

## **Residential Electrician**

### **Task 1: Materials Handling** 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 handling of a variety of electrical materials as per the building construction requirements

#### **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 days/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

- Clean-up (Sweeping, picking up waste materials)
- Materials handling (items handled may range in weight from a few ounces (electrical hardware) up to 80 lbs (generator).

Below is a list of some of the most commonly handled materials/items at the work site:

### Tools

- **Up to 20 lbs:** Drills (cordless/electric), pliers, wire cutters, knives, hammers, level, screwdrivers, wrenches, saws (hand/electric), measuring tape, vacuum, flashlight, crowbar, knock-out sets (foot/hydraulic/mechanical), sledgehammer, grinder, Allen keys, stapler gun, shovel, powder-actuated tools
- **20-49 lbs:** Tool box/belt, cart
- **50-99 lbs:** Portable generators

### Electrical Equipment

- **20-49 lbs:** Floodlight, ladders (up to 12 feet)
- **50-99 lbs:** Ladders (12<sup>+</sup> feet)

#### Electrical hardware

- **Up to 20 lbs:** Electrical panels, breakers, smaller light fixtures, plugs/sockets (boxes of hardware-screws, bolts, nuts, collars), metallic/non-metallic conduit, TV/telephone termination box
- **20-49 lbs:** Larger light fixtures
- **50-99 lbs:** Electrical splitter box

### 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:**

**Rare**

- Wire cutters, knives, broom, cart, dolly

**Personal Protective Equipment Recommended**

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

**Environmental Conditions**

**Inside/Outside Work:**

Inside 95%; Outside 5%

**Working Temperature:**

Depending on which phase of construction the building is in, this task may involve exposure to hot or cold weather conditions

**Walking Surfaces:**

Inside - OSB/Plywood

Outside - Mud, wood, snow, ice, grass (terrain may be uneven)

**Dust:**

Saw dust – Mild; can be Moderate if power saw is being utilized nearby

**Lighting:**

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

**Vapour/Fumes:**

Mild – Exhaust fumes from portable generator

Mild-Moderate - solvent vapours from other trades

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

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

**Vibration:**

Not Applicable

**Moving Objects:**

Mobile equipment, work trucks

**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:**

Occasional – 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:**

N/R

**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> Breaker panels, smaller light fixture, plugs/sockets, box of hardware, metallic/non-metallic conduit, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), larger light fixtures, tool box, portable generator (2-person task); <b>Heavy force:</b> 12+ foot ladder				X		
Lift: Waist to Waist	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, box of hardware, metallic/non-metallic conduit, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), larger light fixtures, tool box, portable generator (2-person task); <b>Heavy force:</b> 12+ foot ladder				X		
Lift: Waist to Chest	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), larger light fixtures; <b>Heavy force:</b> 12+ foot ladder			X			
Lift: Waist to Overhead	<b>Light force:</b> Tools, smaller light fixtures; <b>Medium force:</b> Larger light fixtures			X			
Front carry	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, box of hardware, metallic/non-metallic conduit, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), larger light fixtures, portable generator (2-person task); <b>Heavy force:</b> 12+ foot ladder				X		
Right side carry	<b>Light force:</b> Tools, electrical panels, breakers, smaller light fixtures, plugs/sockets, boxes of hardware, metallic/non-metallic conduit, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), tool box; <b>Heavy force:</b> 12+ foot ladder				X		
Left side carry	<b>Light force:</b> Tools, electrical panels, breakers, smaller light fixtures, plugs/sockets, boxes of hardware, metallic/non-metallic conduit, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), tool box; <b>Heavy force:</b> 12+ foot ladder				X		
Static push	N/R	X					
Static pull	N/R	X					
Dynamic push	<b>Light force:</b> Loading materials; <b>Heavy force:</b> Moving service cable reels				X		
Dynamic pull	<b>Light force:</b> Starting portable generator; unloading materials, moving service cable reels				X		

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	N/R	X					
Repetitive use of dominant hand	N/R	X					
Repetitive use of non-dominant hand	N/R	X					
Bilateral power grip	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, box of hardware, metallic/non-metallic conduit, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), larger light fixtures, portable generator (2-person task); <b>Heavy force:</b> 12+ foot ladder				X		
Power grip with dominant hand	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, metallic/non-metallic conduit, starting portable generator, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), tool box					X	
Power grip with non-dominant hand	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, metallic/non-metallic conduit, starting portable generator, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), tool box				X		
Bilateral fine dexterity skills	Removing packaging from materials			X			
Fine dexterity with dominant hand	Removing packaging from materials				X		
Fine dexterity with non-dominant hand	Removing packaging from materials			X			
Bilateral manual handling	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, box of hardware, metallic/non-metallic conduit, TV/telephone termination box; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), larger light fixtures, portable generator (2-person task); <b>Heavy force:</b> 12+ foot ladder, moving service cable reels				X		
Manual handling with dominant hand	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, metallic/non-metallic conduit; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), tool box					X	
Manual handling with non-dominant hand	<b>Light force:</b> Breaker panels, smaller light fixture, plugs/sockets, metallic/non-metallic conduit; <b>Medium force:</b> Floodlight, ladder (up to 12 feet), tool box				X		
Tool usage bilaterally	<b>Light force:</b> Sweeping with broom			X			
Tool usage with dominant hand	<b>Light force:</b> Knife, wire cutters				X		
Tool usage with non-dominant hand	<b>Light force:</b> Knife, wire cutters			X			

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting	Driving vehicle to/from warehouse				X		
Standing	Sorting/selecting materials, removing packaging from materials			X			
<b>Walking:</b> Level surfaces	Moving supplies/materials to work areas				X		
Rough surfaces	Construction debris/materials			X			
Slopes	Work site terrain		X				
<b>Climbing:</b> Regular stairs	Accessing designated work areas				X		
Ladders	N/R	X					
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Wet, icy, muddy walking surface conditions				X		
Static bending	Sorting/selecting/handling materials			X			
Variable bending	Sorting/selecting/handling materials				X		
Static twisting	Sorting/selecting/handling materials			X			
Variable twisting	Sorting/selecting/handling materials				X		
Kneeling	Sorting/selecting/handling materials		X				
Crouching	Sorting/selecting/handling materials			X			
Crawling	N/R	X					
Repetitive squatting	Sorting/selecting/handling materials			X			
<b>Reaching:</b> Above shoulder	Sorting/selecting/handling materials			X			
<b>Reaching:</b> Below shoulder	Sorting/selecting/handling materials					X	
Neck Postures/Movements	All neck positions required (180°, up, down, side-to-side)						X
Throwing	N/R	X					
Foot Action	<b>Light force:</b> Operating vehicle pedals				X		
Forceful/Jerky movements	<b>Heavy force:</b> Moving service cable reels		X				



## Psychosocial Demands

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

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

Remember locations and routine procedures	Constant
Understand and remember short and simple instructions	Constant
Understand and remember detailed instructions	Occasional

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

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

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

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

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

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

### Yes/No

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

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

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

Is English required for safety purposes?	Yes
Is English required for professional purposes?	Yes

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

Is grade 12 diploma required?	Yes
Is post-secondary required?	Yes
Is additional skill training required?	No

## 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