

**TECHNICAL SPECIAL PROVISION
FOR CONCRETE RESTORATION**

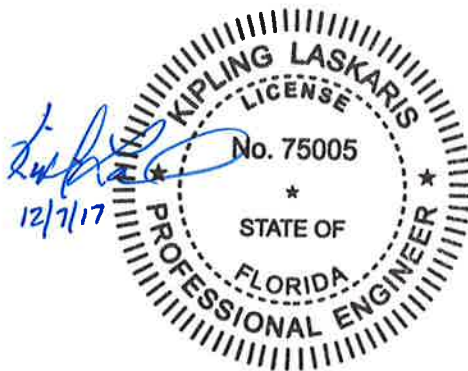
for

Contract No. 7240

Cleaning and Coating of Concrete Surfaces at

Cape Coral Bridge/College Parkway and

Veterans Memorial Parkway/Colonial Boulevard



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Certificate of Authorization No. 02317

Pages: 1-4

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T401 – Concrete Restoration

T401-1 Description:

Replace deteriorated concrete by placing polymer/latex modified concrete containing micro-silica or other specified material as indicated in the contract documents.

For the other specified materials, install in accordance with manufacturer's recommendations and the following installation requirements.

In addition to the locations of spalls shown in the Plans, the Contractor shall perform a sounding survey of the bridge deck and intermediate bent piles and identify all locations in need of concrete repair. The survey shall be performed in the presence of the Engineer prior to commencing any repair procedures. No concrete removal shall be performed without the Engineer's approval.

T401-2 Materials:

Mortar/concrete shall be an approved products list (APL) approved polymer/latex modified-silica fume enhanced mortar/concrete unless otherwise required in the contract documents. The selected material shall achieve a minimum compressive strength of 4,500 psi in seven days and 5,500 psi in 28 days. Due to the nature of the repairs, materials applied with pneumatic sprayers are not allowed.

For horizontal or vertical spalls greater than 1 inch deep, use repair mortar that includes an FDOT approved aggregate in accordance with manufacturer's recommendations.

For spalls near the water that may be submerged during cure, add anti-washout mixture.

For horizontal or vertical spalls less than 1 inch deep, hand-apply repair mortar in accordance with manufacturer's recommendations.

Proposed repair material and method of application (including manufacturer's specifications and formulation) shall be submitted for approval by the Engineer prior to commencing work.

Materials must be applied in accordance with Section 400 of the FDOT Specifications, these Technical Special Provisions, the plans, and the manufacturer's recommendations.

T401-3 Surface Preparation:

Remove deteriorated concrete to sound material (or limits described in plans) by chipping with light duty pneumatic or electric concrete chippers (30 LB or less in general, 15 LB or less adjacent to strand, reinforcing steel, and structural limits of construction). Remove concrete that is contaminated with grease or oil.

Blast clean all reinforcing bars and strand exposed after cleaning to leave a near white metal surface. Replace bars that have lost 1/4 or more of their original diameter with new bars spliced in place within the original cover, lapping sufficiently to develop the full strength of the bar as detailed in the plans and, if necessary, providing additional chipping. Dual bars of equivalent or greater section may be used. Where the bond between existing concrete and reinforcing steel has been destroyed, or where more than half the diameter of

the steel is exposed, remove the concrete adjacent to the bar to a depth that will permit modified concrete to bond to the entire periphery of the exposed bar. In some cases the engineer may require undercutting all exposed reinforcing steel if required to achieve improved bonding. A minimum of ¾ inch clearance is required for this purpose. Prevent cutting, stretching or damaging of exposed reinforcing steel.

Blast clean existing concrete surfaces that will be in contact with freshly placed repair material and clean to remove loose material and dust immediately prior to application of repair material.

T401-4 Mixing:

Provide a Mix Plan for quantities of bag mix in excess of 1.0 cubic yard at a single location for the Engineer's approval including: manufacturer's specifications, method of mixing, means of application, and placement procedure to provide a homogenous pour free of cold joints. Use clean mixers and accurately proportioned ingredients. Mix the materials at the site in accordance with the specific equipment requirements. Ensure that the material, as discharged from the mixer, is uniform in composition and consistency.

T401-5 Quality Control:

A quality control/quality assurance (QC/QA) plan that shall govern all work shall be submitted by the Contractor to the Engineer for approval prior to commencing the installation work for the concrete restoration. Cost of the quality control and other technical services shall be included as incidental to the concrete restoration. No additional payments will be allowed for technical services.

As a minimum, include in the QC/QA Plan means and methods and equipment for removing the deficient concrete and cleaning the reinforcing steel, repair materials, and forming and placement methods. Also include frequency of intended QA visits and time to discuss QC and method of construction with Contractor's and the Engineer.

Produce 4 to 6 test cylinders (as requested by the Engineer) in accordance with ASTM C31 and test for compressive strength gain determinations in accordance with ASTM C39. The Engineer will determine the time of testing. Cure test cylinders in air for the full curing period required before testing

T401-6 Placing and Finishing

Typical spall repair:

A concrete bonding agent, compatible with the repair material and approved by the Engineer, shall be applied to exposed reinforcing steel prior to the placement of new repair material, and, if recommended by the material manufacturer, to the existing concrete. The compound shall be applied and cured in accordance with approved manufacturer's instructions. The bonding agent shall contain corrosion inhibitors. Measures for dewatering areas near the waterline, or providing alternate suitable repair materials for use underwater, all incidental to the concrete restoration work, shall be submitted to the Engineer for approval.

Repair areas of unsound concrete with the following modifications for spalls greater than 1 inch deep. Cut the upper perimeter of sound concrete to an angle sloping slightly upward to avoid entrapping air and water. Form area to be repaired to original neat lines. Form must withstand the anticipated head of the repair material and a minimum pressure of 10 psi. Apply form release agent, compatible to the repair material, to interior surfaces of form. Pump material into forms with proper venting to ensure complete filling of voids, starting with a port at the bottom of the form. Perform external form vibration as necessary to insure proper consolidation. Cap vents when steady flow of material is ensured then fill until an immediate increase of 3 to 5 psi is detected. Upon removal of forms, cure the repair material and patch any deficiencies detected. See plans for additional details. At the Engineer's discretion, gravity fed pours may be allowed in some cases for uniform deficiency shapes where quality control can be assured after trial installations. Forms are not necessary for horizontal top of deck spall repairs.

T401-7 Limitations:

Do not place repair material at temperatures below 45°F, or above 85°F, or more stringent temperature ranges provided by the manufacturer unless adequate protection is provided against adverse effects of extreme temperature conditions.

Coarse aggregate to extend repair material (when bagged mix is used) shall be maintained at a clean, dry, location where protected from the elements to avoid material contamination. Amount of aggregate for grout extension shall be as recommended by material manufacturer. Use coarse aggregate approved by the repair material manufacturer or from an FDOT approved source.

T401-8 Method of Measurement:

The quantity to be paid for will be the volume in cubic feet of concrete repair material authorized, complete, in place and accepted. The method utilized in determining the volume shall be calculated by the Contractor for concurrence by the Engineer and will be the surface area in square feet multiplied by the average depth of such areas.

T401-9 Basis of Payment:

Price and payment will be full compensation for all work specified in this Technical Special Provision including all removals, surface preparations, bonding agents, concrete placement, dewatering, forming, materials, equipment, tools, scaffolds, labor and other materials necessary to complete the work in accordance with the contract documents.

Payment will be made under:

Pay Item No. 401- 70- 4
Restore Spalled Areas – Portland Cement Grout
Per Cubic Foot (CF)