



Structural Steel Coatings – Painting Structural Steel

Revision and Approval

Revision	Date	Nature of Changes	Approved By
0	12-08-2022	Original Issue	Richard Foley

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Background

This process establishes Structure Construction (SC) roles and responsibilities for painting structural steel including:

1. The review and authorization of submittals specifically for painting structural steel and steel soldier piles, including certification for the maximum allowable dry film thickness for inorganic zinc-rich coatings to be used on faying surfaces of High Strength (HS) bolted connections, mandatory Society of Protective Coatings-Qualification Procedures (SSPC-QP) certifications, and the Painting Quality Work Plan (PQWP).
2. Administration of Contractor's quality assurance efforts including the prepainting meeting and quality control testing. The prepainting meeting is used to discuss the requirements of the PQWP and takes place before the PQWP is submitted. Testing of paint application is extensive and requires a thorough understanding of the contract requirements.
3. Construction activities including:
 - a. Construction of authorized containment systems
 - b. Surface preparation and cleaning
 - c. Painting
 - d. Work area monitoring.
4. Preparing and painting sign structures.

Additional unique requirements that supplement this process are detailed in the [Contract Specifications](#) (CS):

- Section 59-1, *Structural Steel Coatings – General*
- Section 59-4, *Structural Steel Coatings – Painting Sign Structures*.

Prior to reviewing this Bridge Construction Memorandum (BCM), it is essential to review the CS, Section 59-2, *Structural Steel Coatings – Painting Structural Steel*, that this BCM is based on as identified in the title block above. The information in the *Contract Specifications* typically will not be repeated in the text of this BCM.

Process Inputs

1. Painting Quality Work Plan
2. Society for Protective Coatings (SSPC)-Qualification Procedures (QP) Certifications
3. American Institute for Steel Construction (AISC) Certifications
4. Maximum Dry Film Thickness Certification for faying surfaces of high strength (HS) bolted connections
5. Debris containment and collection plan, if field painting
6. Authorized scaffolding plan, if applicable
7. Quality Control (QC) test reports performed during the paint work
8. Fabricated sign structure

Procedure

1. All work associated with this process is charged as [Project Direct – Construction](#).
2. Inspection of field work for this process is:
 - a. [Intermittent](#) for containment system construction and work area monitoring.
 - b. [Benchmark](#) for surface preparation and painting.
3. Before construction begins the Structure Representative (SR) or delegate must:
 - a. Meet with the Materials Engineering and Testing Services Representative ([METS Rep](#)) to go over the project and painting requirements ahead of the prepainting meeting.
 - b. Attend the prepainting meeting with METS Rep, the Contractor, and all painting sub-contractors to:
 - i. Discuss the paint quality work plan requirements.

- ii. Discuss the hold points required for inspections.
- c. Review and authorize or return for resubmittal the following submittals:
 - i. The coating material certification indicating maximum allowable dry film thickness (DFT) on HS bolted connections.
 - ii. The Mandatory SSPC-QP and/or AISC Certification. Verify:
 - 1. The certification dates are current through the life of the project.
 - 2. Questions regarding [Caltrans SSPC QP Requirement Notice](#) can be referred to Structure Maintenance & Investigations ([SM&I Bridge Paint Program](#)) Advisor.
 - iii. The PQWP. Verify:
 - 1. The submittal is complete and:
 - a. Includes the required SSPC, AISC, and American Society for Testing and Materials specifications.
 - b. Includes the Maximum DFT Certification for faying surfaces of high strength bolted connections.
 - c. If the submittal is incomplete, the Contractor received the written notification that the submittal was returned and understands the review clock stopped.
 - 2. Copies are distributed for review to the METS Representative.
 - 3. The PQWP is consistent with minutes of the prepainting meeting.
 - 4. The Contractor personnel meet the certification and qualification requirements of the project through the life of the project. Communicate the need to resubmit certifications that will expire during the life of the project.
 - 5. Proposed materials are listed on the Department's [Authorized Material List](#) (AML):
 - a. Review manufacturer's guidelines for compatibility with proposed PQWP.
 - b. Collect complete records prior to construction including paint batch Quality Assurance (QA) results from METS Chemical Testing Branch.
 - c. Verify that finish coats for sign structures match color requirements specified in the CS, Section 59-4.03D, *Structural Steel Coatings – Painting Sign Structures – Construction – Finish Coats*.
 - 6. The PQWP is compliant with environmental requirements, including material storage and handling, surface preparation, painting, providing

adequate containment, etc. Coordinate review and verification with the Resident Engineer.

7. The water supply meets requirements and:
 - a. Review source and quality of Contractor developed water supplies.
 - b. The development of water supply is compatible with the project schedule.
 8. The containment and scaffolding systems are in conformity with:
 - a. The design criteria in the contract documents.
 - b. The requirements of [BCM 7-1.02K\(6\)\(e\)](#), *Legal Relations and Responsibility to the Public – Laws – Labor Code – Occupational Safety and Health Standards – Scaffolding*.
 - c. The requirements of the PQWP.
 9. The PQWP is reviewed with the Resident Engineer for conformance with:
 - a. Environmental requirements (e.g., noise, water pollution control)
 - b. Traffic control requirements (e.g., lane closures)
 - c. Staging area (e.g., footprint, site access, sufficiently sized)
 - d. Safety (e.g., containment system, access points)
 - e. Temporary traffic control requirements of the contract documents:
 - i. Maintain pedestrian access (if applicable) per [BCM 16-2.02](#), *Temporary Facilities – Temporary Pedestrian Facilities*, and in accordance with [Temporary Pedestrian Access Routes Handbook](#).
 - f. Items related to the railroad.
 10. The SC Falsework Engineer is consulted for submittals that affect the railroad.
- iv. Paint color samples for match to project referee samples. Consult with the project architect if required.
 1. Note that the project architect may be the Landscape Architect from the District, and on other projects the project architect may be the Architect from the Division of Engineering Services, Office of Transportation Architecture.
- d. Notify the Contractor in writing of rejection or authorization of all submittals.
 - e. Provide copies of authorized submittals to field staff, METS Representative, project files, architect, and designer (as requested).

- f. Coordinate review of the lead compliance plan with the Resident Engineer (RE) per *Contract Specifications*, Section 7-1.02K(6)(j)(ii), *Legal Relations and Responsibility to the Public – Laws – Labor Code – Occupational Safety and Health Standards – Lead Safety – Lead Compliance Plan*, if a lead compliance plan item is identified by the contract.
- g. Review the CS, Section 59-4, *Structural Steel Coatings – Painting Sign Structures*, for contract requirements for preparing and painting sign structures.
- h. Consult with the Bridge Construction Engineer (BCE) to obtain medical clearance and initiate medical surveillance process for field personnel when disturbing lead-based paint systems:
 - i. Respirators and other appropriate PPE must be utilized when working around lead-based paint systems. Refer to Chapter 12, *Personal Protective Equipment*, and Chapter 15, *Respiratory Protection Program*, of the Caltrans Safety and Health Manual for guidelines, along with [BCM B-2](#), *SC Lead Compliance Plan*.
 - ii. Use [Form SC-0602](#), *SC Medical Testing Authorization Form*.
- i. Arrange with the BCE to complete SC's training course # 101059, *Contract Administration and Inspection of Field Clean and Paint Steel Training*, which is provided on demand.
 - i. If the paint training is not available, review the course material on the SC Intranet under the [Training tab](#).
- j. Acquire suggested Personal Protective Equipment (PPE), inspection tools, and supplies as listed in [Attachment 1](#), *Cleaning and Painting of Structural Steel*. Review the project specific *Code of Safe Practices (COSP)* for PPE requirements and safety hazards associated with the painting operations.
- k. Obtain and review the schedule of values (SOV) from the Contractor, as mentioned in Attachment 1, *Cleaning and Painting of Structural Steel*.
- l. Direct any paint related questions to the appropriate resources as follows:
 - i. Coating Specialists at the METS [Chemical Testing Lab](#), who:
 - 1. Provide testing and problem-solving services related to the chemical content of materials and products (e.g., coating systems, sealing compounds).
 - ii. Structure Maintenance and Investigations (SM&I) Bridge Paint Program Advisor who:
 - 1. Responds to subject area inquiries.
 - 2. Responds to questions regarding SSPC Qualifications.

- iii. SC Technical Team G, *Structural Steel Team*, that:
 - 1. Responds to subject area inquiries.
 - m. Review the authorized project Water Pollution Control Plan (WPCP) or Storm Water Pollution Prevention Plan (SWPPP).
 - n. On projects where existing lead-based paint systems are disturbed, collect air and soil samples under the requirements of work area monitoring per *Contract Specifications*, Section 14-11.13D, *Environmental Stewardship – Hazardous Waste and Contamination – Disturbance of Existing Paint Systems on Bridges – Work Area Monitoring*, if specified by the contract.
 - o. Discuss with the Contractor and evaluate the quantity of spot sandblasting specified in the contract. Discuss locations and quantities with the designer:
 - i. Write a Change Order (CO) to increase bid item quantity if needed.
 - p. Discuss safe access with the Contractor and verify adequacy during the work. Request corrections as needed in writing.
 - q. Arrange for a test section on the bridge to ensure that the Contractor's means and methods for degree of cleaning, surface preparation, and paint application yield acceptable results.
 - r. Review coating manufacturers and Department's guidelines and recommendation for surface preparation, painting, drying, and curing.
 - s. Coordinate with the Contractor to implement protective measures that prevent overspray and accidental paint to adjacent non painted or concrete surfaces or properties (e.g., drop cloths, screen/barriers, overhead tarps, etc.).
4. During Construction the SR or delegate must:
- a. Continue to monitor Contractor SSPC or AISC paint certification expiration dates and remind the Contractor of keeping the certifications up to date as needed.
 - b. Sample paint in the field and send to the METS Chemical Testing Branch to test paint in compliance with [BCM 91-1](#), *Paint – General*.
 - c. Consult with the RE to verify compliance with the authorized SWPPP/WQCP and PQWP for:
 - i. Material storage and handling
 - ii. Containment
 - d. Verify removal of paint with lead content complies with the:
 - i. Project Lead Compliance Plan
 - ii. SC Lead Compliance Program per [BCM B-2](#), *SC Lead Compliance Plan*.

- e. Monitor weather forecasts and maintain communication with the Contractor to:
 - i. Verify that the temperature and humidity at intervals are being checked for compliance. Check inside the containment system if being utilized on the project.
 - ii. Stage activities accordingly and optimize time for working windows.
 - iii. Address and request for repair if containment system is compromised during heavy winds.
 - iv. Look for and repair or replace uncured paint compromised by weather.
- f. Perform timely field inspections including safe operations, obtaining and verifying the Contractor QC test results, performing QA testing, and accepting or rejecting work.
- g. Perform additional timely field inspections including:
 - i. Verifying that safe access to the work is being provided by the Contractor to be assured of specification compliance.
 - ii. Verifying that the solvent (pressure washing or steam) cleaning operation is satisfactorily removing all dirt, grease, loose chalky paint, or other foreign materials.
 - iii. Verifying that the specified biodegradable detergent is being used.
 - iv. On repainting projects, taking initial DFT readings on the existing paint system to obtain average baseline values at various locations on the structure.
 - v. Identifying, measuring, and agreeing with the Contractor on the square footage of spot blast clean areas.
 - vi. Reviewing spot blasted and 100% blasted areas to verify that all rust and old coatings systems have been removed.
 - vii. Measuring and recording spot blast areas daily.
 - viii. Verifying that specification requirements are being complied to with regards to the disposal of used abrasive material.
 - ix. Negotiating a day labor CO for power tool cleaning if the contract spot blast quantity is projected to be less than required in the field.
 - x. Verifying that structural steel is dry prior to application of coating.
 - xi. Verifying that the air pressure and nozzle size meet the specifications.
 - xii. Verifying that the first undercoat is being applied shortly after blasting. If not, be sure that areas are re-blasted before the coating is applied.

- xiii. Visually inspecting the backsides of rivets, top of diaphragms, tops of bottom flanges, and other hard to reach areas to verify that they are properly cleaned and have the required coating coverage.
 - xiv. Observing the mixing of coating materials to verify that the mixing is being properly performed.
 - xv. Randomly checking the wet film thickness for each coat after the coating is applied.
- h. Select locations for the various specified quality control (QC) tests:
 - i. Verify that the dry film thickness of the undercoats is sufficient before allowing top coat application to proceed.
 - ii. Verify final dry film thickness for as-built purposes.
 - i. Issue formal notification of rejection for failed tests and request a remediation plan for review and authorization.
 - j. Obtain and evaluate METS QA paint test results.
 - k. Review the Contractor's reports for QC tests. Verify the results and frequency with the requirements of the contract documents, and notify the Contractor in writing of deficiencies for:
 - i. Blast-cleaned steel for soluble salts
 - ii. Inorganic zinc undercoat before applying final or finish coats
 - iii. Adhesion and hardness testing
 - iv. Soluble salts where final coats are required
 - v. For AASHTO M300 Type II and Type I inorganic zinc primers, dry to solvent insolubility.
 - vi. Surface pH.
 - l. Coordinate with the District for temporary traffic control, if applicable.
 - m. Coordinate with the District for handling and disposal of hazardous waste usually generated when lead based paint systems are disturbed by the removal or cleaning process.
 - n. When shop coated materials arrive at the jobsite:
 - i. Verify that shop coated materials arriving at the jobsite have been inspected and released by METS per [Form TL-6042](#), *Coating Inspection Report*.
 - ii. Inspect for coating damage that may have occurred due to handling or shipping and notify the Contractor for required repairs.

- iii. Verify repairs to galvanized surfaces are performed per CS, Section 75-1.02B, *Miscellaneous Metal – General – Materials – Galvanizing*. Refer to [BCM 75](#), *Miscellaneous Metal*, for guidance.
- iv. If satisfactory field repair is difficult or cannot be achieved, consult with the METS Rep to determine the desired course of action.
- o. For sign and pole structures painted at the jobsite:
 - i. Inspect galvanized surfaces for defects or damage and verify repairs are performed per CS, Section 75, *Miscellaneous Metal*. Refer to BCM 75, *Miscellaneous Metal*, for guidance.
- p. For paint work on column casings, verify application of zinc rich primer utilizing the conventional spray method. Minor repairs can be made using a brush or roller.
- q. Keep test equipment calibrated (e.g., film thickness gauge) by:
 - i. Monitoring the equipment calibration tag on the instruments, and
 - ii. Sending devices to SC Headquarters for servicing ahead of expected work or expiration.
 - iii. Some instruments can be calibrated in the field. See Attachment 1, *Cleaning and Painting of Structural Steel*.
- r. Comply with safety precautions required for the paint systems in use or being disturbed by:
 - i. Following medical surveillance procedures:
 - 1. All staff shall observe medical surveillance procedures required for the hazards presented by the affected paint systems and procedures.
 - 2. The BCE monitors employee compliance.
 - ii. Verifying that PPE for lead based paint removal is:
 - 1. Supplied by the Contractor which includes supplying personal protective equipment, training, and washing facilities for five State employees per the Lead Compliance Plan. Refer to the *Contract Specifications*, Section 7-1.02K(6)(j)(ii), *Legal Relations and Responsibility to the Public –Laws–Labor Code – Occupational Safety and Health Standards – Lead Safety – Lead Compliance Plan*.
- s. Verify that the Contractor is taking necessary measures to prevent overspray of paint onto adjacent non painted or concrete surfaces or properties, such as bridge soffits, concrete caps and piers, and other bridge elements. Areas not protected must be cleaned before the project is accepted.

- t. Document all inspection, construction, and quality assurance activities, pertinent to this BCM, in the Daily Reports per [BCM C-7, Daily and Weekly Reports](#). Additionally, maintain records of paint work by:
 - i. Tracking daily atmospheric measurements, surface roughness measurements, quantities of paint and abrasives used, labor and equipment hours, and locations of applied paint.
 - ii. Recording information daily as work proceeds onto forms:
 1. [Form SC-4807](#), *Spot-Sandblasting Report*
 2. [Form SC-4601](#), *Daily Clean & Paint Record*.
 - iii. Recording information upon completion of work onto forms:
 1. [Form SC-6305](#), *Paint Record*
 2. [Form SC-6302](#), *Clean and Paint Cost Summary*.
5. Following construction, the SR or delegate must:
 - a. For bridge painting lump sum pay items, prepare a summary sheet reflecting the percent of work each activity represents. Use summary sheet for tracking payment. Utilize the schedule of values previously obtained from the Contractor.
 - b. Submit the [Form SC-6305](#), *Paint Record*, immediately after the structure is painted per guidance in Section 8, *Paint Records and Reports*, of [Attachment 1, Cleaning and Painting of Structural Steel](#).

File all project documentation (correspondence, test results, daily reports, etc.) in the appropriate category in the project records as specified in the *Construction Manual, Section 5-102, Organization of Project Documents*.

Process Outputs

1. Authorized submittals
2. Prepainting meeting records and minutes
3. Hazard waste disposal manifests
4. Medical Authorization Forms
5. Notification of QC Test results
6. QC Test reports
7. Daily reports

Attachments

[Attachment 1](#), *Cleaning and Painting of Structural Steel*