

ITEM 582.11 10 M - REMOVAL OF STRUCTURAL CONCRETE - REPLACEMENT WITH EPOXY PASTE

DESCRIPTION.

This work shall consist of the removal and disposal of unsound concrete from an existing structure and providing its replacement with moisture insensitive epoxy paste patching material. All work shall be done at the locations indicated on the contract plans, or where ordered by the Engineer.

MATERIALS.

Epoxy Repair Paste. Epoxy repair paste shall be a low modulus, non-sagging, two component 100 percent solids epoxy capable of bonding firmly to concrete and steel surfaces submerged in a salt water environment and curing fully within 24 hours at temperatures as low as 15 degrees C, meeting the following requirements:

1. Compressive Strength (ASTM C 695), 24 hours - 45 MPa
2. Bond Strength (ASTM C 882), 13 MPa – dry surface.
3. Shrinkage (ASTM C 883), no shrinkage/used with concrete.
4. Pot Life, minimum 2 hours at 20 degrees C.

Epoxy paste shall be manufactured by Fox Industries, Sika, Tamms Industries, or an equal as approved by the Engineer. The manufacturer shall provide written certification that their material meets the above properties.

Samples. Prior to the start of the work, samples of the epoxy paste and low viscosity epoxy shall be submitted for testing to the EIC. For the epoxy paste a well blended representative sample, 2 liter minimum of each component shall be supplied.

CONSTRUCTION DETAILS.

The Contractor shall begin in a tidal zone location that is easily accessible for inspection, as approved by the Engineer, such that actual repair work is done under water during high tide, and then it is fully exposed to air during low tide. The Engineer will then inspect and evaluate the repair material for complete filling, a good bond to the material being repaired, and finishing the area to match the surrounding material. If the repair is inadequate, the Contractor shall remove all the repair material, clean the repair area again, and modify installation methods and/or seek technical assistance until satisfactory results are obtained. Upon approval, the Contractor shall continue with those methods for the rest of the work.

Cleaning. All joint surfaces and voids shall be thoroughly cleaned of all sea growth, barnacles, vegetation, loose or unsound concrete, surface rust of existing reinforcement, or any other debris by mechanical abrasion, chipping hammers, or water blasting. If water blasting is chosen as a method of cleaning, the adequacy of the system used shall be demonstrated (prior to the start of the project), to the satisfaction of the Engineer, to

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evaluate the equipment's ability to remove unsound concrete, rust, sea growth, vegetation, and barnacles. All cleaning methods shall be approved by the Engineer.

All unsound concrete shall be removed to a sound surface as determined by the Engineer. Care shall be exercised while removing the unsound concrete so as not to damage materials which are to remain in place. Exposed reinforcement remaining in place shall be cleaned in accordance with the requirements of 584-3.04A. Chipping hammers shall meet the requirements of 580-3.02.

1. Removal for Concrete Replacement. The minimum depth of removal shall be the greater of the following:
 - a. A depth no less than 25 mm from the rear most point of reinforcement to sound concrete.
 - b. The depth necessary to reach sound concrete.

Should the removal depth exceed 150 mm, the Engineer may order supplementary anchoring as part of the replacement procedure. The sides of the cavity shall be made at a slight angle, so that the width of the base of the cavity is greater than the opening at the surface, thereby providing a key. Feather edges shall not be permitted. The minimum patch depth shall be 13 mm as measured from the theoretical plane of the original concrete surface.

Patching Material Placement. Patching material shall be prepared in accordance with the directions provided by the manufacturer. The Engineer shall be given two copies of the manufacturer's printed instruction at least two weeks prior to the start of all patching work. This shall include the mixing proportions and the mixing method. The manufacturer's literature shall be consulted for surface preparation and priming instructions. The material shall be troweled on in layers, the thickness of which depends on the material consistency and the location and profile of the surface to which it is applied. However, lift thickness in excess of 25 mm will not be permitted without the use of anchoring devices or formwork at overhead locations.

The Contractor shall follow the epoxy repair paste's manufacturer's storing, mixing, and placing instructions. The epoxy repair paste shall not be placed when the ambient temperature is, or is expected to drop below 15 degrees C, during the 24 hours following the time of epoxy application. Application of epoxy paste at temperatures lower than 15 degrees C will require prior written approval by the Director, Materials Bureau. No additional payment will be made for following cold weather placement procedure.

METHOD OF MEASUREMENT.

Measurement will be made as the number of square meters of the plane projection of the repaired area as indicated on the contract plans, or where ordered or approved by the Engineer. Measurement will be made prior to the placement of patching material.

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BASIS OF PAYMENT.

The unit price bid per square meter of repair shall include the cost of all material, labor, equipment, and incidentals necessary for the successful completion of the work. Payment will not be made for delays or repairs necessitated by the Contractor's operations.