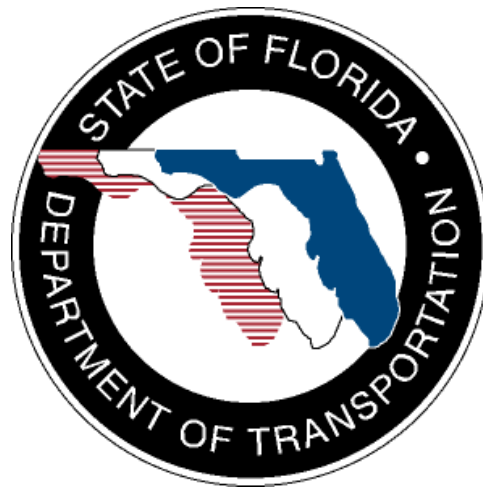


FDOT New Directions in Steel Corrosion Protection



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Problem Description

- FDOT spends a lot of money each year painting new and repainting existing bridges
- FDOT's historic budget for repainting structural steel bridges is as follows:
 - 2012: \$28,500,000
 - 2011: \$27,400,000
 - 2010: \$25,000,000
 - 2009: \$25,500,000
 - 2008: \$26,300,000

Problem Description

- Painting & repainting bridges is expensive, letting & managing painting contracts involve:
 - Mobilization
 - Traffic Control and Detours
 - Removal of Existing Paint & Surface Preparation
 - Containment
 - Environmental Monitoring
 - Disposal of Hazardous Waste
 - Painting
 - Inconvenience and Expense to the Travelling Public due to Traffic Slowdowns

Problem Description

- FDOT's traditional paint system was a 3 coat system incorporating a zinc rich primer, which allegedly has a service life of 25 years
- In practice, bridges painted with FDOT's traditional paint system generally get repainted every 12 to 20 years
- FDOT's current system, a 3 coat inorganic zinc paint system with clear coat finish has an expected service life of approximately 30 years
- A single coat of inorganic zinc paint lasts approximately 30 years, and has a grey appearance
- Proper installation via better inspection is required to realize the full service life of any coating system

Cost Savings Initiatives

- New Steel Bridges:
 - Use weathering steel in suitable environments
 - Use a single coat of inorganic zinc paint system for extremely aggressive environments
 - Where higher aesthetics are required, use a 3 coat inorganic zinc paint system with clear coat finish
 - The use of the 3 coat system with clear coat finish should be an exception, requiring justification and approval from the Chief Engineer

Cost Savings Initiatives

- New Steel Bridges, continued:
 - For multi girder bridges where the use of higher level aesthetics has been approved:
 - Use a 3 coat inorganic zinc paint system with clear coat finish on fascia girders
 - Depending upon environment, use weathering steel or a 1 coat inorganic zinc paint system on interior girders
 - For box girder bridges where the use of higher level aesthetics has been approved, use a 3 coat inorganic zinc paint system with clear coat finish

SR 408 over the Turnpike Built 2006 3 Coat Inorganic Zinc



Ramp SB Turnpike to SR 429 NB Built 2001 - 3 Coat Inorganic Zinc



I-10 over the Suwannee River Built 1972 Weathering Steel



Putnam County Bridge Built 2006 Weathering Steel



Putnam County Bridge Elevation Weathering Steel



Bristol Blountstown SR 20 Built 1998

One coat Paint System



SR 20 Bridge, Paint Damage?



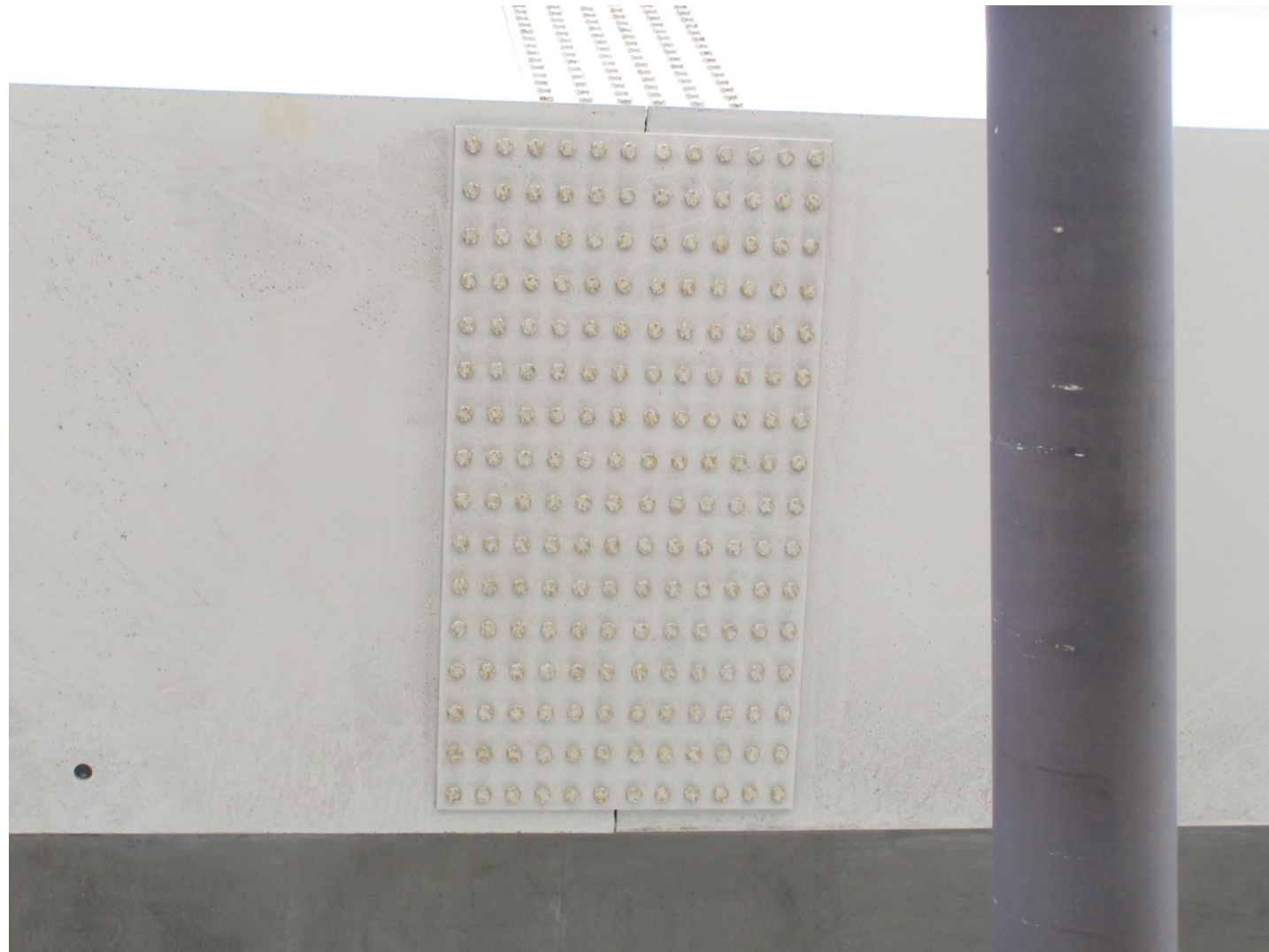
SR 20 Bridge, Mud Dauber damage



Thomas Drive Built 2006 Polysiloxane Coating



Thomas Drive Peeling Paint on Bolted Connection



Paint Retention on Bolt Problem

- Bolts have no prime coat and are typically painted with a finish coat after tightening

Solution to Paint Retention on Bolts

- Use Galvanized Bolts

Boynton Inlet Bridge Built 1975 and Repainted with a Fluoropolymer Paint System in 2010



Boynton Inlet Bridge

Close-up of Fluoropolymer Paint System



Assumptions for New Steel Bridge Painting Cost Savings

- Quantity of Steel Bridges will average what we have averaged from 2000 to 2009
- Steel box girder bridges will have interior painted white for ease of inspection and except for highly aggressive environments will have weathering steel exteriors
- 20% of steel bridges will be deemed highly aesthetic
- For highly aesthetic environments the exterior surfaces of the fascia girders will receive 3 coat system and clear coat

New Painting Assumptions continued

- Interior girders for highly aesthetic bridges will be weathering steel, except in highly aggressive environments where they will receive one coat system
- In aggressive environments for non highly aesthetic bridges a one coat system will be used
- All other non highly aesthetic bridges will use weathering steel

Estimated Painting Savings on New Construction

- 555,000 SF of Weathering Steel @ \$8/SF - \$4,440,000 annual savings
- 120,000 SF of One Coat Inorganic Zinc @\$6/SF – \$720,000 annual savings
- Total Annual Painting Savings on New Construction - \$5,160,000

Results of Presentation to FDOT Senior Management

- FDOT Executive Committee elected to revise painting practices for new steel construction to include:
 - Weathering Steel as the default protection system
 - A single coat of inorganic zinc paint as the default protection system in extremely aggressive environments
 - A 3 coat inorganic zinc paint system with clear coat finish with higher level aesthetics, when approved by the Chief Engineer

Repainting Assumptions

- 3 coat inorganic zinc system with clear coat will continue to be used on trusses and movable bridges
- 1 coat inorganic zinc system will be used on girder bridges, with a project by project approval by the State Materials Office
- On bridge repainting projects the Chief Engineer has subsequently determined that aesthetics at the time of construction will govern

Estimated annual cost savings for repainting

- 8,500 tons of steel repainted with one coat system @ \$400 savings per ton = \$3,400,000 annually

Results of Presentation to FDOT Senior Management

- FDOT Executive Committee elected to adopt the single coat of inorganic zinc paint as the default protection system for bridge repainting projects

Additional Recommended Cost Savings Initiatives

- Repainting Existing Steel Bridges:
 - Do not repaint steel bridges until corrosion necessitates repainting
 - Perform engineering evaluations to determine when bridges need to be repainted and the type of paint system that will be most economical and will last the longest

Future

- Industry claims to have High Performance Paint Systems (HPPS) with up to a 50 year service life, which are utilized by other entities (U.S. Military, Oil and Chemical Industries, etc.)
- Work with AASHTO, Paint Industry, NACE, SSPC, and NSBA to come up with a national specification for the purpose of testing and approving HPPS

Impediments to use of HPPS

- Claimed service life of HPPS has not been independently verified, durability testing is expensive and may not produce accurate results
- The specifications (ASTM testing) needed to gain approval for HPPS by FDOT and other DOTs is expensive (approx. \$25,000) and is not uniformly required nationally
- Most State DOT's low bid processes are an impediment to approving and using costlier HPPS
- HPPS will look faded and worn by the end of its service life, like any other paint system

Current Initiatives

- A presentation was made at the 2012 midyear meeting of the AASHTO SCOBS T-9 “Bridge Preservation Committee” on the need achieve longer service lives for paint systems
- AASHTO and the FHWA have formed a Technical Group to pursue the promotion of paint systems with longer service lives

Objectives of Technical Group

- Develop a Partnership between SCOBS, NTPEP and Industry with the objective of achieving bridge paint system service lives of 50+ years
- Identify laboratory testing needed to achieve HPPS with a 50+ year service life for:
 - New Bridge Construction Projects
 - For Bridge Repainting Projects
- Identify and develop strategies to eliminate impediments to HPPS implementation

Specific Objectives

FDOT would like the Group to work on

- Develop a comprehensive approach to achieve better surface preparation
- Promote better inspection on Paint Projects thru inspector training, mentoring, and by developing a nationwide awareness of the need to enforce specifications
- Promote the use of more effective Paint Systems by challenging the low bid process

Questions?