

INVESTIGATION INFORMATION RELEASE

DATE: DECEMBER 2021

Roof ply rock falls on two workers during pillar extraction

Incident date: 2 November 2021

Event: Serious injuries – fall of roof ply rock on two workers during pillar extraction

Location: Clarence Colliery

Overview

Two workers suffered serious injuries including multiple spinal fractures when they were struck by falling roof ply rock of about 4m² in dimension and weighing about 570kg. The roof ply rock fell from an area in-between a hydraulic breaker line roof support (BLS) and existing primary support roof bolts and mesh during pillar extraction operations (see Figure 1). A third worker was near the two workers.

Figure 1: Photograph looking towards the extracted area (goaf) showing the area from which the roof ply rock fell in-between the BLS, existing roof bolts and mesh (NSW Resources Regulator).



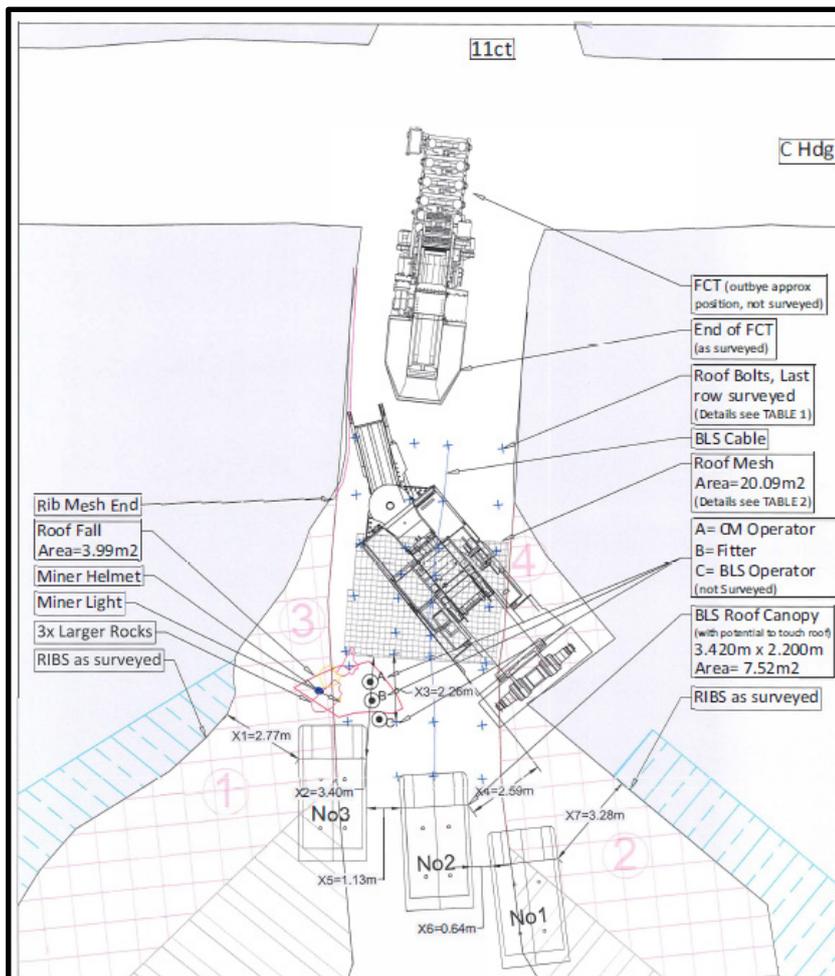
The mine

Clarence Colliery is an underground coal mine near Lithgow in the western coal fields region of NSW. The mine operator is Clarence Coal Pty Ltd.

The incident

At about 3.25am on Tuesday, 2 November 2021, three workers, a continuous miner (CM) operator (using a remote control), a mechanical tradesperson (fitter) and a BLS operator, were standing in the control zone in front of one of three BLS (see Figure 2). They were extracting coal using the CM at the time of the incident. A cracking sound was heard from the roof above immediately after which the roof ply rock fell and struck the CM operator and fitter. The BLS operator was moving towards BLS No 2 and was not hit. The two injured workers were transported by helicopter to Sydney hospitals. The CM operator required emergency surgery for multiple spinal fractures. The fitter also suffered spinal fractures.

Figure 2: Extract of the incident scene plan (by Clarence Colliery).

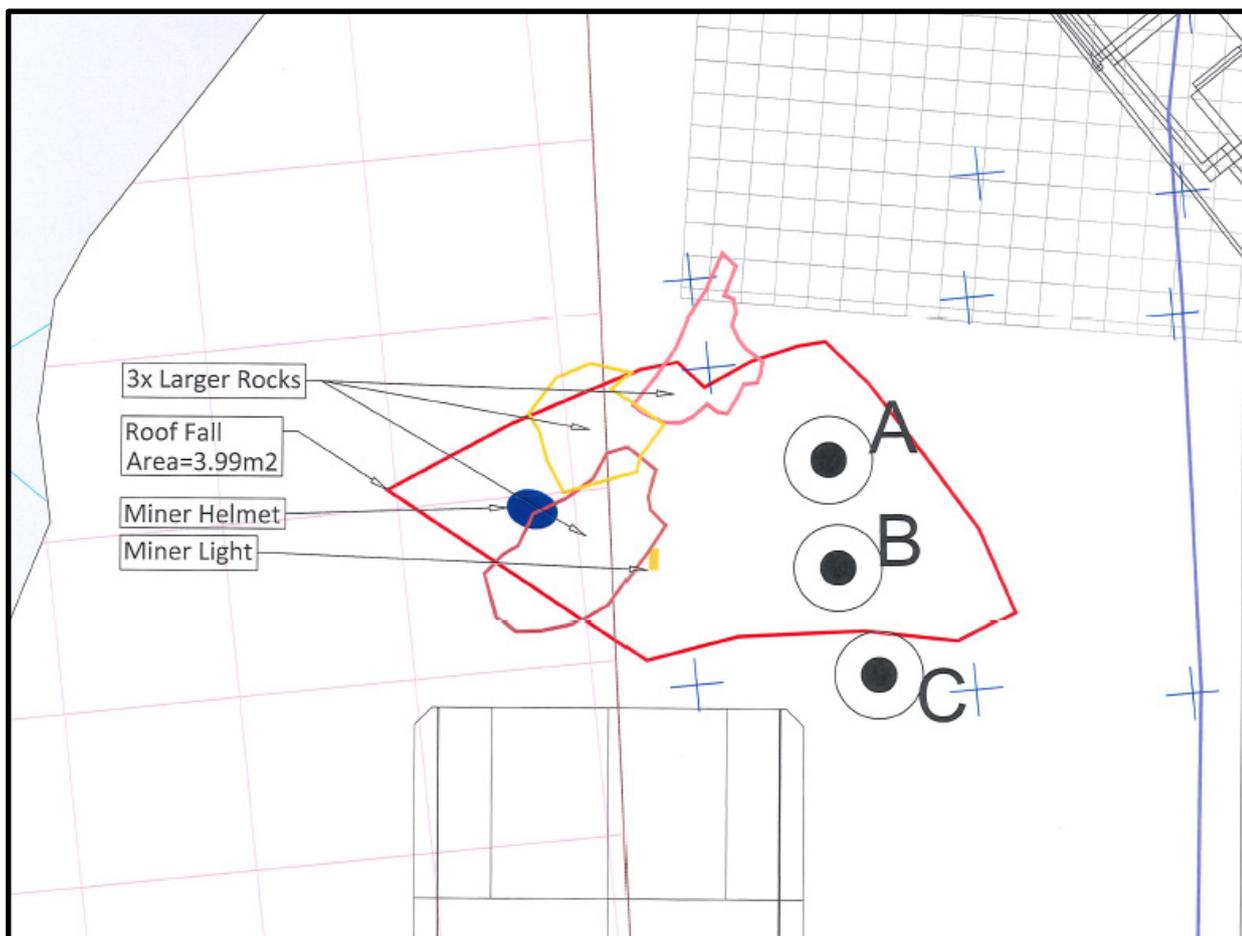


The investigation

The preliminary investigation has established the following from geological and survey mapping information (see Figures 3 and 4):

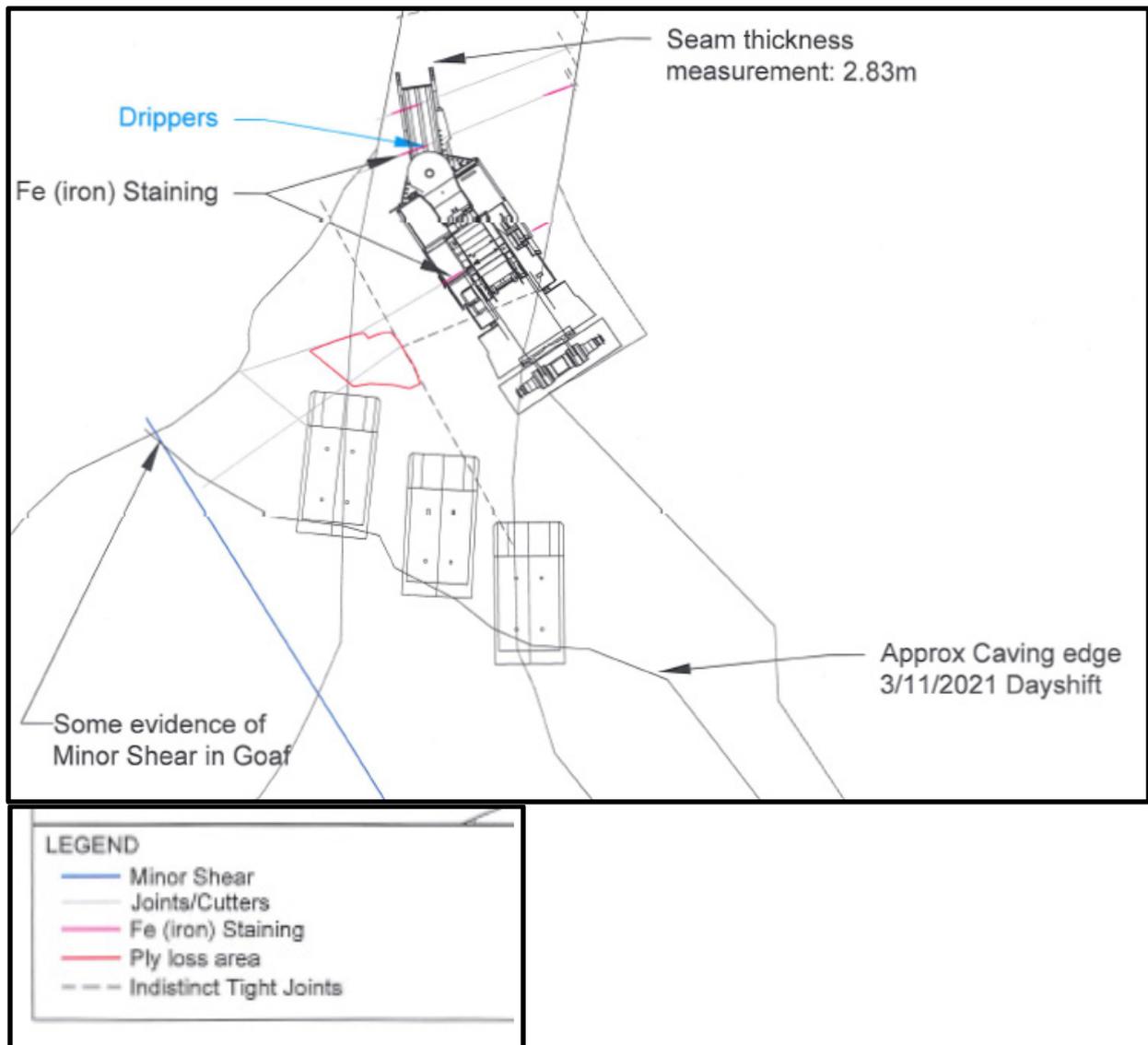
- The coal seam thickness was 2.83m in the extraction area.
- Adjacent to the roof fall area were two sheets of mesh covering 20m². The mesh was installed during primary support development in January 2021. The primary roof support bolts were 1.8 m long with chemical resin anchors.
- The distance between the primary roof bolts supporting the zone where the roof fell was up to 2.26m.

Figure 3: The incident scene plan depicting the area of the roof ply fall (thick red line), approximate location of the three workers (A, B and C), position of roof bolts (blue crosses) and position of roof mesh (blue cross hatch).



- The fallen roof ply rock consisted of carbonaceous siltstone with a gradational base to dull stony coal with an estimated area of fallen material of about 4m².
- Five lumps of broken roof rock were found on the ground after the incident with the largest piece of rock measuring about 1m (length) x 0.6m (width) x 0.2m (thick) with an estimated weight of about 280kg. The total weight of fallen rock was estimated to be about 570kg.
- There was some evidence of minor shear in the goaf adjacent to the fall. Roof joints and cutters were observed in the fallen roof zone. The fallen roof zone was bounded on one side by an indistinct tight joint. There were several iron (Fe) stains and water drippers observed in the roof above the CM (see Figure 4).

Figure 4: Extract of the geological structure mapping plan (by Clarence Colliery).



Safety observations

On 4 November 2021, the NSW Resources Regulator issued a Prohibition Notice under section 195 of the Work Health and Safety Act over pillar extraction in the panel that included the following directions and recommendations:

Directions on measures to be taken:

1. Conduct a review of the mine's Ground or strata failure principal hazard management plan and implement any additional control measures as necessary.
2. Review the systems of work that govern pre-extraction strata audits and who was accountable to complete the audits.
3. Conduct a review of the adequacy and suitability of existing primary support in extraction panel 818A and rectify any defects identified related to ground and strata support compliance.

Recommendations:

When completing direction (1) consider the following:

1. Engaging an independent subject matter expert to assist in the review and conduct a geotechnical investigation as part of the review of controls measures.
2. How the coal tops, that were not being extracted during development activities, affected the density and type of roof support in areas that would be exposed to secondary extraction.
3. How development CM operators maintain reasonable control to manage full seam extraction during a plunge depth of up to 18m.
4. The density and style of support required to be installed before secondary extraction.

Further information

Please refer to the following guidance:

- [MDG-1005 part 1 of 2 Manual on pillar extraction in NSW underground coal mines](#)
- [NSW code of practice: Strata control in underground coal mines](#)

- [Safety Alert 98-04 Separate instances of roof collapse during in pillar extraction](#)
- [IIR 18-05 Serious injury Clarence Colliery](#)
- [Investigation Report Rib failure at Clarence Colliery on 4 July 2018](#)
- [YouTube Centennial Strata Incident Animation](#)

About this information release

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DOCUMENT CONTROL

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