

Consolidated report

Falling objects – stage 2 – surface and underground coal mines

July 2023 to November 2024



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Executive summary

A crucial part of the Resources Regulator’s incident prevention strategy for mines and petroleum sites involves:

- targeted assessments and planned inspection programs – focusing on assessing an operation’s control of critical risks by evaluating the effectiveness of control measures in the mine’s safety management system
- priority programs – proactively assessing a topic that is an emerging risk throughout the industry, which is determined primarily from incident data as well as evolving industry trends.

The planned inspection program at surface and underground coal mines for falling objects – stage 2 was conducted between July 2023 and November 2024.

A bowtie identified the following three threats for the material unwanted event (MUE) falling objects expose people to harm: loose items and material, lifting equipment failure and intentional load movement.

As part of the planned assessment activities, Regulator inspectors attended 46 surface and underground coal mines with a focus on critical controls including loose item containment, operator protective structures and exclusion zones.

This planned inspection program was part of an ongoing effort by the Regulator to reduce the potential risks associated with people exposed to falling objects.

This report provides information on assessment findings and recommendations for surface and underground coal mine operators.

In summary, of the 46 surface and underground coal mines assessed, 47 compliance notices were issued to 26 of the mines assessed.

26 of the 47 compliance notices issued related specifically to the assessment of human exposure to falling objects.

21 of the 47 compliance notices issued related to other types of non-compliance issues.

Explanatory notes on the assessment system are listed in Appendix A.

Assessment criteria for all assessments

Assessment threats and consequences, critical controls and control supports were identified by the Regulator in a bowtie to review how mine operators manage the material unwanted events (MUE) of falling objects expose people to harm. This assessment program reviewed three critical controls selected from the bowtie (PC1.1, PC1.3 and PC1.4).

A tabulation of the threat/consequence and critical controls for the MUE is provided in Table 1.

Table 1. Threats and critical control for the MUE falling objects expose people to harm

Identified threat	Critical control
Loose items and material	(PC1.1) principal control - Loose item containment
	(PC1.3) principal control - Operator protective structures
Loose items and material	(PC1.4) principal control - Exclusion zones
Lifting equipment failure	
Intentional load movement	

A tabulation of the critical controls and control supports for the MUE is provided in Table 2.

Table 2. Critical controls and control supports for the MUE falling objects expose people to harm

Critical control	Control support
Principal control - Loose item containment (PC1.1)	1 Toe boards and under conveyor guarding are effective.
	2 Under conveyor guarding is regularly inspected and cleaned.
	3 Areas are free from loose items that may pose a falling object risk such as spare or replaced components, packaging material, tools, waste, and spills.
	4 The specified task specific falling object controls are implemented.
	5 Any equipment required to implement falling object controls is available.
Principal control - Exclusion zones (PC1.3)	6 Entry to an exclusion zone is restricted to those essential to the task being performed.
	7 Processes are in place to ensure those essential to the task entering an exclusion zone: <ul style="list-style-type: none"> • Are people aware of the hazards and controls in place for the falling or swinging object risk? • Do you have the permission of the person supervising the lift?
	8 Exclusion zones are implemented and maintained according to documented procedures.
	9 Exclusion zones area demarcation equipment is available for use.
	10 People who conduct work that poses a falling or swinging object risk can describe the falling or swinging object exclusion zone barrier requirements.
	11 People who may be required to work near a falling or swinging object exclusion zone can explain the meaning and purpose of the exclusion zone barrier.
Principal control - Operator protective structures (PC1.4)	12 Operator protective structures are fitted to plant specified by the safety management system.
	13 Fitted operator protective structures are suitable to protect operators from falling objects.
	14 Operator protective structures are periodically inspected to ensure they are free from defects that may compromise protection.
	15 Operator protective structures are free from defects that may compromise protection.

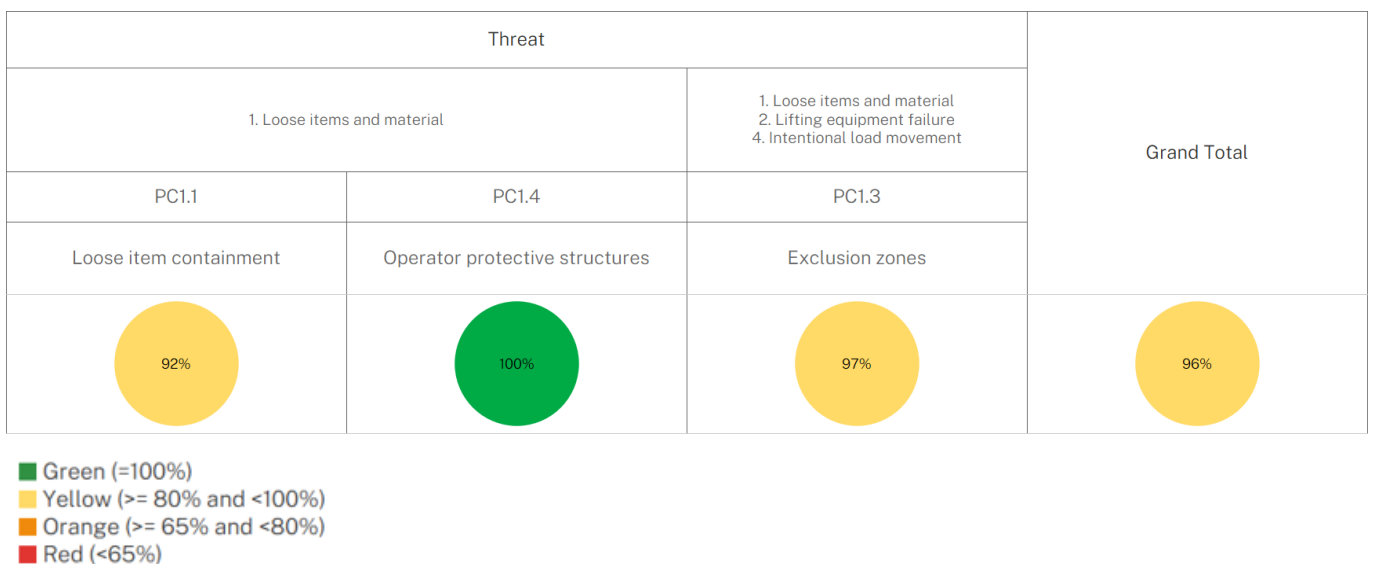
Assessment findings for surface and underground coal mines

Overall, the assessment findings for surface and underground coal mines were:

- 46 surface and underground coal mines were assessed
- 690 individual findings for the assessed criteria
- 43 assessment findings with enforcement action recorded
- 42 compliance notices were issued to 26 of the 46 surface and underground coal mines assessed.

Figure 1 provides a summary assessment of the overall results by critical control.

Figure 1. Summary assessment findings of overall results by critical control



In summary, the overall assessment findings by critical control were assessed in total as 96%.

The assessment overall findings by critical control ranged from 92% to 100% (2 critical control assessment topic findings were in the yellow colour category).

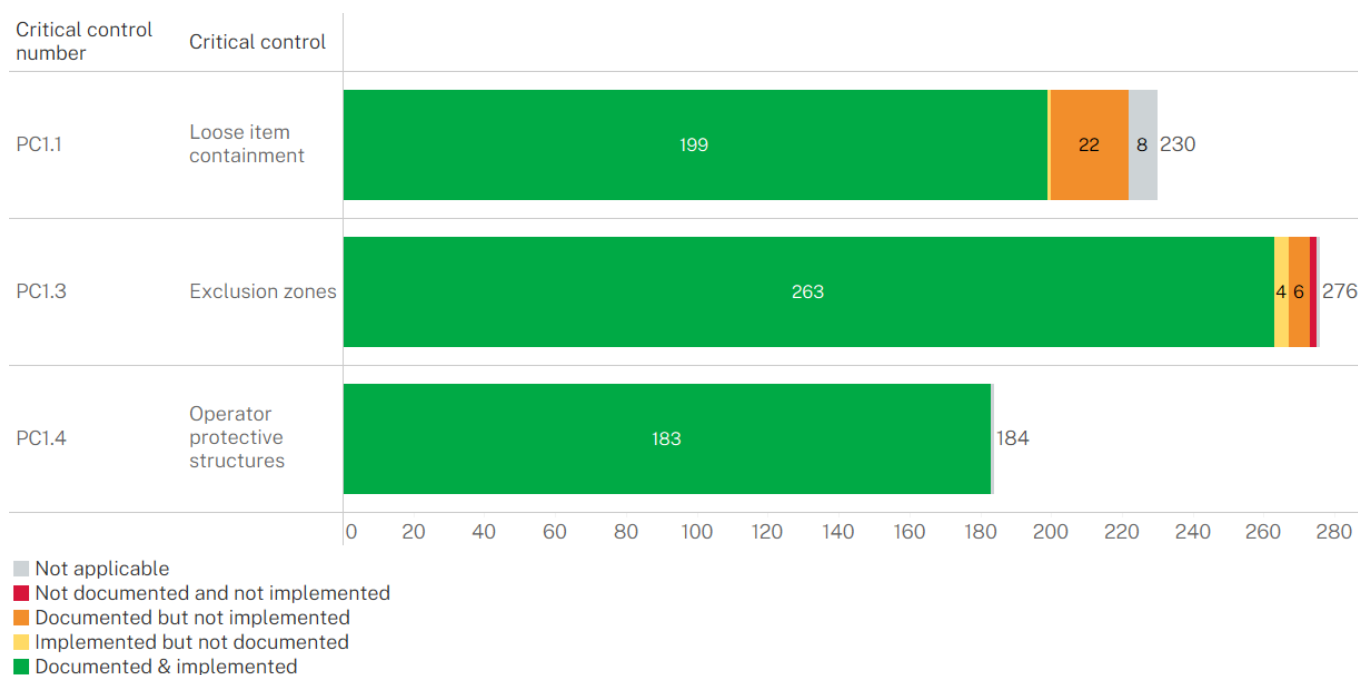
Assessment overall ratings for underground coal mines

In summary the overall assessment ratings for surface and underground coal mines were:

- 93.5% rating for documented and implemented finding
- 0.7% rating for implemented but not documented finding
- 4.1% rating for documented but not implemented finding
- 0.3% rating for not documented and not implanted
- 1.4% for not applicable.

The overall assessment findings ratings by critical control for surface and underground coal mines is shown in Figure 2.

Figure 2. Overall assessment findings ratings by critical control for surface and underground coal mines



The overall assessment findings ratings by critical control and control support for surface and underground coal mines is shown in Figure 3.

Figure 3. Overall assessment findings ratings by critical control and control support for surface and underground coal mines



Notices issued to surface and underground coal mines

In total, 46 assessments were conducted at surface and underground coal mines.

In summary, there were 42 compliance notices issued to 23 surface coal mines and 19 underground coal mines assessed comprising:

- 1 x section s195 prohibition notice
- 18 x section 191 improvement notices
- 23 x section 23 cause for concern notices.

Note: 26 of the 46 compliance notices issued related specifically to human exposure to falling objects.

The WHSA s195 prohibition notice issued to an underground coal mine related to working at heights and the risk management controls for workers accessing vertical ladders and the potential for falling objects whilst workers are using ladders at the site.

Twenty-one of the 46 compliance notices issued related to other types of non-compliance issues.

The compliance notices issued for surface and underground coal mines were reviewed and Table 3 lists the notices issued by type and number.

Table 3: Notices issued for surface and underground coal mines

Category	Surface	Underground	Grand Total
WHS(MPS)A s23 notice of concerns	11	12	23
WHS s191 improvement notice	8	10	18
WHS s195 prohibition notice		1	1
Grand Total	19	23	42

Recommendations for surface and underground coal mines

Based on the findings outlined in this report and in relation to the numbers and types of compliance notices issued during the assessment of human exposures to falling objects in surface and underground coal mines it is recommended that the following topics should be reviewed by operators of surface and underground coal mines:

Review of the site principal mechanical engineering control plan and other systems of work relating to falling objects, in particular:

- Review the risks and controls for workers accessing ladders and managing falling objects while workers are using ladders.
- Review the potential for objects falling from one level to another level and the effectiveness of hard barriers to prevent objects falling and operator protective structures including mobile plant falling object protection systems (FOPS).

- Review provision of signs and clear delineation marking of access walkways and roadways to remove workers from falling object drop zones.
- Review the potential for rock/coal material and plant structural components falling from conveyor gantries, overhead bins and overhead structures, in particular overhead structures associated with coal handling and preparation plant (CHPP).
- Review appropriate road registered haul truck cabin FOPS that pass under material loading bins and conveyor gantries.
- Review appropriate mobile plant cabin FOPS that pass under material loading bins, conveyor gantries, conveyor discharge chutes and when required to clean conveyor sumps.
- Review fixed structure wall cladding, large opening covers, roofing materials and structural fixing and tie-down for degradation and maintaining compliance with Australian building codes and standards and applicable structural guidance material to withstand foreseeable weather events.
- Review the risk of falling objects from scaffolding and elevated work platforms during construction and maintenance activities on site.
- Review information and training in site procedures and work permits provided to workers and contractors who are likely to be at risk of falling objects hitting them.
- Review validation of competency (VOC) of worker and contractor knowledge and implementation of site procedures for managing the risks of being struck by falling objects
- Review supervisor inspection and management reporting systems for worker and contractor compliance with site procedures managing the risks of being struck by falling objects.
- Review outcomes of worker and contractor non-compliance actions taken for managing the risks of being struck by falling objects.

Further information

For more information on safety assessment programs, the findings outlined in this report, or other mine safety information, please contact the Regulator.

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Appendix A – Assessment criteria rating

Each assessed criteria is rated from one to 4 based on evidence supporting the expected control supports identified at the mine site.

Evidence supporting expected control supports

Expected control supports	Rating	Evidence supporting rating / comments				
	<table border="1"> <tr> <td>4</td> <td>3</td> </tr> <tr> <td>2</td> <td>1</td> </tr> </table>	4	3	2	1	
4	3					
2	1					

Assessment findings results are calculated based on the total points allocated to the assessed ratings as a percentage of the maximum possible points for each criteria group, and any findings rated as ‘Not applicable’ were excluded from the calculation.

Criteria assessed ratings and points

Assessed as	Rating	Points
Documented & implemented Compliant	4	4
Implemented but not documented Improvement needed	3	2
Documented but not implemented Significant improvement needed	2	1
Not documented and not implemented Non compliant	1	0
Not applicable (N/A)		

Findings results (points) with colours assigned as follows:

- Green (=100%)
- Yellow (>= 80% and <100%)
- Orange (>= 65% and <80%)
- Red (<65%)
- Not applicable