



To: <p style="text-align: center;"><b>SUPERSEDED BY</b>  <b>EI 19-002</b>  <b>EFFECTIVE 9/1/19</b></p>		<p style="text-align: center;"><i>New York State</i>  <i>Department of</i>  <i>Transportation</i>  <b>ENGINEERING</b>  <b>INSTRUCTION</b></p>	<p style="text-align: center;"><b>EI</b>  <b>07-032</b></p>
<b>Title: MAINTENANCE CLEANING AND WASHING OF BRIDGES – US CUSTOMARY</b>			
Distribution: <input checked="" type="checkbox"/> Manufacturers (18) <input checked="" type="checkbox"/> Local Govt. (31) <input checked="" type="checkbox"/> Agencies (32) <input type="checkbox"/> Surveyors (33) <input checked="" type="checkbox"/> Consultants (34) <input checked="" type="checkbox"/> Contractors (39) <input type="checkbox"/> _____ ( )	Approved:  George Christian, Deputy Chief Engineer Structures <div style="text-align: right;">           9/12/07            Date         </div>		

**ADMINISTRATIVE INFORMATION:**

- This Engineering Instruction (EI) is effective with the letting of 1/10/08.
- EI 02-040 is superseded by this issuance.
- The information transmitted by this issuance will reside in the Special Specifications directory of the Toolbox Server.

**PURPOSE:** The purpose of this EI is to issue updated special specifications for Maintenance Cleaning and Washing of Bridges.

**TECHNICAL INFORMATION:**

- The new special specifications for Maintenance Cleaning and Washing of Bridges have a pay item of 'Each' rather than 'Lump Sum' as appears in the current specifications. This will allow the number of special specifications for bridge washing to be reduced by 95%.
- It is intended that all future bridge washing contracts will be in US Customary units, so no metric specifications are being issued.
- Previously, flaking paint that did not contain lead was considered to be inert, and was permitted to be washed. However, all paint is now considered harmful to the environment, and flaking paint should not be washed at all. This would include all bridges that have a paint rating of 3 or less.
- Guidance for Project Designers:

Item 641.3100nn16 Maintenance Cleaning and Washing of Bridges is the general specification for washing bridges that may contain lead based paints, i.e. those bridges built before 1989. However, it should not be specified to wash bridges with paint ratings of 3 or lower based on the latest Inspection report. Washing structural steel with a paint rating of 3 or lower is likely to dislodge significant amounts of lead based paint. Disturbance of lead based paint must be avoided because the specifications make no provisions for collecting, separating, and disposing of lead based paint chips.

Item 641.3200nn16 may be used to wash all painted bridges under Maintenance Washing of Bridges, Concrete Surfaces, because the structural steel is not washed. Not washing the structural steel avoids the possibility of contamination from lead based paints, but does not remove salts and other debris that promote corrosion of the steel.

Item 641.3300nn16 Maintenance Washing of Bridges, No Lead Based Paint may be used to wash bridges built after 1988. This specification may also be used for bridges built before 1989 if the bridge was de-lead by removing all the paint and applying a non-lead based paint or if the structural steel was replaced after 1988. However, it should not be specified to wash bridges with paint ratings of 3 or lower based on the latest Inspection report. Washing structural steel with a paint rating of 3 or lower is likely to dislodge significant amounts of paint. Disturbance of paint must be avoided because the specifications make no provisions for collecting, separating, and disposing of paint chips.

Item 641.3400nn16 Maintenance Cleaning and Washing of Weathering Steel Bridges

should be used to wash weathering steel bridges, including those which have paint on portions of the steel near bearings.

Bridges that span sensitive streams, including those categorized as CT and CT(s) (i.e. trout streams) are sensitive to thermal shock and other pollutants. These structures should be washed only at times when stream flows are high enough to ameliorate these effects. Therefore, streams that are classified by DEC as CT and CT(s) i.e. trout spawning shall be washed according to a schedule agreed upon with the appropriate Regional office of DEC. In addition, so as to not interfere with DEC's stocking program and the peak fishing season, bridges located at DEC yearling trout stocking sites should not be washed without the cooperation of DEC in scheduling.

The designer must indicate in the proposal all structures for which there will be date restrictions imposed on the Contractor. Information on the location of streams categorized as CT or CT(s) to develop such Special Notes may be obtained from the Regional Environmental Coordinator or the DEC regional office.

Paint condition is an important factor in determining whether painted steel should be washed. The table below describes the paint ratings for non-weathering steel.

**PAINT CONDITION RATINGS**

<u>Rating</u>	<u>Description</u>
7	The paint or coating system is in new or like-new condition.
6	The paint or coating system is in generally good condition with isolated areas requiring touch-up, such as along top flanges adjoining stay-in-place metal deck forms or in roadway splash zones. There may be some thinner areas of paint/coating. Isolated areas of wrinkling due to excessive paint thickness or temperature during application might be observed.
5	The paint or coating system shows signs of deterioration at isolated locations. Typical signs of deterioration include peeling of the finish coat, bleeding with localized areas of rust staining, alligator crackling, and chalking.
4	The paint or coating system has localized areas in poor condition. Bleeding of soluble pigments from the undercoat, peeling, minor blistering, and/or light pinpoint rusting may be present. Reconditioning normally would require local sand blasting and touchup.
3	The paint or coating system is generally in poor condition throughout the structure. Many areas of peeling, blistering, bleeding, chalking, shallow pinpoint rusting, rust undercutting at scratches, and surface scale are common. Reconditioning would require the entire superstructure be sand blasted, cleaned, primed, and re-painted/re-coated.
2	The paint/coating is often peeling, chalking, and/or bleeding and very widespread.
1	Large areas have no paint/coating remaining and where present, paint/coating is faded, peeling, and/or chalking.

In late 1988 the Department changed from lead based paints to an epoxy and polyurethane system for all new painted bridges. It was previously thought that the cured paint is inert, and there are no adverse effects from dropping minor amounts of paint chips into waterways or wetlands or onto the

ground. It is now recognized that all paints have potential to contain harmful chemicals, and it is not acceptable to allow these paint chips to contaminate the environment.

The New York State Department of Environmental Conservation (DEC) has established water quality standards, which are contained in Parts 700 through 705 of Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR 700-705). These standards include, but are not limited to:

1. There shall be no increase in turbidity that will cause a substantial visible contrast to natural conditions;
2. There shall be no suspended, colloidal and settleable solids that will cause deposition or impair the waters for their best usage; and
3. There shall be no residue from oil and floating substances, visible oil film, globules or grease.

Also, Article 24 of the Environmental Conservation Law (ECL), pursuant to Section 24-0701(2), prohibits any form of pollution in or within 100 feet of state regulated wetlands without a permit.

Many of DOT's bridges span wetlands, streams and other water bodies, and some bridge washing contractors have been cited for water quality violations by regulatory agencies. The primary concerns involved with bridge washing over water bodies with respect to water quality are degradation of trout spawning habitat and decreased fish egg survival due to heavy sediment (sand) loads, and various fish wildlife and invertebrate vitality concerns due to concentrated spot loadings of salt, lead (from lead paint), ammonia (from bird droppings), and thermal discharges.

The Migratory Bird Treaty Act of 1918 made it "...unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part, nest, egg or product, manufactured or not. Subject to limitations in the Act, the Secretary of the Interior (Secretary) may adopt regulations determining the extent to which, if at all, hunting, taking, capturing, killing, possessing, selling, purchasing, shipping, transporting or exporting of any migratory bird, part, nest or egg will be allowed..."

The act and amendments now provide that: "Except as otherwise provided in this section, any person, association, partnership, or corporation who shall violate any provisions of said conventions or of this subchapter, or who shall violate or fail to comply with any regulation made pursuant to this subchapter shall be deemed guilty of a misdemeanor and upon conviction thereof shall be fined not more than \$15,000 or be imprisoned not more than six months, or both."

Some bridge washing contractors have been cited for intentionally destroying migratory bird nests and fledglings while conducting their operations. Disturbances of occupied nests are unlawful and must be prevented.

- **Guidance for Field Personnel:** Before washing the bridge, all trash and other debris must be collected from the bridge. All trash and debris, such as paper, rubber, metal, wood and similar materials shall be properly disposed of off-site according to §107-10 Managing Surplus Material & Waste.

If any steel portions of the bridge surface have flaking paint then that portion of the steel surface where flaking paint is present should not be washed. All other portions of the bridge, including the underside, should be washed.

It is very important to note that flaking lead based paint should not be removed from bridges prior to washing. This is due to practical and economical concerns over methods used to collect paint chips. Nonetheless there remain environmental and health concerns over the alternative of non-collection which are being addressed during design by the judicious selection of structures to be included in the contract and the appropriate selection of which of the four bridge washing items to use. Errors in either of these selections can occur and in addition paint condition can continue to deteriorate between the time the bridge was selected for washing and the time the work is actually performed. Therefore it is

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acknowledged that the Engineer may have to use discretion and field staff should be prepared to exercise judgment regarding which surfaces are to be cleaned. The specifications allow the exercise of that judgment. It should be noted that small amounts of loose lead based paint chips which have settled on the flanges of beams will be considered diminimus with minimal environmental effect, and therefore need not be removed prior to the washing operations.

Contrasted with the need to not remove flaking paint, there is a very real need to remove all loose rust on weathering steel bridges. Loose rust that remains will eventually drop off and trap moisture on the bottom flange of girders causing accelerated deterioration.

- Cost Impact: The changes are not expected to have a significant change in the cost of the work.

**IMPLEMENTATION:** When convenient to do so, these specifications can be used on projects prior to the 1/10/08 effective date.

### **TRANSMITTED MATERIALS:**

- Item 641.3100nn16 Maintenance Cleaning and Washing of Bridges
- Item 641.3200nn16 Maintenance Cleaning and Washing of Bridges, Concrete Surfaces
- Item 641.3300nn16 Maintenance Cleaning and Washing of Bridges, No Lead-Based Paint
- Item 641.3400nn16 Maintenance Cleaning and Washing of Bridges of Weathering Steel Bridges

**CONTACT:** Questions or comments regarding this issuance should be directed to Duane Carpenter of the Office of Structures at (518) 457-5715, [dcarpenter@dot.state.ny.us](mailto:dcarpenter@dot.state.ny.us).

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**1. DESCRIPTION**

**1.01 General.** This work shall consist of cleaning bridges by collecting and properly disposing of trash and debris from the bridge, pressure washing the deck, exposed concrete, asphalt and steel bridge surfaces, and cleaning the drainage system and other drainage ways as described herein.

**1.02 Scope.** The cleaning and washing of bridges is divided into various pay items based on the type of bridge and the condition of the paint as follows:

**Maintenance Cleaning and Washing of Bridges -** General specification for washing concrete bridges, or steel bridges with intact lead based paint. If localized areas of flaking paint exist on the bridge, then the steel surface on that portion of the span where paint is flaking shall not be washed.

**Maintenance Cleaning and Washing of Bridges, Concrete Surfaces -** Specification for washing steel bridges with deteriorating paint. All steel surfaces are excluded from washing and the paint shall not be disturbed.

**Maintenance Cleaning and Washing of Bridges, No Lead Based Paint -** Specification for washing painted steel bridges which do not have lead based paint present. If localized areas of flaking paint exist on the bridge, then the steel surface on that portion of the span where paint is flaking shall not be washed.

**Maintenance Cleaning and Washing of Weathering Steel Bridges -** Specification for washing unpainted, controlled oxidizing (weathering) steel bridges. Flakes and delaminations shall be washed off metal surfaces with a water pressure of 3,000 psi minimum with the wand held one foot or less from the steel surface and moved parallel to the surface. Any dislodged material resting on the top of girder flanges shall be washed clean.

**1.03 Definitions.**

- Loose paint chips      paint chips that are no longer adhered to bridge surface
- Flaking paint chips      paint chips that are still partially adhered to bridge surface
- Patina                      Iron oxide coating that forms on weathering steel over time under proper environmental conditions. Dark chocolate or purple when properly formed with a tightly adhered texture. Capable of withstanding hammering or vigorous wire brushing.

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Loose flakes	Coarse flakes of rust that do not tightly adhere to the weathering steel surface. Easily dislodged by a wire brushing. Early indication of a non-forming patina.
Delaminations	Larger sheets of rust that are separating from the weathering steel base metal. More severe indication of a non-forming patina.
Trash and debris	Including but not limited to sand, soil, cinders, silt, dirt, mud, salt, glass, paper, rubber, metal, wood, loose paint chips and loose pieces of concrete and asphalt and rock or stones.
Protected Migratory Birds	Includes all waterfowl, herons, hawks, owls, eagles and songbirds. Excludes rock doves (pigeons), house sparrows, European starlings and monk parakeets.
Migratory Bird Treaty Act of 1918 with amendments	Federal law that protects migratory birds and their nests, eggs, and feathers. Conviction of violating the act can result in a fine of \$15,000 or imprisonment for six months or both.

## 2. MATERIALS

Water for pressure washing shall be clean, fresh water. Detergents or other agents shall not be used.

## 3. CONSTRUCTION DETAILS

**3.01 General.** The Contractor shall provide the Engineer with a bridge by bridge schedule of the work and a work plan including work zone traffic control procedures, equipment proposed for use, identification of water source(s) that will be used, and identification of the disposal facility(s) that will be used.

Unless otherwise indicated below or in the contract documents, all bridge surfaces shall be cleaned, including but not limited to bridge decks, sidewalks, curbs, approach slabs and shoulders, wing walls, back walls, bridge seats, railings, parapets, bridge bearings, piers and pier caps, columns, drainage features, structural steel, light standards, signs, concrete paving block, concrete beams and other surfaces. Limited paved drainage ways and gutters off-structure shall also be cleaned of debris that if permitted to remain would cast runoff back onto the structure or into its drainage ways including those that may exist underneath the structure. The extent of such removal shall be less than 100 feet but it is intended that they be only the minimum necessary to ensure that runoff is not cast back onto the structure being

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cleaned or its drainage ways.

Block paving and paved surfaces other than asphalt paving between adjacent or parallel bridges shall also be cleaned if indicated in the contract documents. Such cleaning shall be limited to narrow areas less than 25 feet in width.

### **3.02 Environmental Protection.**

**3.02 A. Waste.** The provisions of §107-10 Managing Surplus Material & Waste shall apply to the collection, storage, transport and disposal of waste generated by this work. All sand, dirt, cinders, and other trash and debris collected from the bridge shall be disposed of at a suitable off-site disposal facility.

**3.02 B. Water.** The contractor may either withdraw water from local on-site sources or use water from a municipal source for bridge washing. If water is to be drawn from a local on-site water source, to protect aquatic life, there may not be any loss of water elevation at the site of withdrawal or immediately downstream of the site. To further protect aquatic life, water withdrawal shall be accomplished with use of a screened hose, with a screen size not to exceed ¼" square. To prevent the unintentional spread of invasive species such as zebra mussels, wash water withdrawn from a local on-site water source may not be transported to be used at another bridge site in a different watershed. If water is withdrawn from an onsite source, cleaning of equipment will be conducted prior to leaving that watershed. All small equipment (pumps, hoses, barriers, silt fences, floating booms, cofferdams, shovels, rakes, jumping jacks, plate tampers, boots, buckets, industrial vacuums etc.) and large equipment (backhoes, excavators, trucks, tankers, rollers, trailers, etc.) that comes into direct contact with water withdrawn from a local on-site water source must be cleaned (internally and externally) by soaking, dipping in, or scrubbing with a chlorine solution, and/or hot water or steam cleaned and allowed to dry before the next use. The provisions of § 107-12 Water Quality Protection shall apply when discharging wash water near an original body of water. Otherwise, wash water will be collected in suitable containers and disinfected prior to final disposal.

**3.02 C. Birds.** All nests of protected migratory birds on bridges should be presumed to be active and occupied between April 15 and August 15. The areas within 3 feet laterally of the nest should not be cleaned or washed, pressure washing should start at the 3 foot line and progress away from the nest.

Before April 15 and after August 15 nests of protected migratory birds on bridges will most likely be inactive and unoccupied. If confirmed to be unoccupied, the nests should be removed as part of the cleaning operation.

Nests of unprotected species should be removed as part of the cleaning operations. However, pigeons should be treated as humanely as possible, in socially and environmentally sensitive situations removal of

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young from the nest for raising by a wildlife rehabilitator should be considered.

**3.02 D. Schedule.** All structures or bridge drainage systems over water courses shall be washed during the periods indicated in the Contract Documents. The following shall apply:

- Washing shall occur only when adequate flow in the stream exists to dilute possible contaminants.
- Operations shall be sequenced so as to clean structures over small bodies of water or small streams in the spring of the year when flows are greatest.
- Bridges over trout spawning streams, categorized by DEC as Ct or Ct(s), or located at DEC yearling trout stocking sites shall be washed during time periods acceptable to the appropriate regional DEC office.
- Washing, whether during a scheduled period or not, shall be stopped if stream flow drops below normal.

**3.03 Work Zone Traffic Control.** Work zone traffic control shall be in accordance with MUTCD, contract documents, and §619 of the Standard Specifications. High pressure spray and high volume drainage of wash water shall be controlled so as to not present a hazard to traffic or to cause erosion of adjacent ground or drainage ways. Under no circumstances shall high pressure spray or high volume drainage of wash water be discharged directly into active traffic lanes.

**3.04 Preparation.** Prior to any other cleaning work, confirm that the bridge drainage system is not blocked by un-removable debris by rodding with a sewer rod or similar tool. A blocked drainage system is considered to be one from which debris can not be removed using the means specified below in Section 3.05 below. If the Engineer has been notified, and concurs that the drainage system is blocked prior to performing other cleaning work, then clearing, dismantling and reinstalling, if required, of the drainage system, will be extra work, and the Contractor will be paid according to §1.09-05. If the Contractor does not inspect the bridge drainage system and notify the Engineer prior to beginning work, any blocked drains will be considered to be the result of the Contractor's operations, and all clearing and cleaning of the drainage system shall be done as part of the work of this specification.

All loose trash and debris shall be collected by sweeping, shoveling, vacuuming and other suitable methods. Equipment for collecting trash and other debris from bridge decks shall be determined by the Contractor, subject to the approval of the Engineer, and will normally consist of, but not be limited to, industrial vacuums, brushes, brooms, and shovels. Plastic shovels shall be used when other shovels are damaging coated surfaces. The contractor shall not cause or allow trash and/or debris from the bridge to be deposited into a wetland, stream, other water body, bridge drainage system, or active traffic lanes during the cleaning of the bridge.

**3.05 Washing.** When trash and debris collection from the bridge is complete, all bridge surfaces,

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including the underside of the bridge, shall be pressure washed with clean, fresh water. The washing shall be adequate to remove all visible dirt, salt, animal waste and similar debris.

The equipment for pressure washing shall be operated at pressures between 1750 and 2000 psi and with a minimum flow rate of 3.5 gal/minute provided that these pressures do not damage the paint or other coatings on the bridge or undercut the grout or harm the masonry plates beneath the bearings. If these pressures and flow rates cause such damage, then the Contractor shall reduce either or both to a level satisfactory to the Engineer. The pressure washer shall be operated at a distance of 6 inches to one foot from the surface. When washing stream and wetland bridges, the quantity of flow rate of the water used shall be the minimum necessary, as approved by the Engineer, to clean foreign materials from the surfaces where they are encountered.

Pressure washing shall not be allowed when ambient temperatures are less than 40°F or when ambient temperatures are expected to drop below 40°F before the bridge is dry. The Engineer shall be the sole determiner as to when temperatures lower than 40°F are likely to occur.

Scuppers, troughs, and downspouts to the first cleanout above ground level or to their outlet if above ground shall be cleaned by using high pressure water, vacuum, or other techniques satisfactory to the Engineer. Chemical cleaning compounds shall not be used during flushing operations, unless their use has been approved by the D.E.C. and clearance has been given by the Regional Director for their use. Debris from the cleaning operations shall not be deposited in, or around the structure, highway roadway slopes, drainage systems or streams. It shall be disposed of at a suitable off-site disposal facility.

Cleaned scuppers, downspouts and troughs shall allow the unimpeded flow of water. After cleaning has been completed the flow characteristics of the cleaned system will be evaluated by the Engineer. If flow is still impeded because of the presence of dirt or other removable matter or objects in the system, the Engineer will direct the Contractor to reclean the system, including dismantling and reinstalling, if required, at no additional cost to the State. Any damage to the system or structure that occurs during cleaning operations shall be repaired by the Contractor to the satisfaction of the Engineer at no additional expense to the State.

When concrete paving block is cleaned and washed, the removal of weeds between the blocks will not be required under this item.

Work shall be conducted in such a manner so as not to damage or remove existing epoxy protective coatings or any other protective coating on the bridge. Any damage to the structure being worked on or to surrounding structures and property shall be repaired by the Contractor at no cost to the State.

After all trash and debris have been collected, the drainage system cleaned, and washing completed, the

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bridge will be inspected by the Engineer. The cleaned bridge surfaces shall be free of trash and debris as described under Construction Details and the drainage system free running except those systems the Engineer agrees were damaged prior to any cleaning work on the bridge.

**METHOD OF MEASUREMENT**

The work will be measured for payment for each bridge.

**BASIS OF PAYMENT**

The lump sum price bid shall include the cost of all labor, materials, and equipment necessary to satisfactorily complete work including the cost of cleaning the drainage system; collecting, removing and disposing of trash and debris including that off structure but necessary to prevent backup of runoff onto the structure or its drainage ways, and repair of any damage caused by the Contractor. Work Zone Traffic Control will be paid separately. Clearing a blocked drainage system will be paid as extra work according to §1.09-05, except as noted in Section 3.04 above.

Payment will be made under:

<u>Item No.</u>	<u>Item</u>	<u>Pay Unit</u>
641.3100nn 16	Maintenance Cleaning and Washing of Bridges	Each
641.3200nn 16	Maintenance Cleaning and Washing of Bridges, Concrete Surfaces	Each
641.3300nn 16	Maintenance Cleaning and Washing of Bridges, No Lead Based Paint	Each
641.3400nn 16	Maintenance Cleaning and Washing of Bridges, Weathering Steel Bridges	Each

Note: nn denotes a serialized pay item based on the number of spans in the bridge as follows:

<u>nn</u>	<u>Number of Spans</u>	<u>nn</u>	<u>Number of Spans</u>	<u>nn</u>	<u>Number of Spans</u>
01	One	05	five	09	31 to 40
02	Two	06	6 to 10	10	41 to 50
03	Three	07	11 to 20	11	51 to 100
04	Four	08	21 to 30	12	More than 100