

IMPROVING DMC PERFORMANCE

A unique collaborative approach between two leading research groups and a coal operator is paving the way towards yield improvements in the dense medium cyclone (DMC) circuits of Australian coal preparation plants. With DMC circuits processing around \$30 billion of export coal a year, this is of significant commercial benefit.

Through a project funded by ACARP, a number of important aspects of DMC circuit operation at New Hope Pty Ltd's New Acland mine were monitored over an extended period of time. Plant personnel are now able to immediately determine how a DMC or pair of DMCs in a module is performing with a level of detail never achieved before.

Joint Project Leader Bruce Firth said this information would improve process knowledge and, as a consequence of minute-by-minute monitoring of the most important coal preparation processes, would lead to improvements in DMC performance and profitability.

"This project allowed us to modify and develop confidence in the long-term viability of a number of new measurement devices in the harsh environment encountered in a coal preparation plant. These devices included motion analysers, electrical impedance spectrometers and hall effect devices for determining solids mass flows, fluid densities and magnetite concentrations," he said.

"This research provides a new window to monitor plant performance on-line as well as examining the dynamic behaviour of the DMC circuit.

"We believe that the accuracy achieved from this work will help to quickly identify deviations from the preferred plant performance and understand how to correct them. As we improve measurement accuracy we may be able to achieve greater control and thereby obtain the incremental 0.2 to 0.3 per cent yield improvements industry is looking for."

New Acland CHPP Superintendent Rob Rashleigh said given New Acland Coal's proximity to Brisbane, he saw this project as a perfect opportunity to work with a dedicated professional team to deliver real time monitoring in DMC performance.

"As operating costs increase from year to year, plant managers are actively exploring ways of increasing plant yield and a project of this nature has the potential to deliver these gains – increasing plant yield will deliver the best profit as all operating costs are already incurred. Having a tool to monitor DMC performance in real time will allow plant quality engineers to adjust the plant performance for the best process result," he said.

"The project has progressed smoothly with a good working relationship formed between New Acland Coal and ACARP, CSIRO and JKMRRC."

Joint Project Leader Peter Holtham said CSIRO and JKMRRC had joined forces again to undertake further research.

"New Acland Coal has agreed to an extension of the current project, which will involve exploring the linkages between the dynamic behaviour of a DMC circuit and particular operating conditions of the mine and the processing plant," he said.

"These linkages haven't been quantified before. As a result, operational problems can remain undetected for some time and considerable amounts of saleable coal could be lost. Solving this problem is the major benefit of this project."

Both these research projects are setting the groundwork for autonomous operation of coal preparation plants in the future.

"The move towards autonomous operation of a plant will be driven by the availability of experienced metallurgical engineers, both in number and preferred working environment," Bruce said.

"The move will require reliable sensing equipment and 'smart' algorithms to be available to assist in the process, and the ability to access the information at locations remote from the plant. These projects clearly provide a pathway to this objective."

CSIRO and JKMRRC joined forces to extensively evaluate a number of new monitoring/measurement devices which have the potential to dramatically change the management and control of preparation plants in the future.

ACARP

Australian Coal Industry's
Research Program
PO Box 7148 Riverside Centre
Qld 4001 Australia

Phone 07 3229 7661
Email acarpmatters@acarp.com.au