

Industrial 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 structure's 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 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

- Clean-up (Sweeping, picking up waste materials)
- Materials handling (items handled may range in weight from a few ounces (electrical hardware) to several hundred pounds (switch gear, reels of wire/cable).

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

Tools

- **Up to 20 lbs:** Drills, pliers, wire cutters knives, hammers, level, steel fish tape, mechanical pipe benders, screwdrivers, wrenches, saws, measuring tape, vacuum, flashlight, crowbar, knock-out sets, tool belts, sledgehammer, grinder, hydraulic crimpers, sling, ratchet cutter, bolt cutters
- **20-49 lbs:** Tool box

Electrical Equipment

- **20-49 lbs:** Floodlight, ladder (up to 12 feet), cable rollers, hydraulic pipe bender shoes
- **50-99 lbs:** Hydraulic pipe bender shoes, ladder (12+ feet), portable generator
- **100+lbs:** Hydraulic pipe benders, reel cradles, reel jack stands, electric cable tugger

Electrical hardware

- **Up to 20 lbs:** Electrical panels, breakers, smaller light fixtures, plugs/sockets (boxes of hardware-screws, bolts, nuts, collars), metallic/non-metallic pipe
- **20-49 lbs:** Cable trays, larger light fixtures, reels of wire cable
- **50-99 lbs:** Cable trays, reels of wire/cable
- **100+lbs:** Switch gear, transformers, reels of wire/cable

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

- Pallet jack, crowbar, wire cutters, utility knife, metal bar, grinder, dolly, cart

Personal Protective Equipment Recommended

- ✓ Safety Glasses
- ✓ Hearing Protection
- ✓ Hard Hat
- ✓ Steel Toed Boots
- ✓ Gloves
- ✓ Overalls (Optional)
- ✓ Knee Pads (Optional)
- ✓ Fall Protection Equipment (Task-specific)
- ✓ Face shield (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 &/or cold weather conditions

Walking Surfaces:

Concrete, mud, snow (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:

Not Applicable

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:**

Frequent – Traveling between the work site and warehouse for materials/supplies

Working Alone:

N/R

Working Independently / in Group:

Required to work as part of a 2-person 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 pace

Interacting with Others:

Required to work with colleagues and other tradespeople

Operation of Mobile Equipment:

N/R

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FORCE LEVEL	WEIGHT HANDLED
Light	Less than 20 lbs.
Medium	20-49 lbs.
Heavy	50-99 lbs.
Very-Heavy	100+ lbs.

Critical Job Demands

MANUAL HANDLING	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Lift: Floor to Waist	Light force: Tools, electrical panels, smaller light fixture, boxes of hardware, metallic/non-metallic pipe; Medium force: Floodlight, ladder (up to 12 feet), cable rollers, cable trays (2-person lift), larger light fixtures, tool box; Heavy force: Cable trays (2 ⁺ -person lift), ladders (12 ⁺ feet), portable generator; Very-Heavy force: Cable trays (2 ⁺ -person lift), electric cable tugger (2 ⁺ -person lift), hydraulic pipe bender (2-person task)				X		
Lift: Waist to Waist	Light force: Tools, electrical panels, smaller light fixture, boxes of hardware, metallic/non-metallic pipe; Medium force: Floodlight, ladder (up to 12 feet), cable rollers, cable trays (2-person lift), larger light fixtures, tool box; Heavy force: Cable trays (2 ⁺ -person lift), ladders (12 ⁺ feet), portable generator; Very-Heavy force: Cable trays (2 ⁺ -person lift), reel cradles/jack stands, electric cable tugger (2 ⁺ -person lift), hydraulic pipe bender (2-person task)				X		
Lift: Waist to Chest	Light force: Tools, electrical panels, smaller light fixture, boxes of hardware, metallic/non-metallic pipe; Medium force: Floodlight, ladder (up to 12 feet), cable rollers, cable trays (2-person lift), larger light fixtures, tool box; Heavy force: Cable trays (2 ⁺ -person lift)			X			
Lift: Waist to Overhead	Light force: Tools, smaller light fixtures; Medium force: Cable trays, larger light fixtures; Heavy force: Cable trays (2-person lift)			X			
Front carry	Light force: Tools, electrical panels, breakers, smaller light fixture, plugs/sockets, box of hardware; Medium force: Floodlight, ladder (up to 12 ft), cable basket, larger light fixture; Heavy force: Ladders (12 ⁺ ft), portable generator (2-person task), reel cradles/jack stands, electric cable tugger, hydraulic pipe bender (2-person task)				X		
Right side carry	Light force: Tools, electrical panels, breakers, smaller light fixtures, plugs/sockets, boxes of hardware, metallic/non-metallic pipe; Medium force: Floodlight, ladder (up to 12 feet), cable rollers, cable basket, tool box				X		
Left side carry	As above				X		
Static push	N/R	X					
Static pull	N/R	X					
Dynamic push	Light to Medium force: Loading materials back into van/truck				X		
Dynamic pull	Light to Medium force: Removing materials from van/truck				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	Light force: Tools, electrical panels, smaller light fixture, boxes of hardware, metallic/non-metallic pipe; Medium force: Floodlight, ladder (up to 12 feet), cable rollers, cable trays (2-person lift), larger light fixtures, tool box; Heavy force: Ladders (12 ⁺ feet), portable generator; Very-Heavy force: Cable trays (2 ⁺ -person lift), reel cradles/jack stands, electric cable tigger (2 ⁺ -person lift), hydraulic pipe bender (2-person task)				X		
Power grip with dominant hand	Light force: Tools, electrical panels, breakers, smaller light fixtures, plugs/sockets, boxes of hardware, metallic/non-metallic pipe, starting portable generator; Medium force: Floodlight, ladder (up to 12 feet), cable rollers, cable trays; Heavy force: Cable trays (2 ⁺ -person lift), ladders (12 ⁺ feet)					X	
Power grip with non-dominant hand	As above				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	Medium force: Ladder (up to 12 feet), cable basket, larger light fixtures, portable generator; Heavy force: Cable trays (2 ⁺ -person lift), ladders (12 ⁺ feet); Very-Heavy force: Reel cradles/jack stands, electric cable tigger (2 ⁺ -person lift), hydraulic pipe bender (2-person task)				X		
Manual handling with dominant hand	Light force: Tools, electrical panels, breakers, smaller light fixtures, plugs/sockets, metallic/non-metallic pipe; Medium force: Floodlight, ladder (up to 12 feet), cable rollers, cable basket; Heavy force: Ladder (12 ⁺ foot), cable trays					X	
Manual handling with non-dominant hand	As above				X		
Tool usage bilaterally	Light force: Sweeping with broom; Medium to Heavy force: Moving tools, packages with dolly/cart			X			
Tool usage with dominant hand	Light force: Knives, wire cutters				X		
Tool usage with non-dominant hand	Light force: Knives, wire cutters			X			

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting	Driving work van/truck from warehouse to different areas of worksite				X		
Standing	Sorting/selecting materials, removing packaging from materials				X		
Walking: Level surfaces	Moving supplies/materials to work areas					X	
Rough surfaces	Construction debris/materials			X			
Slopes	Work site terrain			X			
Climbing: Regular stairs	Accessing designated areas			X			
Ladders	N/R	X					
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	N/R	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			
Reaching: Above shoulder	Sorting/selecting/handling materials			X			
Reaching: 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	Light force: Operating work truck/van pedals			X			
Forceful/Jerky movements	N/R	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	Rare
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?	No

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