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U.S. General Services Administration

Removing Soluble Salts From Within Brick And Stone Masonry

Procedure code:

450003S

Source:

Hspg Prepared For Nps - Sero

Division:

Masonry

Section:

Masonry Restoration & Cleaning

Last Modified:

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THE CLEANING OR REMOVAL OF STAINS FROM MASONRY MAY INVOLVE THE USE OF LIQUIDS, DETERGENTS OR SOLVENTS WHICH MAY RUN OFF ON ADJACENT MATERIAL, DISCOLOR THE MASONRY OR DRIVE THE STAINS DEEPER INTO POROUS MASONRY. USE THE PRODUCTS AND TECHNIQUES DESCRIBED HERE ONLY FOR THE COMBINATIONS OF DIRT/STAIN AND MASONRY SPECIFIED

PART 1---GENERAL

1.01 SUMMARY

A. This procedure includes guidance on removing soluble salts from within brick and stone masonry. Two methods of salt removal - or desalination - are described and include the application of a clay poultice and the application of a sand:lime render.

B. Reducing the salt content of masonry may be necessary if efflorescence (salt deposits) on the surface becomes a persistent problem.

C. 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).

PART 2---PRODUCTS

2.01 MATERIALS

A. Clean natural fiber rags

B. Poulticing Materials:

1. Filler material for poultice: Use absorbent clay or diatomaceous earth (attapulgitite or sepiolite clay).
 - Available from chemical supply house (both commercial and scientific), or swimming pool supply distributors.
2. Distilled water

C. Sacrificial Render Materials:

1. Lime putty
2. Sand

D. Clean, potable water

2.02 EQUIPMENT

A. Plastic sheeting

B. Poultice Equipment:

1. Plasterer's float or broad trowel
2. Galvanized wire mesh
3. Galvanized staples
4. Pliers
5. Plastic sacks

C. Sacrificial Render Equipment:

1. Mesh screens
2. Plasterer's float or broad trowel
3. Hacksaw blade

PART 3---EXECUTION

3.01 ERECTION, INSTALLATION, APPLICATION

A. Applying a Clay Poultice:

NOTE: THIS METHOD OF DESALINATION IS SUITED FOR USE ON LARGE AREAS OF MASONRY WITH MINIMAL DETAILING, OR ON SIMPLE MASONRY DETAILS. FOR DELICATE DETAILS OR HIGHLY DAMAGED AREAS, THIS METHOD SHOULD BE PERFORMED BY A TRAINED CONSERVATOR.

CAUTION: THIS METHOD IS NOT SUITABLE FOR USE WHERE PRE- WETTING THE SURFACE CAN ADVERSELY AFFECT PLASTER, PAINT, OR EMBEDDED WOOD OR METAL.

1. Saturate the wall for several days by spraying with mists of clean, clear water.
 - Mist the water evenly over the masonry surface at 18 gallons per hour from fine spray heads mounted to a boom.
 - The length of time it takes to fully saturate the wall will depend on the type of masonry, and its porosity (typically 72 hours).

CAUTION: BE SURE TO COLLECT WATER RUN-OFF AND DRAIN SAFELY AWAY FROM THE BUILDING DURING THE CLEANING PROCESS.

2. When the wall is thoroughly saturated, mix filler material with enough distilled water to form a soft, sticky paste. Mix by hand or use a small mechanical mixer. BE SURE TO ADD THE CLAY TO THE WATER, NOT THE REVERSE. ADDING WATER TO THE CLAY WILL RESULT IN A LUMPY, UNWORKABLE MIX.

3. Apply the poultice to the saturated wall in a single layer (no more than 1 inch thick) using a plasterer's float or broad trowel.

NOTE: MAKE SURE THE WALL IS THOROUGHLY SATURATED BEFORE APPLYING THE POULTICE TO AVOID REDISTRIBUTING THE SALTS BACK INTO THE MASONRY.

4. To help bond the clay to the wall surface, press a light-gauge galvanized wire mesh into the poultice and tack it carefully into joints with galvanized staples.

5. Protect the treated area from direct sun or rain with tarpaulins as needed.

6. Allow the poultice to remain in place about 1 month. As the poultice dries, the clay will eventually lighten in color, crack, shrink and detach from the wall.

7. Remove the staples using pliers and roll up the clay and wire mesh.

8. Discard materials safely from the site.

9. Thoroughly rinse the treated area with clean, clear water and allow to dry.

10. Repeat the cycle of wetting and poulticing as needed to reduce the salts to an acceptable level; Repointing may be required at the end of the desalination treatment.

-OR-

B. Applying a Sand:Lime Sacrificial Render:

NOTE: THIS IS A FAIRLY SLOW METHOD OF MASONRY DESALINATION AND MAY TAKE AS LONG AS SEVERAL MONTHS TO PRODUCE EFFECTIVE RESULTS. NOTE: THIS METHOD IS SUITED FOR USE ON LARGE AREAS OF MASONRY WITH MINIMAL DETAILING, OR ON SIMPLE MASONRY DETAILS. FOR DELICATE DETAILS OR HIGHLY DAMAGED AREAS, THIS METHOD SHOULD BE PERFORMED BY A TRAINED CONSERVATOR. CAUTION: THIS METHOD IS NOT SUITABLE FOR USE WHERE PRE- WETTING THE SURFACE CAN ADVERSELY AFFECT PLASTER, PAINT, OR EMBEDDED WOOD OR METAL.

1. Thoroughly saturate the wall with clean, clear water.
2. Mix 1 part slaked and screened lime putty with 4 parts fine sand.
3. Apply the sacrificial render at least 1/2 inch thick to both sides of the wall (if possible) to a height of 2 inches above the salt crystallization/evaporation zone.
4. As the render surface begins to stiffen, roughen it with the fine-toothed edge of a hacksaw blade. The salts from the wall will migrate into the render. As the salts crystalize, the render will begin to crack and crumble.
5. Completely remove the dried render from the surface using a stiff bristle (non-metallic) brush.
6. Thoroughly rinse the surface with clean, clear water and allow to dry.
7. Repeat the entire application process as necessary to achieve the desired level of cleanliness.

3.02 ADJUSTING/CLEANING

A. Upon completion of the masonry cleaning work, clean window glass and spattered adjacent surfaces.

Last Reviewed: 2018-10-25