WJE

SECTION 03 36 50
CONCRETE RESTORATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Proprietary patching applications for repair of concrete.

B. Related Sections include the following:
   1. Section 07 14 60 - Cold Fluid-Applied Waterproofing

1.2 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of concrete required for this Project.

B. Field Supervision: maintain experienced full-time supervisors on Project site during times that removal and preparation work is in progress. Do not change supervisors during Project except for causes beyond the control of the Contractor.
   1. Workers: minimum two (2) years' experience in related concrete restoration. Fully supervise apprentices with an experienced tradesperson.

1.3 WARRANTY

A. Manufacturer Warranty: Material manufacturer shall warrant the patching material against defects that include, but not be limited to, cracking in or around the patch perimeter, scaling, delamination, and spalling caused by deficiencies in the materials by the patching material manufacturer.
   1. Warranty Period: Five (5) years from the date of Substantial Completion.

B. Special Installer's Warranty: The Contractor shall warrant the concrete repairs to be free of faults and defects in accordance with the General Conditions. Installed work discovered to contain faults or defects within the five-year warranty period shall be repaired or replaced with materials in accordance with the specification at no cost to the Owner. The warranty shall be signed by the Contractor and Subcontractor performing the work.
   1. Warranty Period: Five (5) years from the date of Substantial Completion.

PART 2 MATERIALS

2.1 GENERAL

A. Compatibility: Provide repair mortar, polymer admixtures, epoxy for steel reinforcement, and other related materials that are compatible with one another and with substrates under conditions of service and application, as demonstrated by manufacturer representative.

2.2 PROPRIETARY PATCHING MATERIALS

A. Structural Repair Mortar for Horizontal and Formed Vertical, Overhead Patches: Polymer-modified, cementitious mortar with 3/8-inch aggregate added if needed per the manufacturer's recommendations. Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
   1. SikaQuick 1000
   2. Or approved equal.

B. For Trowel-Applied Patches on Vertical and Overhead Surfaces: Polymer- or silica-fume-modified, cementitious, non-sag mortar that is specifically intended for this application. Use one of following:
   1. SikaQuick VOH
   2. Or approved equal.

C. Epoxy for Coating Exposed Reinforcing Steel:
   1. Sikadur 32 Hi-Mod; Sika Corporation.
   2. Or approved equal.

D. Coarse aggregate for deeper concrete patches shall be rinsed 3/8 in. basalt chips.

2.3 STAINLESS STEEL SHAPES

A. Stainless steel shapes and threaded rods shall conform to ASTM A316L.

2.4 ADHESIVE FOR ANCHORS TO CONCRETE

A. Adhesive for anchoring threaded rods, rebars or other elements to concrete:
   1. Hilti HIT-RE 500 V3 Injectable Mortar, Hilti Corporation.

2.5 BAR SUPPORTS

A. Bolster, chairs, spacers, and other devices for spacing, supporting and fastening reinforcing bars in place shall be compatible with the supported bars materials and non-corrosive.

2.6 EQUIPMENT

A. Pneumatic chipping hammers of nominal 15-lb class or less for removal of concrete at repair locations.

B. Percussive or rotary drilling equipment for making holes in the concrete substrate for dowel or pin installation.

C. High pressure (90 psi minimum), oil-free compressed air equipment capable of removing dust and dirt from concrete repair areas, and exposed concrete surfaces.

D. Sawing equipment shall be capable of sawcutting the existing concrete to the specified depth.

E. Other equipment such as scrapers, scarifiers, etc. as required to remove existing coatings.

F. Equipment to scarify to the concrete substrate for bonded concrete overlay and traffic coatings.

PART 3 EXECUTION

3.1 GENERAL

A. All materials shall be installed in strict accordance with the manufacturer's written instructions.

3.2 EXAMINATION

A. The Contractor shall visually examine and sound the concrete surfaces to be repaired to identify spalled, deteriorated, and delaminated concrete. Concrete repair areas shall be marked for Architect's verification prior to concrete removal.

3.3 CONCRETE REMOVAL AND PREPARATION

A. Grind or cut square the repair area edges to provide a uniform, straight edge.

B. During the partial depth repair removal process, exercise care to avoid cracking the adjacent sound concrete. Perform partial depth removal with hammers applied at angles of no more than 60 degrees with the surface.

C. All existing reinforcing shall remain in place unless its removal is directed by the Architect. Where portions of the reinforcing are exposed, remove concrete around and under the bars. For all fully exposed reinforcing, the clearance between the bar and the concrete shall be a

minimum of 3/4 in., measured radially, from the existing concrete. All cuts shall be straight lines and intersect at right angles wherever possible. Avoid 90-degree re-entrant corners.

D. Do not damage the existing reinforcing. Replace at no cost to the Owner any reinforcing damaged by Contractor's operations.

E. All areas of bruised concrete shall be removed. Clean the repair openings by blowing away loose material with a dry, compressed air jet.

F. Inspect and sound all prepared concrete surfaces, repair opening edges, and complete surface preparation to verify that all delaminated and unsound concrete has been removed prior to inspection by the Architect. Remove any additional delaminated concrete prior to inspection by the Architect. Additional saw-cutting may be necessary.

G. The Architect shall be allowed a minimum of 48 hours for the inspection of properly prepared concrete surfaces and reinforcement before the scheduled concrete placement.

H. Where supplemental reinforcement is required by the Architect, sound and unsound concrete shall be removed such that the supplemental reinforcing may be properly positioned with full encasement of new concrete, to achieve the proper lap splice length, and a minimum clear cover of 1-1/2 in.

I. Prior to patching of the void, the contact surfaces between the new and existing concrete shall be brought to a saturated surface dry condition.

J. Prior to placing the new Proprietary Patching Material, the material shall serve as a slurry to be scrubbed into the contact surface of the existing concrete to optimize the bond.

K. Form and cast the new Proprietary Patching Material while the slurry is still plastic.

L. New Proprietary Patching Material shall be vibrated for consolidation and moist cured.

M. The contractor is advised that concrete repair areas in which material is to be removed may contain embedded electrical conduit. If conduit is damaged during concrete removal, new similar embedded conduit shall be installed by an appropriately qualified electrician. All embedded conduits that are exposed shall be treated with coatings similarly to embedded reinforcement. Notify Architect of all areas in which deteriorated electrical conduit is uncovered during concrete removal. All electrical conduit work shall be coordinated with the owner.

3.4 REINFORCEMENT CLEANING AND COATING

A. The bars shall be cleaned with both pneumatic needle gun and then wire wheels to completely remove all rust.

B. Mix the components of the epoxy in proper proportions according to the manufacturer's directions.

C. Fully coat all portions of exposed existing reinforcing bars or welded wire fabric, including the underside, with two liberal coats of epoxy that cover the reinforcement with no gaps, pin holes, or holidays. The first coat shall dry before applying the second coat. A touch-up coat shall be applied if pin holes or holidays remain after the second coat. The minimum dry film thickness of the coating shall be approximately 10 mils.

D. Avoid spilling epoxy on the concrete substrate. Remove any spillage by solvents or additional chipping of the concrete.

3.5 SUPPLEMENTAL OR REPLACEMENT REINFORCEMENT

A. Bring to the attention of the Architect for inspection reinforcing bars that are damaged, incorrectly located, fractured, or that have lost more than 10 percent of their original cross-sectional area at any point. The Architect will determine if the bars should be removed and replaced, or supplemented with additional reinforcing bars.

B. If during removal of unsound concrete, the existing reinforcing bars are found to have a clear cover of less than 1/2 in. cover from the existing concrete surface, notify the Architect before repairs are implemented. A decision will then be made by the Architect on whether to remove or modify those reinforcing bars, or to build out the patch over the bars to provide additional cover. The Contractor shall at no time remove existing reinforcing steel without the prior approval of the Architect.

3.6 PROPRIETARY PATCHING MATERIALS

A. Measure, batch, mix, place, finish, and cure in strict conformance with the manufacturer’s recommendations.

B. Source Limitations: Obtain materials through one source from single manufacturer, or from sources approved by the material manufacturer.

3.7 CLEANING

A. Clean off excess Proprietary Patching Material or smears adjacent to repair areas as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products.

3.8 PROTECTION

A. Protect concrete repairs during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so repairs are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated repair areas immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION