



Commercial Electrician

Task 4: Pulling Wire inside conduits

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 wiring inside conduits 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

- Pulling wire through plastic/metallic conduits
- Clean-up (Sweeping, picking up waste materials)
- Materials handling

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:

Occasional

- Ladders
- Tape measures
- Knives
- Wire cutters
- Pliers
- Vacuum

Rare

- Broom

Personal Protective Equipment Recommended

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

Environment Conditions

Inside/Outside Work:

Inside 99%; Outside 1%

Working Temperature:

Although the temperature varies, pulling cable inside conduits is generally completed within the confines of a temperature-regulated facility, although depending on which phase of construction the building is in, this task may involve exposure to hot or cold weather conditions

Walking Surfaces:

Concrete with slippery areas (water puddles, mud, construction debris)

Dust:

Concrete dust – Mild; can be high during blow down or if jackhammer is being utilized nearby

Lighting:

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

Vapour/Fumes:

Mild – Diesel fumes from mobile equipment

Mild-Moderate - solvent vapours from other trades

Noise Levels (measured with Audiometer):

Can exceed 100 dBA if heavy equipment, portable generators, power saws 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

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)

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 (small gauge cable) or multi-person (large gauge cable) 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 platforms

Assessment Criteria Used

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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: Smaller gauge cable, moving smaller gauge cable reels; Medium force: Ladder (Up to 12-foot), larger gauge cable, moving larger gauge cable reels; Heavy force: Ladder (12+ foot), Tech cable, moving Tech cable reels (2+ person task)			X			
Lift: Waist to Waist	Light force: Smaller gauge cable, moving smaller gauge cable reels; Medium force: Ladder (Up to 12-foot), larger gauge cable, moving larger gauge cable reels; Heavy force: Ladder (12+ foot), Tech cable, moving Tech cable reels (2+ person task)			X			
Lift: Waist to Chest	Light force: Smaller gauge cable, moving smaller gauge cable reels; Medium force: Ladder (Up to 12-foot), larger gauge cable, moving larger gauge cable reels; Heavy force: Ladder (12+ foot), Tech cable, moving Tech cable reels (2+ person task)			X			
Lift: Waist to Overhead	Light force: Smaller gauge cable; Medium force: Larger gauge cable; Heavy force: Tech cable			X			
Front carry	Medium force: Ladder (Up to 12-foot); Heavy force: Ladder (12+ foot) Medium force: Ladder (Up to 12-foot), moving larger gauge cable reels; Heavy force: Ladder (12+ foot), moving Tech cable reels (2+ person task)			X			
Right side carry	Light force: Small-gauge cable rollers; Medium force: Ladder (Up to 12-foot), Tech cable rollers, moving larger gauge cable reels			X			
Left side carry	Light force: Small-gauge cable rollers; Medium force: Ladder (Up to 12-foot), Tech cable rollers, moving larger gauge cable reels			X			
Static push (i.e., Holding cable in place to prevent slippage when lifting against gravity)	Light force: Pushing smaller gauge cable; Medium force: Pushing larger gauge cable; Heavy force: Pushing Tech cable			X			
Static pull (i.e., Holding cable in place to prevent slippage when utilizing the gravity-fed method)	Light force: Pulling smaller gauge cable; Medium force: Pulling larger gauge cable; Heavy force: Pulling larger gauge cable/Tech cable			X			
Dynamic push (i.e., Moving cable from chest height to overhead against gravity)	Light force: Pulling/moving smaller gauge cable &/or reels; Medium force: Pushing larger gauge cable, moving larger gauge cable reels; Heavy force: Pushing Tech cable, moving Tech cable reels				X		
Dynamic pull (i.e., Moving cable from floor to waist height against gravity)	Light force: Pulling/moving smaller gauge cable &/or reels; Medium force: Pulling larger gauge cable, moving larger gauge cable reels; Heavy force: Pulling Tech cable, moving Tech cable reels					X	

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Pulling cable				X		
Repetitive use of dominant hand	Pulling cable					X	
Repetitive use of non-dominant hand	Pulling cable					X	
Bilateral power grip	Light force: Pulling cable, moving cable reels; Medium force: Pulling larger gauge cable, moving cable reels; Heavy force: Pulling Tech cable, moving cable reels (2+ person task)				X		
Power grip with dominant hand	Light force: Pulling smaller gauge cable, moving cable reels; Medium force: Larger gauge cable, moving cable reels; Heavy force: Pulling Tech cable					X	
Power grip with non-dominant hand	Light force: Pulling smaller gauge cable, moving cable reels; Medium force: Larger gauge cable, moving cable reels; Heavy force: Pulling Tech cable					X	
Bilateral fine dexterity skills	Handling small gauge cable			X			
Fine dexterity with dominant hand	Handling small gauge cable			X			
Fine dexterity with non-dominant hand	Handling small gauge cable			X			
Bilateral manual handling	Light force: Pulling smaller gauge cable; Medium force: Ladder (Up to 12-foot), pulling larger gauge cable, moving cable reels; Heavy force: Ladder (12+ foot), pulling Tech cable, moving cable reels				X		
Manual handling with dominant hand	Light force: Pulling smaller gauge cable; Medium force: Ladder (Up to 12-foot), pulling larger gauge cable					X	
Manual handling with non-dominant hand	Light force: Pulling smaller gauge cable; Medium force: Ladder (Up to 12-foot), pulling larger gauge cable					X	
Tool usage bilaterally	Light force: Sweeping broom			X			
Tool usage with dominant hand	Light force: Tape measure, wire cutters, knives					X	
Tool usage with non-dominant hand	Light force: Tape measure, wire cutters, knives				X		

POSITIONAL/ MOBILITY	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Sitting (on ground)	Pulling cable		X				
Standing	Pulling cable, clean-up duties					X	
Walking: Level surfaces	Pulling cable, clean-up duties				X		
Rough surfaces	Construction debris			X			
Slopes	Work site terrain		X				
Climbing: Regular stairs	Accessing designated work areas				X		
Ladders	Pulling cable				X		
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Pulling cable while on a ladder			X			
Static bending	Pulling cable				X		
Variable bending	Pulling cable				X		
Static twisting	Pulling cable			X			
Variable twisting	Pulling cable					X	
Kneeling	Pulling cable		X				
Crouching	Pulling cable		X				
Crawling	Pulling cable		X				
Repetitive squatting	Pulling cable (against-gravity)				X		
Reaching: Above shoulder	Pulling cable					X	
Reaching: Below shoulder	Pulling cable					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	Pulling cable				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	Frequent

B. Sustained concentration and persistence:

Carry out short and simple instructions	Constant
Carry out detailed instructions	Frequent
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 **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. To prevent knee injuries, knee pads should be utilized when kneeling on hard surfaces
7. 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