

CONTACT WITH OVERHEAD POWERLINES

Rise in incidents involving mobile equipment and energized conductors

Mobile equipment contacting overhead powerlines/conductors have become more frequent at mines in British Columbia (BC); 4 (four) high-potential incidents have occurred in the last month. The industry is reminded of the significant dangers of operating mobile equipment near electricity, and the importance of hazard recognition and training to prevent dangerous occurrences involving mobile equipment and electrical installations/conductors. Mines are encouraged to assess their sites for risks associated with electrical contact, including buried electrical cables, to protect the health and safety of mine workers/operators.

For overhead powerline installations, electrical protective devices are primarily designed to protect the installation itself, not individuals who may accidentally be subjected to this type of event. For this reason, the severity of accidental contact between mobile equipment and an energized overhead powerline shall always be regarded and addressed as a dangerous occurrence and the severity of the potential consequences for the incident as high.

Although preventing contact with electricity should be the primary goal, mines need to be prepared to successfully rescue a worker who has contacted an energized powerline. If required, mine rescue teams need to be ready to initiate a safe rescue or if a mine rescue team isn't mandatory, workers need to know what to do in the event of an emergency.

Proper procedures and instructions from certified/qualified persons must be followed in response to an event involving contact with energized powerlines.

*Note: Another electrical-related hazard to consider is **pyrolysis**. Pyrolysis in this case, is caused by electricity flowing through air-inflated rubber tires. When a rubber-tired machine contacts an energized powerline or receives an electrical discharge from lightning, heat and pressure can immediately or progressively increase in the air-filled rubber tires to a point where a tire explosion can occur.*

1: Photo of excavator below powerlines by Darryl Brooks/shutterstock



RECOMMENDED CONTROLS

Distance from Conductors – mines are reminded that no work can be performed, nor equipment, machines, tools or material can be stored within specific minimum distances listed in the *Health, Safety and Reclamation Code for Mines in BC (Code) and M421-16 – Use of Electricity in Mines*.

Emergency Response – In the event of an overhead powerline contact or downed powerline/conductors, workers need to know what to do to protect themselves and others. Mine rescue teams need to be trained to successfully rescue an operator, refer to the Western Canada Mine Rescue Manual for guidance. *Note: Rubber-tired equipment that has contacted energized electrical equipment has the potential for the tires to explode. The machine should be removed (when safe) and isolated at safe distance away from anyone for a period of 24 hours (minimum of 300 m is recommended).*

Risk Assessment – A risk assessment can help to identify electrical installations/conductors that are at risk of contact with mobile equipment and if something changes, a re-assessment should be conducted to ensure any new hazards are captured and mitigated.

Safe Operating Procedure – A safe operating procedure is an excellent administrative control to keep workers safe while working near energized electrical installations/conductors. *Note: Requirements and procedures related to overhead powerlines in mine sites, can be found in Clause 4.3.6 of M421-16 - Use of Electricity in Mines and the supporting Annexes. Further information can be found in the CSA C22.3 No 1 – Overhead Systems.*

Signage and line markings – Where overhead lines cross haul roads, markings and notification signs should be used. *Note: Guidance on the placement and methods for these recommendations can be found in Clause B.3 of Annex B in M421-16 Use of Electricity in Mines.*

Training – Workers must be trained to recognize electrical hazards in their work area, how to work safely around the identified hazards and what to do in the event of an emergency.

KEY REGULATORY REMINDERS

The following Code & CSA requirements are only some of the regulations that must be considered when operating mobile equipment around electrical installations and conductors:

ELECTRICAL-RELATED REGULATORY REMINDERS:

Electrical Rules – Code s.5.1.1: Unless modified by this code, all electrical equipment shall be installed, maintained and operated in accordance with CSA Standard M421 Use of Electricity in Mines, in conjunction with the *Canadian Electrical Code*, as amended from time to time.

Overhead supply line installations – CSA M421-16 4.3.6.1: Electrical supply lines shall be installed in accordance with CSA C22.3 No.1.

Overhead supply line clearances – CSA M421-16 4.3.6.(3-6) and Annex B.3: Minimum overhead clearance is determined by the combined vehicle and load height, the amount of snowpack and the amount by which banked shoulders, crests, or road maintenance increase road elevation. When the minimum clearance does not allow for the movement of special equipment (shovels, drills etc.) the line shall be isolated and grounded.

Distance from High Voltage Conductors – Code s.4.19.8: No work shall be performed, nor shall machinery, equipment, tools, or material be stored within the following specified minimum distances from any high voltage electrical conductor or equipment capable of energizing the material or equipment.

Voltage (phase to phase)	Min. Distance
751 v to 75 kv	3m (10ft)
Over 75 kv to 250 kv	4.6m (15ft)
Over 250 kv to 550 kv	6m (20ft)

Contact with an Energized Electrical Conductor – Code s.4.19.7: Hoisting equipment, which has been in contact with an energized electrical conductor or struck by lightning shall be removed from service and not returned until safe use has been assured by a professional engineer.

GENERAL REGULATORY REMINDERS:

Health and Safety Program – Code s.1.6.9 (1): The manager shall develop a mine health and safety program which includes; (c) safe working procedures on a departmental basis

Workplace Conditions – Code s.1.9.1: The manager shall (1) take all reasonable and practicable measures to ensure that the workplace is free of potentially hazardous agents and conditions which could adversely affect the health, safety, or well-being of the workers.

Training – Code s.1.11.1: The manager shall ensure that workers are adequately trained to do their job or are working under the guidance of someone who has competency both in the job and in giving instruction, and ensure that all employees receive thorough orientation and basic instruction in safe work practices