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16. Abstract

This report documents the periodic inspections made the first year after painting. The system consists of two coats of epoxy-zinc primer, one intermediate coat of epoxy and an appearance coat of #742 grey-finish paint.

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DEMONSTRATION PROJECTS DIVISION
REGION 15

# DEMONSTRATION PROJECT 1-10-84-560

# PROTECTIVE COATINGS FOR STRUCTURAL STEEL

by

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DISCLAIMER STATEMENT

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TABLE OF CONTENTS

## Objective

Service life, cost and effectiveness of various steel coating systems can only be judged by field experience detailed with accurate records and evaluations of each system.

The objective of this project is to evaluate one such coating system as it is applied in the Texas Gulf Coastal area, which is a geographical area with numerous atmospheric and environmental exposure problems. These problems, including sea water, humidity, salt spray, wind and highly chemical laden air, are especially troublesome when attempting to design a coating system that is not only durable but also economical and acceptable from the health and environmental standpoint.

Periodic checks of effectiveness to evaluate the condition of the painted steel on the Port Isabel Causeway Bridge have been conducted jointly by District 21, D-9 and D-10 personnel. These inspections have been made both by observations from boat on the intracoastal waterway and by actually going underneath the bridge on the structural steel to make a closer inspection. This paint was applied between January and August of 1984.

During the detailed close inspection made in June of 1985 very little rust was found on the structure. The little amount of rust observed was found in small out of the way locations making it hard to get to for cleaning purposes.

The majority of the rust found was around the shoes and particularly those in the haunches due to more exposure to the coastal elements. The most severe locations appear to be where the rust scale was not completely removed with the bolts on almost all of the shoes showing at least some rust.

Another area of rust found was at the end of the horizontal stiffners due to having a very small amount of clearance between the ends of the horizontal and vertical stiffners. Also some rust was noticed in the notches of the vertical stiffners where they meet the girder web/flange weld.

The rust stain described above is not flake rust and is not showing any metal loss. Other areas of concern which showed accelerated rusting after the original paint application during construction have no rust showing now. This includes the sway braces and pitted areas on the plate girders. There was concern that all of the residual salt may not have been removed from these pits and that premature failure might occur. None has occurred to date.

At the time this project was nearing completion it was discovered that a number of the slots or gaps between the angle iron struts of the diagrams and small amounts of black rust scale remaining. Removal of this rust would have caused more damage than good so a heavier application of the grease like coating was applied to these slots. Corrosion appears to be continuing in some of these slots in spite of this extra heavy coating.

In addition to the small amount of rust observed, a yellowish-green substance was found on almost all areas of the painted steel. Without having laboratory tests conducted, it is believed that this is probably a mildew or fungus type growth.

It would almost seem that the growth pattern of this substance follows the spray pattern of the 742 finish coat. It is not uniform enough to be deposited from the atmosphere. The color actually ranged from a sulfur-like yellow to light green and even a rust-like brown. Water condensation running down the steel had washed it clean. It also could be easily brushed off the surface without any visible damage to the paint.

Since it is easily removed without leaving a stain or discoloration of the paint and seems to be causing no serious damage, it will just be observed to watch for any changes or further developments.

The following pictures show the yellowish-green to rust-like brown stains on various members of the structure.