

SAFETY BULLETIN

Fluid injections result in surgery

INCIDENT

There have been three incidents this year in which workers were injured when they were injected with pressurised hydraulic fluid resulting in surgery to drain the injected fluid and repair damaged tissue.

All three incidents required extensive rehabilitation.

CIRCUMSTANCES

First incident

The worker was operating the right hand inner bolting rig on a continuous miner. He was lowering the bolting head to the floor after installing a roof bolt and went to remove the drill dolly (bolt tightening device) from the drill head chuck. As he reached down to remove the dolly, a hydraulic hose burst, injecting fluid into his right forearm. (see figure one)

The injury required surgery from the wrist to the elbow.

Second incident

A fitter was attempting to identify a blown hydraulic hose on an air track bolter. The fitter was moving hoses out of the way with his left hand and at the same time operating a hydraulic lever with his right hand. While doing this he suffered an oil injection injury to his left hand ring finger. (see figure two)

The injury required surgery from the finger to the base of the wrist.

Third incident

While investigating a hydraulic leak from a Quick Detach System (QDS) hose on a load haul dump (LHD) vehicle, a worker suffered a hydraulic oil injection injury to the palm of his left hand when the QDS system was inadvertently pressurised by the LHD operator.

The injury required surgery four times to the worker's palm and once to the back of his hand.

INVESTIGATION

An investigation indicated the contributing factors were:

- External wear and abrasion on the exterior case of the hoses
- Corrosion

- Bend radius insufficient
- Poor hose inspection
- No scheduled change out program implemented
- Hydraulic pressure control, identification and testing not to original equipment manufacturer requirements
- Management of isolation and identification of failed components
- Human error



Figure one – Hose failure through external wear and abrasion



Figure two – Hose failure through corrosion and too tight bend radius

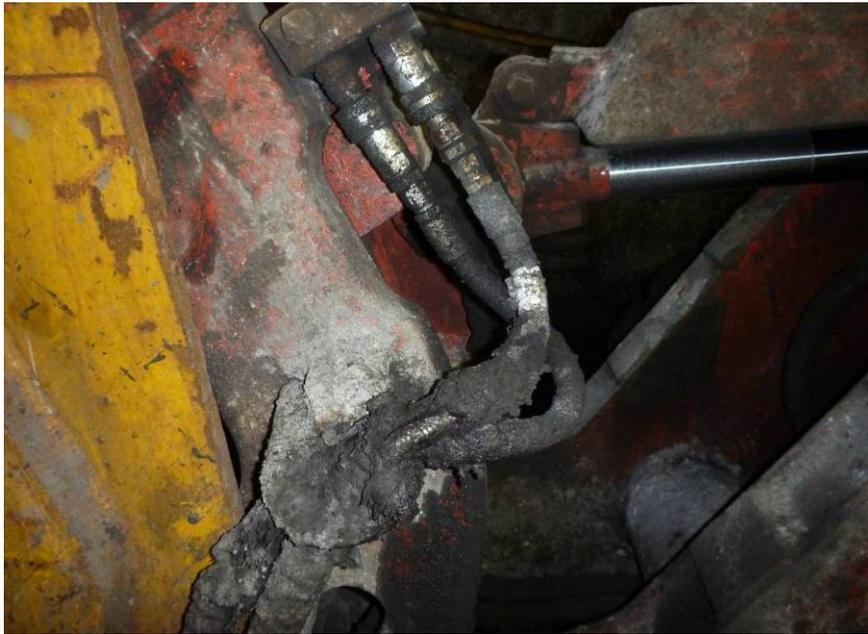


Figure three – External wear and abrasion

RECOMMENDATIONS

An escape of pressurised fluid in the workplace represents a failure of a risk control to a major hazard (pressurised fluids) that may cause serious or fatal injury.

MDG 41, *Guideline for fluid power system safety at mines*, provides guidance in how to control the major hazard of pressurised fluids. Note: The department is initiating a review of MDG 41 this year.

With consideration to the recommendations in MDG 41 and for areas where a worker may be exposed to the hazard, mines should –

1. Implement a hydraulic hose management system that includes:
 - a. reviewing hose layout, routing, protection and support methods.
 - b. an inspection and replacement schedule for hydraulic hoses to determine frequency and identifying their condition for replacement.
 - c. a Trigger Action Response Program (TARP) to identify when to change hydraulic hoses based on hose condition.
 - d. reviewing maintenance schedules and checking lists in relation to the testing and recording of hydraulic system condition against original equipment manufacturer specifications.
2. Review isolation and safe work procedures relating to identifying and changing out unserviceable hydraulic hoses.
3. Ensure workers using hydraulic systems are trained in these areas for each item of hydraulic plant.

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.

Signed

A handwritten signature in black ink, appearing to read 'Rob Regan', written in a cursive style.

**Rob Regan
DIRECTOR
MINE SAFETY OPERATIONS BRANCH
NSW TRADE & INVESTMENT**

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The information contained in this publication is based on knowledge and understanding at the time of writing. (May 2013) However, because of advances in knowledge, users are reminded of the need to ensure that information on which they rely is up to date and to check the currency of the information with the appropriate officer of the NSW Department of Trade and Investment, Regional Infrastructure and Services or the user's independent advisor.