Bridge Painting

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Construction and Maintenance Branch
Coatings Condition Survey

An Essential Step in the Planning Process!

- Assessing Existing Coating’s Performance Level
- Budgeting & Prioritizing Work Between Bridges
- Developing Plans, Specifications & General Notes
Review of Background Information
Jobsite Assessment

Identify:

- Equipment access & staging issues.
- Complicated design details.
- Nearby sensitive areas such as homes, schools, etc. where public activities occur.
To Paint or Not to Paint…?

Spot Repair & Overcoat?  Remove & Repaint?
Visual Observations

- **Degree of Corrosion**
  - SSPC VIS 2 ~ a photographic standard

- **Presence of Paint Defects**
  - Runs, Sags ~ Poor application
  - Fading / Chalking ~ Sun damage
  - Delamination ~ Poor initial surface prep
  - Blisters ~ Contaminants
  - Cracking ~ Poor recoat potential
Visual Findings → Direction

- Establish Maintenance Priorities
  - Level of Corrosion
  - Public Image
  - Lumping of nearby bridges

- Determine Type of Maintenance Work
  - < 25 % ~ Spot Repairs / Overcoat
  - > 25 % ~ Full Removal / Replacement

- Assess Need for Additional Sampling/Testing
Existing Dry Film Thickness (DFT)

Test Frequency Determined by:
- Structure Size
- Type of Coatings Present
- Variance in measurements

“…over-coating is not recommended if existing dry film thickness exceeds 20 mils.”
Number/Thickness of Coats

A Destructive Test:
- Notch through all coats of paint
- Thickness measured by test scale

“...a good method of determining what is already there, and to what extent it can be built upon.”

Tooke Gage
Number/Thickness of Coats

1\(^{st}\) coat = “Primer”

2\(^{nd}\) coat = “Intermediate”

3\(^{rd}\) coat = “Appearance”

Scales used to measure paint layer thicknesses

Tooke Gage’s View Finder
Condition of Base Metal

Another Destructive Test:

- Remove all Paint & Examine Base Metal
- Looking for problems
  - Embedded debris
  - Mill scale
  - Rough edges
  - Rust pits and/or deep profile

“...new paint only helps if it stays on the structure.”

what lies beneath?
Adhesion Testing

ASTM D 3359 ~ Standard Test Method for Measuring Adhesion by Test

- 0A; Within Layer
- 2A; To Primer
- 3A-4A; Topcoat
Adhesion Testing

Adhesion Testing

ASTM D 4541 ~ Evaluation of Dollies (Typical Results)
Testing for Soluble Salts

SSPC Guide 15 ~ “Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates”

- Extraction Methods
- Analytical Methods

“… elevated levels of soluble salts trigger the need for additional cleaning and testing prior to and during blasting operations.”
Testing for Hazardous Materials

Required for bridges suspected of having Lead Based Paint (painted prior to 1990’s).

- Random, yet representative
- Sandwich bag size, ¼” minimum depth
- Collect coating completely down to the steel
- Avoid rust, debris and contaminants
- Properly label and send to CST for analysis

“Lead was finally removed from the primer specification in 1993, though existing stocks in District warehouses and maintenance yards were still being used.”
CST Laboratory Testing

Microscopic Examination
  - Number of Coats
  - Thickness of Coats
  - Microscopic Defects

Infrared Spectroscopy ~ to identify generic paint type used

Atomic Absorption Spectroscopy ~ to determine presence of hazardous materials
Indicate Test Sites and Results

REMEMBER: Photograph these notations for your records!
Referenced Specifications

TxDOT

Industry
The existing paint system contains lead; therefore, the waste generated from cleaning will be classified as hazardous materials. Establish a hazardous coating removal plan to document and control coating removal operations in compliance with OSHA 29CFR Part 1910.1025, 1926.62, and 1926.63. This plan must include all applicable federal and state requirements addressing environmental protection issues and hazardous waste disposal.

The successful (cleaning and painting) Contractor must be certified by the Society for Protective Coatings (SSPC) in accordance with SSPC-QP 1 and SSPC-QP 2. Comply with all provisions of the qualification procedures specifically including, but not limited to, the Quality Control (QC) program as outlined in SSPC-QP 1, “Standard Procedure for Evaluating Painting Contractors (Field Application to Complex Industrial Structures)”. Provide copies of SSPC audit reports for all audits performed during this contract. Provide QC reports upon request by Engineer and/or on a weekly basis.

Typically language used in the General Notes
Worker & Environmental Safety

**TxDOT Policy:** “Repainting where lead is involved should be done in a general construction contract that is separate from any other bridge work (i.e., widening, or new construction); but it **may be included within maintenance/repair contracts.**”

Available online at “I-WAY”

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**Training Summary**

**Course Detail**

**Course Title:** Lead Awareness

**Course Code:** SFH766

**Description:** This course provides an overview of lead awareness. Some topics discussed are: a description of lead, where you find it, the health hazards associated with lead, how to protect yourself from these hazards, and what to do if you are exposed to lead in the workplace.

**External Charge:**

**Training Coordinator:** Johannsen, Laura L

**Telephone:** 512/486-5408  
**Fax Number:** 512/486-5464
Containment System
Containment System

Standard Requirements:

Rigid floor system ~ Formed from 20 gauge (min.) steel

Work Platform ~ Capable of supporting 25 PSF (min.) live load for abrasive blasting, or 10 PSF (min.) live load for water blasting

Watertight ~ Ceiling and floors contoured to eliminate ponding

Walls ~ Full height & capable of withstanding winds up to 30 MPH
Ventilation must keep ambient Total Suspended Particulate (TSP) lead below limits prescribed by (OSHA) 40 CFR 50
An Abrasive Recycling System (with recyclable abrasive) is required when removing existing coatings containing hazardous materials.
Waste Storage & Disposal

50 TAC 305 & 50 TAC 335 are Texas laws related to handing, storage, classification, and disposal of hazardous waste materials.
BRIDGE SURFACE AREA QUANTITY SUMMARY
(FOR CONTRACTOR'S INFORMATION ONLY)

EAGLE NEST CANYON
CSJ: 0022-05-020
TOTAL STEEL SURFACE AREA = 26,500 SF

PECOS RIVER
CSJ: 0022-06-045
TOTAL STEEL SURFACE AREA = 137,000 SF

DEVIL'S RIVER
CSJ: 0022-09-047
TOTAL STEEL SURFACE AREA = 465,000 SF

* ITEMS TO BE PAINTED SHALL INCLUDE GIRDERNS, DIAPHRAGMS, CONNECTIONS PLATES, BEARINGS, STIFFENERS, AND LATERAL BRACING. PAINTING OF GIRDERNS SHALL INCLUDE THE WEB, BOTTOM FLANGE, AND UNDERSIDE OF TOP FLANGE. ANY ADDITIONAL ITEMS SHALL BE VERIFIED BY THE ENGINEER.
Include on Drawings: Paint Systems

ITEMS OF WORK:

Clean and Paint all steel bridge components in continuous plate girder spans (approx. 32,000 SF) in accordance with Item 446, "Cleaning and Painting Steel." **Use Paint System II**, appearance coat to be Federal Standard 595B Color FS 34258.

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**Paint System I**: for over-coating existing paints ~ water blast/hand tools only
**Paint System II**: for new or existing steel ~ the default system
**Paint System III**: for new steel only (3 Coats) ~ harsh environments
**Paint System IV**: for new steel only (2 Coats) ~ mild environments
**Special Protection System**: for unique applications (H-piles, repairs, etc.)
Include on Drawings: Paint Colors

Deck Fan

Internet
Bridge Construction & Maintenance Branch

- 6 Professional Engineers plus 1 E.I.T.
- 4 Certified Structural Steel Field Inspectors.

“We serve as in-house consultants to the Districts and Divisions on bridge construction and maintenance issues.”

Branch Manager: Brian Merrill, P.E. @ (512) 416-2232
Contact for Paint Issues: Maxine Jacoby, P.E. @ (512) 416-2751
Questions?