

Slide in Rollers

Downer Mining

The Problem

WorkCover Qld statistics for musculoskeletal disorders (MSD's) are high. MSD's make up 53 per cent of all workers' injuries in mining. This includes injuries such as muscle sprains/strains and back injuries, with 770 new claims lodged in the 2014-15 financial year. The cost of these claims during that period was over \$13 million at an average of \$12,847 per claim. 32% of MSD's were back-related, while shoulder/upper arm (18%) and knee/upper leg (17.9%) were the next most common injuries.

Downer Mining Coal Handling Preparation Plant (CHPP) Maintenance workers at Meandu Mine identified an opportunity to minimise and eliminate these injuries by developing and implementing an effective risk assessment solution. The 30yr old CHPP, washes approximately 6.5 million tonnes of material per annum to produce 4.8 million tonnes of coal for use at the adjacent Tarong and Tarong North Power Stations. The coal passes along approximately 3 kilometers of conveyor belt and hundreds of rollers. The 24/7 nature of the Meandu Mine operation requires constant maintenance to the rollers which require replacement on a regular basis.

The problem that initiated this innovation was working at height to change out a 2.2m, 60kg roller while working on a 600mm walkway. This is a manually intensive task that must be carried out by a team of a least three workers and a time consuming process often involving working at height while manhandling a heavy load. Through worker consultation it was identified that this task posed a risk of musculoskeletal injury to workers necessitating a proactive ergonomic solution to design safer and more efficient access to the plant rollers for maintenances purposes.

The Solution

The CHPP maintenance team redesigned and manufactured new roller frames which hold dual rollers with a sideways deployment system to allow for easier removal and replacement of rollers. The new assembly meant that only half of the weight now had to be lifted at a time. Furthermore, the rollers now slide into a position that is safer from a manual handling perspective, reducing the chance of MSD whilst replacing the roller. The roller is now only half the original length (2.2m) and no longer extends beyond the 600mm walkway hand rails whilst being removed and inserted (See image 1 and 2).

Introducing the innovation to site proved to deliver significant time saving benefits as what was a three man mission is now a one man undertaking. A strap is used by one worker to carry a roller to the area of change out. Due to the reduced weight, the roller can now be changed over by one worker on his own, turning a big arduous task into an efficient and simple one.

Photos of the innovation showing the use



Image 1: Old style Roller and frame



Image 2: New design Roller



Image 3: Roller frame with one side extended

Slide out ends allows for easy change out of the rollers without having to reach into the open space below the rollers.

The securing bolt at the end ensures that the roller stays in place.



Image 5: Close up end profile showing the sideways access



Image 4: Two piece roller to reduce weight and make the rollers easier to handle

Benefits & Effects

The primary user benefits include: the reduction in the risks posed to health and safety when working in and around mobile plant; being able to replace the rollers without having to use a crane due to the reduced weight; reducing workers being exposed to hazardous manual handling and potential working at heights consequences.

The improvements reduce risk by implementing the hierarchy of controls applied in the following manner:

- Eliminated the risk for working at height during roller change out as the rollers can be changed out from the walkway;
- Engineering the new conveyer roller frame reduced manual handling risks compared to removing a 2.2m roller from the original frame

Transferability

The system is easily applied to other rollers around fixed plant. New slides and rollers are now fabricated in advance by a supplier and stored until needed.

This safer procedure is relative to all sites utilising a conveyor belt and roller system across the industry and has the potential to reduce the risk of exposing workers to musculoskeletal disorder through all businesses and divisions where similar type conveyer systems exist.

Innovation

The innovation was researched and identified by the Meandu CHPP team. The idea was initiated through observation of impact trough roller frames as they slide out sideways for the same purpose and the team saw the potential to incorporate this system into other applications. This was achieved by teamwork and collaboration undertaken to achieve results lead by Wayne McDuffy, CHPP Maintenance Supervisor. Members of the CHPP maintenance and CHPP management were consulted on the planned improvement. The original prototype was fabricated onsite by Andrew Preston, a Maintenance Fitter, and the second prototype included widening the space within the frame to prevent pinching of fingers when placing the roller into position.

Benefits of the new design include:

- No need to attempt to manual handle a 60kg roller that is 2.2m long over a span so it can be fitted in place;
- Simple and quick process to replace the rollers (saves time and the involvement of several workers);
- No need to use a Crane to lift rollers into position;
- Reduced weight significantly improves manual handling tasks with roller change out;
- Removal of exposure to working at heights risks.

Approximate Costs

The Financial benefits of the innovation include:

- Reduces Crane Cost
- Reduced maintenance down time to replace rollers
- Fewer personnel are required to perform the change out of the rollers.

The Cost of the rollers old verses new are \$207.65 (old 2.2m, 60kg roller) /\$94.27 (x 2 for two new rollers).

To manufacture and deliver the new conveyer roller frames (supply deliver material, fabricate, and galvanise as per the sample provided) in lots of ten is \$1867.10 + GST each.

Considering the cost of an average worker's compensation claim for MSD of \$12,847, the financial investment of this innovation was clearly justified in moving forwards with having them manufactured and kept in stock for when change out is needed.