Single Stack Sizer® produces 35 short tons/hour of clean coal using 150 micron Polyweb® screens

- Replaced ineffective sieve bends to remove high ash content from clean coal
- 100µm Polyweb® screen panels slashed ash content from 20% to 10%
- Panel life extends beyond 10 months

Background

The James River Coal Company was using sieve bends in an attempt to remove the high ash fraction from the clean coal produced by clean coal spiral circuits. The sieve bends normally produced a clean coal product that was approximately 15 to 17 percent ash, which exceeded the desired ash content of 10 percent or less.

In looking to improve the ash content of their product, the company sent coal slurry samples to Derrick's full-scale test lab for testing aimed at evaluating the Stack Sizer's performance for ash reduction in clean coal spiral product circuits. During testing, duplicate samples of the oversize and undersize fractions were collected for additional ash content analysis.

Solution

The analysis showed that the ash content of the clean coal product had been reduced from approximately 20 percent to 7 percent when the Stack Sizer® was fitted with Derrick® 180 micron Polyweb panels. Using 150 micron panels, the ash content was reduced to 9 percent. Clean coal product from the Stack Sizer was nearly equivalent to the ash content in their heavy media cyclone circuit!

Figure 1. 5-deck Stack Sizer operating at Bevins Branch Preparation Plant

These results convinced the James River Coal Company to select the Stack Sizer for their Bevins Branch Preparation Plant.

One 5-deck Stack Sizer fitted with Derrick 150 micron Polyweb urethane screen panels could process up to 55 short tons per hour of feed having 39 percent -100 mesh material when the slurry density contained 25 to 30 percent solids by weight. To facilitate separation, repulp water at approximately 50 gallons per minute was added per screen deck.

Approximately 35 short tons of clean coal containing only 7 percent -100 mesh material was produced per hour. Based on this data, it was concluded that a single 5-deck Stack Sizer could process the clean coal spiral discharge, so one Model 2SG48-60R-5STK 5-deck repulping Stack Sizer was installed at Bevins Branch (Figure 1). Performance data from the first few weeks showed that the machine was operating as predicted by the lab tests.

However, the data suggested that more good coal could be recovered if a finer separation could be achieved. Consequently, as a field trial, the 150 micron Polyweb screen panels were replaced with Derrick 100 micron Polyweb panels. The results from the field trial indicated that the clean coal product yield increased with only a slight increase in the ash content. Table 1 lists performance data from the field trial.

Based on the above performance data, it was decided to continue using the 100 micron Polyweb screen panels. After more than 11 months, no apparent performance degradation occurred.

The Bevins Branch Stack Sizer processes approximately 40 stph of clean coal spiral product having about 20 percent ash. The clean coal product yield is approximately 32.5 short tons per hour with about 10 percent ash. This material is then fed to screen bowl centrifuges for additional processing.

FEED		OVERSIZE		UNDERSIZE	
% Solids	% Ash	% Solids	% Ash	% Solids	% Ash
37.05	12.82	49.30	9.86	2.96	40.11

Table 1. Performance data from field trial

Conclusion

Over 10 months of continuous production confirmed that the Stack Sizer fitted with Derrick 100 micron Polyweb screen panels consistently produces a clean coal fraction that ranges from 8 to 10 percent ash. And field data indicates that the 100 micron screen surfaces last longer than 10 months in continuous use.

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