

**ITEM 555.0101 03 - HIGH EARLY STRENGTH (HES) CEMENT CONCRETE  
FOR FULL DEPTH SLAB REPAIR, CONCRETE PARAPET  
REPAIR, AND LONGITUDINAL JOINT REPAIR**

**DESCRIPTION**

This work shall consist of the placement of High Early Strength (HES) cement concrete for full depth structural slab repair, concrete parapet repair and for longitudinal joint repair. Repair areas shall be where indicated on the plans.

**MATERIALS**

The requirements of Subsection 501-2 Materials shall be met, except as modified herein.

Portland Cement	Type III	701-01
Fine Aggregate		703-07
Coarse Aggregate	Type CA 2	501-2.02 B.2
Water		712-01
Air Entraining Agent	(Neutralized vinsol resin based only)	711-08
Membrane Curing Compound		711-05
Polyethylene Film		ASTM C171
Admixtures		NYSDOT Approved Materials List
Prefomed Closed Cell Foam Material		705-08

The maximum allowable total chloride content in concrete shall not exceed 0.10 percent by weight of cement. Testing shall be done in accordance with written procedural directives of NYSDOT.

**Proportioning Concrete:**

- A. The High Early Strength (HES) concrete mix design shall be submitted by the Contractor and approved by the Engineer prior to placing any HES cement concrete. Include admixture brands and dosages as well as mixing, transporting, placing, curing, and anticipated strength gain details. The mix shall meet the requirements of Table 502-1 in Subsection 502-2.02 High Early Strength Concrete, with the exception that the Opening Compressive Strength shall be 21.0 MPa after a 4 day curing period.
- B. Produce and place a 1.0m<sup>3</sup> (minimum) trial batch at an off-contract location selected by the Contractor, and agreed upon by the Engineer. Produce the trial batch using the same materials and processes as those to be used to produce concrete for the contract. Provide the Engineer a 7-day minimum advance notification of trial batch production. Produce and place the trial batch in the presence of the Engineer, the Regional Materials Engineer, and Materials Bureau personnel.  
Provide an American Concrete Institute (ACI) Certified Concrete Field Testing Technician, Grade I, or higher, to:
  - Measure slump, air content, and unit weight of trial batch.

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- Cast cylinders from the trial batch for compressive strength and freeze-thaw resistance testing.

Determine the compressive strength of the trial batch concrete at the desired time as discussed in Subsection 502-3.18C, Project Strength Determination.

The Materials Bureau will render a decision on mix acceptability, curing, and opening to traffic requirements within 45 calendar days of trial batch production. Changes other than minor fluctuations in admixture dosage rates require a new mix design and trial batch. The Engineer will reject the concrete if the specified slump or plastic air content are not achieved.

### **Concrete Batching Facility**

The requirements of Subsection 501-2.03 shall be met, except as modified herein.

- A. All equipment proposed for use shall have the Engineer's approval prior to the start of the work. The specific method and equipment that the Contractor proposes to use for finishing shall be subject to the approval of the Regional Construction Engineer. Specific equipment requirements follow:
1. Finishing Equipment. This shall meet the requirements of Subsection 584-2.04B except finishing machine shall be required only for pour areas exceeding 46 m<sup>2</sup>.
  2. Surface Texturing Equipment. The specific equipment to be used shall be approved by the Engineer. Prior to approval, the Contractor shall demonstrate to the Engineer's satisfaction that the equipment is capable of providing the required surface texture.

### **Concrete Mixer and Delivery Unit**

The requirements of Subsection 501-2.03 shall be met, except as modified herein.

The Contractor shall furnish a recording thermometer, for monitoring batch temperatures, to the Engineer prior to initiating any contract work under this item. The thermometer shall meet the requirements of Subsection 584-2.04C, except that it shall be capable of recording temperatures in the 0°C to 77°C range.

## **CONSTRUCTION DETAILS**

### **General**

Limitation of Operations – The requirements of Subsection 584-3.01 shall apply.

Blast Cleaning – The requirements of Subsection 584-3.02 shall apply.

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Preplacement Wetting – The requirements of Subsection 584-3.03 shall apply. No bonding grout shall be used.

The locations to be repaired shall be shown on the plans or will be designated by the Engineer. Repairs shall conform to the details shown on the drawings.

A four mil polyethylene film shall be installed to act as a bond breaker where required by this item, or where directed by the Engineer.

Preformed Closed Cell Foam Material shall be installed in longitudinal joints as shown or scheduled on the Contract Drawings.

**Reinforcement**

Existing reinforcement designated to remain in place after removal of structural concrete shall be cleaned in accordance with the requirements of Section 584-3.02A.

Existing reinforcement designated to remain in place that has greater than 25% section loss, in the opinion of the Engineer, shall be replaced with the same size and type of the existing reinforcement (uncoated or epoxy) according to the details in the contract drawings.

Bar reinforcement shall be placed at the locations indicated on the plans, and at all additional locations determined by the Engineer.

**Forms**

Forms shall meet the requirements of Subsections 555-3.03 and 557-3.03.

**Concrete Placement**

All surfaces receiving new concrete shall be blast cleaned in accordance with the requirements of Section 584-3.02.

Concrete shall be placed meeting the requirements of Subsection 584-3.05 and Subsection 557-3.05. Concrete may be placed directly from an approved mixer. Chutes used to place the concrete in final position shall be steel lined. The concrete shall be consolidated by internal vibration.

Concrete shall be finished with equipment meeting the requirements of Subsection 584-3.06A. The required macrotexture shall be achieved by longitudinal tining. The tining shall be commenced after a smooth, dense, and even surface has been achieved. Texture resulting from tining will stop within 300 mm of curbs.

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The design of this concrete shall be such that initial set will take place within 6 to 8 hours. To insure that the concrete is discharged and placed in the shortest possible time, the Contractor shall have sufficient labor force available to insure the rapid and expeditious incorporation of the concrete into the project. The provisions of Subsection 557-3.06 Cold Joints shall apply.

Under no circumstances shall the Contractor use more than one truck per repair area unless the second truck is standing by and has commenced its mixing cycle.

**Cylinder Testing**

For each day of production, six 150 x 300 mm cylinders will be taken by the Engineer during placement of a representative repair area and shall be immediately placed in autogenous (insulated) curing boxes furnished by the Engineer. The repair areas from which cylinders are taken shall have a minimum size of 7m<sup>2</sup>. The cylinders will be tested by the Engineer for compressive strength.

**Curing**

Curing shall consist of continuous wet burlap curing as described in Subsection 557-3.11.

If at any time during the curing period, the air temperature falls outside the range specified for curing, the concrete shall be inspected for damage. Concrete damaged by temperature, as determined by the Engineer, shall be removed and replaced by the Contractor at no cost to the Owner.

**Opening to Traffic**

When the repair area has achieved the specified strength requirement, established by the cylinder testing, the repair area may be opened to traffic.

**METHOD OF MEASUREMENT**

This work will be measured as the number of cubic meters of ITEM 555.0101 03 – HIGH EARLY STRENGTH (HES) CEMENT CONCRETE FOR FULL DEPTH SLAB REPAIR, AND PARAPET REPAIR AND LONGITUDINAL JOINT REPAIR satisfactorily furnished and installed.

**BASIS OF PAYMENT**

The unit price bid per cubic meter shall include the cost of furnishing all labor, materials, and equipment necessary to satisfactorily complete the work, including cleaning and blast cleaning. All sawcutting and concrete removal will be paid for under their appropriate items. Repairs to existing reinforcement designated to remain in place shall be paid for in accordance with 109-05. In locations where placement of new reinforcement is designated, the reinforcement shall be paid for separately under its appropriate item.