Vale S.A. Gelado

CASE STUDY 245

Transforming Tailings Into Profit With Derrick's 8-Deck SuperStack®

CUSTOMER NAME
Vale S.A. Gelado

CUSTOMER TENURE
30+ years

INDUSTRY
Iron Ore

EQUIPMENT
8-Deck SuperStack®

LOCATION
State of Para, Brazil

Why Derrick?

To execute this innovative new reprocessing project, Vale selected the Derrick® SuperStack®. With 8 screen decks positioned one above the other, delivering linear motion in parallel, SuperStack is capable of high-capacity fine screening in the footprint of one traditional wet screening machine, utilizing efficient design without sacrificing high-g performance.

One 8-deck SuperStack with 150 µm aperture high-open are, non-blinding Polyweb® urethane screens can process over 200 dry tons of iron ore per hour. That is more than twice the capacity of the previous industry-leading technology in a similar footprint.

The patented Front-To-Back™ (FTB) screen tensioning system reduces screen maintenance time by up to 75% compared to other systems. This novel engineering eliminates the draw bars and bolts used in side-to-side tensioning systems, thereby reducing the time and complexity of screen panel changes.

Overview

Vale is a leading global iron ore producer. A large part of their mission is continuous improvement to safety and sustainability at their Carajás mining complex in the Pará state of Brazil. Vale's sought an innovative solution to transform tailings at its Gelado project into profitable, market-ready "green steel" product. The new process could lower emissions in mining and steelmaking, while producing higher quality iron ore recovered at a lower cost.

The Challenge

Traditional iron ore processing results in a substantial amount of recoverable fine iron ore lost to tailings storage. New developments in separation technology, combined with increasing demand for higher quality ore make the recovery of higher-grade iron ore more cost-effective. Advanced fine screening technology can achieve superior product quality and recovery of fine iron ore.

The Solution

Vale's Gelado project, relying on Derrick's Superstack and Polyweb technology transformed the cost and risk of tailings management into a profitable revenue stream with a new process to recover high quality "green steel" product that yields important environmental and economic benefits.

The Results

The 10 million ton per annum (MTPA) process operates with lower production costs than other current operations at the Carajás complex. The project is expected to recover 10 MTPA of high-grade ore from the Gelado tailings dam over a 10 year period. Average grade of ore is expected to be over 64 percent iron, 2.0 percent silica, and 1.65 percent alumina. The ore will undergo a magnetic concentration process, in which a powerful magnet separates the ferrous particles from the silica and alumina, further increasing its quality.

The high quality "green steel" product results in lower emissions in mining and steelmaking. Mining processes benefit from a near zero transportation distance with no use of trucks, zero crushing requirements, and a reduction in mining rates without lower production. The reduced mining and transportation requirements contribute to reduced sustaining capital costs.

High-quality ore with low impurities (silica and alumina) reduces emissions, byproduct waste, and energy consumption in steelmaking. This ore permits iron ore producers to deliver greater value to their clients with environmental benefits, as well.

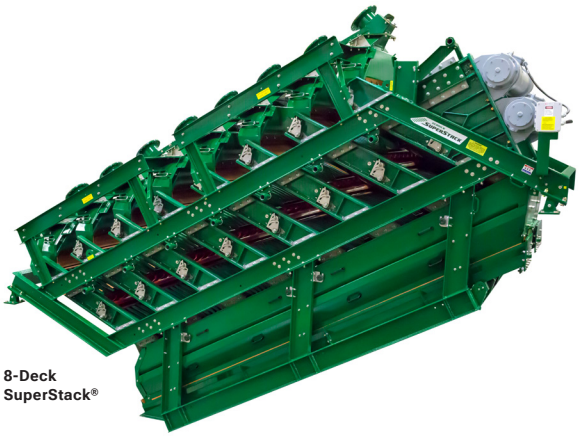
The cost and risk of storing waste tailings can be converted into production of iron ore that is higher quality than the industry standard and at lower operating cost. Fine iron is traditionally lost to tailings and is often better liberated than coarser ore. After beneficiation, the finer size fractions of iron are generally higher grade with less impurities than coarser products. High grade fines can be used as Direct Reduction (DR) grade pellet feed or blended with sinter to improve sinter product grade and value.

Powerful technology like SuperStack allows for profitable recovery of fine iron at reduced costs of tailings management and mining. In addition, the environmental benefits improve the sustainability of mining and the Social License to Operate. Analysis reveals a very attractive return on investment for fine iron recovery projects.

KEY INSTALLATION BENEFITS

- **High grade iron ore screened from reprocessed tailings**
- **Innovative screening process using SuperStack reduces reliance on tailings dams**
- **"Green Steel" product lowers emissions, reduces mining costs, and increases profit**

DERRICK SUPERSTACK®



8-Deck SuperStack®

Solutions to your most challenging fine screening problems:

- Improved efficiency and capacity in closed grinding circuits
- Improved final concentrate grade and recovery
- Improved size classification and product quality
- Reduced impurities
- Pumping and pipeline protection by removing coarse and abrasive particles
- High-capacity trash removal

Scan here to discover more about the SuperStack Wet Sizing Machine!

SCAN ME

DERRICK®

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