

CASE STUDY:

Clay

TIVAR® 88 High Performance Lining Solution

THE CASE IN BRIEF

Application: Hopper Liners

Quantity: 1 Clay Hopper

Liner: TIVAR® 88, 1/2" Thick

Bulk Material: Clay, Gypsum

Substrate: Mild Steel

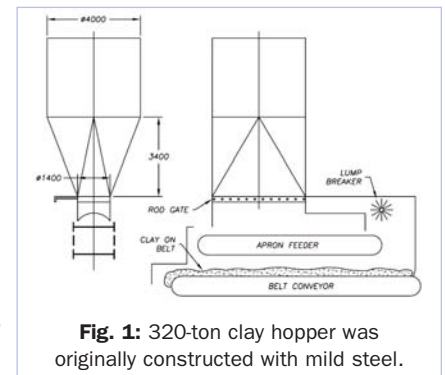
Problem: Flow problems, sticking and bridging

Date Installed: 2000

TIVAR® 88 LINERS HELP CEMENT PLANT ACHIEVE MASS FLOW IN CLAY HOPPERS

Background: The Krupp Polysius 320-ton clay hopper (Fig. 1) for clinker Line # 2 at the Kedah Cement Plant in Langkawi, Malaysia, was designed for mass flow using mild steel as the hopper wall material. This hopper was expected to have a discharge rate of 250 TPH.

Problem: The welded seams on the hopper walls had worn off and there appeared to be some trace of polishing at least on the upper portion of the hopper section. It was suspected the hopper achieved some sort of mass flow when the clay was dry; however, surface corrosion was also visible and this suggested that wetter clay did not flow or move well along the walls. There were almost daily incidences with up to 75% blockage and lost capacity. Three large air cannons with 100-litre tanks - fitted to the upper conical section of the hopper - failed to solve the flow and blockage problems. The air cannons loosened the clay in the immediate vicinity of the air cannon outlets, but the vast majority of the clay continued to bridge and gain strength sufficient to support the rest of the clay sitting on top of it and the result was no flow or restricted flow.



Solution: Prior to installing the TIVAR® 88 lining system, extensive cleaning in the conical section was necessary, with removal of hardened clay chunks, some weighing up to 100 kg each. TIVAR® 88 liners, 1/2"-thick, were installed in the sloping hopper wall section from the outlet up to the transition point where the vertical section begins. The liner was attached with stainless steel welded studs and spanner nuts. Individually cut liner panels were formed to follow the contour of the steel hopper ensuring that it would sit flush against the wall.

The final stage of this lining project was the installation of the stainless steel leading edge protectors welded on the wall above the top row of TIVAR® 88 liner panels to prevent clay migration behind the liner. The installation was completed on schedule and was promptly accepted by the customer. As recommended by the Quadrant Engineering Plastic Products SystemTIVAR® installer, the apron feeder's skirting and the upstream and downstream transfer hoppers were also lined with 1/2"-thick TIVAR® 88 during the same period.

Results: The plant has since operated the TIVAR® 88-lined clay hopper and ancillary equipment smoothly throughout the rainy season. The plant engineers' delight with the success of, and confidence in, the TIVAR® 88 lining system was evident by their immediate decision to line the gypsum hopper and other ancillary equipment. These have been completed and are operating successfully. To date, more than 360 m² of TIVAR® 88 have been installed at this plant. The clay hopper for clinker Line #1 was also lined with the 1/2"-thick TIVAR® 88 after the great success with Line #2.

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.

2007© Quadrant Engineering Plastic Products, Inc., 2120 Fairmont Avenue;
PO Box 14235 - Reading, PA 19612-4235; USA



QUADRANT

You inspire ... we materialize®