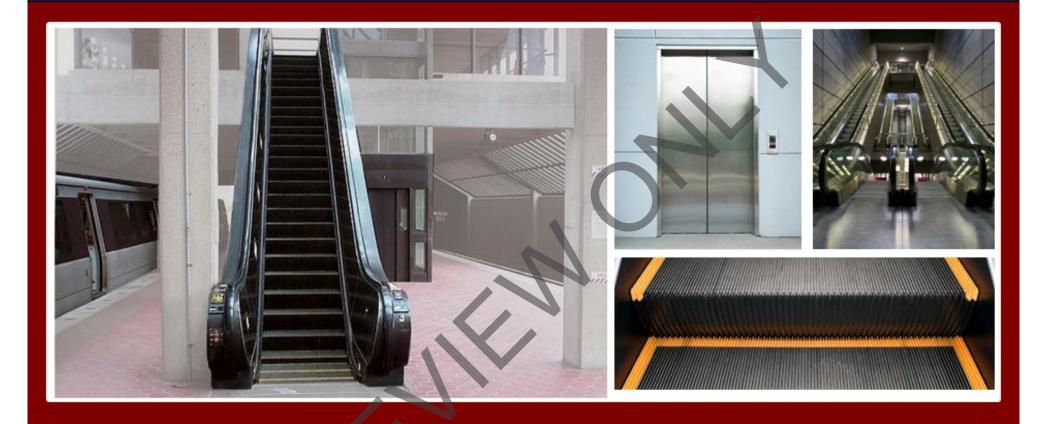# Instructor/Participant Guide

212: Escalator-Inspection & Basic Maintenance

Module 6: Safety Devices

))))): Transit Elevator/Escalator Consortium

Safety Devices

Table of Contents:

Table of Figures:

Icons Used in This Guide

Throughout the Instructor's Guide, the following icons indicate the type of content 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 Circuits	40 minutes
3	Safety Devices	15 minutes
4	Combs and Comb Impact	10 minutes
5	Mechanical Locks	10 minutes
6	Safety Lighting	15 minutes
7	Safety Side Brushes	40 minutes
8	Summary	5 minutes
	Total Time:	**2.5 hours**

Overview

Purpose

The purpose of this module is to:

- Introduce participants to the types and styles of safety devices within transit escalators commonly found in U.S. transit systems.

Objectives

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

- Complete a visual inspection and demonstrate ability to correctly test all safety devices.
- Verify the settings for the comb impact device and record results.
- Perform needed adjustments, repairs or replacements.

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 Escalator Design Guidelines (APTA RT-RP-FS 007-02)

- Field Employees' Safety Handbook
- Transit Agency Handbook

Preparation

PREPARE flip charts with the following title:

- Class Expectations

Instructor's Notes

Slide 6   **Slide 9**

REVIEW slides 6 thru 9 and discuss safety devices.

CONTENT: Direct participants to describe in their own words the basics of safety devices

APPLICATION FEEDBACK: Now that we have discussed a little about safety devices, have the participants answer the following questions.

ASK participants to describe the inspection procedure for the following terms.

Safety Devices

Describe the inspection procedure for the following terms:

Skirt Switches:

_____

_____

Missing Step Detector:

_____

_____

Emergency Stop Button:

_____

_____

Step Upthrust Safety Switch:

_____

_____

Step Level Switch:

_____

_____

Missing Step Device:

_____

_____

Step Lift Switch:

_____

_____

Instructor's Notes

Slide 13   **Slide 14**

REVIEW slides 13 and 14 and discuss preliminary preparation for accurate testing.

ASK: What is the maximum allotted measurement for the gap?

Preliminary Prep for Accurate Testing

What is the maximum allotted measurement for the gap?

_____

_____

_____

_____

Instructor's Notes

Safety Devices
Come Along Device Method
Horizontal Side and Center Actuating Force Test
- Remove the floor plate and four steps.
  - Run the opening under the combplate.
- Remove the two outside comb segments and one comb segment from middle of the combplate.
- Hook the come-along chain to the front LH side of the combplate.
  - Attach the end of the come-along to the dynamometer.
  - Attach the other end of the dynamometer firmly to a fixed point in the pit.

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Slide 16

Safety Devices
Come Along Device Method
Horizontal Side and Center Actuating Force Test
- Increase a horizontal force slowly on one side of the combplate near the skirt panel until the comb impact switch trips.
  - Must be 300-400 lbs.
- Hook the come-along chain to the center of the combplate to perform the horizontal center pull.
  - Verify the force required to trip both left and right comb impact switches is less than 800 lbs.

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Slide 17

REVIEW slides 16 and 17 and discuss the horizontal side and center actuating force test.

ASK participants to describe the maximum force required to trip the left and right comb impact switches.

Horizontal/Center Actuating Force Test

What is the maximum force required to trip the left and right comb impact switches?

_____

_____

_____

_____

Instructor's Notes

Safety Devices

Come Along Device Method

Setting Springs and Switches
- Adjust switches so the switch button sits directly against the bracket or upon the back bolt head.
  - Confirm that all switches are still in the position to be activated with 0.06" – 0.12" of combplate movement.
- Inspect springs and replace all damaged springs.
  - Spring length for vertical switch should be about 2 ¾".
  - Spring length for horizontal switch should be about 2 5/8".

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Slide 22

REVIEW slide 22 and discuss setting springs and switches.

ASK participants to describe what the spring length for the listed switches are.

Setting Springs and Switches

What is the spring length for the following switches?

Vertical Switch:

_____

_____

Horizontal Switch

_____

_____

Instructor's Notes	Prepare Unit for Service

Prepare Unit for Service

What should be done prior to removing the barricades?

_____

_____

Slide 26 (slide image)

Safety Devices

Come Along Device Method

Test the Opposite Landing and Prepare Unit for Service
- Repeat Steps on the opposite landing of the escalator.
- Re-install all of the following:
  - Comb segments
  - Missing steps
  - Newel balustrade panel
  - Inner skirt panels
- Remove all testing equipment after the procedure is completed.
- Run the escalator and ensure it is operating properly before removing the barricades.

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Slide 26

REVIEW slide 26 and discuss testing the opposite landing and preparing the unit for service.

CONTENT: Direct participants to describe in their own words the basics of standard test instruments.
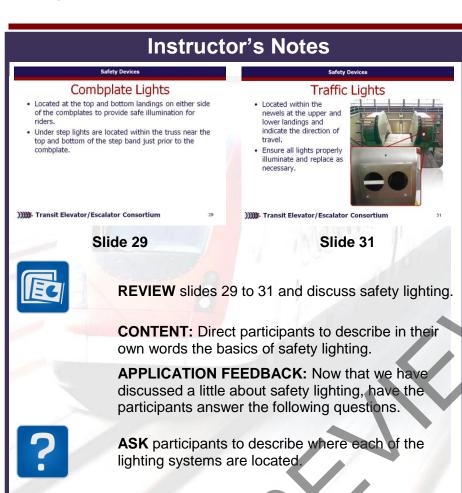
APPLICATION FEEDBACK: Now that we have discussed a little about standard test instruments, have the participants answer the following questions.

ASK participants what should be done prior to removing the barricades?

Instructor's Notes

Combplate Lights

- Located at the top and bottom landings on either side of the combplates to provide safe illumination for riders.
- Under step lights are located within the truss near the top and bottom of the step band just prior to the combplate.

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Traffic Lights

- Located within the newels at the upper and lower landings and indicate the direction of travel.
- Ensure all lights properly illuminate and replace as necessary.

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Slide 29   **Slide 31**

REVIEW slides 29 to 31 and discuss safety lighting.

CONTENT: Direct participants to describe in their own words the basics of safety lighting.

APPLICATION FEEDBACK: Now that we have discussed a little about safety lighting, have the participants answer the following questions.

ASK participants to describe where each of the lighting systems are located.

Safety Lighting

Describe where each of the following safety lighting systems are located.

Combplate Lights:
_____
_____
_____

Balustrade Lights:
_____
_____
_____

Traffic Lights:
_____
_____
_____

Instructor's Notes

Summary

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Slide 33

REVIEW slide 33 and summarize the module.

EVALUATION AND CLOSURE: Recap the main points of the module before moving on to the next topic within this course.

ASK the participants if they have any outstanding questions on what was presented.

Summary