

Pond management equipment improves fines recovery, reduces cost at aggregate plant

- Dewateres super fines to 72% solids by weight
- Eliminates belt presses for substantial cost savings
- Recovers 95 percent of water for return to plant process

Background

Valley Quarries, a large aggregate producer with several plants in Pennsylvania, U.S.A., was experiencing significant problems with fines recovery due to the use of belt presses for dewatering the super fines present in the plant discharge slurry. Mechanical repairs, operating temperature sensitivity, and excessive personnel time were all common penalties with the belt presses. Looking for a solution, Valley contacted Derrick® Corporation to evaluate the daily problems associated with the use of settling ponds during aggregate production and to make recommendations for process improvements.

Solution

To begin evaluating the Valley Quarries fines recovery system, a live sample of the plant discharge slurry was collected. The sample was used to determine the flow rate in U.S. gallons per minute (GPM), percent solids by weight, tonnage rates, and particle gradations of the slurry flowing to the settling pond. All are vital parameters needed for sizing an efficient fines recovery system flowsheet.

High solids recovery units—the Derrick HI-G® Dewatering Machine unit (combination of Derrick hydrocyclones and Derrick high G dewatering screens)—were installed at each Valley facility.



DE-7200 centrifuge dewateres super fines into stackable/conveyable form at 72% solids by weight

These units recover the +400 mesh (38 micron) size materials and convert them into a stackable/conveyable, sellable form. This material accounts for approximately 60 to 70 percent of the solids present in the plant's discharge slurry. The remaining 30 to 40 percent of the solids are sent to a high rate radial thickener device to consolidate the super fines (-400 mesh) and recover 95 percent of the water for return to the plant process. The challenge of handling the

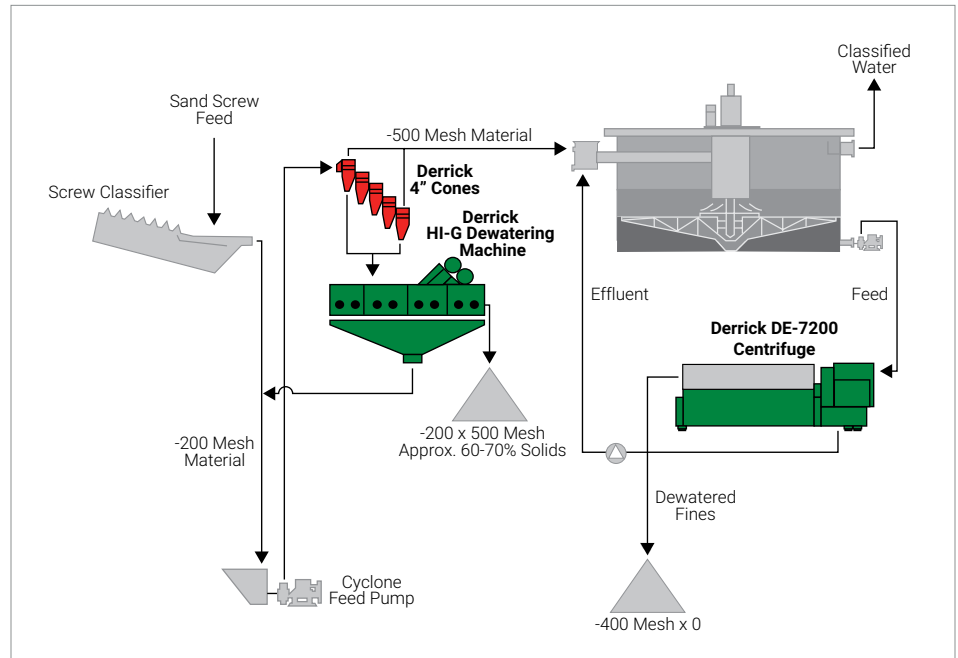
underflow from the thickener was the use of obsolete belt press or plate-and-frame technology for dewatering. To eliminate the outdated technology, Derrick installed a DE-7200™ high capacity centrifuge at their Plant 2 facility to handle the 12 to 15 t/h of thickener underflow. The consolidated solids from the thickener, at approximately 30 percent solids by weight at 165 GPM, are pumped to the DE-7200 centrifuge by a positive displacement pump.

The centrifuge dewateres the super fines into a stackable and conveyable form at 72 percent solids by weight. The liquid effluent is returned to the plant process (thickener feed) as a recirculating load. The settling pond was eliminated, as all process water is recovered from the thickener and 100 percent of the solids is dewatered.

Conclusion

Designed to operate in harsh environments with minimal interaction, the DE-7200 centrifuge provides several advantages over standard belt presses. With safety, reliability, and capacity as a few of the key features of a Derrick centrifuge, this product offers the operator the ability to make on the fly adjustments with the Variable Frequency Drive (VFD™) technology and remote monitoring and operating capabilities.

With the new flowsheet, 100 percent of the super fines in the plant discharge slurry are dewatered to a stackable state, consistently and trouble free. With the settling pond now idle, drastic process improvements have resulted, as well as substantial cost savings.



New Valley Quarries flowsheet with Derrick DE-7200 centrifuge

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

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