



Physical Demands Analysis



Commercial Electrician

Task 7: Installing Cable Trays/Basket Trays

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 cable/basket trays as per the building's electrical blueprints

Work Organization

Journeyman and Apprentice Electrician numbers vary by work site 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

- Installing cable trays:
 - Drilling holes;
 - Hanging struts;
 - Attaching trays;
 - Placing dividers.
- 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 limited to the following:

Frequent

- Tool belt/box
- Tools (pliers, drills, screwdrivers, magnetic level, hammer)
- Ladder
- Tape measure

Occasional

- 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:

The installation of cable/basket trays is generally completed within the confines of a temperature-regulated facility, however depending on what phase of construction the project is in, this task may involve exposure to hot or cold weather conditions

Walking Surfaces:

Concrete

Dust:

Concrete dust – High when drilling holes into concrete to hang the struts

Lighting:

Adequate, indoor lighting in most areas. Natural lighting may vary with season &/or weather conditions.

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: Power tools

Moderate: Concrete 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 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:**

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 as part of a 2-person (basket tray) or multi-person (large cable tray) team 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 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	S	R	O	F	C
Lift: Floor to Waist	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot), tool box; Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task); Very-Heavy force: Cable Trays (2 ⁺ person task)				X		
Lift: Waist to Waist	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot), tool box; Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task); Very-Heavy force: Cable Trays (2 ⁺ person task)				X		
Lift: Waist to Chest	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot); Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task); Very-Heavy force: Cable Trays (2 ⁺ person task)			X			
Lift: Waist to Overhead	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot); Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task); Very-Heavy force: Cable Trays (2 ⁺ person task)				X		
Front carry	Medium force: Cable trays, ladder (up to 12 foot); Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task); Very-Heavy force: Cable Trays (2 ⁺ person task)			X			
Right side carry	Light force: Tools, tool box; Medium force: Basket/cable trays, ladder (up to 12 foot); Heavy force: Cable Trays (2-person task)				X		
Left side carry	Light force: Tools, tool box; Medium force: Basket/cable trays, ladder (up to 12 foot); Heavy force: Cable Trays (2-person task)				X		
Static push	Medium force: Installing cable trays (2-person task), drilling holes in concrete; Heavy force: Installing cable Trays (2- person task)				X		
Static pull	N/R	X					
Dynamic push	Medium force: Installing cable trays (2-person task), drilling holes in concrete; Heavy force: Installing cable Trays (2-person task)				X		
Dynamic pull	N/R	X					

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Utilizing tools to install cable/basket trays					X	
Repetitive use of dominant hand	Utilizing tools to install cable/basket trays						X
Repetitive use of non-dominant hand	Utilizing tools to install cable/basket trays				X		
Bilateral power grip	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot), utilizing concrete drill; Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task); Very-Heavy force: Cable Trays (2 ⁺ person task)				X		
Power grip with dominant hand	Light force: Tools, basket trays; Medium force: Tool box, cable trays (2-person task), ladder (up to 12 foot); Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task)					X	
Power grip with non-dominant hand	Light force: Tools, basket trays; Medium force: Tool box, cable trays (2-person task), ladder (up to 12 foot); Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task)				X		
Bilateral fine dexterity skills	Handling basket/cable tray components, utilizing chalk-line/tape measure					X	
Fine dexterity with dominant hand	Utilizing tools, handling basket/cable tray components					X	
Fine dexterity with non-dominant hand	Utilizing tools, handling basket/cable tray components				X		
Bilateral manual handling	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot), drill; Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task); Very-Heavy force: Cable Trays (2 ⁺ person task)				X		
Manual handling with dominant hand	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot), drill; Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task)				X		
Manual handling with non-dominant hand	Light force: Tools, basket trays; Medium force: Cable trays (2-person task), ladder (up to 12 foot), drill; Heavy force: Ladder (12 ⁺ foot), cable trays (2-person task)				X		
Tool usage bilaterally	Light force: Sweeping, utilizing chalk-line/tape measure; Medium force: Utilizing drill				X		
Tool usage with dominant hand	Light force: Tools						X
Tool usage with non-dominant hand	Light force: Tools				X		

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting	N/R	X					
Standing	Installing basket/cable trays, drilling holes into concrete while on a ladder					X	
Walking: Level surfaces	Clean up, materials handling				X		
Rough surfaces	Construction materials			X			
Slopes	Work site terrain		X				
Climbing: Regular stairs	Accessing designated work areas			X			
Ladders	Installing basket/cable trays, drilling holes into concrete				X		
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Installing basket/cable trays, drilling holes into concrete while on a ladder					X	
Static bending	Installing basket/cable trays				X		
Variable bending	Installing basket/cable trays				X		
Static twisting	Installing basket/cable trays				X		
Variable twisting	Installing basket/cable trays				X		
Kneeling	N/R	X					
Crouching	N/R	X					
Crawling	N/R	X					
Repetitive squatting	N/R	X					
Reaching: Above shoulder	Installing basket/cable trays, drilling holes into concrete					X	
Reaching: Below shoulder	Installing basket/cable trays, handling materials, clean-up				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, utilizing hammer				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	Occasional

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)**

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, it is recommended that workers utilize tool belts with shoulder straps/suspenders to better distribute/carry the weight