Resources Safety & Health
Queensland

Recognised Standard 20

Summary of audits & inspections

Coal Inspectorate

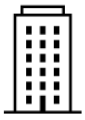
September 2022 | Version 1

Contents

1 Quick reference summary of audit/ inspection findings

25 site visits

44% of all open cut coal mines



Every coal company had at least one site audited or inspected

3

Directives

73

SCP

95

Opportunities for improvement

2 Context

In November 2019, Recognised Standard 20: Dust Control in Surface Mines (RS20) (1) was released for adoption by the Queensland coal mining industry. This standard was developed through a tripartite process involving representation from the coal regulator, coal company operators, and Coal Mine Workers (CMWs).

2.1 Key points about Recognised Standards

The *Coal Mining Safety and Health Act 1999* (2), addresses the purpose (s. 71) and application (s.37) of Recognised Standards for Queensland Coal Mines. Fundamentally these documents provide ways that if followed, may enable operations to achieve an acceptable level of risk when dealing with hazards that exist at the coal mine. Recognised Standards outline best practice for the industry.

It is the Coal Inspectorate's expectation that following the release of a recognised standard:

- Sites will undertake a gap analysis of the standard against the mines safety health management system (SHMS) within 6 months of standard release
- Identify any shortfalls and/or opportunities for improvement
- Prepare an action plan, with completion dates, to address the gaps
- Assign actions to persons with the authority and accountability to address the actions
- Execute the action plan within a reasonable time frame.

3 Introduction

RS20 provides a framework for mines to develop a Dust Management Plan (DMP). This covers aspects of dust generating processes on open cut coal mines and the surface areas of underground coal mines. The standard focuses on the selection and installation of dust controls as well as other important aspects with respect to:

- Mine design considerations
- Maintenance and inspection of dust controls
- Validation of dust control effectiveness
- Training of CMWs.

3.1 Protecting Coal Mine Workers and future proofing our industry

Since the release of RS20, the regulatory limits for respirable coal dust (RCD) and respirable crystalline silica (RCS) have been reduced to 1.5 mg/m^3 and 0.05 mg/m^3, respectively. In recent times Safe Work Australia have initiated processes to further reduce the RCS standard to align with epidemiological evidence suggesting a health-based limit of 0.02 mg/m^3. The current sensitivity of measurement and analysis techniques suggest that a further reduction at this time is premature. However, a future reduction is inevitable, and it would be prudent for the coal industry to adopt an approach that follows the principles of as low as reasonably achievable. Current exposures may indicate an acceptable level of risk but with a further reduction of the RCS limit this may not remain the case. Considerations need to apply to the selection and design of Heavy Mobile Equipment (HME) and specifically the standard of the cabin ventilation systems on board.

Currently a significant percentage (40%) of RCS exceedances recorded on Queensland surface coal mines have been recorded by CMWs operating HME. These CMWs are unlikely to be wearing respiratory protective devices.

4 Overview of Inspection / Audit Program

In February 2021, an audit/ inspection regime was initiated by Resource Safety and Health Queensland (RSHQ) Occupational Hygiene Inspectors (Coal). This process concluded in July 2022 after completion of 25 inspections and audits representing approximately 44% of surface coal mines. At least one mine from each of the coal operating companies received an inspection or audit.

The audit / inspections were conducted with tools mapped against RS20. These consisted of both a desktop and field component. For larger operations, these activities were split across separate days.

Emphasis was placed on the following elements of dust management and control:

- Identification of dust generating tasks

- Cabin ventilation systems to prevent dust ingress into mobile plant
- Process for removing / replacing / cleaning cabin filters
- Processes for cleaning out dust from mobile pant
- Laboratory dust controls including local exhaust ventilation (LEV)
- Processes for cleaning / blowing dust from electrical enclosures
- Inspection and maintenance of dust controls
- Selection, use and maintenance of respiratory protective equipment (RPE)
- Review of DMP / procedure
- Communicating dust monitoring results
- Dust exceedance investigation process
- Training of CMWs.

5 Key Findings

In general, the application of RS20 was found to be inconsistent across the mines reviewed. However, there were a small number of mines that demonstrated that they had identified and implemented the key components detailed in RS20, including a process for upgrading / retrofitting and maintaining HME to meet cabin filtration and pressurisation standards.

Several issues were consistently identified during this program. These are listed below. Some of the more significant items are discussed in detail later in this document.

- Risk Management process applied to the control of dust was inadequate and / or did not comply with legislative requirements generally RS20 2019 s 5.
- The site did not have a DMP in place that satisfied the requirements of RS20 2019 s 5(2).
- Cabin ventilation systems on HME did not meet the requirements of RS20 2019 s 6(5).
- Industrial and portable vacuums used for cleaning dust often did not have high efficiency particulate air (HEPA) grade filters RS20 2019 s 6(4).
- Inadequate systems in place for the inspection and maintenance of dust controls RS20 2019 s 9.
- Training of CMWs did not meet the requirements of RS20 2019 s 11.
- The selection, use and maintenance of RPE (including facial fit testing) did not meet the requirements of RS20 2019 s 10.
- There was no or incomplete compressed air cleaning registers as required by RS20 2019 s 9(1.2.2).
- The investigation process applied to personal dust exceedances did not meet the minimum requirements of Recognised Standard 14: Monitoring Respirable Dust in Coal Mines (RS14), RS14 2021 s 9, and did not consider failed or absent controls specified in RS 20.

6 Corrective actions issued to sites

As a result of this program there was a total of 76 corrective actions issued across the 25 sites. Every site received at least one corrective action. These corrective actions are broken down as follows.

Directives – 3

Substandard condition or practice (SCPs) – 73

The number of corrective actions for each respective category are detailed in Figure 1. Non-conforming cabin ventilation systems, absence of an RPE program (including facial fit testing) and inadequate dust management plans represented approximately 60% of corrective actions.

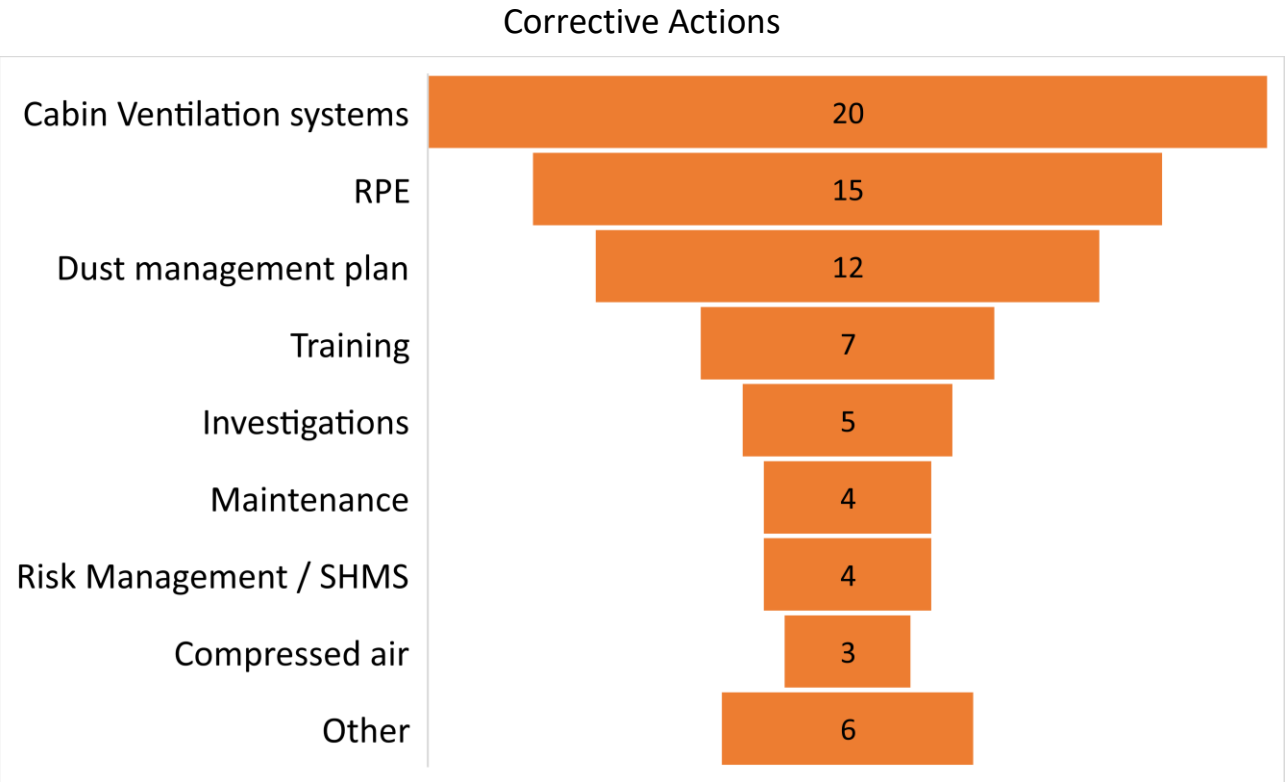


Figure 1: Number of corrective actions (SCPs or Directives) issued by category

In addition to corrective actions there were 95 opportunities for improvement identified collectively across the sites. The most common themes in this category were:

- Amending service sheets to require the cleaning of internal filter housing / duct surfaces when replacing filters.
- Specify intake air and recirculation filter part numbers on service sheets to ensure correct grade filters are fitted.

- Modifying pre-start check lists for HME to include more specific requirements around dust control (e.g., Water sprays, door seals, AC system, pressure sensor etc).
- Installing continuous pressure sensors in cabins with alarming function.
- Compressed air cleaning registers.
- Specifying RPE requirements in Standard Operating Procedures (SOPs) and Safe Work Instructions (SWIs).
- Personal monitoring on weekends and back shifts to minimise sampling bias.
- Maintaining records for competencies for dust samplers and Certified Occupational Hygienist (COH).
- Communicating dust results to CMWs.
- Utilising hygiene service provider and/or subject matter expert to present analysis of dust monitoring data to the mines senior management team at conclusion of the annual monitoring program.

7 Important discussion points

The following elements were consistently identified, as requiring corrective action or were identified as an improvement opportunity. These are discussed in more detail.

7.1 Dust management plans

The majority of DMPs reviewed did not meet the requirements of RS20. Generally, the site procedures which were dedicated to management of dust were heavily focused on RS14 and the regulatory requirements with respect to:

- Undertaking dust monitoring
- Respirable and inhalable dust exposure limits
- Adjusting limits for extended shifts
- Investigation of dust exceedances
- Quarterly reporting of dust monitoring results and single exceedances.

Generally, DMP/ procedures **failed** to adequately provide for:

- Overarching framework for dust management including a general strategy for dust control
- Consideration of hierarchy of control, specifically engineering controls
- Dust control during mine design or construction of infrastructure
- Routine inspection and maintenance of existing dust controls
- Process for infield verification and periodic review of dust control effectiveness
- Sources of dust exposure and dust control requirements in all operational areas of the mine
- Education for CMW on dust.

7.2 Cabin Ventilation systems

Since 2017 approximately 40% of all RCS exceedances occurring on surface coal mines have been recorded by CMW operating HME. This indicates significant dust ingress into the cabin during routine operation or the failure of the cabin ventilation system to remove dust that has entered through the opening of doors or brought into the cabin on the clothes or boots of CMW.

RS20 provides clear guidance on the design specification requirements for cabin ventilation systems in terms of the grade of filtration media (HEPA) and the minimum in cabin pressure levels to prevent inward leakage. These requirements are:

- the ability to supply pre-cleaned and filtered air to the cabin that passes through a HEPA filter of minimum Class H13.
- the ability to pressurise the cabin to sufficient levels to prevent ingress of dust. Some studies show significant cab environmental benefits when cab pressures exceed 20 Pascals (Pa).
- the ability to continuously monitor cabin pressure with a system that alarms when the pressure is not adequate.

There are a select number of vendors who can supply and install devices that preclean, filter and pressurise cabin ventilation systems for HME. Importantly these systems are also able to remove dust that enters the cabin through appropriate recirculation filter. These devices can be fitted to new HME or retrofitted to older models.

In recent times, Original Equipment Manufacturers (OEMs) of HME are also providing optional cabin ventilation systems that meet the performance requirements of RS20.

During the RSHQ inspection/ audit campaign, most sites (80%) did not have a documented standard for the design requirements of cabin ventilation systems and / or HME fleets with compliant systems.

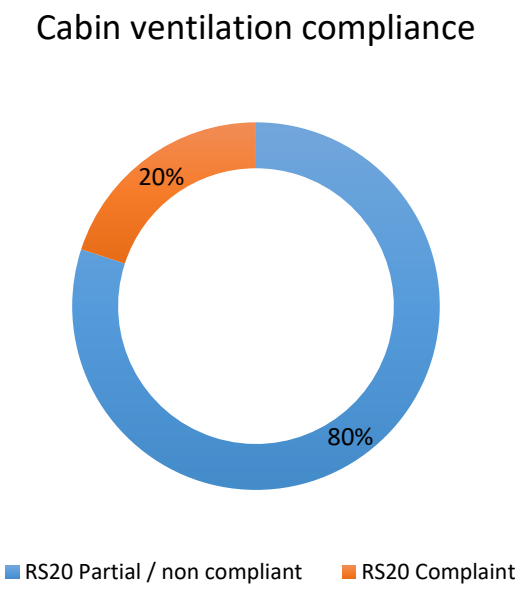


Figure 2: Cabin ventilation systems compliance to RS20

There were, however, a number of sites that had proactively started a systematic risk-based process to upgrade and / or purchase RS20 compliant HME.

The common observations of cabin ventilation systems are as follows with corresponding figures contained in Appendix 1.

- The mines SHMS did not specify a minimum design criteria standard for cabin ventilation systems that was compliant with RS 20.
- Cabin ventilation systems design did not allow for pressurisation of cabin and supply of fresh filtered air (refer figure 11, 12).
- The level of filtration for intake air filters was typically engine grade and did not meet HEPA classification (refer figure 9, 10).
- The recirculation filter typically had no classification and was not rated for any type of particulate (refer figures 15, 16, 17, 18).
- The filtering housing mechanisms were often damaged or had poor sealing capability allowing for bypass (refer figure 5, 6, 7).
- Filters had been installed without adherence to directional markings affecting performance.
- Filters were installed with damaged components or damaged during the install process, affecting performance (refer figure 3, 4).
- Air-Conditioning ductwork contaminated with fine particulate due to dust ingress was not removed during inspection/ maintenance or upgrade of ventilation systems (refer figure 8).
- Placement of precleaning and intake air filter located in position that impacts performance due to water ingress or location of higher dust concentration (refer figure 4).
- Portable vacuum cleaner used to clean inside equipment not fitted with HEPA filter and not maintained (refer figure 13, 14).
- Compressed air gun used to clean equipment (refer figure 19, 20).

7.3 Inspection and maintenance of dust controls

RS 20 section 9 details specific requirements regarding the inspection, monitoring, and maintenance of dust controls. During the audit inspection program, it was observed that sites were routinely inspecting and performing maintenance of filtration systems at specified intervals. During these inspections it was verified that the services were being conducted as per the work order specification. There was considerable variation between some sites at the frequency between these services. Variations of 250 hours to 1000 hours were observed, however most sites adhered to a 250-hour frequency for the HME operating in potentially high dust environments.

With respect to inspection and maintenance of fixed LEV systems (e.g., laboratories and boilermakers shop), the critical maintenance and performance validation of these systems as specified in RS20 was rarely performed or covered by documented procedures.

Similarly, the use of powered air purifying respiratory (PAPR) protective devices was rarely supported by a scheduled maintenance program in line with the OEM guidelines.

7.4 Training of CMW on dust

The training requirements for CMW are detailed in RS20 under section 11 and 11.1. This training is to include the health impacts of exposure to airborne dust and the specific dust control mechanisms relative to the mine. At least 50% of coal mines visited did not meet the education and training requirements of RS20. In addition to the shortcomings of the content material, the training was not often formalised or part of the mines structured training scheme.

Where training was provided it often focused on aspects of dust monitoring, exposure standards and requirement to wear RPE. It did not address specifics of dust control relative to the CMW tasks and the use of RPE did not cover selection, correct fitment, and limitations of use.

7.5 Respiratory protective equipment (RPE)

It is recognised that RPE is the lowest form of control in the hierarchy of control, however, it often forms part or sometimes the primary means of dust control. Through this audit / inspection program it was found that the use of RPE was often specified in SOPs / SWIs or the sites Personal Protective Equipment (PPE) matrix and reinforced through signage at locations across the mine site. This was however rarely supported by training and processes as required by sec. 64 and 65 of the Coal Mining Safety and Health Regulation (3) and / or a respiratory program that included facial fit testing.

In some cases, the use of RPE was stipulated in SOPs / SWIs but there was no guidance on the type

or protection factor (PF) of RPE to be worn or the conditions of use. It was essentially left to the CMW to decide.

The requirement to wear RPE may be decided through:

a) qualitative risk assessment process and then documented in the respective SOP or SWI.
b) review of quantitative exposure date. **Note:** General guidance suggests, if the average exposure for a Similar Exposure Group (SEG) is above 50% of the shift adjusted exposure limit, RPE should be worn.
c) It may also be worn when a CMW chooses to wear for personal protection, irrespective if it is a mandatory requirement.

The tasks, areas or situations where RPE is required to be worn must be clearly identified in SOPs, SWIs or through placement of signage and communicated to CMWs required to wear the RPE.

In each of the cases above or on any other occasion when RPE is worn it should be selected, used, and maintained as part of a respiratory protection program. For negative pressure respiratory protection, this should include facial fit testing. This should be repeated on annual basis or whenever the type of RPE is changed.

8 Recommendations for site senior executives (SSEs)

The following recommendations are made to site senior executives for consideration and review. Inspectors will be on site to discuss, review, and action of these recommendations, as required.

1. Ensure the site has undertaken a gap analysis against RS20 and has an action plan in place to implement and maintain dust controls.
2. Review the SHMS documentation to ensure airborne dust control is addressed as specified in RS20.
3. Develop a cabin ventilation system design standard for HME to ensure compliance with filtration and in cabin pressure requirements of RS20 2019 s 6(5). This must include contractor and hire equipment.
4. Prepare a schedule for implementation of the cabin ventilation system design standard. This should be risk based with priority given to HME operating in high dust environments. Refer example in Appendix 4.
5. Review the use of vacuums and extraction systems on site used for the removal and cleaning of dust. These must be fitted with HEPA grade filters RS20 2019 s 6(4).

6. Ensure dust controls including suppression systems, LEV systems and PAPR are included on the mines planned inspection and preventative maintenance schedule RS20 2019 s 9(1.1). These must be supported by documented procedures.
7. Review the use of RPE on site. Where RPE is required to be worn ensure CMWs receive training in the selection and use of these devices. This must also include facial fit testing for negative pressure RPE in RS20 2019 s 10 and AS1715 (4). CMWs must be informed of when and where to use RPE at the mine site.
8. Review processes for the training of CMWs so that the matters specified in RS20 are included in induction and refresher training.
9. Review investigation process to ensure as a minimum the items specified in section 9 of RS14 (5) are included and addressed and the failed or absence of controls specified in RS 20 are considered.

9 Bibliography

1. **DNRME.** *Recognised Standard 20 – Dust Control in Surface Coal Mines.* Retrieved from https://www.rshq.qld.gov.au/__data/assets/pdf_file/0005/1462685/recognised-standard-20-dust-control-surface-mines.pdf. : Coal Mining Safety and Health Act 1999, 2019.

2. **State of Queensland.** *Coal Mining Safety and Health Act 1999.* Queensland : Office of the Parliamentary Counsel, 2022.

3. *Coal Mining Safety and Health Regulation 2017.* Queensland : Office of the Parliamentary Counsel, 2017.

4. **Standards Australia.** *AS/NZS 1715:2009 Australian Standard: Selection, use and maintenance of respiratory protective equipmenton.* Sydney, NSW. : Standards Australia Limited, 2009.

5. **RSHQ.** *Recognised Standard 14: Monitoring respirable dust in coal mines.* Retrived from: https://www.rshq.qld.gov.au/resources/documents/mines-resources/safety-and-health/legislation,-standards-and-guidelines/recognised-standards-coal-mines/recognised-standard-14.pdf : Coal Mining Safety and Health Act 1999, 2021.

10 Resources

Useful resources included are:

- ISO 23875:2021 Mining – Air quality control systems for operator enclosures – Performance requirements and test methods.
- European Standard EN 15695-1: 2017 Agricultural tractors and self-propelled sprayers – Protection of the operator (driver) against hazardous substances – Part 1: Cab classification, requirements and test procedures.
- European Standard EN 15695-2: 2017. Agricultural tractors and self-propelled sprayers – Protection of the operator (driver) against hazardous substances – Part 2: Filters, requirements and test procedures.
- British Standard BSEN 1822-1: 2019. High efficiency air filters (EPA, HEPA, and ULTA), Part 1: Classification, performance, testing, marking from SAI Global**.**
- Australian Institute of Occupational Hygienist (AIOH) have developed a respiratory fit testing training and accreditation course called RESPFIT. It can be located at https://respfit.org.au/.
- Australian Institute of Occupational Hygienist (AIOH) have developed an education & awareness called Breathe Freely Australia. It aims to prevent dust-related occupational lung disease, such as silicosis, in workers, through of safe work practices to control exposures. It can be accessed at https://www.breathefreelyaustralia.org.au/.
- RSHQ, released *Miners' Health Matters – Your Guide to Mine Dust Lung Diseases in Queensland* in 2020. It can be accessed here https://www.rshq.qld.gov.au/miners-health-matters.

Appendix 1: Field images taken of cabin ventilation systems during this program

Figure 3: Dozer intake air filter damaged during installation/ operation.

Figure 4: Water ingress into intake air filter housing on Cat 793 rear dump, causing filter damage and breakthrough during operation

Figure 5: Visible dust bypass around seal and side of the fresh air intake filter on scraper

Figure 6: Visible dust bypass around seal and side of recirculating filter inside cabin of Cat D11 dozer.

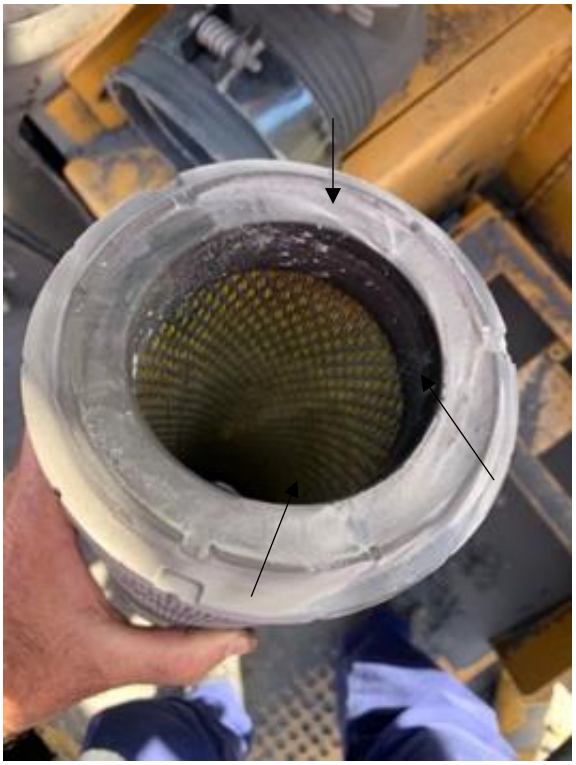


Figure 7: Visible dust bypass around fresh air intake filter on Cat D10 dozer, not seated into correct position.

Figure 8: Dust penetrated beyond intake filter into cabin ventilation ducting.

Figure 9: Grader Intake air filter – Engine grade. Not HEPA.

Figure 10: Cat 992K Loader Intake air filter – Engine grade. Not HEPA

Figure 11: Bucyrus 495 Shovel fresh Intake air filter – Pulse compressed air cleaned - Not HEPA

Figure 12: CAT 7495 Shovel fresh Intake air filter – Pulse compressed air cleaned - Not HEPA

Figure 13: Portable vacuum cleaner used to clean dragline house not fitted with HEPA filter and not maintained

Figure 14: Portable vacuum cleaner used to clean shovel house not fitted with HEPA filter and not maintained

Figure 15: Coarse grade filters used in cabin recirculation ventilation on Leihberr T282 Rear Dump. Not HEPA class.

Figure 16: Coarse grade filters used in cabin recirculation ventilation on a shovel. Not HEPA class.

Figure 17: Coarse grade filters used in cabin recirculation ventilation on a Letorneau loader. Not HEPA class.

Figure 18: Coarse grade filters used in cabin recirculation ventilation on an EPIROC Pit Viper 275 drill rig. Not HEPA class.

Figure 19: Compressed air gun used to clean Raymond mill in coal laboratory without adequate extraction ventilation or hood enclosure.

Figure 20: Compressed air gun plumbed into Le Torneau loader, used to clean cabin.

Appendix 2: Examples of good controls identified on site.

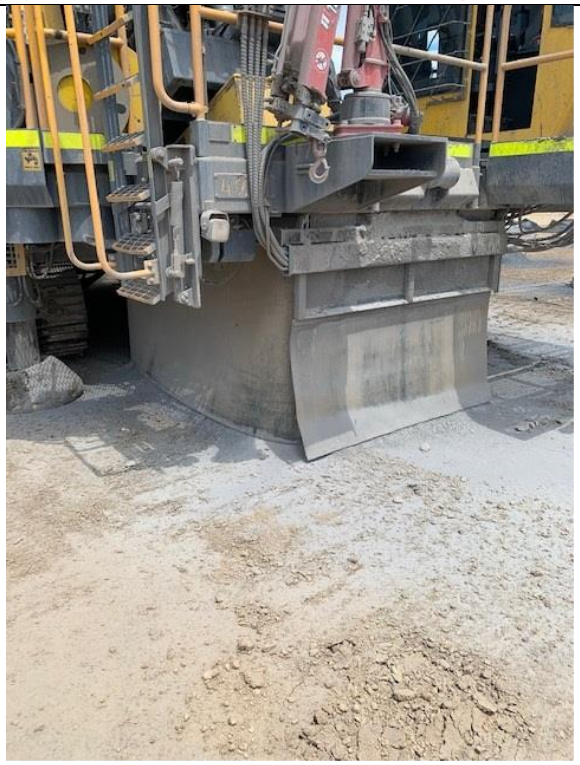


Figure 21: Dust curtains below deck on drilling rig – fully enclosed and well maintained, reduces dust emission from drilling.

Figure 22: Fully enclosed remote controlled/ automated Raymond mill for sample preparation in coal laboratory – eliminates compressed air cleaning.

Figure 23: In-cabin real time direct reading pressure monitors.

Figure 24: In-cabin real time direct reading pressure monitors.

Figure 25: In-cabin real time direct reading pressure monitors.

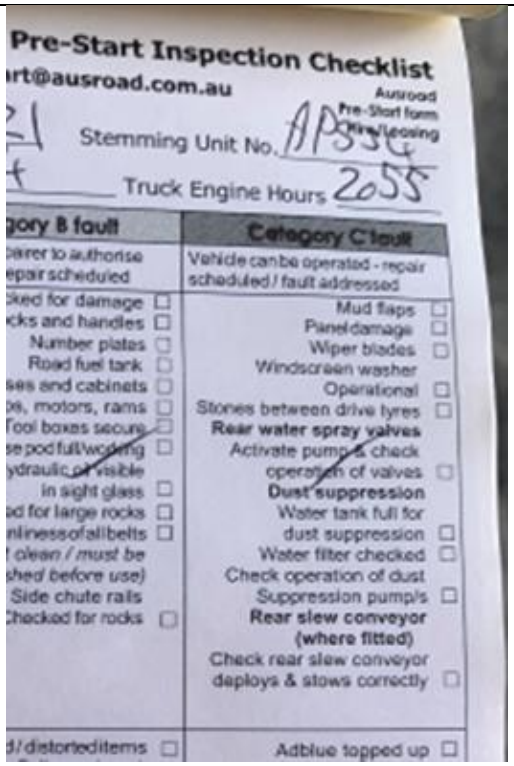
Figure 26: Ultrasonic leak detector for troubleshooting cabin door/ window seals.

Figure 27: Pressurised filtration unit installed on electrical enclosure on Komatsu 830e truck, prevents dust ingress and compressed air cleaning.

Figure 28: Fresh air intake filters on mobile plant cabin ventilation - labelled with HEPA / H13/ H14 Clas.s

Figure 29: Fresh air intake filters on mobile plant cabin ventilation - labelled with HEPA / H13/ H14 Class.

Figure 30: Fresh air intake filters on mobile plant cabin ventilation - labelled with HEPA / H13/ H14 Class.

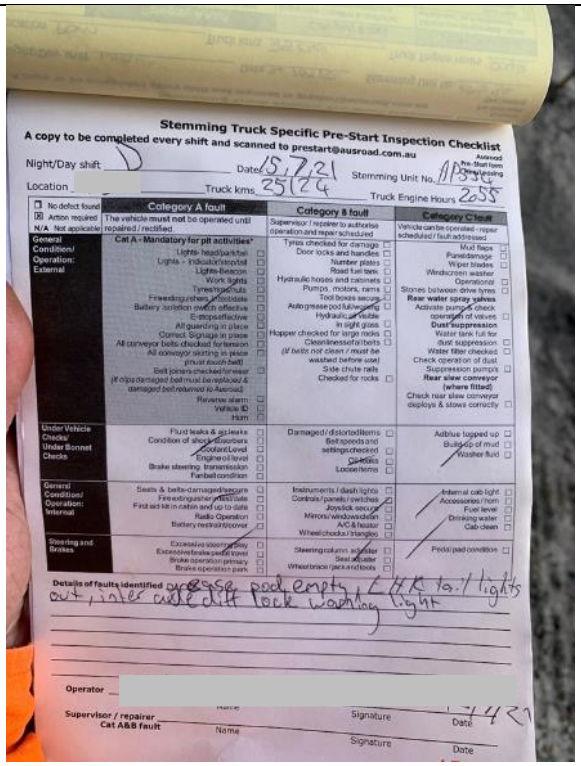

Pre-Start Inspection Checklist

Stemming Unit No. AP536

Truck Engine Hours 2055

Category B fault	Category C fault
arrer to authorise epair scheduled	Vehicle can be operated - repair scheduled / fault addressed
ked for damage	Mud flaps
cks and handles	Panel damage
Number plates	Wiper blades
Road fuel tank	Windscreen washer
ses and cabinets	Operational
os, motors, rams	Stones between drive tyres
Tool boxes secure	Rear water spray valves
se pod full/working	Activate pump & check
ydraulic, if visible	operation of valves
in sight glass	Dust suppression
ad for large rocks	Water tank full for
nliness of all belts	dust suppression
clean / must be	Water filter checked
shed before use)	Check operation of dust
Side chute rails	Suppression pump/s
Checked for rocks	Rear slew conveyor (where fitted)
	Check rear slew conveyor deploys & stows correctly
d/ distorted items	Adblue topped up

Figure 31: Pre-start inspection checklist on stemming truck includes itemised list of dust controls.


Stemming Truck Specific Pre-Start Inspection Checklist

A copy to be completed every shift and scanned to prestart@ausroad.com.au

Night/Day shift D Date 15.7.21 Stemming Unit No. AP536

Location Truck kms 25174 Truck Engine Hours 2055

	Category A fault	Category B fault	Category C fault
No defect found / Action required / N/A Not applicable	The vehicle must not be operated until repaired / rectified	Supervisor / repairer to authorise operation and repair scheduled	Vehicle can be operated - repair scheduled / fault addressed
General Condition/ Operation: External	Cat A - Mandatory for pit activities*	Tyres checked for damage; Door locks and handles; Number plates; Road fuel tank; Hydraulic hoses and cabinets; Pumps, motors, rams; Tool boxes secure; Auto grease pod full/working; Hydraulic oil visible in sight glass; Hopper checked for large rocks; Cleanliness of all belts (If belts not clean / must be washed before use); Side chute rails; Checked for rocks	Mud flaps; Panel damage; Wiper blades; Windscreen washer; Operational; Stones between drive tyres; Rear water spray valves; Activate pump & check operation of valves; Dust suppression; Water tank full for dust suppression; Water filter checked; Check operation of dust Suppression pumps; Rear slew conveyor (where fitted); Check rear slew conveyor deploys & stows correctly
Under Vehicle Checks/ Under Bonnet Checks	Fluid leaks & oil leaks; Condition of shock absorbers; Coolant Level; Engine oil level; Brake steering, transmission; Fanbelt condition	Damaged / distorted items; Belt speeds and settings checked; Cut belts; Loose items	Adblue topped up; Build-up of mud; Washer fluid
General Condition/ Operation: Internal	Seats & belts damaged/secure; Fire extinguisher present/ date; First aid kit in cabin and up to date; Radio Operation; Battery restraint/ cover	Instruments / dash lights; Controls / panels / switches; Joystick secure; Mirrors/ windows clean; A/C & heater; Wheel chocks / triangles	Internal cab light; Accessories / horn; Fuel level; Braking water; Cab clean
Steering and Brakes	Excessive steering play; Excessive brake pedal travel; Brake operation primary; Brake operation park	Steering column adjuster; Seat adjuster; Wheel brace / jack and tools	Pedal pad condition

Details of faults identified grease pod empty, L/H & lights out, water under diff lock warning light

Operator

Supervisor / repairer Cat A&B fault Name Signature Date

Name Signature Date

Figure 32: Pre-start inspection checklist on stemming truck includes itemised list of dust controls.

Appendix 3: Example of Prestart checklist that identifies components of cabin ventilation system.

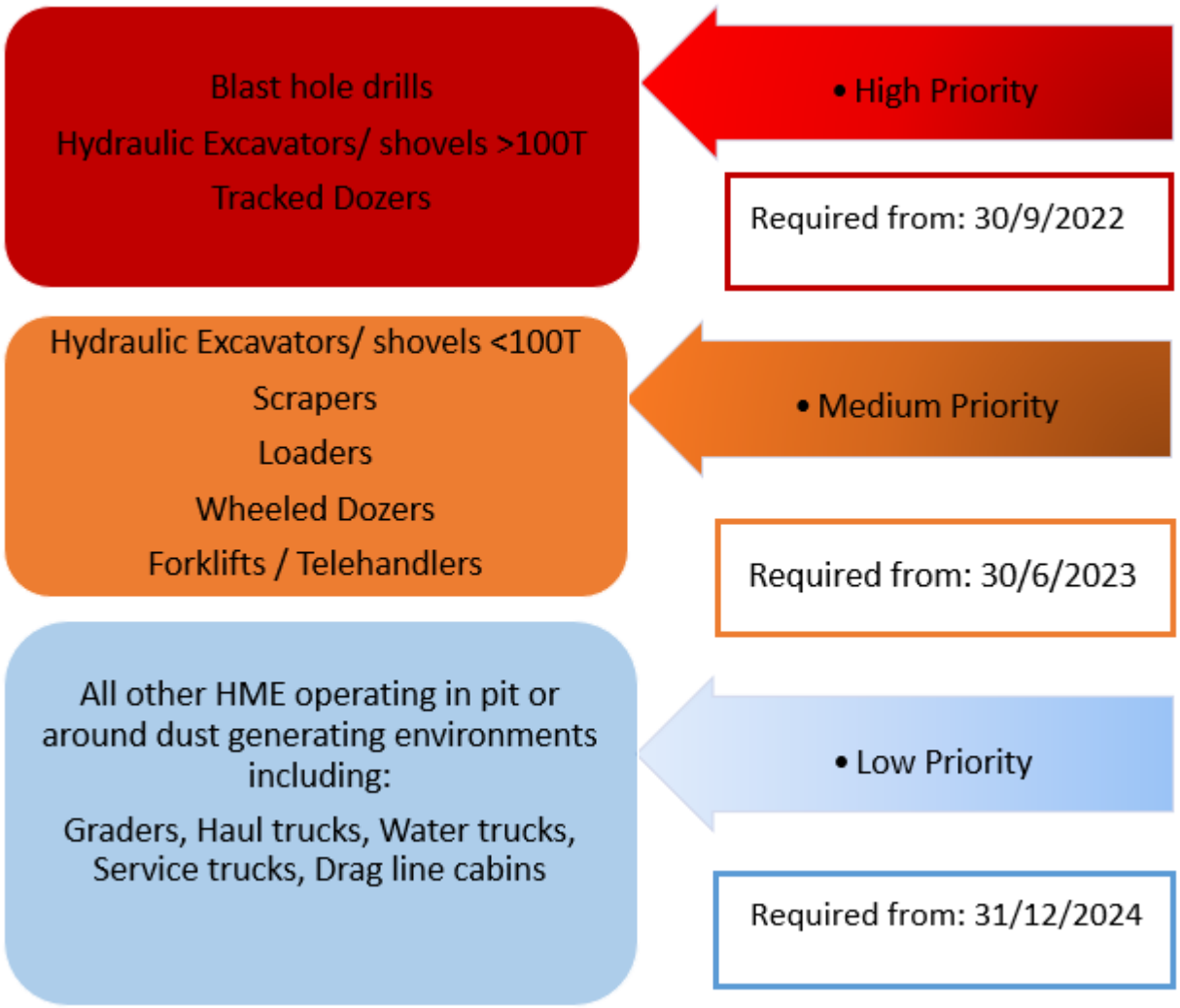
note: this is specific to a drill rig though can be easily adapted to all HME

Prestart inspection checklist **Operator Name:** **Date: / / Time Shift Day/ Night** **Mobile Plant Type:** **Asset/ Unit Number:** **To be completed by operator at start of every shift and prior to operating plant**			
Dust suppression	**OK**	**NA**	**Defect**
Water tank full for dust suppression			
Water filter checked			
Check operation of dust suppression water pumps			
Check operation of water injection / spray system			
Dust Curtains in place and undamaged			
Cabin ventilation system			
Cabin pressurisation monitor checked (above 20 Pa)			
Fresh air intake filter in place (HEPA Class)			
Recirculating filter in place (HEPA Class)			
Window and door seals checked for damage/ leaks			
Housekeeping to reduce dust exposure			
Cabin cleaned and free of dust build up on surfaces			
No visible dust deposits around vents			
Vacuum cleaner for cabin – HEPA filter checked and installed			
Respiratory protection stored in cabin / available to operator			
Comments / Details of Defects identified:			
Inspected by Operator Name: Signature: Date / /			
Copy of pre-start inspection to be forwarded to maintenance team on completion each shift.			

Appendix 4: Example of implementation strategy for upgrade of cabin ventilation system designed through risk-based approach (including review of exposure data).

Note: the low priority group has data that indicates there are sufficiently low dust exposure levels to allow for the asset replacement, unless the equipment was procured after 1/1/2020. All new equipment will require cabin pressurisation that adheres to Recognised Standard 20.

Figure 9: Example of prioritising controls on Mobile Equipment on site



Appendix 5: Mining Activity Dust TARP

Trigger	Normal State • Reasonably expected conditions in day to day operations. • No cause for action, but routine management to be continued.		Level 1 Triggers • Moderate risk of dust related impacts occurring. • Remedial action requires planning and execution.		Level 2 Triggers • High risk of dust related impacts occurring. • A situation has occurred that poses an immediate risk and remedial action must be undertaken; may include ceasing of operations.	
	Trigger	**Action/Response**	**Trigger**	**Action/Response**	**Trigger**	**Action/Response**
Haul Trucks, Water Trucks and Mine Roads	 No dust visible behind truck.	• Continue haul truck operations as normal. • Watering of mine roads as per normal • Operators, Supervisors and Dispatch to monitor.	 Dust visible above height of loaded truck.	• OCE and/or Supervisor Implement speed restrictions. • Prioritise circuits for watering. • Restrict graders to spillage clean ups only. • Operators, Supervisors and Dispatch to monitor.	 Heavy dust visible above height of trucks obscuring vision from all traffic.	• Operator, Supervisor, OCE and Dispatch are to review the operations and seek an alternative. • If no alternative available, operations are to **STOP** until further dust suppression is available. • Only recommence work if the dust has been reduced to an acceptable level.
Scrapers	 No dust visible behind scraper.	• Continue scraper operations as normal. • Watering of stockpiles, topsoil, gravel and sheeting as normal. • Operators, Supervisors and Dispatch to monitor.	 Dust visible above height of scraper bowl.	• Scraper operator to monitor dust on stockpiles, topsoil, gravel, sheeting and all other projects. • Limit travel speed. • Call a water truck up to get them to water the work area. • Operators, Supervisors and Dispatch to monitor.	 Heavy dust visible above height of scraper bowl obscuring vision from all traffic following.	• Operator, Supervisor, OCE and Dispatch are to review the operations and seek an alternative. • If no alternative available, operations are to **STOP** until further dust suppression is available. • Only recommence work if the dust has been reduced to an acceptable level.
Dozers/Dumps	 No dust visible on dump.	• Continue dump operations as normal. • Watering of tip heads and dump areas as normal. • Operators, Supervisors and Dispatch to monitor.	 Dust visible above dozer cab.	• Dozer operator, Supervisor and Dispatch are to limit activity to this area. • Limit travel speeds. • Call a water truck up to get them to water the work area. • Trucks to tip short and dozer push heated material over face or paddock dump. • Move to alternative Dump location if impacting adjacent haul roads • Operators, Supervisors and Dispatch to monitor.	 Heavy dust obscuring dozer.	• Operator, Supervisor, OCE and Dispatch are to review the operations and seek an alternative. • If no alternative available, operations are to **STOP** until further dust suppression is available. • Only recommence work if the dust has been reduced to an acceptable level.

Drills	 No dust visible below deck height.	• Continue drilling activities as normal. • Maintain dust suppression activities. • Operators, Supervisors and Dispatch to monitor.	 Dust visible at deck height.	• Limit number of operations being conducted. • Increase watering of area. • Operators, Supervisors and Dispatch to monitor.	 Persistent emissions of dust above deck height.	• Drilling operations to **STOP.** • Only recommence work if the dust has been reduced to an acceptable level.
Loading Unit	 No dust visible from loading unit.	• Continue loading operations as normal. • Watering of the dig area or stockpile areas as required. • Operators, Supervisors and Dispatch to monitor.	 Dust visible above loading unit.	• Increase watering of dig area. • Water blasted material, dig face or stockpile to reduce dust. • Consider alternative dig locations to reduce dust. • Operators, Supervisors and Dispatch to monitor.	 Heavy dust obscuring loading unit.	• Operator, Supervisor, OCE and Dispatch are to review the operations and seek an alternative. • If no alternative available, operations are to **STOP** until further dust suppression is available. • Only recommence work if the dust has been reduced to an acceptable level.
Striker Crusher	 No dust visible from the crusher.	• Continue crushing operations as normal. • Watering of crushing areas as normal. • Operators, Supervisors and Dispatch to monitor.	 Dust visible above height of crusher.	• Crusher operator and Supervisors are to limit activity in this area. • Limit travel speeds. • Call the water truck up to get them to water the work area. • Operators, Supervisors and Dispatch to monitor.	 Heavy dust completely obscuring crusher.	• Crushing operations to **STOP**. • Only recommence work if the dust has been reduced to an acceptable level.

Appendix 6: Abbreviations

AIOH	Australian Institute of Occupational Hygienists
CMSHA	Coal Mining Safety and Health Act 1999
CMSHR	Coal Mining Safety and Health Regulation 2017
CMW	Coal Mine Worker
COH	Certified Occupational Hygienist
DNRME	Department of Natural Resources, Mines and Energy
DMP	Dust Management Plan
HEPA	High Efficiency Particulate Air [filter]
HME	Heavy Mobile Equipment
LEV	Local Exhaust Ventilation
OEL	Occupational Exposure Limit
OEM	Original equipment manufactures
Pa	Pascals
PAPR	Powered Air Purifying Respirators
PF	Protection Factor
RCD	Respirable Coal Dust
RCS	Respirable Crystalline Silica
RPE	Respiratory Protective Equipment
RSHQ	Resources Safety and Health Queensland
RS14	Recognised Standard 14
RS20	Recognised Standard 20
SCP	Substandard condition or practice
SEG	Similar Exposure Group
SHMS	Safety and Health Management System
SOP	Standard Operating Procedure
SSE	Site Senior Executive
SWA	Safe Work Australia
SWI	Safe Work Instruction