

Moving more for less

A joint venture with Rio Tinto

Project challenge

Rio Tinto Coal Australia (RTCA) wanted to increase machine productivity on a P&H 4100 electric rope shovel that was considered to be underperforming. The goal was a productivity increase of at least 7%, or more than 2 million extra metric tons of material per year, which would match equivalent machines in RTCA's fleet and hit material movement targets for the mine. Adding to the complexity was the project budget: \$0.

Solution design

RTCA's maintenance team partnered with Komatsu personnel to conduct an extensive review of performance, reliability and machine configuration parameters. Team members identified several areas for improvement, including hoist motors over temperature, dipper trips, high voltage supply interruptions, and air and grease system audits.

Improvements in those key areas resulted in an increased mean time between failures of 31%.

But another piece of the puzzle remained. The review determined that the machine was operating within specifications and, contrary to original thoughts, performing at a high operational level. So, as the reliability of the machine improved, efforts then focused on operational constraints to help RTCA take productivity to the level necessary to hit operating targets.

Workshops were conducted with a wide range of mine employees to look at factors impacting performance. Using internal data and prompts, shovel and truck operators identified patterns in the daily mining process and trends impacting production, including crib breaks, swapping truck operators and the first and last loads of the shifts. After validating the workshop outcomes, it became clear the shovel was experiencing unexpected periods of time when no trucks were available to be loaded, also known as "hang time."

Existing systems and data at the mine were not providing enough information for the team to determine when and why these events were occurring, allowing no path for improvement.



"Komatsu Mining Corp. has earned credibility by focusing on stakeholder engagement and the delivery of solutions that benefit the entire mine. They have been a pleasure to deal with."

Scott Macintyre
Principal Advisor, Rio Tinto Coal Australia

The solution

The Komatsu and RTCA teams shifted their focus to hang time, using Komatsu Smart Solutions tools — including PreVail remote health monitoring — to pinpoint consistent times during the shift where hang time occurred. The teams then cross-referenced these times with truck fleet delay data. They also expanded their focus to include two other 4100-series shovels at the site.

Working closely with superintendents of loading and haulage, the teams concentrated on the beginning and end of shift performance, maximizing metric tons over the lunch periods, understanding the causes of truck delays and prioritizing the shovels within on-site fleet management systems.

Ultimately, this led to a new process of swapping truck operators at crib time to significantly reduce wait on truck times at the shovels. Working with Fleet Management System personnel to allocate trucks to higher-priority machines then reduced delays caused by a shortage of trucks.

As a result of the partnership with Komatsu, RTCA was able to pinpoint and understand the delays affecting the production cycle and overhaul performance on not one, but three shovels at the mine. The solution was enhanced by mine site employees' desire to improve and their willingness to embrace the companies' partnership.

The results

To date, the original project shovel has achieved an annualized increase of 2.7 million metric tons of material movement while maintaining the \$0 project budget. Total project value among the three shovels is now a site estimate of more than AU\$9 million (US\$6.52 million).

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