

Problem:

HOW TO REPAIR BALLAST TANK COATINGS WITH MINIMAL DOWNTIME

Keeping a ship in service is a very considerable value. When corrosion protection in ballast tanks is compromised, however, service is interrupted and immediate attention is required, due to the importance of ballast tanks to the structural integrity of a ship.

To deal with localized coating breakdown in a ballast tank, conventional methods of repair take significant time and may require abrasive blasting, residue removal, dehumidification, special work lighting, respi-

NOVEL SOLUTIONS

ratory protection for workers, multi-coat application of repair coatings, and time to allow the coatings to cure before the ballast tank can be put into service.

Early results of a recent demonstration project employing a fluoropolymer film material for repair of localized coating breakdown in ballast tanks have shown that this approach allows very fast turnaround time.

SCREENING AND TRIALS

A demonstration project has been



Figures 1 and 2: (at left) show clear fluoropolymer film patches over areas of coating breakdown in a ballast tank of an oil tanker following six months of immersion service. The dark lines in the photos reveal the boundaries of the patches in each picture. Photos courtesy of Integument Technologies, Inc.

Continued



conducted for an international shipper of petroleum goods in a ballast tank of a double-hulled tanker ship. The project employed fluoropolymer film repair materials manufactured by Integument Technologies (Tonawanda, NY).

The shipper conducted a survey of candidate repair materials for coatings in ballast tanks, using the following criteria:

- single-coat application,
- tolerance of the material to a humid environment,
- surface tolerance,
- ease of application,
- elimination of solvents, and
- capability of immediate service upon application.

Among the repair materials the shipper considered, including a number of liquid coatings, the fluoropolymer film scored the highest and was selected for the demonstration project, together with conventional candidates.

MATERIAL TYPES

The fluoropolymer film used in the shipper's demonstration project is fluorinated ethylene propylene (FEP), commonly referred to by its trade name, Teflon®. This plastic material is extremely resistant to chemicals, temperature cycling, and mechanical stresses. Additionally, it demonstrates low surface energy and is easily cleaned.

For attachment to a substrate, the film employs a pressure-sensitive adhesive laminated to its back side. For the ballast tank project, a 4-mil-thick, acrylic-based adhesive was used. The fluoropolymer film itself is available in 3-, 5-, and 10-mil thicknesses. A 5-mil-thick version of the film was used.

SURFACE PREPARATION AND APPLICATION

Prior to application of the repair film to the oil tanker, surfaces were prepared by hand tool cleaning to remove loosely adhered paint in the repair area. Then the surface area to be

patched was solvent-wiped with alcohol. The manufacturer says the film's adhesive will adhere to paint, to metal, and to concrete as long as the surface is clean, dry, and sound.

About 100 sq ft of the material was applied in the tanker. The manufacturer's employees applied some of the material for the shipper, then instructed the shipper's personnel in applying the remainder. Common hand tools, such as rollers, squeegees, and knives, were used for the application. The corners of the repair film were rounded prior to application.

COSTS

Compared to conventional repair materials, the fluoropolymer film with laminated adhesive backing is more expensive. But because of lower labor and deployment costs, the company says the overall project costs are competitive with repair carried out by conventional methods.

EARLY RESULTS

Repairs on the oil tanker have been in service for 15 months. Figures 1 and 2 show the successful performance of the repair material after 6 months of service.

According to the manufacturer, initial results were very promising, but the project is part of an ongoing development program between the shipper and the film manufacturer. ◀

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