Department of Industry
Resources & Energy

Mine Safety

SAFETY ALERT

Workers hurt when pressurised fluid escapes

INCIDENT

While carrying out weekend maintenance activities on an excavator in October, three workers were exposed to a high pressure fluid release ending in two people being taken to hospital by ambulance.

CIRCUMSTANCES

Maintenance activities on the excavator were being carried out by a work group of five people on 31 October 2015. These workers were a leading hand, a tradesperson and three apprentices. The leading hand had to leave the worksite, giving the apprentices certain tasks to carry out in his absence. Maintenance activities continued under the guidance of the tradesman. The excavator was isolated using the main single point isolation valve.

One task was the replacement of a check valve in the excavator track tensioning circuit. It was assumed by the workers that the hydraulic circuit was isolated and all energy dissipated. Upon unscrewing the fitting on the check valve there was a release

of high pressure hydraulic fluid. The release of high pressures hydraulic fluid resulted in injuries to three people with two being taken to hospital for exploratory surgery.

INVESTIGATION

The investigation identified:

- The check valve was on the hydraulic track adjuster circuit. The circuit was isolated, by the main isolation valve, however the stored energy **was not** dissipated. The circuit has three accumulators with up to 60 litres total capacity of pressurised fluid.
- The excavator's manufacturer procedure required the accumulators to be drained. They were not drained.
- The task of changing the check valve was given to two apprentices.
- There was no hydraulic circuit diagram available on the job.
- The leading hand was not on the site at the time and the tradesperson was not aware of the jobs given to the two apprentices, even though he was within close proximity to them.

RECOMMENDATIONS

Mine operators are reminded that effective isolation and energy dissipation is a critical risk control when working on high pressure fluid systems. It requires **all** of the follow steps **before** working on fluid systems:

1) Isolation of energy
2) Locking of the isolation point
3) Energy dissipation of all circuits on the downside of the isolation valve
4) Verification (test for dead) that there is no residual pressure in the circuit.

Mine operators should:

1) Remind tradespeople of the potential for residual stored energy from accumulators and valves. Tradespeople should always dissipate the energy and verify the circuit is not pressurised before attempting to work on any fluid systems.
2) Where possible install pressure gauges in all hydraulic circuits to assist in verification that all stored hydraulic energy is dissipated.
3) Always review the manufacturer's information regarding the safe method of repair or maintenance.
4) Ensure that tradespeople fully understand the procedure for the task and have schematics/piping diagrams readily at hand.
5) Verify competencies for the task.
6) At all times provide adequate mechanical supervision of apprentices, when carrying out maintenance activities.

Further Information

SB13-01 Fluid injections result in surgery

SB12-02 Fluid power isolation failures

SA16-06 Fatal high pressure hydraulic injection

SA06-04 Hydraulic injection near miss

MDG 41, Fluid power system safety

MDG 40, Hazardous energy control

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 notice board.

Issued by

Gary Parker
Chief Inspector of Mines
Appointed pursuant to Work Health & Safety (Mines) Act 2013

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