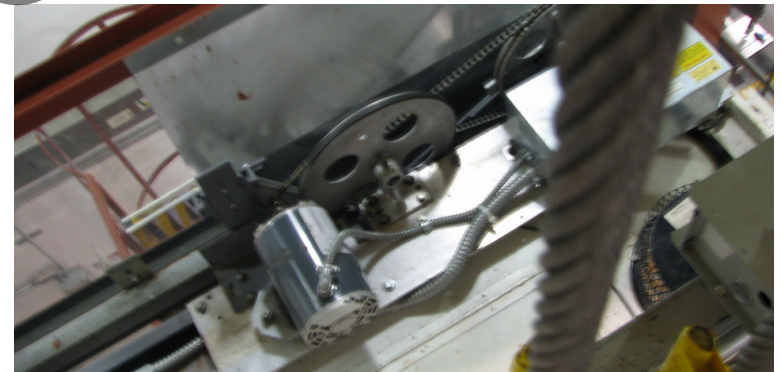
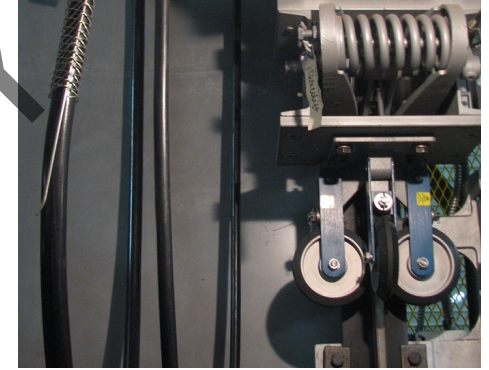


# Instructor Guide



**216: Elevator: Principles of Door Operation & Maintenance**  
**Module 3: Component Maintenance and Replacement**

# Elevator – Door Components & Replacement

*Instructor's Guide*



## **Table of Contents**

<b>Overview.....</b>	<b>4</b>
<b>Adjustments.....</b>	<b>9</b>
<b>Maintenance and Replacement – Header Components.....</b>	<b>18</b>
<b>Maintenance and Replacement – Door Operator.....</b>	<b>33</b>
<b>Maintenance and Replacement – Door Panel Components .....</b>	<b>39</b>
<b>Maintenance and Replacement – Sill Components .....</b>	<b>67</b>
<b>Documentation.....</b>	<b>82</b>
<b>Summary.....</b>	<b>84</b>

PREVIEW ONLY

# Elevator – Door Components & Replacement

*Instructor's Guide*



## Icons Used In This Guide



**REVIEW** slides



**ASK**



**CLASSROOM ACTIVITY**



**SMALL GROUP ACTIVITY**



**INDIVIDUAL ACTIVITY**



**WRITE**



Multimedia



**REFER** participants to

## Agenda

Topic #	Topic Title	Duration
1	Overview	20 minutes
2	Adjustments	50 minutes
3	Field Trip	60 minutes
4	Header Components & Field Trip	120 Minutes
5	Door Operator & Field Trip	120 Minutes
6	Door Panel & Field Trip	180 Minutes
7	Sill Area & Field Trip	120 Minutes
8	Documentation	20 Minutes
9	Summary	30 Minutes
	<b>Total Time:</b>	720 Minutes

PREVIEW ONLY

# Elevator – Door Components & Replacement

## Instructor's Guide



### Overview

**Purpose** The purpose of this module is to:

- Provide the participant with a general knowledge and understanding of the maintenance required for components within transit elevator door systems and to give guidance on how to replace components when needed.

### **Objectives**

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

- Identify components that require adjustment
- Explain how to adjust components
- Define adjustment specifications as per ASME code
- Identify areas to be cleaned
- Describe the procedures used for removal and replacement
- Complete required documentation to reflect the completion of work

### **Materials**

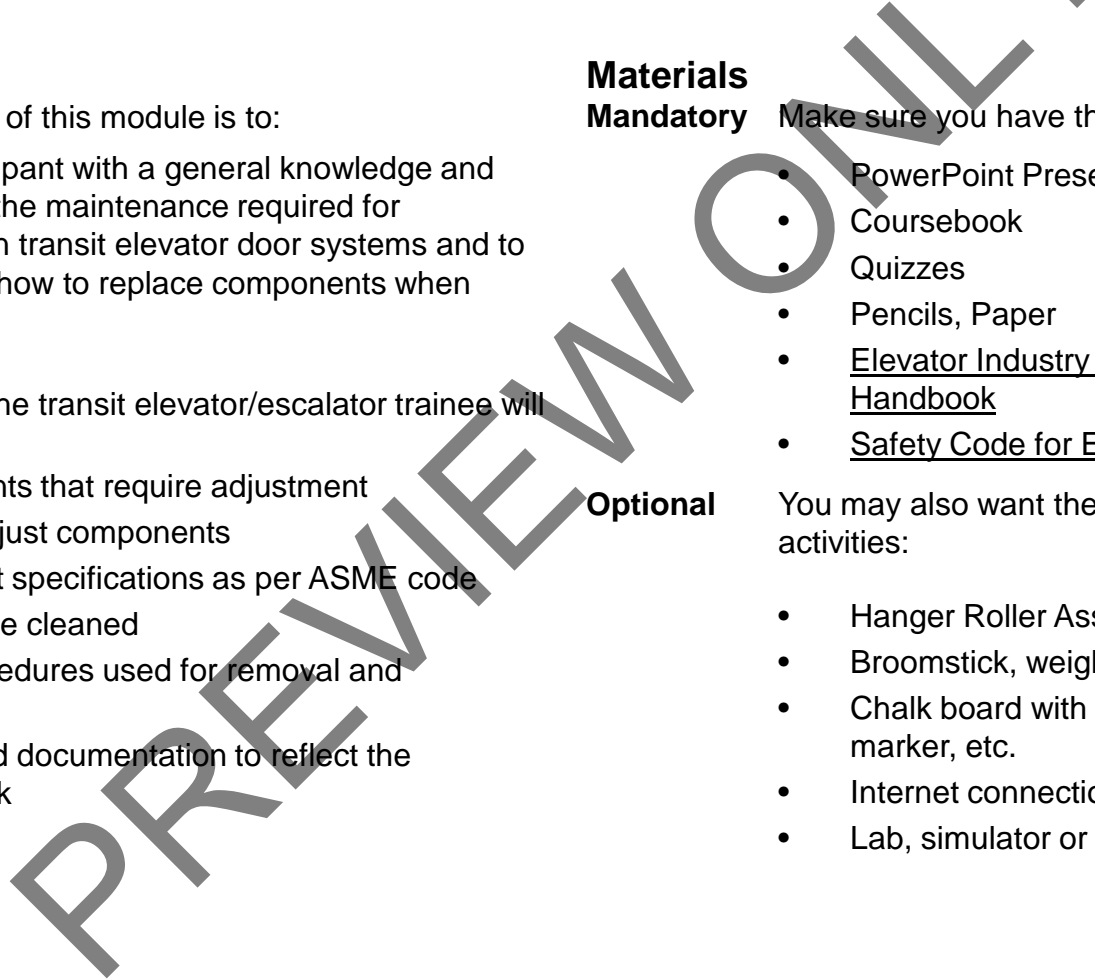
**Mandatory** Make sure you have the following

- PowerPoint Presentation
- Coursebook
- Quizzes
- Pencils, Paper
- Elevator Industry Field Employees' Safety Handbook
- Safety Code for Elevators and Escalators

### **Optional**

You may also want the following for optional activities:

- Hanger Roller Assembly
- Broomstick, weight, and string
- Chalk board with chalk, large paper with marker, etc.
- Internet connection
- Lab, simulator or out of service elevator



# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 720 minutes    This section: 20 min (8 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**REVIEW** slide

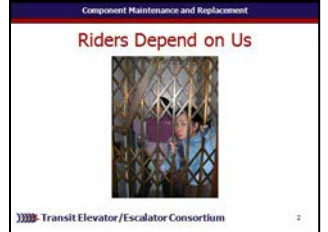
**In your own words:**

Welcome to the course on elevator doors component maintenance and replacement.

**Advance.**

Our riders depend on us to have functioning elevators – this includes their door systems – otherwise they, and you, may encounter situations like this one.

✓ PPT slides 1 and 2



**Instructor's Notes**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 720 minutes    This section: 20 min (8 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
<div data-bbox="19 478 125 578" data-label="Image"> </div> <p data-bbox="150 506 396 542"><b>REVIEW</b> slide</p>  <p data-bbox="28 792 444 835"><b>Instructor's Notes</b></p> <hr/> <hr/> <hr/> <hr/> <hr/>	<p data-bbox="672 428 1023 464"><b>In your own words:</b></p> <p data-bbox="672 506 1410 628">Today we will look at how to maintain and replace elevator door components. In doing so, we will</p> <p data-bbox="672 635 1178 678"><b>Advance for each objective.</b></p> <p data-bbox="672 721 1410 763">Identify components that require adjustment</p> <p data-bbox="672 806 1246 849">Explain how to adjust components</p> <p data-bbox="672 899 1352 985">Define adjustments specifications as per ASME code</p> <p data-bbox="672 992 1139 1035">Identify areas to be cleaned</p> <p data-bbox="672 1078 1362 1163">Describe the procedures for removal and replacement</p> <p data-bbox="672 1213 1246 1292">Complete required documentation <b>Advance.</b></p>	<p data-bbox="1497 456 1748 492">✓PPT slides 3</p> <div data-bbox="1516 521 1845 749" data-label="Image"> </div>

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 720 minutes    This section: 20 min (8 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

### DO



**REVIEW** key terms

### Instructor's Notes

---



---



---



---



---

### SAY

**In your own words:**

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

Adaptor bar, Clutch assembly, Eccentric, Emergency access hole, Fire gib, Flat stock rods, **Advance** Gib bracket, Hanger roller, Hanger roller assembly, Hoistway linkages, Interlock box, Isolation pads **Advance.**

As well as Keeper contact, Linkages, LOTO, Mounting block, Oiler, Pick-up rollers, **Advance**

Relating cables, Round stock rods, Spacers, Slow door link

### Materials Needed

✓PPT slides 4, 5



# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 700 minutes    This section: 50 min (11 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**REVIEW** slides

**In your own words:**

Components on doors that typically need adjusting outside of the replacement of components are the drive chain and drive belt.

Usually after about 2 months of initial installation, drive chains and belts should be checked. The drive chain should be checked first because adjusting the chain will result in an adjustment of the drive belt tension.

**Advance.**

Indications for chain adjustment include when door movement is: **Advance**

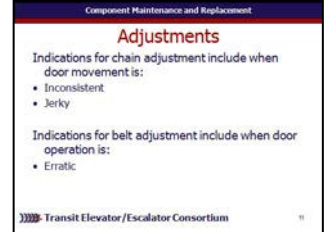
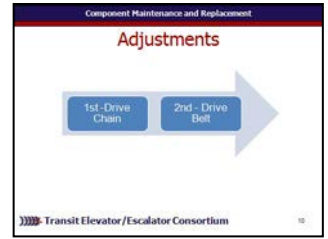
- Inconsistent
- Jerky

**Advance** Indications for belt adjustment include when door operation is **Advance**

- Erratic

**Advance.**

✓ PPT slides 10, 11



### Instructor's Notes

---



---



---



---



---



# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 700 minutes    This section: 50 min (11 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

---



---



---



---



---

### SAY

**In your own words:**

Improper belt tension may result in belt slippage and erratic door operation. Proper belt tension can be checked at the floor 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.**

Locate Stud

- Double nutted stud on rear of door motor base.

Increase Belt Tension

- Tighten down on double nutted stud.

OR

Decrease Belt Tension

- Loosen the double nutted stud.

**Advance.**

### Materials Needed

✓PPT slides 13, 14



# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 700 minutes    This section: 50 min (11 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**ASK**

**In your own words:**

Lets see what we have learned so far:  
The header components that need adjusting include:

(check all that apply)

- a. Chain drive
- b. Drive arm
- c. Belt

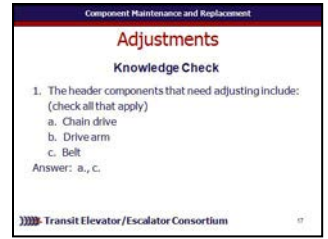
**Answer: a., c.**

**Call on participants for answer.**

**Advance for correct answer.**

**Advance.**

✓PPT slide 17



**Instructor's Notes**

---



---



---



---




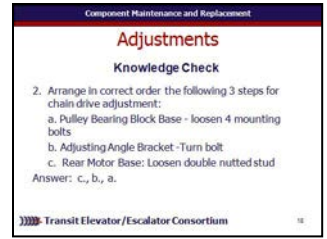
---

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 700 minutes    This section: 50 min (11 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
<p data-bbox="28 464 260 564"> <b>ASK</b></p> <p data-bbox="28 792 454 835"><b>Instructor's Notes</b></p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p data-bbox="666 428 1033 464"><b>In your own words:</b></p> <p data-bbox="666 478 1439 564">Arrange in correct order the following 3 steps for chain drive adjustment:</p> <ul data-bbox="763 571 1439 785" style="list-style-type: none"><li>a. Pulley Bearing Block Base - loosen 4 mounting bolts</li><li>b. Adjusting Angle Bracket -Turn bolt</li><li>c. Rear Motor Base: Loosen double nutted stud</li></ul> <p data-bbox="666 792 975 828"><b>Answer: c., b., a.</b></p> <p data-bbox="666 835 1246 878"><b>Call on participants for answer.</b></p> <p data-bbox="666 878 1188 921"><b>Advance for correct answer.</b></p> <p data-bbox="666 928 859 971"><b>Advance.</b></p>	<p data-bbox="1477 478 1738 514">✓PPT slide 18</p> <div data-bbox="1516 535 1845 771"><p data-bbox="1593 535 1767 549"><small>Component Maintenance and Replacement</small></p><p data-bbox="1622 564 1748 585"><b>Adjustments</b></p><p data-bbox="1622 592 1748 614"><b>Knowledge Check</b></p><p data-bbox="1535 621 1806 642">2. Arrange in correct order the following 3 steps for chain drive adjustment:</p><ul data-bbox="1555 642 1806 706" style="list-style-type: none"><li>a. Pulley Bearing Block Base - loosen 4 mounting bolts</li><li>b. Adjusting Angle Bracket -Turn bolt</li><li>c. Rear Motor Base: Loosen double nutted stud</li></ul><p data-bbox="1535 706 1632 721">Answer: c., b., a.</p><p data-bbox="1526 749 1748 763"><small>Transit Elevator/ Escalator Consortium</small></p></div>

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 650 minutes    This section: 60 min (1 slide)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**CLASSROOM  
ACTIVITY**

**In your own words:**

Okay, now it's time to see how this works in the real world.

Please get your stuff together for a trip to the lab.

*[When you get to the lab/simulator/out-of-order elevator, demonstrate how to adjust a drive chain and a drive belt. Ask for participant assistance in locating these components and how the adjustments should be done.]*

✓ PPT slide 20



✓ Simulator, mock-up, or out-of-order elevator

**Instructor's Notes**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 590 minutes    This section: 60 min (20 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**REVIEW** slide



**ASK**

### Instructor's Notes

---



---



---



---



---

**In your own words:**

Now, you should re-confirm that you have panels that roll smoothly open and closed. There should be no friction from gibs, upthrusts or safety retainers.

**Advance.**

Lets see what we have learned so far:  
 A \_\_\_\_\_ is used for alignment during the replacement of a header.

(check all that apply)

- a. Hanger Roller
- b. Hanger Roller Assembly
- c. Plumb line.
- d. Type "A" Oiler

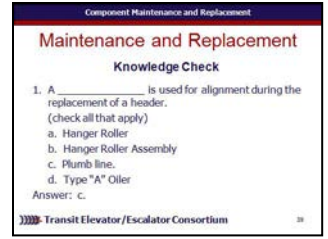
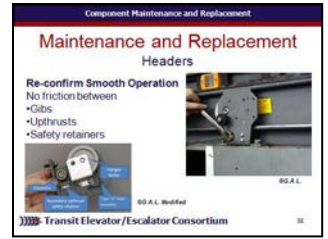
**Call on participants for answer.**

**Advance for correct answer.**

**Answer: c.**

**Advance.**

✓ PPT slides 38, 39



# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 Minutes    Time remaining: 590 minutes    This section: 60 min (20 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**ASK**

**In your own words:**

The clearance dimensions at the jamb and sill generally should not exceed:

- a. 5 mm
- b. 10 mm
- c. 15 mm

**Call on participants for answer.**  
**Advance for correct answer.**

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

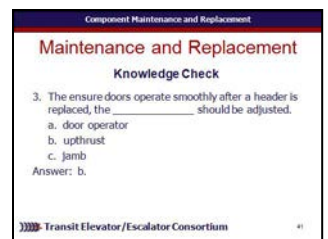
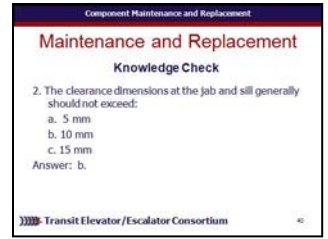
The ensure doors operate smoothly after a header is replaced, the \_\_\_\_\_ should be adjusted.

- a. door operator
- b. upthrust
- c. jamb

**Call on participants for answer.**  
**Advance for correct answer.**

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

✓PPT slides 40, 41



**Instructor's Notes**

---



---



---



---



---

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 470 minutes    This section: 60 min (10 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
<div data-bbox="34 464 144 568" data-label="Image"> </div> <p data-bbox="170 492 409 528"><b>REVIEW</b> slide</p>           <p data-bbox="28 792 444 835"><b>Instructor's Notes</b></p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p data-bbox="672 428 1023 464"><b>In your own words:</b></p> <p data-bbox="672 521 1410 692">We have just looked at header components. Now lets look at the door operator and components that need maintenance and replacement.</p> <p data-bbox="672 699 850 735"><b>Advance.</b></p>	<p data-bbox="1497 471 1748 506">✓PPT slide 43</p> <div data-bbox="1522 535 1839 768" data-label="Image"> </div>

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 470 minutes    This section: 60 min (10 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide

### Instructor's Notes

---



---



---



---



---

### SAY

**In your own words:**

To replace a door operator, begin by disconnecting:

1. Clutch Assembly
2. Linkages
3. Drive Arms

And then...

Unbolt and remove the old door operator.

**Advance.**

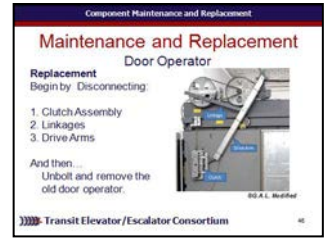
Before installing the new operator, take care to make sure that the elevator doors mechanical operation is correct.

**Read and discuss slide.**

**Advance.**

### Materials Needed

✓ PPT slides 46, 47







# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 350 minutes    This section: 120 min (38 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
 <b>REVIEW</b> slide  <b>Instructor's Notes</b> _____ _____ _____ _____ _____	<p><b>In your own words:</b></p> <p>Here we have a vision panel in a door. In most locations, all maintenance and repair of vision are outsourced to a third party. But, if a vision panel needs to be replaced by a transit authority technician, then the procedures are quite simple. Simply unscrew the molding that holds the vision panel in place, remove the damaged vision panel and replace it with a new pre-cut panel, screw the molding back into place.</p> <p><b>Advance.</b></p>	<p>✓PPT slide 73</p> 

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 350 minutes    This section: 120 min (38 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**REVIEW** slide

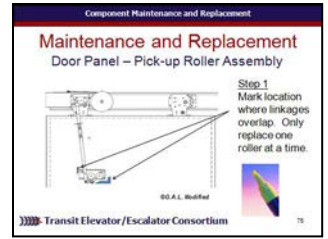
**In your own words:**

Replace when it is broken or not functioning properly. Before removing the current pick-up roller assembly mark its location on the door panel as well as where the linkages overlap. The most commonly used items used to make temporary marks on machinery include white-out or a marker. Note that if you do not mark these items you will have to readjust them – costing you much more time.

Make sure to replace one roller at a time making sure that the new roller sticks out the same length as the current rollers. Note that if all rollers are removed at the same time you will have no point of reference for the length of the new roller shaft.

**Advance.**

✓ PPT slide 75



### Instructor's Notes

---

---

---

---

---

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 170 minutes    This section: 60 min (14 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**REVIEW** slide

**In your own words:**

In most cases you will only be replacing the nylon guide on the gibs. Start with the procedure above by unscrewing the gib bracket from the door panel and sliding it along the track into the door clearance. Lift out of the track and remove. Next unscrew the nylon. Before doing so, take note of where the nylon is attached to the bracket. Remove the nylon guide from the bracket and replace with a new guide. Make sure the hole position is the same as the original one. This is so that the door slides properly and to make sure there are no excessive gaps or friction on the door when the gibs are installed. If the entire gib needs replacement – because it is bent, rusted, etc. – you will still need to connect the new nylon guide to the gib bracket correctly. Use the old gib as a guide.

**Advance.**

✓ PPT slide 102



### Instructor's Notes

---

---

---

---



---

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 170 minutes    This section: 60 min (14 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
 <b>REVIEW</b> slide  <b>Instructor's Notes</b> _____ _____ _____ _____ _____	<p><b>In your own words:</b></p> <p>There will only be a total of 2 fire tabs bent on each gib – one on each side. Bend the tab which aligns horizontally to the middle of the nylon guide.</p> <p><b>Advance.</b></p>	<p>✓ PPT slide 103</p> 

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 170 minutes    This section: 60 min (14 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



**REVIEW** slide

**In your own words:**

For **fire gib** replacement remove whichever regular gib is between the fire gib and the door edge. Then unscrew the fire gib from the door panel and slide it along the track into the door clearance – and lift out of the track and remove. Replace with new fire gib, slide along the track to the appropriate place, screw onto door panel and then replace the gib that was removed previously.

**Advance.**

✓ PPT slide 105



### Instructor's Notes

---

---

---

---

---

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 170 minutes    This section: 60 min (14 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

**DO**

**SAY**

**Materials Needed**



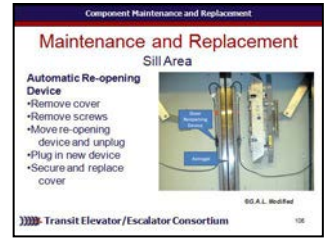
**REVIEW** slide

**In your own words:**

When door reopening devices are purchased, they come with detailed instructions and all associated hardware. General replacement instructions are below:  
Snap off the cover. Remove the screws. Move the re-opening device and unplug. Plug the new device in place. Screw into place. Snap the cover back on. Follow the same procedures for the opposite door.

**Advance.**

✓ PPT slide106



### Instructor's Notes

---

---

---

---

---

# Elevator – Door Components & Replacement

## Instructor's Guide



Module Length: 720 minutes    Time remaining: 30 minutes    This section: 30 min (3 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides



**ASK**

### Instructor's Notes

---



---



---



---



---

### SAY

**In your own words:**

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.**

Each employee will be trained on their authorities specific policies.

**Advance.**

**Administer quiz.**

### Materials Needed

✓ PPT slide 114, 115, 116

