



Mines Safety Bulletin No. 123

Subject: Hazards associated with rigging when replacing conveyor idlers and rollers

Date: 10 August 2015

Background

Mining operations may require different rigging equipment for different tasks. Combining this gear to achieve the safest lifting outcomes requires an understanding of the forces involved and the limits of the lifting system (e.g. working load limit). These competencies also apply when using lever hoists or pullers (commonly called come-alongs) for rigging or dogging purposes.

A high risk work licence for dogging (class DG) is required by anyone who applies slinging techniques to a load, which includes:

- calculating the safe angle for sling or chain
- selecting the type of sling or chain to be used
- selecting the correct method to secure the load
- selecting the safe method to lift the load
- checking the conditions of lifting gear for wear and tear.

A high risk work licence for rigging is required for people undertaking work where decisions regarding slinging techniques are required. In all cases, the job needs to be risk assessed by supervisors or management before allocation of the work.

Inspectors have identified inappropriate or unsuitable rigging practices on several mine sites when come-alongs were used during the replacement of conveyor idlers. Poor rigging practices while conducting such work have resulted in serious injuries in the past, including a broken jaw.

Summary of hazard

The stored energy present in lifting equipment under tension is a known hazard in the resources sector, with the potential for fatal and serious injuries following the uncontrolled release of this stored energy. Falling or failing loads and lifting equipment can result in injury even when the worker is not directly under the load. Workers in the "line of fire" may be struck with extreme force by chain links discharging from the system.

Lifting equipment can be damaged or deformed when placed under unnecessary strain by poor slinging and rigging practices. This reduces the breaking load of components (e.g. chain links, hooks). There is the potential for failure, placing workers at risk, even when the load is within the safe working load limit.

Contributory factors

Lifting equipment may be overloaded when changing conveyor idlers and rollers if work practices are inadequate or loads catch on fixed plant.

Examples of poor lifting practices when using come-alongs

- ***Incorrect seating of the chain in the hook***

This can lead to damage and failure of the lifting equipment, with the chain releasing under pressure through the safety latch of the hook.



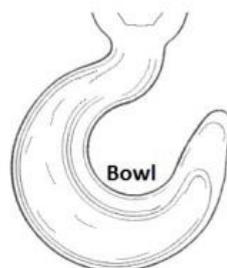
- ***Incorrect installation***

Lifting equipment can be damaged or fail if the correct slings or attachments (e.g. appropriately rated shackles) are not used. A hook can be damaged if it is used directly on a load.



- ***Load not supported through centre of hook***

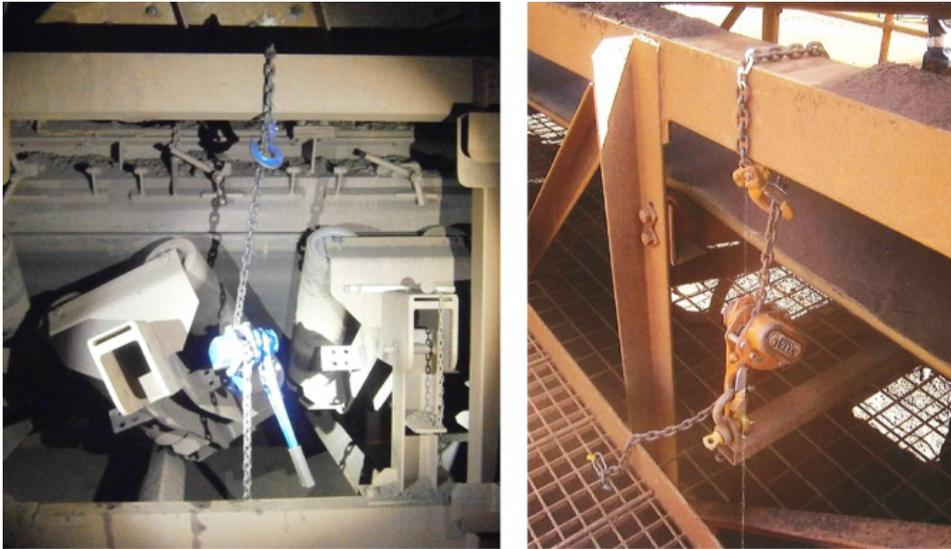
Hooks are designed to support the load in the centre of the bowl. Wedging or forcing the hook tip into a lifting point can result in the hook deforming.



- **Choke hitched or back hooked with the main chain**

The chain used in a come-along has a finer tolerance on the pitch than a sling chain so it can couple with the pockets in the hoist mechanism. Chain links can be bent or stretched if the chain is misused by loading it across an edge or it is backhooked. Wrapping the main chain and back hooking is sometimes used instead of slings, but this stops the hook swivelling, which means any twists in the chain are not removed.

Note: Back hooking is not permitted by the original equipment manufacturers (OEMs) of come-alongs. Always use an approved and correctly rated sling or other lifting accessory in accordance with the competent person's directions.



Contributory factors for poor lifting practices when using come-alongs

Factors that contribute to poor rigging practices when changing conveyor idlers and rollers using come-alongs include:

- adequate tooling not readily available for the work to be conducted (e.g. belt lifters or other speciality tools that mitigate the requirement for rigging work)
- inadequate systems of work exposing employees or other operators to hazards (e.g. procedures that require the use of belt lifters when this equipment is not available to workers)
- failure to follow safe work procedures (SWPs) or safe work instructions (SWIs)
- inadequate job hazard analyses (JHAs) that do not sufficiently detail the rigging requirements or steps for roller removal
- JHAs signed off by supervisors who do not understand the task or hazards involved
- supervisors and operators not conducting adequate workplace inspections before and during work activities to identify hazards and implement necessary controls
- workers conducting rigging or dogging activities without
 - holding the correct licence
 - being assessed as competent
- workers not understanding the correct use of the tools provided by the employer (e.g. come-alongs)
- task-specific training for removing the roller and idler types used on site is not done or is inadequate.

Actions required

Mine operators and supervisors of maintenance activities who rely on come-alongs to assist with dogging or rigging activities are reminded of their duty of care obligations. The use of come-alongs should be reviewed to confirm that a safe system of work is in place.

Recommendations include:

- providing adequate specialised tooling for workers to conduct their assigned tasks (e.g. are there safer tools that can be purchased such as belt lifts so that come-alongs and qualified doggers are not required?)
- following the original equipment manufacturer's (OEM's) instructions and observing warnings when writing the site's SWPs and JHAs
- reviewing SWPs and JHAs for completeness and adequacy
- confirming supervisors who authorise JHAs understand the job steps and have visited the task or have other competent personnel review the system
- confirming, before work commences, that workers conducting dogging and rigging activities are competent and hold the relevant high risk work licence
- verifying that workers tasked with using come-alongs are competent in their use
- conducting task-specific training for the removal of conveyor idlers and rollers
- monitoring compliance with site work standards by planning supervisor visits or inspections to coincide with high risk tasks such as dogging and rigging activities.

Further information

www.dmp.wa.gov.au/ResourcesSafety

- *Frequently asked questions on dogging and rigging – information sheet*
- *Know your hazards – Raising the issues* (video series covering centre of gravity, friction, tensile strength)

www.standards.org.au

- *AS 1418.2 Cranes (including hoists and winches) – Serial hoists and winches*

This Mines Safety Bulletin was approved for release by the State Mining Engineer on 10 August 2015