Government of **Western Australia**
Department of **Mines, Industry Regulation and Safety**

Safety and Health Snapshot

for the Western Australian minerals sector

Ground control

Issued March 2021

Hazardous ground movements resulting from ineffective or inadequate ground control have the potential for serious injury or death. Effective ground control starts with identifying the potential for hazardous ground movements, analysing and assessing the risk and implementing controls to eliminate or reduce the exposure. It is important to understand hazardous areas in your workplace and the potential outcomes if ground control is inadequate.

This snapshot covers the period from 1 July 2019 to 30 June 2020 (unless otherwise stated). During this period there were a total of 14 injuries and 180 incidents involving ground control.

For more information about occupational safety and health, visit our website **www.dmirs.wa.gov.au**

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Department of Mines, Industry Regulation and Safety

Injuries by severity

8 of the 14 injuries

identified as ground control injuries were **classified as serious**

4 of the 14 injuries were **lost time**

Injuries by part of body (top 4)

29% of the 14 injuries were **foot and toes**

Head, back and hand had the 2nd highest at **14% each**

Injuries by employment type

3 Contract

11 Company

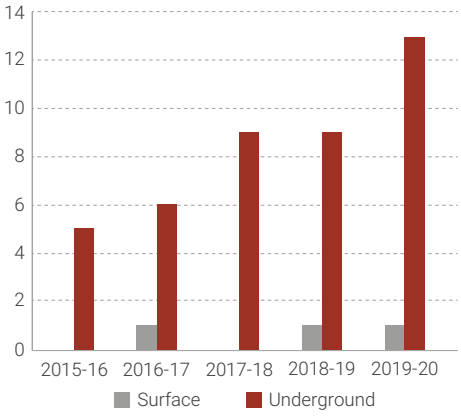
Injuries by nature (top 3)

36% were fractures

Bruise or contusion had the 2nd highest at **29%**

Laceration had the 3rd highest at **21%**

Injuries by location in the last 5 financial years



Notifiable incidents by area

63% of the 180 notifiable incidents occurred during **surface operations**

37% of the 180 notifiable incidents occurred during **underground operations**

Notifiable incidents by legislative description

66% extensive subsidence, settlement or fall of ground or any major collapse.

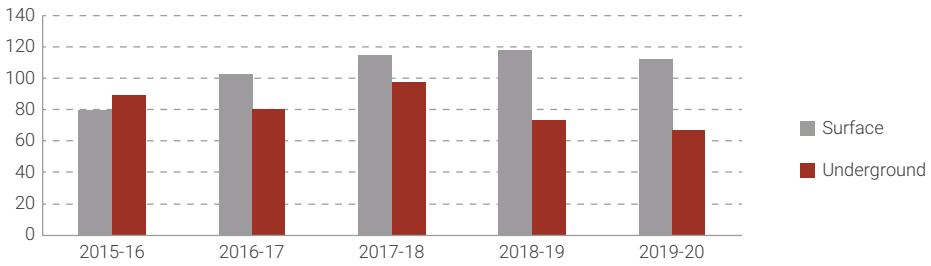
14% potentially serious occurrence

13% earth movement caused by seismic event.

4% inrush of water

3% other

Notifiable incidents by location in the last 5 financial years



Note: The information in this snapshot has come from a keyword search of incident reports.

Some recent incidents

Wall failure 04/07/19

A wall failure dislodged about 1,000 bcm of material at an open pit. Some material made contact with the tyres of a truck being loaded adjacent to the highwall. The driver was taken to the site medic for assessment. The wall was subject to regular prism monitoring. The wall was barricaded and a geotechnical inspection planned.

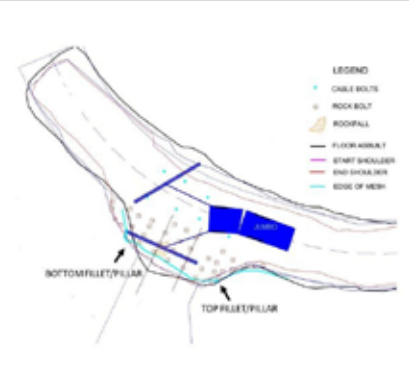
Inrush of water 11/02/20

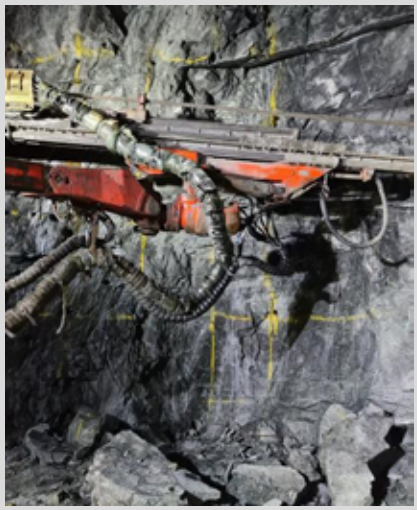
A supervisor at an underground mine saw that a rush of mud and water had occurred from the base of a disused vent shaft following a heavy rain event. Work in the area had ceased due to the weather event and no workers were in the vicinity at the time of the incident. The decline and services were damaged. An investigation was commenced.

Spotlight on *Mines Safety Significant Incident Report No. 282*

Fall of ground in a development heading resulting in serious injury

10 August 2020





Contributory causes

- Use of an out-of-date rock mass model to assess the design.
- The planning and design process did not consider local geotechnical information at the newly established heading.
- Geological information was not available for the development heading due to infrequent mapping.
- Geotechnical inspections were not completed as per the Ground Control Management Plan.
- A large number of geological structures that indicate the presence of blocky ground were not identified prior to the incident.
- Excessive material fell from the backs during scaling, indicating the presence of poor ground conditions, however additional ground support was only installed on the side wall leaving the face unmeshed.
- Development methodology and jumbo setup resulted in rows on the face bored before all the lifter tubes had been installed.
- A 4.9 metre drill steel was used to establish the heading and may have impacted on directional control within fractured or blocky ground resulting in excessive damage to the perimeter and face.
- Inadequate inspections by competent person(s) before commencement of drilling.
- Lack of training in geotechnical hazard awareness.

Applying the **hierarchy of control**

Things you can do

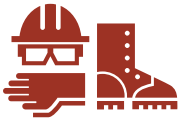
Eliminate – Safely remove loose rock overhanging a workplace.

Substitute – Mine design should address ground control issues (e.g. prevent formation of underground pillars that may become highly stressed; limit the formation of troublesome bullnoses in open pit wall).

Isolate / segregate – Monitor for ground movement and install catch bunds of appropriate size and distance from the hazard to stop the movement of unstable rock.

Engineering – Understand your role in the design quality control and assurance of ground support and reinforcement at your site.

Administration – Make sure you follow the site's formal procedures to stay clear of hazards.



PPE – Wear PPE appropriate for the task at hand and the types of hazards it can control.