

Electricity Human Resources Canada is a non-profit organization supporting the human resources needs of the Canadian electricity sector.

Job Demands Assessment: Power Cable Technician



Job Demands Assessment: **Power Cable Technician**

The purpose of a Job Demands Assessment (JDA) is to document the bona fide essential duties of a task. These assessments can be used for:

- Return to work planning
- Allowing medical professionals to evaluate job offers for suitability
- Determining job and task suitability
- Determining the likelihood that a job or task contributed to an injury
- Assisting Rehabilitation Specialists set up effective treatment protocols
- Training employees
- Hiring practices and Post Offer Pre-employment hiring programs
- Identifying ergonomic hazards

Using the JDA

This JDA is purposely generic in nature to ensure applicability across various organizations. The JDA is meant to serve as a benchmark document that provides an overview of the most common physical demands associated with the occupation. Not all tasks could be observed during the assessment process; instead, the most common tasks have been assessed.

Where applicable, potential accommodations are noted to illustrate alternative means for achieving the required demand or action.

This JDA can be used by Medical Practitioners / Health Care Providers involved in return to work rehabilitation support, and workplace accommodations to identify the Major Essential Demands that can be Performed, Modified, or Avoided by an individual based on their capacity and ability.

Acknowledgements

This JDA was completed by **ERGO Inc.**, an Ergonomics, Injury Prevention & Safety Consulting & Training Firm that has been providing Canadian companies with practical ergonomic and injury prevention solutions for over 25 years.

Electricity Human Resources Canada and ERGO Inc. would like to thank **Hydro Ottawa** for allowing us onsite and in their training facilities to complete the JDA in Ottawa, ON (November, 2021).





General Info	ormation							
	Statement of Overall Job Description: Power Cable Technicians install, operate, maintain and repair underground electrical power transmission and distribution systems. They are employed by electrical power generation, transmission and distribution companies, as well as electrical contractors and public utilities. Tasks of a Power Cable Technician include:	Approx. % of Time Spent Performing Each Task						
	 1. Install/remove cable in vaults, confined spaces, substations, and trenches Review and update maps, safety tail board, traffic plan, identify on-site hazards Load material on truck Prepare cable for pulling, install pulling eye, use reel truck to pull cable, manually pull cable to installation point, attach cable to mechanized pulling equipment, lubricate cable and operate mechanized pulling equipment to pull cable Measure, cut, and mark cable with colour coded tape Record cable used 	Can be assigned to any task on any day for whole or por- tion of day. Typically, 4 hours.						
Job Description	 2. Splicing Load material on truck Identify cable types and sizes Verify cable destinations Strip and splice cables using various tools, final set 	Can be assigned to any task on any day for whole or por- tion of day. Typically, 6 hours.						
	 3. Terminating cables in vaults switching gears, transformers, and substations Load material on truck Prepare cable: identify cable type, verify destination, strip and splice cables using various tools Attach termination (connection device) 	Can be assigned to any task on any day for whole or por- tion of day. Typically, 6 hours.						
	 4. Administrative work Retrieve and complete various reports such as updating maps, safety tail board, traffic plan using computer 	15 minutes per day						
	 5. Safety inspection and equipment Truck safety inspection Identify site safety hazards Implement safety procedures and setup safety equipment as per required by site location, switching operations on underground equipment providing isolation, creating a safe work area through testing, grounding and cable identification testing 	2-4 hours						
Work Load	Demands vary shift to shift with location and type of project being done i.e. in maintenance or open terrain.							
Work Schedule	Monday to Friday – Typically 8 hour shift from 7am to 3pm. May work overtime as needed.							
	Description: Field work conducted primarily outdoors in all seasons with some indoor locations (e.g. parking garages, basement), confined spaces, working at heights. Locations may be in urban and rural areas. Approximately 15 minutes of computer work performed each day in indoor office with monitor, keyboard and mouse.							
Work Environment	Working Heights: Cables and equipment located floor to overhead in below ground and above ground locations. Ladders or hoist used to change elevation. Typical working heights floor to 156", higher depending on depth of maintenance hole.							
	Working Reaches: Typically, forward reach to cables up 20-25". Cables may be at ground level or raised to chest height, with occasional reaches.	ch above shoulder level.						



Position: Power Cable Technician Date of On-Site Assessment: November 30, 2021

Pictures of Main Job Tasks











Feed cable into underground

Strip cable

Strip cable

Working in confined space

Disclaimer: Not all tasks within the occupation were being performed at the time of data collection. The data reported in this document is based on the measurement of available equipment, observation, mockup of some tasks, and walk throughs at a cable installation, as well as a description of other tasks that were described as part of the Power Cable Technician Role. This JDA may not be 100% representative of any one job site, as demands may vary based on company and location.



Summary of Major Essential Demands		mpleted by He er — Please ch	
For further details refer to the tables on the following pages	Able to Perform	Modification Required (Explain)	Unable to Perform
Occasional one - and two-handed lifting (typical <2lbs to 60lbs, max. 60+lbs) of floor to waist typical, occasionally above head. Option for a ladder may be available. Option to lift some tools with 2 hands.			
Rare one - and two-handed carrying (typical 2lbs to 60lbs, max. 60lbs) of cables, reel, pump, hydraulic press, chain block, saw, grinder, small hand tools). Distances are variable, up to ~100′. Option to carry some items with 2 hands.			
Rare to frequent one and two-handed horizontal pushing/pulling (typical varies to max. ~110lbs, distance varies, up to 100ft).			
Rare (driving) to frequent (working underground) sitting on stool, duration varies up to several hours at a time, with intermittent standing or moving around. Option to stand up and move around.			
Rare (typically in low underground) to constant standing on concrete, gravel, or uneven ground, typically standing for short periods (<5 minutes) before moving.			
Rare (typically underground) to frequent walking on outdoor and indoor, typically uneven surfaces in all seasons and conditions, typical 5-30 ft, max. 1000ft.			
Frequent (pulling cable) to constant (hand tools when splicing, terminating) gripping/handling with one/both hands (grip required to apply typical force/lift weight of ~2-60 lbs, max. ~60 lbs in bilateral push/pull motion).			
Rare (pulling cable, terminating) to Occasional (splicing) pinching/fingering with one/both hands (typical force <5lbs) when taping cable, tool triggers, keyboard, writing.			
Rare (above ground) to frequent (low underground) crouching/squatting/kneeling . Option to crouch/squat/kneel. May be able to use block to raise cable and sit on stool.			
Rare climbing and balancing on ladder, climb on/off reel truck.			
Rare driving to job site, duration varies.			
Low to high back repetition , primarily forward bending for low level work (over 20 degrees), with some twisting and lateral (side) bending to gain visual access to hard to see areas. Forward back bending often static, especially in low underground environments. Option to stand up and move around.			
High neck repetition , primarily forward bending for low level work and with visually intensive work (splicing) with some backwards bending to look up for short period, and moderate twisting, sideways bending to maintain situational awareness and gain visual access of hard to see areas. Forward bending is often static.			
Bilateral shoulder repetition high for forward reaching to access cables and manipulate tools with some static postures. Low to moderate upwards reaching >90 degrees, backwards reaching, reaching to the side, reaching across the body, rotating the shoulder, typically in confined spaces and when manipulating tools with some static shoulder postures .			
High bilateral elbow repetition (bending/straightening the arms, turning the palms up/down, all directions) required to manipulate hand tools and pull cables with some static elbow postures (bending/straightening the arms, turning the palms up/down). Full range of extension required to reach forward and upwards.			



Summary of Major Essential Demands		To be completed by Health Care Provider — Please check one:			
For further details refer to the tables on the following pages	Able to Perform	Modification Required (Explain)	Unable to Perform		
Low (pulling cable) to high (using hand tools) bilateral wrist repetition (all directions) required to handle cables, manipulate hand tools with some static wrist postures (bending the wrists up/down, bending the wrists sideways), and forceful exertions when using hand tools during splicing. Small range wrist extension (static) may be present while typing and mousing depending on workstation setup.					
Excellent math, memory, organization, decision making, attention to detail, problem solving, visual acuity, hearing, smell as well as good writing, and tactile / feel capabilities required.					



Demand /	Demand / Action		Check if Description & Potential Accommodations Performed *Accommodation options noted in green		
	Hearing / Speech: Conversation Signals	✓ ✓	Infrequent verbal communication with the public, verbal or 2-way radio used to communicate with co-workers. Use hearing to detect issues with equipment in the field. Hand signals used to communicate with co-workers in loud environments.		
Sensory	Vision: - 20 inches or less	✓	Near: Read work plans, tags, equipment displays, splice cable, attach pulling equipment, mark cables with coloured tape.		
Selisory	• 20 feet or more	✓	Far: See install at a distance, communicate with hand signals.		
	• Colour	√	Colour: Identify colour of different phases. Identify condition of cable.		
	Depth Perception	√	Depth: Splice cables, use equipment to move and install cables in all environments.		
	Smelling	√	May be able to detect equipment issues from smell. Identify safety issues with gas.		
	Tactile / Feeling	✓	Feel if solder is good.		
	Conditions of Work	Work perfo	Field work completed outdoors with some indoor transformer rooms, building basements or parking garages, all seasons. Work performed floor level to overhead, regularly working at heights, regularly in confined spaces, regularly in environments that require use of a respirator. Teamwork and coordination between Technicians required.		
	Temperature / Humidity	Work areas may be hot and humid, especially during summer months. Exposure to cold and outdoor environment in all seasons			
	Noise	Exposure to loud noise levels from trucks and traffic, at times in excess of 85 dBA.			
Environment	Vibration	Whole body vibration exposure when riding in the truck. Segmental vibration while using power tools such as saws, hammer d grinders, and reciprocating saw.			
Environment	Walking / Working Surface	Terrain varies: cement, asphalt, gravel, mud, grass. May be wet or snow/ice covered, uneven.			
	Lighting	Natural outdoor or work light.			
	Electrical	Exposure to high voltage electrical systems. Lock-out procedures in place.			
	Sharp Objects	Constant exposure to sharp tools and edges when splicing. Other tasks have occasional exposure to sharp tools and edges.			
	Hot / Cold Hazards	Exposure to	equipment outdoors in all seasons.		
	Chemical / Dust	Exposure to dust, mold, sulfur, propane, and other gases present in outdoor environment.			
	Moving Machinery / Equipment	Exposure to	moving equipment (e.g., vehicles, reel trailer), lifting and pulling equipment.		
Table	Hand / Sharp Tools	Wrenches, s blocks, Dav	screwdrivers, battery powered impact driver, reciprocating saw, splicing tools, pliers, cable cutters, 12 tonne press, chain it arm.		
Tools	Personal Protective Equipment	Davit arm, safety boots, hard hat, safety glasses, safety vest, gloves, respirator. Access to 40 cal arc flash hood and coverall suit when needed.			
	Other Equipment / Supplies	Reel, propa	ropane torch, soldering torch, measuring tape, tape.		



Demar	Rate Requirement		Description of Tasks that Demand is Required & Potential Accommodations *Accommodation options noted in green			
	Legend: NE = Not Essential	·	sential 5% or less = Rare Essential 6-33% = Minor Essential Demand >33% = Major Essential Demand			
	Reading:					
	• English	Minor	Work plan, safety plans, equipment labels, equipment displays, maps, logs, traffic plan, computer. Alphanumeric.			
	• French	Varies by Province	French required in some provinces.			
	• Other	No				
	Writing:					
	• English	Minor	Short entry, completion of work logs (e.g maintenance issues, maintenance work start/end time) and e-mail. Alphanumeric.			
	French	Varies by Province	French required in some provinces.			
	• Other	No				
	Verbal Communication:					
	• English	Major	With other team members and the public. In person, via phone, potentially via 2-way radio.			
	• French	Varies by Province	French required in some provinces.			
	• Other	No				
	Supervising Others	Yes	Crew supervisor typically on-site.			
	Working to Speed	Self-paced, varies	Self-paced.			
Cognitive	Self-Supervision/ Working Alone	No	Typically works in vicinity of other crew members. May work independently in van preparing cables.			
	Computer Usage	Rate	Typically, 15 minutes per shift to complete reports, pull up maps, record problems, inspection reports, material requests.			
	Math:		Simple calculations for measurements, read gauges, calculate cable length.			
	• Simple	Major	Complex calculations on how much cable can be pulled in a day, manage supply of cable reel, charge cost of supplies for each job, splice			
	• Complex	Major	terminations and determine how much cable is needed (set and adjust distance for length of connector, shrink boots), and use of lift device and pulling equipment.			
	Memory:		STM to track progress through sequential steps in splicing, terminating, and pulling cable.			
	Short Term	Major	LTM and experience used to inform problem solving and decision-making process to adjust the system in face of issues, and installation			
	Long Term	Major	in older infrastructure.			
	Organization	Major	Ensure all required steps are completed in order to ensure the health and safety of the crew and complete installation.			
	Decision Making	Major	To determine what types of adjustment to make to complete the installation and address issues faced.			
	Attention to Detail	Major	Important to maintain safety of crew. Attention to surroundings is critical.			
	Problem Solving	Major	Experience key to diagnosing potential issues and making decisions about how to adjust the system when installing in older infrastructure or when issues arise. Direction available from Supervisors, others, and procedures for critical decisions.			
	Emergency Management	Minor but critical	Written procedures for how to proceed in the event of various types of emergencies (ie. loss of consciousness due to gas and use of Davit arm for rescue, mayday call, ventilator over maintenance hole).			



Position: Power Cable Technician

Demar	Demand / Action		Check if Performed	Duration	Frequency	Description & Potential Accommodations *Accommodation options noted in green
	Legend: NE = Not Essential			t Essential I	ND = Not Daily Rare = 1-5% O	ccasional = 6-33% Frequent = 34-66% Constant = 67-100%
	Lifting	Two Hands	✓	Occasional -	Pulling cable – occasional	Objects: Cable (varies 60+ lbs), reel (45 lbs), pump (37 lbs), hydraulic press (18 lbs), chain block (17 lbs), sawsol (10 lbs), grinder (6 lbs), small hand tools (knife, hammer, up to 2lbs)
	Litting	One Hand	✓	Frequent	Splicing – frequently lifting tools	Weight Max: ~ 60+lbs Weight Typical: ~2-60lbs. Option to lift some tools with 2 hands. Range of Lift: Typically floor to waist typical, occasionally above head. Ladder may be available.
Strength	Carrying	Two Hands	✓	Rare	Varies with task performed.	Objects: Cable (varies 60+ lbs), reel (45 lbs), pump (37 lbs), hydraulic press (18 lbs), chain block (17 lbs), reciprocating saw (10 lbs), grinder (6 lbs), small hand tools (knife, hammer, up to 2lbs)
Strength	currying	One Hand	✓	nare		Weight Max: ~60 lbs. Weight Typical: ~2-60 lbs. Option to carry tools with 2 hands. Distance: Varies ~100' Handles Present: Varies
	Pushing/ Pulling	Two Hands	✓	Rare -	Cable: Rare Using tools: Rare-Frequent	Objects: Cable, install cable pulling device, use hand tools for splicing and cutting cables Force Max / Initial: ~110 lbs.
		One Hand	✓	Frequent		Distance: Pulling cable varies ~100'; splicing and cutting cable is stationary arm work. Handles Present: Varies Frequent use of tools when splicing.
	Sitting		✓	Rare - Frequent	Varies with task. May use stool when working underground.	Stool in underground environments. Completing administrative computer tasks, driving.
	Standing ✓		✓	Rare - Constant	Varies with task. Rare when working in low underground environments.	Stand for short periods (<5 minutes) before moving. Constantly on feet when pulling cable.
	Walking ✓		✓	Occasional - Frequent	Varies with job.	Pulling cable may involve walking typical 5-30 ft and up to 1000ft on outdoor and indoor, typically uneven surfaces in all seasons and conditions. Working in maintenance hole requires rare walking.
	Foot Activation ✓ Crouching/Squatting ✓ Kneeling ✓ Climbing ✓		√ Rare		Varies with job.	Driving, hydraulic press, cable driver.
Mobility			Crouching/Squatting ✓		Rare when working above ground. Frequent when working underground.	Underground environments often are confined space and work often performed near ground level. Option to kneel. May be able to use block to raise cable and sit on stool.
			✓	Rare - Frequent	Rare when working above ground. Frequent when working underground.	Underground environments often are confined space and work often performed near ground level. Option to crouch/squat. May be able to use block to raise cable and sit on stool.
			✓	Rare	Not daily; up to a few times/day.	Ladder to install elevated pulley line.
	Balancing		✓	Rare	Not daily; up to a few times/day.	Ladder to install elevated pulley line, climb on reel truck, scaffolding.
	Crawling		✓	ND	No during typical routine work.	May crawl in small maintenance hole.



Position: **Power Cable Technician**

Demar	Demand / Action Check if Performed		Duration Frequency		Description & Potential Accommodations *Accommodation options noted in green		
	Legei	nd: NE = No	t Essential	ND = Not Daily Rare = 1-5% 0	Occasional = 6-33% Frequent = 34-66% Constant = 67-100%		
	Gripping/Handling (G	ross motor)	Intermittent throughout the shift; varies with task.			
	Right Hand	✓	Frequent (pulling		Objects: Splicing, terminating – Constant gripping and handling of tools, tape. Pulling – frequent gripping,		
	Left Hand	✓	cable) to Constant		use saw, use paint brush to lubricate cable, pull cable. Weight Max: ~60lbs Weight Typical: ~2-60lbs		
Davetavitue	Either	✓	(spicing, terminating)				
Dexterity	Pinching/Fine Finger Movement						
	Right Hand	✓	Rare (pulling	Intermittent throughout the shift;	Objects: Tool triggers, keyboard, pen.		
	Left Hand	✓	cable, to Occasional	varies with task.	Weight: <5 lbs		
	Either	✓	(splicing)				
	Hand/Eye Coordination	✓	Constant	Frequently – pulling. Constantly – splicing, terminating.	Handling and use of tools, handling cables.		



Position: Power Cable Technician

	Demand / Action	Check if Performed	Typical Posture Range of Motion (°)	Typical Repetition Rate/Hour	Description & Potential Accommodations *Accommodation options noted in green	
	Neck Movement					
	• Flexion (bent forward)	✓	□ <20° □ 20-45° ☒ >45°	□ <120 □ 120-180 ☒ >180 ☒ STATIC	Flexion for reading maps, procedures, inspecting equipment, con-	
	• Extension (bent backwards)	✓	□ <5° ×>5°	<120 120-180 >180 STATIC	necting equipment, reading equipment displays, splicing. Extension for visual inspection of overhead equipment, working underground	
	• Rotation (twist)	✓	□ <45° × >45°	☐ <120 ☐ 120-180 ☒ >180 ☒ STATIC	(communicate with co-workers above ground, move tools in/out main-	
	• Lateral Flexion (bent to side)	✓	□ <5° ×>5°		tenance hole). Static for up to a few minutes.	
	Back Movement					
	Flexion (bent forward)	✓	□ <20° × 20-45° × >45°	□ <12 × 12-120 × >120 × STATIC	Full range of back flexion may be needed for all tasks. Back bending	
	• Extension (bent backwards)	✓	⊠ <5° □ >5°	□ <12 □ 12-120 □ >120 □ SIAIIC	over 45° required for low level access, static.	
	• Rotation (twist)	✓	□ <15° □ 15-30° ☒ >30°	□ <12 🗵 12-120 □ >120 🗵 STATIC	To reach in confined work areas.	
	• Lateral Flexion (bent sideways)	✓	□ <20° ⊠ 20-45° □ >45°		For visual access to hard to see area.	
	Shoulder Movement (Dominant)					
	• Flexion (raised in front of body)	✓	□ <45° □ 45-90° ☒ >90°		Forward reaching to use tools, reaching upwards at times, may be static	
	• Extension (raised behind body)	✓	□ <5° 🛛 >5°	□ <90 □ 90-150 図 >150 図 STATIC	but typically for <few a="" at="" extension="" minutes="" occurs="" rarely.<="" td="" time.="" tools="" using="" when=""></few>	
Posture	Abduction (raised to side)	✓	□ <45° 🗵 45-90° □ >90°		Abduction varies, may be static but typically for < few minutes at a	
& Joint	Adduction (across body)	✓	□ <45° ⊠ 45-90° □ >90°	□ <90 □ 90-150 ☒ >150 ☒ STATIC	time; occurs more frequently during splicing.	
Position	 Rotation (turned in/out) 	✓	□ <5° 🗵 >5°		Rotation varies and occurs more frequently during splicing.	
	Shoulder Movement (Non-domin	nant)				
	• Flexion (raised in front of body)	✓	□ <45° □ 45-90° ☒ >90°	□ <90 □ 90-150 図 >150 図 STATIC	Forward reaching to use tools, reaching upwards at times, may be static but typically for <few a="" at="" extension="" minutes="" occurs="" rarely.<="" td="" time.="" tools="" using="" when=""></few>	
	• Extension (raised behind body)	✓	□ <5° × >5°	□ <90 □ 90-150 ☑ >150 ☑ STATIC		
	Abduction (raised to side)	✓	□ <45° 🗵 45-90° □ >90°		Abduction varies, may be static but typically for < few minutes at a	
	 Adduction (across body) 	✓	□ <45° × 45-90° □ >90°	□ <90 🗵 90-150 □ >150 □ STATIC	time; occurs more frequently during splicing.	
	• Rotation (turned in/out)	✓	□ <5° × >5°		Rotation varies and occurs more frequently during splicing.	
	Elbow Movement (Dominant)					
	 Pronation/Supination (palm down/up) 	✓	□ □ ⊠ Neutral Partial Full	□ <120 🗵 120-180 🗵 >180 🗵 STATIC		
	 Flexion/Extension (bent/ straight) 	✓	□ □ ⊠ Neutral Partial Full	□ <120 □ 120-180 ⊠ >180 ⊠ STATIC	Static when gripping cable, tools. Forceful exertions required when manually lift/pull cable, using hand tool during splicing.	
	Elbow Movement (Non-dominan	it)			Small range with elbow near 90° when using hand tools, splicing	
	 Pronation/Supination (palm down/up) 	✓	Neutral Partial Full	□ <120 □ 120-180 ⊠ >180 ⊠ STATIC	cables. Full range motion require to reach forward and upwards to reach cables.	
	 Flexion/Extension (bent/straight) 	✓	□ □ ☒ Neutral Partial Full	□ <120 □ 120-180 ⊠ >180 ⊠ STATIC		



Position: Power Cable Technician

	Demand / Action	Check if Performed		Typical Posture Range of Motion (°)		Typical Repetition Rate/Hour	Description & Potential Accommodations *Accommodation options noted in green
	Wrist Movement (Dominant)						
	Flexion/Extension (bent up/down)	✓	☐ Neutral	☐ Partial	X >½ range	□ <900 □ 900-1800 ⊠ >1800 ⊠ STATIC	
Posture & Joint	• Deviations (bent to side)	✓	☐ Neutral	☐ Partial	X >½ range	□ <900 ⊠ 900-1800 □ >1800 □ STATIC	Small range wrist extension (static) may be present while typing depending on desk set up as well as deviation with use of the mouse.
Position	Wrist Movement (Non-dominan	t)					Wrist movement in all directions required for manipulation of tools.
	Flexion/Extension (bent up/down)	✓	☐ Neutral	☐ Partial	X >½ range	□ <900 □ 900-1800 ⊠ >1800 ⊠ STATIC	More repetitive with splicing tasks.
	Deviations (bent to side)	✓	□ Neutral	☐ Partial	X >½ range	□ <900 ⊠ 900-1800 □ >1800 □ STATIC	



Position: Power Cable Technician Date of On-Site Assessment: November 30, 2021

Optional Form

Can be used for Accommodation and Return to Work. To be completed by employee's medical practitioner/ health care provider (do not include diagnosis).
Employee's Name:
Are there any medical/health conditions that account for absence(s) from the workplace or would affect the employee's ability to perform his/her duties? Yes No I If yes, describe the employee's specific work-related limitations and/or restrictions.
Indicate duration of limitation(s) and/or restriction(s) identified above. Permanent \square Temporary \square If temporary, what is the expected duration?
Is employee involved in treatment and/or taking medication that may affect his or her ability to work, including regular attendance, and/or performing certain duties? Yes No Ilf yes, describe the impact (i.e. medication may cause drowsiness, safety risk related to treatment, treatment requires intermittent absences from work.)
Are any further absences from work (e.g. surgery) anticipated at this time? Yes \square No \square If yes, please specify:
When is the date of your next assessment?
Name and address of medical practitioner/health care provider completing this form:



