



Physical Demands Analysis



Commercial Electrician

Task 12: Installing Light Fixtures – Rough In & Finishing Phases

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 light fixture and associated electrical components 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

- Drilling holes, splicing wires (rough-in phase)
- Terminating wires, assembling/installing fixtures (finishing phase)
- 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 exclusive to the following:

Frequent

- Tool belt
- Tools (wire cutters, pliers, knives, drills, screwdrivers)
- Ladders
- Tape measure

Occasional

- Voltmeter
- Flashlight
- Level
- Chalk-line
- Floodlight

Rare

- 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:

Inside 100%

Working Temperature:

Finishing job duties are generally completed within the confines of a temperature-regulated facility, while the roughing-in phase of the task may involve exposure to hot or cold weather conditions

Walking Surfaces:

Rough-in Phase: Concrete with slippery areas (water puddles, mud, construction debris)

Finishing Phase: Concrete, hardwood, carpet, tile

Dust:

Rough-in Phase: Concrete dust – Mild (Moderate if jackhammer is being utilized nearby)

Finishing Phase: Paint fumes – Mild/Moderate depending on proximity to Painters

Lighting:

Rough-in Phase/ Finishing Phase: Adequate, indoor lighting in most areas; dark spots in basement/parkade

Vapour/Fumes:

Rough-in Phase: Mild – Diesel fumes from mobile equipment

Mild-Moderate - solvent vapours from other trades

Finishing Phase: Mild-Moderate - Paint fumes

Noise Levels (measured with Audiometer):

Rough-in Phase: Can exceed 100 dBA if heavy equipment, portable generators, power tools or hammers are being utilized nearby

Finishing Phase: 58-75 dBA in most areas

Vibration:

Mild – Cordless drill; Moderate – Concrete drill

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:

Adequate

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:

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

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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	R	O	F	C
Lift: Floor to Waist	Light force: Tools, smaller fixtures, electrical outlet components; Medium force: Tool box, ladder (up to 12 foot), larger light fixtures; Heavy force: Ladder (12 ⁺ ft)		X			
Lift: Waist to Waist	Light force: Tools, smaller fixtures, electrical outlet components; Medium force: Tool box, ladder (up to 12 foot), larger light fixtures; Heavy force: Ladder (12 ⁺ ft)		X			
Lift: Waist to Chest	Light force: Tools, smaller fixtures, electrical outlet components; Medium force: Ladder (up to 12 foot), larger light fixtures; Heavy force: Ladder (12 ⁺ ft)		X			
Lift: Waist to Overhead	Light force: Tools, smaller fixtures, electrical outlet components; Medium force: Larger light fixtures				X	
Front carry	Light force: Smaller fixtures, electrical outlet components; Medium force: Ladder (up to 12 foot), larger light fixtures; Heavy force: Ladder (12 ⁺ ft)		X			
Right side carry	Light force: Drills, smaller fixtures, electrical outlet components; Medium force: Ladder (up to 12 foot), larger light fixtures			X		
Left side carry	Light force: Drills, smaller fixtures, electrical outlet components; Medium force: Ladder (up to 12 foot), larger light fixtures			X		
Static push	Light force: Installing smaller light fixtures; Medium force: Drilling holes in concrete, installing larger light fixtures				X	
Static pull	Light force: Splicing/terminating wires				X	
Dynamic push	Light force: Installing light fixtures; Medium force: Drilling holes in concrete			X		
Dynamic pull	Light force: Splicing/terminating wires			X		

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Splicing/terminating wires, utilizing tools, installing/assembling light fixture components, drilling holes into concrete					X	
Repetitive use of dominant hand	Utilizing tools, splicing/ terminating wires, installing/assembling light fixture components						X
Repetitive use of non-dominant hand	Utilizing tools, splicing/ terminating wires, installing/assembling light fixture components				X		
Bilateral power grip	Medium force: Ladder (up to 12 foot), larger light fixtures, handling Drills; Heavy force: Ladder (12*ft)				X		
Power grip with dominant hand	Light force: Utilizing tools, handling light fixture components					X	
Power grip with non-dominant hand	Light force: Utilizing tools, handling light fixture components				X		
Bilateral fine dexterity skills	Utilizing tools, splicing/terminating wires, handling light fixture components, utilizing chalk-line/tape measure					X	
Fine dexterity with dominant hand	Utilizing tools, splicing/terminating wires, handling light fixture components					X	
Fine dexterity with non-dominant hand	Utilizing tools, splicing/terminating wires, handling light fixture components					X	
Bilateral manual handling	Light force: Tools, smaller fixtures, electrical outlet components; Medium force: Ladder (up to 12 foot), larger light fixtures; Heavy force: Ladder (12*ft)				X		
Manual handling with dominant hand	Light force: Tools, smaller fixtures, electrical outlet components; Medium force: Tool box, ladder (up to 12 foot), larger light fixtures			X			
Manual handling with non-dominant hand	Light force: Tools, smaller fixtures, electrical outlet components; Medium force: Tool box, ladder (up to 12 foot), larger light fixtures			X			
Tool usage bilaterally	Light force: Sweeping, utilizing chalk-line/tape measure; Medium force: Utilizing Drills				X		
Tool usage with dominant hand	Light force: Splicing/terminating wires, utilizing tools						X
Tool usage with non-dominant hand	Light force: Splicing/terminating wires, utilizing tools				X		

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting	Assembling light fixture components			X			
Standing	Assembling light fixture components, splicing/terminating wires, installing light fixture components, drilling holes into concrete						X
Walking: Level surfaces	Clean-up, installing light fixture components				X		
Rough surfaces	Construction debris			X			
Slopes	Work site terrain		X				
Climbing: Regular stairs	Accessing designated work areas				X		
Ladders	Splicing/terminating wires, installing light fixture components, drilling holes into concrete				X		
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Splicing/terminating wires, installing light fixtures & drilling holes into concrete while on a ladder				X		
Static bending	Assembling/installing light fixture components, splicing/terminating wires				X		
Variable bending	Assembling/installing light fixture components, splicing/terminating wires				X		
Static twisting	Assembling/installing light fixture components, splicing/terminating wires				X		
Variable twisting	Assembling/installing light fixture components, splicing/terminating wires				X		
Kneeling	Assembling light fixture components		X				
Crouching	Assembling light fixture components		X				
Crawling	N/R	X					
Repetitive squatting	N/R	X					
Reaching: Above shoulder	Splicing/terminating wires, installing light fixture components, drilling holes into concrete, utilizing chalk-line/tape measure					X	
Reaching: Below shoulder	Assembling light fixture components				X		
Neck Postures/Movements	All neck positions required (180°, 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	Constant
Understand and remember short and simple instructions	Constant
Understand and remember detailed instructions	Constant

B. Sustained concentration and persistence:

Carry out short and simple instructions	Constant
Carry out detailed instructions	Constant
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	Constant

C. Social interaction:

Interact with the general public	Seldom
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	Seldom
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?	Yes*

* (Fall Protection, Aerial Work Platform, Powder-Actuated Tools)

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 **Medium** 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.
6. 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
7. To prevent knee injuries, knee pads should be utilized when kneeling on hard &/or rough surfaces