



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

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Michael R. Pence, Governor
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February 26, 2015

CONSTRUCTION MEMORANDUM 15-01

TO: District Deputy Commissioners
District Construction Directors
District Area Engineers
District LPA Coordinators
Field Engineers
Project Engineers/Supervisors

FROM:  Mark A. Miller, Director
Division of Construction Management and District Support

SUBJECT: Hydrodemolition Waste Water Disposal

It has come to the attention of this office that there are environmental concerns about how hydrodemolition waste water is handled on our contracts.

Because of the concerns a new unique special provision was developed and added to contracts as soon as we realized that there was a problem that needed to be addressed. The concern we have is with the pH of the waste water that is being generated by the hydrodemolition of the bridge deck before overlay placement.

Because of the concerns with the pH, it has been decided that all waste water generated will be contained, tested, removed and disposed at a proper facility based on the pH. To this end language is being added to contracts now as they are let.

Attached is a copy of the new special provision that requires that:

The Contractor shall submit a waste water control and disposal plan for approval prior to commencing hydrodemolition activities. The waste water control and disposal plan shall detail how all waste water generated by the hydrodemolition activities shall be contained, tested for pH, stored and transported to a disposal facility in accordance with 202.

And:

The cost of the waste water control and disposal plan, waste water containment, testing, storing, transporting and disposal, and any incidentals related to the carrying out of the plan shall be included in the cost of hydrodemolition. If the waste water is found to have a pH of 12.5 or higher and thereby classified as hazardous, the additional costs associated with this classification will be paid for in accordance with 109.05.

However, contracts were let with hydrodemolition that did not contain the attached special provision.

Therefore, if you have a contract that is already let with hydrodemolition, either as a pay item or is design build and the Contractor is going to use hydro-demolition and the contract did not contain the special provision, a change order will need to be generated to pay for the required plan, testing, storage, transportation and disposal.

If you had a contract that did not have this language but the work is already completed, no further steps are required.

For additional information please see the attached special provision.

Any questions should be directed to the Office of Construction Management.

(Attachment)

MAM/GGP/ddh

EXISTING OVERLAY REMOVAL, HYDRODEMOLITION
AND LATEX MODIFIED CONCRETE OVERLAY FOR BRIDGE DECK

Description

This work shall consist of the removal of the existing bridge deck overlay followed by preparation of the exposed bridge deck surface in accordance with 722, and shall involve milling and the use of hydrodemolition. Subsequent to the deck preparation, the work shall consist of constructing a latex modified portland cement concrete overlay.

Materials

Materials shall be in accordance with 722.02 and as follows.

Evaporation retardant shall be one of the products listed below. A Type D certification in accordance with 916 shall be furnished to the Engineer prior to use.

1. MasterKure ER 50, manufactured by BASF
2. Sika-Film, manufactured by Sika Corporation
3. Eucobar, manufactured by Euclid Chemical Company

Storage and Handling of Materials

Storage and handling of materials shall be in accordance with 722.03.

Construction Requirements

Removal of Existing Concrete Overlay

When an existing deck overlay is to be removed, the removal shall be performed with a milling machine. Removal in areas that are inaccessible to the milling machine, shall be done by chipping hammers or handchipping.

Deck Scarification

The deck surface shall be scarified by surface milling to an initial depth of 1/2 in. The milling operation shall be limited to the portion of the deck that is closed to traffic at any one time. After the initial surface milling, additional milling may be required as directed.

Surface milling shall be performed with a milling machine capable of removal to the required depth. The equipment shall be self-propelled with sufficient power, traction and stability to maintain accurate depth of cut and slope. The equipment shall be capable of accurately and automatically establishing profile grades along each edge of the machine by referencing the existing bridge deck by means of a ski or matching shoe.

If the milling operation results in the snagging of the top mat of steel reinforcement, the milling operation shall be stopped and the depth of removal adjusted. Any damaged reinforcing bars shall be repaired as directed at no additional cost.

Hydrodemolition

Hydrodemolition shall be used to remove all unsound concrete in accordance with 722.05(a)2. The hydrodemolition equipment shall consist of a self-propelled computerized machine that utilizes a high pressure water jet stream capable of removing concrete as specified herein, as well as removing rust and concrete particles from exposed reinforcing bars. The hydrodemolition equipment shall be calibrated and approved prior to use.

Prior to hydrodemolition, the equipment shall be calibrated on an area of sound original deck concrete as designated by the Engineer.

The initial settings shall be verified on an area of unsound concrete. The initial settings may need to be adjusted in order to achieve total removal of unsound concrete. Calibration of the hydrodemolition equipment shall be conducted for every day of operation and, if necessary, re-calibrated to ensure removal of known areas of delaminated concrete as well as to guard against removal of sound concrete. The Engineer shall be notified of the final equipment settings resulting from the calibration process.

After calibration of the equipment, concrete removal by hydrodemolition shall be conducted on the bridge deck. The removal will be verified as necessary, every 30 ft along the cutting path. Handchipping shall be used in areas that are inaccessible to the self-propelled hydrodemolition equipment. Handchipping tools may be hand or mechanically driven and operated.

The Contractor shall submit a waste water control and disposal plan for approval prior to commencing hydrodemolition activities. The waste water control and disposal plan shall detail how all waste water generated by the hydrodemolition activities shall be contained, tested for pH, stored and transported to a disposal facility in accordance with 202.

The Contractor shall provide shielding to ensure containment of all dislodged concrete during hydrodemolition operations to prevent damage to surrounding property and from flying debris both on and under the work site.

Cleaning of the hydrodemolition debris and slurry shall be performed with a vacuum system equipped with fugitive dust control devices and capable of removing wet debris and water in the same pass. The vacuum equipment shall be capable of washing the deck with pressurized water during the vacuum operation to dislodge all debris and slurry from the bridge deck surface. Debris and slurry shall not be allowed to dry prior to vacuuming.

Additional Unsound Concrete Removal After Hydrodemolition

After hydrodemolition has been completed, the deck will undergo sounding to identify remaining areas of unsound concrete. The deck surface shall be completely dry prior to sounding.

Additional concrete removal will be directed by the Engineer and shall be performed by handchipping or hydrodemolition. Only handchipping tools shall be used when removing concrete within 1 in. of reinforcement.

Where the deck is sound for less than half of its original depth, the concrete shall be removed full depth except for limited areas as determined by the Engineer. Forms for areas of up to 4 sq ft may be suspended from wires attached to the reinforcing bars. For areas greater than 4 sq ft, the forms shall be supported from the structural members of the superstructure or by shoring from below.

Where reinforcing bars have been exposed and the bond between the existing concrete and the reinforcing bars has been destroyed, the concrete adjacent to the reinforcement shall be removed to a minimum clearance of 1 in. around the circumference of the exposed reinforcement.

Where reinforcing bars have been exposed and the concrete in contact with reinforcing bars is sound, the additional removal of 1 in. around the circumference of the exposed reinforcement may be waived by the Engineer.

Any damaged reinforcing bars shall be repaired as directed at no additional cost. The removal area shall be cleaned of all dirt, foreign materials and loose concrete to the extent necessary to produce a firm solid surface for adherence of the new concrete. A minimum 1 in. vertical surface shall remain, or be cut 1 in., outside and around the entire periphery of each full depth removal area after removal of all loose and unsound concrete. The 1-in. vertical cut may be waived if it is determined that a cut will damage the reinforcement.

Preparation of Bridge Floor Prior to Overlay Placement

After completion of hydrodemolition and any additional concrete removal, the deck shall be sounded to ensure that all unsound concrete has been removed. Not more than 24 h prior to the placement of the overlay, the deck shall be cleaned in accordance with 722.05(b) and as follows. Water blasting may be used in lieu of sandblasting. The sandblasting or water blasting shall be performed using two passes with the second pass being at a right angle to the first pass or a cross-blasting technique. The minimum pressure of the water blast shall be 7,500 psi.

Patching of the Bridge Floor

Full depth patching of the bridge floor shall be in accordance with 722.06(a).

Proportioning and Mixing

Proportioning and mixing of the latex modified concrete shall be in accordance with 722.04 and 722.08, respectively.

Placing and Finishing

Placement and finishing of the latex modified concrete overlay shall be in accordance with 722.09 except that a bond coat shall not be applied to surfaces where the removal was accomplished by hydrodemolition. Evaporation retardant shall be applied in accordance with the evaporation retardant manufacturer's recommendations to the surface of the latex modified concrete immediately after every second transverse pass of the burlap or pan drag on the finishing machine is completed. Reapplication of the evaporation retardant shall be performed to all areas where the surface has been disturbed after the application of the evaporative retardant, such as from bull floating or hand finishing, or when drying of the surface is observed. The evaporation retardant shall be used as such and not as a finishing aid. Excessive amounts shall not be applied and worked into the latex modified concrete surface.

Texturing and Curing

Texturing and curing shall be in accordance with 722.10 and 722.11, respectively. When a portion of the grooving or tining, not to exceed 5 ft longitudinally, is complete, the evaporative retardant shall be re-applied to the freshly textured surface.

Calibration of Continuous Mixers

Calibration of continuous mixers shall be in accordance with 722.12.

Method of Measurement

Removal of the existing overlay will be measured by the square yard of deck area regardless of the number of passes with the milling machine.

The surface milling operation for deck scarification will be measured by the square yard for the initial 1/2 in. depth. Surface milling below the initial 1/2 in. depth will be measured by the square yard for each increment up to 1/2 in. depth. Additional removal of unsound concrete by handchipping will not be measured.

Hydrodemolition of the bridge deck will be measured by the square yard.

Full depth patching will be measured in accordance with 722.14.

Overlay material used to fill surface irregularities will be measured in accordance with 722.14.

Bridge deck overlay will be measured in accordance with 722.14, except that when no overlay thickness is shown on the plans, the overlay thickness shall be 2 in.

Epoxy resin adhesive and bond coat will not be measured for payment. Blasting, cleaning, finishing, texturing, and curing will not be measured for payment.

Basis of Payment

Removal of the existing overlay will be paid for at the contract unit price per square yard of bridge deck overlay, remove.

Surface milling will be paid for in accordance with 722.15 except as follows. The initial depth to be paid for as surface milling will be 1/2 in. The increments for additional surface removal will be up to 1/2 in., for each individual increment.

Hydrodemolition of the bridge deck will be paid for at the contact unit price per square yard.

Full depth patching will be paid for in accordance with 722.15.

Overlay material used to fill surface irregularities will be paid for in accordance with 722.15.

Bridge deck overlay will be paid for in accordance with 722.15.

Payment will be made under:

Pay Item	Pay Unit Symbol
Bridge Deck Overlay, Remove.....	SYS
Hydrodemolition.....	SYS

The cost of overlay removal by handchipping in areas adjacent to the curb or otherwise inaccessible to the power-operated mechanical milling machine shall be included in the cost of bridge deck overlay, remove. The cost of disposing of overlay removal residue, including water, dust, concrete and incidentals shall be included in the cost of bridge deck overlay, remove.

The cost of deck scarification by handchipping in areas adjacent to the curb or otherwise inaccessible to the power-operated mechanical milling machine shall be included in the cost of surface milling. The removal of

surface milling residue, including water, dust, concrete and incidentals shall be included in the cost of surface milling.

The cost of the waste water control and disposal plan, waste water containment, testing, storing, transporting and disposal, and any incidentals related to the carrying out of the plan shall be included in the cost of hydrodemolition. If the waste water is found to have a pH of 12.5 or higher and thereby classified as hazardous, the additional costs associated with this classification will be paid for in accordance with 109.05. The initial equipment calibration, any re-calibration, equipment shielding, handchipping curb areas, handchipping unsound concrete, cleaning of debris and slurry, compressed air cleaning, water blasting, and sandblasting shall be included in the contract unit price for hydrodemolition.

The cost of bond coat, furnishing and placing the overlay material, and incidentals shall be included in the cost of bridge deck overlay. Coring of the bridge deck, patching core holes, and all corrective measures required in accordance with 722.11 shall be performed at no additional cost.
