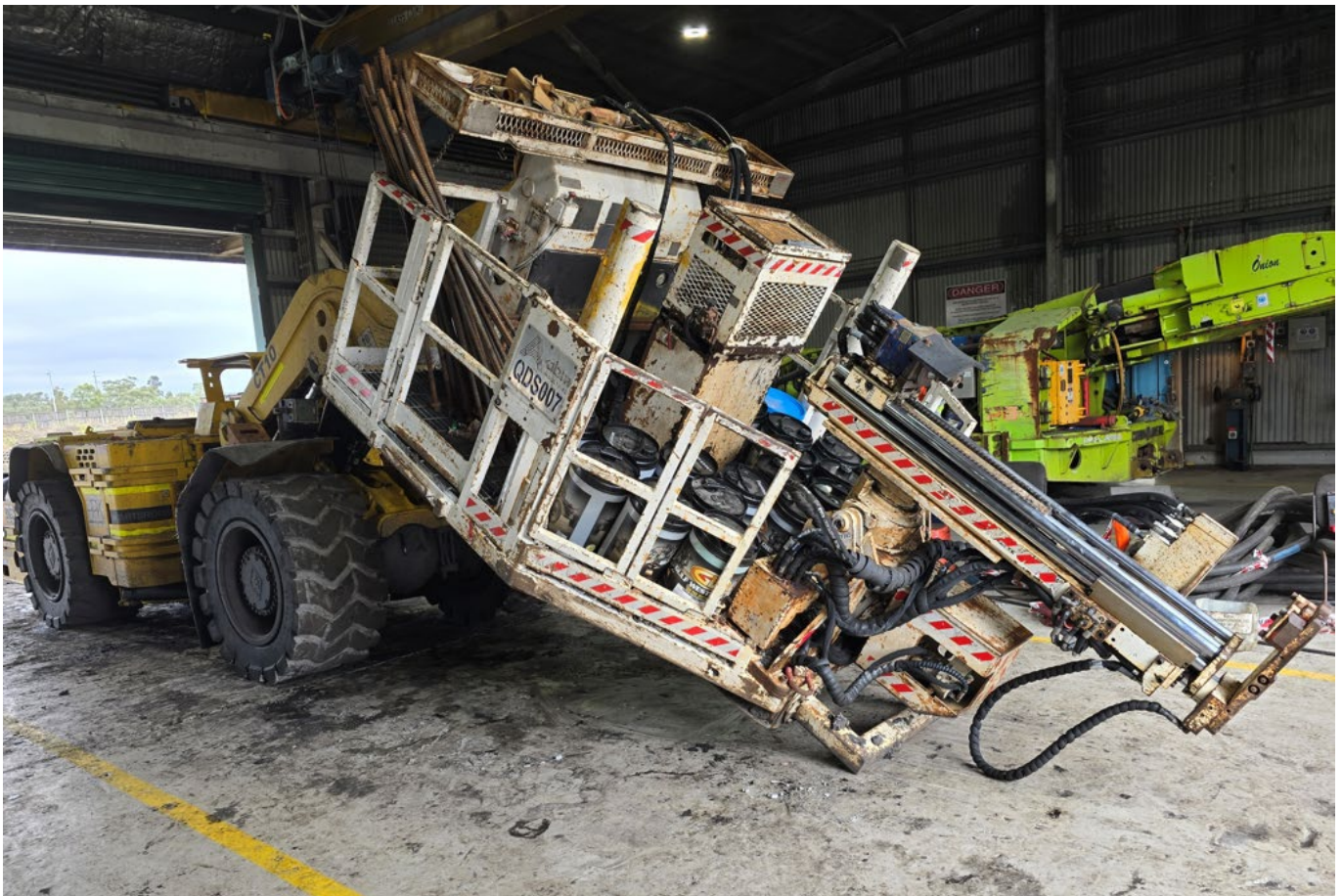


Compliance priority report

Work platform attachments on multi-purpose mobile plant at coal, metalliferous and extractives mines

July 2024 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. Although these topics may also be contained within the Regulator’s planned inspection programs, the aim of compliance priority programs is to gather further information and knowledge about how the industry is managing and controlling a specific issue.

The compliance priority program for work platform attachments on multi-purpose mobile plant was assessed between July 2024 and November 2024 at:

- coal mines - 16 surface and 9 underground coal mines including coal handling and preparation plants (CHPP)
- metalliferous mines - one surface and 13 underground metalliferous mines
- extractives mines - 9 surface sites consisting of 8 construction minerals sites and 1 industrial mineral site (site data included in metalliferous mine data in this report)

The program resulted from an increase in the number of incidents reported to the Regulator involving the overturning, and/or uncontrolled lowering, of work platform attachments on multipurpose mobile plant, including when personnel were in the work baskets or drill platforms.

Multi-purpose mobile plant includes integrated tool carriers, load haul dump machines, all terrain telehandlers, and forklifts.

The program assessment focus reviewed how coal, metalliferous and extractives mines have responded to the Regulator’s recommendations to the mining industry following the publication on 24 April 2024 of the Regulators Safety Bulletin (SB24-02) Load Haul Dump (LHD) crowd cylinder failures – potential worker injuries.¹

This report provides information on the assessment findings and recommendations for the operators of coal, metalliferous and extractives mines. The assessment results and recommendations coal and metalliferous mines (including extractives) will be detailed separately in this report.

In summary of the 25 coal mines assessed resulted in 6 compliance notices issued to 4 underground coal mines assessed.

In summary of the 23 metalliferous & extractives mines assessed resulted in 18 compliance notices issued to 13 surface and underground metalliferous/extractives mines assessed.

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

¹ www.resourcesregulator.nsw.gov.au/sites/default/files/2024-04/safety-bulletin-sb24-02-lhd-crowd-cylinder-failures.pdf

Assessment criteria for all assessments

Assessment criteria were identified by the Regulator to review how coal, metalliferous & extractives mine operators responded to the Regulators recommendation to manage the identified hazards associated with work platform attachments on multi-purpose mobile plant.

A tabulation of the assessment criteria for compliance priority program work platform attachments on multi-purpose mobile plant at coal, metalliferous and extractives mines is provided in Table 1.

Table 1. Criteria for work platform attachments on mobile plant at coal and metalliferous mines

Criteria number	Criteria
1	Does the mine use work platform attachments on multipurpose mobile plant?
2	Has the mine taken action by displaying on mine notice boards, and made their workforce aware of: Safety bulletin SB24-02 LHD crowd cylinder failures – potential worker injuries?
3	Has the mine assessed and / or implemented recommendations of safety bulletin SB24-02?
4	Has the mine completed a risk assessment associated with the use of work platform attachments on multipurpose mobile plant?
5	Has the mine implemented effective controls to manage identified hazards?
6	Is the work platform attachment specifically designed and rated to suit the mine’s multi-purpose mobile plant?
7	Does the mine have site or OEM procedures for the use of the work platform attachment on the multipurpose mobile plant, or does the mine rely on a JSA/JHA completed on the job?
8	Are workers trained and /or authorised to perform working at heights tasks using work platform attachments on multipurpose mobile plant?

Assessment findings for coal mines

Overall, the assessment findings for coal mines were:

- 16 surface and 9 underground coal mines including CHPP were assessed
- 200 individual findings for the assessed criteria,
- 6 compliance notices were issued to 4 of the underground coal mines assessed

Figure 1 provides a summary assessment of the overall results by criteria for coal mines.

Figure 1. Summary of assessment findings by criteria at coal mines



A number of mines (surface coal mines) indicated they did not use work baskets or work platforms attached to multipurpose mobile plant at their site.

One mine assessed was unable to provide examples of effective controls implemented to manage the identified hazards.

Two mines assessed identified they had not adequately trained personnel in working at heights and/or using work platforms attached to multi-purpose mobile plant.

Issues relating to work baskets and work platform attachments in coal mines include:

- damage to safety critical functionality in relation to bent or inoperable self closing gates, missing gate latches, emergency stops not working, missing escape ladder or compromised ladder mounts

- overloading work platforms beyond the rated operating limit, or the limit of the mobile plant, often as a result of no labelling to indicate mass or working load limits (WLL)
- general damage to non safety critical structure of work basket, such as bent structural components, warped floor or failed and/or fatigued welds
- poor housekeeping standards in the basket with pipe fittings, hose, chains, mud, rubbish covering the floor
- lack of standardisation of work baskets on site with variation in safety circuit connection, access, emergency egress
- missing or not completed pre use inspection books, or pre use filled in identifying faults that have not been rectified, or sites with no requirement for pre use checks
- out of date risk assessment (UG diesel operational RA, QDS RA), and/or standard of engineering practice for work baskets
- workers unaware of the safety requirements of workbaskets, including how to egress the basket in the event of an emergency

Assessment findings for metalliferous and extractives mines

Overall, the assessment findings for metalliferous and extractives mines were:

- 8 surface construction materials extractives mines assessed
- 1 surface industrial minerals extractives mine assessed
- 13 underground metals metalliferous mines assessed
- 1 surface mineral sands metalliferous mine assessed
- 184 individual findings for the assessed criteria
- 18 compliance notices issued to 13 of the surface and underground metalliferous & extractives mines assessed

Figure 2 provides a summary assessment of the overall results by criteria for metalliferous and extractives mines.

Figure 2. Summary of assessment findings by criteria at metalliferous and extractives mines



Issues related to work baskets and work platforms attached to multi-purpose mobile plant in metalliferous and extractives mines include:

- damage to safety critical functionality in relation to inoperable self closing gates
- poor housekeeping standards with trip hazards or interference with controls in work basket and/or cabin of ITC
- work basket maintenance inspections out of date whilst the work basket was in use
- no work basket specific pre use inspection requirement, or prestart inspection not completed, whilst the work basket was in use
- task hazard identification form does not identify loads or WLL of work basket
- basket on ITC had no mass, or WLL, or locking pin isolation valve signage

- workers could not identify basket lift capacity
- workers harnesses and/or lanyards out of date.

Notices issued to coal mines

In total, there were 25 assessments conducted at 16 surface and 9 underground coal mines including CHPP.

In summary, there were 6 compliance notices issued to 4 underground coal mines comprising:

- 6 x section 191 improvement notices

The compliance notices issued for coal mines were reviewed and Table 2 lists the notices issued by type and number.

Table 2: Notices issued for coal mines

NOTICE TYPE	TOTAL ISSUED	NUMBER OF SITES
s.191 improvement notice	6	4 (UG)
s.23 notice of concern	0	0
Total	6	4

Note: some mine sites were issued multiple notices

Notices issued to metalliferous & extractives mines

In total, there were 23 assessments conducted at metalliferous and extractives mines.

In summary, there were 18 compliance notices issued to 13 metalliferous and extractives mines comprising:

- 5 x section 191 improvement notices
- 13 x section 23 notice of concern

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

Table 3: Notices issued for metalliferous and extractives mines

NOTICE TYPE	TOTAL ISSUED	NUMBER OF SITES
s.191 improvement notice	5	4
s.23 notice of concern	13	12
Total	18	13

Note: some mine sites were issued multiple notices

Industry development of multi-purpose mobile plant

Historically multi-purpose mobile plant was designed by original equipment manufacturers (OEM) with an attachment system that could support a multitude of implements supplied by either the OEM or third-party providers.

Multi-purpose attachments included:

- buckets – toothed hard rock, blade front coal type, ejector
- forks – both fixed and cross slide
- carry all – single pallet, double pallet, ducks bill, cookie plate
- attachment point for a trailer

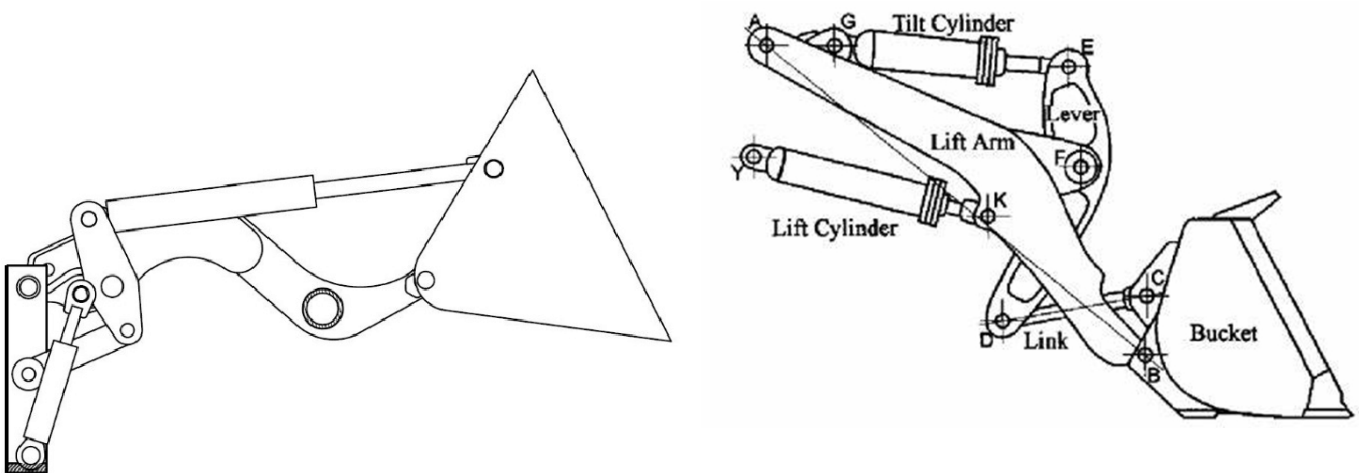
The OEM often may provide a basic machine capacity based on a load centralised to the long axis of the machine, nominally 600mm forward of the attachment point, and elevated approximately 500mm above the ground.

However, the variation in load capacity based on the geometry change of the elevating mechanism was not identified, nor any dynamic effects on the stability of the machine as the centre of mass was moved upwards or forwards.

The loader configuration generally has a loader arm fitted with a hydraulic lift cylinder, and an implement tilt or roll function with a crowd cylinder.

Figure 3 shows the typical loader arm configuration arrangements on a loader.

Figure 3: Typical loader arm configuration arrangements – standard and with Z link bucket tilt mechanism



Both these configuration arrangements shown in Figure 3 have a single line failure component in the crowd / tilt cylinder as referred to in the Regulator’s safety bulletin (SB24-02).

Load is placed on the cylinder and clevis ends in both normal and adverse operation.

Normal operations include carrying known loads within the capacity and stability range of the machine.

Adverse loading includes:

- shaking the bucket to clear out material by rapidly moving the hydraulic tilt back and forward
- driving the machine into fixed objects where the tractive effort is forced through the attachment
- using a bucket attachment to lift the front wheels of the machine off the ground and then perform operations such as back blading
- carrying loads beyond the design operational capacity of the machine, including:
 - long loads where the mass is within the limit of the machine, however the centre of mass is well forward of the attachment face causing an overload condition
 - heavy loads that are within the capacity of the hydraulic system to lift, however exceed the design capacity of the machine
 - heavy loads carried elevated where loader arm geometry has a lesser capacity than when carried close to the ground
 - loads within the design capacity carried on rough roads introducing a dynamic load component.

Consequently, failure of the single line crowd cylinders is a known issue in the NSW mining industry as discussed in recent safety bulletin and safety alert publications:

- Resources Regulator - safety bulletin (SB24-02) load haul dump (LHD) crowd cylinder failures – potential worker injuries
- Resources Safety & Health Queensland Coal Inspectorate – safety alert 454 (dated 14th November 2024) - crowd cylinder failures on load haul dump machines

Multi-purpose mobile plant are generally not specifically designed for operating as an elevated work platform, and may not comply with AS/NZS 1418.10:2011 Amd 1:2017- Cranes, hoists and winches, Part 10: mobile elevating work platforms

Industry organisations such as the Elevating Work Platform Association of Australia (EWPA) or the Telescopic Handler Association of Australia (THA) publish safety fact sheets and good practice guidance notes on the safe use of work platform attachments on multi-purpose mobile plant.

A recent OEM development of a underground coal load haul dump (LHD) loader has a front loader frame option with twin crowd cylinders to provide a safety redundancy for the safety critical lift plate functions on the machine (Figure 4).

Figure 4: Photograph of a OEM development of a twin crowd cylinder on a underground coal LHD loader



OEM development on a LHD loader

- Twin crowd / tilt cylinders controlling the safety critical lift plate

Recommendations for operators of mines

Based on the findings outlined in this report and with respect to the numbers and types of compliance notices issued during the compliance priority program assessment of work platform attachments on multi-purpose mobile plant at mines.

It is recommended that the following should be considered and reviewed by operators of mines:

- mechanical engineering control plans (MECP) and management systems:
 - ensure work baskets and platform attachments are designed for use with, and within the operating parameters of the multi-purpose mobile plant in operation at the site
 - ensure working load limits and capacities of both the mobile plant and the attachments are clearly identified for the full operational envelope of the mobile plant / attachment combination
 - ensure pre-start and maintenance inspections systems include review of the operability of emergency safety equipment on the mobile plant and work platform attachments including the emergency stop controls, egress gates escape equipment functionality from the work platform.

- ensure pre-start inspections record any defects, especially relating to safety critical functionality such as emergency stops and egress, handrails and gates, and attachment security
- ensure maintenance management systems routinely inspect and test multipurpose mobile plant suitability for carrying personnel elevated in work baskets / platforms including single line load supporting components such as loader arms, hinge pins, hydraulic cylinders and attachment points through both non-destructive and component lifecycle change out methods
- ensure maintenance management systems routinely inspect work platform attachments for structural integrity or damage requiring rectification for compliance with relevant standards
- ensure defect management systems identify and rectify critical safety component degradation before the equipment is returned to operational duty.
- ensure operators using mobile plant and work platforms are trained in pre-use inspections and emergency escape functionality of the work platform
- ensure operators using multi-purpose mobile plant attached to work baskets and platforms have competent knowledge of the stability and overload effects of the rated load capacity over the full operating range of the machine
- ensure mobile plant and work platform attachments are regularly cleaned to remove items of equipment, rubbish build up, trip hazards, liquid spills and accumulations of mud material
- ensure the Regulator’s published safety information is effectively provided to workers who operate multipurpose mobile plant and work platforms.
- principal hazard management plan - roads and other vehicle operating areas (PHMP - ROVOA):
 - ensure roadway standards, grades, cross grades are suitable for the complete operational envelope and capacity of the mobile plant with attachments working at their design limit.
- ventilation control plan (VCP):
 - ensure effective air quantity, quality and velocity for gas and dust management in underground roadways for the use of multi-purpose mobile plant with work platform attachments where persons may be working in close proximity to the roof, in particular where workers are lifted into roof cavities .

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