

FAST TRACK TOTAL SURFACE SELECTIVE HYDRO-DEMOLITION STANDARD SPECIFICATIONS

Description

This work shall consist of bridge deck surface preparation using hydro-demolition for selective removal of unsound concrete at variable depths in the structural deck slab and for providing a rough and bondable surface. This item also includes water control, shielding, all removal and disposal of concrete and debris, additional trim work, cleaning and other preparatory work at the site necessary to prepare the bridge deck.

Materials

All material shall be in conformance to the agency specifications.

Types of Repair Work Associated with the Total Surface Selective Hydro-Demolition Process:

Mechanical Scarification

Prior to the scarification, the depth of the rebar shall be verified in the field by the contractor. The original bridge deck surface shall be scarified to a depth as specified on the contract plans (1/4" minimum) with a mechanical milling machine capable of accurately and automatically establishing profile grades. Areas adjacent to the curb, scuppers, joints or other locations inaccessible to the milling machine shall be hand chipped. For decks with an existing wearing surface, all wearing surface material or existing concrete overlay, shall be completely removed either as a separate operation to the milling of the original deck, or in conjunction with it, provided adequate grade control can be maintained.

If mechanical milling results in the snagging of reinforcing steel, the operation shall be stopped immediately, and the depth of removal adjusted. Damaged or dislodged reinforcing steel as a result of contractor negligence during the operation shall be repaired or replaced at the contractor's expense.

All construction debris, wearing surface material, or residual materials from the scarification process shall be completely removed from the bridge deck prior to the commencement of total surface hydro-demolition.

Total Surface Selective Hydro-Demolition

This work shall consist of providing a highly rough and bondable surface, and selective removal of all unsound concrete in the structural bridge deck slab during the initial pass of the hydrodemolition equipment. The work shall include the removal and disposal of all concrete and debris as created by the process, and include shielding, deck washing, water control, and any other incidental concrete removal that may be required to prepare the deck for the placement of the overlay.

Full Depth Repair

As required, this work shall consist of removal and replacement of the bridge deck as identified in the plans or determined in the field. Predetermined areas of full depth repair may be done prior to hydro-demolition. Additional areas may require full depth repair following hydro-demolition as directed by the engineer.

Construction Requirements:

Removal Requirements

Removal requirements beyond the use of hydro-demolition equipment shall be in accordance with the state's normal patching procedures, except that only pneumatic hammers no heavier than the nominal 15-pound class will be allowed, operating at no more than a 45 degree angle from the horizontal, and in areas that are inaccessible to hydro-demolition equipment, or in previously patched or debonded concrete areas that require removal.

Fast Track Total Surface Selective Hydro-Demolition Equipment

The hydro-demolition equipment shall consist of a water supply system, a high pressure water pumping system, and a demolition type unit. The demolition unit shall be a robotic, computerized, and self-propelled unit, utilizing a high pressure water jet stream that is capable of removing concrete to the desired depths specified with a single pass of the unit, including the selective removal of all unsound concrete. It shall also be capable of cleaning rust and concrete particles from all exposed reinforcing steel. The resulting concrete surface profile shall be one that is highly rough and bondable. All water used in conjunction with the hydro-demolition process shall be potable water, except that stream, river or lake water may be used if properly filtered prior to use.

Only individuals who have experience on jobs of similar size and type over the past three years shall operate the hydrodemolition equipment.

The contractor shall take steps to prevent damage to existing reinforcing steel. All equipment shall be operated in a manner that does not damage the slab, reinforcing steel or superstructure components. Any damage caused by the contractors equipment or negligence shall be repaired at the contractors expense. Only those vehicles directly required to perform the hydrodemolition work, clean up, or corresponding overlay construction shall be allowed on the bridge deck. Contamination of the deck by construction equipment or any other source shall be prevented.

The demolition unit must provide shielding to ensure containment of all dislodged concrete within the removal area in order to protect the traveling public and work crew from flying debris on, adjacent to, and below the work site.

Vacuum Clean-up Equipment

The vacuum equipment shall be equipped with fugitive dust control devices and capable of removing wet and dry debris, along with standing water, in the same pass.

Water Control Plan

Prior to the beginning of hydro-demolition, the contractor must submit a plan to the engineer for the control and filtering of all water discharged by the operation. All drains, joints, and other locations where discharge water could exit the deck must be blocked, in order to direct runoff to a central collection and filtering location, as designed by the contractor. The contractor shall be responsible for compliance with all environmental laws and regulations regarding the discharge of runoff water into the environment. Specific details shall be provided by the contractor detailing the method of water and debris collection, filtering, treatment, and legal disposal.

The contractor is responsible for the disposal of all concrete and debris, and securing any applicable permits which may be required.

Equipment Calibration

The robotic hydro-demolition equipment shall be calibrated on a representative sample of sound deck concrete, as directed by the engineer, in order to demonstrate the ability to cut to the desired depth, as indicated on the plans. The minimum allowable water pressure shall be 13,000 psi and the maximum water pressure shall not exceed 20,000 psi. The calibration must accomplish the desired surface roughness, profile, and cutting depth as indicated on the contract plans.

The equipment shall then be moved to an area of deteriorated deck, as directed by the engineer, in order to demonstrate the ability to remove all unsound material. The equipment shall selectively remove all unsound concrete, avoid the removal of unnecessary sound concrete, and provide a highly rough and bondable surface.

Upon approval by the engineer that the equipment settings do selectively remove all unsound concrete and provide a highly rough and bondable surface, the calibration will be approved, and the settings recorded. If the equipment does not demonstrate the ability to produce the desired result, as determined by the engineer, the equipment shall be removed from the project and the contractor shall provide other equipment for calibration. No additional contract time or compensation will be allowed for the mobilization of different equipment to the work site. The operating parameters shall be recorded as follows:

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Water Pressure Gauge: 13,000 – 20,000 PSI

Machine Staging Control (Step)

Nozzle Size

Nozzle Type

Nozzle Travel Speed

Upon approval of the calibration, the contractor shall perform total surface selective hydro-demolition over the entire top surface of the bridge deck with a single pass of the unit.

The calibration and production settings shall be maintained and provided in writing to the engineer. The settings shall be maintained throughout the operation, unless the desired results are not being attained, in which case re-calibration shall be performed. Calibration shall be required

on each bridge, or when different equipment is brought to the site for use. The engineer shall also periodically verify the calibration settings and the desired results are being attained.

Removal of Slurry and Debris

The contractor shall clean up the slurry and rubble from the hydrodemolition operation in a timely manner, and before it dries on the deck and reinforcing steel. Vacuum clean up shall follow as closely as possible behind the hydrodemolition process. The deck shall then be blown dry to remove excess water. Following the cleaning, the surface shall be free of all debris, loose material, slurry, or cement paste.

Reinforcing Steel

Any reinforcing steel damaged by the contractor's operation shall be replaced at no additional cost. Replacement may include the removal of additional concrete to adequately anchor reinforcing steel to the appropriate lap splice length. When latex concrete overlay is specified in conjunction with hydro-demolition, and the bond between exposed reinforcing steel and sound concrete has been compromised, the clearance requirement around existing reinforcing steel may be waived.

Sounding

After the initial pass of hydrodemolition and appropriate cleaning, sounding will be done after the deck is clean, dry and frost free. Any unsound deck concrete that remains shall be removed at the contractor's expense with the use of pneumatic hammers.

Removal of Remaining Unsound Material

Where existing patches have debonded, or previous unsound overlay material is found below the top mat of reinforcing steel, that material shall be removed by force account with the use of pneumatic hammers or hydro-demolition.

Method of Measurement

Surface Milling for scarification into the existing bridge deck, and including overlay material, shall be measured by the square yard, for the entire surface area of the deck.

Hydro-demolition of the bridge deck will be measured by the square yard for the entire surface area of the deck.

Full depth patching will be measured by the square foot. The volume of patching material used in Bridge Deck Patching, Full Depth, will not be measured for payment.

Basis of Payment

The milling operation for the scarification into the existing bridge deck, and existing overlay, if applicable, shall be paid for at the contract unit price per square yard for Surface Milling, based on the depth as specified in the plan documents. The cost of removal in areas adjacent to the curb or otherwise inaccessible areas to the power operated mechanical milling machine will be included in the contract unit price. All equipment, labor and materials necessary to perform the work in accordance with the specifications shall be included in the cost of Surface Milling, plus any other incidental work necessary to complete this item.

Hydro-demolition of the bridge deck will be paid for at the contract unit price per square yard, for Hydro-demolition, regardless of the number of passes of the equipment. The cost for all equipment, labor and materials necessary to perform the work, including blocking drains, initial equipment calibration, any re-calibration, filtering of discharge water, equipment shielding, hand chipping along curb areas, removal of remaining unsound concrete, deck washing, and clean-up, collection and disposal of all debris, slurry, and water produced by the operation, shall be included in the cost for hydro-demolition, along with any other incidental work necessary to complete this item.

Full depth patching will be paid for at the contract unit price per square foot for Bridge Deck Patching, Full Depth. All equipment, labor and materials necessary to perform the operation, including the cost of cleaning the removal area and the patching material used for full depth patching, shall be included in the cost of Bridge Deck Patching, Full Depth, along with any other incidental work necessary to complete this item.

Payment for bid items for total surface hydro-demolition will be made under:

Pay Item	Pay Unit
Surface Milling.....	SQ YDS
Hydrodemolition.....	SQ YDS
Bridge Deck Patching, Full Depth.....	SQ FT