

## **Industrial Electrician**

### **Task 3: Installing Cable Trays**

VIDEO CLIP

#### **Acknowledgement**

***The Alberta Construction Safety Association (ACSA) with the cooperation of member companies and their electrical contractors/workers, the Electrical Contractors Association of Alberta and Jason Shepherd Physical Therapy Inc. developed this electrical industry Physical Demands Analysis.***

#### **Disclaimer**

***The job tasks described in this report & related video footage may vary, please contact the company directly to confirm this job description is accurate.***

#### **Purpose of Task Analysis**

Job demands information that can be utilized for assistance in selecting suitable job candidates, developing proactive injury prevention interventions and effective, sustainable disability management programs.

#### **General Description**

The electrician is responsible for the installation of cable trays as per the structure's electrical blueprints

#### **Work Organization**

Journeyman and Apprentice Electrician numbers vary by worksite and company  
Depending on the construction phase/type, an Electrician may be part of a crew performing this task for several weeks/months before rotating to another task

#### **Work Schedule**

8+ hour shifts  
Regular breaks spaced throughout workday: Usually two 15-minute coffee breaks and one 30-minute lunch break per shift

**Essential Job Functions**

- Installing cable trays:
  - Drilling holes;
  - Hanging struts;
  - Attaching trays;
  - Placing dividers.
- Clean-up (Sweeping, picking up waste materials)
- Materials handling

**Assessment Criteria Used**

Frequency Key		
FREQUENCY	% OF WORKDAY	HOURS OF 8-HOUR WORKDAY
Not required (N/R)	0%	0
Seldom (S)	0 - 5%	Not performed on a daily basis
Rare (R)	1 – 5%	< 29 min/day
Occasional (O)	6 - 33%	29 min to 2 hours 42 min per day or 1 rep/30 min
Frequent (F)	34 - 66%	2 hours 43 min to 5 hours 21 min per day or 1 rep/2 min
Constant (C)	67 – 100%	5 hours 22 min to 8 hours per day or 1 rep/30 sec

**Equipment used to perform the job & frequency of use may include, but not limited to the following:**

**Frequent**

- Tool belt
- Tools (pliers, drills, magnetic level, hammers)
- Ladders
- Tape measures

**Occasional**

- Chalk-line

**Rare**

- Floodlight
- Broom

## **Personal Protective Equipment Recommended**

- ✓ Safety Glasses
- ✓ Hearing Protection (Task-specific)
- ✓ Hard Hat
- ✓ Steel Toed Boots
- ✓ Gloves
- ✓ Overalls (Optional)
- ✓ Fall Protection Equipment (Task-specific)
- ✓ Respiratory Protection (Task-specific)

## **Environment Conditions**

### **Inside/Outside Work:**

Outside 100% (May be under partial cover from the elements)

### **Working Temperature:**

This task may involve exposure to hot and/or cold weather conditions

### **Walking Surfaces:**

Concrete, metal grating

### **Dust:**

Concrete dust – High when drilling holes into concrete to hang the struts

### **Lighting:**

Adequate, overhead lighting or floodlight use

### **Vapour/Fumes:**

Mild – Diesel fumes from mobile equipment

### **Noise Levels (measured with Audiometer):**

Can exceed 100 dBA if heavy equipment, portable generators, power tools or hammers are being utilized nearby

### **Vibration:**

Mild: Power tools

Moderate: Concrete drill

### **Moving Objects:**

Cranes, mobile equipment

### **Risks/Hazards:**

Slips/Trips/Falls, skin punctures, muscle strains/soreness, pinch points, cuts/abrasions

### **Size of Work Space:**

Usually adequate, although the worker may have to maneuver into tight spots in order to complete task on the rare occasion

## **Sensory Requirements**

The following are required to complete essential job functions and remain safe at all times:

**Hearing** (Conversation or Sounds)

**Vision** (Near/Far, Colour, and Depth)

**Feeling** (Tactile sensory discrimination)

**Reading** (English)

**Speech/Comprehension** (English)

## **Other Work Factors**

### **Traveling:**

Seldom – Leaving the work site for materials/supplies

### **Working Alone:**

N/R

### **Working Independently / in Group:**

Required to work as part of a 2-person (smaller length cable tray) or multi-person (larger cable tray) crew for the majority of the shift, although he/she may work independently for short time periods when required

### **Work Pace (self or machine):**

Self-Motivated – Moderate to Fast pace, depending on complexity

### **Interacting with Others:**

Required to work with colleagues and other tradespeople

### **Operation of Mobile Equipment:**

Aerial work platform

**Assessment Criteria Used**

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<b>Seldom (S)</b>	<b>0 - 5%</b>	<b>Not performed on a daily basis</b>
<b>Rare (R)</b>	<b>1 – 5%</b>	<b>&lt; 29 min/day</b>
<b>Occasional (O)</b>	<b>6 - 33%</b>	<b>29 min to 2 hours 42 min per day or 1 rep/30 min</b>
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<b>Constant (C)</b>	<b>67 – 100%</b>	<b>5 hours 22 min to 8 hours per day or 1 rep/30 sec</b>

<b>FORCE LEVEL</b>	<b>WEIGHT HANDLED</b>
<b>Light</b>	<b>Less than 20 lbs.</b>
<b>Medium</b>	<b>20-49 lbs.</b>
<b>Heavy</b>	<b>50-99 lbs.</b>
<b>Very-Heavy</b>	<b>100<sup>+</sup> lbs.</b>

## Critical Job Demands

MANUAL HANDLING	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Lift: Floor to Waist	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot), tool box; <b>Heavy force:</b> Ladder (12+ foot), cable trays (2-person task); <b>Very-Heavy force:</b> Cable trays (2+ person task)				X		
Lift: Waist to Waist	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot), tool box; <b>Heavy force:</b> Ladder (12+ foot), cable trays (2-person task); <b>Very-Heavy force:</b> Cable trays (2+ person task)				X		
Lift: Waist to Chest	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot); <b>Heavy force:</b> Ladder (12+ foot), cable trays (2-person task); <b>Very-Heavy force:</b> Cable trays (2+ person task)				X		
Lift: Waist to Overhead	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot); <b>Heavy force:</b> Cable trays (2-person task)				X		
Front carry	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot); <b>Heavy force:</b> Ladder (12+ foot), cable trays (2-person task); <b>Very-Heavy force:</b> Cable trays (2+ person task)				X		
Right side carry	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot), tool box				X		
Left side carry	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot), tool box				X		
Static push	<b>Medium force:</b> Installing cable trays (2-person task), drilling holes in concrete; <b>Heavy force:</b> Cable trays (2+ person task)				X		
Static pull	N/R	X					
Dynamic push	<b>Medium force:</b> Installing cable trays (2-person task), drilling holes in concrete; <b>Heavy force:</b> Cable trays (2+ person task)				X		
Dynamic pull	<b>Medium force:</b> Hoisting tools/tool box with rope			X			

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Installing cable trays, hoisting tools/tool box with rope					X	
Repetitive use of dominant hand	Installing cable trays, hoisting tools/tool box with rope					X	
Repetitive use of non-dominant hand	Installing cable trays, hoisting tools/tool box with rope				X		
Bilateral power grip	<b>Light force:</b> Tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot), tool box, hoisting tools/tool box with rope; <b>Heavy force:</b> Ladder (12+ foot), cable tray; <b>Very-Heavy force:</b> Cable tray (2+ person task)				X		
Power grip with dominant hand	<b>Light force:</b> Tool box, tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot), tool box, hoisting tools/tool box with rope; <b>Heavy force:</b> Ladder (12+ foot), cable trays					X	
Power grip with non-dominant hand	<b>Light force:</b> Tool box, tools; <b>Medium force:</b> Cable trays (2-person task), ladder (up to 12 foot), tool box, hoisting tools/tool box with rope; <b>Heavy force:</b> Ladder (12+ foot), cable trays				X		
Bilateral fine dexterity skills	Handling cable tray components, utilizing chalk-line/tape measure					X	
Fine dexterity with dominant hand	Utilizing tools, handling cable tray components, securing cable tray in place with rope, securing tools/tool box with rope for hoisting					X	
Fine dexterity with non-dominant hand	Utilizing tools, handling cable tray components				X		
Bilateral manual handling	<b>Medium force:</b> Cable trays, ladder (up to 12 foot), concrete drill; <b>Heavy force:</b> Ladder (12+ foot), cable trays (2-person task); <b>Very-Heavy force:</b> Cable trays (2+ person task)				X		
Manual handling with dominant hand	<b>Medium force:</b> Tools, tool box, cable trays; <b>Heavy force:</b> Ladder (12+ foot), cable trays					X	
Manual handling with non-dominant hand	<b>Medium force:</b> Tools, tool box, cable trays; <b>Heavy force:</b> Ladder (12+ foot), cable trays				X		
Tool usage bilaterally	<b>Light force:</b> Sweeping, utilizing chalk-line/tape measure; <b>Medium force:</b> Utilizing concrete drill				X		
Tool usage with dominant hand	<b>Light force:</b> Screwdriver, wrench, magnetic level, cordless drill					X	
Tool usage with non-dominant hand	<b>Light force:</b> Screwdriver, wrench, magnetic level, cordless drill				X		

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting	N/R	X					
Standing	Installing cable trays, drilling holes into concrete while on a ladder					X	
<b>Walking:</b> Level surfaces	Clean up, materials handling				X		
Rough surfaces	Construction materials, worksite terrain			X			
Slopes	Work site terrain		X				
<b>Climbing:</b> Regular stairs	Accessing designated work areas			X			
Ladders	Installing cable trays, drilling holes into concrete				X		
Other climbing	Scaffolding ladders			X			
Jumping	N/R	X					
Running	N/R	X					
Balancing	Installing cable trays, drilling holes into concrete while on a ladder					X	
Static bending	Installing cable trays				X		
Variable bending	Installing cable trays				X		
Static twisting	Installing cable trays				X		
Variable twisting	Installing cable trays				X		
Kneeling	N/R	X					
Crouching	N/R	X					
Crawling	N/R	X					
Repetitive squatting	N/R	X					
<b>Reaching:</b> Above shoulder	Installing cable trays, drilling holes into concrete					X	
<b>Reaching:</b> Below shoulder	Installing cable trays, handling materials, clean-up					X	
Neck Postures/Movements	All neck positions required (180 <sup>0</sup> , up, down, side-to-side)						X
Throwing	N/R	X					
Foot Action	N/R	X					
Forceful/Jerky movements	Drilling holes into concrete			X			



## Psychosocial Demands

### Seldom/Rare/Occasional/ Frequent/Constant

#### **A. Understanding and memory:**

Remember locations and routine procedures	<b>Constant</b>
Understand and remember short and simple instructions	<b>Constant</b>
Understand and remember detailed instructions	<b>Constant</b>

#### **B. Sustained concentration and persistence:**

Carry out short and simple instructions	<b>Constant</b>
Carry out detailed instructions	<b>Constant</b>
Maintain attention and concentration for extended periods	<b>Constant</b>
Perform activities within a schedule	<b>Constant</b>
Sustain an ordinary routine without supervision	<b>Constant</b>
Make simple decisions	<b>Constant</b>
Solve simple straightforward problems	<b>Constant</b>
Solve complex problems	<b>Occasional</b>

#### **C. Social interaction:**

Interact with the general public	<b>Seldom</b>
Ask questions or request assistance	<b>Occasional</b>
Accept instructions and feedback	<b>Occasional</b>
Get along well with others without distracting them	<b>Constant</b>
Get along well with others without being distracted by them	<b>Constant</b>

#### **D. Adaptation:**

Respond to changes in the environment or tasks	<b>Constant</b>
Aware of normal hazards and take appropriate precautions	<b>Constant</b>
Travel in unfamiliar places or use public transportation	<b>Seldom</b>
Set realistic goals or make plans independently of others	<b>Occasional</b>
Juggle tasks and prioritize	<b>Occasional</b>

### Yes/No

#### **E. Responsibility and accountability:**

Is work place without the pressure of deadlines?	<b>No</b>
Does the work involve occasional pressure to meet deadlines?	<b>Yes</b>
Does the work involve significant pressures?	<b>Yes</b>

#### **F. Language Requirements:**

Is English required for safety purposes?	<b>Yes</b>
Is English required for professional purposes?	<b>Yes</b>

#### **G. Educational Requirements:**

Is grade 12 diploma required?	<b>Yes</b>
Is post-secondary required?	<b>Yes</b>
Is additional skill training required?	<b>Yes*</b>

**\*(Fall Protection, Aerial Work Platform)**

## Injury Prevention Recommendations

1. Stretch regularly - used muscles throughout the shift – neck, shoulders, chest, elbows, forearms, wrists, hands, lower back, thighs and calves/ankles – paying particular attention to the postural muscles (low back and neck) to prevent risk of soft tissue injuries related to prolonged bending/twisting posture.
2. Warm-up exercises are recommended before undertaking manual handling tasks to reduce the chance of soft tissue injuries neck, back, upper and lower extremity
3. Incorporate proper manual handling techniques at all times to help prevent low back strain/sprain from incorrect manual handling techniques –utilize dolly, cart, hoist or forklift for all items over 50 lbs or of awkward shape whenever possible; maintain physical conditioning to a **Heavy** manual handling level
4. To help prevent lower extremity joint/muscle pain due to general deconditioning, poor cushioning in footwear and spending extended periods weightbearing on concrete surfaces – ensure proper fitting footwear with adequate cushioning and take regular stretch breaks hourly
5. When wearing a tool belt for prolonged periods, it is recommended that workers utilize tool belts with shoulder straps/suspenders to better distribute/carry the weight