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# Removing And Replacing Deteriorated Cast Stone Balusters

**Procedure code:**

472001S

**Source:**

National Capitol Region Specifications

**Division:**

Masonry

**Section:**

Cast Stone

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12/23/2014

## REMOVING AND REPLACING DETERIORATED CAST STONE BALUSTERS

### PART 1---GENERAL

#### 1.01 SUMMARY

A. This procedure includes guidance on the removal of deteriorating exterior cast stone (concrete) balusters and their replacement.

B. See 01100-07-S for general project guidelines to be reviewed along with this procedure. These guidelines cover the following sections:

1. Safety Precautions
2. Historic Structures Precautions
3. Submittals

4. Quality Assurance
5. Delivery, Storage and Handling
6. Project/Site Conditions
7. Sequencing and Scheduling
8. General Protection (Surface and Surrounding)

These guidelines should be reviewed prior to performing this procedure and should be followed, when applicable, along with recommendations from the Regional Historic Preservation Officer (RHPO).

#### 1.02 REFERENCES

- A. American Society for Testing and Materials (ASTM), [www.astm.org](http://www.astm.org)
- B. American Concrete Institute (ACI), [www.concrete.org](http://www.concrete.org)
- C. Cast Stone Institute, [www.caststone.org](http://www.caststone.org)
- D. Architectural Precast Association, [www.archprecast.org](http://www.archprecast.org)

#### 1.03 SUBMITTALS

- A. Product Data: Submit specifications and other data for cast stone, including certification that it complies with specified requirements. Include instructions for handling, storage, installation and protection.
- B. Shop Drawings: Submit drawings showing sizes, dimensions, sections and profiles of cast stone units, arrangement and provisions for jointing, anchoring and fastening, supports and other necessary details for lifting devices and reception of other work. Indicate location of each unit on setting drawings with number designation corresponding to number marked on each unit.

#### 1.04 QUALITY ASSURANCE

A. Regulatory Requirements: Provide cast stone which complies with requirements of "Specifications for Cast Stone" (ACI 704-44) of the American Concrete Institute;

Or "Standard Specification for Architectural Cast Stone" (Section 04-72-00 (2011) of Cast Stone Institute;

Or "Architectural Cast Stone" (Section 04720), Architectural Precast Association.

B. Mock-Ups:

1. Prior to installation of stonework, provide one sample railing with all balusters to indicate proposed range of color, texture and workmanship to be expected in completed work. Build mock-up at site as directed, using stone, anchors and jointing, as specified in accordance with final shop drawings.

2. Obtain Contracting Officer's acceptance of visual qualities of balusters before start of stonework. Replace unsatisfactory mock-up work as directed, until acceptable to Contracting Officer. Retain sample panels during construction as a standard for judging completed stonework. Do not alter, move or destroy mock-up until work is completed.

### 1.05 DELIVERY, STORAGE AND HANDLING

A. Packing and Shipping:

1. Finished cast stone shall be carefully packed and loaded for shipment using all reasonable and customary precautions against damage in transit. No material which may cause staining or discoloration shall be used for blocking or packing.

2. Protect cast stone during storage and construction against moisture, soiling, staining and physical damage.

3. Handle stone to prevent chipping, breakage, soiling or other damage. Do not use pinch or wrecking bars without protecting edges of stone with wood or

other rigid materials. Lift with wide-belt type slings wherever possible. Do not use wire rope or ropes containing tar or other substances which might cause staining.

B. Storage and Protection: Store stone on wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stones to distribute weight evenly and to prevent breakage or cracking of stones. Protect stored stone from weather with waterproof, non-staining coverings or enclosures, but allow air to circulate around stones.

#### 1.06 PROJECT/SITE CONDITIONS

A. Existing Conditions: Do not set cast stone in temperatures 40 F or below.

#### 1.07 SEQUENCING AND SCHEDULING

A. Coordinating Work: Installer must review installation procedures and coordination with other work, with Contractor, and other contractors and subcontractors whose work will be affected by stonework.

### PART 2---PRODUCTS

#### 2.01 MANUFACTURERS

See "References, 1.02" and consult industry groups (1.02 - B, C, and D) for membership directories.

#### 2.02 MATERIALS

##### A. Cast Stone:

1. Cast stone shall be a building stone manufactured from Portland cement concrete, precast, and of the same composition throughout the piece.

2. Cement and aggregates shall be carefully chosen to produce a cast stone equal in color and texture to the appearance of the existing stone. Match only cleaned samples of the existing stone.

3. All added colors shall be mineral oxide pigments guaranteed by the manufacturer to be sun-fast and lime-proof.
4. Finish shall duplicate in all respects the finish of specific example(s) of the existing cast stone as designated by the Contracting Officer.
5. Aggregates shall be of known durability and shall be proportioned to produce maximum density.
6. Before delivery, cast stone shall be properly cured and shall have a minimum compressive strength of 5,000 psi and a maximum average water absorption of 7.5 percent.
7. All cast stone shall be sound and perfect. Make all edges sharp and true. Provide continuous slots, bevels, reglets, rebates and other features, as required.

#### C. Mortar and Grout:

1. Portland cement: ASTM C150, except complying with the non-staining requirements of ASTM C91 for not more than 0.03% water soluble alkali.
2. Hydrated Lime: ASTM C207, Type S.
3. Sand: ASTM C144.
4. Water: Clean and potable.

#### D. Stonework Accessories:

1. Anchors: Clean existing base anchors set in stone.
2. Setting Buttons: Lead or plastic buttons of the thickness required for the joint size indicated, and of the size required to maintain uniform joint width.

#### 2.03 MIXES

A. Mortar: Non-staining, cement/lime mortar, complying with ASTM C270, Proportion Specification. Mortar color should match adjacent historic mortar; match tooling and other details.

## PART 3---EXECUTION

### 3.01 PREPARATION

A. Surface Preparation: Clean all adjoining stone surfaces before setting by thoroughly scrubbing with fiber brushes, followed by a thorough drenching with clear water. Use only mild cleaning compounds that contain no caustic or harsh fillers or abrasives. If not thoroughly wet at time of setting, drench or sponge stone.

### 3.03 ERECTION, INSTALLATION, APPLICATION

A. Measure the existing conditions prior to fabrication of the cast stone. Match the existing placement and dimensions.

B. Execute stonework by skilled mechanics, and employ skilled stone fitters at the site to do necessary field cutting as stone is set.

C. Set stone in accordance with drawings and final shop drawings for stonework. Provide anchors, supports, fasteners and other attachments shown or necessary to secure stonework in place. Shim and adjust accessories for proper setting of stone. Completely fill holes, slots and other sinkages for anchors, dowels, fasteners and supports with mortar during setting of stones.

D. Joints: Set units in full bed of mortar, unless otherwise indicated.

1. Wet stone thoroughly before setting.

2. Set stone before initial set of cement bed occurs. Do not set stone on dry bed. Tamp and beat stone for a complete contact between stone and setting

bed. Set and level each unit immediately. Set stone in pattern shown with uniform joints.

3. Grout joints as soon as possible after initial set of setting bed. Force grout into joints, and tool. Wet joint surfaces, if dry, prior to grouting.

4. Cure grout by maintaining in a moist condition for 7 days.

5. Remove grout spillage from face of stone as work progresses.

### 3.03 ADJUSTING/CLEANING

A. Clean stonework not less than six days after completion of work, using clean water and stiff-bristle brushes. Do not use wire brushes, acid-type cleaning agents or other cleaning compounds with caustic or harsh fillers.

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