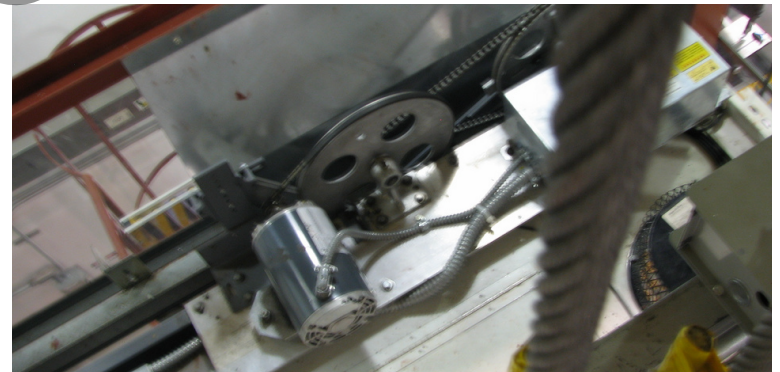
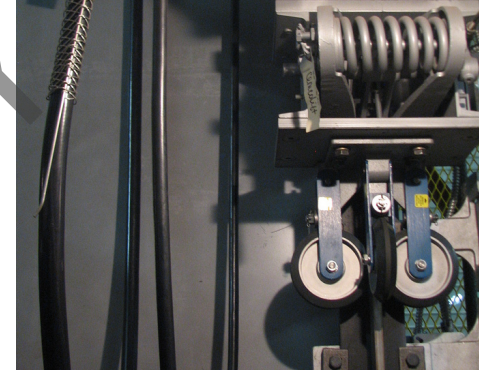
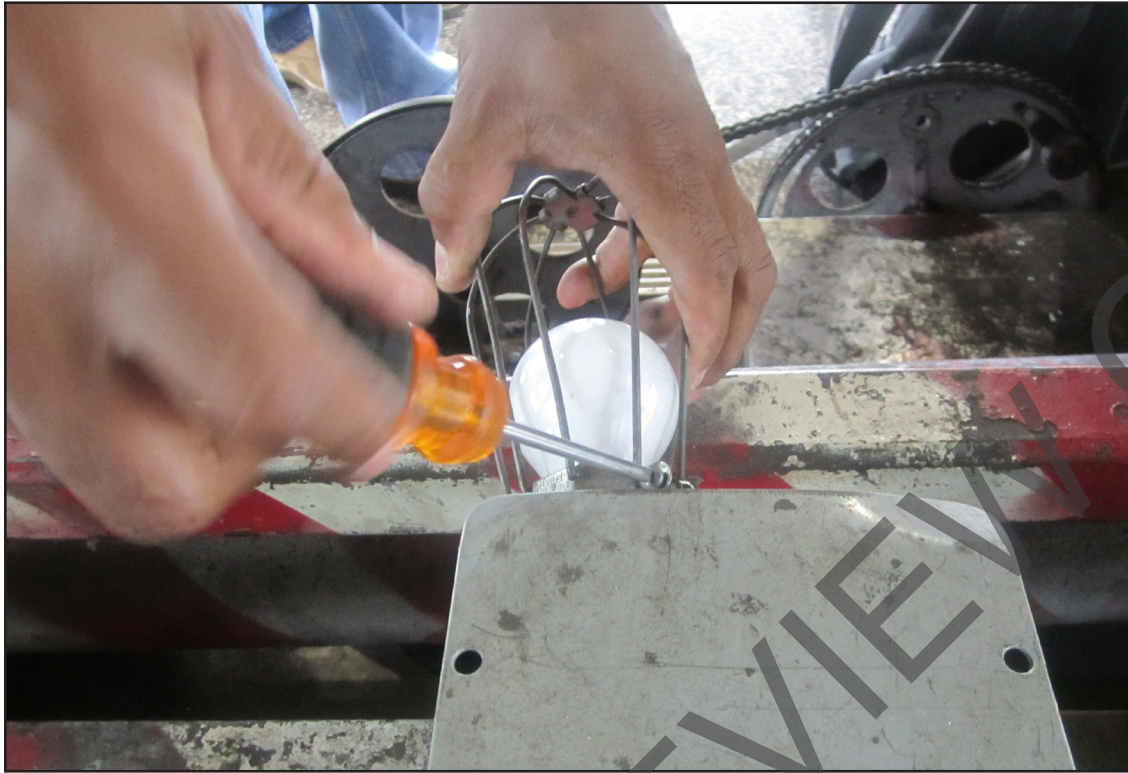


Instructor Guide



219: Elevator: Inspection and Basic Maintenance Module 8A: Hydraulic Machine Room

Elevator – Hydraulic Machine Room

Instructor's Guide



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Summary.....	53

Elevator – Hydraulic Machine Room

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	30 Minutes
2	Sensory Inspection	30 Minutes
3	Maintenance and Inspection	90 Minutes
4	Field Trip	120 Minutes
5	Summary	30 Minutes
	Total Time:	300 Minutes

Elevator – Hydraulic Machine Room

Instructor's Guide



Overview

Purpose The purpose of this module is to:

Provide the participant with an overview of the tasks involved in the inspection and maintenance of the machine room in a hydraulic elevator system.

Objectives

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

- Identify the areas and equipment in a hydraulic elevator machine room where cleaning is required.
- Identify the areas and equipment in a hydraulic elevator machine room where lubrications is required.
- Identify the areas and equipment in a hydraulic elevator machine room where inspection is required.
- List unacceptable conditions which require corrective action.
- Perform a sensory inspection of a machine room.
- Perform an inspection of hydraulic elevator machine room.
- Perform an operational test on all safety devices in the machine room.

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 – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides)

Section start time: _____

Section End Time: _____

DO



REVIEW introduction slides

Instructor's Notes

SAY

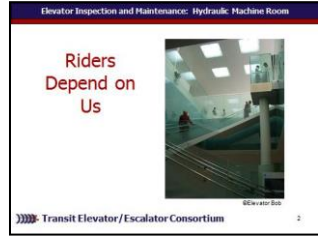
In your own words:

Welcome to the course on inspection and maintenance for hydraulic machine rooms.
Advance

While we may not have any hydraulic systems like this one, we do have many hydraulic elevator systems in transit and their machine rooms require specific inspection and maintenance procedures for effective operation. Riders depend on us.
Advance

Materials Needed

✓ PPT slides 1, 2



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides) Section start time: _____

Section End Time: _____

DO



REVIEW module objectives

Instructor's Notes

SAY

In your own words:

Today we will

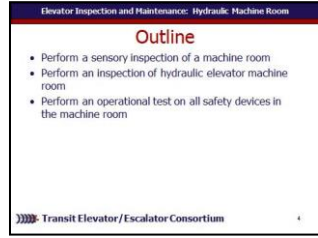
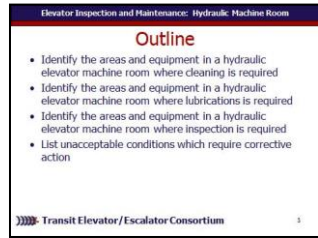
- Identify the areas and equipment in a hydraulic elevator machine room where cleaning is required
- Identify the areas and equipment in a hydraulic elevator machine room where lubrications is required
- Identify the areas and equipment in a hydraulic elevator machine room where inspection is required
- List unacceptable conditions which require corrective action

Advance

- Perform a sensory inspection of a machine room
- Perform an inspection of hydraulic elevator machine room
- Perform an operational test on all safety devices in the machine room **Advance**

Materials Needed

✓ PPT slides 3, 4



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides)

Section start time: _____

Section End Time: _____

DO



REVIEW key terms

Instructor's Notes

SAY

In your own words:

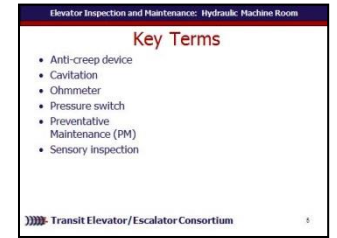
Lets take a look at some of the key words we will be defining as move through this module:

- Anti-creep device
- Cavitation
- Ohmmeter
- Pressure switch
- Preventative Maintenance (PM)
- Sensory inspection

Advance

Materials Needed

✓ PPT slide 5



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides) Section start time: _____

Section End Time: _____

DO



ASK participants what they remember about safety and elevators



SMALL GROUP ACTIVITY



WRITE

Instructor's Notes

SAY

In your own words:

Thinking back to other courses or just in general, what do we already know about hydraulic machine rooms?

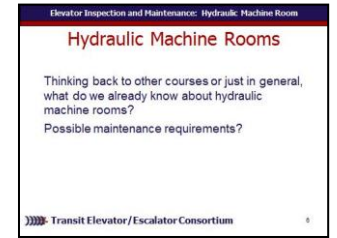
Possible maintenance requirements?

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

Materials Needed

✓ PPT slide 6



- ✓ Chalk board or large paper
- ✓ Blank Paper
- ✓ Writing instruments

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slides

Instructor's Notes

In your own words:

A hydraulic elevator's machine room is typically located at the top of the structure, directly over or adjacent to the shaft or hoistway.

Advance The machine room must be constructed and laid out within the guidelines of ASME and jurisdictional codes and these cover a myriad of guidelines including room door configuration, lighting, ventilation, fire safety equipment, identification of equipment, and much more.

Advance As such, it is the task of the elevator technician to make sure the machine room meets these code requirements.

Advance

✓ PPT slide 7



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slides

Instructor's Notes

SAY

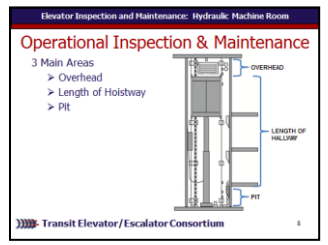
In your own words:

Again, within hydraulic elevator system there are four main areas: we have already covered overhead, length of hoistway, and pit. Now we will cover the machine room.

Advance

Materials Needed

✓ PPT slide 8



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slide



ASK

Instructor's Notes

SAY

In your own words:

Ask

Again, what types of equipment can be found in a machine room?

Allow participants to discuss possible answers.

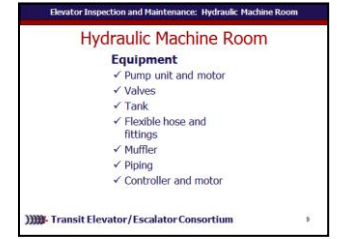
Advance for answers.

The elevator technician is required to inspect and maintain the machine room equipment to ensure elevators keep working. In the machine room of hydraulic elevators several pieces of equipment can be found. This module will focus the following components: the pump unit and motor, valves, the tank, flexible hose and fittings, as well as muffler and piping and the controller and motor.

Advance

Materials Needed

✓ PPT slide 9



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (11 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slide



ASK

Instructor's Notes

SAY

In your own words:

Every transit agency has a system whereby it documents all inspection and maintenance of elevator equipment.

Ask

What do we know about preventive maintenance?

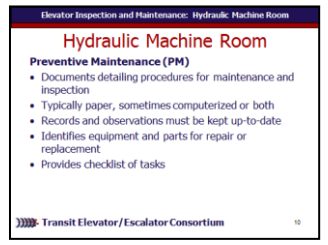
Allow participants to discuss possible answers.

Advance

The technician is provided with a checklist of **Preventive Maintenance (PM)** procedures that is typically in a paper form but may also be computerized checklist or a combination of both. Recording maintenance work and observations is an essential part of maintenance and such records must be kept up to date. Good records help in identifying equipment or parts that may need to be repaired or replaced. **Do Not Advance**

Materials Needed

✓ PPT slide 10



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 300 min This section: 30 min (11 slides) Section start time: _____ Section End Time: _____

DO

SAY

Materials Needed



REVIEW slides

Instructor's Notes

In your own words:

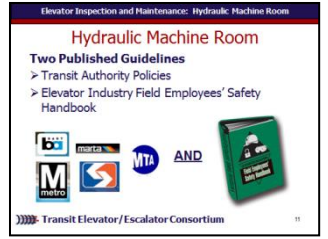
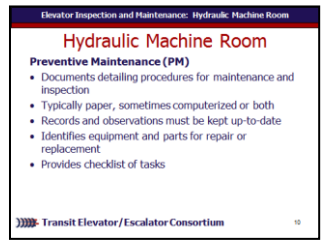
The checklist also provides a means whereby tasks and procedures are not skipped or forgotten.

Advance

Every technician working in a transit environment must follow two published guidelines for working safely around elevator equipment: one, the *Elevator Industry Field Employees' Safety Handbook* published by National Elevator Industry, Inc., and, two, the safety policy of the transit authority with which the technician works.

Advance

✓ PPT slides 10, 11



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 270 min This section: 30 min (7 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slides



ASK

Instructor's Notes

SAY

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.

Advance

Ask

What may indicate a problem with a hydraulic machine room as indicated by sight?

Discuss answers

Advance for sample answers

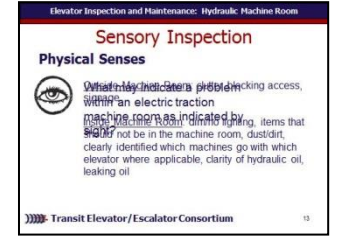
Outside Machine Room: Clutter blocking access, signage

Inside Machine Room: dim/no lighting, items that should not be in the machine room, dust/dirt, clearly identified which machines go with which elevator where applicable, clarity of hydraulic oil, leaking oil

Advance

Materials Needed

✓ PPT slides 12, 13



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (7 slides)

Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slides



ASK

Instructor's Notes

In your own words:

Ask

What may indicate a problem with a hydraulic machine room as indicated by smell?

Discuss answers

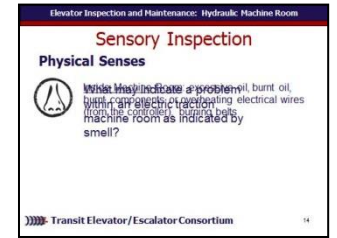
Advance for sample answers

Advance

Inside Machine Room: excessive oil, burnt oil, burnt components or overheating electrical wires (from the controller), burning belts

Advance

✓ PPT slide 14



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (7 slides)

Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slides



ASK

Instructor's Notes

In your own words:

Ask

What may indicate a problem with a hydraulic machine room as indicated by hearing?

Discuss answers

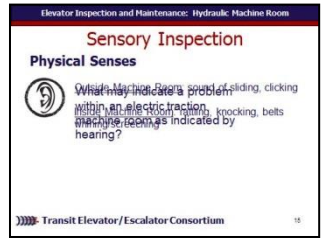
Advance for sample answers

Outside Machine Room: sound of sliding, clicking

Inside Machine Room: rattling, knocking, belts whining/screeching

Advance

✓ PPT slide 15



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (7 slides)

Section start time: _____

Section End Time: _____

DO



REVIEW slides



ASK

Instructor's Notes

SAY

In your own words:

Ask

What may indicate a problem with a hydraulic machine room as indicated by touch?

Discuss answers

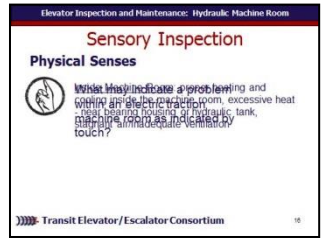
Advance for sample answers

Inside Machine Room: Proper heating and cooling inside the machine room, excessive heat - near bearing housing or hydraulic tank, stagnant air/inadequate ventilation

Advance

Materials Needed

✓ PPT slide 16



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (7 slides)

Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



ASK

Instructor's Notes

In your own words:

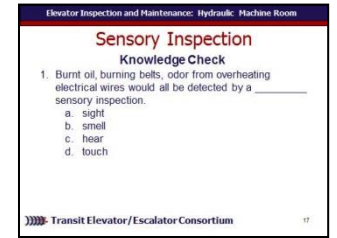
Lets see what we have learned so far:
Burnt oil, burning belts, odor from overheating electrical wires would all be detected by a _____ sensory inspection.

- a. sight
- b. smell
- c. hear
- d. touch

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

Advance

✓PPT slide 17



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (7 slides)

Section start time: _____

Section End Time: _____

DO



ASK

Instructor's Notes

SAY

In your own words:

Knocking and belts whining would all be detected by a _____ sensory inspection.

- a. sight
- b. smell
- c. hear
- d. touch

Call on participants for answer

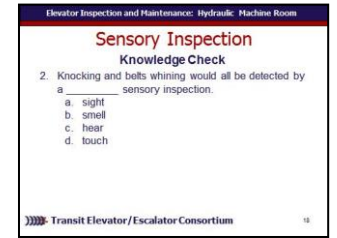
Advance once given the correct answer

Answer: c.

Advance

Materials Needed

✓PPT slide 18



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (7 slides)

Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



ASK

In your own words:

Describe a possible hydraulic machine room problem which would be indicated by touch.

Call on participants for answer

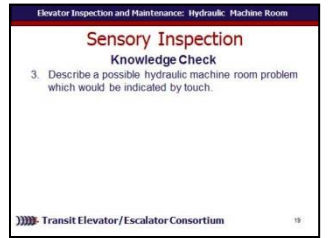
Advance once given the correct answer

Answer:

Inside Machine Room: Proper heating and cooling inside the machine room, excessive heat - near bearing housing or hydraulic tank, stagnant air/inadequate ventilation

Advance

✓PPT slide 19



Instructor's Notes

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slides

Instructor's Notes

SAY

In your own words:

Operational inspection and maintenance of a hydraulic machine room will include inspecting and maintaining the

- ✓ Room check
- ✓ pumping unit and motor
- ✓ Valves
- ✓ Tanks
- ✓ Flexible hose and fittings
- ✓ Piping and muffler
- ✓ Controller and motor starter

Advance

Lets start with a room check.

Advance

Materials Needed

✓ PPT slides 21, 22



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slide

Instructor's Notes

In your own words:

The following are among the tasks the elevator technician must perform in the machine room:

Advance Make sure that the machine room floor is free of oil, grease and dirt.

Advance Empty trash cans, remove debris and sweep floor. The elevator machine room must be cleaned to prevent the hazards of slipping, tripping, fire, and contamination of equipment.

Advance Check for any water infiltration.

Advance Check that drip pans are emptied and the oil discarded.

Advance Used lubricants, including hydraulic oil, must be discarded and removed from the machine room for proper disposal in compliance with environmental requirements.

Advance

✓ PPT slide 23



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slides

Instructor's Notes

In your own words:

Be sure the container for used oil is marked in order to prevent confusing it with new oil.

Advance Check that all maintenance fluids are sealed, identified and stored in an inflammable storage cabinet. Only equipment and materials necessary for operating and maintaining the elevator is allowed to be stored in the machine room.

Advance Check that communications equipment is working as designed.

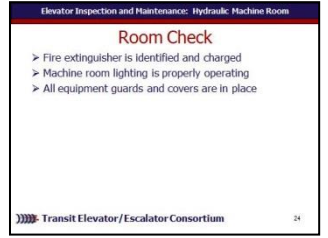
Advance Check that a fire extinguisher is clearly identified and is fully charged.

Advance Check that all machine room lighting is adequate and receptacles are operational.

Advance Check that all equipment guards and covers are in place.

Advance

✓ PPT slides 23, 24



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 240 min This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slides



REFER participants to Course book

Instructor's Notes

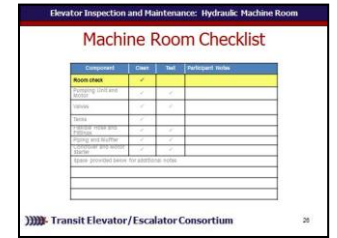
SAY

In your own words:
Have participants turn to page in their course book.
Instruct participants to take additional notes for each component on this page.
Advance

Lets move on and look at the pumping unit and motor.
Advance

Materials Needed

✓ PPT slides 25, 26



✓ Course book



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slides

Instructor's Notes

In your own words:

Check the function of the **power unit**. Remember that because pumps are self-lubricated, they have a very long service life. The main concern with service life of hydraulic pumps is that the hydraulic fluid stays particulate free. Make sure that the tank cover is always in its proper place.

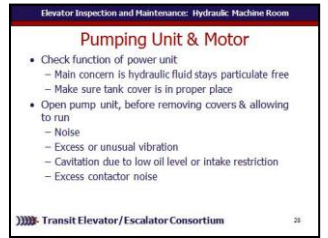
Advance In an open pump unit, before removing covers, allow the unit to run and examine it for:
 Noise, such as belts slipping or loose pump or motor mount.

Excessive or unusual vibration.
 Hammering or heavy vibration possibly caused by **cavitation** due to low oil level or restriction in the pump intake.

Excess contactor noise or other evidence of improper starter operation.

Advance

✓ PPT slides 28



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slides

Instructor's Notes

In your own words:

After LOTO, remove the cover or guard and **Advance** check the pump unit for excess oil leaking around pump shaft seals and pipe connections.

Advance Be sure to empty all oil leak catch containers and record the quantity of oil discarded.

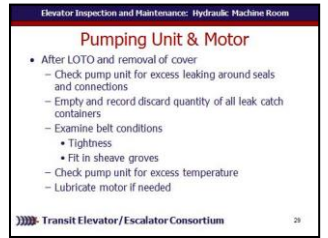
Advance Examine the condition of belts including tightness and fit in sheave grooves.

Advance Check the pump unit for excess motor temperature.

Advance Lubricate the motor, if needed. Note that most hydraulic pump motors have sealed bearings and do not require lubrication. However, be sure to grease fittings, if applicable.

Advance

✓ PPT slides 29



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slides

Instructor's Notes

SAY

In your own words:

For submergible pumps and motors follow the same maintenance procedures described above. Also, note whether there is any oil leakage from the piping and valve above the tank.

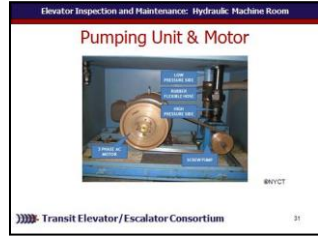
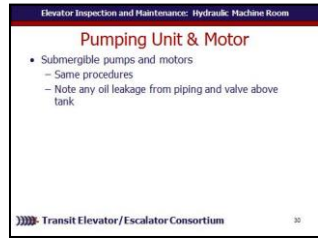
Advance

Share and discuss photo of pumping unit and motor with participants.

Advance

Materials Needed

✓ PPT slides 30, 31



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slide



REFER participants to Course book

Instructor's Notes

SAY

In your own words:
Have participants turn to page in their course book.
Instruct participants to take additional notes for each component on this page.
Advance

Materials Needed

✓ PPT slide 32



✓ Course book

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



ASK

Instructor's Notes

In your own words:

Lets see what we have learned so far:
Describe four things for which the mechanic should check in a hydraulic machine room.

Call on participants for answer

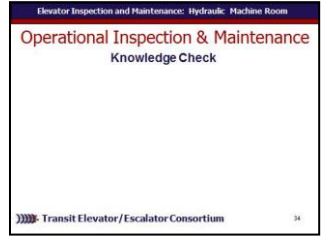
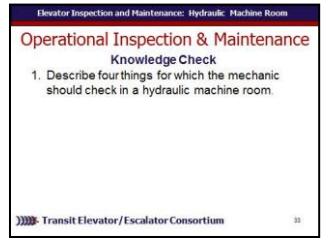
Advance once given the correct answer

Answer:

- Floor is free of oil, grease and dirt
- Empty trash cans, remove debris and sweep
- Check for water infiltration
- Ensure drip pans are emptied and oil discarded
- Discard used lubricants in compliance with requirements
- Ensure all maintenance fluids are sealed, identified and stored properly
- Communication equipment is working as designed
- Fire extinguisher is identified and charged
- Machine room lighting is properly operating
- All equipment guards and covers are in place

Advance

✓PPT slides 33, 34



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



ASK

In your own words:

Name three potential problems to check for during the inspection and maintenance of a motor.

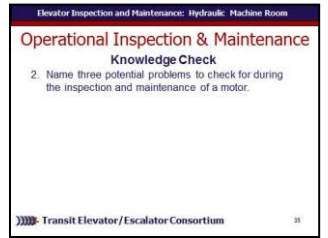
Call on participants for answer

Advance once given the correct answer

- Answers (any three of these):
- Hydraulic fluid if not free of particulates
- Noise in pump unit
- Excess or unusual vibration of pump unit
- Cavitation due to low oil level or intake restriction
- Excess contactor noise
- Excess leaking around seals and connections

Advance

✓ PPT slides 35



Instructor's Notes

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slides

Instructor's Notes

SAY

In your own words:

Lets move on to valves.

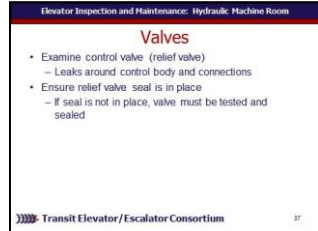
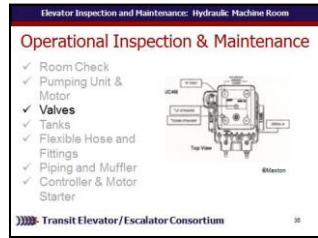
Advance

Examine the control valve, also known as the relief valve, for leaks around the control body and pipe connections. Check that the relief valve seal is in place to prevent changing the adjustment without breaking the seal. If the seal is not in place, the valve must be tested and sealed.

Advance

Materials Needed

✓ PPT slides 36, 37



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slide

Instructor's Notes

In your own words:

Test the relief valve by inching the car at slow speed against the stop ring then cause the controls to attempt to run the car at full speed.

Advance Check the gauge and verify that the full output of the pump should by pass a gauge reading 150% or less of the working pressure.

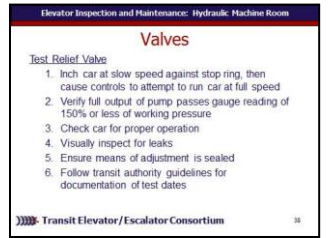
Advance After the test, check the car for proper operation and visually inspect the system for leaks.

Advance Be sure to check that the means of adjustment is sealed.

Advance Follow your authority's guidelines on documentation of test dates and scheduling.

Advance

✓ PPT slide 38



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slide

In your own words:

Where a pressure switch is provided, examine it for proper operation.

Advance First, place the car at any landing except the bottom landing.

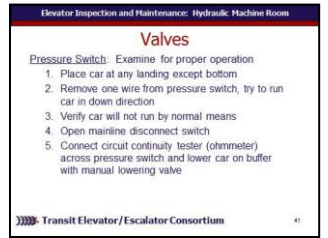
Advance Remove one of the wires from the pressure switch and try to run the car in the down direction.

Advance Verify that the car will not run by normal means. Next, open the mainline disconnect switch.

Advance Connect a circuit continuity tester, such as an **ohmmeter**, across the pressure switch and lower the car on the buffer with the manual lowering valve.

Advance

✓ PPT slide 41



Instructor's Notes

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slides

Instructor's Notes

SAY

In your own words:

When checking the operation of the manual lowering valve and **anti-creep device**, be sure to take the elevator out of service and slowly open the manual lowering valve. The pump should start and maintain the elevator within one inch of the floor.

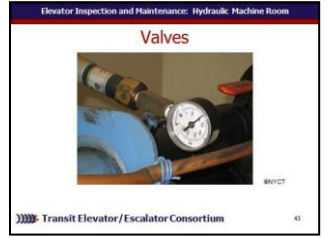
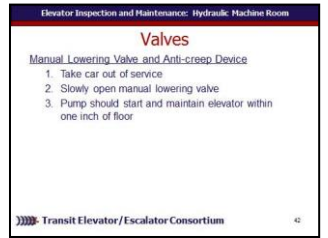
Advance

Share and discuss the photograph with participants.

Advance

Materials Needed

✓ PPT slides 42, 43



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 240 min This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slides



REFER participants to Course book

Instructor's Notes

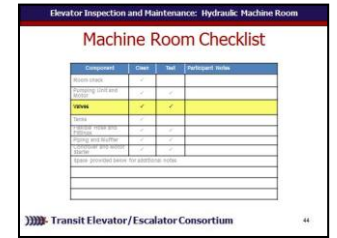
SAY

In your own words:
Have participants turn to page in their course book.
Instruct participants to take additional notes for each component on this page.
Advance

Lets move on to tanks.
Advance

Materials Needed

✓ PPT slides 44, 45



✓ Course book



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



REVIEW slide

Instructor's Notes

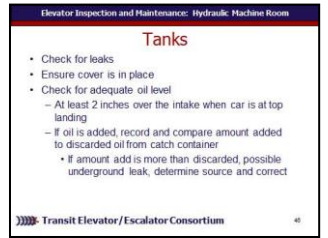
In your own words:

Check the tank for leaks and that the cover is in place.

Advance Make sure there is adequate oil level. There should be at least two inches of oil over the intake when the car is at the top landing. If oil is added, remember to record the quantity of oil added. Compare the amount added to that discarded from the catch containers. If more oil is added than is discarded, possible underground leak is indicated. Determine the source of the leak and correct the defect.

Advance

✓ PPT slide 46



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slide

Instructor's Notes

SAY

In your own words:

Be sure to check the condition of the oil for excess foaming and contamination.

Advance Oil contaminated with water will have a milky-white appearance.

Advance Examine for excessive oil temperature. Oil that operates over 140° F will deteriorate rapidly.

Advance Report oil that has a burned or rancid odor.

Advance Check and clean the screen and vent. Then replace the tank cover and vent opening.

Advance

Materials Needed

✓ PPT slide 47



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slides



REFER participants to Course book

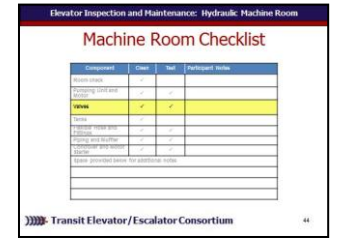
Instructor's Notes

SAY

In your own words:
Have participants turn to page in their course book.
Instruct participants to take additional notes for each component on this page.
Advance

Materials Needed

✓ PPT slides 48



✓ Course book

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO

SAY

Materials Needed



ASK

In your own words:

Lets see what we have learned so far:
Describe the first two steps for the inspection and maintenance of valves.

Call on participants for answer

Advance once given the correct answer

Answer:

- Examine control valve (relief valve)
 - Leaks around control body and connections
- Ensure relief valve seal is in place
 - If seal is not in place, valve must be tested and sealed

Advance

✓PPT slide 49



Instructor's Notes

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



ASK

In your own words:

Yes or No. The oil level should be at least 2 inches over the intake when car is at top landing.

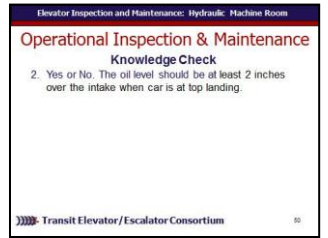
Call on participants for answer

Advance once given the correct answer

Answer: Yes

Advance

✓PPT slide 50



Instructor's Notes

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slide

Instructor's Notes

SAY

In your own words:

Lets take a look at flexible hose and fittings.
Advance

The test of flexible hose and fitting assembly may be conducted concurrently with the relief valve test described above. If the flexible hose is on the pressure side of the pump, inch the car up at slow speed from the machine room until the stop ring is engaged.

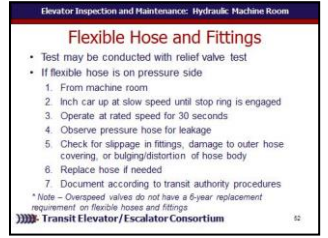
Advance With the elevator operating at rated speed to provide full relief valve bypass pressure for 30 second. While under pressure, observe the pressure hose for any signs of leakage.

Advance Check for slippage in hose fittings and damage to outer hose covering, bulging or distortion of the hose body. Any of these signs require replacement of the hose.

Advance

Materials Needed

✓ PPT slides 51, 52



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____

Section End Time: _____

DO



REVIEW slide

Instructor's Notes

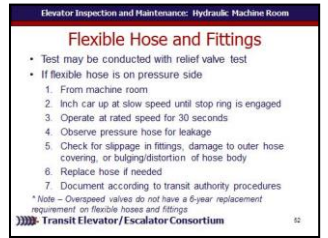
SAY

In your own words:

Be sure to document the date of the test and follow your authority's reporting procedures.
Advance Note: Elevators with an overspeed value, also known as a rupture valve, do not have a six-year replacement requirement on flexible hoses and fittings.
Advance

Materials Needed

✓ PPT slide 52



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slides



REFER participants to Course book

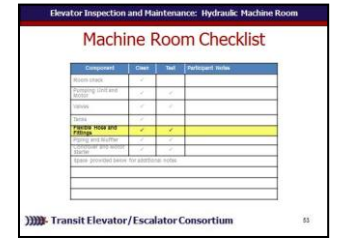
Instructor's Notes

SAY

In your own words:
Have participants turn to page in their course book.
Instruct participants to take additional notes for each component on this page.
Advance

Materials Needed

✓ PPT slides 53



✓ Course book

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 240 min This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO

SAY

Materials Needed



REVIEW slide

Instructor's Notes

In your own words:

Lets look at the inspection and maintenance for piping and mufflers.

Advance

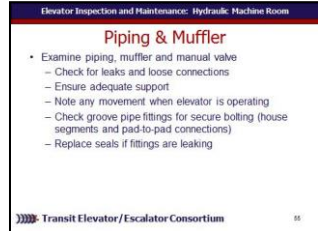
Examine piping, muffler and manual valve for leaks and loose connections. Be sure there is adequate support. Especially note any movement when the elevator is operating. Check groove pipe fittings for secure bolting of housing segments and pad-to-pad connection. If the grooved pipe fittings are leaking, replacement of seals is required. grooved pipe fittings are leaking, replacement of seals is required.

Advance

Share and discuss photo of piping and muffler with participants.

Advance

✓ PPT slide 54, 55, 56



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 240 min This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slide

Instructor's Notes

SAY

In your own words:

Lastly, lets look at the controller and motor starter for inspection and maintenance.

Advance

Examine the controller and motor starter for cleanliness.

Advance After LOTO, clean the controller with a vacuum.

Advance Check the condition of the contacts and amount of remaining contact material.

Advance Be sure to examine the motor starter contacts and control and arc quenching system.

Advance Check fuses for correct size and fit in holders.

Advance Examine relays for worn shunts and signs of overheating.

Advance

Materials Needed

✓ PPT slide 58, 59



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 240 min This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO



REVIEW slides

Instructor's Notes

SAY

In your own words:

Other Equipment

- Lubricate bearings
- Clean and examine fan blades and related equipment. Replace machine room exhaust fan belt as required.
- Check that the mechanical ventilation, cooling and heating systems are operating properly.
- Perform a full emergency power test.

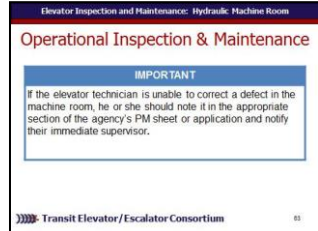
Advance

If the elevator technician is unable to correct a defect in the machine room, he or she should note it in the appropriate section of the agency's PM sheet or application and notify their immediate supervisor.

Advance

Materials Needed

✓ PPT slides 62, 63



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO

SAY

Materials Needed



ASK

In your own words:

Lets see what we have learned so far:
Yes or No. A flexible host test may be conducted with relief valve test

Call on participants for answer

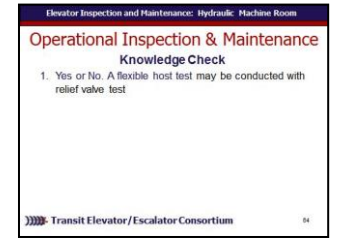
Advance once given the correct answer

Answer:

- Yes

Advance

✓PPT slide 64



Instructor's Notes

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (45 slides) Section start time: _____ Section End Time: _____

DO

SAY

Materials Needed



ASK

In your own words:

Describe the examination of piping, muffler and manual valves.

Call on participants for answer

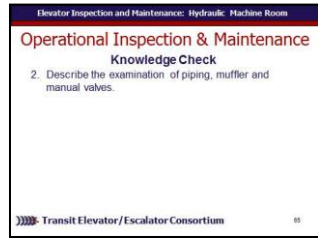
Advance once given the correct answer

Answer:

- Check for leaks and loose connections
- Ensure adequate support
- Note any movement when elevator is operating
- Check groove pipe fittings for secure bolting (house segments and pad-to-pad connections)
- Replace seals if fittings are leaking

Advance

✓PPT slide 64



Instructor's Notes

Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min

Time remaining: 150 min

This section: 120 min

Section start time: _____

Section End Time: _____

DO

SAY

Materials Needed



ASK



CLASSROOM
ACTIVITY

Instructor's Notes

In your own words:

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 a machine room
- Perform an inspection of hydraulic elevator machine room
- Perform an operational test on all safety devices in the machine room

Advance

✓ PPT slide 66



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 30 min This section: 30 min (4 slides) Section start time: _____ Section End Time: _____

DO

SAY

Materials Needed

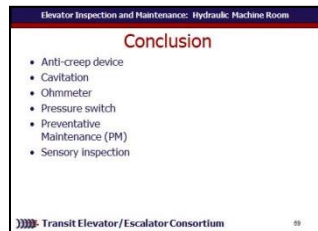
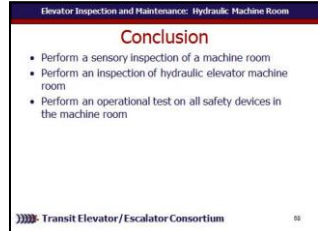
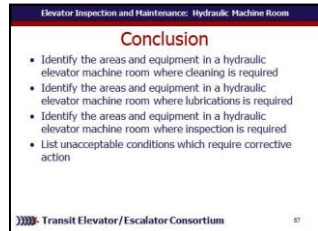


CLASSROOM ACTIVITY

Instructor's Notes

In your own words:
Read slide.
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
Read slide.
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

✓ PPT slides 67, 68, 69



Elevator – Hydraulic Machine Room

Instructor's Guide



Module Length: 300 min Time remaining: 30 min This section: 30 min (4 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 70
- ✓ Quizzes
- ✓ Pencils

