Queensland Mining Industry Health and Safety Conference

Safety Innovation Award Application

Company: Peabody Energy
Site: Millennium Mine
Innovation: T282C Air Filter Lift Access Platform
Presenters: Brad Enthoven (Mechanical Engineer), Matt Anderson (Mobile Maintenance Superintendent) and Andrew Foley (HSET Manager)

The Problem

The process to change out the engine intake air filters on Leibherr T282C rear dump trucks was identified to involve a level of manual handling/ergonomic risk to the Maintenance Teams engaged in the procedure. Maintenance Teams were lifting, pulling, twisting, and reaching above their shoulders to change out the air filter units on top of an access ladder, approximately four metres off the ground. The procedure was raised by maintenance crews as a potential cause of concern. There are four air filter units on a truck, and when full each unit reaches a maximum 25kg mass. This activity exposed Maintenance Teams to possible injury, particularly strains to the shoulders and back. Furthermore, there was potential for a loss of balance and grip when carrying the units down the flight of stairs, all the while trying to maintain three points of contact.

When using an elevated work platform (EWP) the procedure requires a two man team, a working at heights permit, and the appropriate training/competency on the use of such equipment. Additionally, the EWP leaves a large footprint at the front of the vehicle, reducing the working space for other simultaneous maintenance activities. These restrictions reduced the time efficiency of the activity and the practicality of servicing the haul truck.

The procedure is undertaken frequently, on average every 500 hours or when restriction limits are reached prior to the machine's service interval. This equates to approximately 13 change outs per year on each truck, extrapolated over a fleet of 12 Leibherr T282C trucks at Millennium Mine.

The Solution

The solution was to build a piece of equipment with the aim to eliminate, and engineer-control, the manual handling risk associated with walking the air filters down the flight of stairs. *What eventuated* was a custom built prototype Lift Access Platform. The access platform

incorporates a battery drill operated winch pulley attached to a filter hoist cage. Through the operation of the battery drill, the hoist is winched up and down between the top of the access platform and the workshop floor. A sliding gate positioned at the top of the platform allows the Fitter ergonomic access to load and unload the units in the hoist. When the gate is opened for loading/unloading in the raised position, personnel remain within the confines of handrails, which are formed by the filter hoist cage.

The hoist is designed to the specifications of two air filters, and allows a one man operation with the use of the battery drill. Ricbuilt Engineering in Mackay constructed and certified this first of its kind piece of equipment. It was physically tested and validated within the Ricbuilt workshop before its delivery and implementation into the workshop at Millennium mine. The platform is built to the appropriate height specifications of a T282C and within Australian Standards. It comes coupled with a certified 300kg capacity winch, counterweight, and an overhang platform with a 230kg weight restriction. By eliminating the need to manually walk the air filter units down a flight of stairs one at a time, the hoist has effectively reduced the likelihood of injury and sped up the procedure. Additionally, through the classification of the equipment, no working at heights permit or prior training is required to operate the equipment.

Benefits/Effects

The success of the innovation is attributed to the reduction in the amount of manual handling involved in the change out of the air filters, as well as savings in the time it takes to complete the procedure. The required manpower has been reduced to a single Fitter, and further time is saved as there is no requirement for a working at heights permit, Supervisor approval or collecting the appropriate harness and PPE; making this a very time efficient activity. Furthermore, having this equipment available for use will liberate the EWP and access ladder for other workshop activities.

While this innovation was only recently developed, as testament to the success of its design and implementation, the access platform has been well received by maintenance crews and has been quickly adopted into the operating procedure. The OEM Representatives at Millennium and other Peabody sites have actively sourced information and requested drawings of the equipment. As well as safety and productivity gains, there has been a commercial advantage to the initiative with a reduction in the number of damaged filter units. The average filter is dry cleaned and recycled five times in its lifespan. At $200 per filter, there is a considerable cost advantage to preserving the life of the filters which the access platform and basket hoist have demonstrated.

Transferability

Despite the Lift Access Platform being designed to meet the T282C specifications, the design and application of the winch set-up could be easily applied to any other platform. The simplicity of the lift system means that it is a cost effective solution to a very common problem across industries. This innovation is readily transferrable to other mines and those with the same fleet could consider a direct replication of this design for improvements to their T282C air filter maintenance. Within the workshop, the platform can be used for additional maintenance activities on the horn and mirrors of the T282C trucks.

Innovation and Originality

The risk was originally highlighted by Millennium Maintenance Teams concerned with the level of manual handling associated with the air filter maintenance procedure. Upon consultation, the maintenance leadership team and Ricbuilt Engineering were able to design and construct a first of its kind custom prototype access platform that was able to effectively reduce and save both manual handling risks to Maintenance Teams and the time taken to complete the procedure.

Approximate Costs The cost of the staircase, re-engineering, building the frame and hoist was approximately $20,000.