Elevator – Troubleshooting Drive Systems
Instructor's Guide

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PREVIEW ONLY

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	40 minutes
2	Troubleshooting Strategies	40 minutes
3	Field Trip	60 minutes
4	Troubleshooting Drive Systems	60 minutes
5	Documentation	10 minutes
6	Field Trip	60 minutes
7	Summary	30 minutes
	Total Time:	300 minutes

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Overview

Purpose   The purpose of this module is to:

Provide the participant with an overview of gearless drive systems for elevators in use in a public transit environment

Objectives

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

- Explain how a gearless drive system operates
- Identify major components of the gearless drive systems
- List methods of controlling gearless drive systems
- Identify the speed specifications of a gearless drive system
- Explain difference between geared and gearless drive systems

Materials

Mandatory   Make sure you have the following

- PowerPoint Presentation
- Coursebook
- Quizzes
- Pencils
- Elevator Industry Field Employees' Safety Handbook

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

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Module Length: 300 min   Time remaining: 300 min   This section: 40 min (11 slides)   *Section start time: _____*   *Section End Time: _____*

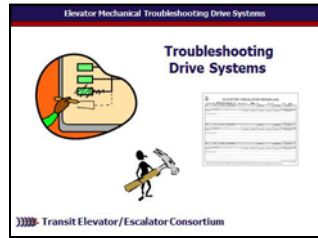| DO	SAY	Materials Needed
REVIEW introduction slides **Multimedia** **Instructor's Notes** _____ _____ _____ _____	**In your own words:** Welcome to the course on Troubleshooting Drive Systems. *Advance* We have all had some experience with troubleshooting. **[Multi-media: Click on the figure with hammer for website with humorous cartoon related to troubleshooting.]** *Advance*	✓PPT slides 1, 2 ✓Internet connection

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DO	SAY	Materials Needed
REVIEW module objectives	**In your own words:**	✓PPT slide 3

SAY

In your own words:

Today we will

Advance Identify troubleshooting strategies for drive systems

Advance Perform a sensory inspection using visual, smell, sound, and touch

Advance Check for normal operation

Advance List various problems which can occur in a drive system

Advance Identify corrective actions related to common problems in a drive system

Advance Perform correct documentation of the problems

Advance

DO

REVIEW module objectives

Instructor's Notes

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Materials Needed

✓PPT slide 3

Elevator Mechanical Troubleshooting Drive Systems
Outline
- Identify troubleshooting strategies for drive systems
- Perform a sensory inspection using visual, smell, sound, and touch
- Check for normal operation
- List various problems which can occur in a drive system
- Identify corrective actions related to common problems in a drive system
- Perform correct documentation of the problems

))))- Transit Elevator/Escalator Consortium

Module Length: 300 min | Time remaining: 300 min | This section: 40 min (11 slides) | *Section start time: _____* | *Section End Time: _____*

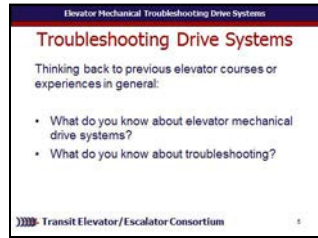| DO	SAY	Materials Needed
ASK participants what they remember about safety and elevators **SMALL GROUP ACTIVITY** **WRITE** **Instructor's Notes** _____ _____ _____ _____	**In your own words:** Thinking back to other courses or just in general, who can think What do you know about elevator mechanical drive systems? *[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.]* Knowing the system is the first step in troubleshooting. That knowing what is normal will help you detect what is not normal when trouble arises. ***Do Not Advance***	✓PPT slide 5 Elevator Mechanical Troubleshooting Drive Systems **Troubleshooting Drive Systems** Thinking back to previous elevator courses or experiences in general: • What do you know about elevator mechanical drive systems? • What do you know about troubleshooting?))))- Transit Elevator/Escalator Consortium

Module Length: 300 min | Time remaining: 300 min | This section: 40 min (11 slides) | *Section start time:* _____ | *Section End Time:* _____

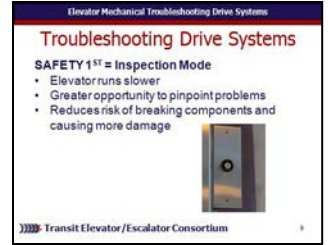| DO	SAY	Materials Needed
REVIEW slide **ASK** What do you recall about inspection mode from earlier courses? ## Instructor's Notes	**In your own words:** When attempting to resolve a problem with elevator drive systems, safety is always the first priority. Run the elevator in inspection mode to further troubleshoot potential problems. In inspection mode, the elevator will run slowly so there is a greater opportunity to pinpoint problems. Operating the elevator in inspection mode also reduces the risk of breaking the elevator components. *[Ask]* What do you recall about inspection mode from earlier courses? *[Discuss participant responses.]* *Advance*	✓PPT slide 9 Elevator Mechanical Troubleshooting Drive Systems **Troubleshooting Drive Systems** SAFETY 1ST = Inspection Mode • Elevator runs slower • Greater opportunity to pinpoint problems • Reduces risk of breaking components and causing more damage))))) Transit Elevator/Escalator Consortium

Module Length: 300 min | Time remaining: 260 min | This section: 40 min (19 slides) | *Section start time:* _____ | *Section End Time:* _____

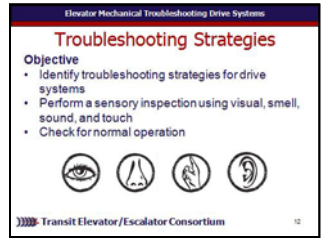| DO	SAY	Materials Needed
REVIEW slide	**In your own words:** Before we look at troubleshooting drive systems specifically, lets take a look at troubleshooting elevator systems in general by talking about some strategies with special attention to sensory inspections and checking for normal operation. *Advance*	✓PPT slide 12 **Elevator Mechanical Troubleshooting Drive Systems** **Troubleshooting Strategies** **Objective** • Identify troubleshooting strategies for drive systems • Perform a sensory inspection using visual, smell, sound, and touch • Check for normal operation)))))- Transit Elevator/Escalator Consortium 12

Instructor's Notes

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Module Length: 300 min   Time remaining: 260 min   This section: 40 min (19 slides)   *Section start time:* _____   *Section End Time:* _____

DO	SAY	Materials Needed
REVIEW slide	**In your own words:** Some common sight problems often seen by elevator technicians include: Severe oil leakage. Oil discoloration. Elevator not responding to calls. Discoloration of paint on motor casing. Elevator not moving. Elevator will not ascend to the top floor. *Advance*	✓PPT slide 14

Instructor's Notes

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Module Length: 300 min   Time remaining: 260 min   This section: 40 min (19 slides)   *Section start time:* _____   *Section End Time:* _____

DO	SAY	Materials Needed
REVIEW slide	**In your own words:** Common problems often detected through hearing include: Unusual noise. Extreme noise particularly with hydraulic drives. Hammering noise. *Advance*	✓ PPT slide 16 *Elevator Mechanical Troubleshooting Drive Systems* **Troubleshooting Strategies** Hearing • Unusual noise • Extreme noise • Hammering noise))))) Transit Elevator/Escalator Consortium

Instructor's Notes

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Elevator – Troubleshooting Drive Systems
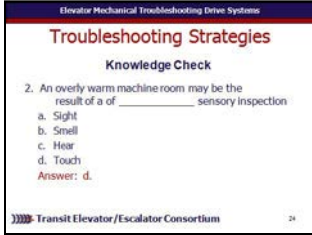*Instructor's Guide*

Module Length: 300 min | Time remaining: 260 min | This section: 40 min (19 slides) | *Section start time: _____* | *Section End Time: _____*

DO	SAY	Materials Needed

ASK	**In your own words:**
	An overly warm machine room may be the result of a _____ sensory inspection
	    a. Sight
	    b. Smell
	    c. Hear
	    d. Touch
		✓PPT slide 24

Instructor's Notes _____ _____ _____ _____ _____	***Call on participants for answer*** ***Advance once given the correct answer*** Answer: d. ***Advance.***	

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Module Length: 300 min   Time remaining: 260 min   This section: 40 min (19 slides)   *Section start time: _____*   *Section End Time: _____*

DO	SAY	Materials Needed

? **ASK**
 	
Instructor's Notes
 	
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	In your own words:
	Checking for common solutions is an example of using the strategy of _____.
	    a. Prior Occurrence
	    b. Recent Alterations
	    c. Function Vs. Non-Function
	    d. Hypothesize
	
	Call on participants for answer
	Advance once given the correct answer
	Answer: a.
	
	Advance.
		✓PPT slide 28

|) Module Length: 300 min | Time remaining: 160 min | This section: 60 min (40 slides | *Section start time: _____* | *Section End Time: _____* |

DO	SAY	Materials Needed
REVIEW slide **REFER** participants to course book, page 50 **WRITE** Authority-specific notes **Instructor's Notes** _____ _____ _____ _____	**In your own words:** Lets take some time now to look at specific problems that can occur in a drive system, and how we can address them. In this section, we will be using our course book, so go ahead and take that out turning to page 50. *[Refer participants to page 50 in their course book. They should also have something to write with for authority specific notes.]* *Advance*	✓PPT slide 32 **Elevator Mechanical Troubleshooting Drive Systems** **Troubleshooting Drive Systems** Objective • List various problems which can occur in a drive system • Identify corrective actions related to common problems in a drive system))))) Transit Elevator/Escalator Consortium

Module Length: 300 min   Time remaining: 160 min   This section: 60 min (40 slides)   *Section start time: _____*   *Section End Time: _____*

DO	SAY	Materials Needed
REFER participants to common issues chart **REVIEW** Common issues, symptoms, causes, corrective actions **WRITE** Authority-specific notes **Instructor's Notes**	**In your own words:** *[Refer participants to common issues charts.]* *[Review and discuss the common issue, symptoms, possible causes, and corrective actions.]* *[Write: Participants should write any authority specific related information in the chart.]* *Advance*	✓PPT slide 41

Module Length: 300 min   Time remaining: 160 min   This section: 60 min (40 slides)   *Section start time: _____*   *Section End Time: _____*

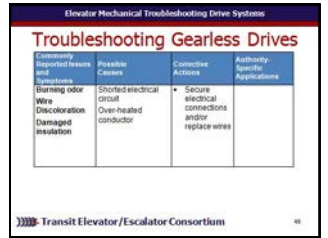| DO	SAY	Materials Needed
REFER participants to common issues chart **REVIEW** Common issues, symptoms, causes, corrective actions **WRITE** Authority-specific notes **Instructor's Notes** _____ _____ _____ _____ _____	**In your own words:** *[Refer participants to common issues charts.]* *[Review and discuss the common issue, symptoms, possible causes, and corrective actions.]* *[Write: Participants should write any authority specific related information in the chart.]* *Advance*	✓PPT slide 49

Module Length: 300 min · Time remaining: 160 min · This section: 60 min (40 slides) · *Section start time: _____* · *Section End Time: _____*

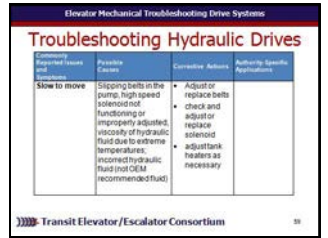| DO	SAY	Materials Needed
REFER participants to common issues chart **REVIEW** Common issues, symptoms, causes, corrective actions **WRITE** Authority-specific notes **Instructor's Notes**	**In your own words:** *[Refer participants to common issues charts.]* *[Review and discuss the common issue, symptoms, possible causes, and corrective actions.]* *[Write: Participants should write any authority specific related information in the chart.]* *Advance*	✓PPT slide 59

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Module Length: 300 min   Time remaining: 100 min   This section: 10 min (5 slides)   *Section start time: _____*   *Section End Time: _____*

DO	SAY	Materials Needed
REVIEW slide	**In your own words:**	✓ PPT slide 70

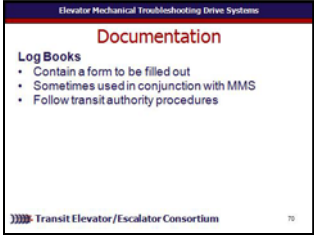**In your own words:**

Some transit authorities rely on the use of log books. Log books typically contain a form that the technician needs to fill out. In some instances both maintenance software and log books are used. Make sure to follow the procedures of your transit authority.

Advance

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Module Length: 300 min   Time remaining: 30 min   This section: 30 min (3 slides)   *Section start time: _____*   *Section End Time: _____*

DO	SAY	Materials Needed
CLASSROOM ACTIVITY **INDIVIDUAL ACTIVITY** **Instructor's Notes** _____ _____ _____ _____ _____	**In your own words:** *Administer quizzes.*	✓PPT slides 75 ✓Quizzes ✓ Pencils