Ministry of Energy, Mines and Petroleum Resources

HAZARD ALERT

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EXPERIENCED WORKER LOSES FOREARM

In April 2018, while working in a gravel pit, a worker's arm became entangled in the conveyor system of a rented portable crushing unit. The worker was "bumping" the conveyor to sweep the underside of the belt to clear rocks from the tail pulley. When the conveyor stopped, the worker failed to recognize that a rock had jammed the pulley and that the conveyor was still in the "on" position. When the worker reached in and cleared the jammed rock, the conveyor resumed movement, rotating the tail pulley and catching the worker's arm. The serious injury to the arm resulted in amputation.

Investigation findings

The investigation determined that the experienced injured worker became entrapped because he believed he was safe: the conveyor was not moving, and he had done this activity before. Additionally, on the day of the incident, he changed his work procedure by directing assistance from a worker he knew was unfamiliar with the machine and task, resulting in confusion at the controls and a delayed emergency shutoff. While clearing rocks, the injured worker placed himself within dangerous proximity to the tail pulley, not recognizing that the conveyor had become jammed and was still energized. Being a supervisor and responsible for lock-out training in the past, the injured worker knew of the hazards associated with energized conveyors and working near tail pulleys. Nevertheless, he intentionally violated safe work procedures by not locking-out the equipment.

Energized conveyors

This incident highlights the significance of how several conditions existing at one time negatively influenced the outcome of a routine task. The success of a routine task can be impacted when conditions change or when controls are circumvented. This incident reminds us that all mining personnel have a vital role to play in ensuring the health and safety of themselves and coworkers. In this case, a pre-job risk assessment may have led to appropriate mitigations for the dangers of working on an energized conveyor while accessing dangerous parts of the machine and/or using rental equipment for which limited workers are trained to use and/or changing the usual work procedure even if it is just to include other workers. Bypassing guarding and accessing dangerous parts of a machine exposes a worker to unnecessary risk, risk that can be avoided by following a system of controls.

Consult the Health Safety and Reclamation Code for Mines in BC for regulatory requirements

Recommended controls:

- ***Risk Assessment*** – A risk assessment was not conducted prior to the task. Risk assessments or reassessments should be completed for all non-routine, new work, or when any changes to safe work procedures are made.
- ***Equipment*** – When possible choose equipment that facilitates workers to perform their work safely and effectively and makes it easy for them to comply with requirements such as lock-out. Lock-out was awkward and difficult to access on this piece of equipment.
- ***Guarding*** – The injured worker reversed the machine onto blocking to create space underneath to access the tail pulley. Guarding must be effective and must never be defeated without following a proper lockout procedure.
- ***Lock-out/Tag-out*** – The injured worker decided not to lockout in order to bump the belt. Equipment must be de-energized and locked-out & tagged-out before maintenance/repairs are carried out, this includes mitigating all "potential-energy" hazards (stored energy, etc.)
- ***Training*** – The injured worker was the only one trained on the rental equipment. All workers that could work on equipment or have to stop it in case of an emergency, should be trained on the safe operation of the equipment, particularly emergency stopping procedures and lock-out/tag-out procedures.

Key Regulatory Reminders

The following *Health, Safety and Reclamation Code for Mines in BC* (Code) requirements are only some of the regulations that must be considered when servicing a conveyor on a mine site in BC:

Employees' Right to Refuse Work – Code s. 1.10.1: A person shall not carry out any work or operate any equipment, tool, or appliance if he/she has reasonable cause to believe that to do so would create an undue hazard to the health or safety of any person.

Training – Code s. 1.11.1: The manager shall ensure that workers are adequately trained to do their job or are working under the guidance of someone who has competency both in the job and in giving instruction, and ensure that all employees receive thorough orientation and basic instruction in safe work practices

Moving Parts of Machinery – Code s. 4.4.2: Unless situated so as to prevent a person coming into accidental contact with it, every drive belt, chain, rope or pulley, sprocket, flywheel, geared wheel and every opening through which any belt, pulley or wheel operates, and every bolt key, set screw and every part of any wheel or other revolving part that projects unevenly from the surface shall be effectively enclosed, covered or guarded.

Servicing of Running Machinery – Code s. 4.4.6: (2) Where is it necessary to remove guards or fences from machinery for servicing purposes, the machinery shall be stopped and locked-out in accordance with sections 4.11.1 to 4.11.7

Cleaning Up Spillage – Code s. 4.4.16: (9) When it is necessary to remove protective fences or guards for servicing or cleanup, the conveyor shall be stopped and locked-out in accordance with sections 4.11.1 to 4.11.7 of the code

Lock-Out Procedures – Code s. 4.11.1: The manager shall develop a lock-out procedure which includes, but not limited to, the requirements of section 4.11.2 to 4.11.7 inclusive, and he/she shall ensure that all persons required to lock-out machinery or equipment are adequately trained in the procedure and that a copy of it is made available to them