

STA/FHWA Joint Review Program 1999 Bridge Coating Process Review

Purpose of Review:

The purpose of this review is to evaluate the overall quality ofs bridge coatings program. Specifically, the review team is charged with performing an assessment of the adequacy of the current bridge painting specifications as they relate to lead paint removal and field coating. Also, statewide policies for determining full paint removal versus spot painting and overcoating will be examined to determine if STA is making cost-effective decisions for the preservation of steel structures. Expected outcomes of this review include modifying and simplifying the current bridge coating specifications if necessary, possibly revising statewide programming and scoping policies and forming a conclusion as to whether the shift from painting during rehabilitation projects to paint-alone contracts is beneficial to the State of

Scope of Review:

An initial part of this review will include an examination of the condition of coatings on bridges that were recently field painted. The review will focus on bridges that were coated within the last + 5 years. Visual inspection will be used to assess coating performance. Cost data for these projects will be collected whenever possible. This portion of the review will also include an assessment of some experimental coating systems that were recently applied.

The review will include discussions with District staff involved with the bridge coating program. It is expected that interviews will be conducted primarily with the District Bridge Maintenance Engineer and the District Bridge Painting Technician. However, others who may be interviewed include staff from Construction, Materials, and Programming. A formal Central Office review will not be conducted because the review team consists of members from all of the affected Central Office Bureaus. Therefore, Central Office responsibility as it relates to the bridge coating program will be discussed internally by the team. A set of guidelines will be used to direct and focus the review through the interview process. Districts selected for review include STA Districts 1, 2, 6, and 8.

Active bridge coating projects will be visited by the review team. The purpose of these reviews is to assess specification compliance and to get feedback from the project inspection staff on the workability of the existing specifications and procedures. Attempts will be made to focus project reviews in the aforementioned Districts, but if other non-typical projects are active in other Districts, inspections will also be conducted in those areas. Field reviews may also be conducted on Department of Transportation projects(((note: a city government))). In addition, the review team may visit some coating projects in adjacent states in an attempt to compare and collect "best practices."

An in-depth analysis of the existing bridge painting specifications and the existing coating policies will be conducted by the team. Project specific and statewide data trends will be collected whenever possible to assess the adequacy of the existing guidance. Changes to the specifications and policies will be proposed based on discussions internally by the team in addition to feedback from the Districts and through literature searches and construction site visits. Industry representatives may be contacted during this process to get feedback on the workability and reasonableness of any proposed revisions.

It is expected that individual summary reports will be prepared for each of the selected Districts. In addition, a statewide summary report will be drafted and carried forward to the statewide close-out meeting for discussion and resolution.

Review Team:

District Review:

A. General

1. How many steel structures are there in this District on the state system?
2. How many of these still have lead paint on them?
3. How many bridges are scheduled to be painted this year? How many separate contracts?
4. How does this compare to the size of the program over the past several years?
5. How many full paint removal projects were conducted in the District in the last five years?
6. How many structures have been overcoated since the original painting? How many have been overcoated

more than once?

7. Describe the District's staffing as it relates to the bridge coatings program.
8. Does the District have a Bridge Painting Technician?
9. How long has this person been in that position?
10. What types of training has this person received?
11. Is bridge painting a full-time or part-time activity of the Bridge Painting Technician? What percentage of time is devoted to bridge painting activities versus other types of activities?
12. To which District Bureau does the Bridge Painting Technician report?
13. If other individuals besides the Bridge Painting Technician are involved in bridge painting inspection, what training is received prior to work?
14. How are the current paint systems for new and existing bridges performing to date?
15. Are there any recent failures, partial or otherwise, that the review team could document or investigate?

B. Project Prioritization

16. Does this District still use the Coating Assessment and Painting Priority System (CAPPS)? If not, go to question #21.
17. If so, who does the CAPPS analysis for the District?
18. Do consultants ever do a CAPPS analysis during the preliminary engineering phase of the contract?
19. How often does the District do an overall CAPPS analysis on their steel bridge inventory?
20. Is this system computerized and easily manageable?
21. Is the Pontis (element-level inspection) data used for the District's bridge painting prioritization program?
22. Who in the District provides element-level data for individual steel structures related to paint condition?
23. How often is this information updated?
24. How does the District prioritize painting projects?
25. What controls how many bridges can be put on one painting contract?
26. What criteria does the District use to place a structure in need of painting under a rehabilitation contract or a paint-alone contract?
27. What funding sources are used for bridge painting?

C. Project Scoping

28. Describe the Bridge Painting Technician's responsibilities as they relate to project scheduling and scoping?
29. Is a field review conducted prior to final project scoping? Does the Bridge Painting Technician attend these reviews?
30. What guidance does the District use to establish scope of work (i.e., Method 1, 2, 3, experimental, full removal, other)?

31. Does the District consider this guidance adequate?
32. Is a cost analysis routinely conducted to determine appropriate scope of work for a project? If so, who performs the analysis? Who reviews the analysis and makes the final decision?
33. What are the District's procedures for proposing an experimental paint system or another system other than the standard epoxy mastic/acrylic paint system?
34. How is the District Bureau of Program Development involved in bridge painting projects?
35. How is the District Materials staff involved in paint testing and approval of paints?
36. Under what situations does the District hold pre-bid meetings for painting projects?
37. Is any painting done by District bridge maintenance crews? Discuss this program.
38. If so, how are worker health and safety, as well as environmental contamination concerns, addressed?
39. What time of year are bridge painting projects typically let in this District?
40. Is there an overall need for additional training in the District as it relates to bridge coating?
41. Does the District have enough qualified inspection personnel to handle the entire bridge painting program in the District?
42. Under what situations are consultant inspectors used?

D. Cost Data

43. Report average cost data for bridge painting projects in the District:

Method 1: _____ sq.ft. cost
 Method 2: _____ sq.ft. cost
 Method 3: _____ sq.ft. cost
 Full Removal Cost: _____ sq.ft. cost

44. Compare cost data for paint-alone projects versus paint during rehabilitation contracts.
45. Is there cost data available that can show that bid prices come in lower when projects are let at certain times of the year versus other times of the year (spring versus fall)?
46. What does the District consider as the typical life expectancy of the normal paint systems used today? Before any touch-up is needed? Before major repainting is needed?
47. Is there any perceived difference in the quality of the paint application on paint-alone versus painting during rehabilitation contracts?

Central Office Review

E. General

1. How many state-maintained steel structures are there in?
2. How many still have lead paint on them?
3. How is the Central Office involved with local agency painting projects?
4. How often is bridge painting training conducted in?
5. If there is a premature paint failure in, what staff at the Central Office is available to assess and make recommendations?

6. Describe the responsibilities of the Bureau of Materials and Physical Research as they relate to the bridge painting program.
7. Is any painting done by Day Labor forces? Who identifies candidates and prioritizes the projects done by day labor? Is there any other oversight or tracking (i.e., reporting into bridge inventory records)?
8. Describe the employee health monitoring program in the Districts for bridge painting inspectors.
9. What is the total statewide budget for bridge painting (excluding local systems) per year?
10. What are the current funding needs to bring all steel bridges up to an acceptable condition?
11. How are the funds allocated per District (number of steel bridges, condition of paint, equal distribution...)?
12. Are warranties ever considered on any projects? If no, why not?
13. What types of funding sources are used to fund bridge painting projects?
14. Does the Bridge Office have a responsibility to review and approve bridge painting projects?
15. Who in the Central Office is responsible for tracking the performance of experimental paint systems?
16. Under what situations are pre-bid meetings held?

F. Follow-up to 1990 Process Review

17. Has STA developed access standards to be used by bridge painting inspectors? Are the standards being used in current painting projects?
18. What is the status of each District having a painting technician on staff?
19. Comment on the thoroughness and usefulness of the standard inspection documentation requirements (standard forms).

G. Paint System Approval

20. List the types of paint systems currently allowed in
21. Describe the process for getting a new paint system approved for use in
22. What types of tests are required prior to a manufacturer's product getting approved for use on State projects?
23. What companies are on the qualified product list for the following:

Inorganic Zinc: _____
 Epoxy Penetrating Sealer: _____
 Aluminum Epoxy Mastic: _____
 Waterborne Acrylic: _____

Guidelines for Active Painting Projects

A. General Project Information

District: _____

Contract Number: _____

Location: _____

Project Description: _____

Surface Preparation Method Used: _____

Containment Used: _____

Paint System Used: _____

B. Contract Management

1. Obtain a copy of the contract special provisions and review for any special painting features.
2. Discuss the contractor's proposed operation (i.e., number of blasters, number of painters, sequence of operation, etc.).
3. What types of equipment, tools, resources are included in the STA inspector's inspection kit? Does the inspector need additional equipment to adequately perform duties?
4. Look at the submitted inspection access plan. Has it been approved and is it adequate to allow for proper inspection? Are safety harnesses and lifelines provided for areas higher than 15 feet above the ground?
5. Review and comment on traffic control.
6. Has the contractor provided a copy of all manufacturer's product data sheets and material safety data sheets to the Resident Engineer for the paints being used? Discuss what the Resident Engineer uses the data sheets for.
7. Does the Resident Engineer have the paint manufacturer's list of approved thinners and a list of unit weights per gallon?
8. Does the Resident Engineer ever use the construction inspector's checklist as provided by the STA Central Office? Is it useful as written?
9. Discuss the Resident Engineer's experience and training in bridge painting.
10. Who is the District Bridge Painting Technician? Is he also the Project Resident Engineer? If not, what is his responsibility and role relating to the project?

C. Quality Control

11. Identify the quality control personnel for the contractor. Check general qualifications.
12. Check the contractor's quality control plan. Did STA approve it?
13. Inspect the quality control measuring instruments.
14. Discuss STA's quality assurance procedures for this painting project.

D. Surface Preparation

15. What is the pressure and air capacity of the blasting equipment with all air blast nozzles being used? (Min. 100 psi and 250 CFM required.) Do the gauges and valves work on the blasting equipment?
16. What is the size of the blast nozzle orifice being used? If it is larger than 3/8 inch, is the minimum capacity of the equipment within the recommendations of the SSPC Good Painting Practice Manual, Volume 1, Chapter 2.4, Table 1? (Table 1 is included as an attachment to the guidelines.)
17. How much time had elapsed from washing the bridge to blast cleaning (two weeks are allowed)? Discuss the adequacy of bridge washing. Was the washing approved and documented prior to solvent cleaning or blasting?
18. Discuss the procedures used in solvent cleaning if solvent cleaning was determined to be necessary.

Check to ensure that solvent cleaning was done prior to blast cleaning.

19. How often is the compressor air checked using ASTM D 4285 to ensure that air is free of oil, water, and other contaminants? Check for documentation of these tests.
20. What type and size of abrasive is being used? Is the same abrasive being used for the duration of the project?
21. How often are abrasives checked for oil contamination and pH? If new abrasive types are brought in, are additional tests made?
22. Comment on the adequacy of the surface profile obtained where Method 1 removal is used. How often is the surface profile checked and with what testing method? (Review team should perform independent tests. 1-3.5 mil profile is required.)
23. Discuss the test section for surface preparation (location, size [11 sq.ft.], documentation). Was the same equipment used for the test section as for production? If new equipment was brought in, was another test section performed? Is a test section done on each structure?
24. Was bare steel allowed to remain unprotected overnight? If so, was the surface reblasted prior to painting?
25. Are rust or corrosion products between connected plates or shapes of structural steel being satisfactorily removed by blasting, hand tools, or power tools? Comment on the condition of these areas for cleanliness and damages resulting from cleaning operations.
26. When steel grit is used, check the manufacturer's written certification:
 - Should conform to the specifications of the Society of Automotive Engineers and Steel Founders Society of America.
 - Hardness of 90% of grit shall be min. of 55 Rockwell C.
27. Where Method 2 surface preparation is required, observe and comment on degree of cleanliness.
28. Where Method 3 surface preparation is required, observe and comment on degree of cleanliness.

E. Paint Application

29. Has all of the painting been accomplished between May 1 and October 31? If not, has the Bridge Office been contacted for approval of an exception?
30. Complete the following table and comment on the adequacy of monitoring environmental conditions during paint application (these items should be measured every day of painting):

Item	Time Tested (a.m./p.m.)	Where Tested (Shade, Sun, Middle)	How many readings per day?
Air Temperature (50 F. to 100 F. Required)			
Steel Surface Temperature (50 F. to 130 F.)			
Dew Point Temperature (Steel temp. must be at least 5 F. above dew point)			
Relative Humidity (Less than 85% required)			
Wind Velocity (Less than 15 mph required for spray painting)			

Comment:

31. List all weather restrictions specified by the manufacturer's product data sheet. Have these been met?
32. How often are filters, traps, and separators cleaned or drained for the painting equipment. Is this adequate to keep the equipment in good working order?
33. Are the air spray paint pots equipped with air operated continuous mixing devices? Are they operating as the paint is being applied?
34. Are mechanical power mixers being used to mix the paint? Are all ingredients in any paint container thoroughly mixed in the original containers before use or mixing with other containers? Are there unsuspected solids at the bottom of the container?
35. Verify that paint is not kept overnight in spray pots, painters' buckets, etc.
36. Was the paint stored in a covered container? What is the shelf life of the paint? Has the life been exceeded? Where is the paint stored?
37. Has the previous paint coat been properly cured? Is the time interval between coating applications in compliance with the manufacturer's instructions?
38. Are the prime, intermediate, and final coat paints supplied by the same paint manufacturer?
39. Are paint coats tinted to allow for differentiation between succeeding coats?
40. Is the paint being applied in a continuous wet film? Are any film defects apparent?
41. Discuss painting techniques being used--in a uniform layer with overlapping at edges of the spray pattern, gun held perpendicular and at an appropriate distance, trigger of gun released at end of each stroke, etc.
42. Is the contractor complying with the specific procedures identified by the manufacturer's product data sheet?
43. Are all runs and sags being brushed out immediately by the painters?
44. Is the contractor cleaning inadvertently painted areas immediately?
45. Has the Resident Engineer inspected and approved each coat of paint prior to the intermediate or top coating?

F. Documentation and Field Testing:

46. Where was the paint manufactured? How was it ascertained that it was an approved source? What was the evidence of inspection?
47. Are the Painting Inspector's Daily Reports (IDRs) completed for each day of painting? Review IDRs to ensure that all applicable items are completed and recorded.
48. Review the Painting Inspector's Progress Report. Is it complete?
49. How often is the field testing equipment calibrated? Check the last calibration date for the equipment as appropriate.
50. Check the Paint Film Thickness Measurement sheets for adequacy and completeness. (No spot may be < 80% of the specification thickness.)
51. Were a satisfactory number of dry film thickness tests performed?
 - a. For bridges < 300 ft², each 100 ft² will be measured as one area.
 - b. For bridges < 1,000 ft², three 100 ft² areas will be measured.

- c. For bridges over 1,000 ft², the first 1,000 ft² will be measured as in b. above with one 100 ft² area for each additional 1,000 ft².

52. Check dry film thicknesses for the following:

For Steel Cleaned by Method 1:

- 1 Full Coat Aluminum Epoxy Mastic - 5.0 to 7.0 mils
- 1 Full Coat Aluminum Epoxy Mastic - 5.0 to 7.0 mils
- 1 Full Coat Waterborne Acrylic - 2.0 to 4.0 mils

For Steel Cleaned by Method 2:

- 1 Full Coat Epoxy Penetrating Sealer - 1.0 to 2.0 mils
- 1 Spot Coat Aluminum Epoxy Mastic - 5.0 to 7.0 mils
- 1 Full Coat Waterborne Acrylic - 2.0 to 4.0 mils

For Steel Cleaned by Method 3:

- 1 Full Coat Aluminum Epoxy Mastic - 5.0 to 7.0 mils
- 1 Full Coat Waterborne Acrylic - 2.0 to 4.0 mils
- 1 Full Coat Waterborne Acrylic - 2.0 to 4.0 mils

53. Observe the frequency of wet film testing. Does it appear adequate?
54. What was the manufacturer's specified weight per gallon and the actual weight per gallon?
55. From where was the paint sample taken (1 qt. required)? Was the paint well mixed first?
56. Were satisfactory test results received prior to the contractor applying the material?
57. Does each container have a label clearly showing the manufacturer, product name, lot number, date of manufacture, and shelf life?
58. Were any deviations from the manufacturer's application instructions allowed? Where were they documented?

G. Containment and Disposal of Lead Paint Blasting Residue

59. Review the contractor's submittal for containment including drawings, equipment specifications, and calculations. Was the plan approved prior to the contractor proceeding with work?
60. Observe the contractor's lighting scheme. Does it provide enough light to effectively work in the containment (illuminance of at least 30 foot candles is required [20-foot candles required for platforms, access and entryways])?
61. Review the contractor's soil, water, and air monitoring plans. Are they thorough and were they submitted before the start of work?
62. Who at STA is responsible for approving the soil, water, and air monitoring plans?
63. Discuss location of soil samples (one sample required for each 300 feet of bridge length, or fraction thereof, at each bridge). Were the test results provided to STA prior to the start of washing or surface preparation?
64. Was an identical series of samples taken and tested at the completion of the surface preparation operations?
65. Are two high-volume air monitoring devices used on the project site for the first five days of blast cleaning? Comment on the location of the devices (devices should be moved to capture the maximum pollutant discharge).

66. Check to ensure that no further lead paint removal was conducted until the air monitoring results were received by STA (should be within 72 hours of collection of samples).
67. Are any visible emissions observed? If so, is air monitoring re-established for a minimum of two days?
68. Are the air monitoring filters turned in to the Resident Engineer after each day they are exposed? Who sends in the filters to the laboratory for analysis?
69. Observe how air samplers are calibrated at the beginning and end of each day's work. Review contractor's daily written report for air sampling. Address timeliness of these reports.
70. Discuss recycling process. Ensure all spent abrasive to be recycled is vacuumed into recycler, not transferred by bucket or other means.
71. Are there visible emissions from the recycling equipment?
72. Observe and comment on the quality of the blast enclosure. Note any problems.
73. Is the decontamination unit within 100 feet of the blast enclosure?
74. Check the maximum height of the containment enclosure (should be less than 10 feet from deck to bottom of containment).
75. Check exhaust ventilation to ensure that it has a capacity of a minimum of 900 cubic feet per minute per abrasive blast nozzle in use.
76. Check that the size of the dust collection system is large enough to provide a minimum capacity of 15,000 CFM.
77. For vacuum blasting, has the contractor placed a coverage on or over the ground under the area to be cleaned?
78. Where vacuum blasting is used, comment on overall performance.
79. Is all disposable protective clothing placed into bags marked with lead caution labels and disposed of as lead-contaminated waste?
80. Ensure that personnel do not go outside the posted boundaries of the lead work area and storage area with their lead work coveralls on.
81. Critique the decontamination unit (should be a three-stage unit).
82. Check if a log is used and up-to-date for documenting entry and exit from the containment.
83. Have any stop work orders been issued for this project?
84. Check the contractor's contingency plan for emergencies and evaluate for completeness.
85. Is cleaning residue collected daily and deposited in all-weather containers?
86. Did the contractor sample and test containers of waste prior to removal from the work area?
87. Where is the waste material disposed of for this project?
88. Did STA obtain identification numbers from the State and Federal environmental protection agencies for the bridge(s) and give them to the contractor?
89. Was the IEPA permit and waste stream authorization obtained prior to beginning of cleaning (some blasting may be done beforehand to obtain samples for the disposal facilities)?
90. Where are STA's copies of the signed manifests stored over the short term? Long term?

91. Review sample manifests and ensure that all necessary signatures were obtained.
92. How long have waste containers been stored on site (90 days is allowed)?
93. Did STA receive a copy of the land ban notification?
94. Review the contractor's written log of weekly inspections of the containers of cleaning residue.
95. Check identification on the waste containers: should have the date the container was filled and placed in storage on site, contract number, and consecutive batch number.

FIELD REVIEW OF EXISTING STRUCTURES

Date of Review: _____ Reviewed By: _____

Structure Number: _____ Route: _____

Location: _____

STA District: _____ County: _____

Year Painted: _____ Time of Year Painted: _____

Scope of Paint Project (Method 1, 2, or 3): _____

Type of Paint System: _____

Paint Supplier: _____ Painting Contractor: _____

Type of Surface Preparation (Grit Blast, Vacuum Blast, Power Tool): _____

Beams Previously Overcoated: _____ YES _____ NO

Type of Contract: _____ Paint-only Contract _____ Bridge Rehabilitation Contract

Total Project Cost: _____ Cost per Square Foot: _____

Surface Adhesion Test: _____

Noted Distress: _____

Comment on Any Known Problems with the Project: _____

PONTIS DATA	LINEAL FEET			
	Date of Last Insp:	Date of Previous Insp:	Date of Previous Insp:	Date of Previous Insp:
Condition State 1				
Condition State 2				

Condition State 3				
Condition State 4				
Condition State 5				