



THE UNIVERSITY OF  
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## Optimisation of Belt Wear and Belt Tracking Problems on a Coal Reclaimer

### Project Scope:

**Bulk Material:** Coal

**Equipment:** Reclaiming system with bifurcated surge bin feeding yard belt conveyor via two belt feeders.

**Problem:** Belt wear and tracking issues required replacement of feeder belts after only 12 months of service.

### TBS Solution

TUNRA Bulk Solids (TBS) applied TBS transfer chute technology principles that have been developed over more than 45 years utilising an integrated continuum – Discrete Element Method (DEM) modelling technique, to investigate the flow conditions for the existing transfer chute and feeder configuration, as shown in Figure 1. Once the critical design parameters were identified, a number of possible design improvements were investigated, with only retrofit solutions being an option. The final solution implemented by the client utilises a flow insert technology, with baffles designed and installed into the two legs of the surge bin directly above the feeders to optimise both flow pattern and velocities (refer to Figure 2).

### Project Outcomes

The DEM results indicated that the TBS solution would improve the wear life of the feeder belts and reduce the tracking issues. This is illustrated by the pressure contours shown in Figure 3, with red being the maximum on the intensity scale.

This project was carried out in 2012 and, since the TBS designed baffles have been installed, the feeder belt wear has been reduced significantly.

The initial wear rate was approximately 1.65mm/million tonnes, while the wear rate after installation of the TBS baffles has dropped to 0.33mm/million tonnes. Initially, the client was hoping to extend the feeder belt life from 12 months to 3 years, however early indications show that the feeder belts may last even longer. Estimated cost saving to the client is \$30,000 per feeder replacement, with 8 feeders operating on site. If the feeder belts have been replaced at the 3 year mark, the savings to the client would have reached \$240,000 per annum.

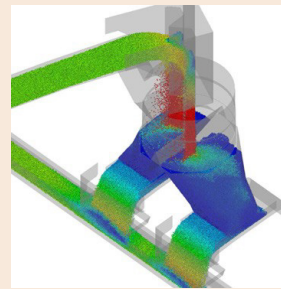


Figure 1: Isometric view of the DEM model of the existing transfer configuration



Figure 2: Installation of baffles into the two legs of the transfer

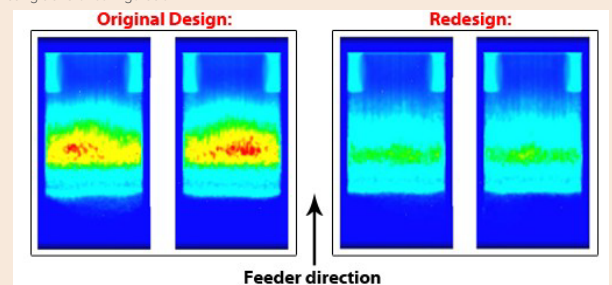


Figure 3: DEM impact intensity contours of the two feeder belts: Left: Initial situation, Right: with inclusion of TBS designed baffles

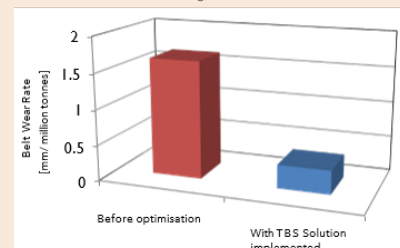


Figure 4: Decrease in belt wear rate after optimisation

Advancing the Bulk Materials Handling Discipline Globally



**For further information:**

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