

**PROGRAM COMMENT FOR DEPARTMENT OF DEFENSE
REHABILITATION TREATMENT MEASURES**

APPENDIX 4

SECTION 04110.02

REPAIR OF HISTORIC STUCCO

PART 1 - GENERAL

1.01 DESCRIPTION

- A. This specification provides procedures appropriate for repairing cracks and patching historic stucco.
- B. This specification has been developed for use on historic properties (defined as any district, site, building, structure, or object that is listed in or eligible for listing in the National Register of Historic Places) and provides an overview of accepted practices.
- C. All work described herein and related work must conform to the Secretary of the Interior's Standards for the Treatment of Historic Properties.
- D. The Contractor shall provide all labor, materials, equipment, and operations required to complete the rehabilitation work indicated herein.
- E. All work described herein and related work must have the approval of a Cultural Resources Manager, Conservator, Historic Architect, or other professional who meets the standards outlined in the Secretary of the Interior's Standards – Professional Qualifications Standards pursuant to 36 CFR 61. Such person is referred to in this document as the *Architect*.
- F. Site-specific specifications, when appropriate, will be provided by the Architect.

1.01 SECTION INCLUDES

- A. Selecting the appropriate stucco (see Section 04110.01)
- B. Stucco patching

1.02 RELATED SECTIONS

- A. 04110.01 – Preparation of Lime- or Portland-Based Stucco
- B. 04400.01 – Identifying Masonry Types and Failures
- C. 04510.01 – Cleaning and Testing of Atmospheric Soiling, Graffiti, Stains, and Biogrowth (pending issuance)
- D. 07100.01 – Water Repellent Properties and Application (pending issuance)
- E. 09910.01 – Surface Preparation and Repainting on Masonry (pending issuance)

1.03 REFERENCES

- A. *The Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring & Reconstructing Historic Buildings* available at the National Park Service (NPS) website at <http://www.nps.gov/history/hps/tps/standards_guidelines.htm>.
- B. *Preservation Brief No. 22: The Preservation and Repair of Historic Stucco* available online at NPS website at <<http://www.nps.gov/history/hps/tps/briefs/brief22.htm>>.
- C. Conway, Brian D. *Illinois Preservation Series Number 2: Stucco*. Springfield, Illinois: Illinois Department of Conservation, Division of Historic Sites, 1980.
- D. Portland Cement Plaster (Stucco) Manual. Skokie, Illinois: Portland Cement Association, 1980.
- E. Vieux Carre Masonry Maintenance Guidelines. Revised from the initial report prepared by Mary L. Oehrlein in 1977. New Orleans, Louisiana: Vieux Carre Commission, 1980.
- F. ASTM C 207 Standard Specification for Hydrated Lime for Masonry Purposes.
- G. ASTM C 144 Standard Specification for Aggregate for Masonry Mortar.
- H. ASTM C 150 Standard Specification for Portland Cement.
- I. ASTM C 1328 Standard Specification for Plastic (Stucco) Cement.
- J. ASTM C 979 Specification for Pigments for Integrally Pigmented Concrete.
- K. ASTM A653/A653M Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
- L. ASTM A123/A123M Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- M. ASTM C926 Standard Specification for Application of Portland Cement-Based Plaster
- N. FS QQ-L-101: Federal Specification: Lath, Metal, and Other Metal Plaster Bases

1.04 SUBMITTALS

- A. The Contractor shall submit a detailed schedule of the areas to be stuccoed, including an assessment of the problem areas, a historic stucco analysis, and detailed procedures for stucco repairs, to the Architect for approval.
- B. Product Literature: The Contractor shall submit manufacturer's product literature to the Architect for all proprietary products specified for stucco patching, grouting and replacement. Product literature shall include specification data, Material Safety Data Sheets, and instructions for storage, handling, and use.
- C. Samples: No stucco restoration work shall proceed until all samples are approved by the Architect. The Contractor shall submit samples of the following stucco repair and replacement materials for the Architect's approval of color and texture match:

Cured stucco samples: Prepare portable samples approximately 6x6 inches. Once a matching stucco color has been approved by the Architect, placement of on-site mock-ups may begin.

1.05 QUALITY ASSURANCE

- A. Work Experience: The Contractor and masons to perform the work in this section shall have demonstrated experience with preparation and installation of historic stucco, ideally a minimum of ten (10) years. He/she shall demonstrate a working knowledge of the Secretary of the Interior's Standards for Guidelines for Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring, and Reconstructing Historic Buildings.
- B. The Contractor shall not change sources or manufacturers of stucco materials during the course of the work.
- C. Warranty: Contractor shall provide a warranty in writing against defects in material and installation for a period of five (5) years.

1.06 MOCK-UPS

- A. The Contractor shall prepare mock-up installations of each type of stucco to be installed at locations selected by the Architect. Test panels shall have a minimum area of 3x3 feet and shall include all types of work required in the overall project, such as patching, and crack repair. Any special tooling and texturing should be included. If cleaning tests are also to take place, test panels should be prepared on the same area. Test panels should not be undertaken in areas that are highly visible. Test panels will be inspected by the Architect for color, texture, and installation technique.
- B. After the test panels have cured for a period of two to three weeks (or otherwise specified by the Architect), the test panels will be inspected for color, texture, and installation technique.
- C. Each mason proposed for work on the project shall prepare a mock-up panel. Masons whose mock-ups are not approved shall not be permitted to work on stucco repair and replacement.
- D. Where stucco is not acceptable to the Architect, the Contractor shall prepare up to three additional mock-ups of each stucco without further compensation. Approved test area(s) shall become part of the work and shall serve as the quality standard for all subsequent work.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. The Contractor shall deliver all products to the site in original packaging, unopened, and undamaged with manufacturer's name and product identification visible thereon, and manufacturer's instructions and Material Safety Data Sheets.
- B. The Contractor shall store products in a dry location and protect them from dampness and freezing following manufactures instructions.

- C. The Contractor shall stockpile and handle aggregates in a manner to prevent contamination from foreign materials.

1.08 PROJECT / SITE CONDITIONS

- A. Normal conditions for the work of this Section shall be defined as when the air and surface temperatures are 40 degrees F and rising or less than 90 degrees F and falling. When temperatures are predicted to rise above or fall below this temperature range, the Contractor shall implement hot or cold weather procedures as defined by the Masonry Institute of America.
- B. The Contractor is responsible for protecting existing adjacent materials and surfaces during the execution of the work and shall provide all necessary protection and follow all necessary work procedures to avoid damage to existing material assemblies not a part of the work in the Section:
 - 1. Minimize levels of dust during stucco removal and application operations.
 - 2. Protect open joints and other vulnerable areas from water penetration to prevent leakage during the course of the work. Open areas shall not be left exposed overnight or when inclement weather is predicted.
 - 3. Temporarily remove and store metal downspouts, window grilles, and other surface-mounted appurtenances during stucco restoration work. Install temporary drainage leaders and window protection if required and reinstall immediately upon completion of work in the immediate area. Protect open boots at grade from accumulation of stucco debris.
 - 4. Protect existing built-in gutters and gutter outlets from damage and accumulation of mortar debris during work on chimneys and parapets.
 - 5. Protect window sashes and frames with plywood or other sturdy barrier during removal of stucco around window openings.
 - 6. Protect the existing roof surface from damage during the course of the stucco rehabilitation work. Repair all damage to slates, metal roofing, gutters, flashings, etc., to the satisfaction of, and at no additional cost to, the Government
 - 7. Protect adjacent work from moisture deterioration and soiling due to stucco application operations. Provide temporary coverings as required to minimize spattering of stucco on other materials.
- C. The Contractor shall provide visible barriers and / or warning tape around the perimeter of the work area for visitor protection and shall provide that nearby vehicles and adjacent structures and foliage are protected from damage during the course of the work.
- D. Contractor shall coordinate stucco work with the other trades involved in exterior rehabilitation work, including but not limited to masonry cleaning, sealing, and painting.

PART 2 – PRODUCTS

2.01 PATCHING HISTORIC STUCCO

The type of substrate must be identified (see section on Identifying Masonry Types and Failures 04400.01). The chosen stucco composition must be compatible with the substrate.

A. Patching Material:

1. Stucco: See Section 04110.01, Preparation of Lime or Portland-Based Stucco.
2. Bonding agent: Where applying stucco coats over smooth substrates such as concrete or concrete unit masonry or when applying new finish coats over existing base coats, the use of a bonding agent may be appropriate. The type of bonding agent required (if any) shall be determined by the Architect and will depend on the composition of the stucco and the substrate to which it will be applied.
 - a. Proprietary bonding agents shall conform to the requirements of ASTM C932 Standard Specification for Surface-Applied Bonding Compounds for Exterior Plastering.

B. Equipment:

Mixing: Trough, wheelbarrow, plastic buckets, hoe, hawk, trowel, burlap (clean, undyed, and unprinted).

1. Stucco Application: Plastic buckets, hoe, hawk, trowel, burlap (clean, undyed, and unprinted)
2. Stucco Removal: Chisel, mason's or chipping hammer, mallet, mortar board

2.02 METAL SUPPORT, FURRING, LATHING, AND ACCESSORY MATERIALS FOR STUCCO

A. Metals and Finishes:

1. Exterior Components: As appropriate for the historic resource, hot-dip galvanized finish; ASTM A653 for 18-gauge and lighter formed metal products; ASTM A 123 galvanized after fabrication for 16-gauge and heavier products.
2. Exterior Exposed Plastering Accessories: Provide zinc alloy accessories.

B. Wire Ties: Galvanized soft steel wire, gauge as required.

C. Metal Lathing Materials:

1. Product Standards: Comply with FS QQ-L-101 C.
2. Exterior Metal Lath: Self-furring, 3.4 lbs. per square yard, galvanized steel with black asphaltum coating.

D. Metal Stuccoing Accessories:

1. Square Edge Casting Beads: Manufacturer's standard, size for thickness indicated, with expanded or short flange to suit application.

2. Fasteners: Galvanized steel, of type and length suitable for adequate penetration of the substrate.

PART 3 - EXECUTION

3.01 GENERAL

- A. The extent of the stucco work and areas to be stuccoed shall be approved by the Architect on site prior to beginning operations. Contractor shall submit testing schedule and a stucco schedule, including the methods and materials to be used.
- B. The Contractor shall protect adjacent materials, openings, and substrate.

3.02 EVALUATION OF EXISTING STUCCO

- A. Visual inspection and conditions analysis: The Contractor shall:
 1. Identify cause and location of stucco deterioration.
 2. Coordinate stucco work with other repairs such as gutter and roof work, cleaning, removal of overgrown vegetation, water runoff and diversion from the building, and painting and sealing.

3.03 STUCCO REPAIR OF MINOR CRACKS ($\frac{1}{8}$ inch and smaller)

- A. Crack should be free from dirt, grease, and vegetation. Blow cracks clean with compressed air, not to exceed 150 psi.
- B. As appropriate, coat crack with a bonding agent in accordance with manufacturer's instructions.
- C. Prepare a slurry coat of stucco to match the color and finish of the existing stucco.
- D. Apply a light coat of the slurry along the crack and work to match existing stucco.

3.04 STUCCO REPAIR OF LARGE CRACKS (larger than $\frac{1}{8}$ inch)

- A. Cracks to be repaired shall be routed to a minimum width and depth of $\frac{1}{4}$ inch to accommodate stucco fill. The edges of the crack shall be undercut where possible. Brush cracks clean of loose debris with a soft brush.
- B. The area to receive the stucco fill shall be thoroughly wetted to prevent dehydration of the stucco. Re-wet as necessary. Using the approved stucco mix, fill the crack and work stucco in as tightly as possible until flush with adjoining surface. Remove excess stucco. Protect filled areas with plastic sheeting and re-wet periodically to allow a full cure.

3.05 STUCCO REPAIR BY PATCHING

- A. Extent and area of patches shall be carefully assessed and reviewed by the Architect.

- B. Remove all loose, deteriorated, and severely cracked stucco to the masonry substrate or lath. Avoid oversounding to prevent additional damage to adjacent keys.
- C. Stucco on Masonry Substrate:
 - 1. Stucco is applied directly to masonry substrates such as brick, stone, concrete, or hollow tile without lath.
 - 2. If necessary, rake out brick or stone mortar joints to a depth of $\frac{5}{8}$ inch.
- D. Masonry on Wood Substrate:
 - 1. Wood Substrate: Determine type of lath—horizontal wood slats or wire mesh, if appropriate.
 - 2. Lath should be in good condition, free of rot and / or rust.
 - 3. Replace areas of metal lath and underlay as approved by the Architect. New wire lath should be nailed over existing wood lath, following review by the Architect.
- E. Surface should be free of debris, dust, dirt, grease, oil, paint, and vegetation. Clean with a bristle brush.
- F. Area should be cut on the diagonal and squared off with a butt joint to provide a neat patch. If necessary, and as reviewed by the Architect, it may be preferred to stucco the area of an entire feature.
- G. New patch must not overlap existing stucco.
- H. Dampen surface before applying stucco.
- I. Apply the scratch coat to the masonry substrate or lath. Number and thickness of the repair coats should match the historic stucco. The scratch coat is generally $\frac{1}{4}$ to $\frac{3}{8}$ inch thick, and must be scratched or crosshatched with a comb to provide a key for the second coat. Allow scratch coat to dry 24 to 72 hours.
- J. The leveling or second coat is often applied in the same thickness as the initial coat. The total thickness of the first two coats is generally $\frac{5}{8}$ inch. Roughen the surface to provide a key for the finish coat.
- K. The final or finish coat is applied when the leveling coat is initially set. Work the finish coat to match the texture of the historic stucco.

3.06 FINAL REPORT

- A. For stucco repair and replacement where no paint or other surface finish is applied, the contractor shall revisit the site with the Architect after the new stucco has cured at least 30 days to inspect the work to see if the desired effect has been achieved.

- B. The Contractor and Architect shall provide a final report of complete work including all approved submittals and photographs of the repaired areas taken before, during, and after the work.

END OF SECTION