



Mines Safety Significant Incident Report No. 165

Sudden depressurisation of an ANFO charge-up kettle

Summary of incident

Shortly after a Normet Charmec ANFO charge-up kettle was pressurised, the pressure (sealing) plate ejected from the throat of the kettle (Figure 1). The plate was restrained by a stainless steel mesh screen bolted to the top of the kettle. However, an operator standing nearby received facial and eye injuries when ANFO sprayed into his face as a result of the sudden pressure release. The operator's hardhat and safety glasses were blown off.

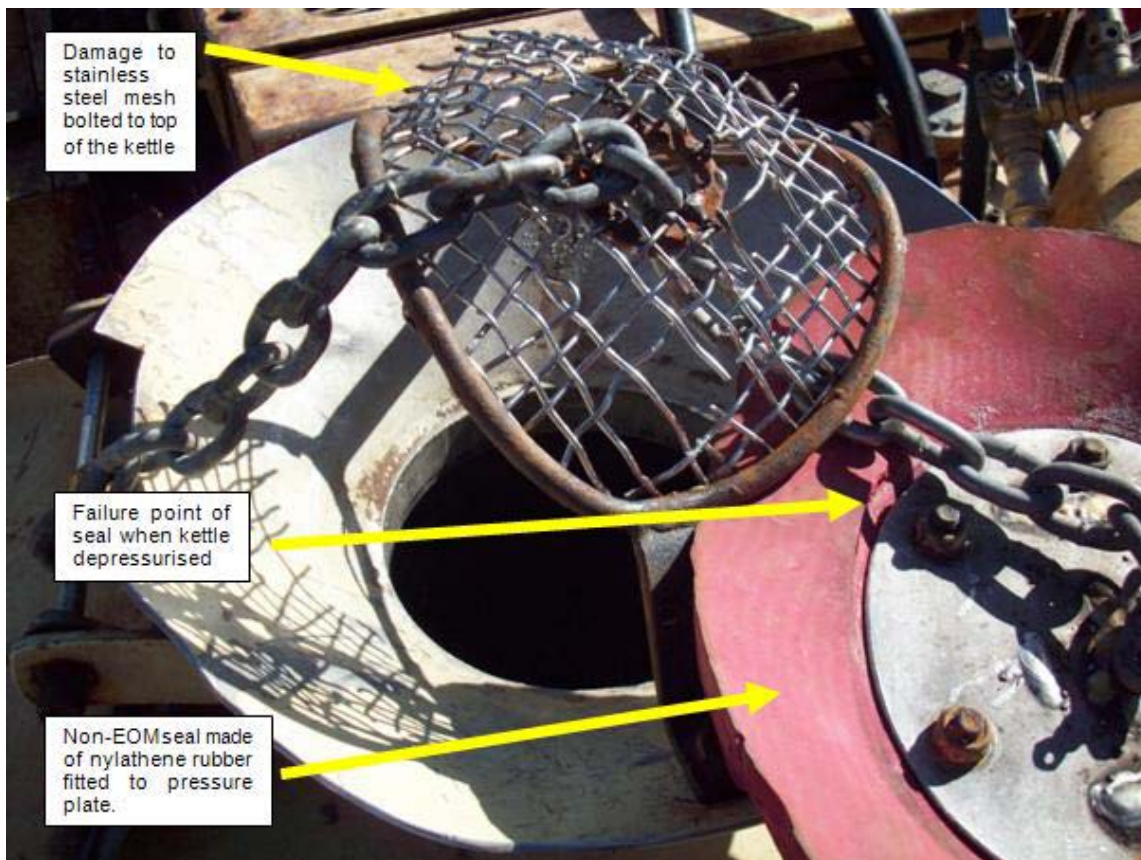


Figure 1 The Normet Charmec ANFO charge-up kettle following the incident

Probable causes

The Normet Charmec ANFO charge-up kettle involved in the incident had a slightly oval-shaped pressure plate to seal and pressurise the vessel (Figure 2). The plate was slightly wider than the throat opening but could be removed when placed vertically along the major axis of the opening. The kettle could be pressurised when the plate seated inside the throat.

Note: Not all ANFO charge-up kettles have this sealing mechanism (e.g. some use a cone-shaped plug).

The pressure plate was originally fitted by the original equipment manufacturer (OEM) with a seal about 3 mm thick and positioned about 10 mm outside the diameter of the plate. This seal allowed the kettle to be pressurised.

The investigation revealed the OEM pressure plate seal (Figure 2) required regular replacement to ensure an effective seal of the kettle. However, the service sheets for the kettle did not specify any requirement to inspect the pressure plate seal.

Some time before the incident, the OEM seal on the pressure plate had been removed and replaced with a fabricated non-OEM seal made of nylathene rubber, about 10 mm thick and extending about 100 mm beyond the diameter of the pressure plate (Figure 1).

Normet provides a handle on the pressure plate and a pivoting screen that can be lifted out of the way when pressurising the kettle. However, a chain had been connected to the top of the pressure plate and pulled through an opening in the fixed mesh screen to position the pressure plate. This modification made it difficult to accurately locate the pressure plate in the throat of the kettle before pressurising it.

It appears that when the kettle was being pressurised, the pressure plate was not located in its correct position inside the throat of the kettle. The oversized pressure plate seal allowed a “false” pressure seal to develop against a section of the nylathene rubber but the kettle suddenly depressurised when the nylathene rubber seal failed.

The investigation did not reveal any damage to the kettle, its regulators or pressure relief valves prior to the incident. The compressed air pressure at the mine was 105 psi (i.e. 724 kpa).

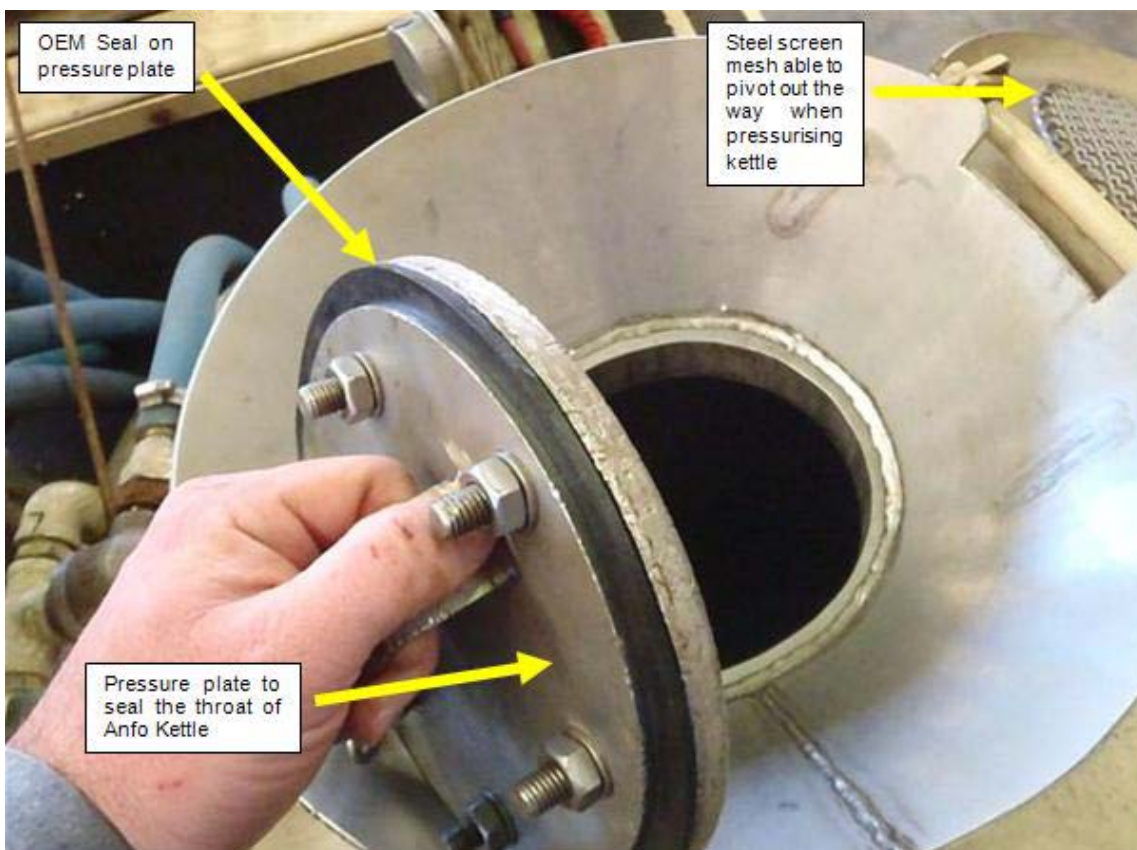


Figure 2 A Normet Charmec ANFO charge-up kettle complying with OEM requirements

Action required

To avoid a recurrence of this type of incident for Normet Charmec ANFO charge-up kettles, mine management must ensure:

- relevant procedures are in place to check that the pressure plate, seal and mesh screen are in a serviceable condition and meet OEM specifications; and
- charge-up operators and assisting personnel are properly trained and competent before pressurising the kettle.

A handwritten signature in black ink, appearing to read 'S. Ridge'.

Simon Ridge

STATE MINING ENGINEER

6 December 2010