

## Remote-Controlled Mobile Equipment in Mines

In December 2023, while performing underground remote-controlled operations, a worker was struck and killed by the remote-controlled mobile equipment they were operating. Similarly, serious incidents have occurred in other mines, where operators using remote-control systems were struck by the equipment they were controlling or by other equipment in the area. These incidents serve as a reminder of the serious hazards posed by remotely controlled equipment in mines.

### Key Takeaways

- Ensure appropriate **safe operating procedures, training, and supervision** are in place.
- Stop and perform a **risk assessment** when operations are new, change, or don't go as planned.
- Workers should always operate remote equipment outside of the **swing path or danger zone**.
- Troubleshooting should always be done with the **equipment de-energized and locked out**.
- Workers must maintain strict adherence to **operational protocols**.
- Regularly test **emergency shutoffs and tilt switches** to ensure they function as intended.
- Consider **increased levels of controls**, for example, exclusion guarding, interlocked fencing, light curtains, barriers, or separated control stations to keep workers away from the remotely controlled equipment while in operation.

### Health, Safety and Reclamation Code for Mines in BC (HSRC)

The following obligations are set out in the *Mines Act* and HSRC:

**Training - 1.11.1** - The manager shall ensure that:

- 1) 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
- 2) Ensure that all employees receive **thorough orientation and basic instruction** in safe work practices.

**Remote Control Operations - 6.18.1** - Before any equipment that can be moved by remote control is introduced at a mine, the manager shall:

- 1) Provide, and have **approved by the chief inspector**, a plan showing that the system, device or controller is capable of operating only the specific piece of equipment it is designed to operate.
- 2) Ensure that other forms of energy are **not capable of rendering the equipment inoperative**, causing uncontrolled activation or operation of the equipment.

- 3) The controller be equipped with a lock-out device that renders it inoperative when not in use.
- 4) Ensure the transmitter is equipped with an **emergency stop mechanism** that when activated applies the brakes and shuts down the equipment.
- 5) For mobile equipment, if the transmitter is hand held, is equipped with a device that automatically works in the same manner as the **emergency stop mechanism** if the transmitter is tilted more than **15% (8.5 degrees) from the level position**.
- 6) For fixed or tracked equipment, a device which causes the machine to cease operating if controls are returned to the **neutral position**.

**Remote Operating Procedures – 6.18.2** – Where remote-controlled equipment is to be used at a mine, the manager shall have established operating procedures which shall include:

- 1) **Safe location for the operator**,
- 2) Allows for a **clear view of the working area**,
- 3) **Safe interaction** between mechanical and remotely controlled equipment,
- 4) A method for **recovering equipment** which has broken down, and
- 5) If applicable, procedures to ensure **contiguous operations do not interfere with remote signals**.

## Chief Inspector Remote Control Operations Plan Review Process

Pursuant to section 6.18.1 (1) of the HSRC, the mine manager must submit a plan to the Chief Inspector of Mines for review and approval. To ensure a timely response, managers must:

- Submit the plan to the chief inspector for approval to [mines.inquiries@gov.bc.ca](mailto:mines.inquiries@gov.bc.ca).
- For remote-controlled operations, address all points in sections 6.18.1 and 6.18.2.
- For emerging technology, address all points in sections 6.18.3 and 6.18.4.
- Respond to comments and questions received by MCM subject matter experts.
- Once approved, adhere to all operational requirements outlined in the Chief Inspector of Mines approval letter.