NSW GOVERNMENT

NSW Resources Regulator

PLANNED INSPECTION PROGRAM CONSOLIDATED REPORT

MANAGING ROADS AND OTHER VEHICLE OPERATING AREAS IN THE SURFACE METALLIFEROUS SECTOR

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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.

To this end, the Regulator 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 final report summarises assessment findings from 35 mines in relation to the principal hazard of roads or other vehicle operating areas. Assessments were conducted for both open cut metalliferous mines and metalliferous processing plants during the period from August 2019 to September 2020. The threats and critical controls assessed are shown in Table 1. Note that not all mines were assessed for all critical controls.

Table 1 Threats and critical controls for the material unwanted event (surface vehicle interaction)

THREAT	CRITICAL CONTROL
■ Substandard vehicle operating areas ■ Environmental conditions ■ Component failure	PC1.1 – Road standards
■ Vehicles operating in close proximity	PC2.1 – Traffic management
■ Substandard vehicle operating areas ■ Vehicles operating in close proximity ■ Environmental conditions ■ Component failure ■ Human and organisational factors	PC2.3 – Competent vehicle operator
■ Vehicles operating in close proximity ■ Environmental conditions ■ Component failure	PC4.2 – Fit for purpose vehicles

- Vehicles operating in close proximity
- Human and organisational factors

PC5.2 – Fit for work operator

Legislative requirements and published guidance relating to the principal hazard of roads or other vehicle operating areas is listed in Appendix A. Figures 1 and 2 present safety compliance findings for each de-identified mine and critical control. Explanatory notes on the assessment system are also listed in Appendix B.

Key findings

One of the key findings identified from this planned inspection program was the need to ensure that plans and systems of work are developed and implemented based upon the underlying risk assessments. As part of this, the safety management system should also include an integrated document management process. The enforcement action taken reflected these concerns, with 29 notices issued that related to either a lack of, irrelevant, or outdated documentation of the controls for roads or other vehicle operating areas (i.e. Risk Assessment, PHMP, TARPs).

Another 33 notices were regarding a lack of information, training, and instruction. Common themes included workers not being familiar with the controls nominated for the site, a lack of training, and information not being clearly defined for the workplace hazards. Deficiencies were identified regarding training records not being maintained adequately to support workers' competencies.

The lack of integrated systems and poor communication of systems was identified during workplace inspections where inspectors observed inadequate construction standards for roadways and intersections. Further observations also found non-compliances by workers with the identified controls the mine had documented.

Another area of concern observed by inspectors was the lack of positive communication between mobile plant and workers. This was uncovered on multiple occasions whilst completing site assessments. When determining how the mine site could verify compliance with its own positive communication procedures, only one mine was found to have an effective system to audit and assess internal compliance.

To ensure equipment is fit for purpose, introduction to site processes covering vehicles and other mobile plant, was identified to be non-compliant on several occasions. This was most notable for contractor plant and equipment, particularly in circumstances where the plant was only intended to be onsite on a temporary basis.

As per the hierarchy of controls, elimination is the most effective control and several mines achieved this through segregation of heavy and light vehicle roadways. This reduced congestion on roadways and intersections as a result and should be adopted by mine operators where reasonably practicable.

Throughout the inspection program, complacency with the sites nominated controls was found to be a major influence on the non-compliances that were discovered. To ensure a robust management system, workers must engage with the controls effectively and routinely. Supervisors also play a key role in maintaining these standards, and sites which displayed strong compliance standards often had effective visible leadership programs implemented. Such programs included regular safety interactions with workers by management or supervisors that were designed to verify compliance to site procedures.

Recommendations

With regards to the assessments conducted within this planned inspection program, the below points highlight some key recommendations which mine operators should consider:

- ensure verification processes are in place to measure and monitor compliance with site procedures and standards for road design and construction
- ensure that supervision is adequate so that work area inspections are detailed thoroughly and identify all reasonably foreseeable hazards
- ensure workers are trained and competent in the systems of work and workplace standards and records are maintained of information, training and instruction provided.
- revise expectations with supervisors and the management team around visible leadership practices and the requirement to conduct meaningful interactions with workers.
- apply risk assessment and change management systems for the development and modification to roads and other vehicle operating areas.

Introduction

The NSW Resources Regulator's planned assessment programs provide a planned, risk-based and proactive approach to assessing how effective an operation is when it comes to controlling critical risk. These programs apply the following principles:

- a focus on managing prescribed 'principal hazards' from the Work Health and Safety (Mines & Petroleum Sites) Regulation 2014
- evaluation of the effectiveness of control measures implemented through an organisation's safety management system and
- consideration of the operation's risk profile.

The objective of risk profiling is to identify the inherent hazards and the hazard burden that exist at individual operations in each mining sector in NSW. The information is then used to develop the operational assessment and inspection plans that inform the program.

Scope

Planned inspection programs include two assessment types:

- **Targeted assessments**, incorporating:
  - desktop assessment of:
    - compliance against legislation with respect to the management of health and safety risks associated with roads or other vehicle operating areas – see Appendix A for details
    - the definition of the controls the mine utilises to prevent and mitigate the risks to health and safety associated with roads or other vehicle operating areas
  - a workplace assessment of the implementation of those controls through the inspection of plant and worker interviews.
- **Planned assessments**, which involve a workplace assessment of the implementation of controls through the inspection of plant and worker interviews only.

The process

The process for undertaking planned inspections generally involves the following stages:

- preliminary team meetings, preparation and review of documents
- execution of an on-site assessment involving:
  - a site desktop assessment of relevant plans and processes measuring legislative compliance of the relevant plans
  - the inspection of relevant site operations
- discussion and feedback to the mine management team on the findings and actions that need to be taken by the mine operators in response.

Assessment findings

Controls assessed

Threats:

- substandard vehicle operator areas
- environmental conditions
- component failure

Critical control: PC1.1 Road standards

There are numerous mechanisms which can contribute to the quality of road standards and if not managed appropriately, can potentially result in serious or fatal injuries to workers who operate equipment within those areas. For this reason, it is critical that mine operators ensure such areas are suitable for use and are regularly maintained and monitored. In relation to road standards, the criteria below were assessed for each site:

- a risk assessment identified risks associated with roads or other vehicle operating areas
- procedures described the controls relating to road standards
- suitable roads were available for vehicles
- roads were inspected and maintained

- road standards information, training and instruction material was produced and delivered.

Of the 35 mines assessed, the majority were found to have systems in place to ensure adequate road standards, however, at numerous sites defective elements were discovered. Issues existed largely around the following:

- documentation around the controls for road standards were either not relevant or current and were not adequately understood or easily accessible by workers
- workers were observed during interactions to be non-compliant with the nominated controls
- to a lesser extent, active roads and intersections were constructed to an inadequate standard and this included inadequate signage and delineation
- bunding for protection of infrastructure and designated park-up areas was either constructed to an inadequate standard or missing altogether.

Threat:

- vehicles operating in close proximity.

Critical control: PC2.1 Traffic management.

Traffic management is a critical control which is intended to prevent the opportunity for vehicles or mobile plant to interact with infrastructure, pedestrians, or other vehicles and mobile plant. It is expected that mines have implemented effective traffic management controls to ensure that such interactions are eliminated or minimised, so far as is reasonably practicable. This inspection program assessed each site's traffic management controls with regards to the following criteria:

- a risk assessment identified the risk of vehicles operating in close proximity to pedestrians, other vehicles and infrastructure
- procedures described the identified traffic management controls
- Trigger Response Action Plans (TARPs) guided the execution of the traffic management controls
- documents, tools and equipment required to manage traffic were made available
- traffic management information, training and instruction material was produced and delivered

- workers were compliant with traffic management requirements
- vehicle interaction near misses and events were reported, investigated and actioned in a timely manner.

The majority of mines had not completely addressed the controls regarding traffic management. Some common issues included:

- not all mines had developed a TARP for the execution and maintenance of traffic management controls
- site induction training was relied upon as the primary means of communicating traffic management controls and formal competency assessments of site traffic rules were lacking at several mines
- positive communication protocols were not always understood by mine workers and at several mines the systems and level of understanding varied between workers and contractors.

Threats:

- substandard vehicle operating areas
- vehicles operating in close proximity
- environmental conditions
- component failure
- human and organisational factors.

Critical Control: PC2.3 Competent vehicle operator.

In addition to implementing effective road standards and traffic management controls, it is imperative that vehicles are safely operated by workers who have the necessary knowledge and skills to carry out the task. Mines should have comprehensive and robust systems in place to ensure workers are not only trained and competent, but also authorised to operate vehicles within various areas of the operation. Sites were assessed on the following criteria:

- a risk assessment identified the risk of vehicles operating in close proximity to pedestrians, other vehicles and infrastructure
- procedures described the identified competent vehicle operator controls

- a system for managing competency of vehicle operators was established
- vehicle operating procedures were available
- vehicle operators were assessed as competent and supporting documents were available
- vehicles were safely operated
- hazards were identified and controlled
- information, training and instruction were delivered to vehicle operators.

Some issues which related to worker competencies for operating vehicles included:

- training and assessment systems were implemented at all mines, however ongoing maintenance of competencies and up to date training records were not always recorded
- contractor competency were not always checked and maintained within the mines systems
- training programs were not always updated when hire plant was introduced to site
- updating and communication of changes to traffic controls was also observed as a deficiency within the mines' communication systems (i.e. toolbox talks or pre-shift communications)
- pre-start systems and maintenance programs were identified as being implemented at all mines.

Threats:

- vehicles operating in close proximity
- environmental conditions
- component failure.

Critical Control: PC4.2 Fit for purpose vehicles.

When determining the type of transport arrangements at an operation, mine operators must ensure that vehicles are able to safely carry out the functions they were designed to perform for the intended use, over the lifetime of the vehicles. This should involve the implementation of numerous systems and processes which verify that the vehicle is fit for purpose prior to the use of the vehicle on site.

Sites were assessed on the following criteria:

- a risk assessment identifies the risk of vehicle component failure

- procedures describe the identified vehicle component failure controls
- vehicles new to site are checked to make sure they are fit for the purpose they will be used for
- vehicles are used for tasks that are appropriate for its design
- vehicle features, critical to its safe use, are identified
- inspection, maintenance, and testing identify safety critical components that do not meet the established criteria
- risk management processes are applied to manage changes to vehicle configuration, using vehicles for purposes other than what they were originally designed for and using vehicles beyond the limits specified by the manufacturer.

With regards to this critical control, the following points highlight some specific findings:

- Introduction to site systems were formally in place and were being maintained.
- Although most mine operators had change management systems implemented, they could not always produce documentation and/or a risk assessment for the modification to mobile plant that had occurred.
- Not all mine operators had developed their scheduled maintenance systems with consideration of a formal critical component failure risk assessments. It was often observed that there was a reliance on the OEMs to manage this information.

Threats:

- vehicles operating in close proximity
- human and organisational factors.

Critical Control: PC5.2 Fit for work operator.

It is a legislative requirement that mine operators implement control measures for workers who may be under the influence of alcohol, drugs or fatigued. Vehicle operators must also be physically and mentally capable of performing their duties. Sites were assessed on the following criteria:

- a risk assessment identifies the risk of vehicles operating in close proximity to pedestrians, other vehicles and infrastructure

- procedures describe the identified operator fitness for work controls
- vehicle operators are physically capable of performing vehicle operating tasks
- vehicle operators are free from impairment caused by alcohol and other drugs
- vehicle operators are well rested and free from the effects of fatigue
- vehicle operators are aware of mental health issues and have access to support when suffering a mental wellness issue
- vehicle operators are aware of fitness for work risks and the controls the site is using
- workers suffering from fitness for work related issues have access to support.

All mines were found to have fitness for work systems that varied in complexity and detail. Best practice was observed at several mines which had developed internal mental health and welfare programs that also address fatigue, weight and lifestyle issues. Alternatively, other sites often relied upon their employee assistance programs to deal with such issues.

1.1. Assessment findings by mine

This table presents aggregate assessment findings by 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 found at Appendix B.

Figure 1 – Assessment findings for the planned inspection program for roads or other vehicle operating areas – surface metalliferous (overall results <90%)

	0102 Surface Vehicle Interaction				
	PC1.1	PC2.1	PC2.3	PC4.2	PC5.2
	1. Substandard vehicle operating areas 3. Environmental conditions 4. Component failure	2. Vehicles operating in close proximity	1. Substandard vehicle operating areas 2. Vehicles operating in close proximity 3. Environmental conditions 4. Component failure 5. Human and organistional factors	2. Vehicles operating in close proximity 3. Environmental conditions 4. Component failure	2. Vehicles operating in close proximity 5. Human and organisational factors
	Road standards	Traffic management	Competent vehicle operator	Fit for purpose vehicles	Fit for work operator
Mine A	Red	Orange	Orange	Not applicable	Not applicable
Mine B	Red	Red	Orange	Yellow	Red
Mine C	Not applicable	Not applicable	Not applicable	Green	Red
Mine D	Red	Red	Yellow	Yellow	Green
Mine E	Red	Orange	Orange	Green	Green
Mine F	Yellow	Red	Orange	Yellow	Yellow
Mine G	Yellow	Yellow	Red	Not applicable	Not applicable
Mine H	Yellow	Orange	Orange	Green	Red
Mine I	Orange	Yellow	Yellow	Not applicable	Not applicable
Mine J	Yellow	Yellow	Green	Not applicable	Not applicable
Mine K	Orange	Yellow	Yellow	Green	Yellow
Mine L	Yellow	Yellow	Green	Not applicable	Not applicable
Mine M	Orange	Yellow	Green	Green	Green
Mine N	Orange	Yellow	Yellow	Green	Green

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

Figure 2 – Assessment findings for the planned inspection program for roads or other vehicle operating areas – surface metalliferous (overall results >90%)

	0102 Surface Vehicle Interaction				
	PC1.1	PC2.1	PC2.3	PC4.2	PC5.2
	1. Substandard vehicle operating areas 3. Environmental conditions 4. Component failure	2. Vehicles operating in close proximity	1. Substandard vehicle operating areas 2. Vehicles operating in close proximity 3. Environmental conditions 4. Component failure 5. Human and organistional factors	2. Vehicles operating in close proximity 3. Environmental conditions 4. Component failure	2. Vehicles operating in close proximity 5. Human and organisational factors
	Road standards	Traffic management	Competent vehicle operator	Fit for purpose vehicles	Fit for work operator
Mine O	Red	Green	Green	Green	Yellow
Mine P	Yellow	Yellow	Green	Yellow	Green
Mine Q	Green	Yellow	Green	Orange	Green
Mine R	Yellow	Yellow	Green	Yellow	Red
Mine S	Orange	Yellow	Green	Green	Green
Mine T	Not applicable	Not applicable	Not applicable	Green	Yellow
Mine U	Green	Yellow	Yellow	Yellow	Green
Mine V	Yellow	Yellow	Yellow	Not applicable	Not applicable
Mine W	Yellow	Yellow	Yellow	Green	Green
Mine X	Yellow	Yellow	Yellow	Green	Green
Mine Y	Green	Yellow	Yellow	Yellow	Green
Mine Z	Yellow	Yellow	Yellow	Green	Green
Mine AA	Green	Green	Yellow	Orange	Green
Mine AB	Yellow	Yellow	Yellow	Green	Green
Mine AC	Green	Green	Green	Yellow	Red
Mine AD	Not applicable	Green	Green	Yellow	Green
Mine AE	Green	Green	Green	Yellow	Green
Mine AF	Not applicable	Not applicable	Not applicable	Green	Green
Mine AG	Green	Green	Green	Green	Green
Mine AH	Green	Green	Green	Green	Green
Mine AI	Green	Green	Green	Green	Green

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

Notices issued

Of the 35 sites assessed under the inspection program, all received notices relating to the principal hazard of roads or other vehicle operating areas, whilst some mines received notices in relation to other matters. For the purposes of this report, contraventions related to other matters have been removed from the analysis. The notices issued for roads or other vehicle operating areas were examined in detail and Table 2 below lists the notices issued by type and details.

Table 2 - Notices issued for the planned inspection program for roads or other vehicle operating areas

NOTICE TYPE	TOTAL ISSUED	NUMBER OF MINES
s.195 prohibition notice	0	0
s.191 improvement notice	39	24
s.23 notice of concerns	44	31
Total	**83**	**35**

Of the combined 83 notices issued, there were some common themes which were apparent throughout the program plan. Table 3 summarises the type of contraventions and outlines the total occurrences encountered. These themes can be related back to the critical controls outlined earlier and identify some trends which are of concern.

Table 3 - Notices issued - prevalence of categories of concern

IDENTIFIED CONCERN CATEGORY	TOTAL OCCURRENCES IN NOTICES
Documentation relating to controls for roads or other vehicle operating areas (i.e. Risk Assessment, PHMP, TARPs) not relevant, current, or readily available	29
Workers not familiar with nominated controls on site	23
Active roads and intersections were not constructed to an adequate standard	18
Workers observed to be non-compliant with the nominated controls on site	17
Poor standard of signage and delineation along active roads	15
Protective bunding for infrastructure and designated park-up areas were either absent or constructed to a poor standard	13
Mobile plant not fit for purpose	12
Pre-use inspection checklists did not accurately specify safety critical components of the vehicle	11
Training information for workers not clearly defined or detailed in relation to the hazard	10
Training records for workers were not recorded or available upon request	9
Pre-work risk assessment was not completed or to a poor standard	8
The mine did not have a component of the safety management system which dealt with mental health or fatigue	8
Opportunities for minimising and/or segregating vehicle interaction were not adequately assessed or implemented	6
Documented maintenance records for mobile plant were not up to date	5
Recent safety incident information had not been communicated to all workers	5
Maintenance of mobile plant was inadequate or non-existent	5

Further information

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

CONTACT TYPE	CONTACT DETAILS
Email	cau@planning.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 of roads or other vehicle operating areas

The following is a list of certain legislative requirements for the management of risks associated with roads or other vehicle operating areas as provided by the Work Health and Safety (Mines and Petroleum Sites) Regulation 2014. In addition, several guidance documents are also noted which have been published and are available for industry distribution.

Work Health and Safety (Mines and Petroleum Sites) Regulation 2014

- Clause 28 - Movement of mobile plant
- Clause 103 - Duty to inform workers about safety management system
- Clause 104 - Duty to provide information, training and instruction
- Clause 107 - Review of information, training and instruction
- Clause 108 - Record of training
- Schedule 1, Part 2, Clause 4 - Roads or other vehicle operating areas.

MDG 15 - Guideline for mobile and transportable plant for use at mines (other than underground coal mines)

MDG 2007 - Selection of collision management systems

Safety Alert (SA20-09) - Operating mobile plant - Incidents and near misses

Safety Bulletin (SB19-09) - Lack of bunding on accessible edges

Safety Bulletin (SB18-11) - Windrow management and demarcation

Safety Bulletin (SB18-06) - Lack of positive communications

Safety Bulletin (SB17-01) - Industry reports more truck rollover incidents

Investigation Information Release (IIR19-11) - Fatality at Snapper Mineral Sands Mine

Appendix B. Assessment system explained

We use 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 in accordance with the ICMM handbook. Only controls deemed critical[1] 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

During each mine's onsite assessment, inspectors rate each control support and record the findings. Points are awarded depending on whether there was evidence that the control support had been documented and/or implemented.

For the finding outcomes in this report, points were awarded for each control support identified within a critical control. An effective control support is allocated four points where the control was assessed as fully implemented and documented. An overall assessment result for the critical control is 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%.

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 take 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.

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

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.

Assessment results 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