

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION
CONSTRUCTION DIVISION MEMORANDUM

GENERAL SUBJECT:	<u>STEEL STRUCTURE PROTECTIVE COATINGS</u>	NUMBER:	<u>CD-2001-2</u>
SPECIFIC SUBJECT:	<u>MAINTENANCE & REMOVAL OF PROTECTIVE COATINGS ON STEEL STRUCTURES</u>	DATE:	<u>JUNE 6, 2001</u>

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Background, Challenges and Foreword: The construction of the Interstate highway system from the late 1950s through the 1970s created a large number of steel structures which are now reaching an age where significant maintenance or rehabilitation is required. The deteriorating condition of these bridges coupled with increasing costs for coatings work have created problems for VDOT in determining which maintenance painting strategies are the most cost-effective. Maintenance painting is not VDOT's only major concern, but coating systems for new structural steel remain a high priority as the need for long term performance becomes more pronounced.

The problem of removing paint (especially lead-containing paint) is a significant threat to the ability of VDOT to adequately maintain corrosion protection and structural capacity. In order to prevent advanced corrosion, normally it is necessary to remove the lead-containing paints and recoat the structure. Both removal and disposal of the paint and abrasive are now rigorously regulated, therefore the Contractor is required at all times to be in compliance with the regulations of the U. S. Environmental Protection Agency, U. S. Department of Transportation, Department of Environmental Quality, Virginia Department of Labor and Industry, Virginia Department of Professional and Occupational Regulations and the U. S. Coast Guard and other applicable codes and regulations.

Sections 411 and 413 were rewritten to address these challenges to aid in the further development and implementation of a uniform, consistent, enforceable and workable system which effectively categorizes newly applied and existing bridge structure protective coatings. Containment, monitoring, and testing requirements; waste storage and disposal, transportation and permitting requirements and responsibilities are addressed in the rewrite also.

Because of the many different coating systems available for use, Section 411 – Protective Coatings of Metal in Structures was revised to address the broad category of coating systems available; thus use of the term "paint" has been restricted. All generic types of liquid protective coatings are composed of three basic components; solvents, resins and pigments. The term "Coating System" refers to the degree of cleaning of a substrate prior to coating and the application of a number of coats, separately applied, in a predetermined order and thickness, within specified intervals to allow for drying or curing.

Contractors, now mandated to be QP-1 certified by August 1, 2001 and more environmentally and safety responsible, are faced with more rigorous and stringent requirements concerning worker, public and environmental controls and safety measures. Compliance with these requirements will increase contractor's costs for training, monitoring, surveillance and documentation, hygiene, and personal equipment, and hence higher cost to VDOT's construction and maintenance programs.

To ensure better understanding of the new provisions and to enhance effective administration and enforcement of the requirements, guidelines for the following categories are enumerated herein:

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Purpose and Expectation: The purpose of this Construction Division Memorandum (CD) is to establish clear instructions and guidelines for all VDOT customers involved in the design, procurement and administration of construction projects requiring these new provisions. As applicable, it is expected that District, Residency and Central Office Divisions comply with the policies and procedures described in this CD.

This CD should be used in conjunction with projects with Type B structure(s) where construction activities require disturbance, partial or total removal of existing paint coating. Both Type A and B structure classifications are defined in Section 411.01.

Beginning with the **February 2001 Advertisement**, the **Road And Bridge Specifications** require the use and enforcement of the new Section 411, dated April 19, 2000 and Section 413, dated June 14, 2000. Except as noted, prior to the February 2001 Advertisement, these provisions were not in effect. A copy of these provisions may be found on the Construction Division's server at the following locations:

\\0501coconst\public\Spec Book Revisions\ or
<http://www.vdot.state.va.us/conbbs/resources/specifications/SpecHome/SpecHome.htm>.

Exceptions: These provisions were incorporated on a **project specific basis** on advertisements scheduled from August 2000 through January 2001. When such use occurred, the project number should appear on the first line below the title block of the special provision.

The Contractor is fully responsible for the protection of workers, the public and the environment from exposure to health hazards resulting from disturbance, removal, storage and disposal of these coatings.

Revisions to Section 411 were initiated by the Construction, Structures and Bridge, Maintenance, Materials, and Environmental Divisions. Modifications to Section 411 more thoroughly address characterization, containment, reuse, removal and disposal of abrasives and other waste products; application of protective coating systems; contractor and other professional worker certification and licensure requirements; and environmental, worker and public health and safety protection issues for work

Performed on or related to structures containing lead-based paints. Additionally, a date requiring SSPC QP1 certification for Contractors performing coating operations on affected contracts by August 1, 2001.

Special Provisions for Section 411 and Section 413 must be included when developing contracts containing bridges with Type B structures or when the existing structure is unclassified.

Special Provision Copied Note, (SPCN) 411a (dated 3-3-97) will remain in effect with existing instructions for appropriate projects awarded on or before August 1, 2001. On August 1, 2001, SPCN 411a should be deleted. Revised Special Provision Section 411 dated April 19, 2000c replaces Special Provision Section 411 (dated 8-1-94c) in its entirety.

Revisions to Section 413 were initiated by the Construction, Structures and Bridge, Maintenance, Materials, and Environmental Divisions. This special provision, dated June 14, 2000, revises Section 413.02 Procedures to compliment changes in Section 411 – Protective Coatings of Metal in Structures. This special provision addresses concerns regarding characterization, containment, removal and disposal of structural members and other waste products and environmental, worker and public health and safety protection issues for work performed on or related to dismantling and removing or removing portions of existing bridge structures containing lead-based paints, including payment provisions. Revisions to this section was borne out of the need to address the limitations of the 1994 Road and Bridge Specification and 413c (0299) Special Provision Copied Note, wherein the reference to Section 411.07 was insufficient direction to handle areas of bridge demolition and repair when coating systems containing lead base paint is encountered.

Other significant changes to Section 413 include the incorporation of pay items and a **100 square foot exclusion clause** related to the submission and implementation of environmental and worker protection plans required in Section 411. Pay items were incorporated in Section 413 to capture cost related to demolition activities, separate and distinct from removal, containment, coating and disposal activities on steel structures for maintenance and new construction projects.

Special Provisions for Section 411 and Section 413 must be included when developing contracts containing bridges with Type B structures or when the existing structure is unclassified.

Please note that it is important to consider the impacts that changes to Section 411 and 413 will have on the construction industry. ALL projects that have a Type B structure that is being removed or modified, when specified as a pay item, must have the new pay items as detailed in the new Section 413 Special Provision. Payment for these items will be made whether or not the amount of material disturbed is greater or less than 100 square feet. To avoid potential claims, it is important that an effort be made to "inform" the construction industry of the necessity of determining the amount of protective coating that will be removed as part of dismantling and removal operations prior to bidding.

Revisions to Section 231 were initiated by Materials, Environmental Divisions and Traffic Engineering. This special provision has been revised to compliment the changes made Section 411 – Protective Coatings of Metal in Structures. This provision deletes all references to Paint System No. 13, Aluminum Paint and corrects some minor typographical errors and formatting changes. All references to traffic paint has been removed and is now included in Section 246. Additionally, modifications to Section 231.02 permits the use of barium sulfate in paint formulas.

Painting Contractor QP-1 Certification

A substantial factor for **determining the lowest responsive bidder** for projects with containment and maintenance painting activities is by August 1, 2001, all painting contractors and painting subcontractors must be able to satisfactorily demonstrate their capability, experience and certification in accordance with SSPC-QP1, Standard Procedure for Evaluating Qualifications of Painting Contractors: Field Application to Complex Industrial Structures.

In order to determine the lowest responsive bidder, prior to award, the apparent low bidder must submit proof that SSPC-QP 1 certification has been obtained. Alternately, prior to February 1, 2002, the bidder may present documentation that demonstrates that equivalent processes and procedures conforming to the standards set forth in the procedures for SSPC-QP 1 have been established and that the certification process is underway. In the instance when the apparent low bidder intends to subcontract all or a portion of the work, the apparent low bidder must submit a written statement prior to award certifying to the Department that all painting subcontractors to be used on the project will be SSPC certified, or that the subcontractor has established equivalent processes and procedures conforming to the standards set forth in the procedures for SSPC-QP 1.

If such documentation is not provided as described above, the apparent low bidder will be considered a **non-responsive bidder**, and the bid should be rejected.

This requirement will apply to all bridge painting work except for bridge superstructure removal and other work as described under Section 413. Section 413 allows for a 100 square foot de minimus (exemption) of paint removal per structure. Such work may be incidental to the main work, small quantities of paint removal under members or items on a given structure. Please note that this exclusion does not eliminate the requirement for Environmental Protection which are highlighted in Section 107.14 and 104.06 and for complying with applicable state and federal laws and regulations. Prior to the Contractor or subcontractor performing the removal or surface preparation/painting application, the Contractor shall submit a plan that demonstrates that such work activities can be

satisfactorily accomplished without exceeding the 100 square foot allowance. This requirement should be addressed by the Project Engineer at the construction pre-bid conference.

On or after August 2, 2001, the painting Contractor and subcontractor must remain in compliance with this requirement throughout the duration of the affected work. Upon request, the Contractor or subcontractor must produce proof that they are SSPC certified. If the Contractor's or subcontractor's SSPC certification expires or is terminated, or they are not performing within the approved framework of the equivalent certification, a stop work notice should be issued. The stop work notice should be issued to shutdown only that work that is in non-compliance and should remain in effect until such time that certification is achieved or work performance is in conformance with the approved frame of work.

In lieu of SSPC-QP1 certification, the Department, at its discretion, may accept documentation until February 1, 2002 which demonstrates that the low bidder has earnestly begun the certification process and that SSPC is currently evaluating the contractor for certification. Such documentation shall consist of evidence that the Contractor has made application for certification and is scheduled for an on-site audit to both its primary place of business and an active job site or that such required audit is currently underway.

Containment System Plan Guidelines/Submittal Checklist

If the project involves the erection of any containment structure with the bridge serving as the primary means of support, then the Contractor is required to describe such system as specified in Section 411.08 (a) and provide certification by a Professional Engineer, licensed in the Commonwealth of Virginia. This requirement, certification by a Professional Engineer, is waived for any containment structure with a total weight bearing capacity of less than 1000 pounds.

The design of the systems to be employed by the Contractor shall include an analysis of the load which will be added to the existing structure by the containment system, and shall take into account blast waste, equipment and personnel. The load analysis shall be performed and signed and sealed by a licensed professional engineer registered in the Commonwealth of Virginia. The analysis shall assure that the system will not induce a load on the bridge that will create an overstress condition or otherwise effect the structural integrity of the bridge. The Project Engineer and District Bridge Engineer will be responsible for reviewing the Contractor's containment system plan submittal. It will be the responsibility of the Project Engineer to solicit, coordinate and incorporate the District Bridge Engineer's review.

1. Plan should contain a sketch or drawing (preferably 22 X 34) of containment system in plan and elevation view, including details of connections.
2. Indicate maximum permissible waste load on the containment system.
3. Indicate maximum number of personnel and permissible weight on the containment system.
4. Identify all containment system components on the plan sheets. Indicate the type and size of scaffolding or rigging to be used and erection procedures. Indicate size of containment area, capacity of dust collector, and type of airflow systems, including number of blasters and capacity of blasting equipment and hose pressure.

Environmental and Health and Safety Plan Guidelines/Submittal Checklist

At least three weeks prior to performing any work on Type B structures, the Contractor is required to submit to the Residency, a written site-specific Environmental Plan (**EP**) and Health and Safety Plan (**H&SP**) prepared by a Certified Industrial Hygienist (CIH) that covers all personnel providing services or labor on the project. Note that this requirement is for the submission of two separate plans.

The Contractor's environmental and health and safety plans, as appropriate, should include procedures for medical surveillance of the contractor's and the state project related representatives, hazard communication procedures, employee training, protective equipment, and all other procedures that may be necessary to comply with 29 CFR part 1926.62 pertaining to lead exposure in construction.

Environmental Plan: The Residency review, coordination, operations, post operations requirements, and the Regional Hazardous Materials Manger requirements are outlined in the "*Check of Major Items for Environmental Protection on Lead-based Paint Projects*" check list. This check list delineates areas of responsibility for the Project Engineer, Inspector and Regional Hazardous Materials Manager when reviewing the Contractor's **EP** and **H&SP** and administering the contract. This checklist can be found in Appendix "A".

Health and Safety Plan: Upon receiving the Contractor's **H&SP**, a copy of this plan must be forwarded to the Central Office Employee Safety and Health Office (**ES&HO**). Within two weeks of receiving the Contractor's plan, the Employee Health and Safety Office will review the plan and return it to the Residency.

A Department inspector must be identified at least six months in advance of construction. The inspector assigned to the project must have all medical and respiratory fit testing complete prior to the commencement of construction activity that potentially may involve encountering hazardous materials. The **ES&HO** will arrange for all medical and respiratory fit testing and training within the District. Any questions regarding required training or medical/respiratory fit testing should be directed to **ES&HO** at (804) 371-6852. After project completion, the inspector must contact the **ES&HO** to arrange for final medical testing.

Work over Railway's Right-of Way: If the project includes work that is to be accomplished over a Railway's right-of-way and tracks, the approaches thereto or the appurtenances thereto, the Contractor's **EP** and **H&SP** must be checked for compliance with Section 107.08 (a) and 107.08 (b) to verify that the Contractor's plan of operations satisfies the terms and conditions of agreement between the Railway and the Department. Specifically, the Department's review should verify that all permanent and temporary construction clearances permitted by the Railway are obtainable. Should the Contractor's proposed containment structure or other plan of operations compromise the temporary construction clearances permitted by the agreement, the Department is responsible to provide notification and details of the Contractor's plan (requiring reduced clearances), to the Railway's representative. The Department is responsible to ensure that the Contractor abides by the instructions provided by the Railway.

Record Keeping and Protective Coating Identification: The Contractor is responsible to maintain a record that establishes and describes the location and limits of the work area where protective coating removal or application has been accomplished. Daily record and mapping format shall meet the approval of the Engineer and shall be established prior to commencement of work. The daily records and mappings shall be maintained in a 3-ring binder throughout the duration of the project. Prior to final acceptance, the Contractor is required to submit to the Engineer that 3-ring binder and certify that all information contained therein is factual and correct.

The development and maintenance of an information management system of record keeping and protective coating identification is in the Department's best interest. Record keeping of this nature affords the Department to make better (documented) choices about maintenance of protective coatings on structures, including surface preparation operations and coating selections.

Further, reliable and accurate documentation is an essential component of maintaining the Department's highway system. Although there will be an initial capitol cost associated with acquiring such records, the documentation is needed for the following reasons:

1. To identify and record coating systems, both partial and entire applications to existing structures, to be retained for future maintenance records on a per structure basis.
2. To record deviations or specific manufacturer provisions incorporated in the work while applying coating systems that vary from those originally specified in plans and specifications.
3. On the short term, to assure that up-to-date and accurate written information is available in the event that either Department inspection personnel or Contractor key personnel are transferred or are not available to complete a project.
4. To maintain a daily routine log of information required by the specifications and coating manufacturers to assure that all quality requirements are being recorded and followed.
5. Records may serve as an aid in claims prevention and early resolution of construction disputes claims and post construction litigation issues that may arise.

These records will be maintained in the Maintenance Division's Inventory and Conditions records and Structure and Bridge's inventory records for structures. This effort will support the maintenance, rehabilitation and replacement of structures throughout the Commonwealth and support budget allocation decisions involving the improvement, rehabilitation and maintenance of structures statewide.

Surface Preparation and Coating Application Selection, Use of Recyclable and Expendable Abrasives, Waste Categorization and Disposal and Measurement and Payment Methods

There are several methods of surface preparation and coating application available for the Bridge or Maintenance Engineer's choice:

1. **Prepare and spot coat existing structure:** Selection of this method provides for prepared areas to be spot-primed with primer(s) from the system specified, followed by application of intermediate and finish coats to spot-primed areas only.

The Bridge or Maintenance Engineer will have to designate areas on the plans that are to be primed and spot coated and must specify the coating system on the plans. By default, if no system is specified, System W will be used. This method should be specified only when the existing structure's protective coating is sound and only minor repairs are required.

This system, (if properly implemented, with testing of adhesion, washing, cleaning and feathering – all measures which add cost), may be MORE expensive than complete removal; therefore the Engineer should use good judgment by avoiding use of this method if the only reason for specifying this method is an attempt to reduce cost.

2. **Prepare and overcoat existing structure:** Selection of this method provides for prepared areas to be spot-primed with primer(s) from the system specified followed by application of intermediate and finish coats to the entire structure. The designer should specify the coating system on the plans. By default, if no system is specified, System W will be used.

The Bridge or Maintenance Engineer will have to designate on the plans the areas on the structure that are to be prepared and primed and specify the method of payment.

3. **Recoat existing structure:** This is the old "Repaint existing structure" item. Selection of this method provides that the entire structure be cleaned to bare metal and recoated using System B.
4. **Coating new steel members used to repair existing structure:** This is a new item intended for use when replacing a damaged structure member with a newly fabricated member. The coating system should be as specified on the plans. If no system is specified, System W shall be used. The Bridge or Maintenance Engineer will have to designate on the plans the areas on the structure that are to be prepared and primed and specify that payment for this work is to be included in "Coating of new metal on structures".
5. **Zone coating:** This is a new item. The Bridge or Maintenance Engineer will have to designate on the plans or elsewhere in the Contract Documents, the areas on the structure that are to be zone coated. Typically, areas considered for zone coating are members such as fascia girders and beams on new or existing structures (for aesthetic purposes), all areas within 5 feet of deck joint or large areas on an existing structure.

Many of the above applications will require the Bridge or Maintenance Engineer to complete a comprehensive condition assessment of each structure under consideration prior to detailing areas of coating application and/or repair. For example, areas with high visible and subject to recurrent deterioration, such as expansion joints, splash areas and drainage areas may be designated as a specific zone or areas identified for specific surface preparation and coating application.

Use of Recyclable and Expendable Abrasives

Use of expendable abrasive may be allowed under certain conditions, where specified or approved by the Engineer. With the expressed approval of the Engineer, expendables or recyclables may be used for abrasive blasting a Type A structure. Other situations where expendables may be considered would be in wet abrasive blasting, where the ability to set up conventional containment systems is a problem, such as projects where bridges cross over the railroad. A current list of approved recyclable and expendable abrasives may be obtained from the Central Office Materials Division's website at: <http://coweb/MaterialsNet/Downloadable Documents.htm>.

Categorization and Disposal of Waste Material

Section 411.08(c) and (d) make reference to the determination as to whether a waste is hazardous. This determination is performed by the Department's Materials Division. Lead paint waste is considered to be hazardous if at least 5 ppm lead leaches in the Toxicity Characteristic Leaching Potential (TCLP) test. Some paint systems contain considerable concentrations of cadmium and therefore the full RCRA 8 metals analysis shall be performed.

As part of its waste reduction effort, the Department requires the use of recycled steel abrasive. The presence of this abrasive in the waste may temporarily bind the lead so that it does not appear in the leachate during the test, and hence the waste may not meet the regulatory threshold, even if the total lead levels are substantial. This binding action may reverse and hence may create future liability for the Department if disposed of in a sanitary (RCRA Subtitle D) landfill.

To reduce this risk, the Department has determined that the waste will be classified as hazardous if the total lead level exceeds 0.01 percent even if the TCLP level is below the regulatory limit. A laboratory certified by the American Industrial Hygiene Association to perform TCLP and total lead analyses should perform the testing. A list of certified laboratories is maintained by Elko Materials Division. If the TCLP test results are at or above the regulatory limits, or if the total lead concentration is greater than 0.01 percent (by weight), the waste will be classified as hazardous. Such waste so classified should be stored, manifested, transported and disposed in full compliance with regulatory requirements. Expendables used for a blasting abrasive on Type B structures in conjunction with beneficial reuse, such as Blastox, would be exempt from this requirement as long as the spent material passes the TCLP, regardless of total lead.

Additives used in conjunction with expendable abrasives such as Blastox shall not be allowed unless used in conjunction with beneficial re-use. Before approval of the use of an additive in this manner, the Engineer must coordinate with Environmental Division's Regional Hazards Material Manger to determine whether the intended application meets the definition of beneficial re-use.

Measurement and Payment

Measurement and payment must be stipulated, including payment provisions for Environmental Protection and Health and Safety, and Categorization and Disposal of Waste Material. Similar but different pay items have been incorporated in Section 413 to capture cost related to demolition activities, separate and distinct from removal, containment, coating and disposal activities for maintenance and new construction projects.

ALL projects that have a Type B structure that is being removed or modified, when specified as a pay item, must have the new pay items as detailed in the new Section 413 Special Provision. Payment for these items will be made whether or not the amount of material disturbed is greater or less than 100 square feet.

RP: rg

C: Mr. Charles D. Nottingham
Mr. Claude D. Garver, Jr.
Assistant Commissioners
Division Administrators
District Construction Engineers
District Maintenance Engineers
District Equal Opportunity Coordinators
District Contract Administrators
Resident Engineers
Project Engineers
Project Inspectors
Federal Highway Administration
Virginia Department of Minority Business Enterprise
Virginia Road and Transportation Builders Association
Old Dominion Contractors Association
Virginia Asphalt Association
Virginia Aggregates Association
American Concrete Pavement Association

Check of Major Compliance Items for Environmental Protection On Lead-based Paint Projects

Project No.: _____ Contractor: _____ Inspector: _____

Date	Residency Requirements:	Circle One		Comments
Reviews/Coordination – (Project Engineer)				
	Original and two copies of the draft EPP received three weeks prior to startup of operations	Yes	No	
	CIH or LLS signature and stamp/number confirmed on cover of original EPP	Yes	No	
	Original PE signature (if applicable*) and seal confirmed on cover of EPP	Yes	No	
	Copies of draft EPP sent to District Environmental and Regional Haz-Mat Manager	Yes	No	
	Copy of this checklist transmitted with draft EPP distribution	Yes	No	
	Environmental comments forwarded to Contractor	Yes	No	
	Final EPP received from Contractor	Yes	No	
	Copy of final EPP sent to consultant inspector (if applicable)	Yes	No	
Operations (Inspector)				
	Contractor's copy of final EPP on site and reviewed by inspector	Yes	No	
	Notifications made and fees paid to DLI and permits obtained (where applicable**)	Yes	No	
	EPP and Contractor Lead Licenses (Contractor, Supervisor and Worker) available on site	Yes	No	
	Confirmation that Blastox® not being used on project or approval by Materials Division	Yes	No	
	Locked waste storage area erected (as noted in the EPP)	Yes	No	
	Drums of waste labeled, dated, covered and stored on pallets in locked area	Yes	No	
	EPA ID number (provisional) obtained by Contractor for hazardous waste disposal	Yes	No	
	CIH, LLS or designated representative on site during operations	Yes	No	
Post Operations (Project Engineer)				
	CIH/LLS signoff provided at end of project	Yes	No	
	Return waste manifests received within 35 days and put into permanent project record at Residency***	Yes	No	
	Final payment held until receipt of CIH/LLS signoff and return waste manifests	Yes	No	

Date Regional Hazardous Material Manager Requirements: Circle One Comments

EPP Review				
	EPP follows format in guidelines	Yes	No	
	EPP is Site Specific	Yes	No	
	CIH/LLS contacted and signature confirmed	Yes	No	
	Coordinate and confirms railway agreement requirements are addressed by Contractor's plan	Yes	No	
	Waste disposal facility identified in EPP	Yes	No	
	Confirmation that Blastox® not being used on project or has been approved by Materials Division	Yes	No	
	Appropriate Lead Licenses in EPP	Yes	No	
	DLI Notifications, permits and fees addresses in EPP	Yes	No	
	Designated representative specifically provided in EPP	Yes	No	
	Review comments and checklist forwarded to Project Engineer	Yes	No	
	EPP determined to be complete	Yes	No	

OTHER COMMENTS	COMMENTOR

- * If any containment structure is required under 411.07 (1997 specification), a PE certification is required. If a containment structure is required, has a total weight bearing capacity of more than 1000 pounds and uses the bridge as a primary means of support, a PE certification is required under Section 411.09a (2000 specifications).
- ** As noted in EPP
- *** Notify Regional Hazardous Materials Manager if not received in 35 days; HMM reports to DEQ if not received in 45 days

Definitions:

- EPP - Environmental Protection Plan
- CIH - Certified Industrial Hygienist
- LLS - Licensed Lead Supervisor
- PE - Professional Engineer
- DLI - Virginia Department of Labor and Industry