

**Audit of Mobile Equipment Cab Safety**  
**Terms of Reference**  
**April 2020**  
(Addendum added November 2021)

## **Background Information**

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Mining operations use many types of mobile equipment, including excavators, haul trucks, loaders, and graders. This equipment is essential to most types and scales of mining operations. Despite the diversity of mobile equipment, common globally recognized manufacturers, such as Komatsu, Caterpillar, Hitachi and John Deere, dominate the mining market in British Columbia.

All mobile equipment on a mine site directly operated by a worker has an operator cab. The cab refers broadly to the station from which the worker controls the travel and work functions of the machine, including any physical enclosure that may surround it. Cabs can take different forms, depending on the type of equipment.

Working in a cab comes with many health and safety hazards, including (but not limited to): machine roll and tip over, falling objects, musculoskeletal impacts and air contaminants. These hazards, in turn, require appropriate controls.

The Health, Safety and Reclamation Code for Mines in British Columbia (the Code) prescribes the technical requirements and controls to ensure the health and safety of workers in cabs. Inspectors in the Ministry of Energy, Mines and Petroleum Resources (the Ministry) assess the mining sector's compliance against the Code.

Since 2007, there have been five fatalities in the B.C. mining sector involving roll-over or tip-over events – four involving excavators and one involving a bulldozer. Additionally, the mining sector reports many dangerous occurrences involving mobile equipment operators to the Ministry each year. These events point to potential, unmitigated risks to worker health and safety in the use of mobile equipment, as well as potential opportunities for improvement.

## **Objective**

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To assess whether the Ministry's regulatory requirements and associated Ministry actions, specific to access/egress and alternate escape, drowning hazards, and operator training and awareness, are protecting workers in mobile equipment cabs at mines from undue risk to their health and safety.

## **Scope & Approach**

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Currently, the Code regulates the following aspects of mobile equipment cabs, either directly or indirectly:

- Seatbelt

- Seat
- Windows
- Roll Over Protective Structures (ROPS) / Falling Object Protective Structures (FOPS)
- Access, egress and alternate escape
- Drowning hazards
- Operator training and awareness
- Ergonomics
- Air quality
- Thermal environment

During the planning phase, the audit team assessed and prioritized these areas for consideration in the audit based on key factors, such as risk, significance and value. The audit team grouped these areas broadly into “safety” and “health” categories to facilitate discussion and the scoping assessment.

As a result of the scoping process, three subtopics will continue to the examination phase of the audit: access/egress and alternate escape, drowning hazards, and operator training and awareness. The audit team will further examine these areas using a variety of data sources and analytical techniques along the following lines of inquiry:

- Industry outcomes/results, including a review of industry compliance and past serious accidents/incidents;
- Ministry actions, including compliance, enforcement and education/outreach activities; and
- Existing requirements, including an evaluation of clarity, enforceability and alignment with regulatory and technical best practice.

## Timeframe & Reporting

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The audit examination is scheduled to commence in April 2020, during which time there will be ongoing communication with stakeholders and partners. The presentation of findings and conclusions, including the publication of a final public report, is expected to occur in fall 2020.

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**Approved by:**



April 9, 2020

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Karina Sangha  
Director, Mine Audits

Date

## ADDENDUM TO THE TERMS OF REFERENCE

Informed by learnings during the audit, the objective for this audit has been revised. Whereas the previous objective focused broadly on the protection of mobile equipment operators on mines, the updated objective focuses more narrowly on the operation of mobile equipment near water. This updated objective allows for a more meaningful, detailed examination of the original audit scope, contributing to more targeted audit findings and recommendations for the Ministry.

### Objective

Updated	Previous
To determine whether the Ministry's regulatory requirements and actions protect workers from undue risks to their health and safety when operating mobile equipment near water.	To assess whether the Ministry's regulatory requirements and associated Ministry actions, specific to access/egress and alternate escape, drowning hazards, and operator training and awareness, are protecting workers in mobile equipment cabs at mines from undue risk to their health and safety.

Due to this update to the objective, the audit title has also been revised as follows:

### Title

Updated	Previous
Worker Protection in Mobile Equipment near Water	Audit of Mobile Equipment Cab Safety

The audit scope remains unchanged. As indicated in the original Terms of Reference for this audit, the audit is focused on the following sections of the Code:

- Drowning Hazard (section 3.3.3)
- Training (sections 1.11.1 and 1.11.2)
- Access to Work Areas (section 4.1.4)

The audit is currently in the reporting phase, with a targeted completion of Spring 2022.




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 Karina Sangha, Chief Auditor

November 9, 2021

Date