Mines Safety Significant Incident Report No. 155

Rock fall during support cycle in a high heading development – fatal accident

Introduction

A number of safety bulletins and significant incident reports have been issued over the years to address the hazard of rock falls in the development of high headings. This significant incident report follows from another fatal accident when an employee was killed by a rock fall while rock bolts and mesh were being installed in a high heading development drive. The report includes recommendations made by the Coroner following an inquest into the circumstances surrounding the incident.

Incident

A standard high heading development was being advanced with four metre long rounds by drill and blast methods with a twin boom jumbo.

Support specifications using split set rock bolts and weld mesh had been developed and were consistent with accepted geotechnical standards.

The ground conditions in the development area were generally good, but the last round had opened up a small fault zone in the backs and created ground conditions that were “blocky” in appearance.

The jumbo operator was being assisted by a second jumbo operator working as an offsider on the day of the accident. Both operators were regarded as being well trained and experienced employees.

The operator who was offsiding was moving forward with a bolt to place it on the boom of the jumbo when a large rock fell from the back, struck him and pressed him to the ground. He died at the scene.

The evidence from the investigation indicated that the deceased was one or two steps beyond the last row of bolts in a position under unsupported ground when the rock fell.

Immediate causes and contributory factors

- There was a change in the ground conditions with a faulted blocky zone exposed in the backs after the last blast.
- The jumbo operators at this mine normally work on their own but, on this day, another operator was used as an offsider because his jumbo was not available for use.
- The operating procedures referred to not working in unsupported ground but there was a lack of clarity in the definition of what comprised unsupported ground.
- Because of the configuration of the jumbo and the dimensions of the drive, it was difficult to see with precision if an offsider moved beyond the last row of bolts into the unsupported ground area.
- The presence of loose rocks on the floor of the drive could have caused the offsider to look down to avoid tripping, instead of carefully observing the backs.
- The operator working as an offsider advanced beyond the last row of rock bolts into an unsupported area and was struck and killed by a large rock that fell from the backs.

Comments and preventative actions

- All employees involved in the operation of high heading jumbo development headings must stay under supported ground at all times.

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- Employers of persons engaged in high heading development must provide a clear definition of what is regarded as supported ground and unsupported ground.
- Where mesh and bolts are used, the boundary between supported and unsupported ground should not be allowed to extend beyond the last complete row of rock bolts, except for a defined distance from the last row of bolts to the working face when the distance between the face and the last row of bolts is less than the interval between each row of bolts.
- Standards should provide this maximum distance from the last row of bolts to the working face.
- The area between the last row of bolts to the face must be carefully scaled or rattled or both, and procedures should allow for spot bolting in this area if required.
- After the accident, the employers, in consultation with employees, introduced a requirement to place witches hats on the ground to demarcate the boundary between supported and unsupported ground during the operations for installing bolts and weld mesh.
- This practice is recommended from the Coroner's findings and should be applied throughout the State. Where witches hats are considered impractical, an alternative method should be used to demonstrate the unsupported ground boundary at ground level.
- When the jumbo is being positioned, it must be possible to configure the booms so that bolts, plates and drilling tools can be put onto the boom from a location under supported ground.
- Specific procedures should be developed for a workplace where a jumbo operator is working with an offsider. These procedures should clearly define the separate responsibilities of the jumbo operator and the offsider, including the interface of those responsibilities.
- A review of the adequacy of the training and ongoing assessment of jumbo operators, including feedback as regards training and assessment, should be carried out to ensure its effectiveness in keeping the workforce competent and aware of safety requirements.

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