

Motor Drive Belt Change Out Maintenance Tool

Rio Tinto Alcan- Weipa Operations

The Problem

In Weipa, the sewage treatment plant is owned and operated by Rio Tinto Alcan Weipa. There is a significant amount of scheduled maintenance to ensure the plant runs efficiently and to prevent plant breakdowns. As part of this routine preventative maintenance the Aeration Blower Machine requires the drive belts to be changed out on a regular basis.

The removal of a drive belt is a labour intensive task. It requires one person to apply considerable force through a pry bar to lift and hold the electric motor in order to take the tension off the drive belt. An additional person is then required to remove the safety cover, remove and install a new drive belt, all while the motor is being held in position via the pry bar. This task requires significant exertion through the back and limbs, particularly the shoulders and arms. There is also the risk of the bar slipping resulting in lacerations, crushes and pinch points.

The Solution

A new maintenance tool has been designed and engineered to reduce the manual handling risks and time associated with the belt change out on the Aeration Blower. The tool is fitted on top of the machine and the chain and bar at the bottom of the tool is hooked onto the spring on the motor (shown in Figure 2 & 4). The tool has been designed specifically to fit on the machine and has guards at each end to prevent it from slipping during operation. Once in place, a spanner is used to tighten the nut on the top of the tool to lever up the motor spring, loosening the belt tension. This tool design allows one person to complete the task. This modification has significantly reduced the cumulative risk of shoulder, arms and back injury, as well as risks associated with pinch points.



Figure 1:
Method of loosening belt

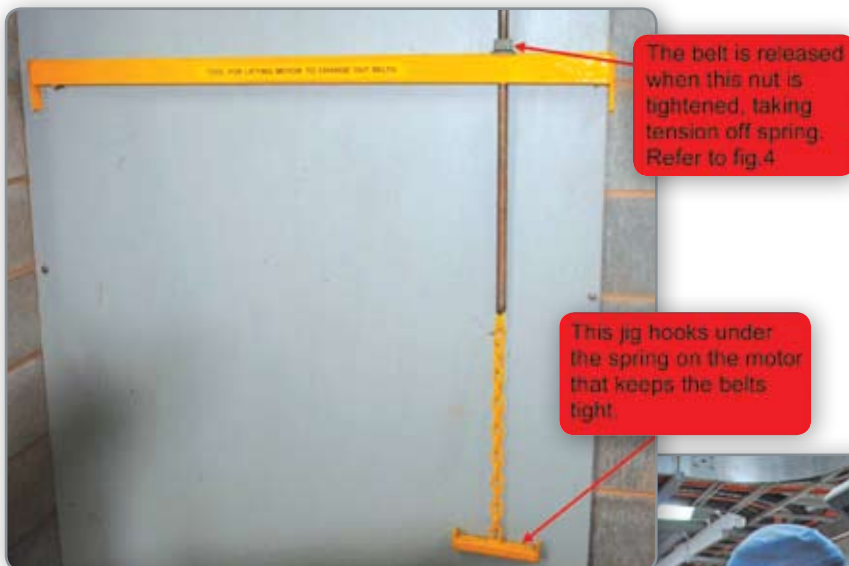


Figure 2:
Drive belt change out maintenance tool.



Figure 3:
Lifting up drive shaft belt using tool

Benefits / Effects / Outcomes

The benefits of using this innovation include:

- Eliminates repetitive movement of the arms and shoulders.
- Reduces the risk of pinch points and hands being in the red zone.
- Provides a simple system to loosen motor belts.
- Significantly reduces time taken to complete task (up to 2 hours).
- The cost of the innovation was minimal at \$250.
- Allows the task to be performed by one person.

Figure 4:
Drive shaft tool pulls spring up.

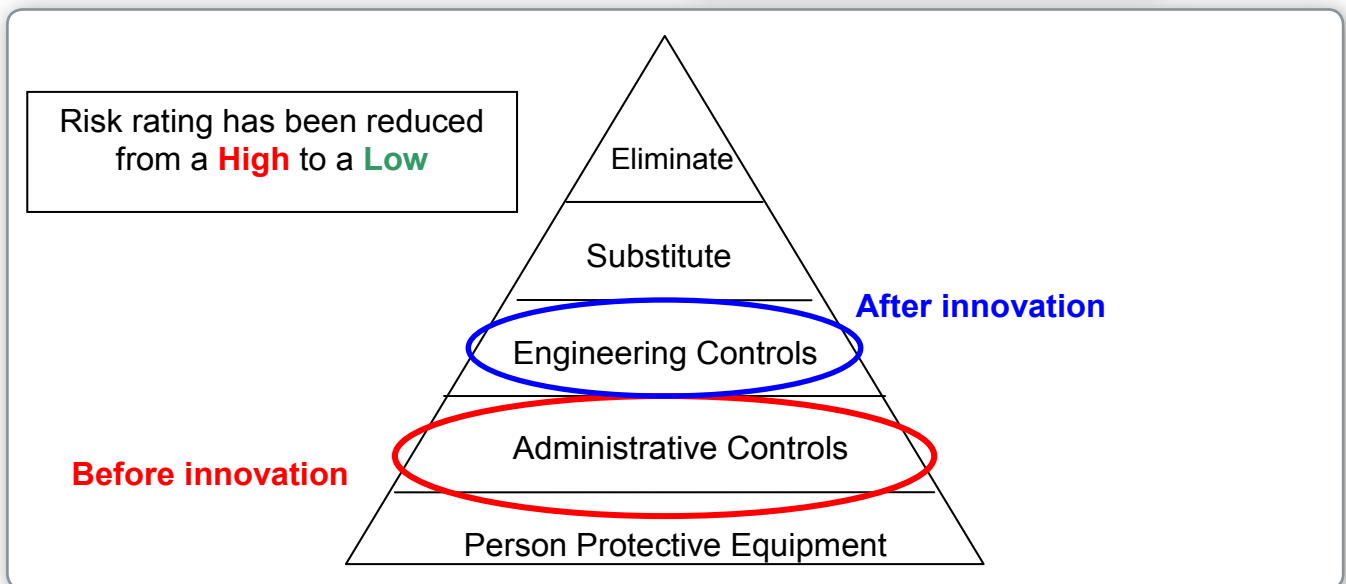
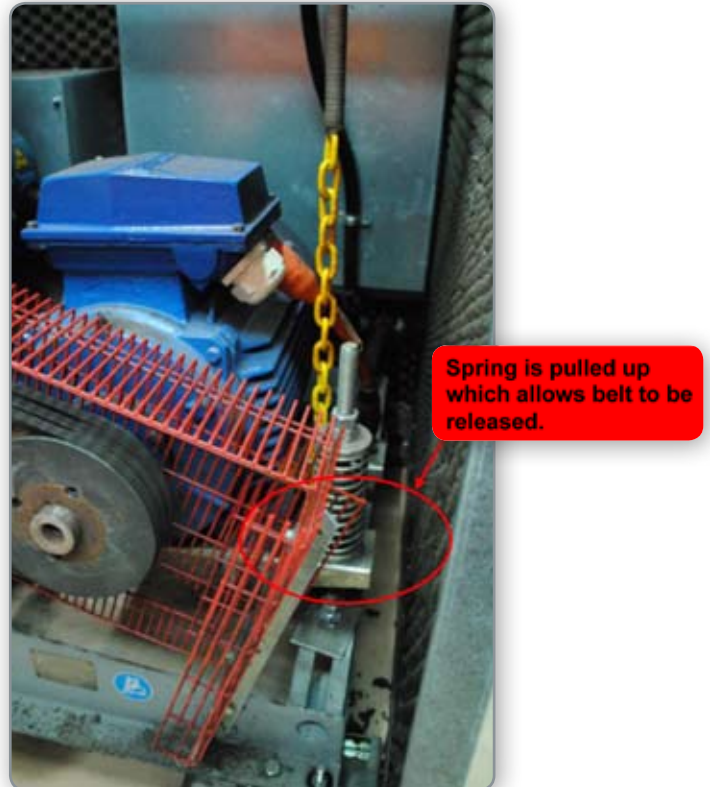


Figure 2:
Hierarchy of Controls – The innovation is an engineered tool that eliminates repetitive manual handling and pinch point risks.

Transferability

This tool design could be tailored to suit a range of different maintenance applications within heavy equipment workshops, mechanical workshops and insitu equipment where there is a requirement for belts to be loosed, removed and changed.

Innovation

A Rio Tinto Alcan Weipa Plumber identified the need for this tool as belts on the equipment are required to be changed on a regular basis. The tool was developed and trialled, ensuring it is adequately rated for the task. Approval was granted by the management team and it is now being used on a regular basis and included in work procedures for this task. Employees have noticed a significant reduction in resources and time required and muscular stress on the body.