



REMOTELY OPERATED LHD – DANGEROUS OCCURRENCES

INCIDENTS

On two occasions in an underground metalliferous mine a remotely controlled load-haul dump machine coasted backward downhill towards the operator and collided against a sidewall. The operator avoided injury each time by taking refuge in a sidewall 'safety recess' specifically provided for the purpose.

CAUSES

Thorough examination and testing of the machine and its controls failed to determine a specific cause of each incident. However, the investigation did reveal the following circumstances that would produce the same effect, should the machine operator conduct the transition from the manual to remote operating mode in a particular manner:

- If the machine's manual transmission lever was left in either the 'forward' or 'reverse' position and not returned to 'neutral', subsequent remote operation of the machine was possible only in that direction. Consequentially, a loader driven into an open stope could not be reversed out, and the transmission of any machine operating on an incline would neutralise, allowing the vehicle to roll freely downhill.
- If the manual park-brake control of the machine was not applied prior to establishing remote operation, an open-circuit fault occurring in parts of the vehicle's wiring resulted in total loss of braking, and again any machine operating on an incline could 'runaway'.

COMMENTS AND PREVENTATIVE ACTION

The potential of mobile equipment that can 'runaway' in the close confines of an underground mine is apparent, and the abovementioned incidents provide a stark reminder for operators of remotely controlled machines to do so only from a safe position, particularly when operating on a gradient. The process of retrieving a loader 'stranded' in an open-stope also presents its problems.

Considering the number of times that a loader operator may undertake the transition between manual and remote operation each shift, the possibility of an operator inadvertently not engaging the machine's transmission or park-brake controls before alighting is both likely and foreseeable. Had the machine's control system been properly assessed for risks, the inherent design failings and non-compliance with AS4240 should have been identified and provision made for the resultant hazards to be effectively safeguarded, by installing protective interlocks.

Employers, manufacturers and suppliers each have a statutory obligation to ensure that hazards associated with plant are identified, and that all practicable measures are taken to reduce risks to employees.

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