

**ITEM 579.03000002 - STRUCTURAL SLAB RECONSTRUCTION PREPARATION,
HYDRODEMOLITION – REINFORCEMENT EXPOSURE NOT
REQUIRED**

A Representative of the hydrodemolition equipment company shall be present to provide guidance to the Contractor with the calibration. After successful calibration, the hydrodemolition equipment Representative shall provide the Engineer with a listing of the equipment settings including:

1. Water pressure gauge
2. Machine staging control (step)
3. Nozzle size
4. Nozzle speed (travel)
5. Water flow rate

The calibration procedure specified is required for each separate span of a structure or once per week, whichever is greater.

The hydrodemolition surface preparation operation shall begin after the Engineer has approved the calibration.

Hydrodemolition. Perform hydrodemolition over the entire top surface of the structural slab to provide a rough and bondable surface. Remove a minimum ¼ inch of concrete or to the depth specified in the plans, and any unsound concrete, using one hydrodemolition pass. Stop the surface preparation operation if it is determined that sound concrete is being removed or unsatisfactory results are being obtained. Perform recalibration or changes to equipment and method as necessary to maintain acceptable removal results.

After the hydrodemolition surface preparation operation has completed the initial pass, and the deck is dry and frost free, resound the deck to ensure all unsound material has been removed. Remove unsound materials detected by the Engineer at no additional cost to the Department. Any unsound concrete or original slab surface remaining after the hydrodemolition pass shall be removed using additional hydrodemolition passes or use of pneumatic equipment meeting the requirements of §580-3.02. Pneumatic hammers operated at no more than a 45 degree angle from horizontal, shall be used in areas that are inaccessible to the hydrodemolition equipment. Unsound concrete is defined as existing structural slab concrete that is deteriorated, unbounded, or spalled.

Clean the hydrodemolition and milling debris with a vacuum system equipped with fugitive dust control devices and capable of removing wet debris and water all in the same pass. Remove all standing water with oil-free compressed air. Perform cleaning in a timely fashion before the debris and water is allowed to dry on the deck surface. Remove any material allowed to dry at no additional cost to the Department. Splice or replace any reinforcing steel damaged or dislodged by these operations with the same size bar, at no additional cost to the Department.

Reinforcement exposed by the hydrodemolition process will not require any additional concrete removal to provide a minimum 1 (one) inch clearance around the reinforcing bars providing that the existing concrete is sound. All loose concrete shall be removed around reinforcing bars. Any exposed reinforcement shall be water blast cleaned with a 7000 psi water jet within 48 hours prior to placement of new concrete.

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Where hydrodemolition results in removal of concrete to the full depth of the structural slab, prepare the patches following the requirements of §579-3.03 except curing shall be a minimum of 24 hours prior to any other concrete placement work. For fast track project applications, the use of a rapid hardening repair material (701-09) may be considered when the area of any one full depth patch is 5 square feet or less.

When used, preparation, placement, and curing of the repair material shall follow manufacturer's recommendations.

METHOD OF MEASUREMENT

Structural Slab Scarification. When the removal of existing concrete and bituminous overlays is necessary prior to performing hydrodemolition surface preparation, the requirements of §579-4.01 shall apply.

Structural Slab Hydrodemolition. The work will be measured as the number of square feet of concrete removed as stated in the estimate of quantities shown on the plans regardless of the number of passes or required additional removal by methods other than hydrodemolition.

BASIS OF PAYMENT

The unit price bid for this work shall include removal and disposal of all concrete and debris, vacuuming, shielding, water control, additional jack hammering and concrete removal necessary to prepare the structural slab and approach slabs for the placement of a specialized concrete overlay. All labor, materials, and equipment for full depth patching in localized areas shall also be covered by the unit price bid for this work. Scarification of concrete and bituminous overlays shall be paid for separately under Item 579.01.

Payment will be made under:

Item No.	Item	Pay unit
579.03000002	Structural Slab Reconstruction Preparation, Hydrodemolition - Reinforcement Exposure Not Required	Square foot

**ITEM 584.33010002 – LATEX MODIFIED SPECIALIZED CONCRETE OVERLAYS
FOR STRUCTURAL SLABS**

DESCRIPTION

The work shall consist of furnishing and placing latex modified concrete on top of a structural slab. Slab reconstruction concrete shall be placed integrally with the latex modified concrete overlay.

Scope. Concrete removal work will be paid under the appropriate item(s). Minimum thickness of the latex overlay is 1-1/2 inches. Separate payment will be made for integrally placed slab reconstruction concrete materials.

The mixture and cement type selected shall be done so to achieve a compressive strength of 2,500 psi prior to opening to traffic and 3000 psi. at 28 days. Cement type selection shall be as follows:

1. Type I: 4 days total curing
2. Type III: 2 days total curing
3. Rapid hardening cement: 4 hours total curing

MATERIALS

All materials to be used in the manufacture of the latex modified concrete overlay shall meet the requirements of §501-2.02 with the following:

Cement. The cement type used shall be Type I or Type III, meeting the requirements of §701-01. Rapid Hardening cement shall meet the requirements of §701-13 and supplied in bulk only.

Latex Admixture. The latex admixture shall be a non-hazardous, film forming polymeric emulsion to which all stabilizers have been added at the point of manufacture. It shall be homogenous, uniform in composition and have less than 1000 ppm of total chloride ions. When tested in accordance with the Department's test method for Total Weight Percent Solids in the Latex, the admixture shall have a solids content of not less than 46%. The latex shall be accepted at the work site provided it meets all the following requirements:

1. A sample of the product to be used shall be submitted to the Director, Materials Bureau, for approval a minimum of thirty days prior to placement. Only one brand shall be supplied.
2. Manufacturer's written certification that the material supplied is identical in composition to the prequalified sample. This certification shall also list particle size, surface tension, and infra red fingerprint information for the lot supplied.
3. Daily Sampling of the latex admixture will be required. The sample shall be provided to the Engineer. The minimum sample size will be one quart of latex for each day's placement. The latex shall be taken from a bypass valve in the latex feed line on the mobile mixer, and placed in a Department approved one quart plastic jar. The sample will be sent to the Materials Bureau for testing.
4. The latex admixture shall be agitated as necessary to prevent separation of the emulsion. It shall be maintained in storage within the temperature range of 32°F to 85°F. Admixture exposed to temperatures outside the foregoing limits shall be removed and replaced at no cost to the Department.

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Manufacture of Latex Modified Concrete.

A. Proportioning. The initial ingredient proportions except for non latex admixtures are in the following table:

MIX CRITERIA(a) –LATEX MODIFIED CONCRETE	
Cement Content for Type I (lb/yd ³) (b)	658
Cement Content for Type III (lb/yd ³)(b)	752
Cement Content for Rapid Hardening Cement (lb/yd ³)(b)	658
Sand Percent Total Aggregate (% total aggregate by volume)	55% ± 5%
Latex Admixture (gallons)	23.0-24.5
Water to Cement Ratio	0.35-0.42
Air Content (%)	3.0-7.0
Slump (in) (d)	4-1/2" – 7-1/2"
Type of Coarse Aggregate Gradation	CA 1

NOTE (a): The criteria are given for design information and the data is based on a fine aggregate modulus of 2.80 and a CA1 coarse aggregate gradation. Adjust the mixture proportions using actual fineness modulus and bulk specific gravities (saturated surface dry for aggregates). Compute the adjustments according to Department instructions.

NOTE (b): The type of cement selected shall be to achieve the desired strength gain and opening to traffic in 4 days, 2 days, or 4 hours from completion of the placement and curing. Contractor shall submit the final mix design, including all batch weights, admixtures, and equipment to be used to the Regional Materials Engineer a minimum of 30 days prior to placement. Contractor shall provide mix design adjustments to achieve yield.

NOTE (c) The amount of added water shall be adjusted to provide slump at or below the prescribed limit.

NOTE (d) Concrete for the slump test shall be deposited in a clean container and allowed to stand uncovered without disturbance for 5 minutes prior to performing the slump test. Care shall be taken during the test to exclude the effects of vibrations caused by traffic and concrete placement operations.

B. Batching and Mixing equipment. The requirements of §501.2.04 C shall apply with the following:

The mobile mixer shall include the following:

1. delivery capacity of at least 6 yd³/h
2. A meter with a printout to measure and record cement dosage
3. A water hose and nozzle for spraying the concrete surface before placing overlay.

All mobile concrete mixing units shall be calibrated a minimum of 14 days prior to placement.

C. Equipment. The requirements of §584-2.04 B and 584-2.04 C shall apply

CONSTRUCTION DETAILS

The requirements of §584-3 shall apply with the following:

Pre-Placement Wetting. The requirements of §584-3.03 shall apply. For latex modified concrete placements which utilize Rapid Hardening Cement, thoroughly wet the structural slab and all porous surfaces to be in contact with new concrete for a minimum of one hour immediately prior to placement.

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Handling and Placing of Concrete. The requirements of §584-3.05 shall apply with the following:

Place concrete only when the ambient air temperature and deck surface temperature (after wetting) will be below 80°F during the entire placement.

The contractor shall perform the placement and finishing during nighttime operations, the cost shall be included in the bid price for the various 584 items and the provisions of §619-3.19 Nighttime Operations shall apply. The nighttime operations provisions may be waived by the engineer if favorable environmental conditions exist. Favorable environmental conditions are defined as an expected weather forecast suitable for concrete placement during the entire placement duration, the evaporation rate not to exceed 0.10 lb/sf-hr, and acceptable curing temperatures expected for the duration of the curing period.

Contamination of the pre-wetted deck by construction equipment or from any other source shall be prevented by placement of a clean 4-mil minimum thick polyethylene sheet (or any other covering as approved by the Engineer) on the surface of the prepared deck.

Finishing and Curing. The requirements of §584-3.06 B shall apply with the following:

All slab reconstruction concrete shall be placed integrally with the latex modified concrete overlay. Use internal vibrators to consolidate the latex modified slab reconstruction and overlay in all areas inaccessible to the finish machine, in all variable depth areas, and along all joints.

Use a finishing machine meeting the requirements of §557-3.07

Surface Texturing: After finishing, the surface shall be given a suitable texture with a stiff bristle broom finish.

Apply curing within 10 minutes after machine finishing. A layer of 100 µm thick white polyethylene film shall be placed over the wet burlap within 1 hour of burlap placement. Care shall be exercised to ensure the burlap remains saturated for the wet cure period, both before and after placement of polyethylene film. Plastic coated fiber blankets may be substituted for the polyethylene film, but shall not replace the initial wet burlap. After the wet cure, the polyethylene film and burlap shall be removed and the concrete shall be air cured. Rainfall during this air cure period will have no detrimental effect. The overlay shall then be cured as follows:

1. Type I cement: Cured 48 hours wet, followed by 48 hours air dry.
2. Type III cement: Cured 24 hours wet, followed by 24 hours air dry.
3. Rapid hardening cement: Cured 4 hours wet.

METHOD OF MEASUREMENT

The overlay concrete shall be measured as the number of square yards of latex modified concrete overlay placed for the 1-1/2 inch depth of overlay, using a placement volume of 0.0417 cubic yards per square yard, to determine the placement volume. The slab reconstruction concrete shall be measured as the number of cubic yards of concrete placed determined by subtracting the volume of overlay concrete at a uniform 1-1/2 inch thickness from the delivered and used total quantity.

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BASIS OF PAYMENT

The unit bid price for latex modified concrete shall include the cost of all labor, materials, and equipment necessary to complete the work. The unit bid price for latex slab reconstruction concrete shall cover material and delivery cost only.

Payment will be made under:

Item No.	Item	Pay unit
584.33010002	Overlay Concrete, Latex modified Concrete-Type 1 Friction	Cubic Yard
584.33020002	Overlay Concrete, Latex Modified Concrete-Type 2 Friction	Cubic Yard
584.33030002	Overlay Concrete, Latex Modified Concrete-Type 3 Friction	Cubic Yard
584.33040002	Overlay Concrete, Latex Modified Concrete- Type 9 Friction	Cubic Yard
584.34000002	Slab Reconstruction Concrete, Latex	Cubic Yard