PROBLEM SOLVED™ PAPER

SOLUTION: Martin® Hurricane Air Cannons

INDUSTRY: Coal Handling

LOCATION: Anglo American Inyosi Coal and BHP Billiton Energy Coal South Africa
Phola Coal Processing Plant, Mpumalanga, South Africa

Engineers traced the slowdown to material build-up in the chute feeding the export silo and discard bin.

To address the blockage issue, Martin recommended 70-liter Hurricane Air Cannons, strategically placed to knock down the filter cake within the chute.

Technicians installed the initial units at a 35° downward-facing angle for maximum effectiveness in this application.

PROBLEM

A 50/50 joint venture between Anglo American Inyosi Coal (AAIC) and BHP Billiton Energy Coal South Africa (BECSA), the Phola coal processing plant is fed equally by AAIC's Zibulo Colliery and BECSA's Klipspruit Mine.

Soon after the plant went online, and the high-volume ramped up, engineers started noticing bottlenecks. They noticed a slowdown due to a material build-up in the chute feeding the export silo and discard bin. Operators determined that the freshly-pressed cakes were sticking to the walls of the chute, narrowing the space for product transfer and leaving "rat holes" which restricted flow. As the blockage grew, it would cause the vessels to fill with material and eventually trip the high level indicator, shutting off the conveyors and forcing downtime for manual cleanout.

SOLUTION

Operators met with representatives from Martin South Africa, who suggested adding a series of air cannons to address the issue. Martin recommended 70-liter Hurricane Air Cannons, placed in strategic locations to knock down the filter cake within the chute. Positioning of the cannons and nozzles is critical to their success, and the technicians installed the four units at a 35° downward-facing angle for maximum effectiveness in this application.

The patented design is engineered to enhance material flow with greater force and faster cycling than traditional valve designs. The cannons fire only when the exhaust valve opens in response to a positive surge of air sent by a solenoid or PLC control. This positive-acting valve amplifies the discharge, providing up to 50% more force than a standard air cannon of the same size. In addition, the improved air path fills the reservoir 3-4 times faster than typical designs.

RESULTS

"The air cannons have proven very effective at blowing the filter cake from the edges of the discard chute, allowing the plant to maintain the output levels for which it was designed," said Richard Kenny, BHP Billiton's Project Director for Klipspruit. "Finding a workable solution to the build-up was a huge relief."

With production rates continuing to rise, Phola has commissioned another series of cannons to further improve the material flow inside the discard bin. The company is currently awaiting installation of a larger air compressor to manage the additional load.

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