

CASE STUDY:

Ore Processing

TIVAR® 88 High Performance Lining Solution

THE CASE IN BRIEF

Application: 3,000 sq. meters Iron Ore Storage Hopper

Quantity: 1 Concrete Hopper/ 28 Rectangular Outlets

Liner: TIVAR® 88, 15mm Thick

Bulk Material: Iron Ore Fines

Substrate: Reinforced Concrete

Problem: Sticking, caking, bridging, arching, freezing

Date Installed: 2001

TIVAR® 88-LINED HOPPER ACHIEVES MASS FLOW OF IRON ORE FINES, ELIMINATES FLOW PROMOTION DEVICES

Background: LKAB is an international high-tech ore processing company, exporting iron ore primarily to European steel mills. The company mines the ore from two underground iron ore mines, then processes the crude iron ore to fines, pellets and special products. The ore is transported by rail to shipping harbors for customer distribution. LKAB decided to erect a new 17,000 ton capacity storage hopper - one without the flow problems previous storage hoppers experienced.

Problem: Arching and bridging of both iron ore fines and pressed pellets was a serious problem for LKAB, resulting in an unacceptable amount of time, effort and money spent trying to achieve and then maintain mass flow. The company encountered additional problems during cold weather when the fines would freeze on the surface of the unlined equipment. In fact, the entire manufacturing process had to be shut down on a frequent basis in order to reactivate the material flow in the chutes, hoppers, silos and railcars. The two production lines alternated operation rather than both operating at the same time because LKAB was forced to constantly perform maintenance to restore acceptable material flow on one line or the other.

Solution: LKAB contacted flow consultant Schluz & Schwedes, Braunschweig, Germany, for assistance in analyzing the situation. The consultants recommended slight modifications of the hopper design in combination with a lining made from TIVAR® 88, a polymeric material recognized and used worldwide for its combination of an exceptionally slick surface, high abrasion resistance and long wear life. Stainless steel (A2-grade) was considered as a possible lining material, but the idea was quickly dismissed because the chemical properties of the iron ore would cause corrosion of the stainless steel and the lining would have been destroyed in a relatively short period of time.

The concrete hopper was lined using TIVAR® 88. Utilizing Quadrant Engineering Plastic Products SystemTIVAR® Engineering group, the hopper lining was designed, manufactured and bundled as a kit for quick installation on-site. The installation involved countersinking screws covered by TIVAR® 88 plugs and advanced butt welding at joints to create a seamless lining surface that would not inhibit mass flow. Leading edge protectors were also installed to prevent the iron ore from migrating behind the liner.

Results: Iron ore flow problems have been virtually eliminated due to the installation of the TIVAR® 88 lining. LKAB personnel are so satisfied with the results that they have decided to line other areas of the iron ore handling system.

Important: Most plastics will ignite and sustain flame under certain conditions. Caution is urged where any material may be exposed to open flame or heat generating equipment. Use Material Safety Data Sheets to determine auto-ignition and flashpoint temperatures of material or consult Quadrant Engineering Plastic Products. WARRANTY: Characteristics and applications for products are shown for information only and should not be viewed as recommendations for use or fitness for any particular purpose. TIVAR® and SystemTIVAR® are registered trademarks of Quadrant Engineering Plastic Products, Inc.

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