

Quality Painting

2020 Mid-Atlantic Quality Assurance Workshop



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Introduction

- What is Quality Painting?
 - Product that gives us adequate protection so our structures can achieve their designed service life
 - A finish and appearance that is aesthetically pleasing to the viewer
- To discuss Quality Painting we will evaluate 3 specific cases of “Poor Quality Painting”
- Use the lessons learned from these cases to help us in future painting projects

▶ Paint Failure Issue (Case #1)

- Case #1: Paint Cracking and Flaking Off

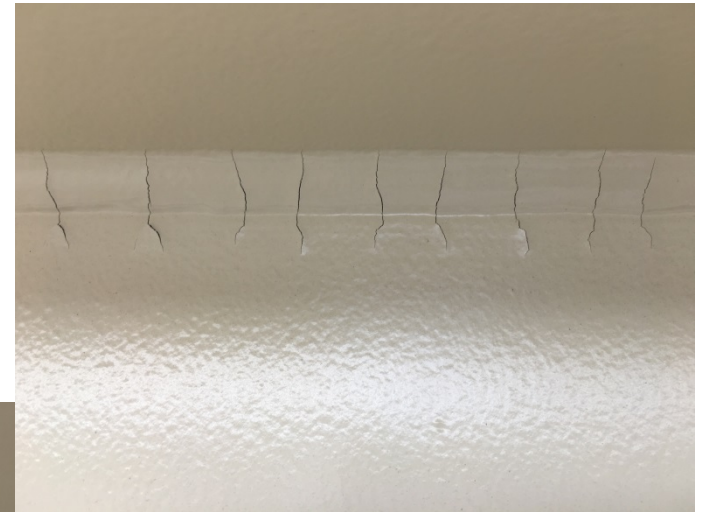
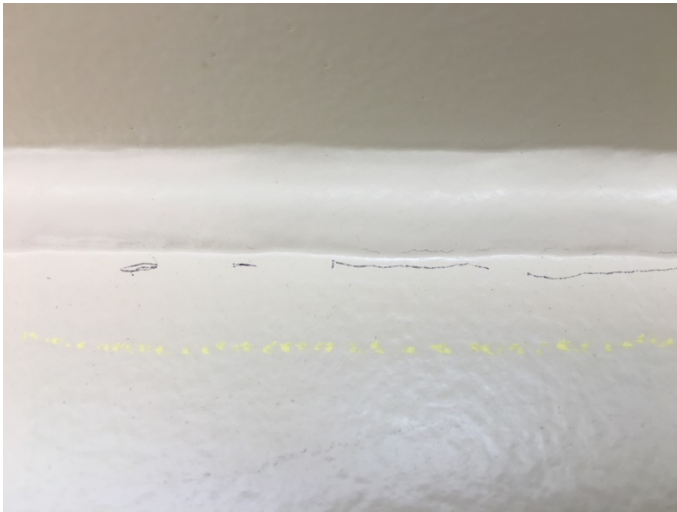


▶ Case #1 Background

- Traditional 3 Coat Inorganic Zinc Rich coating system was used
- Coating operations were conducted in the fall and winter months
- Failures were first noted in the storage yard early to mid summer
- Location of the failure was in the top flange to web weld area
- The delamination was from the IOZ to the substrate

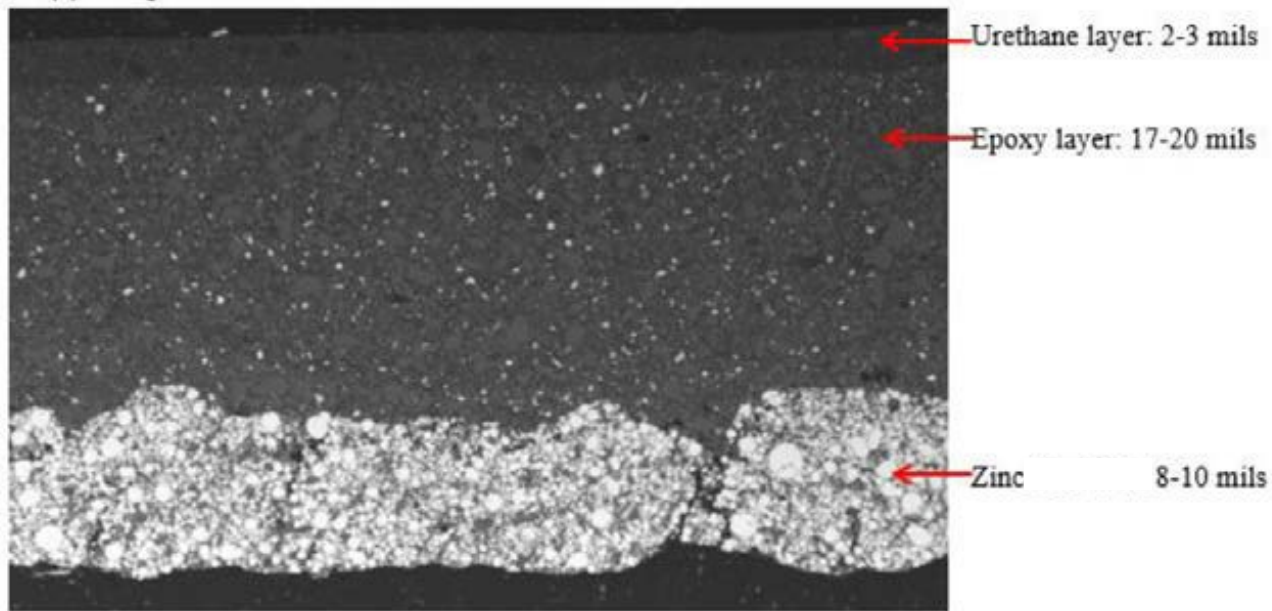
▶ Case #1 Investigation

- Visual inspection of the coating noted varying levels of coating failure



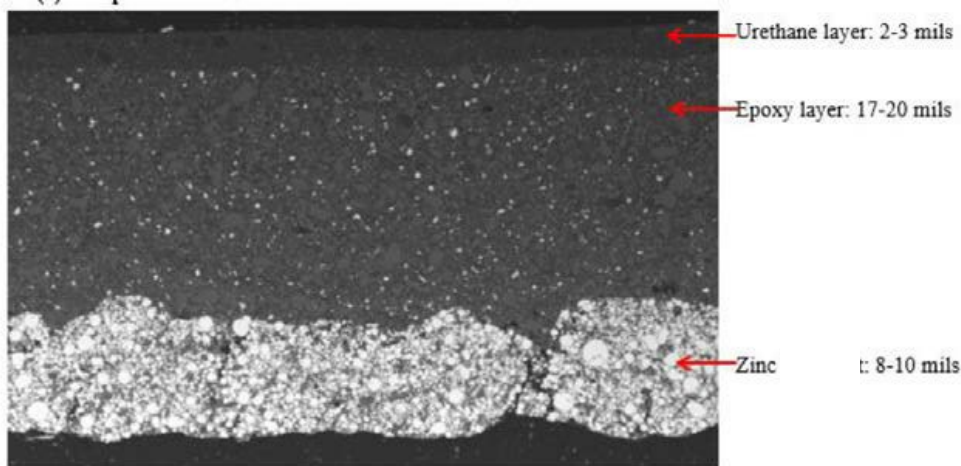
Case #1 Investigation (Continued)

- Paint Chips were collected and analyzed using FTIR, Optical Stereomicroscopy and SEM/X-Ray



Case #1 Evaluation of Results

- Dry film thickness of randomly collected samples showed average DFT values for the Zinc Layer were 8-10 mils
- Manufacturer's Technical Data Sheet specify a thickness of 2-4 mils



▶ Case #1 Failure Analysis

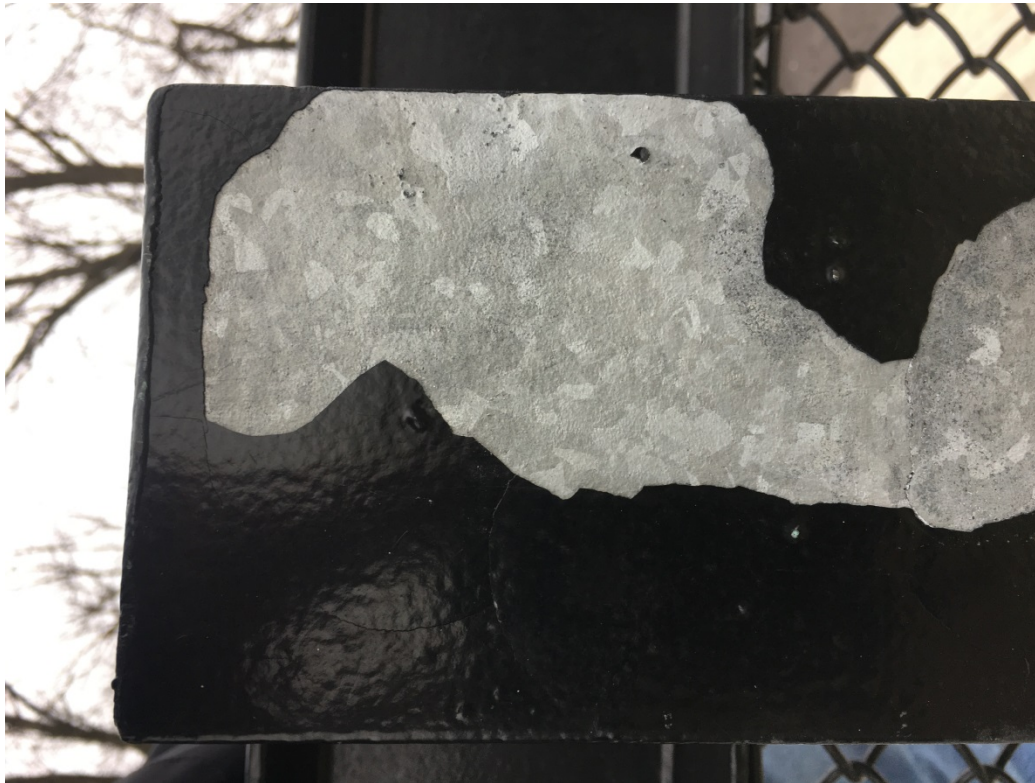
- Based upon the investigation the main contributing factor to the failure was excessive film thickness in the Zinc layer
- The excessive thickness would have lead to extended cure times
- The adhesion of the zinc would have been further impacted by stresses from the epoxy intermediate as it cured.

➤ Case #1 Remedies and Corrective Actions

- All Beams in question were thoroughly evaluated and all loose paint was removed by either mechanical means or blasting
- Feathering edging of 2 inches into the intact coating was done
- Proper cure of the Organic Zinc primer was done according to ASTM D5402 with the following passing criteria
 - Reducer #58, 25 Double Rubs, No more than 1.5 mil loss

▶ Paint Failure Issues (Case #2)

- Case #2 Paint Peeling and Falling Off Galvanizing



Case #2 Background

- Rail-Trail Bridge
- Coating system consisted of single coat Polyaspartic Urethane paint over top of galvanized steel
- Issue first discovered during final construction inspection prior to opening bridge in early December
- Delamination of top coat from underlying galvanizing

Case #2 Investigation

- A field investigation was conducted of the entire bridge with the original focus on the pedestrian rail posts



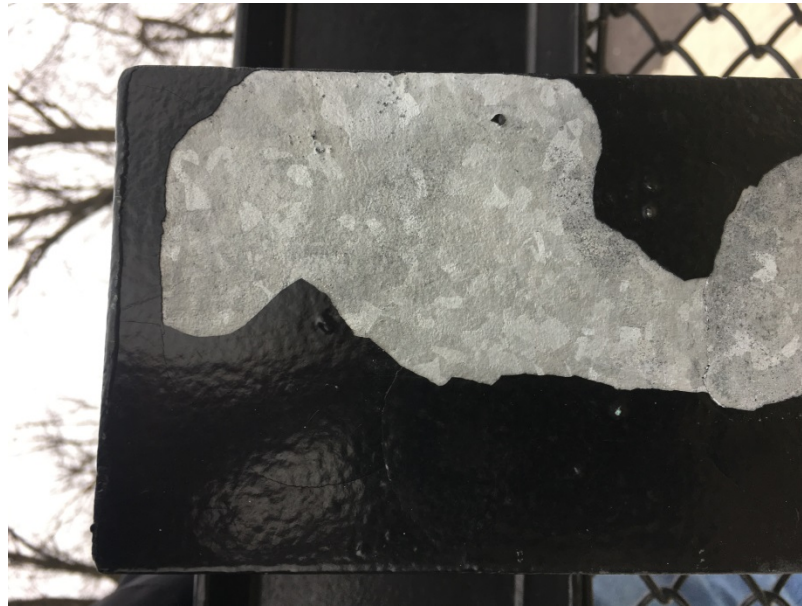
▶ Case #2 Investigation (Continued)

- A closer examination revealed spots that had not yet broke loose but could easily be removed with a dull putty knife



Case #2 Failure Analysis

- After examination and reviewing of fabrication records it was clear that no surface preparation was done to the galvanized surface prior to top coating



➤ Case #2 Remedies and Corrective Actions

- Bridge sat through the winter and was reevaluated in the spring
- All areas of delamination were identified and all loose coating was removed into intact coating
- Surface preparation was done using a Bristle Blaster to produce a min 2 mil profile
- All repair areas were then cleaned with a Clean N' Etch product and allowed to thoroughly dry before application of the top coat

Recent Paint Failure Issues (Case #3)

- Case #3: Paint Not Sticking to Bolts



▶ Case #3 Background

- Truss bridge spanning between PA and NY
- Brand new construction with a shop applied IOZ system with all field splices getting painted in the field
- Coatings failures seems to originate from the bolt heads down to bare steel

Case #3 Investigation

- At the time of completing this presentation I was not able to perform any failure analysis in the field.
- I was only given the photos for review
- However based upon what is seen in the photos start by looking into improperly cleaning of lubricant and preparation of the bolt surfaces

Questions?

