to a recent OSHA research study, among the 100 most cited standards, fire-related standards accounted for 3 percent.
- The employer is responsible for the development and maintenance of an effective fire protection and prevention program at the job site, including the availability of the fire protection and suppression equipment.

Topic: Fire Basics

This topic teaches the basic elements of fires, the types of fuel sources, and common terminologies of fires. Having completed this topic, you should be able to:

- Describe the three elements of fires
- Identify four classes of fuel sources
- Explain the terms commonly associated with fires

Topic summary:

Please take a moment to review these major points before you continue with the next topic.

- Fire needs three elements in order to burn. They are fuel, heat, and oxygen. This is commonly known as the *fire triangle*.
- There are four distinct fuel classifications:
 - **Class A** includes ordinary solids like paper, wood, trash, scrap lumber, cloth, rubber, and some plastics.
 - **Class B** includes flammable liquids like gasoline, oil, grease, acetone, solvents, paints, propane, and any nonmetal in a liquid state. This fuel source usually will boil.
 - **Class C** involves electrical fires that are energized by electrical equipment, motors, and switchgears.
 - **Class D** includes combustible metals like sodium, aluminum, magnesium and potassium.

Topic: Fire Hazards and Prevention

Many hazards are associated with fires. Some common ones are electrical equipment, welding operations, smoking, fueling and refueling, storage, heating devices, and liquid petroleum gas (LPG).

This topic reviews these hazards and controls of these hazards in detail. Having completed this topic, you should be able to:

- List the common fire hazards in construction
- Describe the proper use of electrical equipment
- Describe the proper welding, cutting, and grinding operations
- Describe the proper flammable and combustible storage, both outdoor and indoor.
- Describe the proper fueling and refueling operations
- Describe the proper use of heating devices
- Describe the proper handling of LPG

Topic summary:

Please take a moment to review these points before you continue with the next topic:

- There are seven fire hazards that are common in the workplace. They are:
 - **Electrical Equipment** – Electrical systems and equipment, including wiring, cords, and switches, are major sources of fire ignition sparks or heating hazards.
 - **Welding Operations** – Welding, cutting, and grinding operations can produce sparks that can ignite materials, gases, or flammable liquids in the work area.
 - **Smoking** – Uncontrolled smoking and careless disposal of used cigarettes or other tobacco products are major hazards and the causes of many workplace fires.
 - **Fueling and Refueling** – Flammable and combustible liquids used in service areas for fueling vehicles and equipment can be spilled and create an ignition source for fires.
 - **Storage Areas** – Areas where materials are stored provide a source of fuel for a fire.

- **Heating Devices** – Temporary heating devices also need special care to avoid or control the hazards associated with their use.
- **Liquid Petroleum Gas (LPG)** – Liquid petroleum gas (LPG) is a common hazard on the construction site and poses a serious fire hazard.
- In addition to specific control mechanisms associated with using equipment, storage, and materials, there are other methods for fire control and prevention:
 - Housekeeping
 - Inspection
 - Using MSDS
 - Hazard communication training

Topic: Handling Flammable or Combustible Liquids

Flammable/combustible liquids are prevalent in construction sites. Gasoline, for instance, is everywhere. This topic addresses the handling of flammable or combustible liquids in detail.

Having completed this topic, you should be able to:

- List the storage requirements of flammable/combustible liquids
- Identify the requirements of transferring flammable/combustible liquids
- Describe the requirements for using flammable/combustible liquids

Topic summary:

Please take a moment to review these major points before you continue with the next topic:

- Flammable/combustible liquids are prevalent in construction sites. It is critical to follow safety practices to handle these flammable/combustible liquids.
- Important requirements for flammable/combustible liquids storage:
 - Only approved containers such as metal safety cans and, in some cases, the original shipping containers can be used for the storage of flammable and combustible liquids.
 - Flammable or combustible liquids cannot be stored at exits, stairways, or places normally used for the safe passage of people.
- Important requirements for transferring flammable or combustible liquids to other containers:
 - The transferring operation should be conducted at least 25 feet away from all other operations.
 - Transfer of flammable liquids from one container to another can be performed only when the containers are electrically interconnected (bonded).
 - Drainage or other means should be provided to control spills. Adequate natural or mechanical ventilation must be provided to prevent the buildup of flammable vapors.
- Important requirements for using flammable or combustible liquids:
 - Flammable liquids should be kept in closed containers when they are not actually in use.
 - Any leakage or spillage of flammable or combustible liquids needs to be disposed of promptly and safely.
 - Flammable liquids may be used only where there are no open flames or other sources of ignition a minimum of 50 feet from the operation.
- A fire extinguisher that meets the minimum rating requirements needs to be in place in all above situations.

Topic: Fire Extinguishers

This topic reviews the types and ratings of fire extinguishers and taught you how to use them.

Having completed this topic, you should be able to:

- Identify Class A, B, C, and D fire extinguishers
- Explain different ratings for different classes of fire extinguishers
- Describe the features of four common types of fire extinguishers including dry chemical extinguishers, halon extinguishers, water extinguishers (APW), and carbon dioxide extinguishers
- Describe each of the four steps of fire extinguisher operations known as PASS

Topic summary:

Please take a moment to review these key points before you continue with the next topic:

- There are two systems to classify types of fire extinguishers.
- There are four types of fire extinguishers based on the types of fires that they can put out. They are Class A, Class B, Class C, and Class D.
- There are another four types of fire extinguishers based on the mechanism used to put out fires. They are dry chemical extinguishers, halon extinguishers, water extinguishers (APW), and carbon dioxide extinguishers.
- The correct way to use fire extinguishers is PASS. That is, pull, aim, squeeze, and sweep.

Topic: Fire Protection Plan

Developing and implementing a fire protection program should be a part of the employer's safety and health program. It will help employees be prepared for fire emergencies.

The fire protection program should include fire prevention plans, fire evacuation plans, and emergency action plans. This topic addresses these three plans. Having completed this topic, you should be able to:

- List the essential components of a fire prevention plan
- Name the three essential components of a fire evacuation plan
- Identify the requirements of an emergency action plan
- List situations in which you shouldn't fight the fire

Topic summary:

Please take a moment to review these points before you continue with the next topic:

- Effective fire prevention requires vigilance (regular inspections of the workplace), action (correction of hazardous situations), and cooperation (shared common interests between employers and employees).
- A fire prevention plan should be in place to complement the fire evacuation plan in order to stop unwanted fires from occurring and to minimize the frequency of evacuation.
- Emergency action plans describe the routes to be used and procedures to be followed by employees in the event of an emergency.
- Firefighting is an inherently dangerous activity and should be undertaken only by properly trained and equipped persons. In most circumstances immediate evacuation is the best policy. Employees should attempt to extinguish only small fires at the beginning stages.