

Advantages of high efficiency screening separations as compared to upstream classifiers

- The overall classification efficiency has been increased by 20%
- The process water usage has been reduced by 87%
- The operation became easy to control

Background

Derrick was approached by a major silica sand supplier in Europe that has been producing quartz sand for the glass, foundry, refractory, and ceramic industries for more than a century. The quartz sand beneficiation plant included hydraulic separation and utilized two upstream classifiers fed from a hydrocyclone to produce a product with a 0 percent plus 0.70mm fraction. Due to low efficiency of the hydraulic classifiers, Derrick's high speed Repulp screening machines were installed to control the overflow stream and recover coarse particles.

To improve the energy efficiency and productivity of the beneficiation plant and to meet future production demands, the company required final production to increase by 20 percent.

The sand producer decided to evaluate the feasibility and benefits of replacing the hydraulic classifiers and Repulp control screens with the Derrick® Stack Sizer® to improve the classification efficiency and reduce energy usage and water consumption.

Solution

To demonstrate the potential to improve process efficiency and reduce the water consumption, Derrick conducted tests in its full-scale testing laboratory in Buffalo, New York. The objective of the testing was to evaluate the Stack Sizer performance



Derrick Stack Sizers have improved particle classification and increased cost savings

500 MICRON SEPARATION OF QUARTZ SAND WITH UPSTREAM CLASSIFIER

Hydraulic Classifier	2.6 dia. Upstream Classifier
Solids Feed Rate (t/h)	120.0
Water (m3/h)	300.0

on a high near-size feed material. After successful test results, an on-site comparison test program was performed to evaluate the benefits of the Stack Sizer for particle classification compared with the existing hydraulic classification. A single deck Stack Sizer (1.2m W x 1.5m L) was installed in parallel with the two upstream classifiers to further

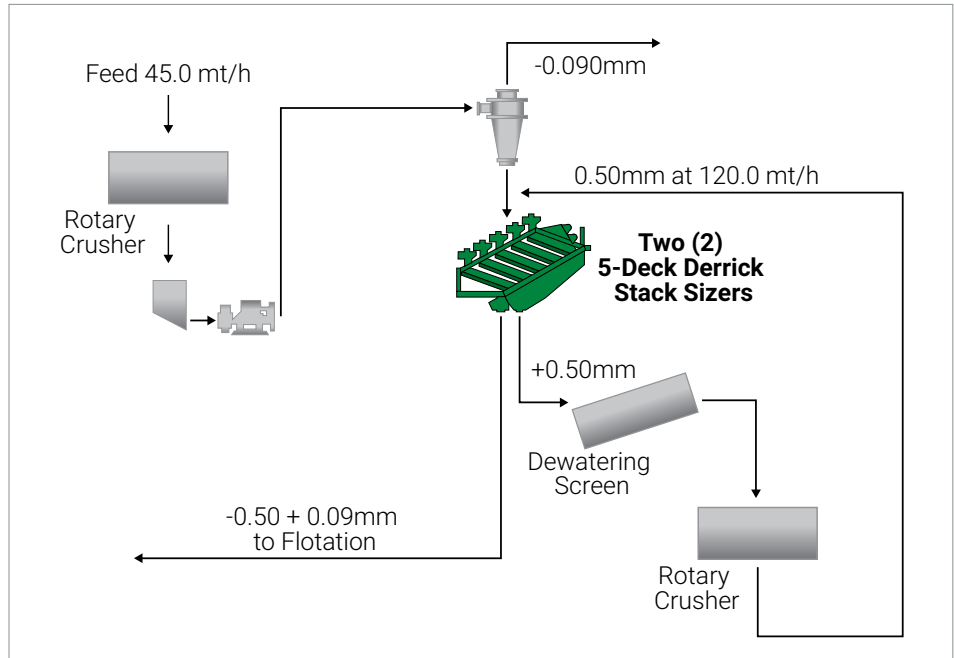
evaluate the benefits of improved clarification. Side-by-side tests were conducted to determine the performance of the Stack Sizer compared with the upstream classifiers. The Derrick Stack Sizers achieved an overall classification efficiency of 93.6 percent while using 87 percent less process water than upstream classifiers.

Based on the on-site testing, the upstream hydraulic classifiers were replaced with two 5-Deck Derrick Stack Sizers.

Conclusion

The Stack Sizer substantially improved performance of the classification and concentration circuits, as revealed by the data. Results include higher accuracy in controlling particle size separation improved classification efficiency higher recovery and increased throughput capacity. Lower operating costs were also achieved including a reduction in water consumption, power consumption, maintenance, and labor costs.

500 MICRON SEPARATION OF QUARTZ SAND WITH DERRICK STACK SIZER UNIT	
Screening Machine	2SG48-60R-5STK, 5-Deck
Solids Feed Rate (t/h)	120.0
Spray Water (m3/h)	40.0



OPENING MICRONS	CUMULATIVE PERCENT RETAINED			EFFICIENCY %		
	FEED	OVERSIZE	UNDERSIZE	OVERSIZE	UNDERSIZE	OVERALL
1000	31.1	47.6	0.0	-	-	-
710	49.2	71.8	0.0	-	-	-
500	70.7	95.2	10.4	95.8	88.4	93.6
300	89.5	95.8	42.7	-	-	-

For more information, please contact your local Derrick sales representative.

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