U.S. General Services Administration

Removing Dirt From Stone Masonry By Steam Cleaning

Procedure code:
440002S
Source:
Developed For Hspg (Nps - Sero)
Division:
Masonry
Section:
Stonework
Last Modified:
02/21/2017

PART 1---GENERAL

1.01 SUMMARY

A. This procedure includes guidance on removing dirt build-up on stone masonry by steam cleaning.

B. Advantages of Steam Cleaning:

1. Is effective in cleaning heavily deteriorated ornate masonry that can not withstand pressure washing or abrasive cleaning techniques.
2. Allows use of the mildest possible cleaning agents and rinsing pressures for removal of severe carbon encrustations on calcareous surfaces.
3. Effective in removing organic growth from the masonry surface.
4. There is less of a chance of staining as compared to other cleaning methods.

C. Limitations of Steam Cleaning:

1. This method is more expensive (due to the high cost of steam-generating equipment) and requires more time than other methods.
2. Excessively high temperatures with this procedure is a safety hazard to the operators.
3. It is sometimes difficult for the operator to monitor his progress due to the cloud of steam generated with this technique.
4. This method is NOT effective in removing severe staining.

D. Safety Precautions:

1. Precautions should be taken to guard against unnecessary water infiltration. Monitors should be set within the walls to determine moisture content and possible problems.
2. Soft water should NOT be used on carbonate stone. Soft water sometimes contains minerals that can bring out impurities in the stone resulting in permanent discoloration. Mildly acidic water can also cause carbonate stone to become more soluble resulting in the eventual dissolution of the stone.

E. 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).

F. See also 04400-01-P and 04400-03-P for alternative guidance on removing dirt from stone masonry.

PART 2---PRODUCTS

2.01 MANUFACTURERS

A. Dow Chemical www.dow.com

B. Union Carbide Corporation
www.unioncarbide.com

C. Ashland Chemical www.ashland.com

2.02 MATERIALS

A. Non-ionic detergent such as "Tergitol, "Triton, "Igepal", or approved equal.

1. Use dilution as approved by testing on material to be cleaned.
2. Acidic or alkaline products are NOT acceptable.

B. Clean, potable water (preferably mineral water)

2.03 EQUIPMENT

A. Garden hose and nozzle (approximately 1/2" diameter)

B. Non-metallic brushes (no iron or brass wire)

C. Wood scrapers

D. Flash boiler for generating the steam

PART 3---EXECUTION

3.01 PREPARATION

A. Protection:

1. Cleaning methods should be tested prior to selecting the one for use on the building; The simplest and least aggressive methods should be selected.
2. The level of cleanliness desired should be determined; A new appearance look is both inappropriate and requires an overly harsh cleaning method.
3. Prolonged exposure of water causes rapid deterioration in older structures.
4. Take precautions to ensure that the water does not penetrate the surface and cause damage to the interior of the structure.
5. This procedure may cause corrosion of hidden iron work and steel anchors causing either staining or cracking due to the rapid expansion of the metal.
6. If the masonry remains saturated during the first frost, surface pieces may spall off as the water freezes.
7. Iron and chloride in the water can cause disfigurement and staining.

B. Surface Preparation:

1. Fill the buckets, usually one or two, with about two gallons of water.
2. Beginning at the top and gradually working down, scrub lightly with the fiber brush to remove any superficial deposits. Take care to avoid scratching or otherwise damaging any polished surfaces.
3. Rinse with clear water.
4. Dry with clean, lint-free toweling or rags.
5. Tenacious mineral deposits may be treated locally with gentle abrasion using wooden paddles or sticks. Great care should be exercised to avoid damaging the highly polished surfaces of masonry where they exist.

3.02 ERECTION/INSTALLATION/APPLICATION

A. Direct steam (generated in a flash boiler) against the masonry surface. The heat of the steam will swell and soften dirt deposits and loosen them from the masonry surface.

1. Use a very low-pressure nozzle (10-30 psi)- about 1/2 inch diameter aperture.
2. Hold the nozzle tip consistently a minimum of 12 inches from the masonry surface.

B. Remove softened dirt by hand, scrubbing with non-metallic brushes. Use a wooden scraper to remove heavy sulphate crusts.

C.Rinse thoroughly with water until surface tests as neutral as indicated with pH strip.

D. If steam alone is not effective, it may be supplemented with a non-ionic detergent.

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