

Safety Alert

Date: December 2023

Worker trapped under lowered canopy

This safety alert provides safety advice for the NSW mining industry.

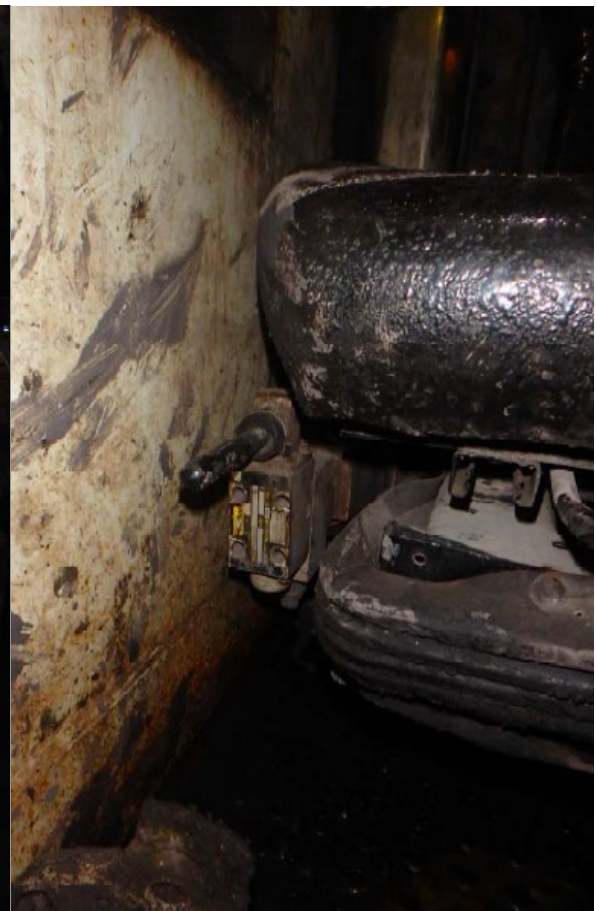
Issue

A fitter's body became trapped between the canopy and the dashboard of a broken-down Jug-A-0 load haul dump (LHD) on 18 November 2023. The machine was fitted with an adjustable height canopy, and although not significantly injured, the fitter was unable to get free.

Figure 1: LHD with canopy and access cover open



Figure 2: Position of canopy control lever



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Circumstances

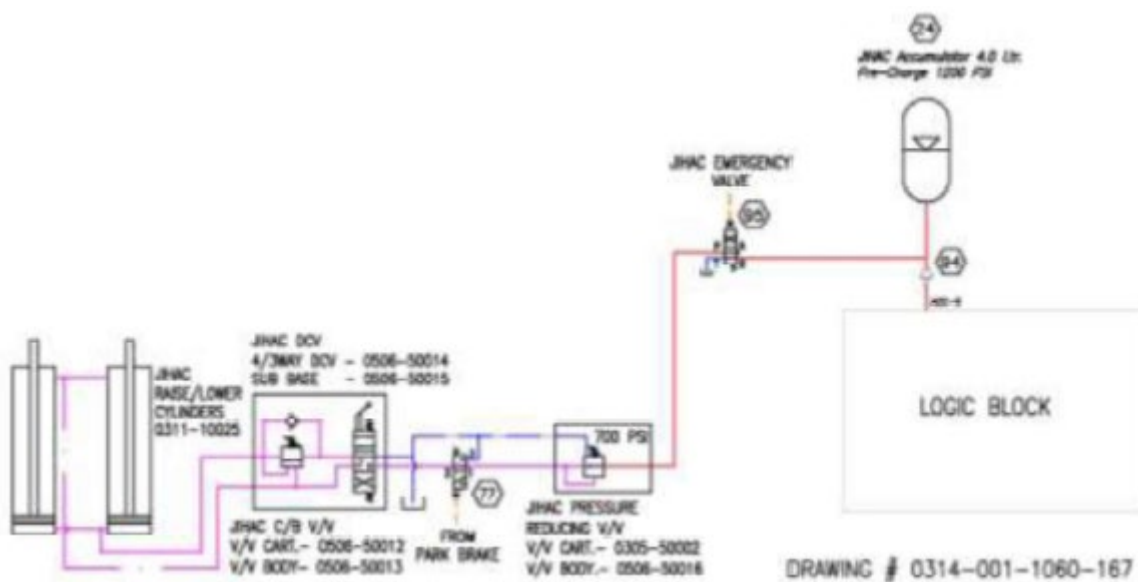
The LHD had broken down on a longwall install face, and the fitter was investigating an air leak in the safety circuit. The fitter was in the LHD cabin leaning out over the dashboard to open a cover on top of the machine when the fitter's foot made contact with the JIHAC control lever that was mounted on the right-hand side of the operator's seat. The fitter felt the canopy and moved, releasing the canopy lever. The fitter was unable to see or reach the release lever and called for the assistance of another operator, who reached into the cabin and raised the canopy. The fitter suffered light bruising.

Investigation

The LHD was fitted with JIHAC canopy, that also adjusted the seat height, to allow the machine to reduce overall height from 2100 mm to 1700 mm to pass under low infrastructure. The canopy was fitted with an interlock so it could only be adjusted when the park brake was activated. The pneumatic system associated with the canopy also had an audible warning, as well as a cylinder lock to limit gear selection to first gear.

The original equipment manufacturer (OEM) determined a scenario existed where if the machine was fully articulated to the left and the canopy was fully lowered, the operator was unable to exit the cabin. To address this issue, the OEM installed an accumulator in the canopy circuit to allow it to raise and lower even with the engine stopped allowing the operator to exit over the dashboard or door.

Figure 3: JIHAC emergency raise system with accumulator



The control lever for the JIHAC canopy was beside the operator's seat but had no secondary function to prevent it from operating when knocked.

When the isolation handle for the machine was turned off, all pressurised hydraulic oil in the accumulator was dumped to tank.

The JIHAC system was not the only height adjustable canopy system for underground LHDs.

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Recommendations

Equipment manufacturers who use adjustable height canopies should:

- review operation and maintenance risk assessment(s), as well as design failure mode effect analysis (DFMEA), in relation to the following:
 - operator envelope requirements for seat height and pedal position
 - safe access and egress requirements for the machine, including when the canopy is fully lowered and the machine articulated to the left, in the event of machine failure
 - power on maintenance task requirements.
- consider the use of alternative controls to limit the minimum height of the canopy, and method of escape when the canopy is lowered. These may include:
 - hard stops to eliminate potential crush points
 - guarding of controls
 - secondary control requirement / two-handed control for raise lower function to prevent inadvertent use
 - mechanical detent / locking of the canopy control lever to prevent inadvertent operation
 - alternative egress methods such as sectional doors.
- review the operator and maintainer training documents in relation to workers keeping their body wholly within the operator's cabin envelope
- undertake change management for any design, engineering, procedural, modifications or component changes
- contact all known users of their LHDs with adjustable height canopies to:
 - make them aware of this incident
 - identify any additional controls to be implemented
 - provide information and training relating to any identified controls to be implemented.

Mine operators should:

- review site operation and maintenance risk assessments in relation to:
 - safe access and egress from LHD's fitted with adjustable height canopies
 - functional requirements for the LHD including minimum operational clearance
 - operator envelope requirements for seat height and pedal position where the seat raises and lowers with the canopy
- consider installing mechanical stops as a control to prevent the canopy fully lowering
- review operator and maintenance training requirements, including keeping wholly within the cabin.

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Note: Please ensure all relevant people in your organisation receive a copy of this safety alert and are informed of its content and recommendations. This safety alert should be processed in a systematic manner through the mine’s information and communication process. It should also be placed on the mine’s common area, such as your notice board where appropriate.

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Document control	
CM9 reference	RDOC23/270304
Mine safety reference	SA23-05
Date published	11 December 2023
Authorised by	Chief Inspector Office of the Chief Inspector