

Safety Bulletin

Date: May 2023

Hose ball valves injure mine workers

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

Issue

There have been many injuries resulting from energised hoses fitted with lever handle ball valves on the discharge end. A common cause of injuries have been a worker moving a hose while not in direct control of the ball valve. The handle lever catches on something and the hose is inadvertently activated, with the resulting jet of pressurised fluid (water, air, etc) whipping the hose around and the valve and/or hose hitting a worker.

There have been 2 recent incidents with the potential for serious outcomes that have prompted the NSW Resources Regulator to highlight this hazard.

Figure 1: Ball valve with lever handle fitted to the free end of a hose at a mine



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Circumstances

Recent injury 1: A deputy was filling a load haul dump (LHD) with water on 20 April 2023. While passing the hose across the LHD, the handle of the ball valve attached to the free end of the hose activated causing the hose and valve to flick back striking the deputy's nose and glasses. The deputy suffered a laceration to the nose.

Recent injury 2: A worker was washing out a concrete kibble using a hose fitted with a ball valve on the free end on 27 April 2023. The worker turned the hose off at the ball valve, placed it on the kibble, and while climbing onto the kibble, the hose moved, activating the ball valve. The hose and valve flung back cutting the person's forearm.

Figure 2 and 3: Ball valve associated with recent injury 2



Investigation

Ball valves have a lever-style handle that requires only 90 degrees of rotation to achieve full flow. In general, ball valves are designed for being fixed to solidly mounted pipework to allow quick activation, such as being attached to the pipe ranges for water and compressed air that feed into hoses.

Some ball valves are fitted with a slider lock, however, this is a gravity slide and the orientation of the valve may render this control ineffective.

Workers are not isolating hoses at the fixed valve on the pipe range, and dissipating pressure from the hose. Instead, they are turning off the valve at the discharge end of the hose, and leaving the hoses charged with pressure.

A charged hose is a source of stored energy. Opening the valve releases stored energy in the form of a fluid jet (air, water, etc) that results in a force on the valve in the opposite direction to the flow. If the valve is not restrained, it may kick back and whip around.

In both recent incidents, the injured workers moved the hoses, or by their actions caused the hoses to move resulting in the handles becoming caught on a fixed object, rotating and activating the flow of water.

Both workers suffered impact injuries with lacerations, and in the first case these were facial injuries.

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Recommendations

Mines and coal handling facilities should:

- risk assess the use of ball valves attached to the free end of hoses as a known hazard that may result in injury
- review alternatives to the use of ball valves attached to the free end of hoses that are fit for purpose
- retrain supervisors and workers in hazards associated with hose whip from inadvertent activation of a hose
- ensure workers check the operating condition and function of the hose valves before use
- depressurise hoses when not in use.

If this is not practicable, as a minimum, hoses should be fitted with nozzles that will not activate without direct involvement by a worker such as:

- two-handed controls such as twisting nozzles similar to fire hoses
- trigger handles
- spring return handles
- handles that positively lock in the off position
- handles that require multiple twists/turns of the valve body/handle to liberate full flow, such as gate valves.

Figure 4: Potential alternatives to ball valves



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