



Avoiding Electrocution Hazards

The OSHA 10-Hour General Industry Course

Required Online Topic Time: 60m



Learning Objectives



Duration

60 minutes

Terminal Learning Objective

Given current OSHA and industry information regarding worksite illnesses, injuries and/or fatalities, the student will be able to recognize electrocution hazards in general industry.

Enabling Learning Objectives

- Identify major electrical hazards.
- Describe types of electrical hazards.
- Describe electrical protection methods.
- Recognize employer requirements to protect workers from electrical hazards.

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Introduction



In 2017, there were over **4,600 electrical related violations** cited by OSHA in the workplace.

Because electricity is such a familiar part of our daily life, we may overlook the hazards electricity poses and fail to take the necessary precautions to protect ourselves, our coworkers, and our clients.



Introduction continued...



In order for current to flow through a conductor, three things must be present:

1. A source of electrical current to flow
2. Something to transport the electrical current -- A conductor
3. Something that causes current to flow through the conductor

People can become part of a circuit. When a person becomes part of an electrical circuit, that person can be shocked.

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Major Electrical Hazards



OSHA recognizes electricity as a serious workplace hazard; therefore, electrical standards are required to protect employees exposed to dangers such as electric shock, electrocution, fires, and explosions.

The acronym **BE SAFE** is a reminder of the most common types of hazards or injuries due to electricity. An electrical hazard is defined as a serious workplace hazard that exposes workers to any of the following:

- Burns
- Electrocution
- Shock
- Arc flash
- Fire
- Explosions



Major Electrical Hazards



Burns are the most common electrical shock-related contact injury resulting from electrical shock, arc flash, or thermal (heat) energy.

Electrical Burns

Electrical burns are among the most serious burns and require immediate medical attention. They occur when electric current flows through tissues or bone, generating heat, and causing damage.

Arc or Flash Burns

Arc or flash burns result from high temperatures caused by an electric arc or explosion near the body.

An example of an arc flash is a lightning bolt. The electrical current travels through air. This type of arc flash generates enough heat to melt metal. The same process can happen with any electrical device.

Thermal Contact Burns

Thermal contact burns are caused when the skin touches hot surfaces of overheated electric conductors, conduits, or other energized equipment. Thermal burns also can be caused when clothing catches on fire, as may occur when an electric arc is produced.

Major Electrical Hazards



Knowledge Key

There are several types of electrical hazards, all of which can cause injury or death. For this reason, you need to be aware of the dangers involved with working around electricity.

Power Lines and Energized Sources



People who encounter high voltage power lines can be injured and may die due to **electrocution**.

People who come in contact with high voltage power lines can be injured and may die due to electrocution. If you touch a power line, covered or bare, death is probable.



Power Lines and Energized Sources



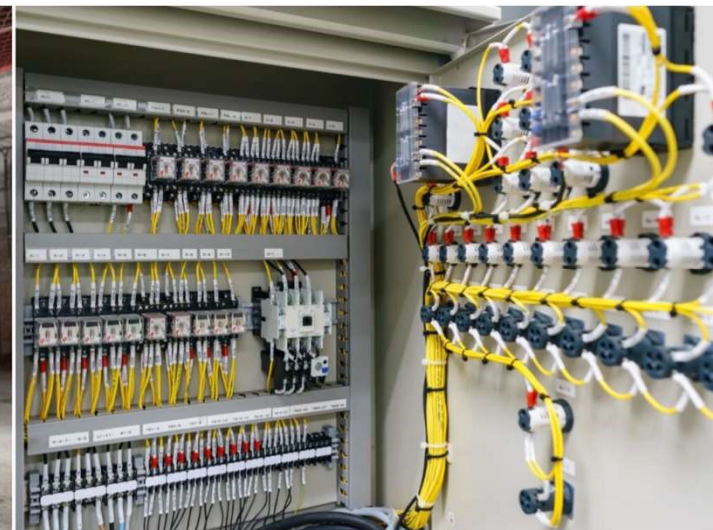
Knowledge Key

In almost all cases, touching power lines or coming into contact with energized sources will result in severe injuries or death.

Employer Responsibilities



OSHA standards focus on the design and use of electrical equipment and systems. The standards cover only the exposed or operating elements of an electrical installation such as **lighting, equipment, motors, machines, appliances, switches, controls, and enclosures**, requiring that they be constructed and installed to minimize workplace electrical dangers.



Employer Responsibilities



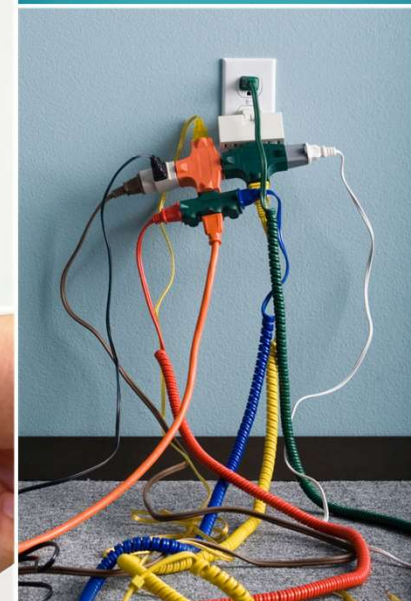
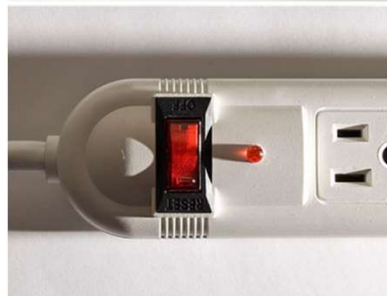
Knowledge Key

OSHA's standards require your employer to ensure that lighting, equipment, motors, machines, appliances, switches, controls and enclosures are constructed and installed to minimize electrical dangers.

Protection Against Electrical Hazards



- *Don't overload circuits*
- *Check switches and insulation*
- *Never use a three-prong grounding plug with the third prong broken off*
- *Remove cords from receptacles on the plugs, not the cords*
- *Use extension cords properly*



Protection Against Electrical Hazards continued...



A Ground Fault Circuit Interrupter (GFCI) is designed to:

- *Protect people from severe and sometimes fatal electrocution by monitoring for electrical leakage to ground*
- *Detect when the current leakage is greater than 5 mA*
- *Interrupt the flow of electric current by tripping quickly enough to prevent electrocution from leakage*

In a case where electrical current leakage from the circuit occurs, the GFCI would:

1. *Sense the current leakage*
2. *Trip the circuit*
3. *Cut off the electricity*



Protection Against Electrical Hazards continued...



Many accidents occur because workers fail to **lockout/tagout** equipment properly. **Lockout/tagout** is an essential safety procedure that:

- *Protects workers from injury while working on or near electrical circuits and equipment.*
- *Locks the device or power source and prevents anyone from turning on the hazardous power sources while someone is performing maintenance or servicing work.*
- *Requires workers to place a tag on the locked device indicating that it should not be turned on.*
- *Prevents contact with operating equipment parts such as, blades, gears, shafts, etc.*
- *Prevents the unexpected release of hazardous gases, fluids, or solid matter in areas where workers are present.*

Electrical circuits must be locked-out/tagged-out before electricians work on any equipment.



Protection Against Electrical Hazards



Knowledge Key

There are several ways you can be protected from electrical hazards. These are using tools and power cords safely, understanding how a GFCI can protect you, and following lockout/tagout procedures.

Practice Questions



1. Which of the following are electrical hazards?

Select all that apply.

- a. Shock
- b. Explosions
- c. Burns
- d. Fire
- e. Arc Flash
- f. Electrocution

2. A worker standing on a freshly mopped floor is adjusting products on a metal shelf with which there is a bare wire in contact. Which hazard is present?

- a. Contacting overhead power lines
- b. Contacting energized sources
- c. Using extension or flexible cords improperly

3. Which of these does OSHA require employers to construct and install to minimize electrocution hazards? Select all that apply.

- a. Lighting found throughout the building
- b. Appliances such as freezers or refrigerators
- c. Switches used with generators
- d. Controls on equipment and machinery in the workplace.

4. How does a GFCI protect you?

- a. It detects when there is any current leakage and cuts off the electrical flow.
- b. It alerts you when there is any current leakage.
- c. It can cut off the electrical flow when you push the reset button.

Practice Questions



5. Is using a three-prong plug with a missing ground post safe or unsafe?

- a. Safe
- b. Unsafe

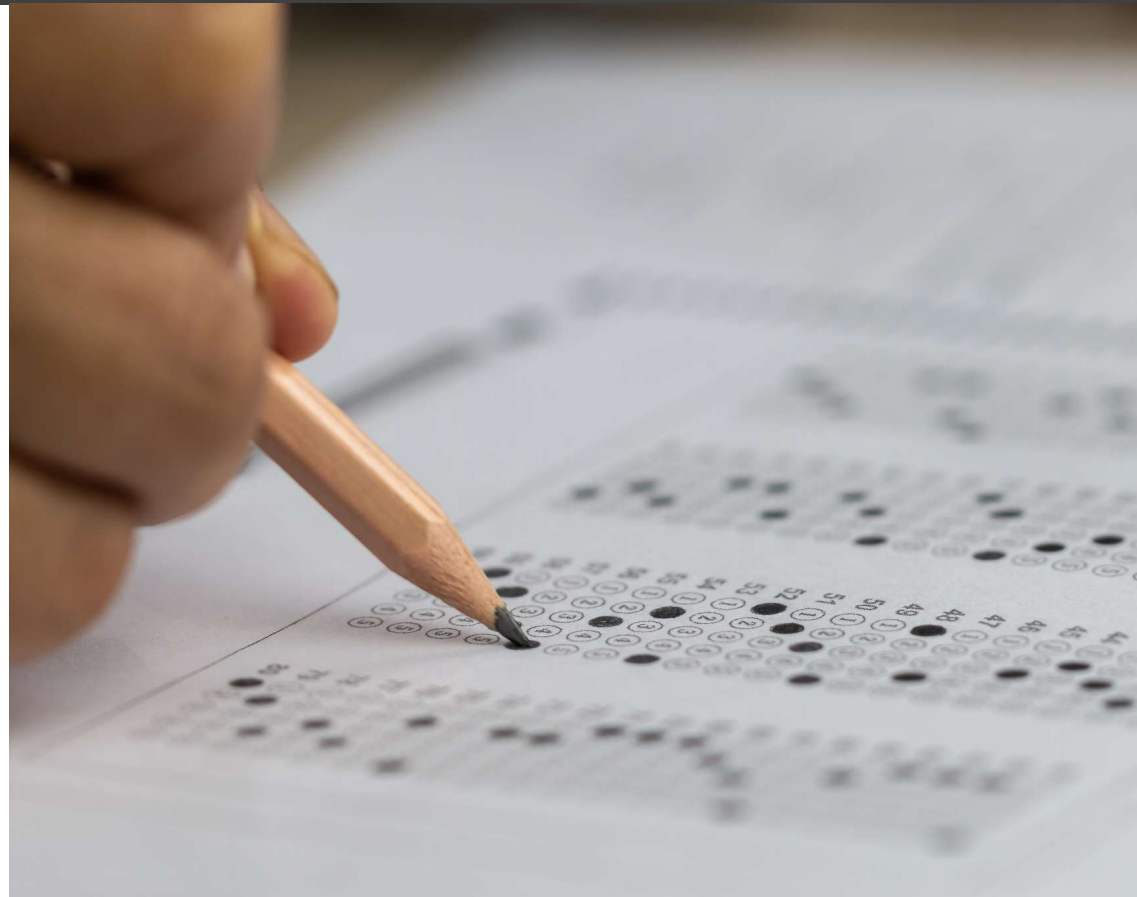
6. Is it safe or unsafe to pull on a cord to remove plug from a wall receptacle?

- a. Safe
- b. Unsafe

Practice Questions Answer Key



1. A, B, C, D, E, F
2. B
3. A, B, C, D
4. A
5. B
6. B



Conclusion



Great Job!

You have completed the Avoiding Electrocution Hazards topic.

