





# Florida Department of Transportation

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## **M E M O R A N D U M**

**DATE:** November 6, 2008  
**TO:** Specification Review Distribution List  
**FROM:** Rudy Powell, Jr., P.E., State Specifications Engineer  
**SUBJECT:** Proposed Specification: 5600000, Coating Structural Steel

In accordance with Specification Development Procedures, we are sending you a copy of a proposed specification change.

This change was proposed by Tom Malerk of the State Materials Office and provides a complete rewrite of the Section.

Please share this proposal with others within your responsibility. Review comments are due within four weeks and should be sent to Mail Station 75 or to my attention via e-mail at ST986RP or rudy.powell@dot.state.fl.us. Comments received after December 5, 2008 may not be considered. Your input is encouraged.

RP/dr  
Attachment

**COATING STRUCTURAL STEEL.**  
**(REV ~~10-14-089-23-08~~)**

SECTION 560 (Pages 648 – 660) is deleted and the following substituted:

**SECTION 560**  
**~~SHOP, FIELD AND MAINTENANCE COATING~~**  
**~~OF STRUCTURAL STEEL~~**

**560-1 Description**

*Coat structural steel in accordance with the requirements of this Section. Coating existing structures is the complete removal and replacement of existing coatings in accordance with the requirements of this Section.* ~~Perform the shop, field and maintenance coating of structural steel surfaces in accordance with the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) PA 1, AASHTO/NSBA Steel Bridge Collaboration S 8.1 and this Specification. This Specification includes the preparation of the steel surfaces and the application, drying, and cure of coatings.~~

**560-2 Materials.**

**560-2.1 Coating System:** Use ~~only~~ coating products and systems meeting the requirements of Section 975. ~~and listed on the Departments Qualified Products List (QPL).~~

*Use Type M coal tar epoxy coatings meeting the requirements of Section 926.*

**560-2.2 Thinners, Solvents and Cleaners:** Use ~~only~~ thinners, *solvents* and cleaners *listed on the coating manufacturer's product data sheet.* ~~meeting the coating manufacturers' recommendations.~~

**560-2.3 Sealants/Caulking:** Use ~~only~~ sealants and caulks *that are paintable, compatible with the coating system and* listed as part of the coating system on the QPL and recommended by the coatings manufacturer *as part of the coating system.*

**560-2.4 Soluble Salts Test Kit:** *Use a soluble salts test kit in accordance with SSPC-Guide 15 utilizing a Class A retrieval method.* ~~Ensure the surface treatment materials are approved by the coating manufacturer. Use soluble Salt Test kits that meet the following requirements: contains all materials, supplies, tools and instructions for field testing and on-site quantitative evaluation; the extract solution is factory pre-measured, pre-packaged, and of uniform concentration; all components and solutions are mercury free and environmentally friendly; contains a factory sealed titration device and contains new materials and solutions for each test.~~

~~\_\_\_\_\_ Ensure the test *sleeve or cell* container (vessel, sleeve, cell, etc.) creates a sealed, encapsulated environment during ion extraction. *and*~~

~~\_\_\_\_\_ Ensure the test container is suitable for testing the following *all structural* steel surfaces. *∴* horizontal (up/down configuration), vertical, flat, curved, smooth, pitted, and rough.~~

~~\_\_\_\_\_ Ensure the kit uses a test container, with resulting ion extract solution, as the titration container.~~

Ensure the Ion concentrations are directly measured in micrograms per square centimeter without using either conversion charts or tables.

**560-2.5 Abrasives:** *Use properly sized abrasives to achieve the required cleanliness and anchor profile.* Use abrasives materials that meeting the requirements of SSPC-AB 1, Mineral and Slag Abrasives, SSPC-AB 2, Cleanliness of Recycled Ferrous Metallic Abrasives, or SSPC-AB 3, Newly Manufactured or Re-Manufactured Steel Abrasive and do not introduce any contamination that interferes with the coating application and performance.

Provide certification to the Engineer that the abrasives used *meet the requirements of this Section and* do not contain any chlorides and other salts.

~~Ensure recycled abrasive meets all requirements of this Specification each time it is placed in the blast pot.~~ *For recycled abrasives, verify compliance with the conductivity and cleanliness requirements of SSPC-AB 2 after each recycling or more frequently if required by the Engineer. Select a sample from each recycling machine in use and conduct the water-soluble contaminant and oil content tests outlined in SSPC-AB 2 at least one time each week or more frequently if directed by the Engineer. Conduct the non-abrasive residue and lead content tests as directed by the Engineer. If test results do not meet requirements, notify the Engineer immediately, remove and replace the abrasive, clean the recycling equipment, and conduct tests each day to confirm the equipment is functioning properly. Return to the weekly testing interval as directed by the Engineer.*

**560-2.6 Rust Preventative Compound:** Use a rust preventative compound that meets the requirements of Federal Standard TT-P-664 *Primer Coating, Alkyd, Corrosion-Inhibiting, Lead and Chromate Free, VOC Compliant.*

**560-2.7 Storage:** *Store materials in conformance with the manufacturer's recommendations and Section 6.*

### **560-3 Equipment.**

**560-3.1 Compressed Air:** Use a compressed air system capable of delivering clean, dry, continuous nozzle pressure to achieve the required surface cleanliness and profile or spray pattern. The system must comply with the instructions and recommendations of the manufacturer of the abrasive blasting system or coating application system.

**560-3.2 Abrasive Blasting System:** Design the blasting system to produce the specified cleanliness and profile.

**560-3.3 Coating Application System:** Use the coating application equipment approved by and in accordance with the Coating Manufacturer's technical data requirements.

### **560-4 Environmental, Health and Safety Requirements.**

Isolate the work areas with containment devices, canvasses, tarpaulins or screens, during all *surface preparation* cleaning and coating *application* operations. Dispose of all debris and waste products generated in accordance with all Federal, State and Local regulations. ~~Requirements for lead abatement are covered in 560-16.~~

### **560-5 Quality Control Assurance.**

~~Develop a QC plan in accordance with Section 105. Ensure that all inspection equipment is maintained, calibrated and in good working condition. Furnish and erect scaffolding to the satisfaction of the Engineer to facilitate safe inspection of all surface preparation and coating application. Ensure that all activities are observed and approved by a coatings inspector.~~

**560-5.1 Shop Preparation and Application:** *Prior to applying coatings, provide a current Corporate Quality Control Plan approved by the American Institute of Steel*

*Construction (AISC) under the Sophisticated Paint Endorsement program or SSPC under the SSPC-QP3 certification to the State Materials Office for approval.*

**560-5.2 Field Preparation and Application:** *Provide a current Corporate Quality Control Plan approved by SSPC under the SSPC-QP1 and/or SSPC-QP2 certifications as appropriate and a site specific Coating Quality Control Plan to the Engineer at least 60 calendar days prior to beginning coatings work. Do not begin coatings work until the site specific Coating Quality Control Plan has been approved by the Engineer.*

**560-5.3 Inspection:** *Ensure that all inspection equipment is maintained in accordance with the manufacturer's instructions, calibrated, and in good working condition. Ensure that all activities are observed and approved by a quality control coatings inspector meeting the requirements of this Section. Maintain daily inspection reports at the job site for review by the Engineer. Provide all daily inspection reports upon completion of the project to the Engineer or more frequently as requested by the Engineer.*

### **560-6 Personnel Qualifications.**

~~Provide documentation to the Engineer that all personnel performing surface preparation or coating application are certified by the American Institute of Steel Construction (AISC) Sophisticated Paint Endorsement or the Society for Protective Coatings (formerly Steel Structures Painting Council) (SSPC) to the requirements of SSPC QP 1, QP 2 and QP 3, as appropriate to the Method of Coating Application, prior to Contract award.~~

~~Provide documentation to the Engineer that all personnel performing coating inspections are NACE CIP certified or are reporting directly to a NACE CIP certified inspector.~~

**560-6.1 Shop:** *Provide documentation to the Engineer at least 60 days prior to beginning work that the shop performing any work in accordance with this Section is certified by AISC Sophisticated Paint Endorsement or by SSPC to the requirements of SSPC-QP3.*

**560-6.2 Field Contractor:** *Provide documentation to the Engineer at least 60 days prior to beginning work that the field contractor performing any work in accordance with this Section is certified by SSPC to the requirements of SSPC-QP1 and/or SSPC-QP2 as appropriate.*

**560-6.3 Quality Control Inspectors in the Shop:** *Provide documentation to the Engineer that all personnel performing quality control inspections in the shop are certified at a minimum as a National Association of Corrosion Engineers (NACE) Coating Inspector Level I or a SSPC Level 1 Bridge Coating Inspector and that they report directly to a Quality Control Supervisor who is certified either as a NACE Coating Inspector Level 3 or a SSPC Level 2 Bridge Coating Inspector.*

**560-6.4 Quality Control Inspectors in the Field:** *Provide documentation to the Engineer that all personnel performing quality control inspections in the field are certified at a minimum as a NACE Coating Inspector Level I or a SSPC Level 1 Bridge Coating Inspector and that they report directly to a Quality Control Supervisor who is certified either as a NACE Coating Inspector Level 3 or a SSPC Level 2 Bridge Coating Inspector.*

**560-6.5 Certifications:** ~~\_\_\_\_\_~~ *Certification must be maintained certifications for the duration of the Contract. If a certification expires, do not the firm will not be allowed to perform any work until the certification is reissued.*

Requests for extension of time for any delay to the completion of the project due to an inactive certification will not be considered and liquidated damages will apply. Notify the Engineer of any change in Contractor certification status.

## 560-7 Surface Preparation.

**560-7.1 General Surface Cleaning:** Ensure all surfaces to be coated are clean, dry, and free from oil, grease, dirt, dust, soluble salts, corrosion, peeling coating, caulking, weld spatter, mill scale and any other surface contaminants. Prepare all surfaces that will become inaccessible after fabrication, erection, or installation while accessible. Sequence the surface preparations and coating operations so that freshly applied coatings will not be contaminated by dust or foreign matter. Protect all equipment and adjacent surfaces not to be coated from surface preparation operations. Protect working mechanisms against intrusion of abrasive. In the event that any rusting or contamination occurs after the completion of the surface preparation, *prepare clean* the surfaces again to the initial requirements. *Perform surface preparation work when the temperature of the steel surface is at least 5° F above the dew point temperature.*

~~All corners resulting from sawing, burning, or shearing operations must be broken. Clean all welds and prepare the area within 2 inches of welds by blast cleaning, power wire brushing, water scrubbing, or chemically scrubbing to remove all detrimental welding deposits and to create a surface profile meeting the coating manufacture requirements.~~

**560-7.2 Mechanical Removal of Surface Defects:** *Break all corners resulting from sawing, burning, or shearing. In areas where burning has been used, remove the flame hardened surface of the steel to the extent necessary to achieve the required surface profile after abrasive blast cleaning. Remove all weld slag and weld spatter. Conduct all of this work in accordance with AASHTO/NSBA Steel Bridge Collaboration S 8.1.*

~~**560-7.1.1 Degreasing:** Degrease by solvent cleaning, detergent washing, or steam cleaning in accordance with SSPC-SP 1.~~

~~**560-7.1.2 Water Washing:** When high levels of chloride or other undesirable contaminants are found on the surfaces, water wash using standard industrial pressure cleaners with a pressure versus volume output balance that will ensure thorough cleaning.~~

**560-7.3 Cleaning:** *Clean all steel surfaces in accordance with the requirements of SSPC-SP 1.*

**560-7.4 Washing:** *Wash all steel surfaces in accordance with the requirements of SSPC-SP 12.*

**560-7.5 Soluble Salts Detection and Removal:** Determine the chloride, sulfate and nitrate concentrations on all *steel* structure surfaces, using soluble salts test kits meeting the requirements of 560--2.4., laboratory test methods or other method approved by the Engineer capable of accurately detecting the concentrations at required limits. Measure the *concentration chloride levels* using *the* a method described in SSPC-TU 4. *Perform the tests after washing and after each applied coat of the coating system. For new steel, test three random locations in the first 1000 square feet and one random location for each subsequent 1000 square feet. For existing steel, test five random locations in the first 1000 square feet and one random location for each subsequent 1000 square feet.* Ensure the *non-visible surface contaminant concentrations chloride level on the blast-cleaned surfaces* does not exceed *the levels in 7 µg/cm<sup>2</sup>* in accordance with SSPC--SP- 12; *Table A1 NV-12. Assessing Conformance with Blast Cleaning Standards for chloride, soluble ferrous iron and sulfate and 10 µg/cm<sup>2</sup> for nitrate. When any concentration exceeds these levels rewash the entire surface area and retest. After surface preparation on structural steel, thoroughly inspect the surfaces. Take soluble salt measurements at the test rate identified in SSPC PA2. When the test results exceeds 7 µg/cm<sup>2</sup> for any of the salt concentrations, the inspector will increase the rate of measurements as required to determine the extent of the deficient area. If additional water washing does not reduce the soluble salt concentration to the acceptable levels, a surface treatment or water additive may be used. Use*

Ensure the ~~a~~ surface treatment or *water* additive *that* is approved by the Coating System supplier and the Engineer.

~~560-7.2 Mechanical Cleaning of Structural Steel:~~ Mechanically clean steel in accordance with SSPC SP 2 or SSPC SP 3. Remove all weld slag, weld spatter, and foreign matter from welds prior to abrasive blasting.

**560-7.63 Abrasive Blast *Cleaning* of Structural Steel:** Prepare steel by abrasive blast *cleaning* to “Near-White” metal condition as defined in SSPC-SP 10. ~~Determine “Near-White” condition according to NACE Visual Standard No. 2.~~ *Use SSPC VIS 1 as an aid in establishing cleanliness.* Ensure all rust is completely removed from pits and depressions. Remove all abrasive residues from the surface, leaving it clean and dry prior to the application of coatings. After *abrasive* blast cleaning, ensure the surface profile meets the *requirements of the* coating manufacturer’s *product data sheet* requirements. *Determine the surface profile using replica tape in accordance with ASTM D 4417, Method C.*

Perform all abrasive blast *cleaning* within a containment system to ensure confinement of all particulates. Design the containment system to comply with all applicable Federal, State, and Local regulations. Ensure the *abrasive* blast *cleaning* operations does not produce holes, cause distortion, remove metal, or cause thinning of the substrate.

~~Successful testing for chlorides and other salts in abrasive material does not negate the final acceptance testing of steel surfaces. Do not use ungraded abrasive, select abrasives and grade to provide a surface profile to the specified depth per coating manufacturer recommendations. Ensure the abrasives used do not produce an additional surface profile on abrasion-sensitive surfaces.~~

**560-7.7 Hand and Power Tool Cleaning:** *Use hand and power tool cleaning for touch-up and repair when approved by the Engineer. Perform power hand tool cleaning in accordance with SSPC (SSPC-SP11-SP 2), power tool cleaning in accordance with (SSPC-SP 3) and hand tool cleaning in accordance with (SSPC SP2 Power Tool Cleaning To Bare Metal (SSPC-SP 11)). Use SSPC VIS 3 as an aid in establishing cleanliness.*

## 560-8 Surfaces Not to be Coated.

**560-8.1 Galvanized Surfaces:** Do not coat galvanized surfaces unless specified in the Contract Documents.

**560-8.2 Surfaces to be in contact with Concrete:** Do not coat the areas of contact surfaces of steel to be encased or embedded in concrete, or coated with concrete, unless specified in the Contract Documents. *When specified, prepare the contact surfaces and apply primer.*

~~However, when steel surfaces are to be coated with an inorganic zinc coating system, coat the areas of contact surfaces embedded in concrete or coated in concrete with the inorganic zinc prime coat.~~

~~As an exception, surfaces of shear connectors may or may not be coated. When surfaces of shear connectors are coated, the requirements for surface cleaning and minimum film thickness will not apply; however, remove runs, sags and cracks in the coating film.~~

**560-8.3 Faying Surfaces:** *After application of the primer, Pprotect the* contact surfaces of members to be joined by high-strength bolts in friction- type joints ~~that are not be coated,~~ from all *other* coatings *and* foreign material.

**560-8.4 Machine Finished Surfaces:** Apply a coating of rust preventative compound to all machine finished or similar surfaces that are not be coated, or will not be coated immediately.

**560-8.5 Surfaces to be Welded:** Mask off surfaces within 1 inch of field welded connections before the application of any shop coating. *Apply a mist coat of primer that is less than 1 mil dry film thickness to surfaces where shear studs will be welded.*

**560-9 Material Storage.**

————— Store coating materials in conformance with manufacturer's recommendations and Section 6.

**560-10 Mixing and Thinning.**

————— Mix in accordance with the manufacturer recommendations. Perform all mixing operations over an impervious surface with provisions to prevent runoff to grade of any spilled material. Ensure the material is agitated as required by the manufacturer's technical data requirements during application to maintain uniform suspension of solids.

**560-911 Application. of Coatings.**

**560-911.1 General:** *Apply a complete coating system to all structural steel surfaces except surfaces indicated in 560-8. Apply a complete coating system to all surfaces that will become inaccessible after fabrication, erection, or installation.*

*For new steel, apply the prime coat in the shop, and apply subsequent coats either in the shop or field. The application of coats in the field may occur before erection or after erection, but apply the finish coat after erection, and do not apply the finish coat until all concrete work is complete.*

Train all coating personnel on the proper mixing and application of the coatings, Specification requirements, material application characteristics, and inspection criteria. Only personnel receiving this training may mix or apply coatings. Use thinners and cleaners according to coating Manufacturer's technical data requirements. Coating that lifts or curls after application must be removed and the area cleaned and recoated, at no additional cost to the Department.

————— *Prior to the application of any coating, inspect the substrate for contamination and defects, and prepare the surface as needed before application of the next coat.*

*Apply each coat including a stripe coat in a color that contrasts with the substrate or preceding coat. For exterior surfaces, apply a finish coat color meeting Federal Standard, 595B, Shade 36622, unless otherwise specified in the Contract Documents.*

Apply a prime coating of a color that will be a definite contrast between the coating and the dull gray appearance of the blasted steel surface immediately following the cleaning and preparation of the surface and apply succeeding coats before contamination of the previous coats occurs. When this is not possible or is impractical, inspect the surface for any damage from contaminants, weather, or other exposure and repair as necessary before application of the next coat.

————— Select intermediate and finish coat colors so that there is a definite contrast between the coatings. Stripe coats may be tinted as necessary to assure proper coverage and facilitate inspection. Apply the finish coating meeting Federal Standard, No. 595B, Table VIII, Shade No. 36622, color designation, unless otherwise identified in the Contract Documents.

————— Ensure that primer for faying (contact) surfaces of high strength bolted connections (for slip critical, frictional transfer of load) meets the Research Council on Structural Connections (RCSC) requirements for a Class B rating, based on certified tests by the coating manufacturer or applicator.

**560-911.2 Weather and Temperature Limitations for Field and Maintenance Coating:** Ensure the ambient weather conditions at the actual location of the work during surface

~~preparation and coating application operations are in accordance with coating system manufacturer's recommendations.~~

~~————— Do not spray coating when the measured wind speed in the immediate coating area is above 15 miles per hour. Ensure the ambient air temperature, relative humidity, and dew point and the surface temperature of the steel to be coated are within limits recommended by the coating manufacturer.~~

~~————— Do not apply coatings when contamination from rainfall is imminent or when the ambient air temperature, or relative humidity, dew point temperature, or temperature of the steel is outside limits recommended by of the coating manufacturer's product data sheet.~~

**560-9.3 Sealing Using Caulk:** *Completely seal the perimeter of all faying surfaces, cracks and crevices, joints open less than 1/2 inch, and skip-welded joints using caulk. Apply the caulk to the joint following the caulk manufacturer's recommendations. Ensure the caulk bead has a smooth and uniform finish and is cured according to the caulk manufacturer's recommendation prior to the application of the coating system.*

**560-9.4 Protection of Adjacent Surfaces:** *Protect all surfaces and working mechanisms not intended to be coated during the application of coatings. Clean surfaces that have been contaminated with coatings until all traces of the coating have been removed. Do not allow material from cleaning and coating operations to be dispersed outside the work site.*

**560-9.5 Mixing and Thinning:** *Mix all coatings in accordance with the manufacturer's product data sheet. Only mix complete kits. Use the volume of thinners and solvents prescribed by the coating manufacturer's product data sheet and confirm the amount added does not cause the coating to exceed VOC regulations stated in Section 975.*

*Perform all mixing operations over an impervious surface with provisions to prevent runoff to grade of any spilled material.*

~~—————~~ **560-9.611.3 Application Methods:** *Use coating application equipment and a Apply coatings per the coating manufacturer's technical product data sheet. requirements. Application with brushes may be permitted for minor touchup of spray applications, and stripe coats, or when otherwise approved by the Engineer. in accordance with manufacturer recommendations. Adjust spray equipment to produce an even, wet coat with minimum overspray. Apply coatings in even, parallel passes, overlapping 50 percent. unless otherwise recommended per manufacturer's technical data requirements. Agitate coatings during application as required by the coating manufacturer's product data sheet.*

~~—————~~ **560-9.711.4 Stripe Coating of Irregular Surfaces:** *Apply stripe coats to achieve Ensure complete coverage and proper thickness on welds, corners, crevices, sharp edges, bolts, nuts, and rivets, and rough or pitted surfaces.*

~~—————~~ **560-11.5 Faying Surfaces:** *Prior to bolting; verify that the coating on the faying surfaces is properly cured in accordance with ASTM D-4752 or the manufacturer's requirements. Verify that the dry film thicknesses (DFT) and the temperature-adjusted cure time for slip-critical bolted faying surfaces are within the range validated by the coating manufacturer.*

~~—————~~ **560-11.6 Protection of Adjacent Surfaces:** *Protect all surfaces and working mechanisms not intended to be coated, during the application of coatings. Clean surfaces that have been contaminated with coatings until all traces of the coating has been removed. Do not allow material from cleaning and coating operations to be dispersed outside the work site.*

~~—————~~ **560-11.7 Inaccessible Surfaces:** *Coat all surfaces that will become inaccessible after fabrication, erection, or installation.*

~~—————~~ **560-11.8 Sealing/Caulking:** *Completely seal the perimeter of all faying surfaces, cracks and crevices, joints open less than 1/2 inch, and skip-welded joints. Apply the sealant to the joint*

following the coating manufacturer's recommendations. Ensure the sealant/caulking bead has a smooth and uniform finish and is cured according to the sealant manufacturer recommendation prior to the overcoat application.

**560-9.811.9 Thickness of Coats:** Apply coatings to the thickness as identified *in* by the manufacturer's *product data sheet*. technical data requirements. Do not allow any portion of the coating films to be less than the specified minimum film thicknesses. Ensure that the total minimum film thickness for any combination of coats equals the sum total of the averages of the specified thickness range of the individual coats. Achieve the total minimum film thickness before the application of the finish coat.

—————After application of each coat of coating, thoroughly inspect the surfaces: *and measure the dry film thickness (DFT)* Take film thickness in accordance with SSPC-PA 2. When the *DFT* film thickness is deficient *or excessive*, correct the deficiency in accordance with *the coating* manufacturer's *written procedures* recommendations to achieve the appropriate thickness and retest the area. Inspect the finish and DFT of each applied coating for compliance prior to the application of successive coats.

**560-9.911.10 Coating Drying, and Curing:** *Apply coatings within the* Follow the *time specified by the* coating manufacturer's *product data sheet* recommended *for* drying and *recoating*, curing times for handling, recoating, and top coating. Meet the coating manufacturer's technical data requirements for testing. *Test* the coating for proper curing *ing* before handling and shipping. *Test for cure in accordance with the manufacturer's recommended method*. Meet the requirements of ASTM D 4752 *for inorganic zinc primers or ASTM D5402 for organic zinc primers* , when the manufacturer's technical data sheet does not *state* have a specified cure test. *Obtain the acceptance criteria from the coating manufacturer and report the results to the Engineer.*

—————Verify the final cure of water-based coatings in accordance with ASTM D 4752, but water must be substituted as the solvent.

*Prior to assembling bolted connections, test and verify that the primer coating on the faying surfaces has cured to a resistance rating of 5 in accordance with ASTM D 4752, ASTM D 5402, or the coating manufacturer's requirements. If cure testing is performed per the coating manufacturer's requirements, submit the test results to the Engineer for approval prior to assembling the bolted connection.*

**560-9.1011.11 Coating Finish:** Apply each coat free of runs, sags, blisters, bubbles, and mud cracking; variations in color, gloss, or texture; holidays; , excessive film buildup; , foreign contaminants; *orange peeling*; and dry overspray. Ensure each coat of applied material is clean, dry, cured, and free of surface contaminants prior to the application of the next successive coat. Check for missed areas or pinholes in accordance with manufacturer's recommendations. On rough or pitted surfaces, it may be necessary to apply a film thickness in excess of the normal manufacturer recommended coating thickness to obtain acceptable coverage.

—————**560-11.12 Coating Welded Areas:** After cleaning the area, apply primer to achieve a DFT per manufacturer's recommendations.

## **560-12 Sequence of Coating-**

—————**560-12.1 Shop Coating:** Perform all work in an area capable of protecting the steel and applied coating from wind, weather, dust and direct sunlight. Ensure that all coated surfaces are protected from damage. Repair all damaged coatings in accordance with SSPC PA 1 and/or the coating manufacturer's recommendations. Repairs to the topcoat must result in an acceptable, uniform gloss and color for visible surfaces. The Engineer will have final authority concerning

the coating's uniformity and acceptable appearance. Handle steel members with care to minimize damage to or contamination of the coating.

~~560-12.2 Field Coating:~~ Field coating of steel members may occur on the ground before erection or after erection, provided any damaged areas are touched up with the same number of coats and coating materials. Apply the finish coat after erection.

~~Do not apply the finish coating until all concrete work is completed. Ensure the surface is clean and free of any foreign matter prior to applying the final coat.~~

### **560-103 Touchup and Repair of Coatings.**

Clean and coat all *damaged or defective areas. The Engineer will determine acceptable coating uniformity and appearance.* field connections, welds or rivets, and bolts, and all damaged or defective coating and rusted areas in accordance with 560-7 and 560-11. Ensure all repairs are in accordance with the manufacturer's recommendations.

### **560-114 Coal Tar-Epoxy Coating of Permanent Bulkhead Sheet Piles and H Piles.**

~~560-14.1 Shop Coating:~~ Take appropriate measures to insure the piles and coatings are protected from wind, weather, dust and direct sunlight.

**560-11.14.2 Surface Preparation:** Immediately before coating, abrasive-blast the steel to a near-white condition at least equal to the SSPC-SP 10. The average profile depth is 1.5 mils minimum. Re-blast piles not coated immediately following surface preparation to the original blast standards before coating application. Ensure that all surfaces to be coated are completely dry and free of any contamination at the time of coating.

~~560-14.3 Materials:~~ Use an inorganic zinc and a Type M coal tar epoxy coating listed on the Qualified Products List.

**560-11.24.4 Application of Coating:** *Unless otherwise shown in the Contract Documents, apply the inorganic zinc and coal tar-epoxy coatings to all sides of H piles and the exposed side of sheet and pipe piles from the top of the piles to a depth of five feet below the lower of the design ground surface or the design scour depth.* Apply the inorganic zinc in accordance with this ~~Section~~ Specification. Apply the coal tar-epoxy in accordance with the following specific requirements:

(1) Apply the coal tar-epoxy system two coats. The time interval between the first coat and the second coat will be in strict accordance with the coating manufacturer's published specifications. Apply the first coat to yield a dry film thickness of 8 to 10 mils. Apply the second coat to attain a total dry film thickness of the two coats is between 16 and 20 mils. For Sheet Piles, give the inside portion of the interlock claw and the interlock ball a single coat that will yield a dry film thickness of 2 to 4 mils. Build up and puddling of the coating in these areas is not permitted.

(2) Ensure that no portion of the coating is less than the specified minimum film thicknesses. The total minimum film thickness for any combination of coats will be the sum total of the averages of the specified thickness range of the individual coats.

(3) After applying the coating on the steel piles, the Engineer will thoroughly inspect the surfaces and make film thickness measurements at the approximate rate of one for each 25 ft<sup>2</sup> of area unless deficient thickness is found. In this case, the rate of sub-measurements will be increased as required to determine the extent of the deficient area.

### **560-15 Maintenance Coating.**

~~560-15.1 Surface Preparation:~~ Prepare all surfaces including any components to be coated per this Specification and in accordance with SSPC-SP 10 to remove corrosion, weld slag,

and existing coating edges or any foreign material. When sound portions of the original coatings are to be left in place, remove all loose, cracked, brittle, and non-adherent coating, and feather back the edges of all existing coating to sound material. When any structural steel appears to be defective during the cleaning operation, notify the Engineer immediately. After repairs are completed, clean and coat the repaired sections per this Specification.

————— Cover all motors, gears and electrical apparatus not to be coated and may be damaged by surface preparations. Ensure all bridge components are kept free of abrasive materials buildup at all times.

————— **560-15.2 Testing of Original Coating:** When sound portions of the original coating are to be left in place, prior to the commencement of cleaning and coating operations, apply a test patch (minimum area of 100 ft<sup>2</sup>) of the proposed coating system in accordance with this Specification and have it evaluated by the Engineer for approval.

————— Allow the test patch to cure a minimum of 7 days prior to evaluation. Ensure the test patch meets all Specification requirements and also exhibit a minimum adhesion rating of 4A when tested in accordance with ASTM D 3359. Repair damage, which occurs as a result of testing in accordance with this Specification.

————— **560-15.3 Application of Coating:** Apply an overall coating system to all surface in accordance with the manufacturers recommendations and the Contract Documents.

### **560-162 Lead Abatement** *Protection of the Environment, Public, and Workers During Coating Removal Operations.*

————— **560-16.1 Coating Hazardous Material Analysis:** When the Contract includes removal of paint from an existing structure the Coating Hazardous Material Analysis Data Sheet will be available on the Department's web site. The URL for obtaining this information is: <http://www.dot.state.fl.us/statematerialsoffice/laboratory/chemical/hazardouscoatings/index.htm>.

**560-12.16.2 General:** *Establish plans and programs to protect the environment, public, contractor employees, and other workers from exposure to toxic heavy metals as well as releases and emissions of hazardous materials and nuisance dusts. Conduct operations in compliance with EPA, OSHA, and other applicable Federal, State and local regulations.*

Establish a hazardous coating removal program to document and control coating removal and application operations in strict compliance with OSHA 29CFR Part 1910.1025, 1926.62, and 1926.63. This program will include applicable requirements from Environmental Protection Agency (EPA) environmental protection issues and hazardous waste disposal.

————— Prior to construction of the containment area or removing any hazardous materials perform Total Suspended Particulate (TSP) sampling and testing of the air and soil for any hazardous materials. Document the number and specific location where each sample is taken as outlined in Project Design—Industrial Lead Paint Removal Handbook, Volume 2 and use these results to determine a baseline level of any hazardous materials on the job site. Continue the TSP monitoring from the beginning of work to the removal of the containment devices.

————— Workday determination constitutes only the time during which cleaning and surface preparation and subsequent clean up is performed. Enter all pertinent information into a field logbook. For the purposes of computing action levels, the workday must not exceed 8 hours.

————— **560-16.3 Pollution Control:** Submit a written pollution control and monitoring plan at the preconstruction meeting which clearly describes the means for complying with all Local, State and federal regulations including pollution control provisions specified herein. The written plan must be in accordance with Project Design: Industrial Lead Paint Removal Handbook,

Volume II, Phase 6, Environmental Monitoring and Phase 7, Worker Protection and specifically include, but not be limited to, providing a scaled map of the work site layout showing the proposed number and location of soil and sediment sampling, waste storage areas, staging areas, temporary waste storage areas and ambient air and personnel sampling frequency.

Comply with all applicable Federal, State, and Local rules and regulations. In the event the Contractor violates any environmental regulations or fails to properly execute any pollution control provisions, the Contractor will immediately cease all operations associated with the infraction. Operations will only resume after written proposed corrective procedures have been submitted to and approved by the Engineer and implemented.

**560-16.4 Permits:** Submit all required permits from all applicable regulatory agencies to the Engineer prior to the commencement of any work. Seek permit determination from these regulatory agencies to avoid any potential non-compliance permit issues during work activities. The Contractor is responsible for all liability resulting from non-compliance with pertinent rules and regulations including permit requirements.

**560-16.5 Containment System:** Submit a written containment system design plan at the pre-construction meeting, which clearly describes the proposed containment system applicable to the intended removal method and in accordance with the requirements outlined herein and SSPC Guide 6, Guide for Containing Debris Generated During Paint Removal Activities. Ensure the plan includes, but not be limited to, removal method; methods for collecting debris; and containment enclosure components. Containment drawings, calculations, and assumptions, including ventilation criteria if applicable, signed and sealed by a Specialty Engineer. Provide a complete structural impact analysis prepared by a Specialty Engineer to verify the existing structure can withstand the live and dead loads of the containment, including wind loads. Ensure the lighting inside the containment is in accordance with SSPC Guide 12, Guide for Illumination of Industrial Painting Projects. All drawings and calculations must be submitted and accepted before any work begins.

Isolate the immediate area of the structure with appropriate containment devices to ensure compliance with current and/or permit requirements associated with air, water, and soil pollution prevention including vehicular and pedestrian traffic. Ensure that under no circumstances any paint, paint chips, or other debris falls outside of containment. Repair any damage created by fastening, bracing, or handling the scaffolding and/or staging, or any surrounding property at no cost to the Department.

**560-16.6 Regulated Area:** Establish a regulated area around the work site to prohibit unauthorized persons from areas where exposure to hazardous airborne metals may exceed the following action levels:

Lead ( $30 \mu\text{g}/\text{m}^3$ )

Cadmium ( $2.5 \mu\text{g}/\text{m}^3$ )

Arsenic ( $5 \mu\text{g}/\text{m}^3$ )

Perform and make initial assessment and results available within 48 hours of the sampling. Perform sampling throughout surface preparation and waste clean up. Report sample results as eight-hour Time Weighted Averages (TWA). Document all pertinent data in a field logbook. Position air sampling pumps around the project perimeter, at a minimum this is defined as upwind and downwind locations. Place sampler inlets at breathing height. Clearly mark the regulated area by the use of warning signs, rope, barrier tape, or temporary construction fencing.

**560-12.216.2 Environmental Protection:** Prepare and submit to the Engineer plans and programs for the protection of the environment and public based on the applicable EPA

*requirements, the requirements of this Section, and the Contract Documents. Include plans and programs for the protection of the air, water and soil.*

**560-12.2.146.7 Ambient Air Quality Compliance and Protection of the Air:**

**560-12.2.1.146.7.1 Visible Emissions:** ~~Comply with 40 CFR 50, National Primary and Secondary Ambient Air Quality Standards (NAAQS) and the Clean Air Acts of 1977 and 1990.~~ Assess the visible emissions *using* EPA Method 22, Timing of Emissions as defined by 40 CFR 60, Appendix A, Standards of Performance for New Stationary Sources. During abrasive blasting, do not allow visible emissions from containment to exceed *a* random cumulative duration of ~~no~~ more than one percent of the workday (SSPC Guide 6, Level 1 Emissions). During pressurized water cleaning, do not allow visible emissions from containment to exceed *a* random cumulative duration of ~~no~~ more than ten percent of the workday (SSPC Guide 6, Level 3 Emissions).

**560-12.2.1.246.7.2 Total Suspended Particulate Matter: Control** *emissions from the containment area to prevent exceeding* ~~Do not exceed~~ the Total Suspended Particulate Lead (TSP Lead) of  $1.5 \mu\text{g}/\text{m}^3$  over a 90 day period, *or the daily and adjusted daily allowances of SSPC-TU 7.* Conduct TSP Lead monitoring in accordance with 40 CFR 50, Appendix B, Reference Method for Determination of Total Suspended Particulate Matter in the Atmosphere (high volume sampler required), *and Analyze filters for lead in accordance with* 40 CFR 50, Appendix G, Reference Method for Determination of Total Suspended Particulate Matter Collected from Ambient Air. Position the TSP *Lead* ~~air~~ monitoring equipment in *general* accordance with 40 CFR 58, Ambient Air Quality Surveillance.

*When lead is present in the coating, perform TSP Lead background monitoring for a period of three days prior to the beginning of abrasive blast cleaning operations. Submit the results from background monitoring and the first week of monitoring during abrasive blast cleaning to the Engineer for review within five calendar days after the first week of work. Continue monitoring until otherwise directed by the Engineer.*

**560-12.2.1.3 Regulated Area:** *Establish a regulated area around the work site to prohibit unauthorized persons from areas where exposure to hazardous airborne metals may exceed the following action levels:*

*Lead ( $30 \mu\text{g}/\text{m}^3$ )*

*Cadmium ( $2.5 \mu\text{g}/\text{m}^3$ )*

*Arsenic ( $5 \mu\text{g}/\text{m}^3$ )*

*Hexavalent Chromium ( $\text{Cr}^{6+}$ ) ( $2.5 \mu\text{g}/\text{m}^3$ )*

*Conduct monitoring in accordance with NIOSH procedures upon initiation of dust producing operations and submit the test results to the Engineer within 72 hours of sampling. Report sample results as eight-hour Time Weighted Averages (TWA). Reestablish the regulated area and perform additional sampling when the results exceed the action levels or when directed by the Engineer. Document all pertinent data in a field logbook. Position air-sampling pumps around the project perimeter where the public or personnel can approach the work area. Place sampler inlets at breathing height. Clearly mark the regulated area by the use of warning signs, rope, barrier tape, or temporary construction fencing.*

**560-12.2.246.8 Soil/ Ground Quality:** *Inspect the ground beneath and in proximity to the structure in the presence of the Engineer for visible paint chips to establish an initial job site cleanliness standard. When heavy metals are in the existing coatings, test soil samples prior to the beginning of operations and after project completion for heavy metals. ~~Sample and test soil for lead after project completion.~~ Document the number and specific locations where the *initial* samples are taken as outlined in the SSPC Project Design-- Industrial*

Lead Paint Removal Handbook, Volume 2 *to ensure the post samples are collected from the same locations. Submit all samples to the Engineer for review. If the project activities increase the heavy metal content in soil to more than 20 percent above the pre-job geometric mean or 100 percent at any one location, Ensure that project activities did not increase soil lead concentrations above pre-job levels. Return the site to the pre-job levels. if the project activities increase the lead in soil levels at no cost to the Department.*

For structures less than 14 feet minimum height, take one sample north, south, east, and west (where soil is present) of the structure. If the structure is longer than 14 feet, take one additional sample for every 14 feet in length.

For structures greater than 14 feet minimum height, take two samples north, south, east, and west (where soil is present) of the structure. Locate the inner row of samples within 14 feet of the structure. Locate the outer row of samples at a distance equal to the height of the structure. If the structure is longer than 14 feet, take one additional sample for every 14 feet in length.

**560-12.2.3 Water Quality:** *Do not release, discharge or otherwise cause hazardous materials, debris, waste, or paint chips to enter the water. Protect against releases due to rain and methods of surface preparation from reaching rivers, streams, lakes, storm drains, or other bodies of water.*

**560-12.2.4 Pollution Control:** *Submit a written pollution control and monitoring plan at the preconstruction meeting which clearly describes the means for complying with all Local, State and Federal regulations including pollution control provisions specified herein. The written plan must be in accordance with Project Design: Industrial Lead Paint Removal Handbook, Volume II, Phase 6, Environmental Monitoring, and specifically include, but not be limited to, providing a scaled map of the work site layout showing the proposed number and location of soil sampling, TSP monitoring sites, waste storage areas, staging areas, temporary waste storage areas, and ambient air and personnel sampling frequency.*

*Comply with all applicable Federal, State, and Local rules and regulations. Immediately cease all operations in the event a violation of any environmental regulation occurs or failure to properly execute any pollution control provisions. Operations will only resume after written proposed corrective procedures have been submitted to and approved by the Engineer and implemented.*

**560-12.2.5 Permits:** *Submit all required permits from all applicable regulatory agencies to the Engineer prior to the commencement of any work. Seek permit determination from these regulatory agencies to avoid any potential non-compliance permit issues during work activities. The Contractor is responsible for all liability resulting from non-compliance with pertinent rules and regulations including permit requirements.*

**560-12.3 Containment System:** *Submit a written containment system design plan at the pre-construction meeting, which clearly describes the proposed containment system applicable to the intended removal method and in accordance with the requirements outlined herein and SSPC Guide 6, Guide for Containing Debris Generated During Paint Removal Activities. Ensure the plan includes, but not be limited to, removal method; methods for collecting debris; and containment enclosure components. Use fire retardant materials. Provide containment drawings, calculations, and assumptions, including ventilation criteria if applicable, signed and sealed by a Specialty Engineer. Provide a complete structural impact analysis prepared by a Specialty Engineer to verify the existing structure can withstand the dead, live and wind loads imposed upon the structure due to the containment system. Ensure the lighting inside the containment is in accordance with SSPC Guide 12, Guide for Illumination of Industrial Painting Projects.*

*Provide lighting to a minimum of 10 foot-candles for general, 20 foot-candles for work, and 50 foot-candles for inspection. All drawings and calculations must be submitted and accepted before any work begins. Include a clear description of the ventilation system components and information including the fan curve and design point on the proposed dust collector. Design to provide ventilation according to the notes provided in SSPC Guide 6: 100 feet per minute cross draft, 50-60 feet per minute downdraft.*

*Isolate the immediate area of the structure to ensure compliance with current and/or permit requirements for air, water, soil, and pollution prevention. Protect the containment system from vehicular and pedestrian traffic. Ensure that under no circumstances any paint, paint chips, or other debris falls outside of the containment area. Repair any damage created by fastening, bracing, or handling the scaffolding and/or staging, or any surrounding property. If a suspended platform is constructed, use rigid and/or flexible materials as needed to create an air and dust impenetrable enclosure. Verify that the platform and its components are designed and constructed to support at least four times its maximum intended load without failure, with wire cables capable of supporting at least six times their maximum intended load without failure. Strictly comply with all applicable OSHA regulations regarding scaffolding. The category and class of containment shall be as required in the Contract Documents.*

**560-12.416.9 Protection of Adjacent Areas:** Protect all areas adjacent to abrasive blast cleaning, including deck grating. Before the commencement of any cleaning and coating operations, provide a control plan for the protection of adjacent surfaces from damage by nearby blasting and coating to the Engineer for review. Repair any damage to adjacent areas. ~~at no expense to the Department.~~ The repair procedure must be submitted to the Engineer for acceptance prior to any remediation.

**560-12.5 Worker Protection:** *Comply with the requirements of OSHA 29 CFR Part 1926 and applicable portions of 29 CFR 1910. Include specific programs as required by Parts 1926.62 (lead), 29 CFR 1926.1118 (inorganic arsenic), 29 CFR 1926.1126 (hexavalent chromium), and 29 CFR Part 1926.1127 (cadmium) when these hazardous agents are present. Implement appropriate safety procedures for all hazards on the job site whether specifically identified herein or not.*

### **560-13 Waste Handling and Management.**

**560-13.1 General:** *Prepare a waste management program plan which addresses the applicable requirements from EPA regulations for hazardous waste management and the Contract Documents. Include provisions for the handling and disposal of non hazardous construction waste.*

**560-13.216.10 Collection and Handling of Waste:** Properly classify, package, *and* store, ~~transportation, and dispose of~~ all paint removal debris, both solid and liquid in accordance with SSPC Guide 7, Guide for the Disposal of Lead-Contaminated Surface Preparation Debris, the Federal Water Pollution Control Act with amendments, and all other current government regulations and guidelines. Comply with the Resource Conservation and Recovery Act to include, at a minimum, CFR 40, ~~p~~Parts 260-268. Keep solid and liquid waste separate and individual waste streams separate prior to identification *and*, storage, ~~transportation, and disposal.~~ Submit the method of disposal ~~Engineer for approval~~ a minimum of three weeks prior to the date of off-site shipment of waste.

**560-13.316.11 Testing and Analysis:** *Laboratory analyses for all waste stream and environmental samples shall be c*Conducted ~~the Analyses for the regulated area and for waste identification~~ by an EPA certified, independent laboratory with an approved comprehensive

Quality Assurance Plan. *Laboratory analyses for worker monitoring and regulated area samples shall be conducted by an AIHA metals accredited laboratory.* Provide a copy of all sampling and test reports no later than 72 hours after collection of samples.

**560-13.416.12 Waste Identification:** Collect samples in accordance with *EPA U.S. Environmental Protection Agency*— SW-846, Test Methods for Evaluating Solid Waste - Physical/Chemical Methods. Use a random and representative sampling technique. Collect a minimum of four representative samples of each waste stream. These waste streams include, but are not limited to, paint chips, dust, and paint chips mixed with disposable abrasives and debris. Complete the initial sampling of each waste stream immediately upon filling the first drum, but do not allow waste to accumulate for longer than 7 days before sampling.

After the representative samples are collected, send them immediately to the EPA certified laboratory for analysis. Unless otherwise directed by the Engineer, required by State regulations, or required by the waste recycling or disposal facility, once each waste stream is sampled, tested, and classified, additional sampling and analysis are not required for subsequent shipments unless the waste stream changes. Submit samples to an approved laboratory to be tested for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver in accordance with EPA Methods 3050 and 6010 (content) and EPA Method 1311, Toxicity Characteristics Leaching Procedures (TCLP). Clearly label each sample with sample number, date and time of sampling, name of collector, and location of collection.

Maintain chain of custody forms for each sample. Enter each sample on a sample analysis request form. Enter sample numbers, type of waste, amount of each sample, distribution of samples, signature and all other information into field logbook.

**560-13.516.13 Waste Storage:** Collect waste from the control devices, equipment, and all work surfaces on a daily basis. Keep hazardous and non-hazardous waste separate. Do not mix blasting debris with any other type of waste. Place waste in approved storage drums.

Locate all hazardous waste within a regulated area. The maximum weight for each drum, when filled, is 821 pounds. Properly seal and label all drums. Transport waste storage drums to a secured, marked, temporary storage area. Locate the temporary storage area on well-drained ground not susceptible to flooding or storm water run-off. Place drums on pallet and cover with fiber reinforced, impermeable tarpaulins. Store drums no more than two drums wide and two drums high. Arrange drums so that labels are easily readable. Do not store waste in the temporary storage area longer than 90 days.

**560-13.616.14 Waste Disposal:** *Transport, treat and* ~~Dispose~~ of all *hazardous and non-hazardous waste.* ~~The Department is responsible for the transportation, treatment and disposal of hazardous waste.~~ Coordinate disposal of hazardous waste with *Notify* the Engineer, a minimum of three weeks prior to the date of off-site shipment of *any waste to an off-site facility. Provide the Engineer with documentation that the receiving disposal facilities are properly licensed. Provide manifests for all hazardous and non-hazardous waste shipments.*

**560-13.717.6 Permits:** *The Contractor is responsible for all liability resulting from non-compliance with pertinent rules and regulations including permit requirements.*

### **560-1417 Method of Measurement.**

The quantities to be paid for will be determined under one of the following conditions:

(a) When no pay item for coating structural steel is included in the proposal, the work specified in this Section will not be paid for directly but will be considered as subsidiary work pertaining to the various items of construction on which coating is applied, *completed and accepted.*

(b) When a pay item for coating structural steel is included in the proposal, the work specified ~~in under~~ this Section will be paid for at the Contract lump sum price, or the Contract price per ton, for Coating Structural Steel. The quantity will be either (1) the lump sum quantity coated, *completed* and accepted, or (2) the plan quantity, in tons of structural steel, actually coated, *completed* and accepted.

**560-1518 Basis of Payment.**

~~When no item for coating structural steel is included in the proposal, the work specified in this Section will be included in the payment for the applicable items under Section 460.~~

~~When an item for coating structural steel is included in the proposal, p~~Price and payment will be full compensation for all work specified in this Section. ~~, including coating of all ferrous metals and machinery and castings.~~

Payment will be made under:

- Item No. 560- 1- ~~Painting~~/Coating Structural Steel - lump sum.
- Item No. 560- 2- ~~Painting~~/Coating Structural Steel - per ton.

painting and this has been corrected. Hexavalent chromium has been added to the hazardous metals action levels.

- 1. Provides editorial updates and clarifications.*
- 2. Clarifies that coating existing structures is the complete removal and replacement of the existing coating. Any overcoating will be handled on the plans or by Modified Special Provision.*
- 3. Specifies the number of non-visible surface contaminant tests per square foot of area for new and existing steel structures.*
- 4. Requires the shop and field to provide approved Corporate Quality Control Plans and a site specific Quality Control Plan for the field.*
- 5. Clarifies the certification requirements of the quality control inspectors and supervisors in the shop and field.*
- 6. Clarifies who is transporting and disposing of the waste material.*

**Recommended Usage Note:** All structural painting projects

**Expected fiscal impact, if implemented:** Implementation of this specification will reduce the cost of structural painting projects by alleviating unnecessary burden on contractors to perform testing that is of no value to the Department.

**Implementation of these changes, if and when approved, will begin with the ~~January~~ *July* 2009 letting.**