Human Resources and Skills Development Canada
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Excellence in Everything We Do

Essential Skills and Apprenticeship

Using Essential Skills: On the Job with a Construction Electrician

Are you starting an apprenticeship as a construction electrician or are you thinking about a career in this trade? Pursuing a career as a construction electrician requires strong essential skills such as reading, document use, numeracy and critical thinking.

Use this booklet to:

- learn how construction electricians use essential skills;
- follow the daily routine of a construction electrician; and
- find out how your essential skills compare to those of a journeyperson construction electrician.

How construction electricians use essential skills

Construction electricians use essential skills to perform a variety of job-related tasks, for example:

- **reading** to follow written instructions for installing equipment such as light fixtures or electric heaters;
- **numeracy** to take measurements and perform calculations to ensure that electrical installations meet electrical code requirements; and
- **problem solving** to troubleshoot problems with malfunctioning equipment.

Construction Electrician

Essential Skills

Reading
Document Use
Numeracy
Writing
Oral Communication
Working with Others
Thinking
Computer Use
Continuous Learning

Construction electricians lay out, assemble, install, test, troubleshoot and repair electrical wiring, fixtures, control devices and related equipment. They work for electrical contractors and the maintenance departments of buildings or businesses. They may be also self-employed.

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Canada

A day in the life of a construction electrician: Janet's story

Reviewing a schematic

Janet is a journeyperson construction electrician who works for an electrical company that does contract work for large industrial plants. One common task for a construction electrician is installing cable trays. Cable trays are rigid, trough-shaped structures with ladder-like bottoms that are used to support cables and distribute them throughout a building.

At the morning meeting with their supervisor, Janet and her work partner Tom are assigned to install a new section of cable trays for supporting the cables that run into a motor control centre building.

They sit down with their supervisor to read the schematic for the cable tray installation and get clarification on the installation process *(oral communication)*. Their supervisor tells them that the supports for the cable trays were installed the day before, so they will be able to put the cable trays in place as soon as they finish preparing them.

It will take you about a day to run the four straight cable tray lines. The most important thing to pay attention to is calculating the length of the cable tray and installing the trays at the correct elevation. To determine the length of the cable tray, you will need to do a scale calculation using the blueprints. Feel free to call me on the radio if you have any questions. If not, I will see you at the end of the day.

Filling out the start card

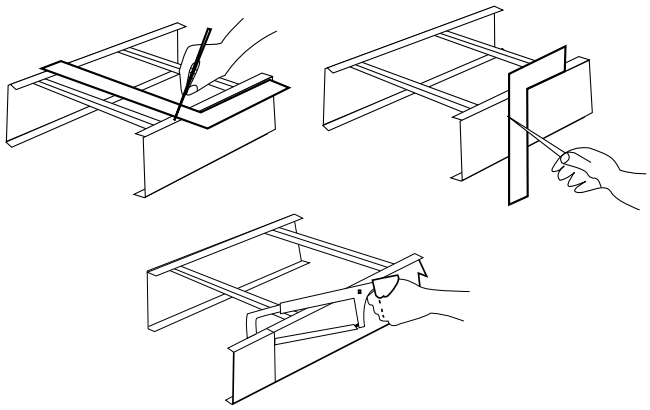
Safety is always extremely important when working on a construction site. Before Janet and Tom start installing the new cable tray, they go to the work area and assess the hazards involved in the job, the tasks they will need to perform and the tools they will need to use. After analyzing the work area, Janet fills out the Hazards Review Card (also called a start card), picks up the tools she and Tom need from the tool crib and returns to the work site *(document use, writing)*. At the work site, Janet and Tom make sure that the start card is posted and stays posted until the end of the work day.

Making calculations

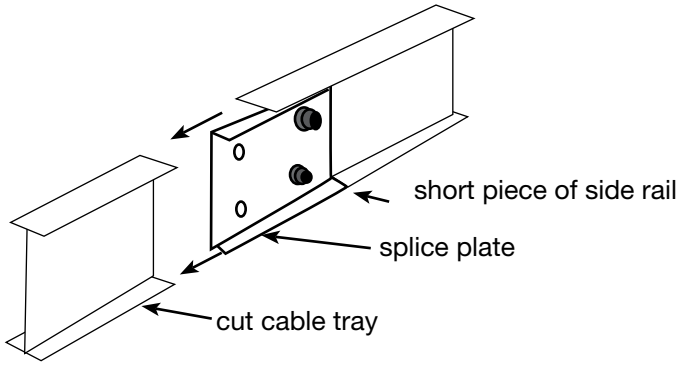
Now that Janet and Tom are ready to start the cable tray installation, their first task is to interpret the schematic and calculate the length of the straight cable trays *(document use, numeracy)*. Using a ruler, Janet measures the length of the first cable tray on the blueprint: it is 47 millimetres long. She then calculates the actual length of the cable tray using the scale ratio on the blueprint and comes up with 2350 millimetres *(numeracy)*.

Taking measurements

Since the required length of the first cable tray is less than the length of a standard cable tray section, Janet will need to cut one down to size. She measures out 2350 millimetres with a tape measure and marks the cable tray using a square *(numeracy)*. She then cuts the cable tray using a hacksaw and files the rough edges.



The next step is to drill holes for attaching the splice plate to the cut cable tray. To make sure the holes are in exactly the right place, Janet uses a splice plate bolted to a short piece of side rail punched with a standard hole pattern as a template. She lines up this template with the cut cable tray, marks the proper drilling location through the holes in the splice plate and drills the required holes in the cut cable tray.



Bolting the cable tray into place

The cable tray is now ready to be bolted to the building vendor using a splice plate. Since the support pieces are already in place, Janet and Tom simply review the schematic and take measurements to double-check that the elevation for the first cable tray is correct *(reading, document use)*. Having confirmed this, Janet bolts the cable tray to the building vendor support plate using carriage bolts.

Now that they have finished with the first cable tray, Janet and Tom repeat the entire process for the other three straight cable trays *(thinking skills – use of memory)*.

Before Janet and Tom finish their shift, they clean up their work area and meet with their supervisor to hand in their start card and discuss the day's work.

Do you have the essential skills to be a construction electrician?

Complete the following questions to see how your skills compare to those of a journeyperson construction electrician. (Answers on page 6.)

1. Reading schematics

Construction electricians review and interpret schematics. Look at the notes section of a schematic. What is the finish grade elevation for the cable trays?

NOTES

1. CABLE TRAY SUFFIXES ARE INCREMENTED OR DECREMENTED BY ‘O1’ AT EACH TRAY SEGMENT BREAK.
2. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
3. FINISH GRADE ELEVATION IS 623.000 mm.
4. COVERS ARE REQUIRED ON CABLE TRAYS WITHIN THE TRANSFORMERS YARD AND AROUND THE BUILDING UP TO 1.5M ABOVE THE GRADE.

CONSTRUCTION NOTES

A. TRAYS OUTSIDE THE ABC BUILDING TO BE INSTALLED BY SITE CONTRACTOR.

B. TIE GROUND BARS TOGETHER WITH #3/E INSULATED COPPER, CONDUCTOR LOOP.

C. BUILDING CONTRACTOR TO PROVIDE TWO 22 mm SLEEVES AT GROUND BAR LOCATION FOR CONNECTION TO EXTERNAL GROUND GRID.

D. GROUNDING CABLES ARE #3/E CU UNLESS NOTED OTHERWISE

2. Reading metric measurement on a tape measure

Construction electricians measure the length of cable trays on blueprints and then convert these to actual lengths. A construction electrician finds that the actual length of a cable tray is 2650 millimetres long. Mark the length on the tape measure below.

3. Filling out a Hazards Review Card

Construction electricians must fill out a safety report if they injure themselves on a job site. Complete the relevant section of the Hazards Review Card based on the following information:

While filing the rough edges of a newly cut cable tray, a construction electrician cuts his hand on a sharp corner and must go to the first aid centre to bandage his hand

JOB COMPLETION

Permit Closed?
☐ Yes
☐ N/A

Warning ribbon removed?
☐ Yes
☐ N/A

Area cleaned up at end of job/shift
☐ Yes
☐ N/A

Hazards remaining?
☐ Yes
☐ N/A

Were there any incidents or injuries?
☐ Yes
☐ N/A

If yes, explain:

Answers

1. Reading schematics *(reading)*

The finish grade elevation is 623.000 mm.

2. Reading metric measurement on a tape measure *(numeracy)*

3. Filling out a Hazards Review Card *(document use, writing)*

Were there any incidents or injuries?

☒ Yes
☐ No

If yes, explain:

Injured hand on a sharp corner and had to go to the first aid centre to bandage up my hand.

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