Resources Regulator
Department of Regional NSW

NSW GOVERNMENT

Consolidated report

Roads or other vehicle operating areas – unplanned vehicle interaction underground – stage 1 – underground coal mines

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Executive summary

A crucial part of the NSW Resources Regulator's Incident Prevention Strategy involves targeted assessment and planned inspection programs for mines and petroleum sites. This is a focus on assessing an operation's control of critical risks through evaluating the effectiveness of control measures in the mine's safety management system.

The Regulator has developed a bowtie hazard management framework and standardised assessment checklist for each program plan. Under each program plan, the effectiveness of the safety management system at each mine site is assessed against a standard set of control supports and critical controls.

This report summarises the assessment findings from 18 mines in relation to assessments for the hazard of (roads or other vehicle operating areas – unplanned vehicle interaction underground – stage 1), conducted between September 2022 and January 2023.

The threats and critical controls assessed for the material unwanted event (roads or other vehicle operating areas – unplanned vehicle interaction underground – stage 1) are shown in Table 1.

Table 1: Threats and critical controls for the material unwanted event (roads or other vehicle operating areas – unplanned vehicle interaction underground – stage 1 – underground coal mines)

THREAT	CRITICAL CONTROL
■ Operator error ■ Rule violation ■ Human and organisational factors	PC 1.1 – Supervision
■ Operator error ■ Rule violation ■ Vehicle operating areas ■ Safety critical component failure	PC 1.2 – Competent operators
■ Human and organisational factors	PC 3.1 – Fit for work

Legislative requirements and published guidance relating to the principal hazard of roads or other vehicle operating areas is listed in Appendix A. Figure 1 presents safety compliance findings for each deidentified mine and critical control assessed for the material unwanted event of roads or other vehicle operating areas – unplanned vehicle interaction underground – stage 1. Explanatory notes on the assessment system are also listed in Appendix B.

Key findings

Critical control: PC 1.1 – Supervision

- Supervisors for underground coal mines are generally appointed to the position and hold statutory qualifications such as deputy or undermanager. Each site had defined roles and responsibilities and guidance for people working in supervisory roles. Some mines had assessments to assess the supervisor's knowledge and suitability for managing roads or other vehicle operating areas (ROVOA).
- Supervisors who were interviewed told inspectors that:
  - they promote compliance with ROVOA rules and procedures
  - they conducted inspections of work areas for compliance with ROVOA rules and procedures and
  - they took action to correct non-compliant vehicle operating standards and behaviour.
- Examples of supervisor inspections on roadways (deputy reports) and examples where undermanagers conducted inspections were recorded on their shift reports and work orders were observed by assessment teams.
- At one mine, a surface board showing each main and panel roads where mine deputies who inspected the roadways coloured the pillar segments to match the trigger action response plan (TARP) level condition of the roadway. Appropriate signs for vehicle speed on these sections was in place to notify vehicle operators when to slow down. Areas requiring attention were addressed by roadwork crews. The inspectors who conducted this assessment considered this represented best practice.
- While there were many examples of effective supervision, there were also examples where supervision was consdered less than effective. These included poor roadway conditions and fatigue, and examples where roadway TARPs were not followed by workers or supervisors.
- Stowing material in cuthroughs caused issues such as limiting shunting of vehicles off the travel road, and material was stowed against ventilation stoppings affecting access for inspection purposes.
- Some mines had dedicated resources to manage and maintain road conditions, however other mines addressed road conditions on an ad hoc basis.

Critical control: PC 1.2 – Competent operators

- All sites had conducted Risk assessments.
- Training and assessment of operators was conducted at each mine using training packages developed from original equipment manufacturers' (OEM) material and using site trainers and assessors. Various training and assessment documentation was observed during the assessments.
- Skills matrixes were managed through electronic records processes such as PULSE and Damstra. Providing these are maintained and kept up-to-date, they are effective. Examples were observed where issues could be identified when a worker logged onto a site and a skill had expired.
- Inspectors observed skills matrix records showing sample area operators of equipment were trained and authorised.
- Generally, training records indicated compliance with training and assessment for equipment operation but some training records were incomplete.
- Workers interviewed could describe appropriate vehicle operating procedures and controls for safe vehicle and pedestrian interactions including no-go zones.

- Examples of observations of equipment operators operating the equipment safely and competently on various tasks during assessments ranged from face mining equipment to outbye rubber tyre vehicle tasks.
- There were some observations of operators not complying with ROVOA processes. Surface and UG. (Seatbelts either incorrectly worn or not utilised)

Critical control: PC 3.1 – Fit for work

- Alcohol and other drugs (AOD)processes and procedures were in place at sites, inlcuding self, random, routine, challenge and post incident.
- Workers were aware of AOD processes and procedures.
- All sites had AOD processes but issues identified included:
  - only one alcohol testing facility on site
  - frequency and extent of drug and alcohol testing being conducted onsite was not sufficient to adequately monitor and detect substance use.
- Fatigue was recognised as an issue and most sites had various tools for workers and supervisors to use to recognise and manage fatigue issues. Assessment forms were available at most sites.
- Some sites appeared to have very little formal controls to assist in managing fatigue.
- Some site fatigue management procedures were not applied to a group of workers.
  - Example:- site procedures described a maximum of 60 hours in a 7 day period. A fatigue management procedure included an assessment / permission form to manage working greater than 14 hrs / day or greater than 60 hrs / week. The form was never used for a group of workers on 7 x 12 hr consecutive shifts.
- Workers had access to EAP providers for both work-related and non-work related issues.
- Mental health appeared to be well considered throughout the workers and management.

Recommendations

Critical control: PC 1.1 – Supervision

- Ensure adequate training and information is available to skill supervisors in their roles and responsibilities.
- Develop standards for roadway clearances including services such as pipes, cables and other equipment and materials that is stored in roadways accessed by vehicles.
- Develop TARPs that are practical and determine the meaning of ‘drive to conditions’.
- Develop systems to ensure the controls to manage the ROVOA risks are effective.
- Provide adequate resources to repair and maintain the roadways required to be travelled.
- Remember:
  - Main travel roads are the main access to and from mine areas and are frequently travelled by workers and supervisors.
  - These roads are the primary egress for escape when required, and
  - These roads are the main egress to extracate injured persons out of the mine.

Critical control: PC 1.2 – Competent operators

- Maintain a high standard of training and assessment of operators to ensure competence.
- Conduct observations at regular intervals to ensure operators are operating equipment competently and in compliance with site procedures.
- Maintain current and effective records of training, assessments and appointments.

Critical control: PC 3.1 – Fit for work

- Maintain effective fit-for-work processes at mine sites.
- Develop processes to confirm the effectiveness of these controls.

Findings by mine

Figure 1 presents aggregate assessment findings by threat and critical control, providing a summary view of the status of each mine's hazard management processes. Importantly, the system recognises the value of fully implemented and documented controls by awarding an additional point if both elements were assessed as present. More details explaining the assessment system are at Appendix B.

Figure 1: Assessment findings for the planned inspection program – Roads or other vehicle operating areas – unplanned vehicle interaction underground – stage 1 – underground coal mines

Mine	Threat		
	1. Operator error 2. Rule violation 3. Human and organisational factors	1. Operator error 2. Rule violation 4. Vehicle operating areas 5. Safety critical component failure	3. Human and organisational factors
	PC1.1	PC1.2	PC3.1
Mine	Supervision	Competent operators	Fit for work
Mine A	Orange	Orange	Orange
Mine B	Green	Green	Yellow
Mine C	Green	Yellow	Green
Mine D	Green	Yellow	Green
Mine E	Green	Yellow	Green
Mine F	Green	Green	Green
Mine G	Green	Green	Green
Mine H	Green	Green	Green
Mine I	Green	Green	Green
Mine J	Green	Green	Green
Mine K	Green	Green	Green
Mine L	Green	Green	Green
Mine M	Green	Green	Green
Mine N	Green	Green	Green
Mine O	Green	Green	Green
Mine P	Green	Green	Green
MIne Q	Green	Green	Green
Mine R	Green	Green	Green

Green (=100%)
Yellow (>= 80% and <100%)
Orange (>= 65% and <80%)
Red (<65%)

Notices issued

Of the 18 sites assessed under the inspection program, 7 separate mines were given notices relating to the principal hazard of roads or other vehicle operating areas – unplanned vehicle interaction underground, while some mines were given notices in relation to other matters. For the purposes of this report, contraventions related to other matters were removed from the analysis. The notices issued for roads or other vehicle operating areas – unplanned vehicle interaction underground was examined in detail and Table 2 below lists the notices issued by type and details.

Table 2: Notices issued for the planned inspection program – Roads or other vehicle operating areas – unplanned vehicle interaction underground – underground coal mines

NOTICE TYPE	TOTAL ISSUED	NUMBER OF MINES
s.195 prohibition notice	-	-
s.191 improvement notice	9	4
s.23 notice of concerns	9	7
Total	**18**	

Of the combined 18 notices issued, there were some common themes that were apparent throughout the program plan. Table 3 summarises the type of contraventions. These themes can be related to the critical controls outlined earlier and identify some trends that are of concern.

Table 3: Notices issued - prevalence of categories of concern

IDENTIFIED CONCERN CATEGORY
Poor road conditions observed and encountered during assessments.
Site roadway TARPs and site procedures not followed.
Poor roadway clearances to services such as pipes and cables and stored materials.
Training records either incomplete or not current.
Stowage underground • Excessive stowage in cut-throughs limiting shunting opportunities for vehicles. • Stowage from roadworks stored against ventilation stoppings and preventing access for inspections.
AOD testing • Minimal frequencies • Lack of or minimal availability for alcohol self-testing
Surface roads, drainage, and vehicle interactions.
Fatigue management site processes not followed.
Loss of first aid equipment off vehicle; not secured.
Safety chains on equipment allowed to drag on the ground increasing wear.

Further information

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

CONTACT TYPE	CONTACT DETAILS
Email	cau@regional.nsw.gov.au
Incident reporting	To report an incident or injury call 1300 814 609 or log in to the Regulator Portal
Website	www.resourcesregulator.nsw.gov.au
Address	NSW Resources Regulator 516 High Street Maitland NSW 2320

Appendix A. Legislative requirements and published guidance relating to the principal hazard roads or other vehicle operating areas

The following is a list of certain legislative requirements for the management of roads or other vehicle operating area risks referred to in this report, as provided by the Work Health and Safety (Mines and Petroleum Sites) Regulation 2022 and Work Health and Safety Regulation 2017.

Work Health and Safety Act 2011 No 10

- s18 What is reasonably practicable in ensuring health and safety
- s19 Primary duty of care

Work Health and Safety (Mines and Petroleum Sites) Regulation 2022

- s27 Identification of principal hazards and conduct of risk assessments
- s28 Preparation of principal hazard management plan
- s29 Review of principal hazard management plan
- s32 Movement of mobile plant
- s88 Inspection plan
- s99 Emergency exits

Schedule 1 Principal hazard management plans

- s7 Roads or other vehicle operating areas
- MDG 1009 Managing roads and vehicle operating areas in underground coal mines

Safety Alerts

- SA 21-05 – Potential crush point on personnel transport vehicle
- SA21-07 - Lift arm failure on load haul dump (LHD)
- SA20-09 - Operating mobile plant – incidents and near misses

Safety Bulletins

- SB22-08 - Issues found on forklifts during mine site assessments

Appendix B. Assessment system explained

The NSW Resources Regulator uses a bowtie framework to proactively assess how mine sites manage their principal hazards. Bowties are a widely used risk management tool that integrates preventative and mitigating controls onto threat lines that relate to a material unwanted event.

As part of program planning, controls were categorised by the NSW Resources Regulator's mine safety inspectorate in accordance with the ICMM handbook. Only controls deemed critical1 are assessed under a planned inspection program. For a control to be assessed as effective, each of its control supports must be in place and operational.

Assessment findings results calculation

During the program, each control support assessed at each mine was rated and the findings recorded. Points were awarded depending on whether there was evidence that the control support had been documented and / or implemented. Importantly, the system recognises the value of fully implemented and documented controls by allocating four points if both these elements were present.

For finding outcomes, points were awarded for each control support identified within a critical control. An overall assessment result for the critical control was then calculated as a proportion of the maximum possible points for that critical control. For example, if a critical control comprises ten control supports and five were assessed as fully implemented ('documented and implemented') and five were found to be 'not documented and not implemented' then the overall assessment result for that critical control would be 50%.

Table 3: Finding outcome and points

FINDING OUTCOME	POINTS
Documented and implemented	4
Implemented but not documented	2
Documented but not implemented	1
Not documented and not implemented	0

Critical control calculations also took into account instances where control supports were not applicable to the mine being assessed or when control supports were not able to be assessed during a site visit.

The overall assessment result for each critical control has been assigned a colour based on the assessment bands presented in the table below. The colour band results are then used to identify industry focus areas requiring improvement.

Table 4: Assessment results and colour code

CRITERIA	COLOUR
An assessment result of 100% of possible points	Green
An assessment result of ≥ 80% but < 100% of possible points	Yellow
An assessment result of ≥ 65% but < 80% of possible points	Orange
An assessment result of < 65% of possible points	Red

[1] Critical Control Management Implementation Guide, International Council on Mining and Metals (ICMM), 2015.