

## **Industrial Electrician**

### **Task 8: Termination of Large Conductors**

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 termination of large cables 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**

- Terminating large conductors
- Clean-up (Picking up waste materials)
- Materials handling

### **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**

- Ratchet cutters
- Knives
- Hydraulic crimping tools (Mechanical/Battery-powered)

#### **Occasional**

- Tape measures
- Wire/Cable cutters
- Sling
- Wrenches (pipe/strap)
- Saws Band, hack, reciprocating)
- Screwdrivers
- Drills
- Tool box

## **Personal Protective Equipment Recommended**

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

## **Environment Conditions**

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

Inside 50%/Outside 50%

### **Working Temperature:**

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

### **Walking Surfaces:**

Concrete, metal grating, mud, snow, ice (terrain may be uneven)

### **Dust:**

Mild

### **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 – Drills

### **Moving Objects:**

Cranes, mobile equipment

### **Risks/Hazards:**

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

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

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

## **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 work site for materials/supplies

### **Working Alone:**

Seldom - Worker may have to perform task at work site without colleagues or other trades people

### **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:**

N/R

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<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>Medium force:</b> Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Larger diameter Tech cable (Multi-person task)				X		
Lift: Waist to Waist	<b>Medium force:</b> Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Larger diameter Tech cable (Multi-person task)				X		
Lift: Waist to Chest	<b>Medium force:</b> Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Larger diameter Tech cable (Multi-person task)				X		
Lift: Waist to Overhead	N/R	X					
Front carry	<b>Light force:</b> Power saws; <b>Medium force:</b> Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Larger diameter Tech cable (Multi-person task)			X			
Right side carry	<b>Light force:</b> Power saws; <b>Medium force:</b> Tool box			X			
Left side carry	<b>Light force:</b> Power saws; <b>Medium force:</b> Tool box			X			
Static push	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)				X		
Static pull	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable				X		
Dynamic push	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)				X		
Dynamic pull	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)				X		

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Splicing/terminating cables, utilizing mechanical crimper tool				X		
Repetitive use of dominant hand	Splicing/terminating cables					X	
Repetitive use of non-dominant hand	Splicing/terminating cables					X	
Bilateral power grip	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable, utilizing hydraulic crimper tool (mechanical); <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)				X		
Power grip with dominant hand	<b>Light force:</b> Utilizing tools, utilizing hydraulic crimper tool (battery-powered); <b>Medium force:</b> Bending Medium diameter Tray/Tech cable, tool box; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)					X	
Power grip with non-dominant hand	<b>Light force:</b> Utilizing tools, utilizing hydraulic crimper tool (battery-powered); <b>Medium force:</b> Bending Medium diameter Tray/Tech cable, tool box; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)				X		
Bilateral fine dexterity skills	Splicing/terminating cables				X		
Fine dexterity with dominant hand	Splicing/terminating cables					X	
Fine dexterity with non-dominant hand	Splicing/terminating cables					X	
Bilateral manual handling	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)				X		
Manual handling with dominant hand	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)					X	
Manual handling with non-dominant hand	<b>Medium force:</b> Bending Medium diameter Tray/Tech cable; <b>Heavy to Very-Heavy force:</b> Bending Larger diameter Tech cable (Multi-person task)					X	
Tool usage bilaterally	<b>Medium force:</b> Utilizing hydraulic crimper tool (mechanical), cable cutter				X		
Tool usage with dominant hand	<b>Light force:</b> Utility knife, ratchet cutter, utilizing hydraulic crimper tool (battery-powered)					X	
Tool usage with non-dominant hand	<b>Light force:</b> Utility knife, ratchet cutter, utilizing hydraulic crimper tool (battery-powered)				X		

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting (on ground/crate)	Splicing/terminating cables, bending Tray/Tech cable				X		
Standing	Splicing/terminating cables, bending Tray/Tech cable				X		
Walking: Level surfaces	Bending Tray/Tech cable				X		
Rough surfaces	Work site terrain			X			
Slopes	Work site terrain			X			
Climbing: Regular stairs	Accessing designated work areas			X			
Ladders	Accessing designated work areas			X			
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Pulling wire/tech cable while on slippery surfaces (mud, snow, ice)				X		
Static bending	Splicing/terminating cables, bending Tray/Tech cable			X			
Variable bending	Splicing/terminating cables, bending Tray/Tech cable				X		
Static twisting	Splicing/terminating cables, bending Tray/Tech cable			X			
Variable twisting	Splicing/terminating cables, bending Tray/Tech cable				X		
Kneeling	Splicing/terminating cables, bending Tray/Tech cable			X			
Crouching	Splicing/terminating cables, bending Tray/Tech cable		X				
Crawling	Splicing/terminating cables, bending Tray/Tech cable		X				
Repetitive squatting	N/R	X					
Reaching: Above shoulder	N/R	X					
Reaching: Below shoulder	Splicing/terminating cables, bending Tray/Tech cable						X
Neck Postures/Movements	All neck positions required (180 <sup>o</sup> , up, down, side-to-side)						X
Throwing	N/R	X					
Foot Action	Holding cable in place during bending process			X			
Forceful/Jerky movements	Terminating cables, bending Tray/Tech cable					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>No</b>

## 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 prevent knee injuries, knee pads should be utilized when kneeling on hard &/or rough surfaces