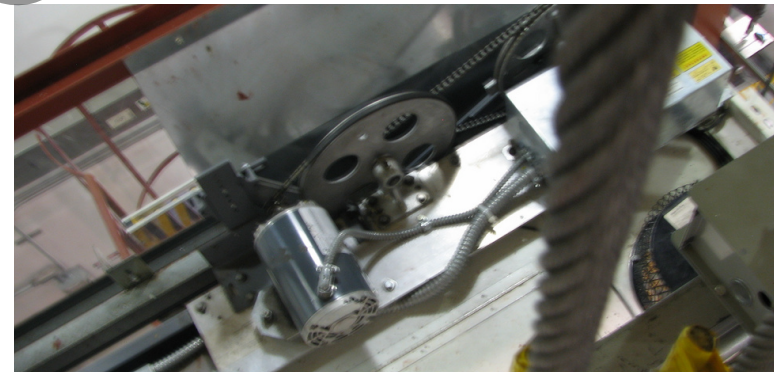
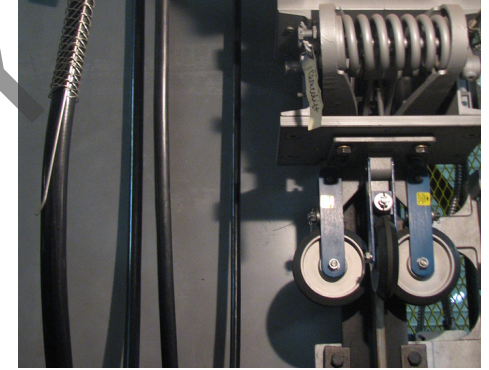


# Instructor Guide



## 213: Elevator: Principles of Operation Module 2: Hydraulic Elevators

# Elevator – Hydraulic Elevators

*Instructor’s Guide*



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Major Components.....	8
Basic Operation.....	15
Control Systems.....	22
Safety Features.....	26
Summary.....	28

PREVIEW ONLY

# Elevator – Hydraulic Elevators

*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	15 minutes
2	Major Components	40 minutes
3	Field Trip	70 minutes
4	Basic Operation	40 minutes
5	Field Trip	70 minutes
6	Control Systems & Safety Features	40 Minutes
7	Field Trip	70 minutes
8	Summary	15 Minutes
	<b>Total Time:</b>	360 Minutes

# Elevator – Hydraulic Elevators

## *Instructor's Guide*



### Overview

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

- The purpose of this unit is to explain and discuss the principles Hydraulic Elevator Operations. The key concepts discussed will aid the trainee in their future applications of elevator concepts and terminology.

### **Objectives**

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

- **Define terminology associated with hydraulic elevator operation**
- **Identify major components of hydraulic elevators**
- **Describe the basic operation of a hydraulic elevator**
- **Identify different hydraulic lift configurations**
- **Identify control systems and associated components**
- **Identify safety features of hydraulic elevators**

### **Materials**

#### **Mandatory**

Make sure you have the following

- PowerPoint Presentation
- Course book
- Quizzes
- Pencils
- Paper
- Elevator's 101

#### **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
- Dual Cylinder Machine if applicable to your transit authority

# Elevator – Hydraulic Elevators

## Instructor's Guide



Module Length: 360 min    Time remaining: 360 min    This section: 15 min (6 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
<div data-bbox="19 439 131 542"></div> <div data-bbox="154 456 614 499">REVIEW introduction slides</div> <div data-bbox="19 559 131 671"></div> <div data-bbox="154 578 363 621">Multimedia</div> <div data-bbox="19 785 444 835"> <h3>Instructor's Notes</h3> <hr/><hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 421 1023 464">In your own words:</div> <div data-bbox="705 499 1367 585"> <p>Welcome to the introductory module for hydraulic elevators.</p> <p><b>Advance.</b></p> <p><i>[Click on the box and briefly share the animated diagram to participants.]</i></p> </div> <div data-bbox="705 806 1381 985"> <p>We are going to begin to take a closer look at this type of elevator – a hydraulic elevator. We will come back to this and look at it in more detail in a little while.</p> <p><b>Advance.</b></p> </div>	<div data-bbox="1497 464 1787 506">✓PPT slides 1, 2</div> <div data-bbox="1535 535 1854 763"> </div> <div data-bbox="1535 785 1854 1021"> </div> <div data-bbox="1506 1035 1864 1078">✓Internet connection</div>


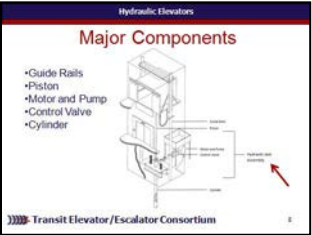
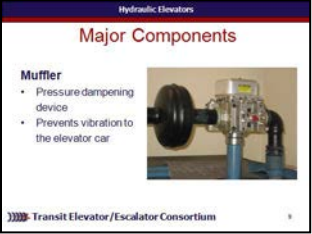


# Elevator – Hydraulic Elevators

## Instructor's Guide

Module Length: 360 min    Time remaining: 345 min    This section: 40 min (10 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_



DO	SAY	Materials Needed
<div> <b>REVIEW</b> slides</div> <div><h3>Instructor's Notes</h3><div></div><div></div><div></div><div></div><div></div><div></div></div>	<p><b>In your own words:</b></p> <p>Major components you may already be familiar with in a hydraulic elevator system include... Guide Rails, Piston, Motor and Pump, Control Valve, Cylinder</p> <p>Lets look at some additional components you will need to know at this point.</p> <p><b>Advance.</b></p> <p>The first is the hydraulic jack assembly as indicated here by the arrow.</p> <p><b>Advance.</b></p> <p>Another component is a muffler. This is a pressure dampening device and prevents vibration to the elevator car.</p> <p><b>Advance.</b></p>	<p>✓ PPT slides 8, 9</p> <div></div> <div></div>

# Elevator – Hydraulic Elevators

## Instructor's Guide



Module Length: 360 min    Time remaining: 345 min    This section: 40 min (10 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_


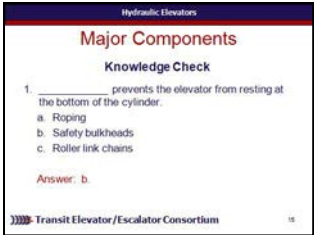
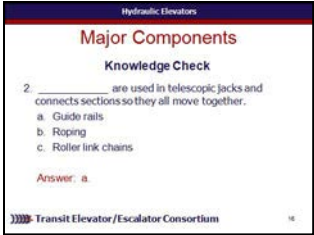
DO	SAY	Materials Needed
<div data-bbox="19 439 131 545"></div> <div data-bbox="150 456 392 499">REVIEW slide</div> <div data-bbox="19 792 444 835">Instructor's Notes</div> <div data-bbox="19 892 614 1242"><hr/><hr/><hr/><hr/><hr/></div>	<p data-bbox="676 421 1023 464">In your own words:</p> <p data-bbox="676 521 1381 606">Roping connects the car and the hydraulic jack.</p> <p data-bbox="676 606 850 649"><b>Advance.</b></p>	<p data-bbox="1526 464 1777 506">✓PPT slide 13</p> <div data-bbox="1541 535 1854 768"><p>Hydraulic Elevators Major Components Roping • Connects the car and the hydraulic jack. Transit Elevator/ Escalator Consortium</p></div>

# Elevator – Hydraulic Elevators

## Instructor's Guide



Module Length: 360 min    Time remaining: 345 min    This section: 40 min (10 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
<div> <b>ASK</b></div> <div><b>Instructor's Notes</b> <hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/></div>	<p><b>In your own words:</b></p> <p>Lets see what we have learned so far: What prevents the elevator from resting at the bottom of the cylinder?</p> <ul style="list-style-type: none"><li>a. Roping</li><li>b. Safety bulkheads</li><li>c. Roller link chains</li></ul> <p><b>Call on participants for answer.</b> <b>Advance for correct answer.</b> <b>Answer: b.</b> <b>Advance.</b></p> <p>What is used in telescopic jacks and connects sections so they all move together?</p> <ul style="list-style-type: none"><li>a. Guide rails</li><li>b. Roping</li><li>c. Roller link chains</li></ul> <p><b>Call on participants for answer.</b> <b>Advance for correct answer.</b> <b>Answer: a.</b> <b>Advance.</b></p>	<p>✓PPT slides 14, 15</p> <div></div> <div></div>


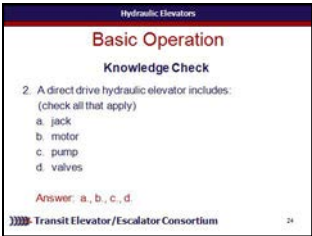


# Elevator – Hydraulic Elevators

## Instructor's Guide




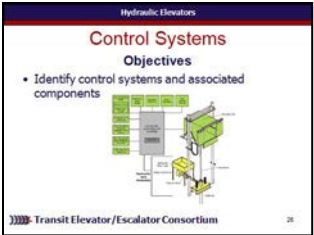
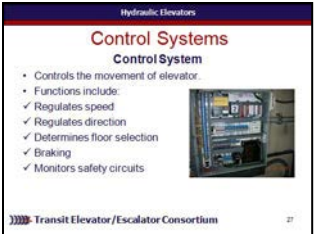
Module Length: 360 min    Time remaining: 235 min    This section: 40 min (7 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
<div data-bbox="19 439 241 546">  <b>ASK</b> </div> <div data-bbox="19 792 444 839"> <b>Instructor's Notes</b> </div> <div data-bbox="19 892 614 1242"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 425 1362 921"> <p><b>In your own words:</b>            A direct drive hydraulic elevator includes:            (check all that apply)</p> <ul style="list-style-type: none"> <li>a. jack</li> <li>b. motor</li> <li>c. pump</li> <li>d. valves</li> </ul> <p><b>Call on participants for answer.</b>  <b>Advance for correct answer.</b>  <b>Answer: a., b., c., d.</b>  <b>Advance.</b></p> </div>	<div data-bbox="1526 468 1777 511"> <b>✓PPT slide 24</b> </div> <div data-bbox="1541 535 1854 768">  </div>

# Elevator – Hydraulic Elevators

## Instructor's Guide

Module Length: 360 min      Time remaining: 125 min      This section: 40 min (7 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_


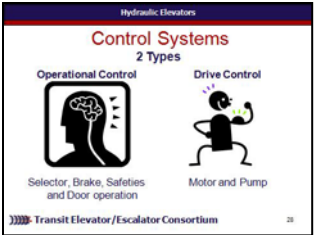
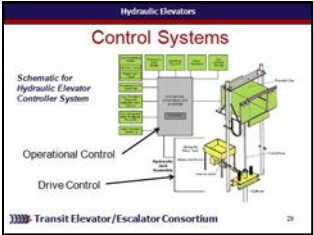
DO	SAY	Materials Needed
<div> <b>REVIEW</b> slides</div> <div><h3>Instructor's Notes</h3><div></div><div></div><div></div><div></div><div></div><div></div></div>	<p><b>In your own words:</b></p> <p>Moving on, we will look at control systems and associated components next.</p> <p><b>Advance.</b></p> <p>A controller controls the movement of elevator. Functions include regulating speed, regulating direction, determining floor selection, braking, and monitoring safety circuits.</p> <p><b>Advance.</b></p>	<div>✓ PPT slides 27, 28</div> <div></div> <div></div>

# Elevator – Hydraulic Elevators

## Instructor's Guide

Module Length: 360 min      Time remaining: 125 min      This section: 40 min (7 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_




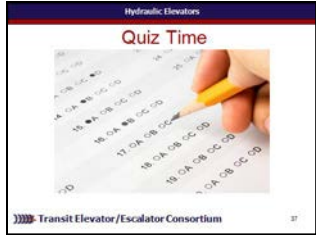
DO	SAY	Materials Needed
<div> <b>REVIEW</b> slides</div> <div><h3>Instructor's Notes</h3><div></div><div></div><div></div><div></div><div></div><div></div></div>	<p><b>In your own words:</b></p> <p>Essentially there are two types of controls: operation and drive. <b>Operation control</b> may be characterized as the “brain” while <b>drive control</b> as the “muscle” controlling the motion of the elevator. Components of “the brain” or operational control include selector, brakes, safeties, door operation. The muscle or the drive control contain the motor and the pump.</p> <p><b>Advance.</b></p> <p><i>[Discuss slide pointing out where the <u>operational control</u> and <u>drive control</u> are located in the system.]</i></p> <p><b>Advance.</b></p>	<p>✓ PPT slides 29, 30</p> <div></div> <div></div>

# Elevator – Hydraulic Elevators

## Instructor's Guide



Module Length: 360 min    Time remaining: 15 min    This section: 15 minutes (3 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
<div data-bbox="19 435 399 549"> <b>CLASSROOM ACTIVITY</b></div> <div data-bbox="19 792 444 835"><b>Instructor's Notes</b></div> <div data-bbox="19 892 608 1242"><hr/><hr/><hr/><hr/><hr/></div>	<p>In your own words:</p> <p><i>Administer quiz.</i></p>	<p>✓ PPT slide 37</p> <div data-bbox="1522 521 1839 753"></div>