Resources Regulator
Department of Regional NSW

Safety Alert

Date: December 2023

Potential heating of acetylene cylinder raises potential for underground explosion

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

Issue

While conducting hot work, an orange glow was seen to be coming from the bottom of an acetylene cylinder.

After initial cooling of the cylinder, mine workers loaded it on the back of a light vehicle and transported it to the surface without adequate considerations to the hazards.

Figure 1: Approximate position of workers with oxy/acetylene in stillage in the background

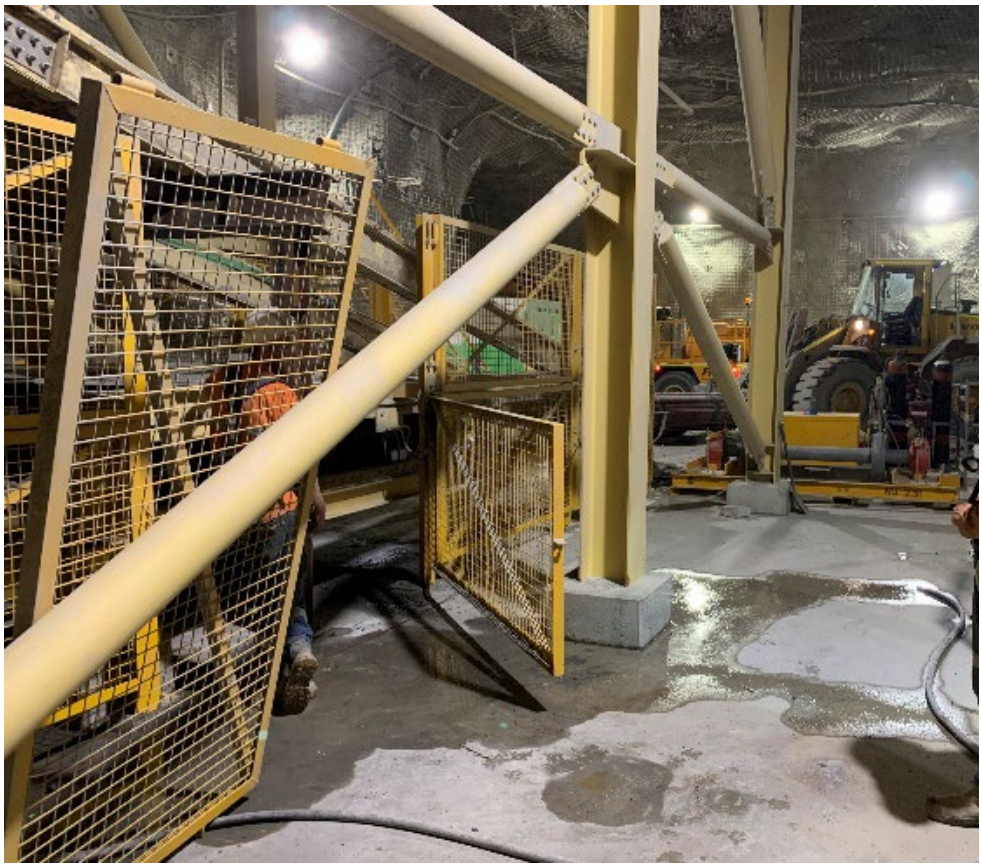
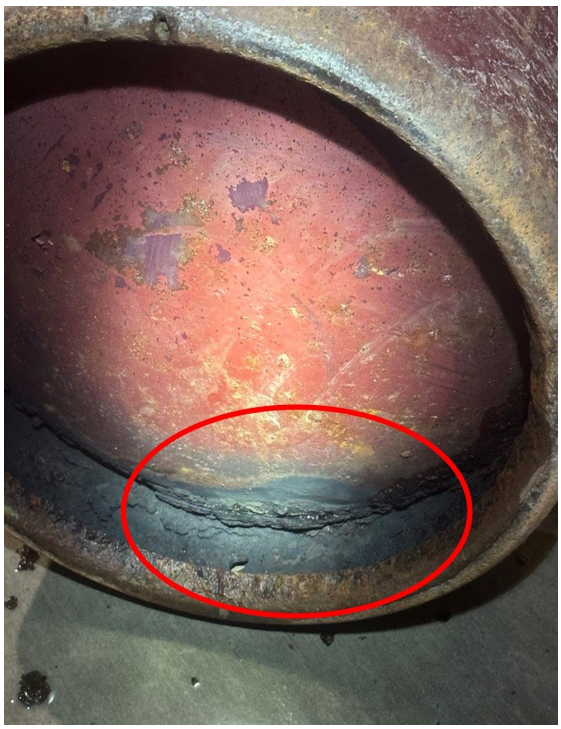


Figure 2: Underside of acetylene cylinder with heat affected area



Circumstances

Hot work was being carried out underground on ore handling infrastructure during a night shift. A designated spotter noticed an orange glow coming from the bottom of an acetylene cylinder and immediately alerted the work crew.

The hot work was immediately stopped, and water was applied to the cylinder to cool it down. The cylinder valve was closed and the cylinder was monitored for about one hour.

The workers loaded the cylinder on the back of a light vehicle and transported it to the surface, where it was quarantined. (Note this is not recommended practice when dealing with an acetylene incident).

A visual inspection of the underside of the cylinder identified what appeared to be localised corrosion at the heat-affected area, and this may have contributed to a possible leak.

The mine took initial immediate actions:

1. All acetylene cylinders on site were inspected for structural integrity and corrosion.
2. Warehouse staff began an immediate review of the Quality Assurance (QA)/Quality Control (QC) process with the vendor.

The trigger for this heating event remains uncertain at the time of writing.

No-one was injured in the incident, but it raised the serious potential for an explosion underground. The mine immediately identified 2 areas where the emergency procedure was not followed:

1. An emergency response was not called.
2. The acetylene cylinder safe use standard stand-off time was not complied with.

The mine is continuing an investigation into the incident and the cause of the heating.

Recommendations

Mine operators should consider the following:

- Inspect all stock of acetylene cylinders across sites to ensure there is no corrosion and the structural integrity around the base of cylinders is free of visual mechanical defects.
- Contact the suppliers of gases and verifying the QA/QC process, including inspecting and testing cylinders, marking and stamping from testing authorities and labelling of those cylinders is known.
- Ensure appropriate handling and storage of cylinders (both in use and off use) in purpose-built stillage in clean and ideally dry conditions.
- Ensure an emergency response plan covers a hazardous materials incident response, including gas cylinders and the subsequent explosion risk. The response plan should outline the steps to be taken in the event of a gas incident. Implementation should include training for response personnel and awareness and familiarity with this plan across all areas and workers where gases are used.
- Ensure oxy/fuel equipment is maintained in good condition and that flash back arrestors are installed at both the cylinder and handpiece ends.
- Ensure workers are competent in the safe use, handling and storage of oxy/fuel equipment including cylinders.

More detailed information is available at:

- TRG Hot work (cutting and welding) at mines and petroleum sites
- Guidelines for gas cylinder safety
- Operational guidelines for acetylene cylinder incidents

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

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