# Instructor/Participant Guide



209: Escalator: Electrical Systems

Module 1: General Electrical Safety Procedures





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#### **Icons Used in This Guide**

Throughout the Instructor's Guide, the following icons indicate the type of content being presented.



**Refer To** 



**PowerPoint** 



Multimedia



Web based **Training** 



Write



Ask



**Individual Activity** 



**Small Group Activity** 



Classroom **Activity** 



Duration

## **Agenda**

Topic No.	Topic Title	Duration
1	Introduction	5 minutes
2	Safety Oversight Resources	15 minutes
3	Electrical Safety	20 minutes
4	Physiological Effects of Electrical Energy	20 minutes
5	Reducing Occupational Hazards  • Determining Boundary Levels	20 minutes
6	Safe Practices  Lockout/Tagout  Electrical Cords and Equipment	20 minutes
7	Emergency Response	15 minutes
8	Summary	5 minutes
	Total Time:	2 hours

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#### **Overview**

**Purpose** 

The purpose of this module is to:

Introduce participants to general electrical safety procedures.

**Objectives** 

At the end of this chapter, the learner will be able to:

- Indentify General Safety Procedures
- Relate Safe Work Practices to Escalator Maintenance

**Materials** 

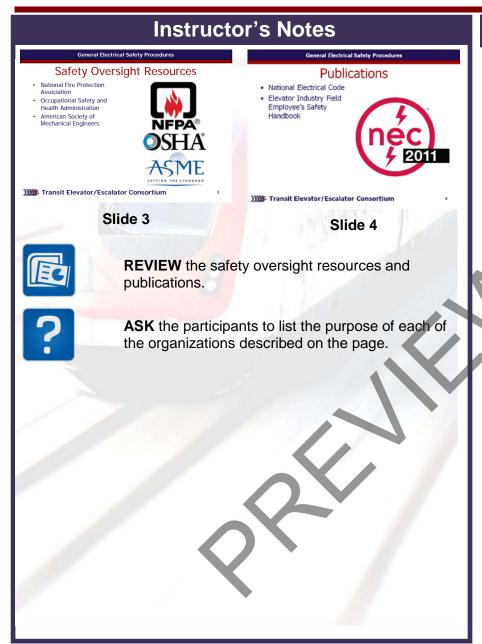
Make sure you have the following:

- Laptop (one for leader)
- Participant Guides
- PowerPoint slide deck
- LCD projector
- A17.1 Safety Code for Elevators and Escalators
- A17.2 Guide for Inspection of Elevators. Escalators and Moving Sidewalks
- A17.3 Safety Code for Existing **Elevators and Escalators**
- Heavy Duty Transportation System Elevator Design Guidelines (APTA RT-RP-FS 008-03)
- Heavy Duty Transportation System Escalator Design Guidelines (APTA RT-RP-FS 007-02)
- Field Employees' Safety Handbook
- Transit Agency Handbook

**Preparation** 

PREPARE flip charts with the following titles:

Class Expectations





## **Safety Oversight Resources**

List the purpose of each organization below.

**National Fire Protection Association** 

**Occupational Safety and Health Administration** 

**American Society of Mechanical Engineers** 



#### **Instructor's Notes**

Electrocution

#### · Electrocution is a fatality resulting from an individual being exposed to a lethal amount of electrical energy.

 The human body becomes part of an active electrical circuit having a current capable of over stimulating the nervous system and/or causing damage to internal

#### Electrical Shock

#### Occurs from:

- · Direct contact with electrical energy.
- · Flame burns from ignition of clothing.
- · Injuries from Arc Flash - May result in an explosion known as an



)))))- Transit Elevator/Escalator Consortium







**REVIEW** slides 7 and 8 and review electrocution and electrical shock.

An Electrical Foreman with over 20 years' experience was working on a high-voltage circuit that he thought was de-energized. Unfortunately, he had de-energized the wrong circuit. He was thrown back by an arc flash/blast and received burns to his arm, neck, and face.

ASK participants to define Arc Flash and Arc Blast.

### **Electrocution**

Define the following:

**Arc Flash** 

**Arc Blast** 





#### **Instructor's Notes**

#### General Electrical Safety Procedures Effects of 60 HZ AC Currents

- 1mA Sensation Threshold
- 16mA Cannot Let Go
- · 20mA Muscular Paralysis
- 50-60mA Death
- 100mA Ventricular Fibrillation Threshold
- · 2Amps Cardiac Standstill and Internal Organ Damage



#### Slide 12



**REVIEW** slide 12 and review the types of burns and how they are caused.

**APPLICATION FEEDBACK:** now that we have discussed a little about the preventive maintenance procedures, have the participants answer the following question.

ASK: What can occur with electrocution over 50mA?

### **Effects of 60 HZ AC Current**

At what current do the following effects occur?

**Sensation Threshold** 

**Cannot Let Go** 

**Muscular Paralysis** 

Possible Death

Ventricular Fibrillation Threshold

**Cardiac Standstill** 



**Determining Boundary Level** 

#### **Instructor's Notes Determining Boundary Level** Safe Practices Removing Power: · Securing a circuit, device, or system in this condition is commonly known as placing it in a deenergized or zero energy state. WWW. Transit Elevator/Escalator Consortium Slide 15 Slide 16 **REVIEW** slides 15 and 16 and describe how to determine an appropriate boundary level. Describe

**Limited Approach Boundary Restricted Approach Boundary** ▶ Flash Protection Boundary

Define the following boundary levels.

**Prohibited (Shock) Boundary** 

levels. APPLICATION FEEDBACK: Now that we have discussed a little about reducing occupational hazards, have the participants respond to the

some safe practices to display during electrical

**CONTENT:** Direct participants to describe in their own words how to properly determine boundary

following topic.

work.

**ASK** the participants to define the boundary levels.



#### **Instructor's Notes**

General Electrical Safety Procedures

#### **Electrical Cords and Equipment**

- . Should be free of loops and kinks when in use and shall be properly stored after use.
- · Should be covered or elevated to protect them from physical damage when passing through work areas, walkways, or passageways
- · Worn, frayed or defective electrical cords should not be used and must be recycled
- · Employees should disconnect receptacle plugs by grasping the plug and not pulling the cord

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#### Slide 19



**REVIEW** slide 19 and review the basic rules of using electrical cords and equipment.

**APPLICATION FEEDBACK:** now that we have discussed a little about safe practices, have the participants answer the following question.

ASK the participants to describe how to properly disconnect receptacle plugs.

## **Electrical Cords and Equipment**

How do you properly disconnect receptacle plugs?



