

SECTION 03900P – CONCRETE RESTORATION AND CLEANING

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes:
 - 1. Repair of spalled and debonded exposed concrete surfaces.
 - 2. Cleaning of soiled concrete surfaces.

1.2 PERFORMANCE REQUIREMENTS

- A. For significant concrete repairs and/or if requested by the Owner, the Architect shall engage a qualified concrete technologist who is a Rhode Island licensed engineer, to evaluate the condition of the concrete structure and the causes for deterioration, and write a report documenting their findings and recommendations. Submit the report to the Owner for review prior to specifying concrete repairs.
- B. General guidance regarding evaluation of existing conditions: Make actual on-site field surveys using pachometer, sounding techniques, chain-drag, measurement of carbonation, and other appropriate methods to determine the full extent of existing deterioration and the probable long-term extent of deterioration. Develop a matrix of cost options that address the following issues:
 - a. Replacement Option: Replacement of the structure with new construction of a more durable type
 - b. Continued Maintenance Option – Limited repair combined with coatings or other treatments that extend the life of the structure
 - c. Long-term Repair – Full replacement or rehabilitation of all reinforcement or other elements subject to deterioration over the foreseeable future.
 - d. Other reasonable options particular to the specific structure under consideration, such as cladding, roofing, or other protection.

Based on the projected long-term economic cost and service life, recommend an appropriate option in the evaluation report.

- C. After selecting an appropriate option in consultation with the Project Manager, prepare detailed concrete repair drawings showing building elevations, location of concrete elements, repair details for each type of repair, and estimating the quantity of repair work to be performed. The repair drawings shall also show all embedded items, interface with adjacent materials, formwork if used, in sufficient detail to cover all the requirements of the work.
- D. Comply with the recommendations of ACI, including:
 - 1. ACI 201.1 – Guide for Making a Condition Survey of Concrete in Service
 - 2. ACI 364.1 – Guide for Evaluation of Concrete Structures Prior to Rehabilitation

- E. Install a mock-up of the proposed repair at a test location approved by the Owner. Reinstall the mock-up as many times as required for acceptance.
- F. Concrete cleaning - The cleaning materials, equipment and methods shall not cause staining, etching, erosion or other damage to the concrete surfaces. Demonstrate the proposed cleaning materials, equipment and methods on a test section at least 4 ft by 4 ft at a location approved by the Owner. Adjust the cleaning process as many times as required for acceptance. Use the minimum strength cleaning material that provides acceptable results. Retain and protect the approved test section during the work as a standard for the cleaning work.
- G. Environmental: In specifying a cleaning material, all parties to the work shall take into consideration all applicable federal, state, local, and other environmental regulations regarding the testing, handling, containment, collection, transport, disposal and discharge of hazardous wastes and cleaning effluents.
- H. Protect the structure and all adjacent surfaces from damage associated with the work.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Provide cleaning materials by the following:
 - 1. ProSoCo, Lawrence, Kansas
 - 2. Approved equal
- B. Provide polymer modified repair mortar by the following
 - 1. Fosroc
 - 2. Sika
 - 3. Approved equal
- C. Provide zinc-rich primer (minimum 70% zinc by weight of dried primer) by the following:
 - 1. Duncan Galvanizing
 - 2. Tnemec
 - 3. Sherwin-Williams
 - 4. Approved equal

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Remove unsound, weak or damaged concrete with hand tools.
- B. Remove concrete from around exposed and or corroding steel reinforcement. Expose steel a minimum of 1 inch beyond existing concrete to provide bond to patching material. Mechanically clean exposed steel down to bare metal. Paint exposed steel with 2 coats of zinc-rich primer per manufacturer's recommendations. Paint dry film thickness shall be 3 mil minimum per coat.
- C. Remove damaged concrete to a depth of 1/2 inch minimum. Sawcut edges of repair area to a depth of 1/2 inch to prevent featheredging.
- D. Provide stainless steel anchors for patch material in repair areas without existing steel reinforcement, to ensure that the patch material is mechanically bonded to the existing concrete. Space anchors approximately 6 inches each direction. Use stainless steel screws or threaded rods for mechanical bond.
- E. Immediately before placement of patching materials, clean and rinse the excavated concrete surface to remove all dust and debris. The substrate to receive the patch material shall be saturated surface dry.
- F. Use primers or bonding agents as recommended by the manufacturer of the patch material.

3.2 INSTALLATION OF REPAIR MORTAR

- A. Do not install repair material in temperatures below 40°F. In hot weather or windy conditions protect the material from premature drying as recommended by the manufacturer.
- B. Use formwork wherever feasible. Formwork shall have sealed surfaces to ensure that no water is absorbed from the repair material.
- C. Where steel reinforcement has inadequate cover (less than 2 inches), provide a buildup of the repair material to provide a minimum cover of 2 inches.
- D. Follow repair material manufacturer's written instructions for placing, stripping, finishing and curing.

3.3 CLEANING

- A. Protect the building, its interior, pedestrians, landscaping, vehicles and the site from all risks associated with the work. Do not work in winds that would cause drifting of spray of cleaning materials or rinse water. Protect glass, aluminum, polished stone, and all other surfaces as required.

- B. Apply cleaners in areas of repair patches only after repair materials have cured sufficiently as recommended by the repair material manufacturer.
- C. Apply cleaners to substrates in accordance with manufacturer's printed instructions. Prewet the surface prior to applying cleaning materials. When cleaning vertical surfaces, keep lower surfaces wet to avoid streaking. Scrub surfaces with cleaning brushes to loosen dirt and contaminants.
- D. Rinse surfaces using low pressure (less than 400 psi) equipment.
- E. Manufacturer's Field Services: Provide the services an authorized field representative from the manufacturer to verify that test sections, surface preparation and application of cleaning materials is in accordance with manufacturer's instructions and the project requirements.

END OF SECTION