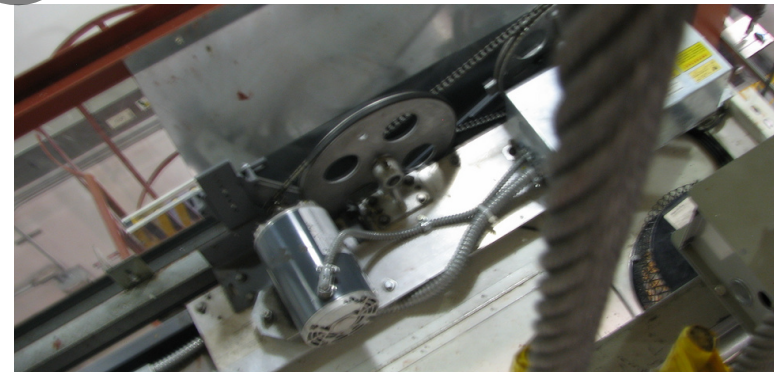
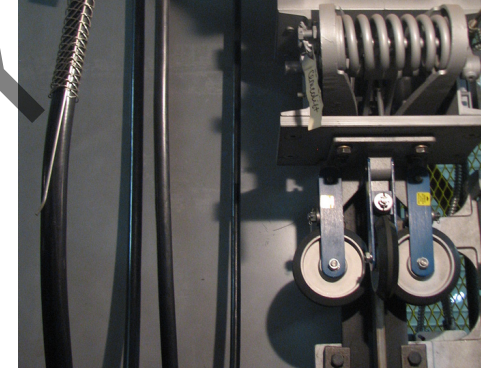


Instructor Guide



218: Elevator: Hydraulic Elevator Module 5: Maintenance Requirements

Elevator – Hydraulic Elevator Maintenance
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PREVIEW ONLY

Elevator – Hydraulic Elevator Maintenance

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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	30 minutes
2	Maintenance Control	30 minutes
3	Viscosity	30 minutes
4	Additives	30 minutes
5	Solid Lubricants	20 minutes
6	Elevator Lubrication	30 Minutes
7	Maintenance Checklists	30 minutes
8	Summary	40 Minutes
	Total Time:	270 Minutes

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Overview

Purpose The purpose of this module is to:

- The purpose of this unit is to explain and discuss the principles hydraulic elevator system maintenance. 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:

- Describe general maintenance practices for electric traction elevators
- Describe authority-specific maintenance requirements

Materials **Mandatory**

Make sure you have the following

- PowerPoint Presentation
- Course book
- Quizzes
- Pencils
- Paper
- Elevator Maintenance 2nd Edition by Zach McCain
- Sample checklist (WMATA)
- Preventative maintenance control program plan for hydraulic elevator system (NYCT)
- Authority specific guidelines

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
- Samples of various lubricants

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Module Length: 360 min Time remaining: 360 min This section: 30 min (5 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 131 545" data-label="Image"></div> <div data-bbox="150 456 614 499" data-label="Text"> <p>REVIEW introduction slides</p> </div> <div data-bbox="19 792 444 839" data-label="Section-Header"> <h3>Instructor's Notes</h3> </div> <div data-bbox="19 892 614 1242" data-label="Form"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 421 1023 464" data-label="Section-Header"> <p>In your own words:</p> </div> <div data-bbox="705 499 1381 635" data-label="Text"> <p>Welcome to the introductory module for basic maintenance for hydraulic elevator systems.</p> </div> <div data-bbox="705 635 879 678" data-label="Text"> <p>Advance.</p> </div> <div data-bbox="705 721 1159 768" data-label="Text"> <p>[Share humorous photo.]</p> </div> <div data-bbox="705 768 1352 899" data-label="Text"> <p>Basic maintenance will help prevent situations like this – What happened to the car??</p> </div> <div data-bbox="705 942 879 985" data-label="Text"> <p>Advance.</p> </div>	<div data-bbox="1497 464 1787 511" data-label="Text"> <p>✓ PPT slides 1, 2</p> </div> <div data-bbox="1535 535 1854 768" data-label="Image"> </div> <div data-bbox="1535 792 1854 1025" data-label="Image"> </div>

Elevator – Hydraulic Elevator Maintenance

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Module Length: 360 min Time remaining: 330 min This section: 30 min (16 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 131 545" data-label="Image"> </div> <div data-bbox="150 456 390 499" data-label="Text"> <p>REVIEW slide</p> </div> <div data-bbox="19 792 444 839" data-label="Section-Header"> <h3>Instructor's Notes</h3> </div> <div data-bbox="19 892 614 1242" data-label="Form"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 421 1023 468" data-label="Section-Header"> <h3>In your own words:</h3> </div> <div data-bbox="705 485 1381 706" data-label="Text"> <p>Lets take another look at our first objective for hydraulic elevators – Describe general maintenance practices for electric traction elevators Advance.</p> </div>	<div data-bbox="1497 464 1729 511" data-label="Text"> <p>✓ PPT slide 6</p> </div> <div data-bbox="1541 535 1854 768" data-label="Image"> </div>

Elevator – Hydraulic Elevator Maintenance

Instructor's Guide



Module Length: 360 min Time remaining: 330 min This section: 30 min (16 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 131 545" data-label="Image"></div> <div data-bbox="150 456 390 499" data-label="Text"> <p>REVIEW slide</p> </div> <div data-bbox="19 792 444 839" data-label="Section-Header"> <h3>Instructor's Notes</h3> </div> <div data-bbox="19 892 614 1242" data-label="Form"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 421 1023 464" data-label="Section-Header"> <h4>In your own words:</h4> </div> <div data-bbox="705 485 1391 1192" data-label="Text"> <p>Preventative Maintenance Advance. involves examining the equipment periodically and performing adjustments, testing, and lubrication as indicated.</p> <p>Advance. The idea is to maintain and extend the life of the equipment, and to ensure the equipment is reliable, safe, and efficient. Advance. Advantages for this type of approach means that code compliance is followed, the life span of the equipment is optimized, safety is maintained, performance is optimized, time the equipment is down is minimized, and the reputation of the equipment owner increases.</p> <p>Advance.</p> </div>	<div data-bbox="1497 464 1738 506" data-label="Text"> <p>✓ PPT slide 11</p> </div> <div data-bbox="1535 535 1854 768" data-label="Image"> </div>

Elevator – Hydraulic Elevator Maintenance

Instructor's Guide



Module Length: 360 min Time remaining: 330 min This section: 30 min (16 slides) Section start time: _____ Section End Time: _____



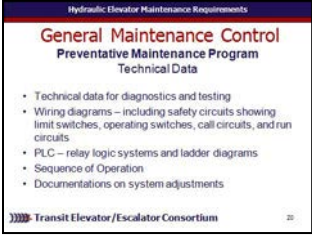
DO	SAY	Materials Needed
<div data-bbox="19 439 131 545"></div> <p>REVIEW slides</p> <div data-bbox="19 559 131 665"></div> <p>REFER participants to <u>Elevator Maintenance Manual 2nd Edition</u></p> <div data-bbox="19 788 444 839"><h3>Instructor's Notes</h3></div> <div data-bbox="19 896 610 1239"> <hr/><hr/><hr/><hr/><hr/><hr/> </div>	<p>In your own words:</p> <p>Equipment data in a preventative maintenance program must be identified for specific maintenance requirements and generally utilizes a standard form for each elevator.</p> <p>[Direct students to <u>Elevator Maintenance Manual 2nd Edition Appendix 1.3a page 18.</u> Advance.</p> <p>A Description of Maintenance Activity usually means a description of maintenance work and special instructions. If equipment is under contract, technician should be familiar with the contract as well.</p> <p>[Direct students to <u>Elevator Maintenance Manual 2nd Edition Appendix 1.3b page 21.</u> Advance.</p>	<p>✓ PPT slides15, 16</p> <div data-bbox="1541 535 1854 768"> </div> <div data-bbox="1541 792 1854 1025"> </div> <p>✓ Elevator Maintenance Manual</p>

Elevator – Hydraulic Elevator Maintenance

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Module Length: 360 min Time remaining: 330 min This section: 30 min (16 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 415 549">  REVIEW slides </div> <div data-bbox="19 792 608 1242"> <h3>Instructor's Notes</h3> <hr/><hr/><hr/><hr/><hr/><hr/> </div>	<p>In your own words:</p> <p>A Source and location for a supply of routinely used parts should be available as part of a Preventative Maintenance program. Sometimes a description of company policy for ordering parts when needed is also included.</p> <p>Advance.</p> <p>Technical Data is also part of a PMP and includes Advance. technical data for diagnostics and testing, Advance. wiring diagrams including safety circuits showing limit switches, operating switches, call circuits, and run circuits, Advance. PLC information such as the relay logic systems and ladder diagrams, Advance. the Sequence of Operation, and Advance. Documentations on system adjustments</p> <p>Advance.</p>	<p>✓ PPT slides 19, 20</p> <div data-bbox="1541 535 1854 768">  </div> <div data-bbox="1541 792 1854 1025">  </div>

Elevator – Hydraulic Elevator Maintenance

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Module Length: 360 min Time remaining: 240 min This section: 30 min (5 slides) Section start time: _____ Section End Time: _____


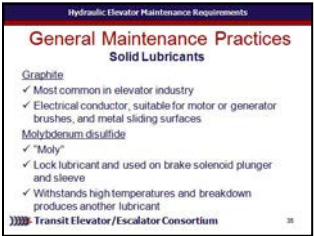
DO	SAY	Materials Needed
<div data-bbox="19 439 131 545"></div> <p>REVIEW slide</p> <div data-bbox="19 559 131 665"></div> <p>REFER participants to <u>Elevator Maintenance Manual 2nd Edition</u></p> <div data-bbox="19 792 614 1242"> <h3>Instructor's Notes</h3> <hr/><hr/><hr/><hr/><hr/><hr/> </div>	<p>In your own words:</p> <p>Common additives also include – Rust and Corrosion Inhibitors – neutralize acids that may form in extended use Friction Modifiers – improve the friction- reducing qualities of the oil Pour Point Depressants – reduces the formation of wax crystals at low temperatures and thus reduces the pour point Foam Inhibitors or Antifoam – collapses air bubbles and enhances lubrication Each lubrication supplier will use their own proportions and chemical composition of additives. <u>[Refer participants to Elevator Maintenance Manual 2nd Edition p,. 40 for this section and for the next slides.] Advance.</u></p>	<p>✓ PPT slide 32</p> <div data-bbox="1541 535 1854 768"> </div> <p>✓ Elevator Maintenance Manual</p>

Elevator – Hydraulic Elevator Maintenance

Instructor's Guide



Module Length: 360 min Time remaining: 210 min This section: 20 min (5 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div> REVIEW slide</div> <div><h3>Instructor's Notes</h3><hr/><hr/><hr/><hr/><hr/><hr/><hr/><hr/></div>	<p>In your own words:</p> <p>Lubricants with solid materials are also common including molybdenum disulfide, graphite, nylon, polymers, and some metals. Paraffin is sometimes included as well. Advance. Graphite is the most common in elevator industry. It is an electrical conductor, suitable for motor or generator brushes, and can be used on metal sliding surfaces. Advance. Molybdenum disulfide, or sometimes known as “Moly” is a lock lubricant and used on brake solenoid plunger and sleeve. “Moly” can withstand high temperatures and it’s breakdown produces another lubricant. Advance.</p>	<p>✓ PPT slide 37</p> <div></div>

Elevator – Hydraulic Elevator Maintenance

Instructor's Guide



Module Length: 360 min Time remaining: 190 min This section: 30 min (15 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 131 545"></div> <div data-bbox="150 459 390 496">REVIEW slide</div> <div data-bbox="19 559 131 665"></div> <div data-bbox="150 582 525 711">REFER participants to <u>Elevator Maintenance Manual 2nd Edition</u></div> <div data-bbox="19 788 444 839">Instructor's Notes</div> <div data-bbox="19 896 614 1245"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 425 1023 468">In your own words:</div> <div data-bbox="710 488 1375 973"> <p>Anti-friction bearings are also known as anti-friction ball, roller, or rolling element bearings. Most do not need lubrication as they are lubricated by gear oil or have pressure fittings and relief plugs. They most often fail by improper lubrication rather than lack of lubrication. When using a grease gun, Zert fittings and relief plugs must be removed. Lets take a look at Maintenance 101 for this process.</p> </div> <div data-bbox="710 979 1375 1108"> <p><u>[Refer participants to Elevators Maintenance Manual 2nd Edition p. 43 for this section.]</u></p> </div> <div data-bbox="710 1153 879 1196">Advance.</div>	<div data-bbox="1503 474 1742 511">✓ PPT slide 42</div> <div data-bbox="1541 536 1854 768"> </div> <div data-bbox="1510 808 1864 888">✓ Elevator Maintenance Manual</div>

Elevator – Hydraulic Elevator Maintenance

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Module Length: 360 min Time remaining: 190 min This section: 30 min (15slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 131 545" data-label="Image"></div> <div data-bbox="150 459 409 496" data-label="Text"> <p>REVIEW slides</p> </div> <div data-bbox="19 792 444 839" data-label="Section-Header"> <h3>Instructor's Notes</h3> </div> <div data-bbox="19 896 614 1239" data-label="Form"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 425 1023 464" data-label="Section-Header"> <p>In your own words:</p> </div> <div data-bbox="676 488 1367 1325" data-label="Text"> <p>Wire rope must be lubricated. Advance. This reduces wear and prevents rust as well as depreciation. Advance. Excess lubrication reduces traction and contaminates rope surface. Advance. If the surface is dry, Then lubricate. Advance. A test by wiping a finger in sheave groove should leave lightly oily smudge. If not, then lubricate. Advance. ASME A17.1 prohibits lubrication of governor ropes after installation unless recommended by manufacturer to prevent over-lubrication. Advance. Lubricate according to manufacturer. Advance. Clean ropes before lubrication (do not use solvents). Advance. Best lubrication device includes a wick. Advance</p> </div>	<div data-bbox="1497 471 1825 511" data-label="Text"> <p>✓ PPT slides 45, 46</p> </div> <div data-bbox="1541 535 1854 768" data-label="Image"></div> <div data-bbox="1541 792 1854 1025" data-label="Image"></div>

Elevator – Hydraulic Elevator Maintenance

Instructor's Guide



Module Length: 360 min Time remaining: 190 min This section: 30 min (15 slides) Section start time: _____ Section End Time: _____


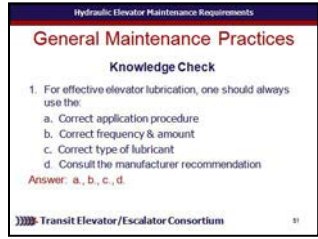
DO	SAY	Materials Needed
<div data-bbox="19 439 131 545" data-label="Image"></div> <div data-bbox="150 456 390 499" data-label="Text"> <p>REVIEW slide</p> </div> <div data-bbox="19 792 444 839" data-label="Section-Header"> <h3>Instructor's Notes</h3> </div> <div data-bbox="19 892 614 1242" data-label="Form"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 421 1023 464" data-label="Section-Header"> <h4>In your own words:</h4> </div> <div data-bbox="705 485 1381 1106" data-label="Text"> <p>Guide rails and lubrication. Advance Roller guides do not need lubrication. Advance But, sliding guides do need Lubrication. Advance . Always follow manufacturer specifications. Advance Automatic rail lubricators best for application, usually a wick type that provides slow drip. Advance A catch system (like disposable pie pan) should be used to collect lubricant in the pit. Advance. Periodically fill lubricant Reservoir. Advance. Rails should be kept clean. Advance</p> </div>	<div data-bbox="1497 464 1748 506" data-label="Text"> <p>✓PPT slide 47</p> </div> <div data-bbox="1535 535 1854 768" data-label="Image"> </div>

Elevator – Hydraulic Elevator Maintenance

Instructor's Guide



Module Length: 360 min Time remaining: 190 min This section: 30 min (15 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 241 549">  ASK </div> <div data-bbox="19 792 454 842"> Instructor's Notes </div> <div data-bbox="19 892 608 1249"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="666 421 1439 1013"> <p>In your own words: Lets see what we have learned so far: For effective elevator lubrication, one should always use the:</p> <ul style="list-style-type: none"> a. Correct application procedure b. Correct frequency & amount c. Correct type of lubricant d. Consult the manufacturer recommendation <p>Call on participants for answer. Advance for correct answer. Answer: a., b., c., d. Advance.</p> </div>	<div data-bbox="1487 464 1748 514"> ✓PPT slide 51 </div> <div data-bbox="1535 535 1854 771">  </div>

Elevator – Hydraulic Elevator Maintenance

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Module Length: 360 min Time remaining: 160 min This section: 30 min (1 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div data-bbox="19 439 131 545"></div> <div data-bbox="150 459 595 539"> <p>REVIEW slide and sample checklists</p> </div> <div data-bbox="19 559 131 665"></div> <div data-bbox="150 568 405 645"> <p>CLASSROOM ACTIVITY</p> </div> <div data-bbox="19 682 131 788"></div> <div data-bbox="150 711 343 745"> <p>Multimedia</p> </div> <div data-bbox="19 788 444 839"> <p>Instructor's Notes</p> <hr/> <hr/> <hr/> <hr/> <hr/> </div>	<p>In your own words:</p> <p><i>[Pass around sample checklists for participant review. Demonstrate to participants how to complete and process checklists for preventative maintenance procedures.]</i></p> <p><i>[Click on the link to view an 8 minute video about elevator maintenance and checklist demonstration.</i> Advance.</p>	<p>✓ PPT slide 54</p> <div data-bbox="1541 535 1854 768"> </div> <p>✓ Internet connection</p> <p>✓ Sample checklists</p>

Elevator – Hydraulic Elevator Maintenance

Instructor's Guide



Module Length: 360 minutes Time remaining: 130 minutes This section: 90 minutes Section start time: _____ Section End Time: _____


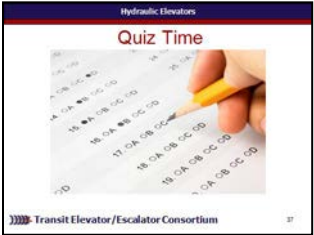
DO	SAY	Materials Needed
<div data-bbox="19 435 135 549" data-label="Image"> </div> <div data-bbox="150 456 396 542" data-label="Section-Header"> <h3>CLASSROOM ACTIVITY</h3> </div> <div data-bbox="19 792 444 835" data-label="Section-Header"> <h3>Instructor's Notes</h3> </div> <div data-bbox="19 892 608 1242" data-label="Form"> <hr/><hr/><hr/><hr/><hr/> </div>	<div data-bbox="676 421 1023 464" data-label="Section-Header"> <h4>In your own words:</h4> </div> <div data-bbox="676 471 1429 599" data-label="Text"> <p>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.</p> </div> <div data-bbox="676 649 1371 863" data-label="Text"> <p><i>[At instructor's discretion, take time to visit the field and look for hydraulic elevator maintenance practices and related information.]</i> Advance.</p> </div>	<div data-bbox="1497 471 1777 506" data-label="List-Group"> <ul style="list-style-type: none"> ✓ PPT slide 55 </div> <div data-bbox="1535 535 1854 763" data-label="Image"> </div>

Elevator – Hydraulic Elevator Maintenance

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Module Length: 360 min Time remaining: 40 min This section: 40 minutes (3 slides) Section start time: _____ Section End Time: _____

DO	SAY	Materials Needed
<div> CLASSROOM ACTIVITY</div> <div>Instructor's Notes <hr/><hr/><hr/><hr/><hr/><hr/></div>	<p>In your own words:</p> <p><i>Administer quiz.</i></p>	<p>✓ PPT slide 58</p> <div></div>