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Elevator – Door Operation
Instructor’s Guide

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Agenda

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<td>Overview</td>
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<td>7</td>
<td>Summary</td>
<td>40 Minutes</td>
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Total Time: 480 Minutes
Overview

Purpose
The purpose of this module is to:

Provide the participant with an overview of the inspection and maintenance requirements for car doors components and operation.

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

- Identify the components of the car doors, which require inspection, cleaning and adjustment
- Clean, adjust, lubricate, and/or repair components as necessary
- Perform a sensory inspection of the door assembly
- Perform an operational inspection of the door assembly
- Perform an operational test on all safety devices on the doors
- Identify clearance parameters as per industry code

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
- Elevator Maintenance
- ASME A17.1
- ASME A117.1
- G.A.L. CD Installation Procedures
Welcome to the course on inspection and maintenance for elevator door operation. 

Advance

Courtesy of Elevator Bob, what we see in this photo is what we hope to avoid with proper inspection and preventive maintenance for elevator door components and operation.

Click on movie camera for short video about safety and doors.

Video length: 44 seconds

Advance
### Instructor’s Notes

- 

### DO

- 

### SAY

**In your own words:**

Today we will
- Identify the components of the car doors, which require inspection, cleaning and adjustment
- Clean, adjust, lubricate, and/or repair components as necessary
- Perform a sensory inspection of the door assembly
- Perform an operational inspection of the door assembly
- Perform an operational test on all safety devices on the doors
- Identify clearance parameters as per industry code

**Advance**

### Materials Needed

- PPT slide 3
**In your own words:**

Let's take a look at some of the key words we will be defining as we move through this module:

- Clearance Parameters
- Door Clutch
- Door Hanger Tracks
- Door Operator
- Door Panels
- Door Re-Opening Device
- Eccentric
- Force Gauge
- Gate Switch
- Gibs

- Hanger Roller
- Hanger Roller Assembly
- Header
- Hoistway Door Closers
- Hoistway Door Interlocks
- Hoistway Interlock Rollers
- Measurements
- Nudging
- Relating Cable

**Advance**
In your own words:

Lets take a look at some of the key words we will be defining as we move through this module:

- Relating Cable
- Release Roller
- Resilient Stops
- Safety Curtain
- Safety Retainer
- Sensory Inspection
- Sight Guard
- Sill Area (aka Footer)
- Spirator
- Spring Closer

- Stop Roller
- Strike Post
- Strike Posts Bumpers
- Toe Guard
- Type “A” Oilier

Advance
Elevator – Door Operation

Instructor’s Guide

Module Length: 480 min  Time remaining: 480 min  This section: 40 min (10 slides)  Section start time: ________  Section End Time: ________

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASK participants what they remember about safety and elevators</td>
<td><strong>In your own words:</strong> Thinking back to other courses or just in general, what do we know about elevator door systems? What do we know about inspection or maintenance for door systems and their operation?</td>
<td>✓ PPT slide 6</td>
</tr>
<tr>
<td>SMALL GROUP ACTIVITY</td>
<td>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</td>
<td>✓ Chalk board or large paper</td>
</tr>
<tr>
<td>WRITE</td>
<td></td>
<td>✓ Blank Paper</td>
</tr>
<tr>
<td>Instructor’s Notes</td>
<td></td>
<td>✓ Writing instruments</td>
</tr>
</tbody>
</table>

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Transit Elevator/Escalator Consortium
Preventive maintenance has been defined as scheduled maintenance procedures at predetermined time intervals. **Advance** These procedures are performed by cleaning, inspecting, adjusting, lubricating and replacing worn parts before they fail. **Advance** The advantages of preventive maintenance are increased elevator life expectancy, improved elevator reliability, and decreased operating costs over the life of the elevator.

Maintenance is required for the safe, efficient, and reliable operation of transit elevators. It is a primary responsibility of an efficient elevator technician. In this module we will focus on preventive. **Advance**

### Materials Needed

- PPT slide 7
### Elevator – Door Operation

**Instructor’s Guide**

<table>
<thead>
<tr>
<th>Module Length: 480 min</th>
<th>Time remaining: 480 min</th>
<th>This section: 40 min (10 slides)</th>
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</thead>
</table>

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| REVIEW slide | **In your own words:**
The following text uses GAL door components as an example since these are common amongst all transit agencies which have elevators. Other manufacturers will be covered in the 300 Level Courseware. As we are using GAL door systems as the model for this course, we will follow their recommendations. As per GAL there are no components in elevator door systems that require lubrication. The manufacturer recommends that the oilers on the door rollers be replaced annually. The replacement of the oiler is covered in the text to follow. There are no other scheduled lubrications for GAL door operators. **Advance** | ✓ PPT slide 8 |

**Instructor’s Notes**

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### Elevator – Door Operation

**Instructor’s Guide**

**Module Length:** 480 min  
**Time remaining:** 480 min  
**This section:** 40 min (10 slides)  
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<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
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</thead>
</table>
| REVIEW   slide | In your own words:  
A warning and safety precaution to always follow when working with door systems:  
- Remember to always wear proper PPE including safety vest, gloves and glasses.  
- Always follow transit authority safety procedures. | ✓ PPT slide 9 |
|          | **Advance**                                                              |                 |

**Instructor’s Notes**

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________

________________________________________________________________________________________
In your own words:

Ask
What are the main areas or sections of an elevator door?

Discuss participant answers

Advance

For the purposes of this manual, components are grouped according to how they work together from the top to the bottom of the elevator. As such, our review of how to inspect and perform required maintenance on door components will be sorted into the three main sections of a transit elevator door (Figure 2). At the top, the header which includes the door hanger assembly, door hanger tracks and the door operator which is mechanically linked to the door panels and at the bottom, the sill area or footer which consists of the door skills, gibs, etc.

Advance

Materials Needed

✓ PPT slide 10
In your own words:

Generally, preventative maintenance of doors includes the inspection and testing the door operator, checking for loose parts, cleaning the controls, cams, resistors, etc. as well as lubricating the drive chains and gear reducer and checking motor brushes. In addition, door hangers, locks, sliding doors and gates must also be examined and tested.

Advance

While each authority has its own preventive maintenance checklist(s) there are several components which are common to many authorities. This module will focus on components of doors that require regular inspection and maintenance. A list of these components and a schedule of the different types of maintenance required is provided in the table on p. 84.

Advance
## Elevator – Door Operation

**Instructor’s Guide**

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:**  
**Section End Time:**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| ![Where to Start] | In your own words:  
**Ask**  
What do we know about the door operator?  
**Allow participants to discuss possible answers.**  
**Advance**  
**Review photo with participants.**  
**Advance**  
Examine the **door operator** for loose parts, including all fastenings. Clean the dust off the cover, motor, pulleys, belt and crank arms.  
**Advance**  
| ![Where to Start] | [✓ PPT slides 13, 14](slide.png) |

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**Instructor’s Notes**

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## Door Operation

**In your own words:**

Door operator components to check include:
- **✓** Bearings
- **✓** “V” belts
- **✓** Drive pulleys
- **✓** Belt and chain
- **✓** Pivot points and drive
- **✓** Set screws, keys, pulleys
- **✓** Drive chains
- **✓** Cam and switches
- **✓** Controls board, cams, resistors
- **✓** Sound isolation mounting

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### Instructor's Notes

- Insert notes here.

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### Materials Needed

- **✓** PPT slide 15

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**Advance**
<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>REVIEW</strong> slide</td>
<td><strong>In your own words:</strong> Check lubrication in bearings. Also, check the condition and tightness of “V” belts. Check the drive pulleys to ensure they are aligned and secured. <strong>Advance</strong></td>
<td>✔ PPT slide 16, 17</td>
</tr>
<tr>
<td>Instructor’s Notes</td>
<td>Inspect the belt and chain for tension and condition. Be sure chain tension is +/- 1/2 inch deflection. Adjust to proper tension and/or replace if needed. Clean and lubricate all pivot points and drive. Also, determine if set screws, keys and pulleys are moved out of position. <strong>Advance</strong></td>
<td></td>
</tr>
</tbody>
</table>
**Instructor’s Guide**

**Elevator – Door Operation**

<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>SAY</strong></th>
<th><strong>Materials Needed</strong></th>
</tr>
</thead>
</table>
| REVIEW slides | **In your own words:**
Clean and lubricate drive chains, as necessary. Be sure to wipe excess lubricant from outside of the chain. Examine the condition of cam and switches and clean the controls board, cams, resistors, etc. If sound isolation for mounting is used, check for damage. **Advance**

*Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines. Advance*

| ![Course book](p.83) |

**Materials Needed**

- PPT slides 18, 19
- Course book p.83
### Elevator – Door Operation

**Instructor’s Guide**

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| ![REVIEW](image) | In your own words:  
**Ask**  
What do we know about the operator linkages?  
*Allow participants to discuss possible answers.*  
**Advance**  
**Review photo with participants.**  
**Advance** | ✓ PPT slide 20 |
| ![ASK](image) |  |  |

**Instructor’s Notes**

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**Instructor’s Notes**

Preventive maintenance of **operator linkages** should start with a check for cleanliness and loose hardware. Operator linkages are replaced very infrequently.

**Advance** They will be replaced in the case of bent arms, worn bearings and/or elongated holes.

**Advance** Be sure to clean and lubricate the equipment and

**Advance** check and adjust door closing force (not to exceed 30 pounds of force). For closing force use a **force gauge** on the edge of the hoistway door – as the sensor will detect an obstruction if it is measured on the inside of the car door, and will not close. Where this is measured on the door depends on the manufacturer, so be sure to consult your manufacturer's specifications.

**Do Not Advance**
**Elevator – Door Operation**

*Instructor’s Guide*

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:**  
**Section End Time:**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVIEW slides</td>
<td><strong>In your own words:</strong> Kinetic closing energy measurements vary depending on the type of door. <strong>Advance</strong> After attempting to close three times, the doors will go into <strong>nudging</strong>, this assures the <strong>safety curtain</strong> is functioning and will operate the doors at a reduced closing force not be exceed 7 pounds of force. In nudging, the door operator will sound a buzzer indicating that the operator is in nudging. <strong>Advance</strong> Be sure to check door open time (adjusts to 8-12 seconds) and adjust drive belt/chain as needed. Also, check and adjust door open/close limits to ensure full open. <strong>Advance</strong></td>
<td>✓ PPT slides 21, 22</td>
</tr>
</tbody>
</table>

**Instructor’s Notes**

<table>
<thead>
<tr>
<th>Slide 21</th>
<th>Slide 22</th>
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</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Header Components" /></td>
<td><img src="image1.png" alt="Header Components" /></td>
</tr>
</tbody>
</table>
| **Operator Linkages**  
- Check for dents/bends and loose hardware  
- Replace if bent arms, worn bearings, elongated bolts (“new – release restraints”)  
- Clean and lubricate equipment  
- Check and adjust door closing force  
  - Use force gauge on edge of fastener door  
  - Consult manufacturer specifications  
  - Kinetic closing energy measurements vary with door type  |  
| **Operator Linkages**  
- Check nudging & safety curtain  
- Safety bar reduces closing force to 7 pounds or less  
- After attempting to close three times, buzzer sounds  
- Check door open time  
  - Adjust to 8-12 seconds  
  - Adjust drive belt/chain as needed  
  - Ensure fully open/when open |
The code also specifies that elevator doors shall remain fully open in response to a car call for 3 seconds minimum (ANSI-Section 407.3.5).

**Advance** To determine how long the door will remain open, you must measure the distance from the center line of the car doors to the farthest call button.

**Advance** For example, if you measured that distance to be 12 feet then the door must remain open for 18 seconds.

**Advance** It is estimated that the average wheelchair travels 1.5 feet per second.

**Advance**

Refer participants to ANSI 117.1 section 407.3.4 and 4.7.3.5

**Advance**
## Elevator – Door Operation

### Instructor’s Guide

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)  
Section start time: ________  
Section End Time: ________

### DO

- REVIEW slide
- REFER participants to Course book

### SAY

In your own words:

*Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines. Advance*

### Materials Needed

- PPT slide 24
- Course book p.83
## Elevator – Door Operation

### Instructor’s Guide

In your own words:

Let's see what we have learned so far:

A door operator chain tension should be ______ deflection.

- a. +/- 1/8 inch
- b. +/- 1/4 inch
- c. +/- 1/2 inch
- d. +/- 1 inch

**Call on participants for answer**

**Advance once given the correct answer**

Answer: c.

**Advance.**

### Materials Needed

- ✓ PPT slide 25

---

**Instructor’s Notes**

---

**DO**

**SAY**

### ASK

---

- In your own words:
- Let's see what we have learned so far:
- A door operator chain tension should be ______ deflection.
- a. +/- 1/8 inch
- b. +/- 1/4 inch
- c. +/- 1/2 inch
- d. +/- 1 inch

**Call on participants for answer**

**Advance once given the correct answer**

**Answer:** c.

**Advance.**
### Elevator – Door Operation

**Instructor’s Guide**

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:**  
**Section End Time:**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| ASK | In your own words:  
Amri must complete a door linkage inspection.  
What should Amri do to check the door nudging and safety curtain?  

*Call on participants for answer  
Advance once given the correct answer*  

Answer:  
Ensure  
- Safety curtain reduces closing force to 7 pounds or less  
- After attempting to close three times, buzzer sounds  

*Advance* | ✓ PPT slide 26 |

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**Instructor’s Notes**

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### Elevator – Door Operation

**Instructor’s Guide**

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)  
Section start time:  
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<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>SAY</strong></th>
<th><strong>Materials Needed</strong></th>
</tr>
</thead>
</table>
| REVIEW slide | In your own words:  

**Ask**  
What do we know about stop rollers?  
**Allow participants to discuss possible answers.**  
**Advance**  
You will recall its function is to prevent the drive pulley from over traveling.  
On G.A.L. door operators, verify that the stop roller is in the proper position when the doors are closing and opening. Adjust and secure the stop roller as required. The roller should land on the stop plate at a reduced speed. If not adjusted properly the stop roller will shear off.  
**Advance**  

| ASK | ✓ PPT slide 27 |

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**Instructor’s Notes**

- [Image]
- [Image]
### Elevator – Door Operation

**Instructor’s Guide**

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:** ______  
**Section End Time:** ______

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| REVIEW slide | In your own words:  
**Ask**  
What do we know about belts and chains?  
**Allow participants to discuss possible answers.**  
**Advance**  
Remember the safety precaution:  
Always remove power from the elevator and perform appropriate LOTO procedures before examining or adjusting belts and chains.  
**Advance** | ✓ PPT slide 28 |

**Instructor’s Notes**

________________________________________

________________________________________

________________________________________

________________________________________
## Belt Life

Belt life is dependent on many factors, such as the operating speed, load, environment, run time alignment and radius of the sheaves. With proper maintenance, drive belts on elevator equipment will provide many years of reliable service. The “V” belt is used most on G.A.L. operators.

### Instructor’s Notes

- [Blank lines]
- [Blank lines]
- [Blank lines]
- [Blank lines]
- [Blank lines]

### Materials Needed

- ✓ PPT slide 29

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**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:** ____  
**Section End Time:** ____
In your own words:
Examine belt drives for proper tension.

**Advance** Check the alignment of sheaves and whether or not the belt is seating in the sheave groove. In most cases, the top of the belt should be flush with the sheave groove. In multiple belt drives, all belts should seat to the same depth. The belt should never run in the bottom of the groove.

**Advance**
Also, check for damaged or worn sheaves, contamination of oil, grease, etc. and worn, cracked or damaged belts.

**Advance** Determine if the “V” belt is seating in the bottom of the “V” groove. If there is noise or squeaking this would indicate that there is slippage.

**Advance**
### Elevator – Door Operation

**Instructor’s Guide**

<table>
<thead>
<tr>
<th>Module Length: 480 min</th>
<th>Time remaining: 440 min</th>
<th>This section: 180 min (86 slides) Section start time:</th>
<th>Section End Time:</th>
</tr>
</thead>
</table>

### DO

- REVIEW slide

### SAY

In your own words:

Proper tension is essential for quiet, efficient and reliable operation. If a belt is too tight, the belt and bearing life will be reduced. Likewise, if the belt is too loose, slippage will occur. Slippage will create noise and reduce belt life as well as drive efficiency. **The ideal tension will prevent slippage under maximum load, but not place unnecessary load on the bearing and sheaves. The best source for belt tension adjustment criteria is the manufacturer of the equipment.**

**Advance** Measuring alignment of the belt to the drive pulley is straightforward. Simply perform a straight edge alignment test using a straight edge. If they are misaligned, the belt will ride off of the pulleys during operation. **Advance**

### Materials Needed

- ✓ PPT slide 33
### Elevator – Door Operation

*Instructor’s Guide*

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
</tr>
</thead>
</table>
| REVIEW slide | **In your own words:**  
*Share illustration for belt tension with participants.*  
Advance  
*Share illustration for alignment test with participants.*  
Advance |

**Instructor’s Notes**

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### Materials Needed

- ✓ PPT slide 34, 35
**Reinforce Learning**

**In your own words:**

Belts must be examined and replaced when any of the following conditions exist. The belt material is cracking and dry.

**Advance** The outer cords, covering or strips of rubber have separated from the belt.

**Advance** The belt has been contaminated with oil, grease or other foreign substances. Note that even if these substances can be cleaned off, the deterioration of the belt material will continue and accelerate failure. The foreign substance may also cause slippage and accelerated wear.

**Advance** If the bottom of the belt is riding against the sheave groove bottom, it must be replaced. The “V” side of the belt must ride on both sides of the sheave in a pinch-like method.

**Advance** Check for damage to the sheave or worn sheave grooves. **Advance**

**Materials Needed**

- PPT slide 36

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### Instructor’s Notes

- In your own words:
- Belts must be examined and replaced when any of the following conditions exist. The belt material is cracking and dry.
- **Advance** The outer cords, covering or strips of rubber have separated from the belt.
- **Advance** The belt has been contaminated with oil, grease or other foreign substances. Note that even if these substances can be cleaned off, the deterioration of the belt material will continue and accelerate failure. The foreign substance may also cause slippage and accelerated wear.
- **Advance** If the bottom of the belt is riding against the sheave groove bottom, it must be replaced. The “V” side of the belt must ride on both sides of the sheave in a pinch-like method.
- **Advance** Check for damage to the sheave or worn sheave grooves.
In your own words:

It is best to replace the belt to avoid a failure of the elevator or a call-back. A broken belt may also damage other equipment such as wiring and controls. When it is necessary to replace a belt, it is best to copy the number from the old belt and obtain an exact replacement. This may not be possible if the belt is damaged or the number is not legible.

**Advance** The pitch diameter is the effective diameter of the sheave and is slightly outside the midpoint that the belt runs in the sheave. Replace with a belt that has a standard length that is closest to the calculated length. For serrated belts, the pitch diameter is approximately the midpoint of the serration on the pulley.

**Advance**
## Elevator – Door Operation

### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:** ________  
**Section End Time:** ________

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| REVIEW slide | In your own words:  
*Share the illustration for finding pitch diameter with participants.*  
Advance | ✓ PPT slide 38 |

### Instructor’s Notes

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**Transit Elevator/ Escalator Consortium**

33
### DO

- REVIEW slide
- REFER participants to Course book

### SAY

In your own words:

*Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines. Advance*

### Materials Needed

- ✓ PPT slide 39
- ✓ Course book p.83

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**Instructor’s Notes**

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The ideal belt tension prevents slippage under:

a. Maximum load
b. Minimum load
c. Maximum noise
d. Minimum noise

Call on participants for answer
Advance once given the correct answer

Answer:
• a. Maximum load

Advance

Materials Needed

✓ PPT slide 40
### Materials Needed

- PPT slide 41

### Instructor’s Notes

- In your own words: Yes or No. Belts should be replaced if contaminated with grease or oil.

### SAY

- **In your own words:** Yes or No. Belts should be replaced if contaminated with grease or oil.

- **Call on participants for answer**

- **Advance once given the correct answer**

- **Answer:** Yes

- **Advance**
**DO**

**SAY**

**Materials Needed**

**In your own words:**

Drive chains must have the proper tension to maintain good contact with the sprocket. **Advance**

When examining take up force, do so while the chain is operating. If the links sag on the return side, the chain needs to be adjusted. **Advance**

Chains must be kept clean to prevent dirt and grime from accelerating wear. Dirt and lint will also tend to wick the lubricant from the chain interior. When this occurs, fretting corrosion and rapid wear will result. Never clean chains with a solvent that will break down or wash away all of the lubricant. A nylon brush is the best method of cleaning lint and dust from chains on door operators. **Advance**

 ✓ PPT slide 42, 43, 44

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**Instructor’s Notes**

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In your own words:
Proper chain lubrication is a challenging task partly due to their location and environment. Chains require lubrication internally as well as where the rollers and sides contact the sprockets.

**Advance** In most cases, a light chain oil will provide good lubrication. However, there are special chain lubricants formulated for particular environments and conditions. Where the manufacturer specifies a certain lubricant, it should be used.

**Advance** The challenge is often to keep the chain lubricated properly without contaminating other components or allowing oil to drip into the cab of the elevator. Always check your authority’s requirements for oil and lubrication. And, remember that oil and lubrication may change depending on the season of the year. **Advance**
Elevator – Door Operation

Instructor’s Guide

Module Length: 480 min  Time remaining: 440 min  This section: 180 min (86 slides)  Section start time:  Section End Time: 

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVIEW slide</td>
<td><strong>In your own words:</strong> Chains should be examined for correct tension, <strong>Advance</strong> corrosion, <strong>Advance</strong> the wear of the barrel/bushings and sprockets. <strong>Advance</strong> Check the alignment of sprockets and looseness. <strong>Advance</strong> Also, check the lubrication and accumulation of dirt and grime. <strong>Advance</strong> Examine for stretching, also known as elongation. <strong>Advance</strong> Both chains and sprockets should be replaced when they are worn and weakened. <strong>Advance</strong> Look for looseness in the links and wear on the sprockets. <strong>Advance</strong></td>
<td>✓ PPT slide 46</td>
</tr>
</tbody>
</table>

Instructor’s Notes

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### Materials Needed

- PPT slide 47, 48

### Instructor’s Notes

In your own words:

*Share the photo of barrel bushings with participants.*

**Advance**

When replacing a chain, measure the pitch of the chain to determine its length. The pitch of a chain is determined by measuring the distance between the center of the tooth and the center of the next tooth. Usually if the chain is replaced, it is necessary to replace the sprockets since their tooth profile will be worn to reflect the change in the pitch of the old chain. If a new chain is installed on a worn sprocket, the drive will often be rough, noisy and accelerate the chain and sprocket wear. **Advance**
After an initial break-in period drive chain and belt tension of the door operator should be checked. Note that the break-in period will vary with frequency of usage. If adjustments are necessary, the chain should be adjusted first. Adjusting the chain will require readjusting the drive belt tension. Inconsistent or jerky door movements are indications that the drive chain needs to be adjusted. Check the chain by applying moderate pressure on the chain. The deflection should be approximately ½ inch. If the deflection is either more or less than ½ inch the drive chain must be adjusted. Once the drive chain is adjusted correctly, the drive belt can be adjusted. Note that the holes in the intermediate pulley bearing block are slotted to allow for lateral adjustment.

**Advance**
### Materials Needed

- PPT slide 50

### Instructor’s Notes

- In your own words:
  - When needed, there are 3 steps to chain adjustment.
  - First, locate and loosen the double nutted stud on the rear of the door motor base to decrease the belt tension as shown here.
  - **Advance**
  - Then loosen the four mounting bolts on the base of the intermediate pulley bearing block.
  - **Advance**
  - Lastly, turn the bolt on the adjusting angle bracket so as to move the intermediate pulley away from the drive pulley. After the proper chain tension is obtained, check the two pulleys for alignment and tighten the four mounting bolts to secure the pulley.
  - **Advance**

### DO

**REVIEW** slide

### SAY

In your own words:

When needed, there are 3 steps to chain adjustment.
First, locate and loosen the double nutted stud on the rear of the door motor base to decrease the belt tension as shown here.

**Advance**

Then loosen the four mounting bolts on the base of the intermediate pulley bearing block.

**Advance**

Lastly, turn the bolt on the adjusting angle bracket so as to move the intermediate pulley away from the drive pulley. After the proper chain tension is obtained, check the two pulleys for alignment and tighten the four mounting bolts to secure the pulley.

**Advance**
**Elevator – Door Operation**

**Instructor’s Guide**

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:**  
**Section End Time:**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| REVIEW slide | In your own words: Improper belt tension may result in belt slippage and erratic door operation. **Advance** Proper belt tension can be checked at the floor level with the heaviest hoistway door by energizing the door open relay when the door is a few inches from open. If there is proper belt tension the door will open at this slow speed without belt slippage. If there is any slippage, the tension should be adjusted. **Advance**  
*Share the illustration for belt adjustment. Point out the double nutted stud on rear of motor base.* **Advance** | ✓ PPT slides 51, 52 |

**Instructor's Notes**

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Sometimes a belt may need further adjusting. If so, start with motor placement.

**Advance** Loosen four mounting bolts and move as needed.

Final Adjustments that may be needed:

**Advance** Check for proper belt seating on intermediate pulley.

**Advance** Check motor pulley for alignment with intermediate pulley and tighten four bolts.

**Advance** Allow door to cycle a few times checking that belt rides in center of pulley groove.

**Advance** If belt rides to edge of pulley or becomes twisted, recheck alignment of motor and intermediate pulleys.

**Advance**
In your own words:

*Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines.*

Advance

**Materials Needed**

- PPT slide 54
- Course book p.83
### Elevator – Door Operation

**Instructor’s Guide**

- **Module Length:** 480 min
- **Time remaining:** 440 min
- **This section:** 180 min (86 slides)

**DO**

<table>
<thead>
<tr>
<th>ASK</th>
</tr>
</thead>
</table>

**SAY**

**In your own words:**
Yes or No. Chains must never be cleaned with a solvent that interferes with lubrication.

*Call on participants for answer*

*Advance once given the correct answer*

**Answer:** Yes

**Advance**

**Instructor’s Notes**

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**Materials Needed**

- ✓ PPT slide 55

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**Transit Elevator/Escalator Consortium**
Elevator – Door Operation
Instructor’s Guide

Module Length: 480 min  Time remaining: 440 min  This section: 180 min (86 slides)  Section start time:  ________  Section End Time:  ________

DO  SAY  Materials Needed

In your own words:
Jim must complete a chain examination. What must Jim examine to complete this process?

Call on participants for answer
Advance once given the correct answer

Answer:

- Correct tension
- Corrosion
- Wear of barrel/bushings and sprockets
- Alignment of sprockets and looseness
- Lubrication
- Accumulation of dirt and grime
- Stretching (aka elongation)
- Worn or weakened – replace
- Looseness in links, wear on sprockets

Advance

Materials Needed

- PPT slide 56
Elevator – Door Operation

Instructor’s Notes

**In your own words:**

Normally, the **hanger roller assembly** will not be replaced in its entirety, just the individual components: **hanger roller, eccentric, upthrust safety retainer** and **type “A” oiler**.  **Advance**

**Hanger Roller Replacement**

1. Wedge door open
2. Loosen eccentric
3. Loosen one hanger bolt, remove the other
4. Swivel door hanger 90°
5. Remove safety retainer
6. Replace hanger roller
7. Bolt new roller
8. Replace safety retainer

**Advance**
In your own words:
The type “A” oiler should be changed annually as per G.A.L.’s suggested maintenance specifications. A properly installed oiler will keep the roller clean, preventing buildup of shaft debris and any excessive build up on lubricants, as well as reduce noise and extend its life.

**Advance**

Be sure to check and adjust the eccentric. It will only need to be replaced if it is missing or the bearing has failed. Proper adjustment is 1/64 of an inch between the eccentric and the hanger track.

**Advance**

*Share eccentric replacement illustration with participants.*

**Advance**

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**Materials Needed**

- PPT slides 59, 60, 61
**Elevator – Door Operation**

**Instructor’s Guide**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words:</td>
<td>✓ PPT slide 62</td>
</tr>
<tr>
<td></td>
<td>If the entire hanger roller assembly has to be replaced due to vandalism or preventive maintenance,</td>
<td></td>
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<tr>
<td></td>
<td><strong>Advance</strong> Start by releasing the eccentric roller on both hanger assemblies.</td>
<td></td>
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<tr>
<td></td>
<td><strong>Advance</strong> Next remove the door panel from the track.</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Advance</strong> Then remove the door hanger assembly bolts.</td>
<td></td>
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<tr>
<td></td>
<td><strong>Advance</strong> Replace the door hanger assembly and reverse the steps.</td>
<td></td>
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<tr>
<td></td>
<td><strong>Advance</strong></td>
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</tbody>
</table>

**Instructor’s Notes**

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### Elevator – Door Operation

**Instructor’s Guide**

**DO**

**SAY**

**Materials Needed**

- **In your own words:**
  
  Be sure that the doors cannot be lifted off the hanger track. This is insured by properly adjusting the eccentric on each hanger roller assembly.

  **Advance** To adjust the eccentric, use a slotted screwdriver to turn the eccentric to within 1/64 inch of the bottom of the hanger track.

  **Advance** While holding it in this position, tighten the nut on the back of the upthrust assembly.

  **Advance** Note that it is crucial that this be done for every hanger roller assembly.

  **Advance**

  *Share hanger roller assembly replacement photo with participants.*

  **Advance**

- **REVIEW slide**

- **Instructor’s Notes**

- ✓ PPT slides 63, 64
## Elevator – Door Operation

### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:**  
**Section End Time:**

### Materials Needed

- PPT slide 65

### DO

<table>
<thead>
<tr>
<th>In your own words:</th>
</tr>
</thead>
<tbody>
<tr>
<td>During preventive maintenance, verify that the car door tracks are secured and clean. Tighten all loose track hardware.</td>
</tr>
<tr>
<td><strong>Advance</strong> Also check the car door hangers, rollers, felt wicks (oiler) and relating cables for defects and damage.</td>
</tr>
<tr>
<td><strong>Advance</strong> Ensure that the oiler/felt wick is lubricating the hanger roller. Lubricate as required.</td>
</tr>
<tr>
<td><strong>Advance</strong> Check the car door eccentric rollers. Make sure that the gap between the upthrust rollers and track is 1/64 inch (0.39mm). As always, adjust, repair or replace as specified by your authority’s procedures.</td>
</tr>
<tr>
<td><strong>Advance</strong></td>
</tr>
</tbody>
</table>

### SAY

**REVIEW** slide

**Instructor’s Notes**

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**Elevator – Door Operation**

**Instructor’s Guide**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| **REVIEW slide** | **In your own words:**
To ensure proper door panel adjustment, start by examining door hangers. Do this by manually open the door and allow it to close, to observe any roughness in the roller bearing track. Also, listen for noise that may indicate dragging or binding.

**Advance** Examine door skins for signs of wear,

**Advance** Door panel scraping each other,

**Advance** Verify that the leading the door panel closes even with the **strike post**.

**Advance** Always re-install the **hanger cover** where provided. Most two-speed doors require hanger covers to maintain the code-required clearance between the car sill and hoistway. In all cases, the cover protects the track- and door-support mechanism from dirt.

**Advance**

<table>
<thead>
<tr>
<th>Instructor’s Notes</th>
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</thead>
<tbody>
<tr>
<td><img src="https://via.placeholder.com/150" alt="Image" /></td>
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</tbody>
</table>

**Materials Needed**

- ✓ PPT slide 66

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*Transit Elevator/Escalator Consortium*
In your own words:

To ensure proper door panel adjustment, start by examining door hangers. Do this by manually open the door and allow it to close, to observe any roughness in the roller bearing track. Also, listen for noise that may indicate dragging or binding.

Advance  Examine door skins for signs of wear,

Advance  Door panel scraping each other,

Advance  Verify that the leading the door panel closes even with the strike post.

Advance  Always re-install the hanger cover where provided. Most two-speed doors require hanger covers to maintain the code-required clearance between the car sill and hoistway. In all cases, the cover protects the track- and door-support mechanism from dirt.

Advance  

Materials Needed

✓ PPT slide 66
# Elevator – Door Operation

## Instructor’s Notes

**In your own words:**

Refer participants to Elevator Maintenance, 2nd Edition

See Section 3.2 Maintenance Performed from the Top of the Car Examining door hangers, locks: p. 192-199 Figures 3.2.8.2.3 p. 199 and 3.2.8.2.2: p. 198

Advance

Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines. Advance

## Materials Needed

- PPT slide 67, 68
- Elevator Maintenance
- Course book p. 83

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<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words: Refer participants to Elevator Maintenance, 2nd Edition</td>
</tr>
<tr>
<td>REFER participants to Elevator Maintenance</td>
<td>See Section 3.2 Maintenance Performed from the Top of the Car Examining door hangers, locks: p. 192-199 Figures 3.2.8.2.3 p. 199 and 3.2.8.2.2: p. 198 Advance</td>
</tr>
<tr>
<td>Instructor’s Notes</td>
<td>Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines. Advance</td>
</tr>
</tbody>
</table>

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Transit Elevator/Escalator Consortium
### Elevator – Door Operation

#### Instructor’s Guide

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ASK</strong></td>
<td><strong>In your own words:</strong> Number in correct order the process for replacing a hanger roller.</td>
</tr>
</tbody>
</table>
|  | - Bolt new roller  
|  | - Loosen eccentric  
|  | - Wedge door open  
|  | - Replace safety retainer  
|  | - Swivel door hanger 90°  
|  | - Replace hanger roller  
|  | - Loosen one hanger bolt, remove the other  
|  | - Remove safety retainer  |

#### Instructor’s Notes

- Call on participants for answer
- Advance once given the correct answer
- Answer: 7, 2, 1, 8, 4, 6, 3, 5

<table>
<thead>
<tr>
<th>Materials Needed</th>
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</thead>
<tbody>
<tr>
<td>✓ PPT slide 69</td>
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</table>

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**Transit Elevator/Escalator Consortium**
### Elevator – Door Operation

#### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:**  
**Section End Time:**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| ![ASK] | **In your own words:**  
When checking the eccentric rollers, Julie must ensure the gap between the upthrust rollers and track is _____________.  
   a. 1/64 inch  
   b. ¼ inch  
   c. ¾ inch  
   d. 1 inch | ✓ PPT slide 70 |

**Instructor’s Notes**

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**Call on participants for answer**  
*Advance once given the correct answer*  
**Answer:** a.
### Elevator – Door Operation

#### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  
**Section start time:** __________  
**Section End Time:** __________

<table>
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<tr>
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<th><strong>SAY</strong></th>
<th><strong>Materials Needed</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>REVIEW slide</td>
<td><strong>In your own words:</strong> To ensure proper door panel adjustment, start by examining door hangers. Do this by manually open the door and allow it to close, to observe any roughness in the roller bearing track. Also, listen for noise that may indicate dragging or binding. <strong>Advance</strong> Examine door skins for signs of wear, <strong>Advance</strong> Verify door panels are not scraping each other, <strong>Advance</strong> Ensure that the leading the door panel closes even with the <strong>strike post.</strong> <strong>Advance</strong></td>
<td>✓ PPT slide 71</td>
</tr>
</tbody>
</table>

#### Instructor’s Notes

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**Door Panel Components**
- Door Panels
  - **Advance**
    - Inspect door hangers
    - **Advance**
      - Manually open door and allow to close
      - Observe any roughness in roller bearing track
      - Listen for noise indicating dragging or binding
    - Ensure door skins are not scraping each other
    - Ensure leading door panel closes even with **strike post**
    - Re-install hanger cover where provided

---

**Transit Elevator/Escalator Consortium**
**Instructor’s Notes**

- Always re-install the **hanger cover** where provided. Most two-speed doors require hanger covers to maintain the code-required clearance between the car sill and hoistway. In all cases, the cover protects the track- and door-support mechanism from dirt.

**Advance**

**Materials Needed**

- PPT slide 71

**In your own words:**

In your own words:

Always re-install the **hanger cover** where provided. Most two-speed doors require hanger covers to maintain the code-required clearance between the car sill and hoistway. In all cases, the cover protects the track- and door-support mechanism from dirt.

**Advance**
Elevator – Door Operation

Instructor’s Guide

Module Length: 480 min  Time remaining: 440 min  This section: 180 min (86 slides)  Section start time:  Section End Time: ________

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| REVIEW slide | **In your own words:**  
As per height of the hoistway door may need to be adjusted periodically  
When inspecting door panels, check the overlap of door panels, door frame and multi-speed panels  
**Advance** when the door is closed.  
**Advance** It should be at least one inch for new equipment. Worn or missing resilient stops or adjustment or relating devices can affect the overlap. Adjust or replace resilient stops as needed.  
**Advance** Missing strike posts bumpers may cause incorrect operation.  
**Advance** Note: Overlap varies from installation to installation see when the elevator was installed to find the proper code for overlap. **Advance**  
| ✓ PPT slide 72 |}

Instructor’s Notes

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**Elevator – Door Operation**

**Instructor’s Guide**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
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</thead>
<tbody>
<tr>
<td>📋 REVIEW slide</td>
<td><strong>In your own words:</strong></td>
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<tr>
<td>🔴 ASK</td>
<td><strong>Ask</strong></td>
<td></td>
</tr>
</tbody>
</table>

In your own words:

**Ask**

What is a safety retainer?

*Allow participants to discuss answers.*

The primary guiding means must engage the sill by at least ¼ inch. A safety retainer is required to prevent displacement of the panel by ¾ inch if the primary means fails. A typical safety retainer would fasten to the panel adjacent to the guiding means.

**Advance** Examine the safety retainers for secure fastening and proper placement.

**Advance**

- PPT slide 73
### Instructor’s Notes

- Examine the safety retainers for secure fastening and proper placement. Note that it is a code requirement ASME A17.1 that each replacement component must be plainly marked for identification. As such all replacement components must be included in the original manufacturer’s listing of acceptable replacements parts as identified by an approved certifying agency.

**Advance**

- Discuss illustration of safety retainer with participants.

**Advance**

### Materials Needed

- PPT slide 73, 74
Elevator – Door Operation

**Instructor’s Guide**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| REVIEW slide | In your own words:  
*Ask*  
What is a door closer?  
*Allow participants to discuss answers.*  
*Advance to show a Spring Closer.*  
*Advance to show and Spirator.*  
*Advance* | ✓ PPT slide 75 |

**Instructor’s Notes**

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### Materials Needed

- PPT slide 76

### Instructor’s Notes

- In your own words:
  At least one of two types of door closers are required on all hoistway door panels as per the code: **spring closer** or **spirator** G.A.L. manufactures have both types.

  **Advance** Be sure to examine **hoistway door closers**, verify that when the door is one inch from fully closed and released the closer is adjusted to close and lock the door. Check to see that all the hardware that attaches the door closer is tight and in place.

  Note that the base of the spring closer is attached to the saddle/sill and the articulated arm is attached to the fast speed door. Spring closers have more exposed and moving parts, be sure to lubricate the pivot points.

  **Advance**

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<table>
<thead>
<tr>
<th>DO</th>
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<th>Materials Needed</th>
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<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words:</td>
<td>✓ PPT slide 76</td>
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</tbody>
</table>

**Reminder:**
- Instructor’s Guide
- Module Length: 480 min
- Time remaining: 440 min
- This section: 180 min (86 slides)

**Advance**

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The spirator also known as a *reel closer* requires less maintenance if it is properly shielded from contaminants. Examine the cable for signs of wear. Note that the base reel closer/spirator is attached to the hanger roller assembly and the end of the cable is attached on the door lock assembly.

*Advance*
**Elevator – Door Operation**

*Instructor’s Guide*

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
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</thead>
</table>
| REVIEW slide | **In your own words:**

**Ask**

What is a relating cable?

**Allow participants to discuss answers.**

**Advance**

In multispeed door configurations, the doors are attached and kept in time with the use of a **relating cable.**

**Advance** Verify that the relating cable is securely attached to the fast speed door and the slow speed door. Examine the relating cable for signs of wear and replace as needed.

**Advance**

<table>
<thead>
<tr>
<th>Instructor’s Notes</th>
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</thead>
<tbody>
<tr>
<td><em>In your own words:</em></td>
</tr>
<tr>
<td><em>Ask</em></td>
</tr>
<tr>
<td>What is a relating cable?</td>
</tr>
<tr>
<td><em>Allow participants to discuss answers.</em></td>
</tr>
<tr>
<td><em>Advance</em></td>
</tr>
<tr>
<td>In multispeed door configurations, the doors are attached and kept in time with the use of a <strong>relating cable.</strong></td>
</tr>
<tr>
<td><em>Advance</em> Verify that the relating cable is securely attached to the fast speed door and the slow speed door. Examine the relating cable for signs of wear and replace as needed.</td>
</tr>
</tbody>
</table>

| PPT slide 77 |

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**Instructor Notes**

- Ask: What is a relating cable?
  - Allow participants to discuss answers.
  - Advance: In multispeed door configurations, the doors are attached and kept in time with the use of a relating cable.
  - Advance: Verify that the relating cable is securely attached to the fast speed door and the slow speed door. Examine the relating cable for signs of wear and replace as needed.
## Elevator – Door Operation
### Instructor’s Guide

**Instructor’s Notes**

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**DO**

- REVIEW slide
- ASK

**SAY**

- **In your own words:**
  - What is a door reopening device? *Allow participants to discuss answers.*

- **Advance**
  - Check the operation of the **door re-opening device**. Verify that the doors return to the fully open position.
  - **Advance** Clean the lenses and reflector on photo devices and examine them for alignment and secure mounting.
  - **Advance** Where the door opening is protected with a non-contact door-reopening device, the covers should be cleaned and examined for defects.
  - **Advance** Be reminded that as per the code each car door should have an automatic re-opening device.

**Materials Needed**

- ✓ PPT slide 78

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**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)

---

**ASK**
### Elevator – Door Operation

**Instructor’s Guide**

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)  
Section start time: ________  
Section End Time: ________

<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>SAY</strong></th>
<th><strong>Materials Needed</strong></th>
</tr>
</thead>
</table>
| REVIEW slide | In your own words:  
*Discuss illustration of the door re-opening device with participants.*  
Advance | ✓ PPT slide 79, 80 |
| REFER participants to A17.3 A117.1 | Refer participants to  
- A17.3 – 2002 Section 2.8.2  
- A117.1 – 2003 Section 4.0.7  
for Code requirements on ADA compliance  
Advance | ✓ A17.3 - 2002  
✓ A117.1 - 2003 |

---

**Instructor’s Notes**

- *
- *
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- *
- *
**In your own words:**

**Ask**
What do we know about release rollers, door clutches, and car guide shoes?  
**Allow participants to discuss answers.**

**Advance**
Examine the release roller and door clutch engagement. Visually inspect the car guide shoes for wear. If they are worn, do not make any adjustments, follow your authority’s guidelines.

**Refer participants to**
- Figure 71, 2A, 2B, 2C and 2D for door release roller to car clutch clearances for two-speed sliding doors.
- Figure 72, 5A, 5B, and 5C for door release roller to car clutch clearances on center-parting car doors

**Materials Needed**
- PPT slide 81
- Course book p. 100 – figures 71 and 72
In your own words:

For center-opening car door leading edges, examine the astragals for wear and damage. **Advance** Also, verify the strike post bumpers are installed and in good condition. Repair or replace as required. If they are missing or damaged follow your authority’s procedure. **Advance**

Examine all vision panels for broken glass, missing or damaged grills. **Advance** Also, check the sight guard(s) for damage and ensure it is securely fastened to the door panel(s). Make repairs as required. Sight guards are required when the gap between the car door and hoistway door exceeds 51/2 inches. **Advance** After these checks record all defects or any missing items and again follow your authority’s procedures. **Advance**
**Elevator – Door Operation**

**Instructor’s Guide**

Module Length: 480 min

Time remaining: 440 min

This section: 180 min (86 slides)

Section start time: ________

Section End Time: ________

<table>
<thead>
<tr>
<th>DO</th>
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</thead>
<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words:</td>
<td>✓ PPT slide 84, 85</td>
</tr>
<tr>
<td>REFER participants to Course book</td>
<td>Share photo of sight guard with participants. Advance</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines. Advance</td>
<td></td>
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</tbody>
</table>

**Instructor’s Notes**

- _____________________________________________________________________________
- _____________________________________________________________________________
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- _____________________________________________________________________________
### Elevator – Door Operation

#### Instructor’s Guide

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<td>?</td>
<td>ASK</td>
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</table>

- **In your own words:**
  Yes or No. Code requires automatic re-opening device for some cars.

- **Call on participants for answer**
  **Advance once given the correct answer**

**Answer:** No – required for all cars

- **Advance**

**Instructor’s Notes**

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- ✓ PPT slide 86
DO

ASK

SAY

In your own words:
Danny must inspect the relating cables. What should Danny verify and examine to complete this process?

Call on participants for answer

Advance once given the correct answer

Answer:
• Verify secure attachment to fast speed door and slow speed door
• Examine for signs of wear, replace as needed

Advance

Materials Needed

✓ PPT slide 87
### Elevator – Door Operation

**Instructor’s Guide**

| Module Length: 480 min | Time remaining: 440 min | This section: 180 min (86 slides) | Section start time: | Section End Time: |

#### DO

| REVIEW slide |

#### SAY

| In your own words: |

**Ask**

What do we know about the footer or sill area?

**Allow participants to discuss answers.**

**Advance**

Always examine and tighten each landing sill for defects and damage. Check and tighten all landing sills fasteners. Remove all debris from sills. Note that door sills should also be cleaned. As always, follow your authority's specific procedures. Also, inspect the car platform **toe guard(s)** for corrosion and loose hardware. Be sure to secure all loose hardware.

**Do Not Advance**

#### Materials Needed

- PPT slide 88

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**Instructor’s Notes**

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**Elevator – Door Operation**

*Instructor’s Guide*

Module Length: 480 min  
Time remaining: 440 min  
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Section start time: ________  
Section End Time: ________

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
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</thead>
</table>
| REVIEW slide | In your own words:  
Though rarely seen by elevator passengers, the sole purpose of the toe guard is to protect the passengers from accidentally sticking their foot under the platform if it is not level with the landing. True to its name, the toe guard is there to protect the passenger’s toes.  
**Advance**  
*Share and discuss photo of toe guard with participants.**  
**Advance** | ✓ PPT slide 88, 89 |

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**Instructor’s Notes**

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________________________________________________________________________

________________________________________________________________________
### Elevator – Door Operation

**Instructor’s Guide**

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)  
Section start time:  
Section End Time:  

<table>
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<td></td>
<td>✓ PPT slide 90</td>
</tr>
</tbody>
</table>

**In your own words:**

**Ask**

What do we know about gibbs?  
*Allow participants to discuss answers.*

**Advance**

**Gibs**

When the doors open and close the door panels ride along the door hanger track at the top of the door by use of the door hanger assembly. At the bottom of the door panel are a set of gibbs which slide along the door sill found at each landing.

Check the hoistway door guides/car door guides (gibs) and safety retainers for secure attachment and wear. Repair or replace as required.  
*Advance*

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**Instructor’s Notes**

- [Insert instructor’s notes here]
- [Insert instructor’s notes here]
- [Insert instructor’s notes here]
- [Insert instructor’s notes here]
- [Insert instructor’s notes here]
### Elevator – Door Operation

**Instructor’s Guide**

<table>
<thead>
<tr>
<th>DO</th>
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</thead>
<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words: Check that the guides engage the corresponding sill by not less than ¼ inch. Adjust door height as required. The code-required space between the panel and the jamb is 3/8 inch (¼ inch is recommended). In multi-speed doors this measurement should be true or between the two panels. Advance</td>
</tr>
</tbody>
</table>

**Materials Needed**

- ✔ PPT slide 90

---

**Instructor’s Notes**

- Check that the guides engage the corresponding sill by not less than ¼ inch.
- Adjust door height as required.
- The code-required space between the panel and the jamb is 3/8 inch (¼ inch is recommended).
- In multi-speed doors this measurement should be true or between the two panels.

Advance
### Instructor’s Notes

- In most cases only the nylon guide on the gibbs will be replaced.
- **Advance** If the entire gib needs replacement – because it is bent, rusted, etc. – the new nylon guide will still need to be connected to the gib bracket correctly. Use the old gib as a guide.

### Materials Needed

- ✓ PPT slides 91, 92
- ✓ Elevator Maintenance

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
</tr>
</thead>
</table>
| REVIEW slide | **In your own words:**
| REFER participants to Elevator Maintenance | In most cases only the nylon guide on the gibbs will be replaced.

**Advance**

- If the entire gib needs replacement – because it is bent, rusted, etc. – the new nylon guide will still need to be connected to the gib bracket correctly. Use the old gib as a guide.

- **Refer participants to**
  - Elevator Maintenance
    - Section 3.2.9 Doors, Pages 197-201
    - Section 4.29 Doors, Pages 223-230

- **Advance**

- **Share and discuss photo of gibbs with participants.**  **Advance**
## Elevator – Door Operation
### Instructor’s Guide

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)  
Section start time:  
Section End Time:

<table>
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<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words:</td>
<td>✓ PPT slide 93</td>
</tr>
<tr>
<td>REFER participants to Course book</td>
<td>Use the checklist chart in the course book to add and review any additional authority specific procedures or guidelines. Advance</td>
<td>✓ Course book p. 83</td>
</tr>
</tbody>
</table>

**Instructor’s Notes**

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<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>SAY</strong></th>
<th><strong>Materials Needed</strong></th>
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</thead>
</table>
| ![Question Icon]  | **In your own words:** Inspecting a car platform toe guard includes checking for ______________. (check all that apply)  
  a. Corrosion  
  b. Loose hardware  
  c. Bent tabs  
  d. Burning wires  | ✓ PPT slide 94 |

**Instructor’s Notes**

---

| **ASK** | **Call on participants for answer** Advance once given the correct answer **Answer:** a., b.  
  **Advance** |
## Elevator – Door Operation

### Instructor’s Guide

Module Length: 480 min  
Time remaining: 440 min  
This section: 180 min (86 slides)  
Section start time: ________  
Section End Time: ________

### Materials Needed

- PPT slide 95

### DO

If an instructor's guide is available, it should be followed in your own words:

### SAY

**In your own words:**
While code requires 3/8 inch between panel and jamb, ________ is actually recommended.

- a. 1/8 inch
- b. 1/4 inch
- c. 1/2 inch
- d. 3/4 inch

**Call on participants for answer**

**Advance once given the correct answer**

**Answer:** b.  
**Advance**

### Instructor’s Notes

- __________________________
- __________________________
- __________________________
- __________________________
- __________________________
- __________________________
- __________________________
## Elevator – Door Operation

### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 440 min  
**This section:** 180 min (86 slides)  

**DO** | **SAY** | **Materials Needed**
---|---|---
```
ENTER slide
```
**REFER** participants to Elevator Maintenance 
& G.A.L. Installation Procedures

### Instructor’s Notes

- In your own words:
- Refer participants to
  - *Elevator Maintenance* pages 209 through 235
  - *G.A.L. Installation Procedures CD* 
    "Tune up and code compliance"

- for a detailed review of transit elevator components that require inspection. 
- Advance

- ✓ PPT slide 96
- ✓ Elevator Maintenance
- ✓ G.A.L. Installation Procedures
## Elevator – Door Operation

### Instructor’s Guide

| Module Length: 480 min | Time remaining: 260 min | This section: 80 min | Section start time: | Section End Time: |

### DO

**ASK**

**CLASSROOM ACTIVITY**

### SAY

In your own words:

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

- Clean, adjust, lubricate, and/or repair components as necessary

**Advance**

### Materials Needed

✓ PPT slide 97
## Elevator – Door Operation

### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 180 min  
**This section:** 15 min (4 slides)  
**Section start time:**  
**Section End Time:**

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| ![REVIEW](image.png) | **In your own words:**
During a **sensory inspection** a good elevator technician relies on the **physical senses** of sight, smell, hearing, and touch while inspecting and maintaining the elevator emergency equipment.
**Advance**  
**Ask**
What may indicate a problem with elevator door operation as indicated by sight?
**Discuss answers**  
**Advance for sample answers**
Seeing signs of scraping on the metal, seeing jerky movement/binding, door isn't closing completely  
**Advance** | ✓ PPT slides 98, 99 |

### Instructor’s Notes

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**Transit Elevator/Escalator Consortium**  

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**Elevator – Door Operation**

*Instructor’s Guide*

Module Length: 480 min  
Time remaining: 180 min  
This section: 15 min (4 slides)  
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<table>
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<th><strong>DO</strong></th>
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<tbody>
<tr>
<td>REVIEW</td>
<td>slide</td>
<td></td>
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<tr>
<td>ASK</td>
<td></td>
<td></td>
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</tbody>
</table>

**In your own words:**

**Ask**
What may indicate a problem with elevator door operation as indicated by smell?

**Discuss answers**

**Advance for sample answers**

Burning of electrical wires

**Ask**
What may indicate a problem with elevator door operation as indicated by touch?

**Discuss answers**

**Advance for sample answers**

Scraping, clicking

**Advance**

**Materials Needed**

✓ PPT slides 99, 100
## Elevator – Door Operation

### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 180 min  
**This section:** 15 min (4 slides)  
**Section start time:**  
**Section End Time:**

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<table>
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<th>DO</th>
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<th>Materials Needed</th>
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</thead>
</table>

- **REVIEW slide**

- **ASK**

**Instructor’s Notes**

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**In your own words:**

**Ask**

What may indicate a problem with elevator door operation as indicated by hearing?

**Discuss answers**

**Advance for sample answers**

Jerk movement or vibration  
With more experience, you will become more familiar with the normal sights, smells, sounds and feel of the system. During a sensory inspection, check for deviations from this norm.  

**Advance**

- ✔️ PPT slide 100
**Elevator – Door Operation**

**Instructor’s Guide**

Module Length: 480 min  
Time remaining: 180 min  
This section: 15 min (4 slides)  
Section start time:  
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<table>
<thead>
<tr>
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<th>Materials Needed</th>
</tr>
</thead>
</table>
| ![Question Mark] | **In your own words:** Jerky movement or vibration would be detected by a _________ sensory inspection.  
   a. sight  
   b. smell  
   c. hear  
   d. touch  

**Instructor’s Notes**

Call on participants for answer  
Advance once given the correct answer  
Answer:  
**d. Advance**

✓ PPT slide 101
When performing an operational inspection check to make sure the doors’ functions are smooth and quiet. **Advance** Wear and tear on the system can be reduced by careful adjustment of zone and speed while engaging and disengaging the **hoistway interlock rollers**. **Advance** Pay close attention to the speed at which doors approach the ends of travel (full open and full close). Doors should never strike the jamb (or opposing panel on center opening) and bounce. Doors should have enough power to reach full open and full close without relying on momentum. This can be checked by momentarily stalling the doors when they are near their limit of travel. In the presence of an obstruction in the door opening, the door should reopen without hitting the obstruction. **Advance**
### Elevator – Door Operation

**Instructor’s Guide**

Module Length: 480 min  
Time remaining: 165 min  
This section: 45 min (13 slides)  
Section start time:  
Section End Time:  

<table>
<thead>
<tr>
<th><strong>DO</strong></th>
<th><strong>SAY</strong></th>
<th><strong>Materials Needed</strong></th>
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</thead>
<tbody>
<tr>
<td>In your own words:</td>
<td>Make sure that nudging engages after the pre-set amount of time.</td>
<td>✓ PPT slides 102, 103</td>
</tr>
<tr>
<td><strong>Advance</strong></td>
<td>There should be no bouncing, slamming and hitting. If needed, adjust the door operator to achieve smooth acceleration and deceleration in both the open and closed direction.</td>
<td>Operational Inspection - Inspect for smooth/paid door function - Ensure careful adjustment of area and speed while engaging/disengaging hoistway/interlock rollers - Ensure smooth/quiet/quiet door operation - Adjust door operator as needed - Smooth acceleration and deceleration - Listen for noises - Scraps, rattles - Inspect possible causes such as hanger rollers - Repair as needed - Inspect car and hoistway/door operation - Smooth movement transitions - Door opening restrictions - Try opening car doors from inside when car is outside *Holding zone</td>
</tr>
<tr>
<td><strong>Advance</strong></td>
<td>Listen for noises such as scraping and rattles. Determine the cause of such noise and eliminate it with repairs. Doors that bounce and rattle probably need new hanger rollers.</td>
<td></td>
</tr>
<tr>
<td><strong>Advance</strong></td>
<td>Check both the car hoistway and car door operation. Make sure both doors operate without binding and dragging. Door movements should be without abrupt transitions.</td>
<td></td>
</tr>
</tbody>
</table>

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**Instructor’s Notes**

- Make sure that nudging engages after the pre-set amount of time.
- There should be no bouncing, slamming and hitting. If needed, adjust the door operator to achieve smooth acceleration and deceleration in both the open and closed direction.
- Listen for noises such as scraping and rattles. Determine the cause of such noise and eliminate it with repairs. Doors that bounce and rattle probably need new hanger rollers.
- Check both the car hoistway and car door operation. Make sure both doors operate without binding and dragging. Door movements should be without abrupt transitions.

---

Transit Elevator/Escalator Consortium
**In your own words:**

Next, examine door opening restrictions. When the car is outside the unlocking zone, try to open the doors from inside the car. Verify that the car doors are so aligned that the car doors cannot be opened more than four inches.

**Advance**

Note that the door zone is defined in the ASME code as 18 inches above and below the hoistway door sill and the elevator car sill. The purpose of a door zone lock is to prevent the doors from opening when the elevator is not in the unlocking zone. G.A.L. manufacturing complies with this by the use of a zone locking device, more commonly called a **door restrictor**. The door restrictor keeps the doors from being able to be opened when the car is not on a floor level.

**Advance**

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**Instructor’s Notes**

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**Materials Needed**

- PPT slides 103, 104
**In your own words:**

The following check of the car door gate switch should be performed using the inspection station on top of the car. Verify that the elevator does not move with the leading edge of the door(s) or gate open greater than two inches.  

**Advance**

Next, from the outside of the car, examine the hoistway door interlocks by standing outside at each landing and **Advance** manually check that the hoistway door mechanical interlocks cannot be released by pulling or lifting the door panel(s).  

**Advance** Inspect and clean every landing, the interlock electrical contacts and the MO keeper bridging block contact.  

**Advance**
<table>
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<th><strong>Materials Needed</strong></th>
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<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words: Repair or replace as required. Also, inspect for free movement of all interlock and assemblies; <strong>Advance</strong> lubricate linkages and pivot points. <strong>Advance</strong> At each landing with the hoistway door open, try to run the elevator on inspection from the top of the car inspection station. If the elevator runs you must correct the defect. As always, after each inspection step repair and replace in accordance with your authority’s procedures. <strong>Advance</strong></td>
<td>✓ PPT slide 106</td>
</tr>
</tbody>
</table>
### Elevator – Door Operation

**Instructor’s Guide**

<table>
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<tr>
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</table>
| ![review](image) **REVIEW slide** | **In your own words:**

For Door Closers

**Advance** With the doors disengaged verify that the hoistway door closer initiates closing at several positions of travel to the locked position.

**Advance** Check proper tension on the door closer by opening the hoistway door about one inch and ensure the door fully closes to the locked position.

**Advance** Be sure to check that the door closing force, making sure it does not exceed 30 lbs of force. This can be checked with a force gauge.

**Advance** With the hatch door between 1/3 and 2/3 closed, stop it with your hand.

**Advance** |

- **Materials Needed**

  ✓ PPT slides 107, 108
**Elevator – Door Operation**

**Instructor’s Guide**

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<tr>
<td></td>
<td><strong>In your own words:</strong></td>
<td>✓ PPT slide108</td>
</tr>
<tr>
<td></td>
<td>Put the scale against the door edge and slowly release the door, allowing the closing force to be imposed on the scale, <strong>Advance</strong> then move the test scale away from the door. At this point read the door closing force. <strong>Advance</strong> Always take more than one reading and record the average. <strong>Advance</strong> Kinetic closing energy measurements vary depending on the type of door. <strong>Advance</strong></td>
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**Instructor’s Notes**

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**Elevator – Door Operation**

*Instructor’s Guide*

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<tbody>
<tr>
<td>REVIEW slide</td>
<td>In your own words:</td>
<td>✓ PPT slide 109</td>
</tr>
<tr>
<td>REFER participants to Elevator Maintenance</td>
<td>Refer participants to</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• <strong>Elevator Maintenance</strong> page 236</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for a detailed review of Measuring kinetic closing energy.</td>
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<tr>
<td></td>
<td>Advance</td>
<td>✓ Elevator Maintenance</td>
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Instructor’s Notes

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**Module Length:** 480 min  
**Time remaining:** 165 min  
**This section:** 45 min (13 slides)  
**Section start time:** ________  
**Section End Time:** ________
<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
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</thead>
</table>
| REVIEW slide | In your own words:  
As always, follow your authority’s specific requirements on preventive maintenance inspections.  
Make sure that the belts and chains on the operator are properly adjusted.  
In addition, take the following measurements that are mandated as per code: Clearance parameters & Closing Force.  
**Advance** For clearance parameters (gaps), simply use a ruler to make sure that all spaces are within code specifications as per A17.1 - 2010 Section 2.11.  
et correctly. Use the old gib as a guide.  

Refer participants to  
• **ASME A17.1**  
Advance | ✓ PPT slides 110  
✓ ASME A17.1 |
### Elevator – Door Operation

**Instructor’s Guide**

<table>
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<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| REVIEW slide | In your own words:  
For closing force use a force gauge on the edge of the hoistway door -- as the sensor will detect an obstruction if it is measured on the inside of the car door and will not close. Where this is measured on the door depends on the manufacturer - be sure to consult your manufacturer's specifications.  
**Advance** | ✓ PPT slide 111 |

**Instructor’s Notes**

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### Elevator – Door Operation

#### Instructor’s Guide

**Module Length:** 480 min  
**Time remaining:** 165 min  
**This section:** 45 min (13 slides)  
**Section start time:**  
**Section End Time:**  

<table>
<thead>
<tr>
<th>DO</th>
<th>SAY</th>
<th>Materials Needed</th>
</tr>
</thead>
</table>
| ASK | In your own words:  
Yes or No. During a door inspection, Jerome should ensure that door force does not exceed 30 lbs force.  
**Call on participants for answer**  
**Advance once given the correct answer**  
**Answer:** Yes  
**Advance** | ✓ PPT slide 112 |

### Instructor’s Notes

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**Transit Elevator/Escalator Consortium**

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In your own words:
When Phil is inspecting the gate switch, he should verify the car does not move with the leading edge of the door or gate open greater than ________.
  a. 1/64 inch
  b. ½ inch
  c. 1 inch
  d. 2 inches

Call on participants for answer
Advance once given the correct answer
Answer: d.
Advance
### Elevator – Door Operation

**Instructor’s Guide**

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<th>DO</th>
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<td>ASK</td>
<td><strong>In your own words:</strong></td>
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<td>CLASSROOM ACTIVITY</td>
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**Take time to visit the field to provide an example demonstration and opportunities for participants to perform the following tests:**

- Perform a sensory inspection of the door assembly
- Perform an operational inspection of the door assembly
- Perform an operational test on all safety devices on the doors

**Advance**

**Materials Needed**

- PPT slide 114

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**Instructor’s Notes**

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In your own words:
For each objective, briefly review what was learned in this module or ask participants to share what they have learned for each learning objective and briefly discuss as a class.

Advance

Lets take a look at some of the key words we have defined as moved through this module.

Read slide. Discuss definitions as a group.

Advance

Read slide. Discuss definitions as a group.

Advance

Read slide. Discuss definitions as a group.

Advance

Read slide. Discuss definitions as a group. Advance
Elevator – Door Operation

Instructor’s Guide

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<td>In your own words:</td>
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<td>Administer quizzes.</td>
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CLASSROOM ACTIVITY

INDIVIDUAL ACTIVITY

Instructor’s Notes

Module Length: 480 min
Time remaining: 40 min
This section: 40 min (4 slides)
Section start time: ________
Section End Time: ________

CLASSROOM ACTIVITY

INDIVIDUAL ACTIVITY

Transit Elevator/Escalator Consortium