

Starter Motor Jig for Caterpillar 776D Belly Dump Trucks

Rio Tinto Alcan- Weipa Operations

The Problem

Heavy mining equipment requires substantial maintenance and repair activities to be carried out due to the nature of the working environment. One such task is the removal and replacement of the starter motor in a Cat 776D belly dump haul truck. This labor intensive task requires personnel to position themselves under the truck while reaching up to a height of approximately two metres to access the starter motor. The Cat 776D starter motor weighs over 20 kilograms and requires the use of ropes and come-a-longs to hoist it up and down. High physical workload combined with prolonged awkward positions and the potential for pinch points categories this as a high risk task.

The Solution

Boiler makers in the heavy equipment workshop developed a purpose built tool to eliminate the associated manual handling risks and have significantly reduced the turnaround time for changing out starter motors. The design involves two cradles attached to an extendable pole operated by a remote control. The design allows the user to securely attach the jig securely to the starter motor and operate from a safe distance.

Our site management of change processes was completed with approval and sign off by management and the innovation was implemented and shared with other departments on site.



Figure 1:
Starter motor jig being bolted into place



Figure 2:
Jig extended into place

Benefits / Effects / Outcomes

The benefits of using this innovation include:

- Dramatically reduces manual handling risks associated with task.
- Eliminates the potential for movement of raised or supported equipment during maintenance activities as it is securely attached to the jig.
- Removes any element of guess work when placing jacks under equipment, which is currently the alternative method.
- Provides simple system for all maintainers to follow.
- The cost of the innovation was minimal at approximately \$3,000.
- Significant reduction in time up to 2-3 hours.

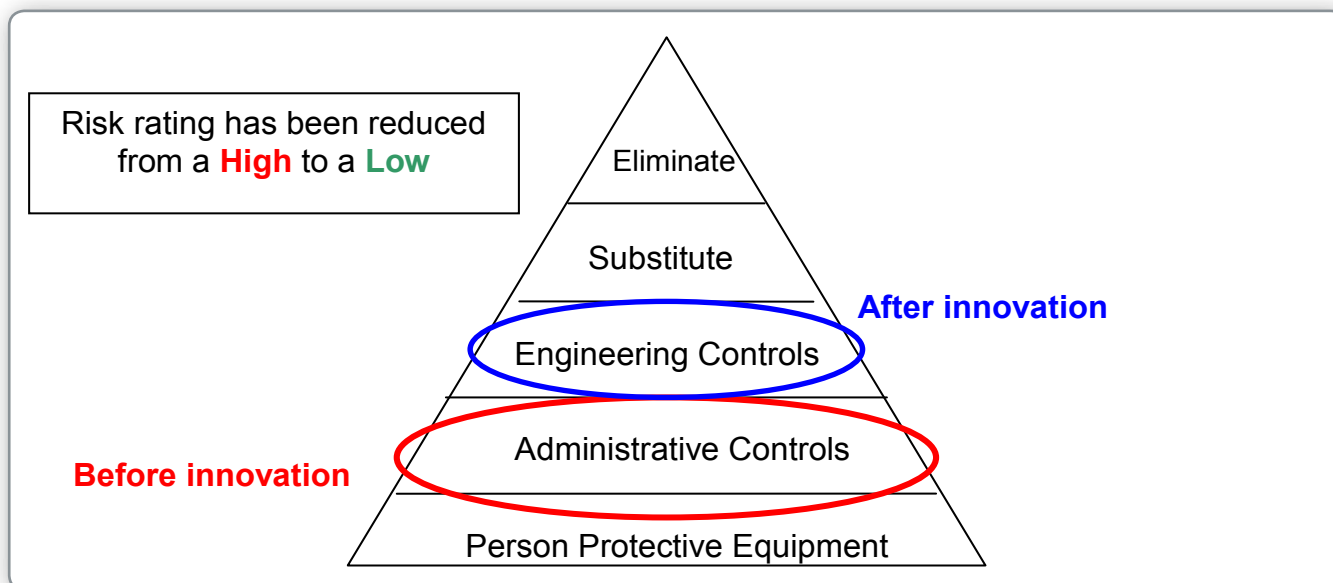


Figure 3:

Hierarchy of Controls – The innovation is an engineered solution that provides an effective jacking method preventing uncontrolled movements and eliminating manual handling of the equipment.

Transferability

This device could be utilised for similar styles of equipment that have the potential for uncontrolled movement during maintenance activities where awkward, heavy work is required. The use of the extendable pole and remote control can be readily adapted to suit other applications where there is overhead work.

Innovation

An employee identified that the current method of securing and the removing the starter motor during maintenance could be improved. The employee worked on the design ensuring it is adequately rated for the load and gained approval from site and managers.