



SOLVENTLESS TAR-EPOXY COATING PROTECTS COAL UNLOADING FACILITY AT SEACOAST POWER STATION

New England Power Company's Brayton Power Station in Somerset, Massachusetts is subject to corrosive conditions typical of tidal areas.

At their recently modernized coal unloading facility potential corrosion problems were avoided by the use of a coating system which employs a moisture-tolerant urethane-modified epoxy primer and a solventless coal tar-epoxy topcoat to increase the usable life of dock, pier, and seawall structures.

MAJOR ENERGY CONSERVATION PROJECT

In 1980, an extensive energy conservation project was undertaken at Brayton Point involving conversion of three oil fired boilers back to their original coal burning capability, installation of new pollution control equipment, and renovation of the coal handling system.

REHABILITATION OF COAL HANDLING SYSTEM

An extensive program was undertaken to improve reliability and safety of the coal handling facilities. Careful attention was paid to the condition of all steelwork including the sheet piling of the unloading docks and the supports for the coal-unloading pier.

The original steelwork, installed in 1960, was protected with a hot-applied coal tar-enamel coating supplemented by a cathodic protection system installed in 1964.

CORROSION SURVEY CONDUCTED

A corrosion survey was conducted in the dock and pier areas. While there was some evidence of corrosion in the tidal zone areas, ultrasonic testing indicated that the steelwork was still basically sound and only required minor repairs.

In the tidal zone most of the original coal tar-enamel coatings had deteriorated badly and would have to be removed and the steelwork recoated.



Seaward corner of the coal-unloading pier is shown completely primed with Epodur®2755 primer, a moisture-tolerant corrosion inhibitive primer that cures rapidly and allows topcoating prior to the rise of the incoming tide

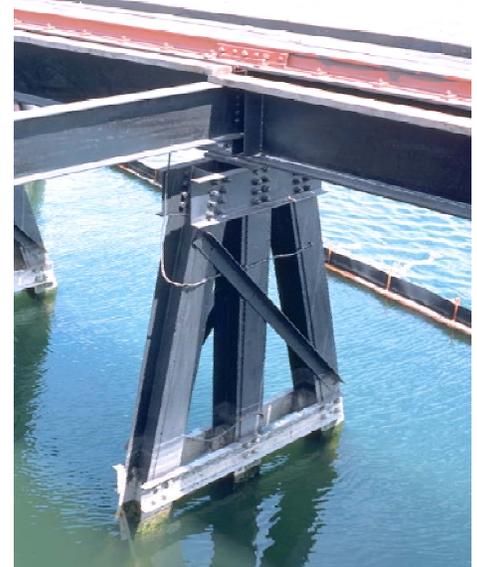
But above the high water line, the original coatings were still in good condition and would only require cleaning, spot priming, and topcoating to provide years of additional service.

TOUGH REQUIREMENTS FOR COATINGS

In developing the coating specification many important factors were considered.

First, the coatings would have to fulfill all the stringent requirements for marine coatings, including: good adhesion in immersion, toughness, resistance to abrasion and undercutting, good corrosion inhibition, salt water and chemical resistance, humidity and weather resistance, resistance to cathodic disbonding, high film thickness, and ease of application.

Secondly, since the time available for surface preparation and application in the tidal zone would be limited by the rising tides to two hours, the coatings would have to cure sufficiently to resist immersion within this period. (Most conventional solvent-based coatings require a week to cure and to release solvents before they can be subjected to immersion service.) The coatings would also have to provide good adhesion to the original coal tar-enamel coatings.



Comprehensive protection of steelwork in dock and coal unloading area is assured by use of Epodur 2755/Epodur 782 coating system in conjunction with cathodic protection. Intercoat adhesion to sound, previously applied coal tar-enamel coating is excellent, and the coatings have proven to be resistant to cathodic disbondment and the effects of tides and winter ice.

Finally, the cost of application had to be reasonable. It would be advantageous if the coatings could be applied by an industrial painting contractor rather than by marine divers.

VARIETY OF COATINGS CONSIDERED

In reviewing the types of coatings available, New England Power ruled out hot-applied coal tar-enamel as their previous experience indicated the probability of early failure at the waterline. It would also require heating to 350°F and would be hazardous to apply without using cofferdams.

Another possibility was straight (unmodified) epoxy coatings but they were judged to be too costly.

Solvent-based coal tar-epoxy coatings were ruled out because they would not release solvents quickly enough or cure adequately before the rising tides. This could lead to blistering and disbondment of the coating due to solvent entrapment.

DAMPNEY PROVIDES COATING SYSTEM SOLUTION

To provide maximum corrosion protection in the tidal one Dampney Company recommended a two-coat system of Epodur®2755 urethane-modified epoxy primer and epodur®782 solventless coal tar-epoxy topcoat. A coating specification was prepared accordingly.

Epodur 2755 is a corrosion-inhibitive primer, which is more tolerant of surface moisture and cures at lower temperatures than conventional polyamide-epoxy primers. It provides excellent adhesion in immersion service, and resists undercutting corrosion in damaged areas.

Since it cures rapidly under highly humid conditions it was applied with assurance that it would adequately resist immersion before the rising tides.

The Epodur 782 topcoat is thixotropic, high-build coating having unique properties, which made it particularly suitable for this application. It can be applied using standard airless spray equipment with no need for special handling procedures. There was no need to preheat the components to reduce the coating to spray viscosity.

The coating could be applied in a single, high-build, non-sag coat, eliminating the need for multiple-coat application. And since it has a 2-hour pot life, there was no need to use complex plural-component spray equipment. These factors helped reduce application time and cost.

Because Epodur 782 is solventless, it eliminates potential blistering and



Airless spray equipment was used to apply Epodur®2755 urethane-modified epoxy primer to steelwork in the seaward corner of the coal-unloading pier. The corrosion-inhibitive primer is very tolerant of surface moisture, cures more quickly and at lower temperatures than conventional polyamide-epoxy primers, and provides excellent adhesion even in severely corrosive environments and in continuous immersion service.

pinholing due to solvent evolution, thereby assuring better film integrity, and since it would not soften the existing coal tar-enamel coating it could be used to topcoat existing sound coatings.

SURFACE PREPARATION AND COATING APPLICATION

First, all surfaces were washed down with fresh water to remove accumulated salts. In the tidal zone, all rust, rust scale, calcereous deposits, and foreign matter were then removed by abrasive blasting per specification SSPC-SP 10 "Near White Blast Cleaning."

Above the high tide line, all sound existing coal tar-enamel coating was blasted per specification SSPC-SP 7 "Brush Off Blast Cleaning" to remove loose coating and contaminants and to provide an anchor pattern to improve adhesion of the topcoat.

No larger area was blasted than could be painted in one day. In the tidal zone the surfaces were primed with one coat of Epodur 2755 to a dry-film thickness of 2 mils. After the primer set dry to touch (in about 20 minutes) a single topcoat of Epodur 782 was applied to a dry-film thickness of 16 mils.

Above the high water line, bare areas were spot primed with Epodur 2755 and topcoated with Epodur 782 to a dry-film thickness of 16 mils.

Extra coatings were applied to bold heads, web edges, and other areas vulnerable to corrosion. Work was conducted with the changing tides without

the need for cofferdams or divers, and the coatings were immersed as the tides came in.

COMPREHENSIVE CORROSION PROTECTION ASSURED

Corrosion protection is now assured for the dock and pier area. The Epodur 2755 epoxy primer/Epodur 782 solventless tar-epoxy coating system provides long-term protection above the low waterline, and the cathodic system protects the structure below it.

Subsequent inspections have shown excellent intercoat bond between the old coal tar-epoxy and the new 100% solids epoxy coating. The new coating system has also proven to be resistant to cathodic disbondment and to the abrasive effects of winter ice.

FOR FURTHER INFORMATION

Additional information about Epodur 2755 primer and Epodur 782 100% solids coal tar-epoxy coating may be obtained from The Dampney Company at the address below.



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