

Industrial Electrician

Task 2: Handling and Working with Mineral Insulated Cable

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 electrical heat tracing on steel pipes as per the structure'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/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

- Attaching electrical heat tracing (EHT) to steel pipes of varying dimensions
- Clean-up (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

- Pinch pliers
- Dead-blow hammer
- Knives
- Cold lead bending tools

Occasional

- Tape measure
- Wire/Cable cutter
- Screwdrivers
- Drills
- Flashlight
- Voltmeter
- Ladder
- Tool box

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:

Outside 100% (May be under partial cover from the elements)

Working Temperature:

This task may involve exposure to hot and/or cold weather conditions

Walking Surfaces:

Concrete, metal grating

Dust:

Mild

Lighting:

Adequate, overhead lighting or flashlight/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:

Mild – Drills, dead-blow hammer

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:

The worker may have to maneuver into tight spots in order to complete task on an Occasional basis

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:

Seldom - Worker may have to perform task at a work site without colleagues or other trades people

Working Independently / in Group:

Required to work as part of a multi-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 to Fast pace, depending on complexity

Interacting with Others:

Required to work with colleagues and other trades people

Operation of Mobile Equipment:

Aerial lift 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, box of Cold-lead cable and components; Medium force: Roll of EHT cable, roll of stainless steel banding/tie wire, ladder (up to 12 feet)			X			
Lift: Waist to Waist	Light force: Tools, box of Cold-lead cable and components; Medium force: Roll of EHT cable, roll of stainless steel banding/tie wire, ladder (up to 12 feet)			X			
Lift: Waist to Chest	Light force: Tools, Cold-lead cable and components, EHT cable				X		
Lift: Waist to Overhead	Light force: Tools, Cold-lead cable and components, EHT cable				X		
Front carry	Medium force: Roll of stainless steel banding			X			
Right side carry	Light force: Tools, box of Cold-lead cable and components, tool box; Medium force: Roll of EHT cable, roll of stainless steel banding/tie wire, ladder (up to 12 feet)			X			
Left side carry	Light force: Tools, box of Cold-lead cable and components, tool box; Medium force: Roll of EHT cable, roll of stainless steel banding/tie wire, ladder (up to 12 feet)			X			
Static push	Light to Medium force: Bending/installing Cold-lead cable and EHT cable				X		
Static pull	Light to Medium force: Bending/installing Cold-lead cable and EHT cable				X		
Dynamic push	Light to Medium force: Bending/installing Cold-lead cable and EHT cable					X	
Dynamic pull	Light to Medium force: Bending/installing Cold-lead cable and EHT cable, pulling up supplies/tools by rope				X		

GRIP STRENGTH /COORDINATION	Comments	FREQUENCY OF WORKDAY					
		N/R	S	R	O	F	C
Bilateral repetitive use of hands	Terminating cables at junction boxes, utilizing Cold-lead/EHT bending tools (mechanical), bending/installing Cold-lead cable and EHT cable					X	
Repetitive use of dominant hand	Terminating cables at junction boxes, utilizing Cold-lead/EHT bending tools (mechanical), bending/installing Cold-lead cable and EHT cable						X
Repetitive use of non-dominant hand	Terminating cables at junction boxes, utilizing Cold-lead/EHT bending tools (mechanical), bending/installing Cold-lead cable and EHT cable					X	
Bilateral power grip	Light force: Utilizing Cold-lead/EHT bending tools (mechanical); Light to Medium force: Bending/installing Cold-lead cable and EHT cable, carrying ladder (up to 12 feet); Medium force: Moving rolls of EHT cable, roll of stainless steel banding/tie wire				X		
Power grip with dominant hand	Light force: Tools (utilizing Cold-lead/EHT bending tools); Light to Medium force: Bending/installing Cold-lead cable and EHT cable, carrying ladder (up to 12 feet); Medium force: Moving rolls of EHT cable, roll of stainless steel banding/tie wire					X	
Power grip with non-dominant hand	Light force: Tools (utilizing Cold-lead/EHT bending tools); Light to Medium force: Bending/installing Cold-lead cable and EHT cable, carrying ladder (up to 12 feet); Medium force: Moving rolls of EHT cable, roll of stainless steel banding/tie wire				X		
Bilateral fine dexterity skills	Terminating cables at junction boxes, bending/installing Cold-lead cable and EHT cable				X		
Fine dexterity with dominant hand	Terminating cables at junction boxes, bending/installing Cold-lead cable and EHT cable					X	
Fine dexterity with non-dominant hand	Terminating cables at junction boxes, bending/installing Cold-lead cable and EHT cable					X	
Bilateral manual handling	Medium force: Moving rolls of EHT cable, roll of stainless steel banding/tie wire, carrying ladder (up to 12 feet)				X		
Manual handling with dominant hand	Light force: Tool box; Medium force: Moving rolls of EHT cable, roll of stainless steel banding/tie wire, carrying ladder (up to 12 feet)				X		
Manual handling with non-dominant hand	Light force: Tool box; Medium force: Moving rolls of EHT cable, roll of stainless steel banding/tie wire, carrying ladder (up to 12 feet)				X		
Tool usage bilaterally	Light force: Utilizing Cold-lead/EHT bending tools, cable cutter				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 (on ground/crate)	Terminating cables at junction boxes, utilizing Cold-lead/EHT bending tools (mechanical), bending/installing Cold-lead cable and EHT cable			X			
Standing	Terminating cables at junction boxes, utilizing Cold-lead/EHT bending tools (mechanical), bending/installing Cold-lead cable and EHT cable					X	
Walking: Level surfaces	Bending/installing Cold-lead cable and EHT cable				X		
Rough surfaces	Worksite terrain			X			
Slopes	Worksite terrain			X			
Climbing: Regular stairs	Accessing designated work areas			X			
Ladders	Accessing designated work areas			X			
Other climbing	N/R	X					
Jumping	N/R	X					
Running	N/R	X					
Balancing	Bending/installing Cold-lead cable and EHT cable while standing on a ladder			X			
Static bending	Bending/installing Cold-lead cable and EHT cable				X		
Variable bending	Bending/installing Cold-lead cable and EHT cable					X	
Static twisting	Bending/installing Cold-lead cable and EHT cable				X		
Variable twisting	Bending/installing Cold-lead cable and EHT cable					X	
Kneeling	Bending/installing Cold-lead cable and EHT cable				X		
Crouching	Bending/installing Cold-lead cable and EHT cable			X			
Crawling	Bending/installing Cold-lead cable and EHT cable			X			
Repetitive squatting	Bending/installing Cold-lead cable and EHT cable		X				
Reaching: Above shoulder	Bending/installing Cold-lead cable and EHT cable					X	
Reaching: Below shoulder	Bending/installing Cold-lead cable and EHT cable					X	
Neck Postures/Movements	All neck positions required (180°, up, down, side-to-side)						X
Throwing	N/R	X					
Foot Action	Holding cable in place during bending process			X			
Forceful/Jerky movements	Bending/installing Cold-lead cable and EHT 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 **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 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. To prevent knee injuries, knee pads should be utilized when kneeling on hard and/or rough surfaces