Trade & Investment Mine Safety

SAFETY BULLETIN

Fluid power – isolation failures

Several people have been injured while working on pressurised fluid power systems such as compressed air, hydraulic, fire water and pump lines in recent months.

Each incident can be attributed to a failure to implement isolation procedures.

INCIDENTS

A number of incidents involved workers uncoupling connectors from compressed air lines, some of which were 50mm (2") lines.

- In two incidents workers sustained life-threatening facial injuries.
- In another, workers were injured when a 50mm hose whipped around and struck them.
- In two other incidents, failure to isolate caused a high potential for injury

CIRCUMSTANCES

All incidents have similar causal factors:

1. The mines' isolation procedures were not followed:
   - isolate, lock, depressurise, verify
2. Workers assumed that:
   - the line was disconnected, or
   - the line was not pressurised, or
   - the equipment was not in service
3. Circumstances had changed from the time the workers were given verbal instruction to carry out the task. e.g. in one incident workers checked the monorail connection at the pump station and found it disconnected, however, unknowingly the compressed air line was connected at a different location.
4. There were no means of identifying if the line was still pressurised.
5. In one incident there was no specific procedure for the task being performed. The mine was relying on general isolation policy, training on the equipment and the workers' experience.

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6. Workers did not believe that the compressed air system was dangerous as it was operating at 100 psi / 700 kPa / 7 Bar.
7. Isolation valves were leaking, which led to the recharging of the compressed air line.

Note: The mines where these incidents occurred had good isolation procedures that were well known and supported. There appears to be no obvious reason for the failures except that the known systems were not followed.
People who work on pressurised systems should discuss this type of failure with their colleagues. Ask, 'Do we know the severity of injuries that can occur? What can we do to avoid injury? What gear do we need to do the work safely?'

RECOMMENDATIONS

Workers should:

1. Always assume the circuit to be worked on is pressurised and dangerous.
2. Always follow the mines' isolation process before working on plant, even if a hose is cut in half. If in doubt, discuss with other workers and your supervisor.
3. Always:

   (a) isolate
   - the correct valve
   - the power supply

   (b) lock
   - the isolation valve in the closed position
   - with personal locks at the isolation point

   (c) depressurise the energy source

   (d) lock the bleed valve in the open position

   (e) verify effective isolation (test for dead)
   - prove that the line is depressurised
   - check the gauge is at zero
   - check fluid no longer passes through the bleed valve

Mines should:

4. Provide multiple pressure indicators on long lines at strategic locations, particularly where sections of hose range can be isolated from the remainder of the line.

5. At a change of shift:
    - follow the mines' isolation procedures, remove your personal lock and place an '*Out of Service Lock and Tag'* at the isolation point with a description of the work task that is not completed
    - record the status of the work being carried out
    - verbally report to the oncoming shift personnel if possible; and as a minimum, verbally report the status to the immediate supervisor
6. Review tasks being performed (identify the hazards) and:
    - write specific procedures for tasks, including the isolation process
    - include controls that assist in minimising human error
7. Correctly identify and label pressurised lines and hoses where practical.

Further guidance is available in:

- MDG 40 Guideline for hazardous energy control (Isolation or Treatment)
- MDG 41 Guideline for fluid power system safety at mines
- AS 4024.1603 Safety of machinery - Prevention of unexpected start-up
- National code of practice for plant – Managing the risks of plant in the workplace

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

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DIRECTOR
MINE SAFETY OPERATIONS
NSW TRADE & INVESTMENT

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