Electrical Safety

Module 9

0.75 hours of instruction

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Learning Objectives

- Recognize common electrical hazards in roadway construction
- Identify normal and ground-fault circuit interrupter (GFCI) outlets and explain the differences
- Describe how to mitigate or avoid electrical hazards

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VIDEO:

STUDY CASE: ELECTROCUTION - SCAFFOLDS AND POWER LINES

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Electricity Basics

Voltage – the pressure under which electricity flows through a wire, measured in volts

Resistance – impeding the flow through a wire, measures in Ohms

Current – the volume of the flow from the source through the wire over time, measured in Amps

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Dangers of Electricity

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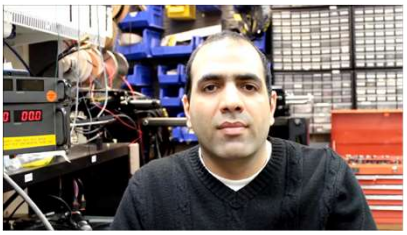
Video Presentation

Effects of electrical shock on the body

Direct current – DC

Alternating current – AC



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I. Indoors

Estimated Effects of AC Currents (U.S. Standard 60 Hz)	
1 milliamp (mA)	Barely perceptible
16 mA	Maximum current an average man can grasp and "let go"
20 – 30 mA	Paralysis of respiratory muscles
100 mA	Ventricular fibrillation threshold
2 Amps	Cardiac standstill and internal organ damage
15/20/30 Amps	Common U.S. household breakers

Electrical Harm

PATH: Harm is related to the path by which current passes through the body.

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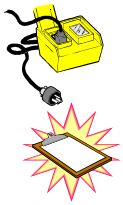
Employer's Responsibilities



Employers have two choices:

- Ground-Fault Circuit Interrupters (GFCIs) (for receptacle outlets that are not part of permanent wiring)
- Assured Equipment Grounding Conductor Program (AEGCP)

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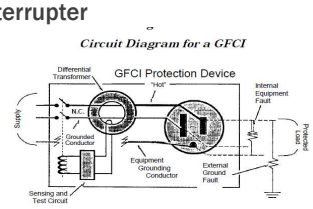
GFCI

Ground-Fault Circuit Interrupter



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What Is an Assured Equipment Grounding Conductor Program?

An AEGCP covers all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and equipment connected by cord and plug which are available for use or used by employees

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EMPLOYER MUST PROVIDE

-Written Description of Program
-Competent Person to Implement

-Inspection and Testing
-Records and Test Results

Tests:

Frequency - *Before each day's use; After repair and before placing back in service; Before use after suspected for damage; Every three months, except cords and receptacles exposed to damage must be tested at regular intervals, not to exceed six months*

Test for - *Continuity of equipment grounding conductor; Proper terminal connection of equipment grounding conductor*

Inspections:

Frequency - *Before each day's use*

Required Visual Inspection - *Cord sets; Cap, plug and receptacle of cord sets; Equipment connected by cord and plug*

Exceptions - *Receptacles and cord sets that are fixed and not exposed to damage*

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Lockout/Tagout

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Power Tools & Extension Cords

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Ground Prong

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II. Overhead Power Lines

- Dump trucks raising the bed
- Concrete pumps
- Cranes
- Extractors

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VIDEO:

CRANE AND POWER LINE - FIRE

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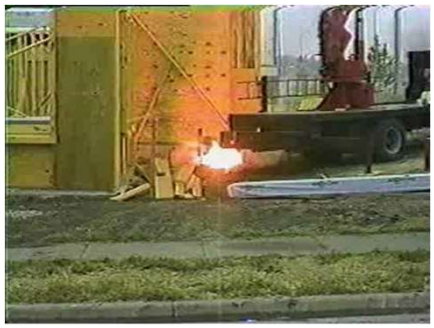

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Protective Measures

Table A - Minimum Clearance Distances	
Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(As established by the utility owner/ operator or registered, qualified professional engineer.)
Note: The value that follows "to" is up to and includes that value. For example, over 50 to 200 means up to and including 200kV.	

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Underground utilities

Obtain information about the location of buried utilities before excavating

Use appropriate protective equipment

811 Know what's below. Call before you dig.

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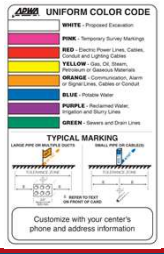
Underground Power Lines & Utilities



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Identify the Hazards

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VIDEO: OSHA

LADDERS AND POWER LINE - ELECTROCUTION

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Electric Hazard – Power Lines

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Electric Hazard – Power Lines

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VIDEO: Worksafe BC

QUE HACER SI SE ESTA EN CONTACTO CON CABLES ELECTRICOS SOBRE UN VEHICULO O EQUIPO

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Electrical Hazards

- Overhead & underground power lines
- Arc flash
- Power panels
- Transformers & generators
- Power tools & extension cords

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Identifique los Peligros

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Power Panels & Arc Flash

Massive energy release

- Temperatures 35,000 ºF
- Vaporize metal
- Blasting molten metal
- Expanding plasma

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Transformers & Generators

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Electrical Hazards Summary

- Recognize common electrical hazards in roadway construction
- Identify normal and GFCI outlets and explain the differences
- Describe how to mitigate or avoid electrical hazards

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Break

Questions?

Poll

We Will continue in … minutes

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