



Truck and loader matching 6 3 November 2009

This week I want to present a case study where a mine had a large shovel with 44 CuM dipper loading 218 tonne trucks perfectly in two and a half passes! (Situation normal for most!) The dilemma, faced by multitudes of mines around the world) is do you put a third small pass in the truck or do you send it away 80% full?

The average payload was 85 tonnes. The original methodology for determining the match was not known but the performance of the dipper was quite good when looking around the industry. It appears likely that the original aim was to fill the 218 tonne trucks in three passes. Two passes sent trucks away with an average of 170 tonnes payload. The decision was made not to put the third pass into the trucks due to the loss in productivity, damage caused to trucks by overloading and the increased spillage.

Desired average payload was 218 tonnes per truck (109 tonnes per dipper). The mine had a quote from the OEM to change the boom geometry of the two shovels and provide two new dippers. Quote was for \$6M+.

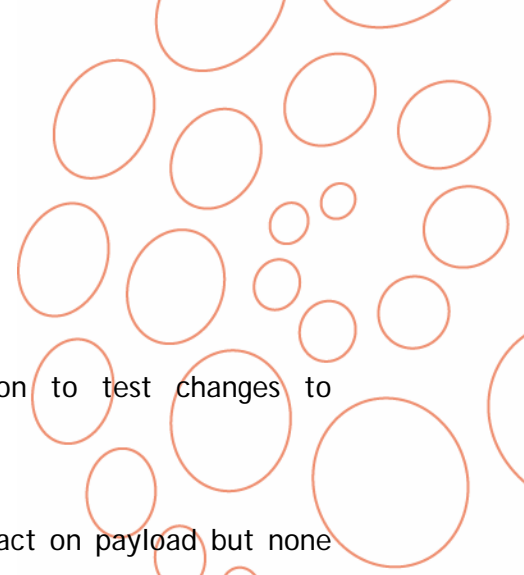
Using a combination of data analysis and physical modelling four stages of work were undertaken with the following outcomes;

Stage 1 Analyse data. Process changes recommended. Discussions held with operators.
Result - Payload increased to 95 tonnes on average which was in line with best practice dipper performance.

Stage 2 Physical modeling of the existing dipper, the supplier's recommended dipper and two boom geometries.
Result - Modelling proved accurate. Modelling demonstrated under-performance of supplier's recommended dipper relative to existing dipper. Recommendation made not to change boom geometry. Recommendation not to purchase new dipper due to

Head Office
Brisbane Technology Park
Unit 2 / 53 Brandl St
Eight Mile Plains Q 4113
Australia
Ph: +61 7 3147 8300
Fax: +61 7 3147 8305
Email: gbi@gbimining.com
www.gbimining.com

South African Office
8 Corridor Crescent
Building B Ground Floor
Route N4 Business Park
Ben Fleur X11 Witbank 1035
South Africa
Ph: +27 13 6564114
Fax: +27 13 6564114
www.gbimining.com



substantial under-performance. Recommendation to test changes to existing dipper.

- Stage 3 Physical modeling of changes to the dipper.
Result - A number of changes had a positive impact on payload but none gave enough by themselves to increase payload to 109 tonnes. Recommendation to conduct further testing combining various options to modify the dipper.
- Stage 4 Four options were presented which met the target 109 tonne average payload, (Figure 1).

The mine chose the preferred option with a slight change, engaged a structural engineer to design the modifications and a local business undertook the modifications to one dipper (Figure 2).

End Result All up cost \$350,000, Average Payload 111 tonnes. Value to mine \$8M per annum.

Consequently a second dipper was modified for the second shovel.

All up cost was \$470,000 with two dippers achieving 111 tonnes and 109 tonnes average payload. Cash saved >\$5.5M. Value to the mine \$15M per annum.

The most important lesson here is that you can't achieve anything if you won't have a go. The four stages here took 18 months and were rigorously evaluated before proceeding, but the key is that they did it and they added real value.

