

Two Stack Sizer[®] machines produce 33 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 less than 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 their product, the company sent coal slurry samples to Derrick[®] Corporation for testing aimed at evaluating the Stack Sizer's performance for ash reduction in clean coal spiral product circuits. Duplicate samples of the oversize and undersize fractions were collected for additional ash content analysis.

Solution

The ash content analysis showed that 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! These results convinced the James River Coal Company to select the Stack Sizer for their Leatherwood Preparation Plant.



Figure 1. Leatherwood Stack Sizer installation

Test data indicated that two five-deck Stack Sizers were required to process the anticipated feed flowrate of approximately 80 short tons per hour of clean coal spiral discharge. The data also indicated that the maximum screening efficiency occurred when the feed to the Stack Sizer was approximately 25 to 30 percent solids by weight. Based on the test results, two Stack Sizers were installed at Leatherwood (Figure 1). Using the positive results from the Bevins Branch machine for guidance, Derrick 100 micron Polyweb screen panels were installed on both units.

Some dilution water was required to achieve the desired Stack Sizer feed density of 30 percent solids or less by weight. The dilution water was added upstream of the flow distributor that fed the Stack Sizer.

After several weeks of operation, samples of the oversize and undersize fractions from the Stack Sizer were collected and analyzed to confirm the performance of the machine. Table 1 lists performance data from one of the sampling events.

Each Leatherwood 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. The original 100 micron screen panels installed on the machines showed no apparent degradation in performance after more than 11 months in service.

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.

Each five-deck Stack Sizer operating at the Leatherwood Preparation Plant produces approximately 33 short tons per hour of clean coal containing about 9 percent ash. This represents a clean coal yield of about 75 percent and an ash reduction of about 11 percent from the feed slurry.

FEED		OVERSIZE		UNDERSIZE	
% Solids	% Ash	% Solids	% Ash	% Solids	% Ash
22.31	21.23	34.65	9.67	7.71	61.75

Table 1. Clean coal from Stack Sizers fitted with 100 micron Polyweb screen panels

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