

### *OSHA Online Outreach Course Materials* Module 5: Focus Four – Electrocution Hazards

OSHA mandates that students spend a specific amount of time in each module of this course. In order to comply with OSHA's requirement, additional resources related to this module's content are provided below. You should also consider reviewing the Fact Sheet for this module, which is located at the end of this resource list.

When the minimum required time for this module has elapsed, you will be allowed to proceed to the next module.

# CAUTION: When closing resource links, take care to not close your course browser window, as that will stop the module timer.

Module 5: Focus Four – Electrocution Hazards		
Title	URL	
Topic 1	What is an electrocution hazards?	
Bureau of Labor	http://www.bls.gov/iif/oshcfoi1.htm	
Statistics		
NIOSH FACE	http://www.cdc.gov/niosh/face/stateface.html	
Reports		
NFPA 70E:	http://www.nfpa.org/aboutthecodes/AboutTheCodes.asp?DocNum=70E	
Standard for		
Electrical Safety		
in the		
Workplace		
Topic 2	What are the major types of electrocution hazards in construction?	
Deaths Due to	http://www.osha.gov/SLTC/etools/construction/electrical_incidents/fatexground.ht	
Discontinuous	<u>ml</u>	
Path to Ground		
Controlling	http://www.osha.gov/Publications/osha3075.pdf	
Electrical		
Hazards		
Preventing	http://www.cdc.gov/niosh/docs/91-110/	
Electrocutions		
During Work		
with Scaffolds		
Near Overhead		
Power Lines		
Topic 3	How can I protect myself from electrocution hazards?	
NIOSH Electrical	http://www.cdc.gov/niosh/docs/2009-113/pdfs/2009-113.pdf	
Safety Manual		
Preventing	http://www.cdc.gov/niosh/docs/87-103/	
Fatalities of		



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Title	URL	
Workers Who		
Contact		
Electrical Energy		
Preventing	http://www.cdc.gov/niosh/docs/87-100/	
Electrocutions		
Due to Damaged		
Receptacles and		
Connectors		
Topic 4	What is my employer required to do to protect workers from electrocutions?	
Using Portable	http://www.osha.gov/OshDoc/data_Hurricane_Facts/portable_generator_safety.pdf	
Generators		
Safely. OSHA		
Fact Sheet		
Working Safely	http://www.osha.gov/OshDoc/data_Hurricane_Facts/elect_safety.pdf	
with Energy.		
OSHA Fact Sheet		
Portable	http://www.osha.gov/OshDoc/data_Hurricane_Facts/portable_generators.pdf	
Generator		
Safety Tips		
OSHA Quick		
Card		
Control of	http://www.osha.gov/Publications/osha3120.pdf	
Hazardous		
Energy (LOTO)		



## **Module 5: Focus Four – Electrocution Hazards**

In this module, we cover information that will enable workers to recognize major electrocution hazards at construction worksites and methods for protecting workers from electrocution hazards.

#### **Module Objectives**

#### **Terminal Objective**

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

Enabling Objectives Specifically, the student will be able to:

- 1. Identify major electrocution hazards.
- 2. Describe types of electrocution hazards.
- 3. Protect himself/herself from electrocution hazards.
- 4. Recognize employer requirements to protect workers from electrocution hazards.

#### What Is An Electrocution Hazard?

An electrocution hazard is a serious workplace hazard in which a person is exposed to a lethal dose of electricity. The acronym, **BE SAFE**, describes the hazards associated with electricity:

- Burns
- Electrocution
- Shock
- Arc Flash/Arc Blast
- Fire
- Explosion

The Bureau of Labor Statistics indicates that electrocution accounted for 9% of the 1,243 construction worker deaths in 2005, which makes it the fourth leading cause of death in construction. An average of 121 electrocutions per year occurred in the construction industry (2003-2005) with the highest numbers of victims being electricians, construction laborers, supervisors/managers, and electrical power installers and repairers.

## What Are The Major Types Of Electrocution Hazards In Construction?

Major types of electrocution hazards include:

- Contact with overhead power lines
- Contact with energized sources

Instructor Guide, April 2011, pg. 6)

• Improper use of extension and flexible cords (OSHA's Construction Focus Four: Electrocution Hazards



Source:

OSHA Fatal Facts No. 11

#### How Can I Protect Myself From Electrocution Hazards?

To protect workers from electrocution hazards, OSHA provides the following safe practices:

- Maintain a safe distance from overhead power lines
- Use ground-fault circuit interrupters (GFCI)
- Inspect portable tools and extension cords
- Use power tools and equipment as designed
- Follow lockout/tagout procedures
- (OSHA's Construction Focus Four: Electrocution Hazards Instructor Guide, April 2011, pg. 13)

**Overhead Power Line Safety** 

The best option for protection from overhead power lines is to stay away from them. OSHA requires minimum clearance distances from power lines in Table A of 29 CFR 1926.1408(h):

Table A – Minimum Clearance Distances			
Voltage (nominal, kV, alternating current)	Minimum Clearance Distance (ft)		
Up to 50	10		
>50 to 200	15		
>200 to 350	20		
>350 to 500	25		
>500 to 750	35		
>750 to 1,000	45		
>1,000	(As established by the power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)		

Workers should practice the following preventative measures when working near power lines:

- General before work begins, be sure that:
  - Equipment/activity is located within a safe working distance from power lines.
  - Utility company has de-energized and visibly grounded the power lines or installed insulated sleeves on power lines.
  - Flagged warning lines have been installed to mark horizontal and vertical power line clearance distances.
  - Tools and materials used are nonconductive.
- Cranes and other high-reaching equipment:
  - Be sure utility company has confirmed the voltage and, therefore, the safe working distance from the power lines.
  - If applicable and feasible, use a/an: observer; insulated link; boom cage guard; proximity device.



Source: OSHA Fatal Facts No. 17

- Mobile heavy equipment if provided, use installed rider posts under power lines to avoid working too close to the power lines.
- Ladders use nonconductive ladders and be sure to retract them before moving.
- Material storage
  - Ensure that no materials are stored under power lines
  - Use caution tape and signs to cordon off area under power lines
- Excavations
  - Locate and know what the markings from the local underground line locator service has marked before digging.
  - Hand dig within three feet of cable location. Be aware that more than one underground cable may be buried in area of locator markings.

(OSHA's Construction Focus Four: Electrocution Hazards Instructor Guide, April 2011, pg. 14)

**Ground-Fault Circuit Interrupters (GFCI)** Use a ground fault circuit interrupter to detect ground faults and interrupt the flow of electric current. This will protect the worker by limiting the duration of an electrical shock.

Be sure to visually inspect and test the device according to recommendations based on the type of device used: receptacle GFCI; temporary/portable GFCI; circuit breaker GFCI.

**Portable Tools/Equipment and Extension Cords** Workers should practice the following preventative measures when working near power lines:

- Inspect extension cords and cords on electric-powered tools or equipment for cuts, abrasions, or damaged insulation prior to using them.
- Select flexible cords that are designed for the intended use. Cords should be marked with usage type designation size and number of conductors.
- Follow tool safety tips to avoid misusing power tools and equipment:
  - Never carry a tool by the cord.
  - Never yank the cord to disconnect it.
  - Keep cords away from heat, oil, and sharp edges.
  - Disconnect tools/equipment when not in use and when changing accessories such as blades and bits.

- Avoid accidental starting. Do not hold fingers on the switch button while carrying a plugged-in tool.
- Use gloves and appropriate footwear.
- Store in a dry place when not using.
- Don't use in wet/damp environments
- Keep working areas well lit.
- Ensure that cords do not cause a tripping hazard.
- Remove damaged tools from use.
- Use double-insulated tools.

(OSHA's Construction Focus Four: Electrocution Hazards Instructor Guide, April 2011, pg. 18)

#### Lockout/Tagout Procedures

Use lockout/tagout (LOTO) procedures to protect workers while they are working on, or near, electrical circuits and equipment. A checklist for LOTO procedures may include:

- Identify all sources of electrical energy for the equipment or circuits in question.
- Disable backup energy sources such as generators and batteries.
- Identify all shut-offs for each energy source.
- Notify all personnel that equipment and circuitry must be shut off, locked out, and tagged out.
- Shut off energy sources and lock switch gear in the OFF position. Each worker should apply his/her individual lock and keys kept with the worker.
- Test equipment and circuitry to ensure they are de-energized. This must be done by a qualified person.
- Deplete stored energy by bleeding, blocking, grounding, etc.
- Apply a lock or tag to alert other workers that an energy source or piece of equipment has been locked or tagged out.
- Make sure all workers are safe and accounted for before equipment and circuits are unlocked and turned back on. Only a qualified person may determine when it is safe to re-energize circuits.

(OSHA's Construction Focus Four: Electrocution Hazards Instructor Guide, April 2011, pg. 19)



Source: OSHA Fatal Facts No. 60

#### What Is My Employer Required To Do To Protect Workers From Electrocutions?

Employers must protect workers from electrocutions and are required to:

- Ensure overhead power line safety.
- Isolate electrical parts.
- Supply ground-fault circuit interrupters (GFCI).
- Ensure proper grounding.
- Ensure power tools are maintained in a safe condition.
- Ensure proper guarding.
- Provide training.
- Enforce LOTO safety-related work practices.
- Ensure proper use of flexible cords.

(OSHA's Construction Focus Four: Electrocution Hazards Instructor Guide, April 2011, pg. 21)



Source: OSHA Fatal Facts No. 57