

TR-407 Hydro-surface Preparation & Coating for Painted Structural Steel

Key Words: Bridges, Structures, Water Jetting, Painting

Abstract

Cities and counties in Iowa have more than 8,890 steel bridges, most of which are painted with red lead paint. The Iowa Department of Transportation (Iowa DOT) maintains less than 35 bridges coated with red lead paint, including seven of the large border bridges over the Mississippi and Missouri Rivers. Because of the federal and state regulations for bridge painting, many governmental agencies have opted not to repaint, or otherwise maintain, lead paint coatings. Consequently, the paint condition on many of these bridges is poor, and some bridges are experiencing severe rusting of structural members.

This research project was developed with two objectives: 1) to evaluate the effectiveness of preparing the structural steel surface of a bridge with high pressure water jetting instead of abrasive blasting and 2) to coat the structural steel surface with a moisture cured polyurethane paint under different surface preparation conditions.

During this research project, the researchers observed favorable results from the high pressure water jetting. Although the Wapsinoc Creek samples were incomplete, the soil samples showed no contamination from high pressure water jetting. Air samples collected both inside and outside the containment showed no signs of contamination. In other words, the containment structure successfully contained the water and paint waste generated by the high pressure water jetting.

As expected in the Research Proposal for this project, hydro blast wastewater was filtered and discharged in a publicly owned treatment facility. The solid waste was classified as hazardous and disposed of in a Subtitle C facility in accordance with federal regulations. Although an employee showed an increase of lead in the blood, two other employees showed no significant increase of lead in the blood. All employees' air monitoring samples showed airborne lead levels below OSHA action levels.

Except for the areas in the surface steel where the small diameter rust pits were found, high pressure water blasting met the three surface steel cleaning standards. Using the high pressure water jetting on any bridge to Surface Cleaning Standard 1, an engineer could have confidence that the surface steel was properly prepared for overcoating a bridge.

Until this overcoat paint has been on this bridge for a few years, the researchers will not know how well moisture cured polyurethane is performing. The moisture cured polyurethane will also have to be reviewed over time to assure that no thermal stress or bonding problems exist. If the stress between the existing paint system and overcoating is great enough to cause this paint system to shear, then the paint will peel off the bridge beams.