



## Commercial Electrician

### Task 6: Pulling BX Cable [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 electrical cable as per the building'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 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

- Pulling BX cable through steel wall studs
- Clean-up (Sweeping, picking up waste materials)

### **Assessment Criteria Used**

<b>Frequency Key</b>		
<b>FREQUENCY</b>	<b>% OF WORKDAY</b>	<b>HOURS OF 8-HOUR WORKDAY</b>
<b>Not required (N/R)</b>	<b>0%</b>	<b>0</b>
<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>
<b>Frequent (F)</b>	<b>34 - 66%</b>	<b>2 hours 43 min to 5 hours 21 min per day or 1 rep/2 min</b>
<b>Constant (C)</b>	<b>67 – 100%</b>	<b>5 hours 22 min to 8 hours per day or 1 rep/30 sec</b>

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

#### **Frequent**

- Tool belt (pliers, wire cutter, hammers, drills, files, electrical tape)

#### **Occasional**

- Ladders
- Tape measures
- Cable cutters

#### **Rare**

- Broom
- Tool box
- Aerial work platform

#### **Personal Protective Equipment Recommended**

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

## **Environment Conditions**

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

Inside 99%; Outside 1%

### **Working Temperature:**

Pulling cable is generally completed within the confines of a temperature-regulated facility, although depending on which phase of construction the building is in, this task may involve exposure to hot or cold weather conditions

### **Walking Surfaces:**

Concrete with slippery areas (water puddles, mud, construction debris)

### **Dust:**

Concrete dust – Mild; can be high during blow down or if jackhammer is being utilized nearby

### **Lighting:**

Adequate, indoor lighting in most areas; dark spots in basements/parkades

### **Vapour/Fumes:**

Mild – Diesel fumes from mobile equipment

Mild-Moderate - solvent vapours from other trades

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

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

### **Vibration:**

Mild – from BX cable ribbing as it contacts metal wall studs

### **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**

All of 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:**

Worker may have to perform task at a work site without colleagues or other trades people on a rare basis

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

Required to work independently for the majority of the shift, although he/she may be asked to assist a co-worker or request assistance for him-/herself 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 trades people

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

Aerial work platform

**Assessment Criteria Used**

<b>Frequency Key</b>		
<b>FREQUENCY</b>	<b>% OF WORKDAY</b>	<b>HOURS OF 8-HOUR WORKDAY</b>
<b>Not required (N/R)</b>	<b>0%</b>	<b>0</b>
<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>
<b>Frequent (F)</b>	<b>34 - 66%</b>	<b>2 hours 43 min to 5 hours 21 min per day or 1 rep/2 min</b>
<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> Tool belt; <b>Medium force:</b> Tool box, ladder (Up to 12-foot), BX cable reel; <b>Heavy force:</b> Ladder (12+ foot)			X			
Lift: Waist to Waist	<b>Medium force:</b> Ladder (Up to 12-foot), BX cable reel; <b>Heavy force:</b> Ladder (12+ foot)			X			
Lift: Waist to Chest	<b>Medium force:</b> Up to 12-foot ladder; <b>Heavy force:</b> 12+ foot ladder			X			
Lift: Waist to Overhead	N/R	X					
Front carry	<b>Medium force:</b> BX cable reel; <b>Heavy force:</b> Ladder (12+ foot)			X			
Right side carry	<b>Light force:</b> BX cable/cable cutters, tool belt; <b>Medium force:</b> Up to 12-foot ladder, BX cable reel, tool box				X		
Left side carry	<b>Light force:</b> BX cable/cable cutters, tool belt <b>Medium force:</b> Up to 12-foot ladder, tool box				X		
Static push	N/R	X					
Static pull	N/R	X					
Dynamic push	N/R	X					
Dynamic pull	Light to <b>Medium force:</b> Pulling BX cable through steel studs					X	

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Pulling BX cable through steel studs, clean-up					X	
Repetitive use of dominant hand	Pulling/cutting BX cable through steel studs, clean-up					X	
Repetitive use of non-dominant hand	Pulling BX cable through steel studs, clean-up					X	
Bilateral power grip	<b>Medium force:</b> Ladder (Up to 12-foot), pulling BX cable through steel studs, BX cable reels; <b>Heavy force:</b> 12 <sup>+</sup> foot Ladder				X		
Power grip with dominant hand	<b>Light force:</b> Tool box; <b>Medium force:</b> Ladder (Up to 12-foot), pulling BX cable through steel stud, BX cable reels				X		
Power grip with non-dominant hand	<b>Light force:</b> Tool box; <b>Medium force:</b> Ladder (Up to 12-foot), pulling BX cable through steel stud, BX cable reels				X		
Bilateral fine dexterity skills	Handling BX cable			X			
Fine dexterity with dominant hand	Handling BX cable			X			
Fine dexterity with non-dominant hand	Handling BX cable			X			
Bilateral manual handling	<b>Medium force:</b> Ladder (Up to 12-foot), BX cable reels; <b>Heavy force:</b> 12 <sup>+</sup> foot ladder				X		
Manual handling with dominant hand	<b>Medium force:</b> Ladder (Up to 12-foot), pulling BX cable through steel studs, BX cable reels				X		
Manual handling with non-dominant hand	<b>Medium force:</b> Ladder (Up to 12-foot), pulling BX cable through steel studs, BX cable reels				X		
Tool usage bilaterally	<b>Light force:</b> Sweeping			X			
Tool usage with dominant hand	<b>Light force:</b> BX cable cutters				X		
Tool usage with non-dominant hand	<b>Light force:</b> BX cable cutters			X			

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting (on ground)	Pulling BX cable through steel studs			X			
Standing	Pulling BX cable through steel studs, clean-up					X	
<b>Walking:</b> Level surfaces	Pulling BX cable through steel studs, clean-up					X	
Rough surfaces	Construction debris			X			
Slopes	Work site terrain		X				
<b>Climbing:</b> Regular stairs	Accessing designated work areas				X		
Ladders	Pulling BX cable through steel studs				X		
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Pulling BX cable through steel studs while on a ladder				X		
Static bending	Pulling BX cable, clean-up			X			
Variable bending	Pulling BX cable, clean-up					X	
Static twisting	Pulling BX cable, clean-up			X			
Variable twisting	Pulling BX cable, clean-up					X	
Kneeling	Pulling BX cable, clean-up				X		
Crouching	Pulling BX cable, clean-up		X				
Crawling	Pulling BX cable, clean-up		X				
Repetitive squatting	Pulling BX cable, clean-up		X				
<b>Reaching:</b> Above shoulder	Pulling BX cable, clean-up				X		
<b>Reaching:</b> Below shoulder	Pulling BX cable, 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	<b>Light force:</b> Pulling BX cable (edges may catch on steel wall studs)				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>No</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
6. To prevent knee injuries, knee pads should be utilized when kneeling on hard &/or rough surfaces