

# SAFETY ALERT

## SHOTFIRER HIT BY FALLING SHOTCRETE

### INCIDENT

A shotfirer working underground in a large block cave mine received serious crush injuries to both legs when hit by a large piece of shotcrete that fell from the backs of a drawbell. The piece of shotcrete hit the shotfirer on the lower back knocking him to the ground. The shotfirer sustained a broken right femur, knee and foot, a broken left hip and a broken rib along with severe bruising to the lower back. Fortunately the shotfirer did not suffer spinal or head injuries.

### CIRCUMSTANCES

The injured shotfirer was working with an assistant shotfirer who was operating a mobile processing unit (MPU) fitted with an extension boom for charging upholes. The assistant shotfirer was loading a hole with emulsion from the MPU while the shotfirer was preparing a primer for the next hole. A piece of shotcrete fell from the backs of the drawbell without warning striking the shotfirer.

An undercut firing had taken place at the end of the previous shift in close proximity to the drawbell being charged. A few blast holes in the drawbell had to be redrilled prior to charging activities commencing due to dislocation in the blast holes from stress redistribution. Some 'booting' was also heard in the area before charging commenced.

### INVESTIGATION

Investigations are continuing. However, contributing factors may include, but are not limited to, the following:

- The mine was using a post undercut mining system.
- The ground support systems in the drawbell had been affected over time by the redistribution of stresses following undercut blasting activities in the undercut level. Approximately 80% of the undercut blasting activities had been completed at the time of the accident.

- The inspection process did not clearly identify the effect that stress redistribution had on the ground and its affect on existing ground support in the drawbell. The ground support in the drawbell had been installed a considerable time before the blasting activities commenced.
- Technically competent persons such as geotechnical engineers were not directly involved in the drawbell inspection process prior to charging activities commencing. This was particularly important as there was a redistribution of ground stresses taking place.

## **RECOMMENDATIONS**

- It is essential that all persons working in underground mines where high stress conditions exist and seismic events are possible are trained in early identification and interpretation of changes in ground and ground support. This would allow for management to make a positive response to eliminate or control the effect of stress related hazards on the work environment.
- All underground mines should ensure that the adequacy of installed ground support systems are regularly reviewed and assessed by personnel with technical expertise and knowledge of ground support systems.
- Review risk assessments and ensure they identify and address all risks associated with high stress environments especially in regard to its effect on ground support over time. An installed ground support system may not be suitable following a change in stress conditions over a period of time. In particular, there is a need to ensure that persons are not put at risk by working in areas where the integrity of ground support has been affected by stress.
- Mine operators and managers should be aware of the requirements of Clauses 36 and 46 of the Mine Health & Safety Regulation 2007.

### **Clause 36 Mine Health & Safety Regulation 2007 states:**

#### **Ground instability**

The operator of a mine must ensure that, in assessing risks associated with any unplanned falls of any rock, ore or other substances at the mine, the OH&S risk assessment for the mine takes into consideration, but is not limited to, the following:

- a) geological and geotechnical conditions,
- b) any subsidence at or outside the mine,
- c) any potential for airblasts,
- d) adequacy of installed ground support.

**Clause 46 Mine Health & Safety Regulation 2007 states:**

**Mine safety and stability**

If there is a risk of unplanned fall of ground, ore or other substance that impedes passage, disrupts production or ventilation or involves a fall of ground support where persons could be present, the operator of the mine must ensure:

- a) the ongoing monitoring of the condition of ground and the control for the stability of pit wall faces, berms and stockpiles, and
- b) the training of persons at the mine in ground support principles, interpretation of ground support design, ground support installation and recognition and planned responses to indicators of change that may affect excavation stability in a mine.

**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 notice board.

**Signed**

A handwritten signature in black ink that reads "William Barraclough". The signature is written in a cursive, slightly slanted style.

**Bill Barraclough  
ACTING DIRECTOR  
MINE SAFETY OPERATIONS BRANCH  
INDUSTRY & INVESTMENT NSW**

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