Resources Regulator

Investigation report

Haul truck collides with excavator

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Table of Contents

Introduction 4
The mine 4
Background 4
The incident 5
Investigation 9
Recommendations 10
Further information 11

Introduction

The rear of a 789 haul truck collided with the cabin of a 49-tonne excavator about 3:35 pm on 20 February 2025. The excavator was positioned on a 1.9-metre-high bench in a non-production area of an open-cut coal mine. The haul truck operator reversed the truck towards the excavator to allow material in its tray to be scraped out. The haul truck and excavator operators did not communicate with each other prior to the incident. The haul truck operator misjudged the distance between the rear of his truck and the excavator and a collision occurred. An emergency was called and an operation was conducted to free the excavator operator from the cabin of the excavator. The excavator operator was not injured.

The mine

The incident occurred at a large open-cut coal mine (the mine) that produces thermal coal in the NSW Hunter Valley.

Background

Practice of ‘backscratching’

From time to time, wet and sticky ground material forms a solid bed in the trays of haul trucks at the mine. The material is commonly referred to as ‘hang up’. A practice referred to as ‘backscratching’ had developed whereby excavators were used to scrape out the hang up.
A job hazard analysis (JHA) for backscratching was developed at the mine on 9 February 2025. The JHA identified that backscratching created a risk of interactions occurring between mobile plant. It contained the following controls:

1. Excavator must wait at toe of ramp or out of the line of fire while the truck reverses into position under positive communication, as instructed by excavator operator, with the park brake applied before next step.
2. Bench must be stable and must be constructed flat at the minimum height of 2 m with windrows on edges, positive communication before entry, excavator operator confirms truck is stationary with park brake applied.
3. Truck remains stationary, unless instructed otherwise by excavator operator.
4. Excavator retreats first to toe of ramp or out of the line of fire under positive communication; truck does not move until full clearance is given via positive communication from excavator operator.

The JHA did not specify what type and size of excavator should be used to undertake the work, although backscratching of the 789 haul trucks at the mine was typically undertaken using larger excavators than the one involved in the incident.
None of the workers and supervisors involved in the incident had seen the JHA. The mine operator had referred to the development of the JHA in its daily production pre-start packs that were provided to supervisors leading up to the incident but had not otherwise provided a copy to the involved workers.

The mine operator required haul trucks to be backscratched before they were taken to the workshop for maintenance. This requirement was implemented to control the risk of hang up falling from truck trays in the workshop.

Mobile plant and workgroups involved in the incident

A 789 haul truck operated by the mine operator was due to attend the workshop for scheduled maintenance on 20 February 2025. The haul truck was part of a small fleet of mobile plant allocated to operate on a pre-strip project in an area commonly referred to as the 'alluvials'. It was fitted with a digital VHF radio but was not fitted with a UHF radio. A video camera was mounted on the back of the truck facing rearward. It was connected to a live monitor mounted in the operator's cabin of the truck but the displayed images were of limited quality.

A team of contracted workers worked at the alluvials. The work was overseen by a supervisor appointed by the mine operator (the alluvials supervisor). There was an excavator allocated to the alluvials area, but the alluvials supervisor considered it to be too large to backscratch the 789 haul trucks.

The mine operator engaged a contracting company (the contractor) to undertake a separate project aimed at reducing topsoil stockpiles in an area referred to as 'Topsoil Section 3' (the topsoil project). Topsoil Section 3 was relatively proximate to the alluvials. The contracting company owned and operated a 49-tonne excavator (the excavator) which was used on the topsoil project. The excavator was new and had only recently been commissioned at the mine. The excavator was fitted with a UHF radio but had not been fitted with a digital VHF radio. This was contrary to the mine operator's commissioning requirements. Operators of the excavator were required to use a portable handheld digital VHF radio to communicate with other mobile plant that only operated on the VHF band, including the haul truck.

A team of contracted workers performed the work on the topsoil project, which was overseen by a supervisor employed by the contractor and approved by the mine operator (the topsoil supervisor). Some of the activity at the topsoil project was coordinated by a worker who the topsoil supervisor had adopted into an informal leading hand role (the leading hand), which involved assisting the running of the topsoil work crew when the topsoil supervisor was not physically at the work area.

Previous backscratching activity in the topsoil area

One day in the fortnight prior to the incident, the alluvials supervisor asked an excavator operator at the topsoil project to backscratch one of the haul trucks from the alluvials. The haul truck was driven to the topsoil section where a backscratch was performed without incident. It appears that the controls in the JHA were followed on that occasion, notwithstanding that the truck driver and excavator operator involved had not seen the document. The topsoil supervisor was not aware that the backscratch had been performed but the leading hand was.

It does not appear that there were any other prior occasions where larger haul trucks had received backscratches in the topsoil project area although there were occasions that much smaller trucks allocated to the topsoil project underwent backscratches at that location.

The incident

The alluvials supervisor contacted the leading hand about 11:30 am on 20 February 2025. He asked if the haul truck could be backscratched in the topsoil project area. The leading hand agreed to the request, having seen the same type of haul truck receiving a backscratch in the area in the fortnight prior. The topsoil supervisor was not advised by the leading hand or the alluivals supervisor about

the request. The leading hand advised the excavator operator that the haul truck would be attending the topsoil project area for a backscratch.

The haul truck attended the topsoil project area at 3:33 pm. The leading hand was parked in a light vehicle in a park-up area adjacent to the entry point to the topsoil project area. The leading hand asked the excavator operator on the UHF band how he wanted the haul truck positioned for the backscratch. The excavator operator replied to the leading hand, 'I'll just set up on the bench up here and get him to reverse up onto it'. The haul truck's operator did not hear those communications as they occurred on the UHF band.

The leading hand said to the haul truck's operator on VHF, 'Just reverse up to the bench and he'll get it off there'. The excavator operator did not hear that communication, possibly because it was on a portable radio located some distance from his ear. The haul truck's operator mistakenly believed that the instruction was issued by the excavator operator, rather than the leading hand. He believed that he had achieved a sufficient level of communication with the excavator operator to approach the excavator.

None of the radio communications described in the above sequence referred to the assigned mobile plant identifiers of the maker or intended receiver of each message, which was contrary to the mine operator's Transport Management Plan.

No further communications occurred between the haul truck operator, excavator operator and the leading hand prior to the collision.

Figure 1 Overview of incident area (Source: modified from base image supplied by mine operator)

After entering the topsoil project area, the truck drove in a generally south-westerly direction towards the excavator which was moving in a south-easterly direction along a narrow 1.9-metre high (average height) bench at the far end of that area. The haul truck made a wide U-turn in front of the

bench, with the intention of reversing the truck towards the excavator on the bench. As the haul truck was making that U-turn, the excavator continued to move south-easterly along the bench.

Figure 2 Path of travel – haul truck (Source: modified from base image supplied by mine operator)

Figure 3 Path of travel – excavator (Source: modified from base image supplied by mine operator)

As the haul truck completed its U-turn, the excavator was angled across the bench, as shown in Figure 3. At that time, the excavator operator expected that the truck operator would keep the truck stationary, whilst waiting for his further instructions. The excavator operator had intended to straighten the excavator so that it was parallel along the bench. However, the haul truck began moving rearward towards the excavator before he had an opportunity to do so.

The rear of the haul truck continued to move towards the cabin of the excavator. The excavator operator observed this occurring and anticipated that a collision was imminent. The excavator operator stated that at that time he was unable to reach the portable VHF radio that was in the

cabin of the excavator. He broadcast a message to the leading hand on the UHF radio. Part of the message from the excavator was indecipherable but video footage confirmed that the words, 'Get him to stop' can clearly be heard in the cabin of the leading hand's light vehicle. The leading hand was focused on non-work-related digital material on his mobile phone and did not acknowledge or act upon the excavator operator's request.

The excavator operator attempted to move the excavator away from the rear of the truck. However, the proximity of the truck and the narrowness of the bench resulted in the excavator only being moved a short distance. Whilst this was occurring, the excavator operator sounded the excavator's horn. Despite the evasive action taken by the excavator operator, the rear tray of the haul truck collided with the cabin of the excavator. The impact forced the front left pillar of the excavator's cabin inward towards the excavator operator resulting in the cabin door becoming inoperable.

The haul truck operator was unaware that a collision had occurred. He heard the excavator's horn which he took to be a signal for him to stop and raise the truck's tray in preparation for the backscratch. The haul truck operator began raising the tray of the truck. This caused the rear of the tray to lower, which resulted in further damage to the excavator's cabin.

Figure 4 Position of haul truck and excavator at the point of impact

The excavator operator was still unable to reach the portable VHF radio in the excavator cabin. He made several broadcasts on the UHF radio to the leading hand requesting him to alert the truck operator that the collision had occurred. However, the leading hand remained distracted by the material on his mobile phone and he failed to intervene.

The haul truck operator observed in his side mirror that the excavator's tracks were moving but the excavator remained stationary. Realising that something was wrong, he stopped raising the truck's tray. Eventually the leading hand heard the excavator operator's requests for assistance and an emergency was called. The excavator operator remained in the cabin of the excavator for approximately 35 minutes before being freed uninjured.

Investigation

The Resource Regulator's Major Safety Investigation Unit investigated the incident to determine its cause and circumstances.

The investigation found several factors contributed to the worker being exposed to the risk of serious injury or death, including the following:

- The excavator was commissioned at the mine without it having been fitted with a fixed VHF radio in the cabin. This was contrary to the mine operator's procedures and resulted in the excavator operator being unable to contact the truck operator.
- The truck operator, excavator operator and leading hand all failed to identify the caller's equipment type and equipment number in each of their radio communications prior to the incident. This was contrary to the mine operator's communications standards and resulted in the truck operator mistakenly believing that he had established positive communication with the excavator operator.
- The leading hand's communications with the truck driver and excavator operator prior to the incident were unclear.
- Contrary to the mine operator's backscratching JHA, the excavator moved to the proposed backscratching location before the haul truck had adopted a stationary position at the bench.
- The mine operator did not adequately verify that mobile plant operators in some non-mining areas of the mine were observing communication standards.
- The haul truck was too large to safely access the topsoil project area. Its entry into that area should not have been authorised by the alluvials supervisor and the leading hand prior to a change management process being undertaken.
- No adequate inspection and/or assessments were undertaken of the suitability of the work area or the excavator to perform a backscratch on the haul truck.
- The size of the excavator (relatively smaller) and the height of the bench that the excavator was positioned on (too low) resulted in the excavator's cabin being in the line of fire of the rear of the truck as it reversed.
- The supervision of the backscratching activity was inadequate. Key individuals mistakenly believed that the leading hand had a position of authority in relation to the activity in the topsoil project area.
- The leading hand was distracted by his mobile phone. He failed to take steps that may have prevented the collision occurring or mitigated the risk of the excavator operator being injured.
- No risk assessments were undertaken in contemplation of the backscratching activity being undertaken in the topsoil project area.
- There was no consultation with the workgroups involved in the incident when the backscratching JHA was first developed on 9 February 2025.
- The JHA and the risk controls described therein were not adequately communicated to the workgroups involved in the incident.

Recommendations

Mine operators are reminded of their duty to identify hazards and manage risks to health and safety in accordance with provisions of the *Work Health and Safety Act 2011* and *Work Health and Safety (Mines and Petroleum Sites) Act 2013* and Regulations.

In particular, mine operators and contractors must:

- Ensure the introduction of mobile plant to site processes are implemented so that mine vehicles are appropriately fitted with readily accessible communication equipment such as in-cabin fixed radios, with appropriate inspection and verification processes occurring prior to being put into operation
- Ensure all work groups including contractors involved in/or exposed to mobile plant interactions are provided with appropriate instruction and supervision to ensure effective positive communications (using clear methods of identification) are maintained by operators and that backscratching operations are undertaken safely
- Review the adequacy of surface transport management plans, including establishing rules for safe mobile equipment interaction when backscratching operations occur
- Ensure when excavators are working in proximity to haul trucks that hard barriers are in-place, such as a sufficient bench height above the running surface (accounting for possible soft ground conditions), or an adequate separation windrow is maintained if operating at a level where interaction can physically occur
- Ensure that backscratching only occurs in suitable locations designed for that purpose, that are identified through appropriate risk assessments
- Ensure that appropriate change management processes are implemented whenever an unscheduled, out-of-scope backscratch is required to be undertaken
- Consider, and where reasonably practicable incorporate, the use of available technology to control mobile plant interactions such as proximity detection and collision avoidance systems
- Ensure the risk controls for mobile plant interaction are adequately monitored and verified by safety management system review and auditing mechanisms.

Workers are reminded of their duty to take care for their own health and safety and that of their co-workers. They must also comply, as far as they are reasonably able, with the mine's work instructions, policy and procedures to ensure worker safety and compliance with the *Work Health and Safety Act 2011* and related legislation.

In particular, workers must:

- Comply with the mine operator's procedures in relation to establishing positive communications with other operators to minimise the risk of a collision occurring
- Maintain awareness of the work environment and not allow themselves to be distracted by using personal devices such as mobile phones to undertake non-work-related activities.

Further information

Please refer to the following guidance materials:

- Technical reference guide – Roads or other vehicle operating areas - principal hazard management plan for surface mining operations
- Safety alert SA20-09 October 2020 – Operating mobile plant - incidents and near misses
- Safety bulletin 18-06 – Positive communications
- Safety bulletin 24-08 – Recent increase in vehicle interactions
- MDG15 – Mobile and transportable plant for use on mines and petroleum sites
- Investigation Information Release IIR26-02 – Dump truck narrowly avoids collision with light vehicle
- SafeWork NSW – Code of practice: Managing risks of plant in the workplace