Coal mine worker struck by coal from a longwall face

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In the preceding year, 8 coal mine workers (CMWs) in Queensland underground coal mines were injured while engaged in strata control activities on the face side of the Armoured Face Conveyor (AFC). The injuries occurred primarily during longwall bolt-up and meshing activities in preparation for a longwall move.

Background

A central Queensland mine, conducting a longwall bolt-up used a combination of three Rapid Face Bolters (RFB) deployed via a chute road entry. The maingate and tailgate ramp pan zones were bolted conventionally, with hand-operated pneumatic bolters.

The serious accident occurred at the #64 shield zone, on the face line, where the coal face spalled over top of the RFB with four CMWs still on board. The spall was approximately 6 m long, 5.3 m high and 400 mm deep.

A CMW was admitted to hospital as an inpatient for non-life threatening injuries, while another was treated for minor injuries and released from hospital the same day. A third CMW sustained a glancing blow to the back of his hand, which did not require treatment.

Photo 1 shows the maingate end of the RFB, where operators at this end would be standing. Photo 2, shows the tailgate end of the RFB, looking from above into the compartment where two operators were standing.

Conditions observed along the longwall face line at the time of the incident included a number of minor structures / joints / small faults and rolls, as well as a greater than 2 m throw fault in the maingate end, starting at approximately the #40 and extending into the maingate corner. While the accident site at #64 shield lacked evidence of structure, the physical height and friable nature of the coal meant it was prone to face spall. A cavity had progressively formed in this zone, exceeding the planned cut height of 3.8 m to beyond 5.3 m. It can't be discounted that a pressure bump at the time, from cyclic weighting, contributed to the rib spall.

Investigation

DNRM carried out a nature and cause investigation that resulted in:

- directives being issued to the site senior executive (SSE)
- compliance actions conducted with 18 site employees.

Letters were also issued to suppliers of the hire equipment and consultants engaged to facilitate the site ICAM investigation, providing a brief of the incident and areas for improvement to be addressed.

Findings from the nature and cause investigation included:

- systemic failings in management and review of the safety and health management system (SHMS)
- failure to maintain an acceptable level of risk in the workplace, identified at a number of levels
- examples of site SHMS documents / systems not followed and documents not accessible to CMWs
- gaps and omissions found in SHMS risk assessments
- SHMS lacked controls to prevent the accident occurring

- individual obligations under the Coal Mining Safety and Health Act 1999 (CMSHA) either not discharged or not understood
- evidence of a lack of line of control / management of the mine in implementing corrective actions for hazardous conditions recorded on statutory reports
- CMWs not fully aware of Rapid Face Bolter limitations / extent of reach to contact roof
- Inspectors' interviews found inconsistencies in findings from the sites ICAM
- deficiencies in original equipment manufacturers (OEM) risk assessment to provide fit for purpose equipment.

Recommendations to industry

1. Ensure SHMS Effectiveness Audits are conducted, reviewed and corrective actions implemented.
2. Ensure active SHMS documents can be accessed by CMWs.
3. Ensure documents are reviewed accordingly to the site's SHMS.
4. Ensure all CMWs are aware of their obligations under the CMSHA and the SHMS.
5. When conducting risk assessments, consult with a relevant cross section of the workforce involved in carrying out a task.
6. Persons approving risk assessments should review the document before signing it.
7. In planning and assessing the bolting strategy employed on longwall take-offs, the risk assessment team must consider the sites history, geological hazard management plans and geotechnical advice provided to the Underground Mine Manager, as a minimum. Any bolting strategy must consider changing conditions and controls required.
8. The SSE should ensure there is a system in place for implementing actions identified from statutory reports.
9. When conducting site investigations at an underground coal mine, ensure sites procedures for investigating accidents and incidents comply with the Coal Mine Safety and Health Regulation 2017, section 15(1)(2)(b).
10. Ensure the process for introducing new or hire equipment to site is followed, and due diligence is applied in ensuring the equipment is fit for purpose.
11. Ensure equipment on site is used in accordance to OEM specifications.
12. Risk management tools used by sites, such as SLAM or Take 5, be audited by front line Supervisors, (not just by administration staff), to ensure they are conducted as required by the site's SHMS. The SSE must demonstrate there is an auditable system in place.
13. Other audits conducted by frontline supervisors and ERZ Controllers should be documented / recorded in a manner prescribed by the SHMS.

Reference: This link to the United States Mine Safety and Health Administration https://www.msha.gov/data-reports/fatality-reports/2017/fatality-13-september-28-2017/fatality-alert concerns a 2017 fatal accident during a longwall recovery process, when coal from the longwall face rolled out and completely covered a 39-year-old miner.

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