

Toll-free (U.S./Canada):
1-877-4POLYHI (1-877-476-5944)
tele: 260-479-4100
fax: 260-478-1074

THE CASE IN BRIEF

Application: Coal Silos
Quantity: Five 500-Ton Silos
Liner: TIVAR[®] 88, 1/2" Thick
Bulk Material: Sub-Bituminous Coal
Substrate: 304-2B Stainless Steel
Problems: Complete blockage/bridging in lower portion of cone
Date Installed: 1992

TIVAR[®] 88 Liners Reduce Coal Silo Blockage Occurrences at Power Plant from 200 to 1

BACKGROUND

Perusahaan Umum Listrik Negara (PLN) is Indonesia's national electric utility – the primary electricity supplier for the country. The coal-fired steam boilers supply approximately 40% of the electricity on Java Island.

The Suralaya Power Station is an existing PLN facility with four units of 400 MW (megawatts) each. This coal-fired plant burns sub-bituminous coal that is mined at Sumatra in Indonesia. Unit 1 has been in operation since 1984, Unit 2 since 1985, Unit 3 since 1987 and Unit 4 since 1988.

PROBLEM

Unit 2 coal silos were originally constructed with a carbon steel cylinder section and a 70° (from horizontal) hopper section of carbon steel clad with a 304 stainless steel with a 2B finish (Fig. 1).

The plant experienced complete blockage or bridging in the lower hopper cone section of the silos an average of 200 times each year. The vibrators, originally installed on the hopper sections, provided no contribution to the flow improvement so plant personnel resorted to using sledgehammers to beat on the hoppers and downspouts (stand-pipes) to maintain coal flow.

The station was derated by 25% (maximum of 100 MW) of its designed electrical output capacity due to the blockages that lasted an average of 15 minutes each time.

continued on next page ►

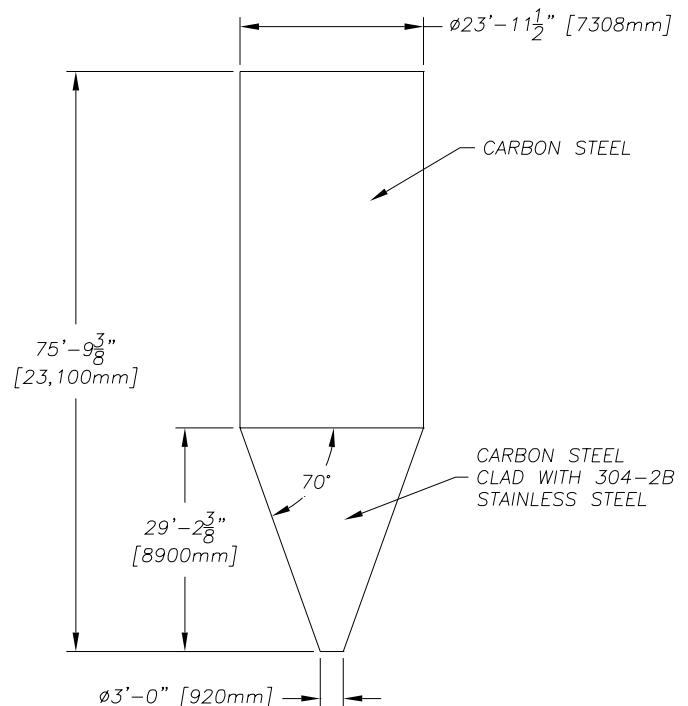


Figure 1: Original hopper designed with a 304-2B stainless steel liner

case study: sub-bituminous coal

TIVAR® 88 HIGH PERFORMANCE LINING SOLUTION

► SOLUTION

In 1991, TIVAR® 88 linings were introduced to the Suralaya Power Station as a flow improvement solution for these 500-ton cylindrical coal silos. In July 1992, the hopper portion of the five silos at Suralaya in Unit 2 were lined with 1/2"-thick TIVAR® 88. The TIVAR® 88 was installed directly over the 304 stainless steel (Fig. 2).

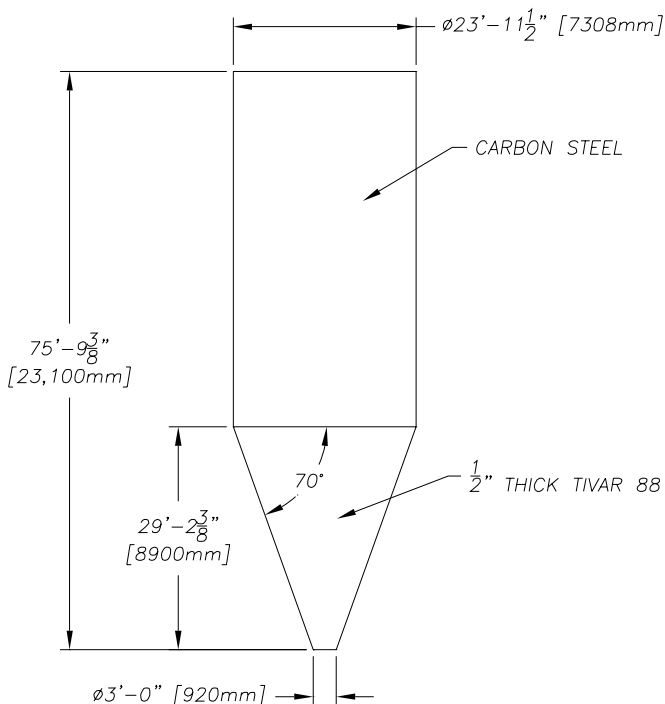


Figure 2: TIVAR® 88 lined hopper provides reliable, uninterrupted coal flow

► RESULTS

During the next year, the power plant experienced only one blockage in the TIVAR® 88 lined hoppers – a reduction in the number of occurrences of nearly 100 percent.

Due to the extremely satisfactory performance of the TIVAR® 88 hopper liners in Unit 2, plant personnel have expressed great satisfaction and an intent to line silos in three additional units. All liners continue to perform successfully.

► COMMENTS

Coal-fired power plants often experience a variety of flow problems in coal silos even when hopper sections are designed with 70° cones that are lined with 304 stainless steel with a 2B finish. These coal-handling problems are particularly apparent when handling sub-bituminous and lignite coals due to the combination of finer particle sizes and high moisture levels.

During these occurrences, plant personnel often resort to “active” methods to achieve bulk flow, i.e., using mechanical means such as vibrators or sledgehammers. There is a theory in this industry that the problem will be alleviated as the flowing coal polishes the stainless steel surface. Unfortunately, this does not always happen. In order to ensure smooth uninterrupted flow and eliminate the problems within the hopper, a passive method, such as the installation of a TIVAR® 88 liner over the stainless steel, is the most effective, cost-efficient long-term solution. TIVAR® 88's extremely low coefficient of friction allows the coal to flow smoothly down the 70° hopper wall.

In new construction, it is economically sound to consider a TIVAR® 88 liner with a carbon steel substrate for hoppers handling non-free-flowing, cohesive bulk solids such as, sub-bituminous and lignite coal, lime, limestone, FGD sludge (synthetic gypsum) and flyash.

POLY HI SOLIDUR

▲▲ A MENASHA SUBSIDIARY



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 Poly Hi Solidur. 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 Poly Hi Solidur, Inc. 2004© Poly Hi Solidur, Inc., 2710 American Way, Fort Wayne, IN 46809, USA.