

Investigation report

Serious hand injury to a worker operating a mobile screen

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Introduction

A worker sustained a serious hand injury on 19 September 2022 at Thuddungra Mine when a spade he was holding became entangled in the moving conveyor rollers of a mobile screen which was being cleaned while operating with a guard removed.

Further, the worker was exposed to a risk of more serious injury or death as a result of being entangled in or crushed by moving parts of the mobile screen.

The mine

Thuddungra Mine is a magnesite mine located near Thuddungra, about 28 km northwest of Young NSW. The mine operator uses open cut mining methods to strip overburden and extract magnesite. At the time of the incident the workers on site were screening material from existing stockpiles.

After screening, materials are conveyed to a plant in Young where they are processed and packaged for sale.

The incident

The incident occurred at the stockpile area of the mine where two workers were cleaning the tail drum of the main conveyor on the mobile screen. The conveyor belt had tracked to one side due to a build-up of clay mud on the tail drum caused by wet conditions at the mine and lack of regular cleaning of the mobile screen. The workers had two weeks (the injured worker) and four months (the other worker) experience respectively operating the mobile screen and were conducting the task with no instructions having been provided to them regarding a safe work practice or procedure.

Figure 1 The mobile screen at Thuddungra Mine with mining stockpiles in background



Figure 2 Photograph taken by a worker of clay mud build-up on the tail drum and main conveyor belt prior to the incident

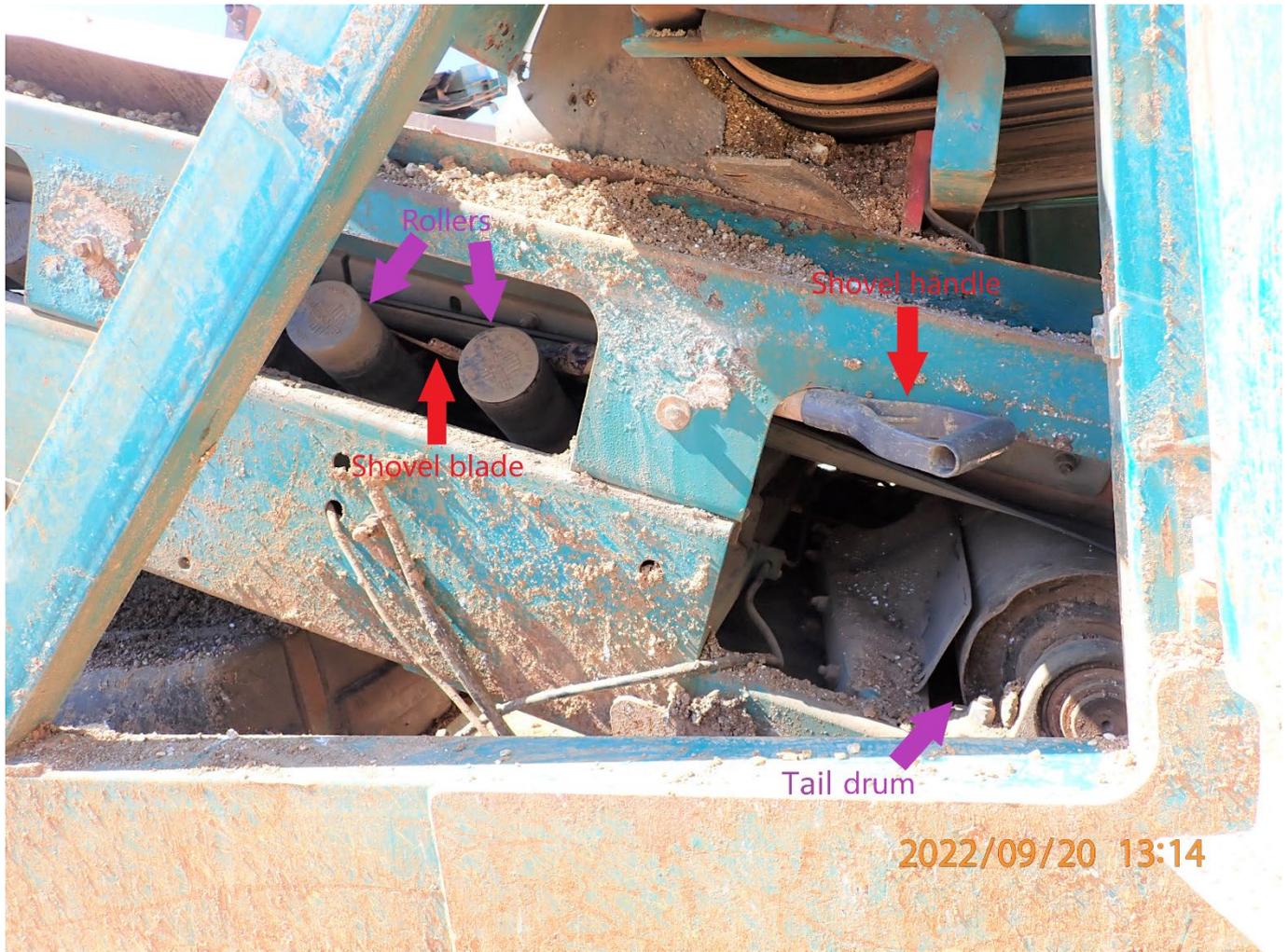


Guarding had been removed from the mobile screen by the workers for the purpose of cleaning mud off the tail drum of the mobile screen's main conveyor. The workers cleaned the tail drum by holding the edge of a standard garden spade against it as it rotated at idle speed. After scraping mud off the tail drum using this method, the belt speed was then increased to assist in tracking the conveyor belt to realign it.

While the belt was moving at speed one worker walked around to the opposite side of the mobile screen. At this time the injured worker again placed the spade against the rotating tail drum, which caught the spade causing it to be pulled into the conveyor rollers. The worker had one hand on the handle and the other hand on the shaft of the spade as it was drawn into the moving conveyor rollers. The motion of the conveyor rollers caused the spade to be pulled across his shoulder. He forcefully 'yanked' his hands off the spade to prevent his hands and arms from being pulled into the conveyor belt along with the spade. In doing so, he sustained serious injuries to his left hand consisting of degloving of the thumb and a tip amputation to his ring finger.

At the time of the incident, the injured worker had worked at the mine for approximately 2 weeks. While the mine operator had a system for inducting workers to the site, the injured worker had not received a site induction or any other training in procedures concerning the operation or cleaning of the mobile screen at the site. His experience in the mining industry was limited to working as an operator at a quarry for a few months over 15 years preceding the incident.

Figure 3 Final resting position of the spade following the incident



Investigation

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

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

1. Operating the mobile screen with wet and muddy product resulting in a build-up of mud on the tail drum.
2. The mobile screen was not adequately maintained (neither the scraper on the tail drum nor the skirting rubbers on the conveyor belt were adequately maintained and in good order).
3. Fit for purpose tools necessary to safely clean the conveyor tail drum were not provided to, or used by, workers such as:
 - a. isolation locks to positively isolate the mobile screen from its power source at its central isolation point
 - b. a high-pressure hose for cleaning the tail drum (a high pressure hose at the mine was not near the mobile screen).

4. No risk assessment was undertaken for:
 - a. cleaning and / or maintenance of the mobile screen including the risk arising from entanglement
 - b. management of wet and muddy conditions.
5. There were no safe work procedures providing direction in areas such as:
 - a. managing and operating the mobile screen in wet and muddy conditions and product
 - b. cleaning the mobile screen including the conveyor tail drum.
6. Specific instructions for cleaning contained within the mobile screen user manual produced by the original equipment manufacturer (**OEM**), that amongst other things required use of a high-pressure hose and a direction not to remove guarding while the mobile screen was running, were not adopted.
7. There was no adequate system of preventative maintenance for the mobile screen.
8. No site induction training was provided to the injured worker nor adequate induction given to other workers.
9. There was no formal training or adequate on-the-job training provided to workers.
10. Adequate supervision and management arrangements were not implemented through the appointment of a Quarry Manager or other 'competent' person to supervise mining operations and adequate supervision of workers was not otherwise provided.

The Regulator published a brief description of the incident in the Mine Safety News 'Weekly incident summary' on 30 September 2022.

Recommendations

Mine and quarry operators must:

1. Ensure plant, equipment, machinery and associated work tasks (such as cleaning and maintenance) are subject of an adequate risk assessment:
 - a. Directed to:
 - i. the identification of reasonably foreseeable hazards
 - ii. risks arising from reasonably foreseeable hazards
 - iii. measures to control risks in accordance with the hierarchy of controls.Refer to Code of practice – how to manage work health and safety risks
 - b. That takes into account:
 - i. information provided by the OEM
 - ii. regulatory requirements concerning risk management and plant
 - iii. authoritative material such as, in the case of plant and equipment, the SafeWork NSW Code of Practice: Managing the risks of plant in the workplace, SafeWork NSW Plant, Equipment and Machinery: Energy isolation guidelines, Australian Standards and similar.

2. Provide and maintain (or implement) safe systems of work including safe work procedures:
 - a. Governing risk assessments including job safety analysis or similar for work tasks
 - b. For cleaning and maintenance of mobile plant
 - c. That refer to OEM user manuals or consultation with the OEM or plant supplier to ensure compliance with OEM-recommended procedures for cleaning and maintenance
3. Provide workers with adequate information, instruction and training relating to risk assessment and safe work procedures prior to commencement of work.
4. Engage adequately trained, experienced and qualified managers and / or supervisors.
5. Provide and maintain safe mobile plant by:
 - a. implementing a preventative maintenance schedule
 - b. providing fit for purpose tools for cleaning and maintenance of plant
 - c. implementing safe work procedures for the operation of plant in adverse environmental conditions.

Workers must:

1. conduct risk assessments directed to the matters set out above at 1.a 'Mine and quarry operators'
2. only remove guarding when necessary to conduct a task and in accordance with safe work procedures
3. ensure plant is isolated from its energy source when guarding is removed through the application of isolation locks to central isolation points
4. never start or operate mobile plant with guards removed
5. consider alternative ways of conducting a task that does not involve removal of guards (e.g. tracking a conveyor belt through viewing windows rather than removing guarding for the task)
6. familiarise themselves with safe work procedures of the mine or quarry operator and OEM user manuals relating to cleaning and maintenance of plant.

Each of the above recommendations are general in nature and not directed at any specific mine or quarry operator or worker.