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# Elevator – Electric Traction 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	Inspection & Maintenance	90 Minutes
4	Field Trip	120 Minutes
5	Summary	30 Minutes
	<b>Total Time:</b>	300 Minutes

# Elevator – Electric Traction 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 inspecting and maintaining the machine room in a traction 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 traction elevator machine room where cleaning is required.
- Identify the areas and equipment in a traction elevator machine room where lubrications is required.
- Identify the areas and equipment in a traction 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 traction 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
- Bethlehem Elevator Rope® Technical Bulletin 3 on rouging which accompanies Module 7B: Traction Hoistway.
- Bethlehem Elevator Rope® Technical Bulletin 6 on lubricant build-up on ropes which accompanies Module 7B: Traction Hoistway.

# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** introduction slides

### Instructor's Notes

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### SAY

#### In your own words:

Welcome to the course on inspection and maintenance of the electric traction machine room.

#### **Advance**

Machine rooms and their equipment can be modern like we saw in the previous slide, or older like we see here. This is a Otis geared machine from 1926 in Brussels, Belgium.

#### **Advance**

### Materials Needed

✓ PPT slides 1, 2



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** module objectives

### Instructor's Notes

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### SAY

**In your own words:**

Today we will

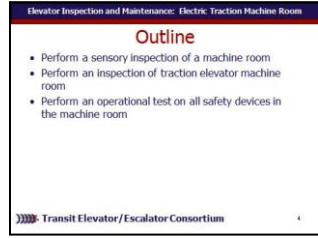
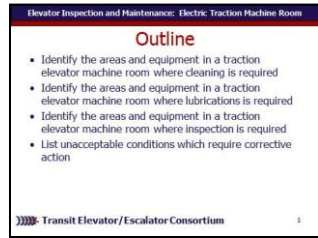
- Identify the areas and equipment in a traction elevator machine room where cleaning is required
- Identify the areas and equipment in a traction elevator machine room where lubrications is required
- Identify the areas and equipment in a traction elevator machine room where inspection is required
-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

**Advance**

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

### Materials Needed

✓ PPT slides 3, 4



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides) Section start time: \_\_\_\_\_ Section End Time: \_\_\_\_\_

### DO



**REVIEW** key terms

### Instructor's Notes

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### SAY

#### In your own words:

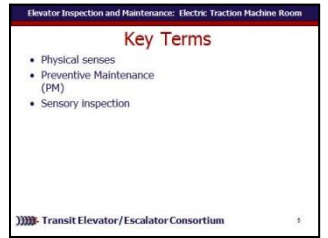
Lets take a look at some of the key words we will be defining as move through this module:

- Physical senses
- Preventive Maintenance (PM)
- Sensory inspection

#### Advance

### Materials Needed

✓ PPT slide 5



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**ASK** participants what they remember about safety and elevators



**SMALL GROUP ACTIVITY**



**WRITE**

### Instructor's Notes

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### SAY

#### In your own words:

Thinking back to other courses or just in general, what do we already know about electric traction machine room?

Possible maintenance requirements for these machine rooms?

***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 – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides) Section start time: \_\_\_\_\_ Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide

### Instructor's Notes

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#### In your own words:

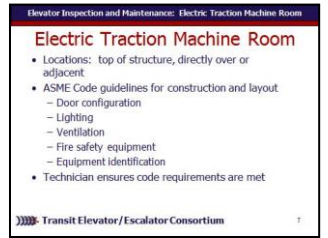
A traction elevator's machine room is typically located at the top of the structure, directly over or adjacent to the shaft or hoistway.

**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, to name a few!

**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 – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides



**ASK**

### Instructor's Notes

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#### In your own words:

Again, within the electric traction 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

#### Ask

What types of equipment can be found in a machine room?

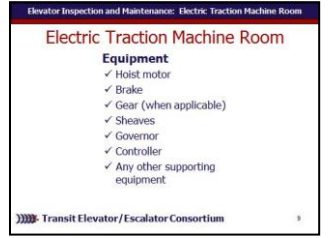
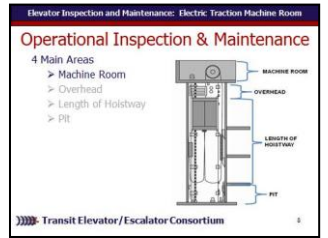
**Allow participants to discuss possible answers.**

#### Advance for answers.

The elevator technician can expect to spend much of the work day in the machine room where the hoist motor, brake, gear (where applicable), sheaves, governor, controller, as well as other equipment that supports these major machinery are located.

#### Do Not Advance

✓ PPT slides 8, 9



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides



**ASK**

### Instructor's Notes

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#### In your own words:

This equipment must be regularly maintained and serviced to keep the elevators working. The technician generally does preventive maintenance, such as lubricating and greasing moving parts, replacing worn parts, and adjusting equipment for optimal performance.

#### Advance

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

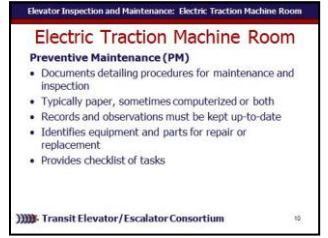
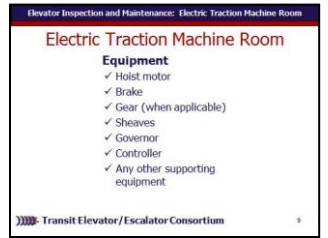
#### Ask

What do we know about preventive maintenance?

**Allow participants to discuss possible answers.**

**Advance for answers.**

✓ PPT slides 9, 10



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 300 min

This section: 30 min (12 slides) Section start time: \_\_\_\_\_ Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide



**ASK**

### Instructor's Notes

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#### In your own words:

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

#### Advance

✓ PPT slide 10



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 270 min      This section: 30 min (8 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides

### Instructor's Notes

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**In your own words:**

A traction elevator's machine room is typically 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**

Lets look at what a sensory inspection of an electric traction machine room might turn up first.

**Advance**

✓ PPT slides 11, 12



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (8 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide



**ASK**

### Instructor's Notes

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#### 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.

**Ask** What may indicate a problem within an electric traction machine room as indicated by sight?

**Discuss possible 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, overflowing drip pans (geared only), clearly identified which machines go with which elevator where applicable, scoring on the brake drum, missing guards, clarity of oil.

**Advance**

✓ PPT slide 13



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (8 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide



**ASK**

### Instructor's Notes

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#### In your own words:

**Ask** What may indicate a problem within an electric traction machine room as indicated by smell?

**Discuss possible answers**

**Advance for sample answers**

Inside Machine Room: excessive oil, burnt oil, burning coils, overheating brakes, burnt components or overheating electrical wires

**Advance**

✓ PPT slide 14



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (8 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide



**ASK**

### Instructor's Notes

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#### In your own words:

**Ask** What may indicate a problem within an electric traction machine room as indicated by hearing?

**Discuss possible answers**

**Advance for sample answers**

Outside Machine Room: sound of sliding, clicking

Inside Machine Room: rattling, knocking (geared only), noises from the sheaves, dragging on the brake drum. Brush chatter.

**Advance**

✓ PPT slide 15



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 270 min      This section: 30 min (8 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**ASK**

### Instructor's Notes

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### SAY

**In your own words:**

**Ask** What may indicate a problem within an electric traction machine room as indicated by touch?

**Discuss possible answers**

**Advance for sample answers**

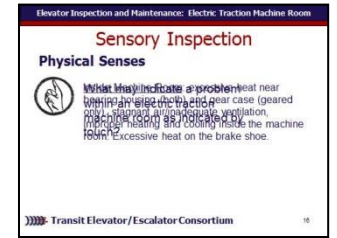
Inside Machine Room: excessive heat near bearing housing (both) and gear case (geared only), stagnant air/inadequate ventilation, improper heating and cooling inside the machine room. Excessive heat on the brake shoe.

With more experience, you will become more familiar with the normal sights, smells, sounds and feel of the system. During a sensory inspection, check for deviations from this norm.

**Advance**

### Materials Needed

✓ PPT slide 16





# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (8 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

### Instructor's Notes

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#### In your own words:

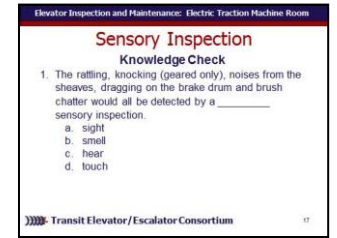
Lets see what we have learned so far:  
 The rattling, knocking (geared only), noises from the sheaves, dragging on the brake drum and brush chatter would all be detected by a \_\_\_\_\_ sensory inspection.

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

**Call on participants for answer**  
**Advance once given the correct answer**  
**Answer: c. hear**

**Advance**

✓PPT slide 17



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (8 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

### Instructor's Notes

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**In your own words:**

Dim lighting, dust, clutter, missing guards, scoring on the brake drum, missing signs, and overflowing drip pans would be all detected by a \_\_\_\_\_ sensory inspection.

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

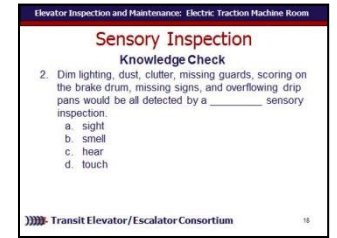
**Call on participants for answer**

**Advance once given the correct answer**

**Answer: a. sight**

**Advance**

✓PPT slide 18



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 270 min

This section: 30 min (8 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

### Instructor's Notes

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**In your own words:**

Describe a possible brake problem which would be indicated by touch.

***Call on participants for answer***

***Advance once given the correct answer***

**Answer:**

Inside Machine Room: excessive heat near bearing housing (both) and gear case (geared only), stagnant air/inadequate ventilation, improper heating and cooling inside the machine room. Excessive heat on the brake shoe.

**Advance**

✓ PPT slide 19



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 240 min      This section: 90 min (43 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**REFER** participants to Course book

### Instructor's Notes

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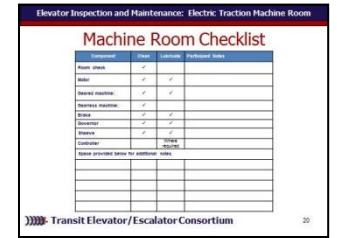
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### SAY

**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 20



✓ Course book

# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

#### In your own words:

Lets look at the areas and equipment we will want to focus on for maintenance and inspection of an electric traction machine room.

- ✓Room Check
- ✓Motor
- ✓Gear
- ✓Brake
- ✓Sheaves
- ✓Governor
- ✓Controller

#### **Advance**

We'll start with a room check.

#### **Advance**

### Materials Needed

✓PPT slides 21, 22



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide

### Instructor's Notes

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#### In your own words:

Among the tasks that an elevator technician must take care of in the machine room are: 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 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**

✓ PPT slide 23



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 240 min      This section: 90 min (43 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

**In your own words:**

Check that communications equipment is working as designed.

**Advance** Check that a fire extinguisher is clearly identified in the machine room and is fully charged.

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

Check that all equipment guards and covers are in place.

**Advance**

Here is a photo of an electric traction machine room and items to be checked.

**Review photo and indicated items with participants.**

**Advance**

### Materials Needed

✓ PPT slides 23, 24



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 240 min      This section: 90 min (43 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**REFER** participants to Course book

### Instructor's Notes

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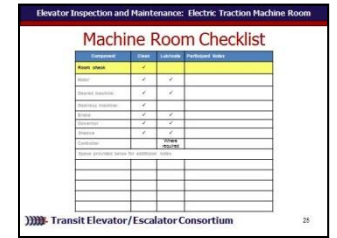
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### SAY

**In your own words:**  
*Have participants turn to page in their course book.*  
*Instruct participants to add any additional notes as per specific transit authority procedures related to electric traction machine room check at this time.*  
**Advance**

### Materials Needed

✓ PPT slide 25



✓ Course book



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides

### Instructor's Notes

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**In your own words:**

Lets move on and look at the motor.

**Advance**

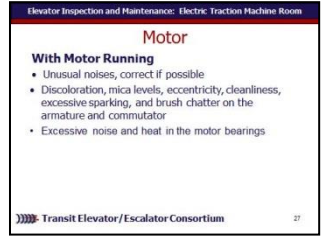
With the elevator running, listen and observe the hoist motor for:  
Unusual noises. Correct the defect if possible.

**Advance** Discoloration, mica levels, eccentricity, cleanliness, excessive sparking, and brush chatter on the armature and commutator.

**Advance** Excessive noise and heat in the motor bearings.

**Advance**

✓ PPT slides 26, 27



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_ Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide

### Instructor's Notes

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#### In your own words:

With Power Off:

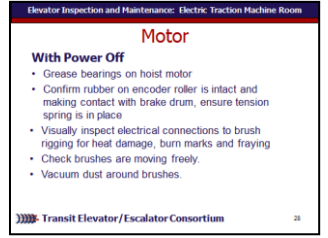
Grease bearings on hoist motor.

**Advance** Confirm that the rubber on the encoder roller is intact and is making contact with the brake drum, and that the tension spring is in place. Correct defect if possible.

**Advance** Visually inspect electrical connections to the brush rigging for heat damage, burn marks and fraying, due to over current or loose connections. Correct defect if possible. Check that the brushes are moving freely in the brush holder.

**Advance**

✓ PPT slide 28



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides

### Instructor's Notes

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**In your own words:**

Check the wear on the brushes and replace as required. Use the correct brush as replacement.

**Advance** Ensure that the brush is properly seated with the correct pressure against the commutator.

**Advance**

Inspect the field coils and interpoles (where applicable) for damage, insulation breakdown and loose connections. Tighten loose connections where indicated.

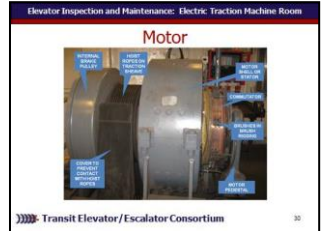
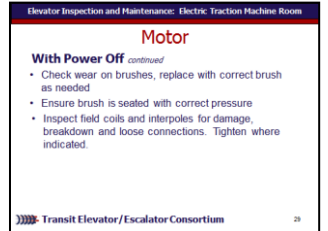
**Advance**

Here is a photo of an electric traction motor and areas to be checked.

**Review photo and indicated items with participants.**

**Advance**

✓ PPT slides 29, 30



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 240 min      This section: 90 min (43 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

**In your own words:**

If Motor Generator is present and with the elevator running, listen and observe the motor generator set for:

Unusual noises. Correct defect if possible.

**Advance** Discoloration, mica levels, eccentricity, cleanliness, excessive sparking, and brush chatter on the armature and commutator.

**Advance** Excessive noise and heat in the motor bearings.

**Advance**

With Power Off:

Grease bearings on hoist motor.

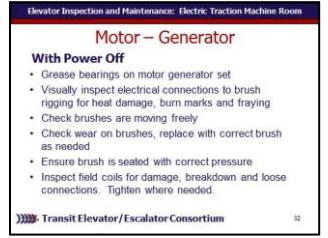
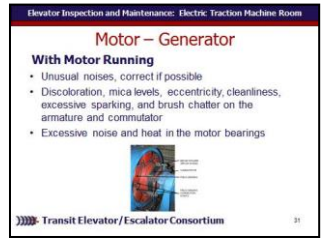
Confirm that the rubber on the encoder roller is intact and is making contact with the brake drum, and that the tension spring is in place.

Correct defect if possible.

**Advance**

### Materials Needed

✓ PPT slides 31, 32



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide

### Instructor's Notes

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### SAY

#### In your own words:

Visually inspect electrical connections to the brush rigging for heat damage, burn marks and fraying, due to over current or loose connections. Correct defect if possible.

**Advance** Check that the brushes are moving freely in the brush holder.

**Advance** Check the wear on the brushes and replace as required. Use the correct brush as replacement.

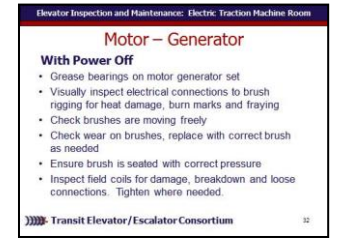
**Advance** Ensure that the brush is properly seated with the correct pressure against the commutator.

**Advance** Inspect the field coils and interpoles (where applicable) for damage, insulation breakdown and loose connections. Tighten loose connections where indicated.

**Advance**

### Materials Needed

✓ PPT slide 32



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_ Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide

### Instructor's Notes

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### SAY

**In your own words:**

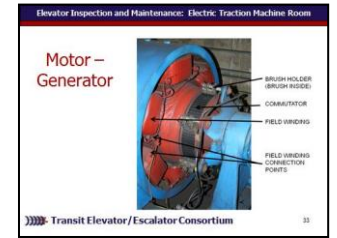
Here is a photo of an electric traction motor - generator and areas to be checked.

***Review photo and indicated items with participants.***

***Advance***

### Materials Needed

✓ PPT slide 33



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

### Instructor's Notes

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**In your own words:**

Lets see what we have learned so far:  
Describe what should happen in a room check of an electric traction machine room.

***Call on participants for answer***

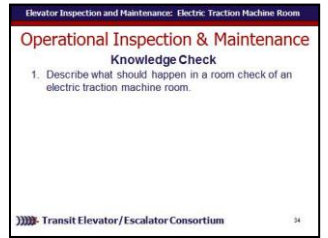
***Advance once given the correct answer***

**Answer:**

- Floor is free of oil, grease and dirt
- Empty trash cans, remove debris and sweep
- Check for water infiltration
- Ensure 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 slide 34



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

**In your own words:**

Describe a difference between inspection and maintenance of a motor and a motor-generator.

**Call on participants for answer**

**Advance once given the correct answer**

**Answer:**

On a motor with the power off, confirm rubber on encoder roller is intact and making contact with brake drum, ensure tension spring is in place. This does not need to be conducted with a motor generator.

**Advance**

✓ PPT slide 35



### Instructor's Notes

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# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 240 min      This section: 90 min (43 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**REFER** participants to Course book

### Instructor's Notes

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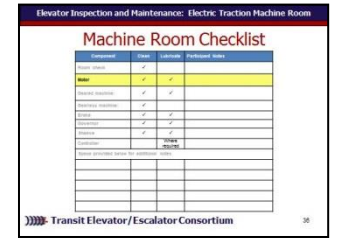
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### SAY

**In your own words:**  
*Have participants turn to page in their course book.*  
*Instruct participants to add any additional notes as per specific transit authority procedures related to electric traction machine room check at this time.*  
**Advance**

### Materials Needed

✓ PPT slide 36



✓ Course book

# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

**In your own words:**

Lets move on and look at the Gear.

**Advance**

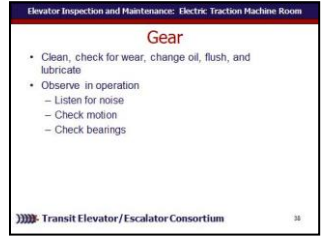
**Gear**

Inspection and maintenance of the gear machinery means that the technician should clean, check for wear, change oil, flush, and lubricate. Observe in operation, listen for noise, check motion, and check bearings.

**Advance**

### Materials Needed

✓ PPT slides 37, 38



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides

### Instructor's Notes

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#### In your own words:

With the car running, observe the operation of the gearbox:

#### **Advance**

Check the worm shaft for excessive play or backlash, leaking seals, noise and excessive heat.

Observe and verify through access covers that the helical gear is carrying oil and being lubricated.

Check the oil level of the gear case and add lubricant as required.

With Power Off:

#### **Advance**

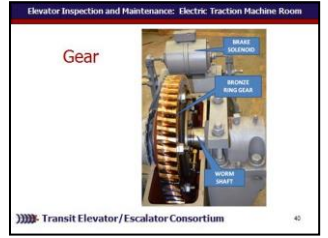
Grease bearings.

#### **Advance**

Here is a photo of an electric traction gear unit and areas to be checked.

**Review photo and indicated items with participants. Advance**

✓ PPT slides 39, 40





# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

**In your own words:**

Lets move on and look at the Brake.

**Advance**

For the Drive Machine Brake and with the elevator running:  
Check that the brake lifts and sets, without delay.

**Advance** Visually inspect for clearance between the brake pads and drum. The brake pad should not be dragging. If it is dragging, correct the defect.

**Advance** Check that the brake switches are properly adjusted and secured. Correct the defect as required with the power off.

**Advance**

### Materials Needed

✓ PPT slides 42, 43



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides

### Instructor's Notes

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**In your own words:**

With Power Off:

Verify that all fasteners are in place (e.g. springs, pivot pins, cotter pins, nuts, etc).

**Advance** Examine the brake lining for uneven wear.

**Advance** Clean the brake assembly and lubricate brake pivot points.

**Advance** Inspect the brake coil for damage, insulation breakdown (if possible) and loose connections. Tighten loose connections, if required.

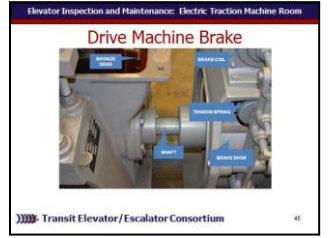
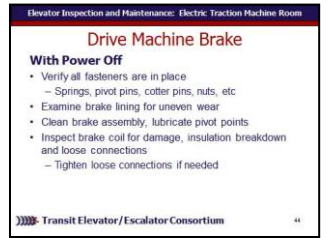
**Advance**

Here is a photo of an drive machine brake and areas to be checked.

**Review photo and indicated items with participants.**

**Advance**

✓ PPT slides 44, 45





# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_ Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

### Instructor's Notes

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#### In your own words:

Lets see what we have learned so far:  
 Checking worm shaft for excess play and checking for leaking seals should be done with \_\_\_\_\_ for the inspection and maintenance of gears..

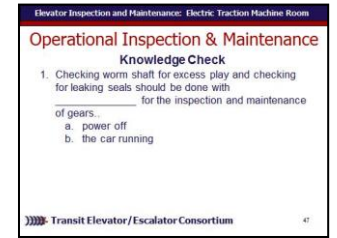
- a. power off
- b. the car running

**Call on participants for answer**  
**Advance once given the correct answer**

**Answer: b. the car running**

**Advance**

✓PPT slide 47





# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides)

Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

**In your own words:**

Check brake lifts and sets without delay with \_\_\_\_\_.

- a. power off
- b. elevator running

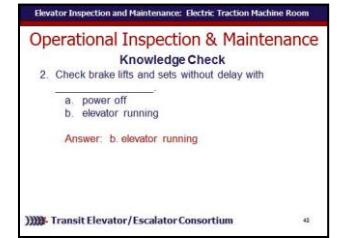
**Call on participants for answer**

**Advance once given the correct answer**

**Answer: b. elevator running**

**Advance**

✓PPT slide 48



### Instructor's Notes

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# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 240 min      This section: 90 min (43 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

**In your own words:**

Lets take a look at sheaves.

**Advance**

Typically the drive sheave and sometimes a secondary sheave are located in the elevator machine room.

**Advance** Grease all sheave bearings in machine room. Although not in the machine room, there are other sheaves that must also be greased.

**Advance** The elevator technician must also check grooves for wear and seating path and shape.

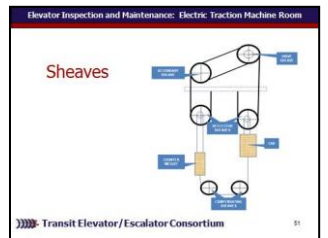
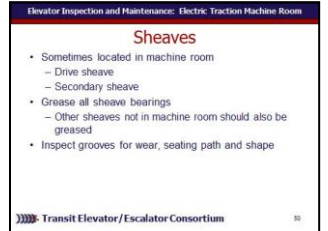
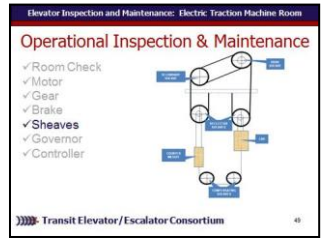
**Advance**

Here is a illustration of sheaves and areas to be checked.

**Review photo and indicated items with participants. Advance**

### Materials Needed

✓ PPT slides 49, 50, 51



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide

#### In your own words:

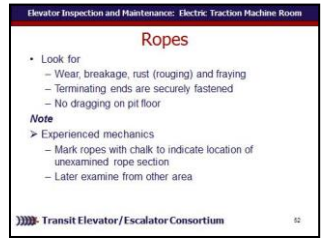
Look for wear, breakage, rust (**rouging**) and fraying ropes. Check that terminating ends are securely fastened. Make sure they are not dragging on the pit floor. If they are dragging this means that runby space may be inadequate.

#### **Advance**

Experienced mechanics will mark the ropes with chalk to indicate the location of the unexamined section of ropes, later examining them from the machine room or other areas such as the overhead machinery space or from the pit.

#### **Advance**

✓ PPT slide 52



### Instructor's Notes

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# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slide

### Instructor's Notes

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#### In your own words:

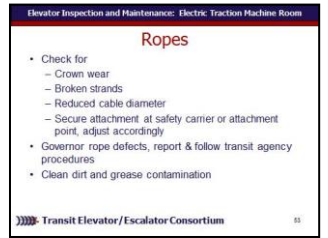
Check for crown wear, broken strands, or reduced cable diameter. Some transit agencies provide their mechanics with a pocket-sized gauge to check rope diameter and whether or not the diameter may be worn beyond allowable specifications.

**Advance** Report defects with the governor rope and follow the standard maintenance procedures of the transit agency. Check that there is a secure attachment at the safety carrier or safety attachment point and adjust accordingly.

**Advance** Clean dirt and grease contamination.

**Advance**

✓ PPT slide 53



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_ Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**REFER** participants to **Bethlehem Elevator Rope Technical Bulletin 3 & 6**

### Instructor's Notes

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### SAY

**In your own words:**

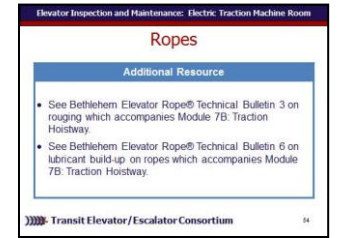
***Direct attention and share with participants:***

- Bethlehem Elevator Rope® Technical Bulletin 3 on rouging which accompanies Module 7B: Traction Hoistway.
- Bethlehem Elevator Rope® Technical Bulletin 6 on lubricant build-up on ropes which accompanies Module 7B: Traction Hoistway.

**Advance**

### Materials Needed

✓ PPT slide 46



✓ **Bethlehem Elevator Rope Technical Bulletin 3 & 6**



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

**In your own words:**

Lets move on and look at the Governor.  
**Advance**

Electrically trip the governor switch and confirm that the elevator does not operate. Reset the switch and clean as required. If the switch is not functioning as designed, correct the defect as required.

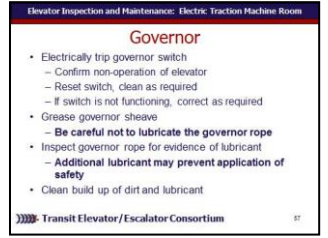
**Advance** Grease the governor sheave bearing **being careful not to lubricate the governor rope.**

**Advance** Inspect the governor rope for any evidence of lubricant. **The additional lubricant may interfere with the ability of the governor to retard the governor rope and apply the safety.**

**Advance**

### Materials Needed

✓ PPT slides 56, 57



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**REVIEW** slides

### Instructor's Notes

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**In your own words:**

Clean any build up of dirt and lubricant.  
**Advance**

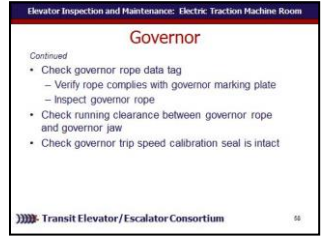
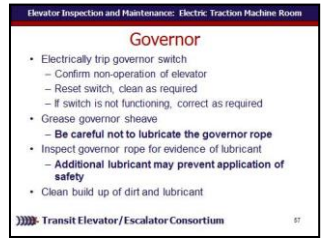
Check the governor rope data tag and verify that the rope complies with the specification on the governor marking plate. Inspect the governor rope.

**Advance** Check the running clearance between the governor rope and the governor jaw.

**Advance** Check that the governor trip speed calibration seal is intact.

**Advance**

✓ PPT slides 57, 58





# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min      Time remaining: 240 min      This section: 90 min (43 slides)      Section start time: \_\_\_\_\_      Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**REFER** participants to Course book

### Instructor's Notes

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### SAY

**In your own words:**  
*Have participants turn to page in their course book.*  
*Instruct participants to add any additional notes as per specific transit authority procedures related to electric traction machine room check at this time.*  
**Advance**

### Materials Needed

✓ PPT slide 58



✓ Course book

# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO



**REVIEW** slides

### Instructor's Notes

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### SAY

**In your own words:**

Controllers will be addressed in Module 9.

So the last part we want to review for machine room inspection is other equipment. Any other equipment will require the following:

Lubricate bearings

**Advance** Clean and examine fan blades and related equipment. Replace machine room exhaust fan belt as required.

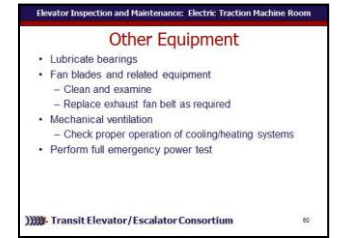
**Advance** Check that the mechanical ventilation, cooling and heating systems are operating properly.

**Advance** Perform a full emergency power test.

**Advance**

### Materials Needed

✓ PPT slides 60



# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 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. When greasing governor sheave, be careful not to lubricate the governor rope.

***Call on participants for answer***

***Advance once given the correct answer***

**Answer: Yes.**

***Advance***

✓PPT slide 61



### Instructor's Notes

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# Elevator – Electric Traction Machine Room

## Instructor's Guide



Module Length: 300 min

Time remaining: 240 min

This section: 90 min (43 slides) Section start time: \_\_\_\_\_

Section End Time: \_\_\_\_\_

### DO

### SAY

### Materials Needed



**ASK**

**In your own words:**

When inspecting ropes, what extra step does an experienced mechanic take?

***Call on participants for answer***

***Advance once given the correct answer***

**Answer: Experienced mechanics**

- Mark ropes with chalk to indicate location of unexamined rope section
- Later examine from other area

***Advance***

✓ PPT slide 62



### Instructor's Notes

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# Elevator – Electric Traction 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

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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 traction elevator machine room
- Perform an operational test on all safety devices in the machine room

**Advance**

✓PPT slide 63



# Elevator – Electric Traction 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

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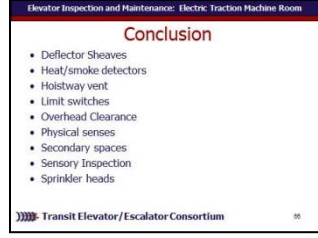
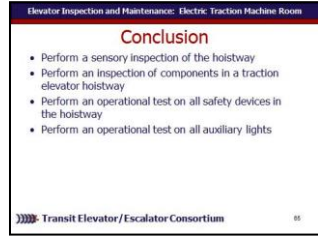
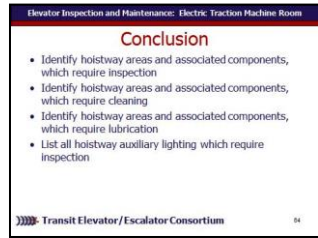
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**In your own words:**  
*[Read slide.*  
**For each objective, briefly review what was learned in this module or ask participants to share what they have learned for each learning objective and briefly discuss as a class.]**

**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 64, 65, 66



# Elevator – Electric Traction 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



**CLASSROOM  
ACTIVITY**



**INDIVIDUAL ACTIVITY**

### Instructor's Notes

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### SAY

**In your own words:**  
  
*Administer quizzes.*

### Materials Needed

- ✓ PPT slides 67
- ✓ Quizzes
- ✓ Pencils

