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U.S. General Services Administration

Removing Fire, Smoke, Soot, Pitch And Wood Tar Stains From Concrete

Procedure code:

371019S

Source:

Hstrc Concrete: Investigation & Rpr/Pre-Conf Training - 1989

Division:

Concrete

Section:

Concrete Cleaning

Last Modified:

08/02/2016

PREFACE: The cleaning or removal of stains from concrete may involve the use of liquids, detergents or solvents which may run off on adjacent material, discolor the concrete or drive the stains deeper into the porous concrete. Use the products and techniques described here only for the combinations of dirt/stain and concrete specified.

PART 1---GENERAL

1.01 SUMMARY

A. This procedure includes guidance on removing fire, smoke, soot, pitch and wood tar stains from concrete by scrubbing with scouring powder or by using chemical solvents in a bandage or poultice.

B. Safety Precautions:

1. DO NOT save unused portions of stain-removal materials.
2. DO NOT store any chemicals in unmarked containers.
3. EXCELLENT VENTILATION MUST BE PROVIDED WHEREVER ANY SOLVENT IS USED. USE RESPIRATORS WITH SOLVENT FILTERS.

NOTE: SOME OF THE SOLVENTS LISTED ARE KNOWN CARCINOGENS AND MAY BE BANNED IN SOME STATES.

4. No use of organic solvents indoors should be allowed without substantial air movement. Use only spark-proof fans near operations involving flammable liquids.
5. Provide adequate clothing and protective gear where the chemicals are indicated to be dangerous.

Have available antidote and accident treatment chemicals where noted.

C. See "General Project Guidelines" 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).

D. For additional information on poulticing, see 04455-02-R.

PART 2---PRODUCTS

2.01 MATERIALS

NOTE: Chemical products are sometimes sold under a common name. This usually means that the substance is not as pure as the same chemical sold under its chemical name. The grade of purity of common name substances, however, is usually adequate for stain removal work, and these products should be purchased when available, as they tend to be less expensive. Common names are indicated below by an asterisk (*).

A. Scouring Powder

B. For Bandage Treatment:

1. Trichloroethylene (highly refined solvent):

CAUTION: TRICHLOROETHYLENE IS HIGHLY TOXIC AND MAY REACT WITH STRONG ALKALIS SUCH AS FRESH CONCRETE TO FORM DANGEROUS GASES.

- a. Other chemical or common names include Ethinyl trichloride.
- b. Potential Hazards: TOXIC.
- c. Available from automotive supply distributor, chemical supply house (both commercial and scientific), dry cleaning supply distributor, paint store, photographic supply distributor (not camera shop), or printer's supply distributor.

2. Undyed flannel, cotton or cotton batting

C. For Poulticing:

1. Sodium Hypochlorite (NaOCl):

- a. An unstable salt produced usually in aqueous solution and used as a bleaching and disinfecting agent.
- b. Other chemical or common names include Bleaching solution*; Household bleach*; Laundry bleach*; Solution of chlorinated soda*.
- c. Potential Hazards: CAUSTIC TO FLESH.
- d. Available from chemical supply house, grocery store or supermarket, hardware store or janitorial supply distributor.

-OR-

2. Javelle Water: Made by user, see "Making Javelle Water" for guidance on preparation.

- a. Calcium Hypochlorite (CaCl₂O₂):

- 1) A white powder used especially as a bleaching agent and disinfectant.
- 2) Other chemical or common names include Chlorinated calcium oxide; Bleaching powder*; Calcium oxymuriate*; Chloride of lime*; Chlorinated lime*; Hypochlorite of lime*; Oxymuriate of lime*.
- 3) Potential Hazards: CORROSIVE TO FLESH;
FLAMMABLE (WHEN IN CONTACT WITH ORGANIC SOLVENTS).
- 4) Available from chemical supply house, dry cleaning supply distributor, drugstore or pharmaceutical

supply distributor, janitorial supply distributor, swimming pool supply distributor, or water and sanitation supply distributor.

b. Sodium Carbonate (Na_2CO_3):

- 1) A sodium salt of carbonic acid used especially in making soaps and chemicals, in water softening, in cleaning and bleaching and in photography; A hygroscopic crystalline anhydrous strongly alkaline salt.
- 2) Other chemical or common names include Carbonate of soda*; Sal soda*; Soda*; Soda ash*; Washing soda*.
- 3) Available from chemical supply house, grocery store or supermarket, hardware store, paint store, or water and sanitation supply distributor.

3. Filler material such as powdered talc or diatomaceous earth

4. Mineral water

D. Clean dry towels for blotting the area after treatment

E. Clean, potable water

F. Accessible source of water, soap and towels for washing and rinsing in case of emergencies associated with the use of chemicals

2.02 EQUIPMENT

A. Poulticing Equipment:

1. Glass or ceramic container for mixing the solution
2. Wooden utensil for stirring the ingredients

B. Wood or plastic spatula

C. Stiff bristle brush (non-metallic)

PART 3---EXECUTION

3.01 PREPARATION

A. Protection:

1. Provide adequate wash solutions (i.e. water, soap and towels) before starting the job.
2. Whenever acid is used, the surface should be thoroughly rinsed with water as soon as its action has been adequate. Otherwise it will continue etching the concrete even though the stain is gone.

3.02 ERECTION, INSTALLATION, APPLICATION

A. NOTE: DO NOT TRY MORE THAN ONE TREATMENT ON A GIVEN AREA UNLESS THE CHEMICALS USED FROM PRIOR TREATMENT HAVE BEEN WASHED AWAY.

B. Remove as much surface staining as possible by scrubbing with water and scouring powder, powdered pumice or grit.

C. Apply a Bandage Treated with a Chemical Solvent:

1. Swab the stained concrete with trichloroethylene.
2. Soak 3- or 4-layers of undyed flannel, cotton or cotton batting in trichloroethylene.
3. Apply the treated bandage to the stained area. Be sure to spread the bandage well beyond the stained area.
4. Remove the bandage periodically, wring out, resaturate and reapply. On horizontal surfaces, use concrete slabs or flat stones to hold the bandage in place. On vertical surfaces some kind of prop should be devised to hold the bandage against the concrete.
5. Repeat the process as necessary to achieve the desired level of cleanliness.
6. Thoroughly rinse the area with clean, clear water and allow to dry.

-OR-

D. Apply a Poultice:

1. Mix 1 part sodium hypochlorite (commercial household bleach, which is about 5% hypochlorite) or Javelle water (diluted with 4 to 6 parts of water) with a talc or other suitable fine material to make a smooth paste. For guidance on making Javelle water, see "Making Javelle Water" for guidance.
2. Thoroughly wet the concrete surface to be treated with clean, clear water.
3. Apply the poultice mixture to the stained area using a wood or plastic spatula and allow to dry. Be sure to spread the poultice well beyond the stained area. The liquid portion of the paste will migrate into the concrete where it will dissolve some of the staining material. Then the liquid will gradually move back beyond the concrete surface and into the poultice, where it will evaporate, leaving the dissolved staining material in the poultice.
4. When the poultice has dried, brush or scrape it off with a wooden scraper.
5. Using a stiff bristle brush, scrub the surface with scouring powder and clean water to remove any residual staining.
6. Thoroughly rinse the area with clean, clear water and allow to dry.
7. Repeat the process as necessary to sufficiently remove the stain.

NOTE: BOTH SODIUM HYPOCHLORITE AND JAVELLE WATER WILL BLEACH COLORED CLOTHING AND ARE SOMEWHAT CORROSIVE TO METALS.

Last Reviewed: 2018-10-25