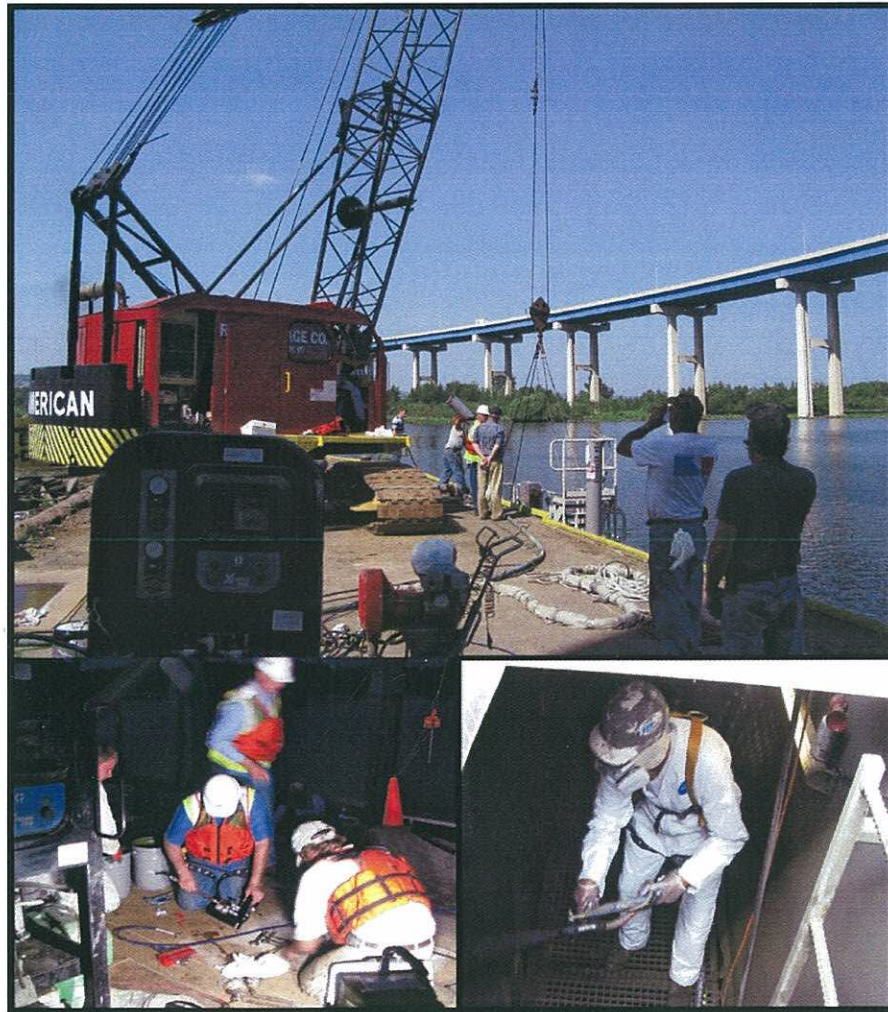


# Cofferdam Applied Coating Trial

Prepared for the City of Superior, Wisconsin



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## Trial Overview

In the natural harbor shared by Duluth, Minnesota and Superior, Wisconsin structural steel is being lost to corrosion at a rate much greater than what is experienced at other fresh water ports. Various chemical, biological, and electrolytic factors are being investigated to find the factor or factors that are contributing to this accelerated corrosion. The problem was first discovered in 1998, since then research has indicated that the increased corrosion started in the late 1970's. With the amount of steel lost in that time some structural members require immediate repairs or replacement to allow for the continued use of the structures. For much of the 13 miles of unprotected steel structures in the harbor, prompt action is needed to prevent the corrosion from compromising the integrity of the structures.

Since most of the current working docks have structural sheet pilings that make up the dock walls a cofferdam applied coatings may protect the steel from corrosion. Cofferdams allow for the structural steel to be exposed, cleaned, repaired, and prepped by enclosing a section of the wall and allowing pumps to dewater that section. This technique provides a dry and well prepared surface for the application of the protective coating.

One of the difficulties experienced in the Duluth /Superior harbor is that the coatings are susceptible to damage from the thick ice that breaks up and moves around due to ship traffic or currents. The ice has the ability to exert massive amounts of force on small areas of the coating and this can cause areas of the coating to chip off or wear down and ultimately lead to the premature failure of the coating.

So far the data collected on how coatings hold up to these conditions has come from several full scale coating projects as well as studies in which coated pieces of steel were mounted at various locations in the harbor. These samples were generally prepared and coated in a shop allowing for excellent surface preparation and long cure times. This study was designed to monitor how different coatings hold up when applied in imperfect conditions and with short cure times, and also to see how a larger sample held up to the ice impact and abrasion. Eight commercially available coatings were selected to participate in the trial. Each coating was applied to an area approximately 8ft wide extending from 2 feet above the waterline to 10ft below, allowing two coatings to be applied during each cofferdam setup.

The site selected for the trial is on the North-East corner of the Cenex-Harvest States Dock in Superior, Wisconsin. The site was chosen because the sheet pile there was installed in the 1970's and has the type of severe pitting seen throughout the harbor, and there was no major structural damage that would hamper the trial. This area is also on a point that is exposed to ship traffic and ice movement, making it an ideal place to test the abrasion and impact resistance of the coatings.