

INVESTIGATION INFORMATION RELEASE

DATE: 5 June 2020

Causal investigation - partial collapse of a ventilation shaft

Incident date: 3 May 2020

Event: Dangerous incident

Location: North Wambo Coal Mine, NSW

Overview

The failure of an underground bulkhead seal during shaft boring operations led to a surface sinkhole being created beneath a drilling rig, causing workers to take evasive action and the drilling rig to partially descend into the void. No one was injured.

Figure 1: Fan shaft collar collapse



The mine

Wambo Coal Mine is owned and operated by Peabody Energy. It is a thermal coal operation mining the Middle Whybrow seam, located about 20 kilometres west of Singleton in NSW.

The incident

On 3 May 2020 at approximately 8:15am, there was a rapid loss of drilling mud from a blind bore drilling shaft, caused by a catastrophic failure of an underground bulkhead seal.

An engineering designed underground bulkhead seal was installed directly beneath the blind bore drilling project, where the shaft was to intersect the roadway underground. The purpose of this bulkhead seal was to confine the drilling mud to within the shaft column for the duration of the drilling project, and to prevent interaction with the underground workings. The design strength of the bulkhead seal was intended to reach 7.6 megapascal (mPa), however after three weeks of curing time, the average strength of the bulkhead seal was determined, through sample core testing to be approximately 2.5mPa.

The mine contacted the design engineer to seek his opinion on how the lower strength material would perform compared to the original design. A revised factor of safety was introduced to the seal, along with the understanding that the seal may show signs of cracking and/or leaking, however would not catastrophically fail.

The mine had implemented an Inrush Control Zone, removed all persons and equipment and had barricaded the areas underground that may have been effected by bulkhead failure.

At around 8:15am, at a drilling depth of 59.3 metres, a three metre diameter bore shaft was being drilled toward an existing development roadway underground. The drillers on the surface reported a loss of drilling mud from within the shaft. At this point, the bulkhead seal had catastrophically failed, causing the drilling mud to enter into the underground workings. Drilling operations were approximately 500 millimetres above the underground roadway. Within minutes, the alluvial materials close to the surface began to collapse into the shaft void, due to the rapid loss of confinement pressure.

A sinkhole rapidly developed and the drill rig personnel moved to a place of safety, prior to both the drilling rig and pad partially descending into the sinkhole.

Subsequently, an underground inspection was undertaken by mining supervisors, who confirmed that there was clear evidence that the bulkhead had catastrophically failed, and that no further source of ground instability was identified.

Figure 2: Bulkhead seal failure



The investigation

The Resources Regulator has commenced a causal investigation to determine the cause and circumstances of the incident. The mine operator, relevant contracting companies as well as the site and industry safety and health representatives are participating in the investigation.

Initial safety observations

- Design risk assessments should be carried out prior to the commencement of construction activities.
- Operational risk assessments should consider the findings from within the specified design risk assessment and implement appropriate risk controls to effectively reduce the risk, to as low as reasonably practicable.
- Critical controls identified in both design and operational risk assessments should be accompanied with a system of work to verify the effectiveness of the critical controls, along with prescribed actions to be completed if deficiencies are identified.
- The loss of confinement pressure in the shaft due to the catastrophic failure of the bulkhead had not been considered in respect to the impact on the integrity of the unlined shaft, and consequently no controls were identified. The assumption maintained throughout the risk assessment process was that the drilling mud would remain insitu until the drilling had been completed.

Mine operators must manage the risks associated with all reasonably foreseeable hazards likely to cause injury to that person or any other person. There are several health and safety duties and requirements set out in the Work Health and Safety Act 2011 and Work Health and Safety (Mines and Petroleum Sites) Act 2013. In particular, mine operators should review Clause 9 and 10 of the Work Health and Safety (Mines & Petroleum Sites) Regulation 2014.

Further information

Please refer to the following guidance materials:

- ICMM Health and safety critical control management – good practice guide
- ICMM Critical control management – implementation guide

About this information release

The Regulator has issued this information to draw attention to the occurrence of a serious incident in the mining industry. Further information may be published as it becomes available.

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