

# Instructor Guide



## 202: Switches/Derails Inspection & Maintenance Module 3: Switch and Derail Generic Inspection & Maintenance

# I &M of Switches/Derails – Generic I&M

*Instructor's Guide*



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# I &M of Switches/Derails – Generic I&M

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## Icons Used In This Guide

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**REVIEW** slides
- 

**INDIVIDUAL ACTIVITY**
- 

**ASK**
- 

**WRITE**
- 

**CLASSROOM ACTIVITY**
- 

Multimedia
- 

**SMALL GROUP ACTIVITY**
- 

**REFER** participants to

## Agenda

Topic #	Topic Title	Duration
1	Overview	15 minutes
2	General Inspection & Maintenance	15 minutes
3	Lubrication	25 minutes
4	Rods	15 Minutes
5	Circuit Controllers	20 Minutes
6	Ancillary Devices	10 Minutes
7	Seasonal Inspection & Maintenance	10 Minutes
8	Testing	40 Minutes
9	Clean-up	10 Minutes
10	Field Trip	60 Minutes
11	Summary	15 Minutes
	<b>Total Time:</b>	235 Minutes

# I &M of Switches/Derails – Generic I&M

## Instructor's Guide



### Overview

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

provide an overview of the inspection, maintenance and testing that is performed on all types of switches.

### **Materials**

**Mandatory** Make sure you have the following

- PowerPoint Presentation
- Coursebook
- Quizzes
- Pencils
- Switch/derail lubrication inspection sheets from your authority

**Optional** You may also want the following for optional activities:

- Chalk board with chalk, large paper with marker, etc.
- Internet connection

### **Objectives**

At the end of this lesson, the signal maintainer trainee will be able to:

- Identify hardware which needs to be tightened
- Demonstrate ability to tighten appropriate hardware
- Ensure all locks are in place and secure
- Identify areas/components which need to be lubricated on a regular PM schedule
- Inspect and maintain switch layout (where applicable)
- Describe purpose and components of mechanical locking
- Inspect and maintain lock rod
- Inspect and maintain throw rod
- Inspect and maintain point detector rod
- Inspect and maintain switch circuit controller
- Inspect and maintain switch point heaters/snow melters (where applicable)
- Inspect and maintain moveable point frogs
- Demonstrate ability to perform point detector test
- Demonstrate ability to perform obstruction test
- Demonstrate ability to adjust point tension
- Inspect and maintain circuit control heaters (where applicable)
- Demonstrate ability to test electrical indication

# I &M of Switches/Derails – Generic I&M

## Instructor's Guide



Module Length: 235 min    Time remaining: 220 min    This section: 15 min ( 5 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**CLASSROOM ACTIVITY**

### Instructor's Notes

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### SAY

#### In your own words:

From your previous experience, you should know where the hardware that needs to be inspected are in the switch layout.

**Call on participant(s) to identify the hardware listed on the screen.**

**Once all answers are received, *Advance Slide.***

Use an operating rod wrench or pry bar to make sure that the point is tight against the stock rail. Next, the switch should be thrown. Notice any excessive movement of the tie plates, ties, stock rail or the switch machine itself. Make sure to tighten any lose hardware and replace any pieces that are missing.

***Advance Slide***

### Materials Needed

✓ PPT slides 9, 10



# I &M of Switches/Derails – Generic I&M

## Instructor's Guide



Module Length: 235 min    Time remaining: 205 min    This section: 25 min ( 13 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

### DO



**REVIEW** slide



**ASK** participants what they already know

### Instructor's Notes

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### SAY

#### In your own words:

Grease is applied using a **grease gun**. It can either be applied topically or by way of a **grease fitting**. A grease fitting is a metal fitting used to feed grease into a bearing under moderate to high pressure. When greasing by way of a grease fitting, put the gun flat on the top of the fitting and squeeze the lever until a small amount of grease comes out, signaling that the reservoir is full. Take care to make sure the grease is actually going into the grease fitting. If not, it may be because of lack of tightness between the grease fitting and the end of the grease gun.

**Before advancing, ask participants if they've ever encountered a difficult grease fitting and how they dealt with it.**

#### Advance Slide

One solution may be to put a piece of cloth between the two to create a stronger coupling before squeezing grease into the grease fitting **Advance Slide**

### Materials Needed

✓ PPT slides 20, 21






# I &M of Switches/Derails – Generic I&M

## Instructor's Guide



Module Length: 235 min    Time remaining: 165 min    This section: 20 min ( 6 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_

DO	SAY	Materials Needed
 <p><b>REVIEW</b> slide</p>  <p><b>Multimedia</b></p> <h3>Instructor's Notes</h3> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>	<p><b>In your own words:</b></p> <p>Much like a spring, contacts provide tension by the metal being tempered to a certain point. When a contact gets overheated, it loses its original temper and the tension between contacts is diminished. This is why it is important to check this tension that is also known as closed contact pressure. Make sure the contact is closed and place one edge of the wire on the spring gauge also known as a <i>spring scale</i> under a given contact. Since the contact is a lever and pressure would be different at different points, it is important to lift at the point closest to the end of the contact under which the spring gauge will stay in place - this is usually at a bend. Lift upwards and observe the contact. Notice the reading on the spring gauge at the point when the contact opens. This reading should be within the allowable limits as determined by authority and OEM requirements.</p> <p><b>View and discuss video on contact tension test.</b> <b>Advance Slide</b></p>	<p>✓ PPT slide 37</p>  <p>✓ Internet connection or downloaded video</p>

# I &M of Switches/Derails – Generic I&M

## Instructor's Guide





Module Length: 235 min    Time remaining: 125 min    This section: 40 min ( 10 slides)    Section start time: \_\_\_\_\_    Section End Time: \_\_\_\_\_


### DO

### SAY

### Materials Needed

 **REVIEW** slide

 **Multimedia**

 **CLASSROOM ACTIVITY**

**Instructor's Notes**

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**In your own words:**

The point detector test ensures functionality of point detector and provides additional safety by monitoring switch point position. This test will be done on all switches/derails with a circuit controller. A point detector test will not be performed on manual switches /derails that are not connected to a circuit controller.

**Advance Slide**

Watch the video and take notes on the steps made to perform this test. We will share afterwards.

**Play the video. Ask for volunteers to outline the steps of the test. Have one participant scribe responses.**

**Advance Slide**

**Go over steps outlined on slide 54 and compare to participant responses.**

**Advance Slide**

✓ PPT slides 52, 53, 54



**Obstruction Test**

Ensures contacts do not make up when there is an obstruction between running rail and point/derail when point changes position

General: 1/8 inch point gap is allowable, but not more than 1/4 inch

Specific:

Location	Obstruction Gauge	Allowable Point Gap	Notes
RA1	Obstruction Gauge	1/8 inch	OK
RA2	Obstruction Gauge	1/8 inch	
RA3	Obstruction Gauge	1/8 inch	

- Obstruction Test**
- Ensure contacts DO NOT make up with unacceptable gap
    - Place 1/8 inch of obstruction gauge between running rail and switch point
    - Throw switch
    - Adjust/loosen rod if needed
  - Ensure contacts DO make up with acceptable gap
    - Place 1/8 inch of obstruction gauge between running rail and switch point
    - Throw switch and adjust rod if needed
  - Remove obstruction gauge and throw switch a few times, ensure proper operation of circuits
  - Repeat steps when throwing switch in opposite direction