

Dangerous Incident – Dump slump 7th November 2022

Dangerous incident | IncNo0043383

Open cut coal mine

Ground or strata failure



Summary: A dozer operator noticed minor cracking on a dump and notified their supervisor. The supervisor inspected the area and believed the cracks were associated with reject management at the front of the dump and only affected the current lift (7 m high). A hard barrier was established behind the area and the dozer operator was tasked with cutting down the dump. Later in the shift, the dozer operator noticed movement on the dump and began to reverse. The section of the dump the dozer was on slumped about 10 metres. The dozer was unable to exit the dump. The operator raised the emergency. A second dozer cut an access path for the first dozer to safely exit the area.



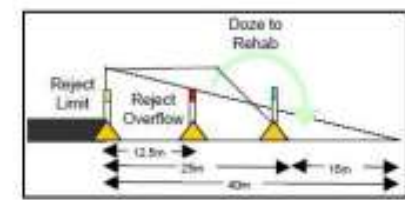
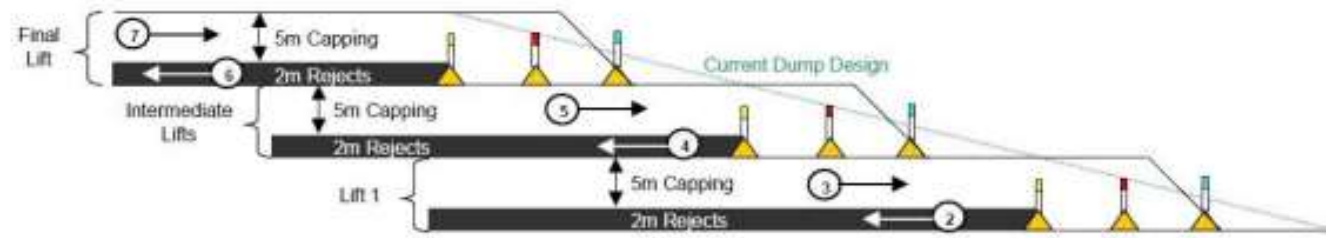
Recommendations to industry: When a hazard is identified, workers must not be placed at risk to remediate the hazard. The integrity of waste material and impacts on the mine design must be considered when dumping reject material in the mine.



Hazard awareness context

- What happened
- Emergency Response
- Immediate actions
- Investigation
- Remediation
- Operational changes

BASIC REJECT CELL CONSTRUCTION DIMENSIONS



Source: PHMP – Ground or strata failure

Events leading up to the incident

What happened

Emergency Response

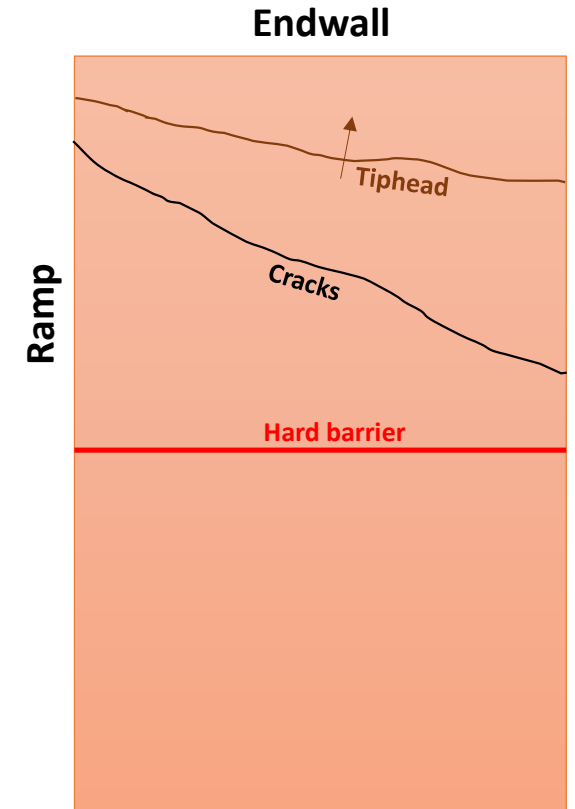
Immediate actions

Investigation

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Operational changes

- **11:30pm:**
 - OCE receives call about cracking on the dump
 - OCE arrives and inspects dump
 - Cracks are diagonal and appear to be settling cracks
 - Remediation plan devised – hard barrier 100m back from dump, lighting plant relocated, dump to be cut down perpendicular to cracks.
- **03:20am:**
 - Dozer operator called to say he is stuck on the dump since it had given way
 - OCE initiated the emergency procedure



Video 5 x speed

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What happened

Emergency Response

Immediate actions

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Operational changes



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Video normal speed

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Video normal speed



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Emergency response

What happened
 Emergency Response
 Immediate actions
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- Ceased all operations
- Mobilised ERT to the scene
- Established recovery method (doze in an access) and assessed the risks
- Managed the wellbeing of the worker post-incident
- **Key elements of JHA:**
 - Lighting plants relocated
 - Spotter on endwall (monitoring for movement), adjacent road, and dump
 - Dozer operator remained in machine
 - Sling equipment on standby
 - OCE also monitoring for movement

NEW HOPE GROUP
JOB HAZARD ANALYSIS (JHA)

Department/Contracting Company: **PRODUCTION** Job Co-ordinator Name: **P. WALKER**

Job: **D2 19.28000**

TASK STEP	HAZARD	CONTROL	IMPACT	PERSONNEL
1. CREATE ACCESS TO GET PORTABLE LIGHTING PLANTS	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR
2. DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR
3. DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR

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3. DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR	DOZER OPERATOR

Post-incident actions

What happened

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First two priorities:

- **Prevent an escalation of this event**
 - Risk of further movement?
 - Risk to endwall?
 - Risk of propagation into adjacent ramp?
- **Prevent a reoccurrence elsewhere when operations restart**
 - Inspection of all other dumps
 - Preliminary geotechnical assessment
 - Detailed analysis of construction of all other dumps

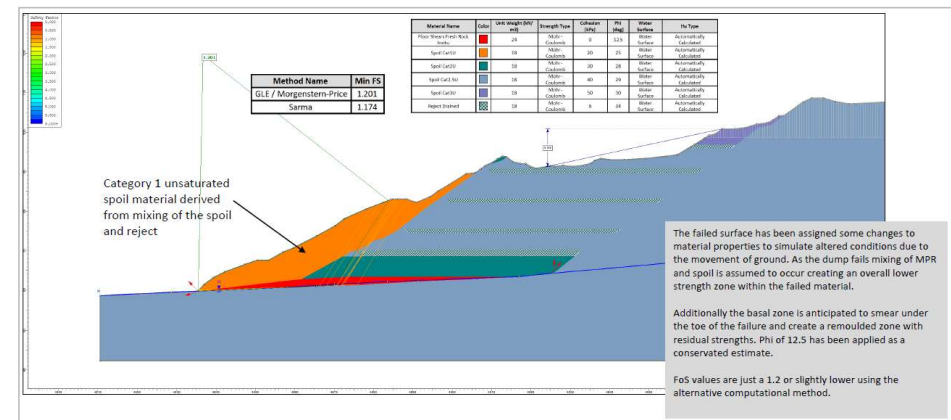
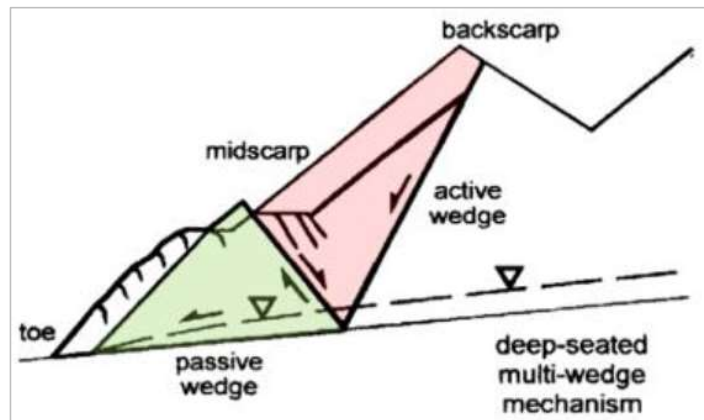


Investigation – geotechnical

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Contributing factors:

- A weak foundation layer in the base of the dump
- Contact between endwall (insitu) and reject has elevated pore pressures/weakened material strengths
- Hard-packed road + in-situ bench (the base of the dump) created differential contact and limited drainage
- Construction of the base of the dump was during very wet conditions



Investigation – geotechnical

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Investigation – geotechnical

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Investigation – geotechnical

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Investigation – geotechnical

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Investigation – organisational

What happened

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Contributing factors:

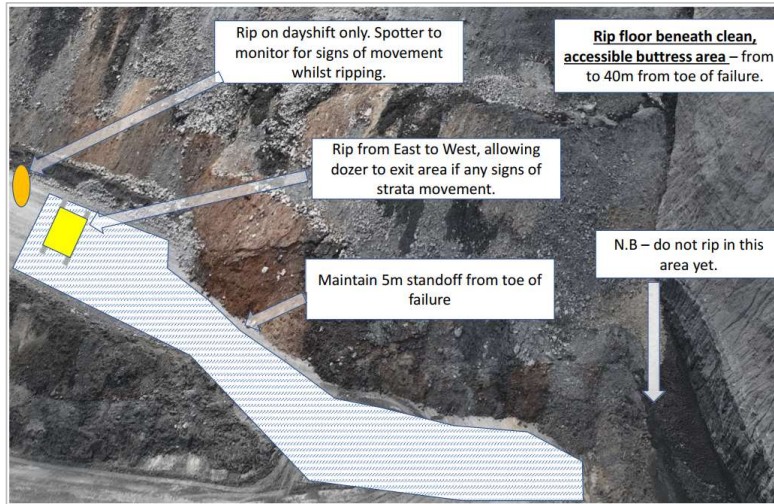
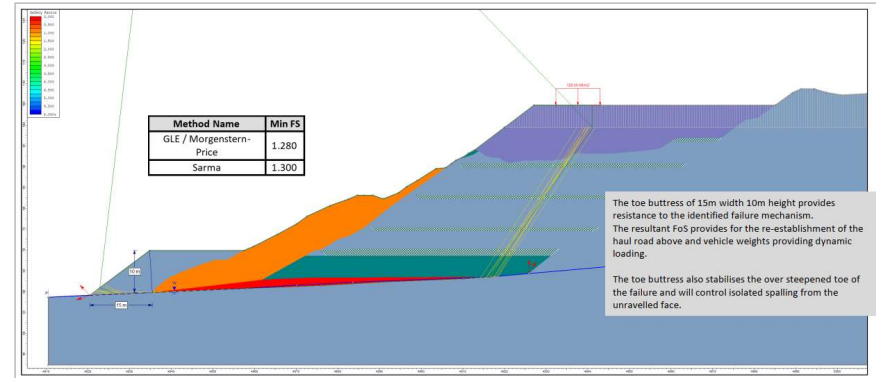
- The mine only had weathered material available during construction of the base
- Settling cracks are common and did not cause concern
- No systematic disruption of hard surfaces in dump foundations (excl. pit floor for dragline spoil)
- Technical services dump design checklist does not take into account 'foundational layers' of dumps
- Performance of reject/dirt mixing practices had been good, and dump conditions weren't perceived to be out of the ordinary

Remediation



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- Geotechnical design
- Qualitative risk assessment
- Run as a 'project' with consistent supervision
- Day shift only initially
- Management of reject against endwall



Remediation

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Remediation

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Operational changes

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Establishment of key zones for dumping.

Tech services dump design checklist, OCE inspections, and geotech systems updated to identify:

1. Interface of insitu and dump surfaces (primarily endwalls)
2. Commencement of baselift dumps (where high tip-heads are unconfined)
3. Dragline bench

Dumping Procedures Review
Interim Controls Communication

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KEY ZONE 1: Interface of insitu and dump surfaces (primarily the endwall dumps)
Focus areas include:

- Ensuring the insitu bench provides a competent base. No reject can be placed on this bench, and before tipping in the area the removal of mud, reject spillage, old, wet windrows and any ponded water is required
- Ensuring that drainage along the endwall is unimpeded as the dump lifts progress. This may include removal of mud and reject spillage to allow any water contained in the dumps or produced from the endwall to freely drain.

The diagram shows a cross-section of a dump lift with three layers: 'Dry Cell against wall', 'Dry Cell standoff', and 'Dry Cell against wall'. A red dashed line indicates the 'Key zone 1: interface of insitu and dump surfaces'. Below the diagram are two photos: 'Example of the Northern endwall interface between insitu and dump surfaces' and 'Example of the Southern endwall interface between insitu and dump surfaces'. A label 'Insitu Endwall & Bench' is at the bottom right.

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KEY ZONE 2: Commencement of Northern and Southern Base Lifts (where excess height or unconfinement are involved)
Focus areas include:

- Floor preparation – ensure no mud or reject material on the floor prior to dump commencement
- Initial two lifts of the dump to only use fresh material in development of reject cells (for Southern Base Lift)

Two photos show the start of new base lifts. The left photo is captioned 'Example of the start of a new Southern base lift area. This needs to be clean and free of mud and reject, and the initial 2 lifts must use fresh material.' The right photo is captioned 'Example of the start of the Northern base lift where the outside edge is very high, requiring clean floor preparation'.

Dumping Procedures Review
Interim Controls Communication

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KEY ZONE 3: Dragline bench
Focus areas include:

- Ensuring that no mud or reject spillage is present on or immediately adjacent to the DG bench ig to the west of the DG spoil peaks.

Two photos show dragline benches. The left photo is captioned 'Example of mud and reject spillage on the dragline bench in the north'. The right photo is captioned 'Example of spillage next to the dragline bench in the south'.

Thank you