NSW GOVERNMENT

NSW Resources Regulator

INVESTIGATION INFORMATION RELEASE

DATE: JUNE 2022

Unplanned initiation of explosives at Peak Gold Mine

Incident date: 18 May 2022

Event: Unplanned initiation of electronic I-Kon III detonators wired into a 240V mains firing line that was also used to fire electric detonators.

Location: New Cobar 25L North down hole stope, Peak Gold Mine, Cobar NSW.

Overview

The NSW Resources Regulator is facilitating a causal investigation into an incident at Peak Gold Mine on 18 May 2022 where there was an unplanned partial initiation of a blast.

At the time of the event all controls to prevent exposure to blasting hazards were in place and no-one was in the vicinity of the unplanned initiation.

On the day of the incident, two blasts were charged with electronic detonators. One blast was a development heading, under the control of the Pybar Development Shotfirer, to be initiated with a single electronic starter detonator. The other was a production blast that used electronic detonators in each blasthole and was under the control of the Orica Production Shotfirer. The blasts were designed to fire simultaneously.

There were delays in the leadup to the proposed firing time. In addition, during the firing process the blasting equipment could not function due to a flat battery. Hence, the initiation could not occur within the scheduled time.

As the firing window was coming to an end, a decision was made to change the blasting plan and fire the development heading only, using an electric starter detonator. The Shotfirer working at the

development heading replaced the electronic starter detonator with electric detonators that could be fired with the existing 240V mains firing line.

The production stope electronic detonators were not disconnected from the mains firing line before firing.

The detonation at the development heading occurred as the workers expected. However, the production stope partially initiated, with evidence of cratering and rock/emulsion ejection. During the initial investigation, it became apparent workers were not aware of the potential for initiation when an electronic blasting system is connected to a conventional 240V AC firing system.

The mine

Peak Gold Mines Pty Ltd operates Peak Gold Mines, which are 9 kilometres south-east of Cobar, NSW. Peak Gold Mines consist of several underground gold and copper deposits: Perseverance, Peak, New Occidental, Chesney and New Cobar. Mining at the four active mines is typically via open stope underground methods with backfill.

Pybar, a mining contractor company, manages development activities at the mines. Orica, a supplier of explosives and explosive support services, manages production blasting.

The incident

On the day of the incident, the original plan for the blasting was to fire a development heading at the 16L along with a production stope at the 21L (referred to as the 25L Nth Stope).

The original blasting plan was to be conducted using the I-Kon III electronic blasting systems. To ensure both locations would fire together, the development heading had been connected to the mains firing line via an I-Kon III electronic starter detonator. The production stope was also primed with I-Kon III electronic detonators, and the joint firing was registered and logged with electronic blasting equipment and wired into the mains firing line, as per standard procedures.

During the pre-firing process, the production shotfirer was unable to power up the blasting equipment due to a flat battery. The production shotfirer decided to remove the production stope from the planned production and development firing following consultation with mine representatives and the development shotfirer.

In order to only fire the development heading, the I-Kon III starter detonator that had previously been installed would need to be removed, along with the firing line connection to the production stope. An electric detonator would then need to be installed on the development heading. This would be fired using a 240 AC pulse delivered via the mains firing line located at the mine portal entrance.

The Development Shotfirer changed over the detonator at the development heading and conducted the firing with approval from the shift supervisor.

During the re-entry post-firing it was identified that the 25L Nth production stope had not been disconnected from the mains firing line and there had been an unplanned initiation of some electronic detonators in the stope.

Figure 1: Post-incident photo of 21L showing floor heave in line with mark-up of the charge holes (painted on wall).

The investigation

The NSW Resources Regulator has initiated a causal investigation into the incident. The purpose of this causal investigation is to enable the quick and full understanding of the causes of this incident, and publication of corresponding lessons to industry in a timely manner to reduce the likelihood of a recurrence.

A preliminary investigation of the incident undertaken by the regulator did not identify any material breaches of the *Work Health and Safety Act 2011* and the regulator has no intention of conducting any further investigation into any potential non-compliance issues or taking any prosecutorial enforcement action, subject to the terms of the Causal Investigation Policy.

The investigation team comprises representatives from the Resources Regulator, Peak Gold Mines, Pybar Mining Services and Orica Mining Services.

An animation and investigation report will be published at the conclusion of the investigation.

Safety observations and preliminary findings

The immediate apparent cause of the incident was the application of a 240V AC current to the I-Kon III electronic detonators resulting in the unplanned initiation of some electronic detonators.

The initial investigation identified the following causal factors:

- Peak Gold Mines (PGM) used a single main firing line system to initiate both electric and electronic blasting systems. Electric detonators were used to fire development headings while electronic blasting systems were used for production stopes and when there are dual production and development blasts are fired together. The voltage of the mains firing system is 240V AC. The mine did not identify all hazards associated with different initiation systems operating on a single main firing line.
- Due to the change in firing processes on the day of the event, there was miscommunication regarding which shotfirer had responsibility to remove the production stope from the mains firing line, once the decision had been made to initiate the development heading with electric detonators after the failure to power up the Blaster device.
- The Production Shotfirer did not check that the Blaster was fully charged prior to the task, which, in addition to other delays, created extra pressure to complete the firing within the approved firing window.
- Personnel who were not familiar with electronic blasting systems considered the I-KON III detonators to be resistant to transient stray voltage, including 240V power. As a result of this perception, PGM procedures highlighted damage to the logger device as the only risk associated with exposure to an electrical charge. The mine did not consider mains 240V voltage and the probability of and unplanned initiation of electronic detonators.

Recommendations

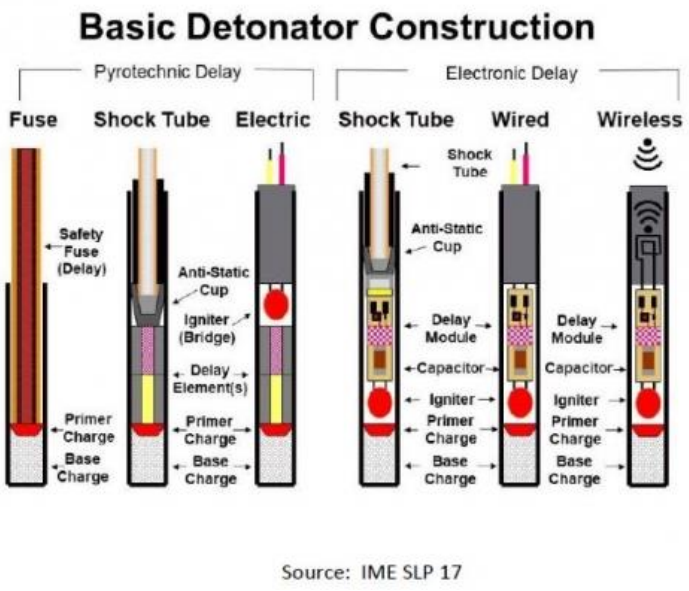
It is recommended that mine operators review their blasting risk assessments, management plans and operating procedures with the understanding that it is possible to initiate electronic detonators with 240V AC power and / or other non-approved initiation methods.

To minimise the risk of recurrence, the product manufacturer has prepared an alert for distribution to customers using electronic blasting systems, warning that electronic detonators must not be connected to 240V AC power and / or other non-approved initiation equipment.

Users of similar electronic blasting systems need to be fully aware of the risks associated with the accidental connection of an OEM electronic initiating system to 240V and or other electrical power sources. That could potentially initiate electronic detonators. Therefore, robust training and awareness procedures need to be in place and to ensure they understand all aspects of the system.

All mines that utilize electronic blasting detonators and manufactures of this type of product should be aware of the requirements for electronic detonator systems as per Australian Standards AS2187.2 – 2006 Explosives – Storage and Use – Part 2 Use of explosives, section 8.2.2 Electronic detonator systems.

Figure: Basic detonator construction. Pyrotechnic versus electronic delay.



Source: IME SLP 17

Further information

Please refer to the following guidance materials:

- https://www.rshq.qld.gov.au/safety-notices/explosives/unplanned-initiation-of-an-electric-detonator-by-an-electronic-detonator-firing-unit
- https://www.rshq.qld.gov.au/safety-notices/explosives/unplanned-initiation-of-electronic-detonators

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.

Visit our website to:

- learn more about our work on causal investigations and emergency response
- view our publications on other causal investigations

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