Instructor Guide



219: Elevator: Inspection and Basic Maintenance

Module 7B: Electric Traction Hoistway

TRANSIT ELEVATOR/ESCALATOR CONSORTIUM



Table of Contents

Overview	4
Sensory Inspection	9
Operational Inspection and Maintenance	
Lighting	84
MRL Elevators	
Summary	90

Icons Used In This Guide



REVIEW slides



INDIVIDUAL ACTIVITY



ASK

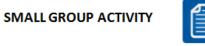


WRITE





Multimedia





REFER participants to

Agenda

Topic #	Topic Title	Duration
1	Overview	30 Minutes
2	Sensory Inspection	20 Minutes
3	Field Trip	60 Minutes
4	Inspection and Maintenance	120 Minutes
5	Field Trip	60 Minutes
6	Inspection and Maintenance	60 Minutes
7	Lighting	10 Minutes
8	MRL Elevators	20 Minutes
9	Field Trip	60 Minutes
10	Summary	40 Minutes
	Total Time:	480 Minutes

Overview

Purpose The purpose of this module is to:

> Provide the participant with an overview of inspecting and maintaining components in the hoistway of a traction elevator system within a public transit environment.

Objectives

At the end of this lesson, the transit elevator/escalator trainee will be able to:

- Identify hoistway areas and associated components requiring inspection
- List all hoistway auxiliary lighting requiring inspection
- Identify hoistway areas and associated components requiring cleaning
- Identify hoistway areas and associated components requiring lubrication
- Perform a sensory inspection of a hoistway
- Perform an inspection of components in a traction elevator hoistway
- Perform an operational test on all safety devices in the Hoistway
- Perform an operational test on all auxiliary lights

Materials Mandatory

Make sure you have the following

- PowerPoint Presentation
- Coursebook
- Quizzes
- **Pencils**
- Paper

Optional

You may also want the following for optional activities:

- Chalk board with chalk, large paper with marker, etc.
- Internet connection
- Lab, simulator or out of service elevator
- **ASME A17.1**
- **ASME A17.2**
- **ASME A17.3**
- Bethlehem Rope Technical Bulletin 3 & 6

Instructor's Guide



Module Length: 480 min Time remaining: 480 min This section: 30 min (7 slides) Section start time: Section End Time: **Materials Needed** DO SAY In your own words: ✓ PPT slides 1, 2 Welcome to the course on inspection and **REVIEW** introduction slides maintenance of electric traction hoistways. **Electric Traction Hoistway** Advance Imagine being a technician for this electric traction elevator system in Canada! While this is very interesting to see, most hoistways in transit don't look like this one but will Instructor's Notes Riders Depend on require similar maintenance. "Le Stade Olympique (The Olympic Stadium) is in **Advance** Montreal, Quebec, Canada Martin Degré of Ascenseur Élévapro Inc. provided me with the location of this beautiful structure." Transit Elevator/Escalator Consortium



Module Length: 480 min

Time remaining: 480 min

This section: 30 min (7 slides)

Section start time:

DO	SAY	Materials Needed
REVIEW module objectives	 In your own words: Today we will Identify hoistway areas and associated components, which require inspection Identify hoistway areas and associated components, which require cleaning Identify hoistway areas and associated 	✓ PPT slides 3, 4 Devator Inspection and Haintenance: Detric Traction Hostway Outline I dentify hoistway areas and associated components, which require inspection I dentify hoistway areas and associated components, which require cleaning I dentify hoistway areas and associated components, which require cleaning I dentify hoistway areas and associated components, which require lubrication List all hoistway auxiliary lighting which require inspection
Instructor's Notes	 components, which require lubrication List all hoistway auxiliary lighting which require inspection Advance And 	Outline Perform a sensory inspection of the holstway Perform an inspection of the holstway Perform an inspection of components in a traction elevator holstway Perform an operational test on all safety devices in the holstway Perform an operational test on all auxiliary lights
	 Perform a sensory inspection of the hoistway Perform an inspection of components in a traction elevator hoistway Perform an operational test on all safety devices in the hoistway Perform an operational test on all auxiliary lights <i>Advance</i>))))))). Transit Elevator/Escalator Consortium



Module Length: 480 min

Time remaining: 480 min

This section: 30 min (7 slides)

Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 5 Lets take a look at some of the key words **REVIEW** key terms we will be defining as move through this · Cable Support module: Deflector Sheaves · Final Limit Switches Cable Support · Normal Limit Switches · Physical Senses Sensory Inspection **Deflector Sheaves** Final Limit Switches Transit Elevator/Escalator Consortium **Normal Limit Switches Instructor's Notes Physical Senses Sensory Inspection** Advance

Instructor's Guide

Module Length: 480 min

Time remaining: 480 min

This section: 30 min (7 slides)

Section start time:

Section End Time:

Materials Needed

DO **ASK** participants what they remember about safety and elevators SMALL GROUP ACTIVITY **WRITE Instructor's Notes**

In your own words:

Thinking back to other courses or just in general, what do we already know about electric traction hoistways?

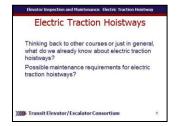
SAY

Possible maintenance requirements for electric traction hoistways?

Allow participants to think for a minute and perhaps discuss with a partner ideas as well as write down any ideas. Discuss participant responses and if possible list them on a chalk board or similar.

Advance

✓ PPT slide 6

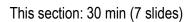


- Chalk board or large paper
- Blank Paper
- Writing instruments

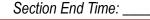


Module Length: 480 min





Section start time:



Materials Needed

DO **REVIEW** slides Instructor's Notes

In your own words:

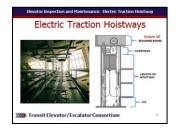
A **hoistway** is a shaft or space typically enclosed by fireproof walls to permit passage of an elevator, dumbwaiter, or material lift between the floors of a building. The hoistway extends from the bottom pit to the top of the shaft, which is generally the underside of the overhead machine room floor or the underside of the roof. Hoistway doors on each floor provide access to the elevator. Many hoistways are constructed with strategic access points along the shaft in the event of a mechanical failure.

SAY

Advance There are three major areas of the hoistway: overhead, hoistway length, and pit shown here. Inspection and maintenance of the machine room is covered separately in Module 8B of this course.

Do Not Advance

✓ PPT slide 7



Instructor's Guide

Module Length: 480 min

Time remaining: 450 min

This section: 20 min (6 slides)

Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 7, 8 **REVIEW** slides This module examines the components within each area of the traction hoistway that the **Electric Traction Hoistways** elevator technician needs to inspect and maintain regularly. Advance Lets begin by looking at a sensory inspection Instructor's Notes in an electric traction hoistway. Advance Transit Elevator/Escalator Consortiu



Module Length: 480 min

Time remaining: 450 min

This section: 20 min (6 slides)

Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 9 During a **sensory inspection** a good elevator **REVIEW** slide technician relies on the physical senses of Sensory Inspection sight, smell, hearing, and touch while Physical Senses **ASK** Loose hardware, worn rollers, fraved cables inspecting and maintaining the elevator. slack in cables, rust on the cable (rouging), dim lights, wear on selector tape, elongated holes in selector tape, water in the pit, debris in the pit Ask and twists in the cables. Smell of burnt electrical wires. What may indicate a problem within the Transit Elevator/Escalator Consortiur traction hoistway as indicated by sight? Instructor's Notes Discuss possible answers Advance for sample answers Loose hardware, worn rollers, frayed cables, slack in cables, rust on the cable (rouging), dim lights, wear on selector tape, elongated holes in selector tape, water in the pit, debris in the pit and twists in the cables. Advance



Module Length: 480 min

Time remaining: 450 min

This section: 20 min (6 slides)

Section start time:

In your own words: Ask What may indicate a problem within the traction hoistway as indicated by smell? Discuss possible answers Advance for sample answers Smell of burnt electrical wires. Advance Ask What may indicate a problem within the traction hoistway as indicated by smell? Discuss possible answers Smell of burnt electrical wires. Advance Ask What may indicate a problem within the traction hoistway as indicated by hearing? Discuss possible answers Advance for sample answers Rattling or clicking of loose components such as rollers, hardware. Clicking near hoistway door. Clunking of counterweight or car landing on buffer. Advance	DO	SAY	Materials Needed
	? ASK	Ask What may indicate a problem within the traction hoistway as indicated by smell? Discuss possible answers Advance for sample answers Smell of burnt electrical wires. Advance Ask What may indicate a problem within the traction hoistway as indicated by hearing? Discuss possible answers Advance for sample answers Rattling or clicking of loose components such as rollers, hardware. Clicking near hoistway door. Clunking of counterweight or car landing on buffer.	Sensory Inspection Physical Senses Loose hardware, worn rollers, frayed cables, slack in cables, rust on the cable (rouging), dim lights, wear on selector tape, elongated holes in selector tape, excessive oil in the pit and/or diripping down the cylinders, water in the pit, debris in the pit and twists in the cables. Smell of burnt electrical wires. Smell of burnt electrical wires. Smell of burnt electrical wires. Division Inspection and Hamtenance: Electric Traction Hostowy Sensory Inspection Physical Senses Rattling or clicking of loose components such as rollers, hardware. Clicking near hoistway door. Clurking of counterweight or car landing on buffer. Excessive heat. Rough spots on release rollers. Loose hardware.



Module Length: 480 min

Time remaining: 450 min

This section: 20 min (6 slides)

Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 10 Ask **REVIEW** slide What may indicate a problem within the Sensory Inspection **Physical Senses** traction hoistway as indicated by touch? Rattling or clicking of loose components such as **ASK** rollers, hardware. Clicking near hoistway door. Clunking of counterweight or car landing on Discuss possible answers Excessive heat. Rough spots on release rollers Advance for sample answers Excessive heat. Rough spots on release Transit Elevator/Escalator Consortium rollers. Loose hardware **Instructor's Notes** Advance



Module Length: 480 min

Time remaining: 450 min

This section: 20 min (6 slides)

Section start time:

Section End Time:

Materials Needed DO SAY In your own words: Lets see what we have learned so far: ✓ PPT slide 11 **ASK** Excessive heat, rough spots on release Sensory Inspection rollers, and loose hardware would be detected Knowledge Check Excessive heat, rough spots on release rollers, and loose hardware would be detected by a ______ by a sensory inspection. b. smell a. sight c. hear d. touch b. smell Transit Elevator/Escalator Consortiu hear touch Instructor's Notes Call on participants for answer Advance once given the correct answer Answer: d. touch. Advance.



Module Length: 480 min

Time remaining: 450 min

This section: 20 min (6 slides)

Section start time:

Section End Time:

Materials Needed DO SAY In your own words: Clunking of a counterweight or car landing on ✓ PPT slide 12 **ASK** a buffer would be detected by a Sensory Inspection sensory inspection. Knowledge Check Clunking of a counterweight or car landing on a buffer would be detected by a ______ senso a. sight b. smell c. hear d. touch hear Transit Elevator/Escalator Consortiu touch **Instructor's Notes** Call on participants for answer Advance once given the correct answer Answer: c. Advance.

DO



Module Length: 480 min

Time remaining: 450 min

This section: 20 min (6 slides)

Section start time:

Section End Time:

Materials Needed

ASK

Instructor's Notes

In your own words:

Describe a possible hoistway problem which would be indicated by sight.

SAY

Call on participants for answer Advance once given the correct answer

Possible Answers:

Loose hardware, worn rollers, frayed cables, slack in cables, rust on the cable (rouging), dim lights, wear on selector tape, elongated holes in selector tape, excessive oil in the pit and/or dripping down the cylinders, water in the pit, debris in the pit and twists in the cables.

Advance.

✓ PPT slide 13

Sensory Inspection Knowledge Check 3. Describe a possible hoistway problem which would Transit Elevator/Escalator Consorti



Module Length: 480 min

Time remaining: 430 min

This section: 60 min

Section start time:

Section End Time:

Materials Needed

DO **ASK CLASSROOM ACTIVITY Instructor's Notes**

In your own words:

Take time to visit the field to provide an example demonstration and opportunities for participants to perform the following tests:

SAY

Perform a sensory inspection of the hoistway

Advance

✓ PPT slide 14





Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slides 15, 16 **REVIEW** slides Again, within the electric traction elevator system there are four main areas: machine 4 Main Areas room which we will cover later, overhead, > Overhead > Length of Hoistway length of hoistway, and pit. Advance Transit Elevator/Escalator Cons Lets start by looking at overhead components. Instructor's Notes Review locations of overhead components Operational as indicated on diagram: Inspection & Maintenance Refuge space Overhead Sprinkler head Smoke detector Heat detector Limit switches Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: **REVIEW** slide Refer participants to ✓ PPT slide 17 **Participant Course book REFER** participants to Course book Course book for chart to write additional notes. Transit Elevator/Escalator Consortiur Advance **Instructor's Notes** Course book



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

DO	SAY	Materials Needed
REVIEW slides 2 ASK	In your own words: Ask Where is overhead clearance? Allow participants to discuss answer. Advance Advance Advance and share photo. Advance	✓ PPT slides 18, 19 Decador Inspection and Hantenance: Electric Traction Hoistway Overhead Refuge Space Overhead Overhea
Instructor's Notes	Many hydraulic elevators have very limited overhead clearance. Ask What is refuge space? Allow participants to discuss answer. Advance Elevators require a certain amount of overhead clearance (refuge or runby space) to accommodate essential components on top of the car. Do Not Advance	Nefuge Space or Overhead Clearence • Accommodates essential top of car components • Measured from upper level floor to lowest obstruction in top of hoistway • Ensure area is free of debris and hazards • Ensure are is free of debris and hazards • Ensure any needed warning signs are in place See ArT 1 Section 1 and 2.4.T. ArT 2 2.4. for a debited revieword code requirements for overhead chearance Transit Elevator/Escalator Consortium 14

Instructor's Guide

This section: 120 min (50 slides) Section start time:



Module Length: 480 min Time remaining: 370 min Section End Time: DO SAY **Materials Needed** In your own words: **REVIEW** slide Overhead clearance is measured from the ✓ PPT slide 19 upper level floor to the lowest obstruction in the top of the hoistway. Make sure that this **REFER** participants to area is free of any debris or hazards. Make Before maintenance **ASME A17.1** Verify available refuge space · Most likely limited sure that necessary warning signs are in Be aware of top car emergency stop switch **ASME A17.2** Ensure area is free of debris and hazards place. **ASME A17.3** Advance Transit Elevator/Escalator Consortiur Instructor's Notes **ASME A17.1** Refer participants to **ASME A17.2 ASME A17.3** A17.1 Sections 1 and 2.4.7.1, A17.2 Section 3.4.1 and A17.3 Sections 1 and 2.4, for a detailed review of code requirements for overhead clearance Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 20 Ask **REVIEW** slides Lets talk about heat and smoke detectors. Heat/Smoke Detectors Who maintains these items? Visual inspection **ASK** - No damage Allow participants to discuss answer. - Nothing out of ordinary Advance and share diagram. Advance While the job to check the operation of heat Instructor's Notes and smoke detectors is generally left to fire inspectors, elevator technicians should visually check these components. Make sure the unit is intact and not separated from its base. Also check that there is no damage such as cracks. Visually note anything out of the ordinary. Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

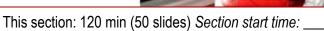
Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slides 21, 22 Ask **REVIEW** slides What is a hoistway vent? Allow participants to discuss answer. **ASK** Advance and share photo. Advance The hoistway vents located at the top of the overhead allows heat to dissipate from the Instructor's Notes hoistway. · Ensure intact and secure Advance · Test operation of louvers if present Make sure the hoistway vent is intact and secure. If louvers are present, make sure they Transit Elevator/Escalator Consort are operational. Check for debris stuck to the vent, obstructing the flow of air. One item that is commonly found here is newspaper. Advance

Instructor's Guide

Module Length: 480 min

Time remaining: 370 min





DO	SAY	Materials Needed
REVIEW slides REVIEW slides REVIEW slides REVIEW slides	In your own words: Ask Lets talk about guide rail brackets. What are guide rail brackets? Allow participants to discuss answer. Advance Examine the guide rail brackets for loose fastenings and proper fit at the joints. Check for corrosion. Because rail brackets have a protruding ledge that runs horizontally, dirt and dust can collect on top. Make sure to clean these surfaces. Advance Ask What is a limit switch? Allow participants to discuss answer. Advance and share photo. Advance	PPT slides 23, 24 Lieutor Inspection and Haintenance: Electric Traction Hoistway Overhead Guide Rail Brackets 1. Inspect for loose fastenings and proper joint fittings 1. Inspect for corrosion 1. Clean top surfaces where dust and dirt collect Dimensional Elevator/Escalator Consortium 22 Limit Switches Limit Switches Aver



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

DO	SAY	Materials Needed
REVIEW slide	In your own words: There are three types of limit switches in the hoistway of transit elevators. One set is located in the overhead and the other set is located in the pit. Advance If limit switches appear sticky, clean the arm or activator.	✓ PPT slide 25 Therefor Inspection and Haintenance: Textice Traction Hointway Overhead Limit Switches • Locations: overhead and pit • Sticky appearance - Clean arm or advistor • Confirm alignment and secure fastening, adjust if needed • Switch roller should strike cam bevel • Replace worn roller, lubricate pivot points • Examine switch confacts and assemblies, wipe clean)))) Transit Elevator/Escalator Consortium
Instructor's Notes	Advance Check that the switches and cams are aligned correctly and are securely fastened and adjust accordingly. Advance The switch roller should strike the bevel of the cam and should be adjusted accordingly. Advance Replace worn rollers and lubricate pivot pins. Advance	



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slides 25, 26 **REVIEW** slides Examine the switch contacts and assembly for proper movement (contacts should wipe) Limit Switches and reaction and, where required, repair or · Locations: overhead and pit · Sticky appearance - Clean arm or activator replace. · Confirm alignment and secure fastening, adjust if · Switch roller should strike cam beve Note: you may need a ladder to reach some · Replace worn roller, lubricate pivot points Examine switch contacts and assemblies, wipe of the switches in order to test them. Transit Elevator/Escalator Consortiur Advance Instructor's Notes Overhead Normal Limit Switches > Operate car on inspection mode to where bottom For **Normal Limit Switches**, operate the car normal limit device can be reached > Activate normal limit device > Run car, should run up but not down on inspection mode to a point where the > Repair as needed bottom normal limit device can be reached. Activate the normal limit device. The car Transit Elevator/Escalator Consortiur should run up, but not down. If not functioning as designed, correct the defect as required. Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: **REVIEW** slide For **Final Limit Switches**, operate the car on inspection speed to a point where the final stopping device can be reached. Activate the bottom final device and try to move the car. The car should not move in either direction. If the car moves repair the defect. Advance Instructor's Notes

✓ PPT slide 27

	Overhead	
Final Li	mit Switches	
	te car on inspection mode to where find ng device can be reached	al
> Activa	te bottom final device	
> Try to	move car	
> Car sh	ould not move in either direction	
> Repair	as needed	
Mr. Transit	Elevator/EscalatorConsortium	



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

SAY

Section End Time:

Materials Needed

DO **ASK** Instructor's Notes

In your own words:

Lets see what we have learned so far: What should Yvonne do when performing an inspection and maintenance of a limit switch?

Call on participants for answer Advance once given the correct answer

Answer:

- Sticky appearance
 - Clean arm or activator
- Confirm alignment and secure fastening, adjust if needed
- Switch roller should strike cam bevel
- Replace worn roller, lubricate pivot points
- Examine switch contacts and assemblies, wipe clean

Advance

✓ PPT slide 28





Module Length: 480 min

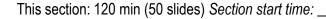
Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

DO	SAY	Materials Needed
? ASK	In your own words: Yes or No. When testing a final limit switch, the car should not move in either direction. Call on participants for answer Advance once given the correct answer Answer: Yes Advance	✓ PPT slide 29 Devator Inspection and Haintenance: Electric Traction Hostway Overhead Knowledge Check 2. Yes or No. When testing a final limit switch, the car should not move in either direction. """ """ """ """ """ """ """
Instructor's Notes	Advance	

Instructor's Guide







Materials Needed DO SAY In your own words: ✓ PPT slide 30 **REVIEW** slides Review locations of length of hoistway components as indicated on diagram: Governor rope Operational Inspection Hoist rope Maintenance Guide rails Length of Hoistway **Dust cover** Door frame Instructor's Notes Fish plate Cable support grip Counterweight Halfway box Traveling cable Fascia plates Rail brackets Selector tape Compensating cable Advance



Module Length: 480 min

Time remaining: 370 min

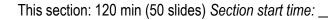
This section: 120 min (50 slides) Section start time:

DO	SAY	Materials Needed
REVIEW slide	In your own words: Refer participants to	✓ PPT slide 32
REFER participants to	Participant Course book	Length of Hoistway Harris Harr
Course book	for chart to write additional notes.	Course book p. 149 ware
	Advance))))))-Transit Elevator/Escalator Consortium
Instructor's Notes		✓ Course book

Instructor's Guide

Module Length: 480 min

Time remaining: 370 min

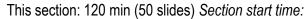




DO SAY Materials Needed
REVIEW slides Ask What is a halfway junction box? Allow participants to discuss answer. Advance and share photo locations on diagram. Advance Sheaves Grease all sheave bearings in the hoistway, including the deflector sheaves attached to the crosshead, in the overhead, under the car (if under slung), and mid shaft (if applicable). Advance The grease fitting, many times referred to as "Zerk fitting", is used to feed lubricating grease into the sheave bearing. Advance

Instructor's Guide







DO	SAY	Materials Needed
REVIEW slides REVIEW slides REVIEW slides REVIEW slides	In your own words: Ask What is a traveling cable? Allow participants to discuss answer. Advance and share ✓ photo ✓ labeled parts ✓ locations on diagram. Advance Look for wear, chafing, kinking and alignment. Examine for chafing points such as caused by exposure to beams, bolts, or rough wall. Make sure that there is no fraying on the outer insulation sheave. Protect cable from chafing. Examine attachment points for secure fastening and looseness. Fasten securely. Check that the cable support or Kellum grips are present and in good shape at both terminating points of the traveling cable. Advance	PPT slides 34 35 Devator Inspection and Hantenance: Electric Traction Hostway Length of Hoistway Traveling Cable ■ Examine of Traveling points ■ Ensure no fraying on outer insulation sheave ■ Examine attachment for fastening and fooseness ○ Check cable support grips or Kellum grips ■ Ensure good shape at both terminating points)))))) Transit Elevator/Escalator Consortium If



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 36 Ask **REVIEW** slide What is a hoist ropes? Allow participants to discuss answer. **Hoist Ropes ASK** Advance and share photo labeled parts locations on diagram. **Instructor's Notes** Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

DO	SAY	Materials Needed
REVIEW slide	In your own words: For hoist ropes — Inspect the ropes for corrosion (rouging), crown wear, broken strands and equal tension. Advance Examine the shackles, springs, bolts and cotter pins.	✓ PPT slide 37 **Length of Hoistway **Length of Hoistway **Hoist Ropes** • Examine ropes for corrosion, crown wear, broken strands and equal tension • Examine shades, springs, bolts and cotter pins • Verify ropes • securely fastened • free of dirt and excessive oil • Use rope gauge, check for proper rope size • Very threading through shackles is minimum ½ inch **Transit Elevater/Escalator Consortium**
Instructor's Notes	Advance Verify that the ropes are securely fastened and free of dirt and excessive oil. Advance Using a rope gauge, check for proper rope size. Advance Verify that the cable being threaded through the shackles, to prevent the rotation of the ropes, is a minimum of ½ inch. Advance	



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

DO	SAY	Materials Needed
REVIEW slide	In your own words: Examine ropes for signs of lubricant build-up of Advance solids, such as metal shavings from sheaves and ropes;	✓ PPT slide 38 Checator Impection and Hainterance: Electric Traction Holistway
Instructor's Notes	Advance and non-solids, such as lubricant filled with contaminants. Advance The acceptable method of cleaning elevator ropes is manually with a brush. Some transit properties use an automatic rope cleaner. Advance	- Manually with brush - Some transit agendes use automatic rope deaner)))))) Transit Elevator/EscalatorConsortium 37



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

SAY

Section End Time:

Materials Needed

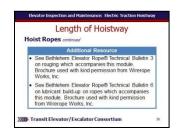
DO **REVIEW** slide **REFER** participants to Bethlehem Rope Technical Bulletin 3 & 6 Instructor's Notes

In your own words: Refer participants to

- Bethlehem Elevator Rope® Technical Bulletin 3 on rouging which accompanies this module. Brochure used with kind permission from Wirerope Works, Inc.
- Bethlehem Elevator Rope® Technical Bulletin 6 on lubricant build-up on ropes which accompanies this module. Brochure used with kind permission from Wirerope Works, Inc.

Advance

✓ PPT slide 39



Bethlehem Rope Technical Bulletin 3 & 6



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO	SAY	Materials Needed
REVIEW slide REVIEW slide REVIEW slide REVIEW slide	In your own words: Ask What is a rope fastenings? Allow participants to discuss answer. Advance and share ✓ photo ✓ labeled parts ✓ locations on diagram. Advance Examine the suspension, compensating ropes and fastenings for secure fastening with both nuts secure and cotter pins installed. Advance Examine equalizer springs for proper positioning and the presence of any breaks. Advance	PPT slide 40 Length of Hoistway Rope Fastenings ■ Examine for secure fastening with both ruts secure and prins installed ■ Suspension ■ Compensating ropes ■ Fastening ■ Proper position ■ Presence of breaks



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 41 Ask **REVIEW** slide What are compensating ropes and chains? Allow participants to discuss answer. Compensating Ropes and · Examine for wear, breakage **ASK** Advance and share Check secure fastening of · Ensure no dragging on pit photo labeled parts locations on diagram. **Instructor's Notes** Advance Look for wear, breakage, rust (rouging) and fraying ropes. Check that terminating ends are securely fastened. Make sure they are not dragging on the pit floor. If they are dragging this means that runby space may be inadequate. Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 42 Ask **REVIEW** slide What is a governor rope or cable? Governor Rope / Cable Allow participants to discuss answer. **ASK** Advance and share photo labeled parts locations on diagram. **Instructor's Notes** Advance



Module Length: 480 min

Time remaining: 370 min

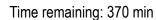
This section: 120 min (50 slides) Section start time:

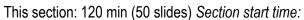
Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 43 **REVIEW** slide ASME code prohibits any lubrication of the governor cable. Lubricating the governor rope Length of Hoistway Governor Rope / Cable or cable will affect the of the governor jaws to · ASME prohibits lubrication Inspect for crown wear, broken strands, or reduced cable diameter engage correctly in an emergency. · Report defects following transit agency standard procedures · Ensure secure attachment at safety carrier or safety **Advance** Check for crown wear, broken attachment point, adjust as needed · Clean dirt and grease contaminants strands, or reduced cable diameter. Some Transit Elevator/Escalator Consortium transit agencies provide their mechanics with Instructor's Notes a pocket-sized some gauge to check rope diameter and whether or not the diameter may be worn beyond allowable specifications. **Advance** Report defects with the governor rope and follow the standard maintenance procedures of the transit agency. **Advance** Check that there is a secure attachment at the safety carrier or safety attachment point and adjust accordingly. **Advance** Clean dirt and grease contamination. Advance

Elevator – Electric Traction Hoistway

Instructor's Guide







Module Length: 480 min	Time remaining: 370 mi	in This section: 120 min (50 slides) Section start time:	Section End Time:
DC		SAY	Materials Needed
REVIEW sli REVIEW sli REVIEW sli REVIEW sli	ide	In your own words: Ask What are guide rails, brackets, or joints? Allow participants to discuss answer. Advance and share ✓ photo ✓ labeled parts ✓ locations on diagram. Advance	✓ PPT slide 44 Devator Impection and Haintenance: Dectric Traction Hoistway Length of Hoistway Guide Rails, Brackets, Joints MANON: MAN



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slides 45, 46 **REVIEW** slides Inspect the guide rails, guide rail brackets, rail joints and connecting plate for corrosion and Length of Hoistway Guide Rails, Brackets, Joints loose hardware and repair as required. · Inspect for corrosion and loose hardware - repair as · Guide rails Advance Clean guide rails of any lint and - Check rails for nicks, gouges, and burs - repair as dirt. Check rails for nicks, gouges and burs - Check alignment (very important in earthquake areas) · Lubricate shoes if present and repair as required. Check alignment Transit Elevator/Escalator Consortiu visually or with a laser. This is especially Instructor's Notes significant in earthquake-prone areas. Length of Hoistway Guide Rails, Brackets, Joints a · Roller guides Advance If use shoes, then have to - Inspect for wear - Lubricate per OEM and transit authority recommendations lubricate. - Check fit and alignment with rail - Inspect for loose fastenings and fit Advance Transit Elevator/Escalator Consortium With roller guides, rails don't get as dirty though they are more prone to dust. Inspect for wear; lubricate per OEM or Authority recommendations; check roller guides for fit and alignment with rail; inspect guide rail for loose fastenings and fit. Clean. Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: Ask **REVIEW** slide What is a selector tape? Allow participants to discuss answer. **ASK** Advance and share photo labeled parts locations on diagram. **Instructor's Notes** Advance

✓ PPT slide 47





Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 48 **REVIEW** slide Examine the stationary **selector tape** by shining a flashlight beam parallel with the tape Length of Hoistway Selector Tape and check for any bends or cracks. · Examine stationary selector tape - Flashlight beam parallel with tape Advance Examine the sensor guides on the - Check for bends or cracks · Examine sensor guides or stationary tape for wear Replace when guide groove is 2x width of tape stationary tape for wear. If the guide groove is · Ensure fastened at each end · Magnetic selector tape: examine for grime, etc. · Holed selector tape: holes not elongated twice the width of the tape thickness, it should Transit Elevator/Escalator Consortiun be replaced. Instructor's Notes **Advance** Make sure that the selector tape is securely fastened at each end. **Advance** For magnetic selector tapes, examine the magnets on tape for grime build up or materials that may interfere with their operation. **Advance** For ones with holes, make sure that the holes are not elongated. Advance

Elevator – Electric Traction Hoistway

Instructor's Guide



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

SAY

Section End Time:

Materials Needed

DO **REVIEW** slides **ASK** Instructor's Notes

In your own words:

Ask

What is a fish plate?

Allow participants to discuss answer.

Advance and share

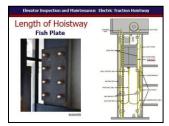
- photo
- labeled parts
- locations on diagram.

Advance

Inspect the fish plates checking for corrosion and loose hardware. Repair defects as required.

Advance

✓ PPT slides 49, 50

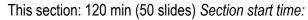




Elevator – Electric Traction Hoistway

Instructor's Guide







3	, ,	
DO	SAY	Materials Needed
REVIEW slide REVIEW slide REVIEW slide REVIEW slide	In your own words: Ask What is a fascia plate? A dust cover? Allow participants to discuss answer. Advance and share ✓ photo ✓ labeled parts ✓ locations on diagram. Advance Inspect the fish plates checking for corrosion and loose hardware. Repair defects as required. Advance	✓ PPT slide 51 Devator Impection and Haintenance: Checke Traction Holdway Fascia Plates & Dust Covers 88.4.1
		1



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slides 52, 53 **REVIEW** slides Examine the entire shaft and ensure that all fascia plates and dust covers are in place, Length of Hoistway Fascia Plates & Dust Covers aligned correctly, and securely fastened. · Examine entire shaft · Ensure all are Advance - Aligned - Securely fastened Examine fascia plate for scrapes Examine the **fascia plate** for presence of · Secure loose dust covers as needed scrapes. Check and secure loose dust Transit Elevator/Escalator Consortiu covers. Instructor's Notes Advance Length of Hoistway · Ensure secure attachment at safety carrier o attachment point · Examine crosshead linkage in relation to safeties a hottom rail shoes Ensure a secure attachment at the safety - Set screws - Pins - Mechanical keys carrier or safety attachment point. - Rode - Connection points **Advance** Examine the crosshead linkage Transit Elevator/Escalator Consortiu (where applicable) for the condition of the set screws, pins, mechanical keys, rods and connection points to the safeties located at the bottom rail shoes. Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 54 **REVIEW** slide If the plank/safety switch is located on the cross head, activate and verify that the Length of Hoistway elevator will not move. · If plank/safety switch is on crosshead, activate and verify elevator will not move "Type B" safeties **Advance** On elevators with "type B" safeties, Clean and lubricate threaded rod and drum beneath car in safety plank - Examine tail rope clean and lubricate the threaded rod and · Verify rust-free and tight on drum · Located in deflector pulley to deploy as designed, not to kink or break drum beneath the car in the safety plank. Transit Elevator/Escalator Consortiur **Advance** Examine the tail rope that attaches Instructor's Notes to the safety carrier. Verify that it is rust-free and tight on the drum. Also check that the tail rope is in the deflector pulleys, so that when activated it will deploy as designed and not kink or break. Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slides 55, 56 Ask **REVIEW** slide What is a halfway junction box? Length of Hoistway Allow participants to discuss answer. Halfway Junction Box **ASK** Advance and share photo labeled parts locations on diagram. **Instructor's Notes** Advance Length of Hoistway **Halfway Junction Box** · Ensure terminating end of traveling cable is secure to hoistway box · Ensure secure fastening to bulkhead · Inspect cable grip for good condition At the junction box, ensure that the · Ensure cover is in place terminating end of the traveling cable is securely fastened to hoistway box. Transit Elevator/Escalator Consortiu **Advance** Make sure it is securely fastened to the bulkhead. **Advance** Make sure cable support grip is present and in good condition. **Advance** Make sure cover is in place. Advance



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 57 **REVIEW** slide Verify that the gap between the up-thrust rollers and the track is 1/64 inch (0.39mm). Length of Hoistway Hoistway Eccentric Rollers Adjust as required. Verify gap between up-thrust rollers and track is 1/64 inches (0.39mm) · Adjust as needed Advance Transit Elevator/Escalator Consortiu **Instructor's Notes**

Elevator – Electric Traction Hoistway

Instructor's Guide

Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

SAY



DO **REVIEW** slide **ASK Instructor's Notes**

In your own words:

Ask

What is a counterweight and a counterweight guard?

Allow participants to discuss answer. Advance and share

- photo
- labeled parts
- locations on diagram.

Advance

Safety Warning - BE EVER VIGILENT when working near the counterweight Advance

✓ PPT slide 58

Length of Hoistway		e0/400
Counterweight and Guards	8 9	then
Warning: Safety Precautions!		10
BE EVER VIGILENT when working near the counterweight.		-
A		Par 100



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO	SAY	Materials Needed
REVIEW slide Instructor's Notes	In your own words: Examine the elevator counterweight and its assemblies. Advance Check and tighten rods and bolts as required. Advance Examine shackles and verify all shackle fastenings are tight and secure. Advance Grease sheave bearing (only applies to 2:1 roping configuration). Advance Make sure counterweight runby is still adequate per code requirements. Advance Though presence of rust does not	Materials Needed ✓ PPT slide 59 Legato Impertion and Haintonance: Electric Traction Holetway Leggth of Holstway Counterweight and Counterweight Guards
	affect the integrity of the counterweight, the technician should check on the source of the dampness that may cause problems for other hoistway components. **Advance** Experienced mechanics call the counterweight the "silent killer" hence the necessity of having the guard in place. **Advance** Advance**	



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

SAY

Section End Time:

DO **REVIEW** slide Instructor's Notes

In your own words:

Lets look at counterweight rollers and shoes.

Advance

Inspect the guide rollers for wear and damage and replace as required. Examine the guide rollers for fit and alignment. Guide rollers should contact the rails with sufficient force to make a firm contact with the rail

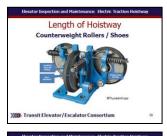
Advance Inspect all counterweight guide shoes for wear and damage and replace as required.

Advance

Review illustration with participants pointing out the rubber roller wheel, ball bearing, and stabilizing spring. Advance

✓ PPT slides 60, 61, 62

Materials Needed









Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

DO	SAY	Materials Needed
? ASK	In your own words: Lets see what we have learned so far: A is used to feed lubricating grease into the sheave bearing. a. Fish plate b. Selector tape c. Junction box d. Zerk fitting	✓ PPT slide 63 **Tevator Inspection and Haintenance: Bettre: Traction Heartway **Length of Hoistway **Knowledge Check** 1. A
Instructor's Notes	Call on participants for answer Advance once given the correct answer Answer: d. Advance	



Module Length: 480 min

Time remaining: 370 min

This section: 120 min (50 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 64 Tom is given the task to perform inspection **ASK** and maintenance of the counterweight and Length of Hoistway counterweight guards. What must Tom do to Knowledge Check Tom is given the task to perform inspection and naintenance of the counterweight and counterweight complete this task? uards. What must Tom do to complete this task? Call on participants for answer Transit Elevator/Escalator Consorti Advance once given the correct answer Answer: Instructor's Notes Examine counterweight and assemblies Tighten rods and bolts as needed Verify shackle fastenings are tight and secure 2:1 roping configuration – grease sheave bearing Ensure runby is adequate per code Inspect sources of any dampness "Silent Killer" – ensure guard is in place

Advance

Elevator – Electric Traction Hoistway

Instructor's Guide

Module Length: 480 min Time remaining: 250 min This section: 60 min

Section start time:

Section End Time:

Materials Needed

ASK



CLASSROOM ACTIVITY

DO

Instructor's Notes

In your own words:

[Take time to visit the field to provide an example demonstration and opportunities for participants to perform the following tests:

SAY

- Perform an inspection of components in a traction elevator hoistway
- Perform an operational test on all safety devices in the hoistway

Advance

✓ PPT slide 65





Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed

REVIEW slides

DO

Instructor's Notes

In your own words:

Review locations of overhead components as indicated on diagram:

SAY

Pit light

Stop switch, outlet, and GFI

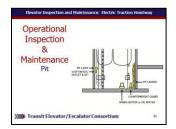
Pit ladder

Counterweight guard

Spring buffer or oil buffer

Advance

✓ PPT slide 66





Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO	SAY	Materials Needed
REVIEW slide	In your own words: Refer participants to	✓ PPT slide 67 Becator Impertion and Haintenance. Electric Traction Holetony
REFER participants to Course book	Participant Course book	Pit Course book Prison
	for chart to write additional notes.	Companies (form Versity (form Use form Commande Bades
Instructor's Notes	Advance	>>> Transit Elevator/Escalator Consortium ✓ Course book



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 68 **REVIEW** slides The **pit** floor should be cleaned using a dustpan and broom. Never pick up trash with your bare hand. Clean the pit floor of any oil, grease, dirt and debris Any oil, grease, dirt and debris Examine bottom level landing sills, clean as neede · Examine fascia below lower landing for secure **Advance** Examine the bottom level landing . Turn in found valuables as per transit authorit · Check for water infiltration sills and clean as required. Transit Elevator/Escalator Consortiu **Advance** Examine the fascia below the lower Instructor's Notes landing for secure fastening. Make necessary repairs as required. **Advance** Any valuable items found in the pit, such as keys, jewelry or other items, must be turned in to appropriate person or department as per your local transit agency policy. **Advance** Check for water infiltration. Clean the pit floor of any oil, grease, dirt and debris. Advance



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 69 Ask **REVIEW** slide What is governor tension sheave Allow participants to discuss answer. Required to keep proper tension on governor cable during **ASK** Advance The governor rope tension sheave is required When tripped, elevator must be deemed for safe operation and then system is reset to keep proper tension on the governor cable Transit Elevator/Escalator Conso during operation of the elevator. Instructor's Notes **Advance** There are two governor sheaves: one in the machine room and one in the pit. **Advance** If the elevator has experienced an overspeed condition in which the governor tripped and set the safety, it will be necessary to reset the system after the elevator has been deemed safe for operation. Advance

Elevator – Electric Traction Hoistway

Instructor's Guide

Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:



DO	SAY	Materials Needed
REVIEW slide REVIEW slide REVIEW slide REVIEW slide	In your own words: Ask What does GFI stand for? Allow participants to discuss answer. Advance Ground Fault Circuit Interrupter (GFI Receptacle) Set and reset the GFI to make sure it is functioning properly. If it is not, replace it. Advance Pit Ladder Make sure the pit ladder is in place and securely fastened. Check to make sure the rungs are not oily. If they are, clean them. Advance	PPT slide 70 Clevator Impection and Maintenance: Electric Traction Holethery FIT Receptacle - Set and reset, test for proper function - If not functioning, replace PPT Ladder - Ensure in place, securely fastened - Clean rungs if oily "Transit Elevator/Escalator Consortium 15



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 71 **REVIEW** slides Pit Light Check the operation of the pit lighting and Check operation of lighting and receptacles. Verify that the pit light has Verify installation required safety guard installed. of safety guard Sump Pump Advance · Lift float rod, ensure operation · Check cover Pit Sump Pump Transit Elevator/Escalator Consort Verify that the **sump pump** is operational by Instructor's Notes lifting the **float rod**. If it is not functioning as designed, correct the defect. Note that sump pumps in pits, where provided, must be covered. Check that the cover is secured and level with the pit floor. Advance

DO



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

SAY

Section End Time:

Materials Needed

REVIEW slides Instructor's Notes

In your own words:

Pit Stop Switch

Advance

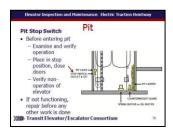
Examine the condition and verify operation of the **stop switch** before entering the pit. Verify that the pit stop switch is operational and prevents the car from moving when activated. Place the pit stop switch in the stop position and close the doors to verify that it will prevent operation of the elevator. **Advance** If the pit stop switch does not function properly, it must be repaired before

any other work is done. Make necessary

Advance

repairs as required.

✓ PPT slide 72



Elevator – Electric Traction Hoistway





This section: 60 min (31 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slides 73, 74 **REVIEW** slides Rope gripper safety warning: Whenever Working on Rope Gripper, KEEP HANDS CLEAR. Forces created can cause Rope Grippe injury. Advance Check that the ropes between the stationary Instructor's Notes and movable shoes on the rope gripper. Ensure ropes are between Ropes should be an even distance from the stationary and movable sho - Even distance from shoes - Almost touch stationary sh shoes - side to side and top to bottom. Ropes · Adjust gripper as needed Replace shoe lining when should almost touch the stationary shoe excessive wear is preser lining. Uneven ropes or a gripper that is Transit Elevator/Escalator Consorti installed at a bad angle will cause excessive and accelerated brake lining wear. Advance Adjust gripper as necessary and **Advance** replace shoe lining when there is excessive wear. Advance



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 75 Ask **REVIEW** slide What is compensating sheave? Allow participants to discuss answer. Activate switch, verify prevention of car movement Clean switch **ASK** Advance · Verify not landed and within limit of guide rails Grease bearings as required Activate the compensating sheave switch and verify that it will prevent the car from moving. Transit Elevator/Escalator Consorti **Advance** Clean the switch and lubricate the Instructor's Notes pivot point as required. **Advance** Verify that the compensating sheave is not landed and is within the limit of the guide rails. **Advance** Grease the bearings as required. Advance



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO	SAY	Materials Needed
REVIEW slide REVIEW slide REVIEW slide REVIEW slide	In your own words: Ask Again what is a traveling cable? Allow participants to discuss answer. Advance Verify that the traveling cable is not touching the pit floor or rubbing against any other equipment. Advance Examine the cables for wear, twists or damage (may need to inspect from top of the car). Advance Check that the traveling cable is securely fastened to all junction boxes (may need to inspect from on top of the car). Advance	✓ PPT slide 76 Devator Inspection and Haintenance: Electric Traction Hostway Pit Traveling Cables • Verify proper location • Not on floor • Not nubbing against other equipment: • Examine cables • Wear, kvists or damage • Check for secure fastering to junction boxes **Transit Elevator/Escalator Consortium** 74



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 77 Ask **REVIEW** slide Again, what do we know about limit switches? Limit Switches Discuss participant ideas. · Sticky appearance **ASK** There are three types of limit switches in the · Confirm alignment and secure fastening, adjust i · Switch roller should strike cam bevel · Replace worn roller, lubricate pivot points hoistway of transit elevators. One set is · Examine switch contacts and assemblies, wipe located in the overhead and the other set is Transit Elevator/Escalator Consortiur located in the pit. Inspection and maintenance Instructor's Notes in a traction systems is similar to hydraulic systems. **Advance** If limit switches appear sticky, clean the arm or activator. **Advance** Check that the switches and cams are aligned correctly and are securely fastened and adjust accordingly. **Advance** The switch roller should strike the bevel of the cam and should be adjusted accordingly. Advance



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed

DO **REVIEW** slide **ASK** Instructor's Notes

In your own words:

Replace worn rollers and lubricate pivot pins. **Advance** Examine the switch contacts and assembly for proper movement (contacts should wipe) and reaction and, where required, repair or replace.

SAY

Note: you may need a ladder to reach some of the switches in order to test them.

Advance

✓ PPT slide 77





Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed

REVIEW slides

DO

Instructor's Notes

In your own words:

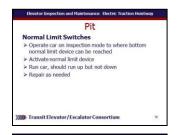
For **Normal Limit Switches**, operate the car on inspection mode to a point where the bottom normal limit device can be reached. Activate the normal limit device. The car should run up, but not down. If not functioning as designed, correct the defect as required. Advance

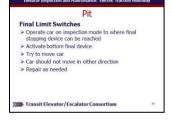
SAY

For **Final Limit Switches**, operate the car on inspection speed to a point where the final stopping device can be reached. Activate the bottom final device and try to move the car. The car should not move in either direction. If the car moves repair the defect.

Advance

✓ PPT slides 78, 79







Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slides 80 **REVIEW** slides Advance Verify that the counterweight is not touching Verify not touching the counterweight buffer the counterweight buffer. And remember when working near the Warning: Safe Precautions! counterweight, be ever vigilant! BE EVER VIGH ENT Advance F Transit Elevator/Escalator Consort **Instructor's Notes**



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 81 Ask **REVIEW** slide What is a buffer? Discuss participant ideas. · Trip car and switch, verify non-**ASK** Advance Clean switch as · Check for secure Inspect the operation of the car and fastening and Check oil level as counterweight buffer switch (if applicable) by needed and per OEM recommendations Transit Elevator/Escalator Consor tripping and verifying that the car will not run. Instructor's Notes Clean the switch as required. Check that the car and counterweight buffers are securely fastened and are aligned with the striker plates. Where oil buffers are used, check the oil level adding oil per OEM recommendations. Advance

DO



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed

ASK

Instructor's Notes

In your own words:

Lets see what we have learned so far: What should Bobby do before entering the pit with regard to the pit stop switch?

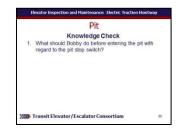
SAY

Call on participants for answer Advance once given the correct answer

Answer:

- Examine and verify operation
- Place in stop position, close doors
- Verify non-operation of elevator

Advance



DO



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

SAY

Section End Time:

Materials Needed

ASK

Instructor's Notes

In your own words:

Yes or No. Whenever Working on Rope Gripper, Jim should keep hands clear as forces created can cause injury.

Call on participants for answer Advance once given the correct answer

Answer: Yes

Advance





Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed DO SAY In your own words: **REVIEW** slide Refer participants to ✓ PPT slide 84 Operational Inspection & Maintenance **Participant Course book REFER** participants to Attached to Car Course book for chart to write additional notes. Transit Elevator/Escalator Consorti Advance **Instructor's Notes** Course book



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed

DO **REVIEW** slide **ASK Instructor's Notes**

In your own words:

Ask

What do we see on the top of the car here? Discuss participant ideas. Advance Discuss photo and title. Advance

SAY





Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

DO	SAY	Materials Needed
REVIEW slides Instructor's Notes	In your own words: For the Stop Switch Advance Before entering the top-of-car, place the stop switch in the stop position. Then allow the doors to close and verify that the car will not run. And for the Top of Car Operator and Light Advance Examine the top of car operator, stop switch and light by testing for proper operation. Any needed repairs must be made to the top-of- car operator, stop switch and light before proceeding with any other maintenance.	Materials Needed ✓ PPT slides 86 Levator Importion and Haintenance: Electric Traction Holdstway Attached to Car Stop Switch • Before entering, place stop switch in stop position • Allow doors to close and verify car will not run Top of Car Operator and Light • Test operator, stop switch and light for operation • Repairs must be made before other maintenance • Missing guards should be replaced)))) Transit Elevator/Escalator Consortium 13
	Always maintain the guard on the top car light. If the guard is missing, it must be replaced. Make all needed repairs. Advance	



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slides 87 **REVIEW** slides **Roller Guides** Examine the **roller guides** atop the car to Attached to Car Roller Guides determine the condition of the rollers and fit - Determine condition and fit on rail - If needed, adjust for firm fit against guide rail on the rail. If required, adjust for a firm fit · Roller guides barely turned by hand Check for alignment and wear in support pivots against the guide rail whereby the roller · As per manufacturer and authority guidelines guides are just barely able to be turned by Transit Elevator/Escalator Consortium hand. Check for proper roller guide alignment Instructor's Notes with the guide rail. Check the support pivots for evidence of wear. Lubricate the pivot bushing per manufacturer and authority quidelines. Advance



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slides 88, 89 **REVIEW** slides **Bottom Roller Guides** Examine the lower roller guides to determine Attached to Car Roller Guides the condition of the tires and fit on the rail. If - Determine condition and fit of tires on rail - If needed, adjust for firm fit against guide rail required, adjust for firm fit against the rail · Roller guides barely turned by hand Check for alignment and wear in support pivot whereby the roller guides are just barely able - Lubricate pivot bushing · Few drops of 3-in-1 machine oil · Through housing hole Make repairs as needed to be turned by hand. Check for proper roller Transit Elevator/Escalator Consorti guide alignment with the guide rail. Check the Instructor's Notes support pivots for evidence of wear. Lubricate Attached to Car Car Guide Shoes · Check for the pivot bushing with a couple of drops of 3-- Pad thickness - Tightness of hardware - Shoes move freely and smoothly in-1 machine oil through the hole in the housing. Make necessary repairs or adjustments as required. Transit Elevator/Escalator Consortium Advance Car Guide Shoes In cases where guide shoes are used instead of guide rollers, check pad thickness, tightness of hardware, and that the shoes move freely and smoothly.

Advance



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

In your own words: Ask How do we replace car guides or shoes? Discuss participant ideas. Advance Replacing Guides/Shoes When an elevator car is misaligned on the guide rail, it is often because of faulty roller guides and/or guide shoes. To replace a guide roller start by marking its position on the crosshead by putting a box around the outside of its mounting bracket. This will make it easy to know exactly where the new roller guide/shoe assembly should be placed. Next, loosen spring tension so that	DO	SAY	Materials Needed
you can pull the rollers back. Lastly, remove the four bolts at the bottom and lift the assembly off. Advance	? ASK	Ask How do we replace car guides or shoes? Discuss participant ideas. Advance Replacing Guides/Shoes When an elevator car is misaligned on the guide rail, it is often because of faulty roller guides and/or guide shoes. To replace a guide roller start by marking its position on the crosshead by putting a box around the outside of its mounting bracket. This will make it easy to know exactly where the new roller guide/shoe assembly should be placed. Next, loosen spring tension so that you can pull the rollers back. Lastly, remove the four bolts at the bottom and lift the assembly off.	Attached to Car Replacing Car Guides or Shoes McGred to Gar Replacing Car Guides or Shoes McGred to Gar Replacement 1. Mark by placing box around outside of mounting bracket 2. Losen spring tension to pull rollers back 3. Remove 4 bolts at bottom and lift off assembly

Elevator – Electric Traction Hoistway

Instructor's Guide

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:



Module Length: 480 min Section End Time: DO SAY **Materials Needed** In your own words: ✓ PPT slides 91, 92, 93 **REVIEW** slides Share photo and illustration. Advance Attached to Replacing Car Place a new a roller guide assembly inside the box you marked previously. Tighten into place by tightening the four bolts at the bottom and then tighten the spring tension so Instructor's Notes that the rollers are secure on the guide rail. Attached to Car Replacing Car Guides or Shoes Faulty roller guides or shoes result in misaligned ca Advance 1. Mark by placing box around outside o mounting bracket 2. Loosen spring tension to pull rollers back 3. Remove 4 bolts at bottom and lift off assembly 4. Place new roller guide within markings Car Fan 5. Tighten 4 bolts 6. Tighten spring tension to secure rollers on guide rai Clean car ventilation and fan opening. If Transit Elevator/Escalator Consorti necessary, remove the car fan and clean the Attached to Car blades or squirrel cage. Car Fan · Clean ventilation and fan opening · If needed, remove car fan and clean blades or squirrel Advance Transit Elevator/Escalator Consort

DO



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

Section End Time:

Materials Needed

ASK

Instructor's Notes

In your own words:

Lets see what we have learned so far: Yes or No. Faulty roller guides or shoes will not result in misaligned car.

SAY

Call on participants for answer Advance once given the correct answer

Answer: No. Faulty roller guides or shoes will result in a misaligned car.

Advance





Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

DO	SAY	Materials Needed
? ASK	In your own words: Lets see what we have learned so far: Number in correct order the steps for replacing car guides or shoes Remove 4 bolts at bottom and lift off assembly	✓ PPT slide 95 Revetor Inspection and Hammanous (Betric Traction Hoseivary) Attached to Car Knowledge Check Revetor shoes
Instructor's Notes	 Tighten 4 bolts Place new roller guides within markings Tighten spring tension to secure rollers on guide rail Mark by placing box around outside of mounting bracket Loosen spring tension to pull back rollers 	Mark by pleting box around outside of mounting bracket Loosen spring tension to pull back rollers
	Call on participants for answer Advance once given the correct answer	



Module Length: 480 min

Time remaining: 190 min

This section: 60 min (31 slides) Section start time:

DO	SAY	Materials Needed
Instructor's Notes	In your own words: Answer: 1. Mark by placing box around outside of 2. mounting bracket 3. Loosen spring tension to pull rollers back 4. Remove 4 bolts at bottom and lift off assembly 5. Place new roller guide within markings 6. Tighten 4 bolts 7. Tighten spring tension to secure rollers on guide rail Advance	PPT slide 96 Devotor Inspection and Hamtenance: Electric Traction Hostway Attached to Car Knowledge Check 2. Answer: 1. Mark by placing box around outside of mounting bracket 2. Loosen spring fension to pull rollers back 3. Remove 4 bots at bottom and lift off assembly 4. Place new roller guide within markings 5. Tighten 4 bots 6. Tighten spring fension to secure rollers on guide rail)))) Transit Elevator/Escalator Consortium H

Elevator – Electric Traction Hoistway

Instructor's Guide



Module Length: 480 min

Time remaining: 130 min

This section: 10 min (1 slide)

Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 97 **REVIEW** slide Review locations of lighting as indicated on diagram: Always in on car top and pit, sometimes in Inspection Maintenance hoistway and on bottom of car. The presence of lights along the hoistway is Check condition of all lighting much more likely in traction elevators as they generally have longer hoistways than Instructor's Notes hydraulic elevators. **Advance** Make sure to check the condition of all lighting components including lenses, covers and bulbs. For more information on inspection and maintenance of lighting in transit elevators refer to Module 2 in this course. Advance



Module Length: 480 min

Time remaining: 120 min

This section: 20 min (3 slides)

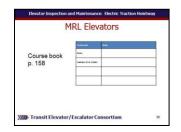
Section start time:

Section End Time:

Materials Needed

DO SAY In your own words: **REVIEW** slide Refer participants to **Participant Course book REFER** participants to Course book for chart to write additional notes. Advance **Instructor's Notes**

✓ PPT slide 98



Course book



Module Length: 480 min

Time remaining: 120 min

This section: 20 min (3 slides)

Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: ✓ PPT slide 99 **REVIEW** slide Inspecting and maintenance of MRL elevators are similar to the procedures for traction · Similar to standard electric traction elevators · MRL motor resides in hoistway · Utilize sensory inspection - Loud humming noises, screaming bearings, knocking **Advance** The obvious difference is, of - Smell of electrical burning course, that with no machine room, the MRL - Hardware is securely fastened - When applicable, follow guidelines to grease fittings - If bearings are sealed, no need to grease fittings motor resides in the hoistway itself. Transit Elevator/Escalator Consortium Note: governors are located in hoistway. It is Instructor's Notes seldom that the elevator technician has to take apart the motor to perform routine maintenance. **Advance** The technician usually depends on sensory inspections listening, for example, for loud humming noises, or a bearing screaming or knocking. **Advance** Look for alignment of the motor and check that hardware is securely fastened. Where applicable, follow guidelines to grease fittings. If bearings are sealed, then there is no need to grease fittings. Advance



Module Length: 480 min

Time remaining: 120 min

This section: 20 min (3 slides)

Section start time:

Module Length: 480 min	ime remaining: 120 min	n This section: 20 min (3 slides)	Section start time:	Section End Time:
DO		SAY		Materials Needed
REVIEW slide		In your own words: Because MRL elevators oper gearless direct drive, listen for such as screaming or knocking pearings. Check for the smell ourning which may be a resuluindings. Advance	r unusual noise ng noise from l of electrical	✓ PPT slide 99 Revator Impection and Haintenance: Electric Traction Hoistway MRL Elevators • Similar to standard electric traction • MRL motor resides in hoistway • Utilize sensory inspection • Loud humming noises, screaming bearings, knocking • Smell of electrical burning • Check • Allgrment + Hardware is securely fastened • When applicable, follow guidelines to grease fittings • If bearings are sealed, no need to grease fittings
Instructor's Notes	I	Advance		

DO



Module Length: 480 min

Time remaining: 120 min

This section: 20 min (3 slides)

Section start time:

Section End Time:

Materials Needed

ASK

Instructor's Notes

In your own words:

Lets see what we have learned so far: Yes or No. MRL elevator inspection and maintenance is similar to hydraulic inspection and maintenance.

SAY

Call on participants for answer Advance once given the correct answer

Answer: No. MRL elevator inspection is similar to a traction elevator inspection and maintenance process.

Advance

✓ PPT slide 100

MRL Elevators Knowledge Check 1. Yes or No. MRL elevator inspection and maintenance is similar to hydraulic inspection and Transit Elevator/Escalator Consorti

Elevator – Electric Traction Hoistway

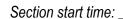


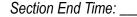




Advance

SAY





Materials Needed

DO In your own words: **ASK** Take time to visit the field to provide an example demonstration and opportunities for participants to perform the following **CLASSROOM** tests: **ACTIVITY** Perform an inspection of components in a traction elevator hoistway Perform an operational test on all safety **Instructor's Notes** devices in the hoistway Perform an operational test on all auxiliary lights





Module Length: 480 min

Time remaining: 40 min

This section: 40 min (3 slides)

Section start time:

Section End Time:

DO SAY **Materials Needed** In your own words: Read slide. ✓ PPT slides 102, 103 **CLASSROOM** For each objective, briefly review what **ACTIVITY** Conclusion was learned in this module or ask · Identify hoistway areas and associated components. · Identify hoistway areas and associated components, participants to share what they have which require cleaning · Identify hoistway areas and associated components, which require lubrication learned for each learning objective and · List all hoistway auxiliary lighting which require inspection briefly discuss as a class. Transit Elevator/Escalator Consortium Advance Instructor's Notes Conclusion Perform a sensory inspection of the hoistway Read slide. · Perform an inspection of components in a traction elevator hoistway · Perform an operational test on all safety devices in For each objective, briefly review what · Perform an operational test on all auxiliary lights was learned in this module or ask participants to share what they have Transit Elevator/Escalator Consortiur learned for each learning objective and briefly discuss as a class. Advance



Module Length: 480 min

Time remaining: 40 min

This section: 40 min (3 slides)

Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 104 **CLASSROOM** Lets take a look at some of the key words we **ACTIVITY** have defined as moved through this module. · Cable Support Deflector Sheaves Read slide. Discuss definitions as a · Final Limit Switches · Normal Limit Switches · Physical Senses · Sensory Inspection group. Advance Transit Elevator/Escalator Consortium **Instructor's Notes**

Elevator – Electric Traction Hoistway



Module Length: 480 min

Time remaining: 40 min

This section: 40 min (3 slides)

Section start time:

Section End Time:

Materials Needed DO SAY In your own words: ✓ PPT slide 105 **CLASSROOM** ✓ Quizzes **ACTIVITY** Administer quizzes. ✓ Pencils INDIVIDUAL ACTIVITY **Instructor's Notes**