PACIFIC RIM CORROSION RESEARCH PROGRAM (PRCRP)

UPDATE OF ZINGA DOORS EXPOSED AT KENNEDY SPACE CENTER

Background

In 2001 Corrpro Companies, Inc. (Corrpro), performed a zinc-rich paint evaluation program for the US Army Tank-automotive and Armaments Command (TACOM). During this study test samples were exposed at Kennedy Space Center (KSC), FL. As part of our support to the TACOM on the PRCRP study we will be exposing zinc-rich panel samples in Hawaii.

This update provides a follow-on evaluation of the performance of 5-ton truck doors after nominally four (4) years total exposure.

Experimental Approach

At KSC several 5-ton truck doors; representative of original manufacturing techniques; were evaluated. These doors were carbon steel doors that had been exposed at this site for a number of years, already having corrosive attack at the edges and seams. These doors were painted using the Zinga product and CARC system. These doors were blasted at the local maintenance shop to a SP-10 condition, then the coating systems were brush applied to the face of the doors. Figure 1 shows a sketch of the system layout on the 5-ton truck doors.

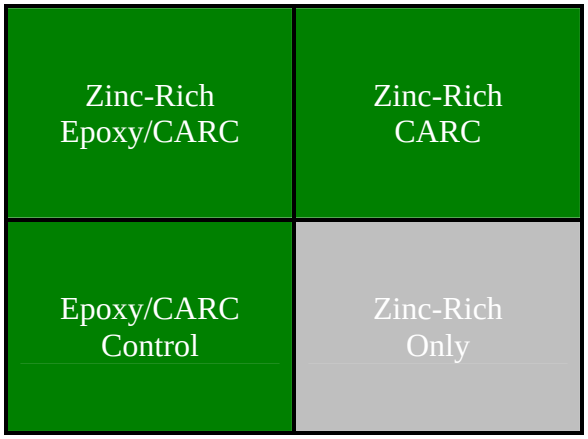


Figure 1. Sketch of Coating System Layout on Test Doors (KSC Only).

Current Status

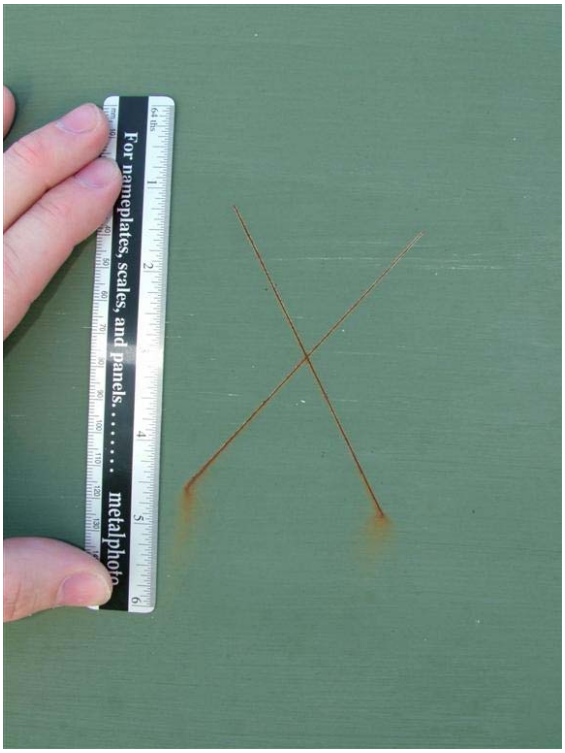
The test doors at KSC were inspected in February 2005 (4 years and 1 month after exposure). Figure 2 shows a representative truck door painted with Zinga.

Figure 2. 5-Ton Truck Door at KSC.

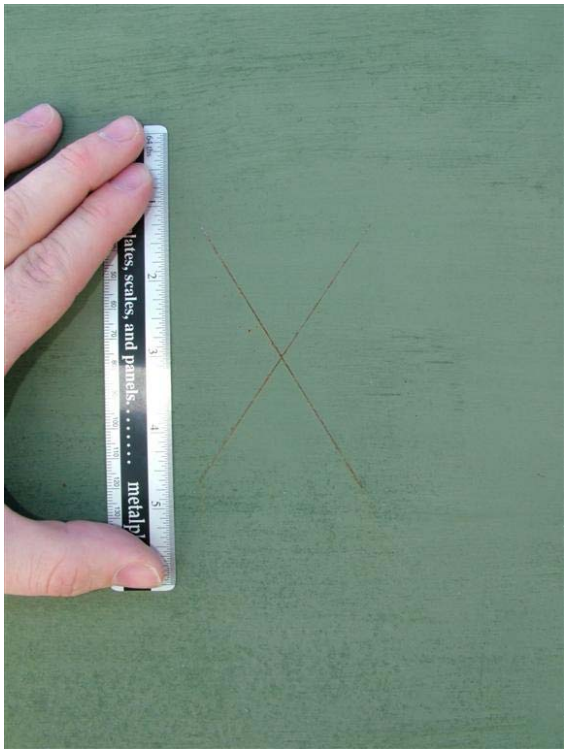
The door was split into quadrants, for evaluation of four (4) coating system variations on one door. There were (from top left, going clockwise): Zinga/Epoxy/CARC, Zinga/CARC, Zinga and Epoxy/CARC (control).

Figure 2 shows that after four (4) years of exposure there is less corrosive attack of the test areas as well as in the scribes. For the Epoxy/CARC section, stage 2 corrosion was observed over 5% of the bold surface (excluding the edges as well as the pre-existing areas of metal loss due to corrosion). The only other area to exhibit stage 1 corrosion was the Zinga/Epoxy/CARC area, which has one initiation site. The Zinga area has stage 1 zinc corrosion, but no evidence of steel substrate corrosion on the bold surface.

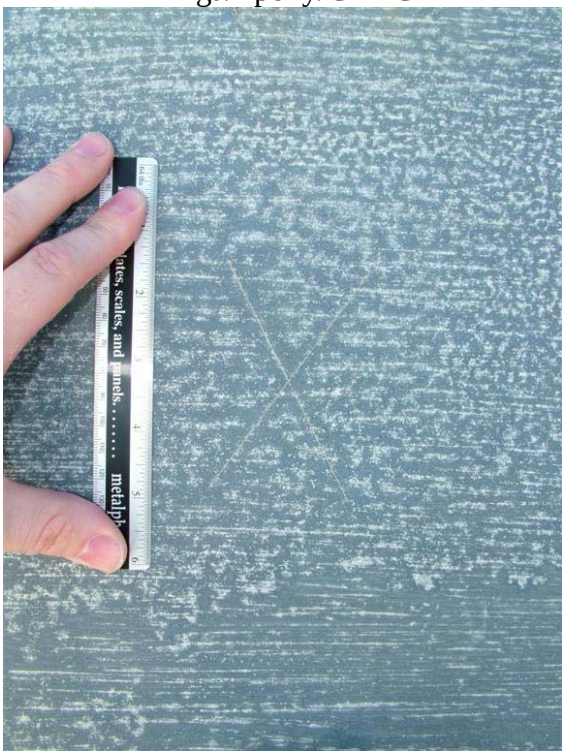
Each of these areas was also intentionally scribed to measure corrosion propagation at a known defect. Figure 3 shows a close-up of the scribe areas for these four quadrants.



Zinga/Epoxy/CARC



Zinga/CARC



Zinga

Epoxy/CARC

Figure 3. 5-Ton Truck Doors, Scribe Performance.

Figure 3 shows that the scribed areas of all sections except Zinga only have scribe corrosion. The corrosion products are heaviest in the Epoxy/CARC system scribes. This

system had a measurable cutback of up to 1/8-inch (3.2-mm). The other scribes did not have a measurable cutback. However, it was noted that the corrosion products in the Zinga/Epoxy/CARC scribes did appear heavier than the Zinga/CARC scribes. This may be an artifact of the porous nature of the CARC topcoat, which may provide a larger effective contact area between the steel exposed within the scribe and the zinc-rich coating, when moisture is present.

Summary

The following summarizes the status of these door samples after four (4) years exposure:

1. The presence of the Zinga primer appears to reduce corrosion.

2. Use of an epoxy inter-coat does not appear to significantly improve or reduce performance.

3. Without a topcoat Zinga provided the most protection to the steel substrate.

4. The Epoxy/CARC system is already showing a need for maintenance painting of the bold and scribed surfaces.