

Safety Bulletin

Date: September 2024

Mobile plant used for pulling create line-of-fire hazard

This safety bulletin provides safety advice for the NSW mining industry.

Issue

In the past month, there have been 2 significant incidents involving the use of mobile plant in a pulling activity. Both incidents involved workers who were in the line of fire of metal objects travelling at high speed when the rope or sling they were attached to suddenly recoiled.

Figure 1 – Forklift with shattered rear and front windscreens after the M36 nut projectile narrowly missed the operator



Safety Bulletin SB24-07

Circumstances

Incident 1 - IncNot0047474

On Friday 16 August 2024, contract mine workers were removing pins from a length of excavator track on a shutdown pad. A nyloc nut was welded to the end of the pin to act as a connection point for pulling (snigging). A series of slings and shackles were then connected between the tow hitch of an all-terrain forklift and the nut welded to the pin. The forklift was then driven forward to give a slight jolt for the pin to come out.

Many pins had been extracted by this method the previous day, and 2 pins immediately before the incident. The pin in the incident required several attempts with increasing intensity while trying to jolt it free. The last attempt resulted in failure of the weld between the nut and pin, causing the M36 nut, weighing 425 grams, to recoil under tension of the slings. The nut, shackle, and slings shattered the rear window of the forklift, narrowly missing the operator, before shattering the front windscreen and coming to rest entangled in the mast. The forklift operator suffered only minor grazing to their back from the broken glass.

Figure 2 – Sling connection to forklift was re-enacted after the incident



Incident 1 investigation findings include:

1. The supervisor for the shutdown pad was not present for the week leading up to the incident.
2. Authority to work documentation:
 - a. had not been signed over to an on-shift supervisor
 - b. did not list pin removal as an activity in the work scope
 - c. did not reference the Job Safety Analysis (JSA) prepared for removing the pins.

Safety Bulletin SB24-07

3. The JSA identified the hazard of ‘flying pins’ and controls as "stay out of the line of fire when pulling the pins" but did not identify the forklift operator as being in the line of fire.
4. The mine safety management system had an excavator final drive change out procedure containing details of track pin removal, but it was not used.
5. People involved had done this task many times before using this process at this site and other sites.
6. Workers did not stop the task and re-assess even though the pins were progressively becoming harder to remove.

Incident 2 - IncNot0047422

On Monday 12 August 2024, underground coal mine workers were installing a pull rope over the return side of conveyor belt structure that was suspended from the roof. The workers were using a load haul dump machine (LHD) with a quick detach system (QDS) work platform positioned beneath the conveyor structure, pulling around 50 metres of rope at a time from the spool located back at the tail pulley. They would then use the LHD and work platform to manually pass the rope over the conveyor structure until needing to pull more from the spool. This process was repeated several times until approximately 700 metres of rope had been pulled out along the conveyor structure.

About 1am, a knot occurred in the rope when pulling rope from the spool. As the LHD moved forward the knot became stuck in the conveyor structure. The end of the rope was fitted with a metal eyelet weighing approximately 1 kilogram, and was simply looped over the front handrail of the work platform as shown in figure 4. Tension in the rope developed and became sufficient to overcome the securing method. The rope and the eyelet recoiled past the workers in the QDS workbasket, the LHD operator, and landed approximately 50 metres behind the LHD.

Figure 3 – Re-enactment of rope pulling through conveyor structure



Safety Bulletin SB24-07

Figure 1 - Rope looped over workbasket handrail (left), and rope spool at conveyor tail (right)



Incident 2 investigation findings include:

1. Mine personnel did not identify the incident as a dangerous incident, which caused a delay in notification.
2. Introduction to site documentation for the rope winch was incomplete and did not identify the mine representative authorising its use on site.
3. Mine workers were using a safe work procedure prepared by the conveyor contractor, which did not include details for installation of the pull rope.
4. In not reviewing the rope installation task, the mine failed to identify:
 - a. the potential for the rope to develop knots or become tangled
 - b. the potential for tension and stored energy to develop in the rope
 - c. the importance of, and method for, positive communications between the LHD team and the winch team at the tail of the conveyor
 - d. a means of monitoring and controlling the tension in the rope
 - e. a means to remain clear of the line of fire.

Recommendations

Mine operators:

- In the management of risk to health and safety for pulling activities using mobile plant eliminate risks so far as is reasonably practicable, and if it is not reasonably practicable to eliminate risks, minimise those risks so far as is reasonably practicable.
- Make readily available procedures for pulling activities.
- Have a system in place such a JSA or equivalent to assess the risks and implement controls where a procedure does not exist or does not cover all the steps required to undertake the pulling activity.
- Have a system in place to assess the risks and implement controls when deviating from a developed procedures to include approvals required.
- Have a system in place to review and update procedures to ensure work as intended by the procedure and work as done by the worker are one in the same.

Safety Bulletin SB24-07

- Where the task is performed on a regular basis, a procedure should be developed. Special tools or equipment more suited to the task should also be considered.

Workers

- are to use relevant safe work procedures for pulling activities.
- Where a procedure does not exist or does not cover all the pulling activity, undertake a JSA or equivalent to assess the risks and implement controls.
- When deviating from a procedure, follow the site procedures for this.
- The JSA or equivalent should identify and manage:
 - the maximum pull force or impact load able to be exerted
 - the safe working load of each component used to transfer force in the pulling system
 - the system of work to ensure the pulling force exerted cannot exceed the load capacity of components in the pulling or towing system
 - potential failure modes, and the lines of fire, both in the direction of pulling, and recoil (opposite direction)
 - a safe standing plan to identify all people and where they will be standing for the task
 - a means to dampen the recoil energy where webbing slings or fibre ropes are used
 - escalation to the supervisor if the task is not progressing as planned.
- Consideration should be given to the use of a steel (tow) bar instead of webbing slings to eliminate stored energy potential, or the use of soft shackles instead of steel, or tow sling dampener blankets when undertaking pulling activities.

Supervisors should ensure:

- work plans or work authorities include sufficient detail to describe the actual work to be undertaken
- all procedures, JSAs or equivalent are present on the job, or accessible with the work order or work authority, and identify the details of the work scope
- where JSAs or equivalent have been recently developed for a pulling activity, they are reviewed by suitably competent people
- engineering assistance is sought where required.

Note: Please ensure all relevant people in your organisation receive a copy of this safety bulletin and are informed of its content and recommendations. This safety bulletin should be processed in a systematic manner through the mine's information and communication process. It should also be placed on the mine's common area, such as your notice board where appropriate.

Visit our [website](#) to:

- find more safety alerts and bulletins
- use our searchable safety database

Safety Bulletin SB24-07

Document control	
CM10 reference	RDOC24/158608
Mine safety reference	SB24-07
Date published	12 September 2024
Authorised by	Chief Inspector Office of the Chief Inspector

© State of New South Wales through the Department of Primary Industries and Regional Development 2024. You may copy, distribute, display, download and otherwise freely deal with this publication for any purpose, provided that you attribute the Department of Primary Industries and Regional Development as the owner. However, you must obtain permission if you wish to charge others for access to the publication (other than at cost); include the publication in advertising or a product for sale; modify the publication; or republish the publication on a website. You may freely link to the publication on a departmental website.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (September 2024) and may not be accurate, current or complete. The State of New South Wales (including Department of Primary Industries and Regional Development), the author and the publisher take no responsibility, and will accept no liability, for the accuracy, currency, reliability or correctness of any information included in the document (including material provided by third parties). Readers should make their own inquiries and rely on their own advice when making decisions related to material contained in this publication.