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U.S. General Services Administration

Poulticing Lubricating And Petroleum Oil Stains From Concrete

Procedure code:

371031S

Source:

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

Division:

Concrete

Section:

Concrete Cleaning

Last Modified:

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

Some specified chemicals may not be permitted or appropriate for all locations. Review manufacturer cautions and federal and state environmental requirements. Test milder formulations for effectiveness before proceeding to stronger cleaners.

PART 1---GENERAL

1.01 SUMMARY

A. This procedure includes guidance on removing oil stains such as lubricating and petroleum oil from concrete using chemical solvents in poultices and bandages. Four different methods are described.

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.
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.
6. Have available antidote and accident treatment chemicals where noted.

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)

PART 2---PRODUCTS

2.01 MANUFACTURERS

- A. Diedrich Technologies, Inc.
Oak, Creek, WI
- B. ProSoCo, Inc.

2.02 MATERIALS

NOTE: Chemical products are sometimes sold under a common name. These products may not be as pure, but are the same chemical sold under its chemical name, but are usually adequate for stain removal work, and less expensive. Common names are indicated below by an asterisk (*).

A. For regular stains

1. Strong Soap or Scouring Powder
-OR-
2. Recommended: First test for effectiveness, water-based proprietary products formulated for removal of petroleum oil from concrete, such as "Aspir-Solv Safe Solvent Cleaner" (Diedrich Technologies, Inc.), or approved equal.
-OR-
3. Proprietary cleaners for removal of oil from concrete such as "Consolideck Cleaner-Degreaser" (milder), "Consolideck Oil and Grease Stain Remover" (ProSoCo, Inc.) applied as a poultice using fuller's earth (see below). Rinse thoroughly.
-OR-
4. Proprietary engine degreaser such as "GUNK".

B. For Heavy Stains: Method 1 (See Section 3.02 G.1.)

1. Sodium Hydroxide (NaOH):
 - a. A white brittle solid that is a strong caustic base used especially in making soap, rayon, and paper.
 - b. Other chemical or common names include Caustic soda*; Hydrate of soda*; Hydrated oxide of sodium*; Lye*; Mineral alkali*; Soda lye*; Sodid hydrate*; Sodium hydrate*.
 - c. Potential Hazards: CAUSTIC TO FLESH AND FLAMMABLE (WHEN IN CONTACT WITH ORGANIC SOLVENTS).
 - d. Available from chemical supply house, drugstore or pharmaceutical supply distributor, hardware store, or paint store.
 2. Sodium Orthophosphate:
 - a. Other chemical or common names include Tribasic sodium phosphate; Trisodium orthophosphate; Trisodium phosphate; TSP*; Phosphate of soda*.
 - b. Potential Hazards: CAUSTIC TO FLESH.
 - c. Available from chemical supply distributor, supermarket, grocery, or hardware store.
- OR-

C. Method 2 (See Section 3.02 G.2.):

1. Mineral spirits:

- a. A petroleum distillate that is used especially as a paint or varnish thinner.
- b. Other chemical or common names include Benzine* (not Benzene); Naphtha*; Petroleum spirits*; Solvent naphtha*.
- c. Potential Hazards: TOXIC AND FLAMMABLE.
- d. Safety Precautions:
 1. AVOID REPEATED OR PROLONGED SKIN CONTACT.
 2. ALWAYS wear rubber gloves when handling mineral spirits.
 3. If any chemical is splashed onto the skin, wash immediately with soap and water.
- e. Available from construction specialties distributor, hardware store, paint store, or printer's supply distributor.

-OR-

D. For Heavy Stains: Method 3 (See Section 3.02 G.3.):

1. Acetone (C₃H₆O):

- a. A volatile fragrant flammable liquid ketone used chiefly as a solvent and in organic synthesis and found abnormally in urine.
- b. Other chemical or common names include Dimethyl ketone; Propanone.
- c. Potential Hazards: VOLATILE AND FLAMMABLE SOLVENT.
- d. Available from chemical supply house or hardware store.

2. Amyl Acetate:

- a. Other chemical or common names include Amyl acetic ester; 1-pentanol acetate; Banana oil*; Pear oil*.
- b. Potential Hazards: FLAMMABLE.
- c. Available from chemical supply house, drugstore or pharmaceutical supply distributor, paint store or photographic supply distributor (not camera shop).

3. 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.

E. Filler material such as diatomaceous earth, fuller's earth, talc, fly ash, cornmeal, cornstarch or cat litter

F. Mineral water

G. Plastic sheeting

H. Clean dry towels for blotting the area after treatment

I. Masking tape

J. Clean, potable water

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

L. Small slab of concrete or pane of glass

2.03 EQUIPMENT

A. Glass or ceramic container for mixing the solution

- B. Wooden utensil for stirring the ingredients
- C. Wood or plastic spatula
- D. 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

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

- A. Blot excess oil with clean dry cloths.
- B. Apply one of the dry powdered materials listed in Section 2.01 to the stained area.
- C. Leave it in place for about a day and sweep up or brush off.
- D. Reapply as necessary to absorb as much of the oil as possible.
- E. Scrape off any solidified oil or scum using a wooden scraper.
- F. If there is still oil visible within the concrete, scrub with one of the following: Scouring powder, strong soap solution, sodium orthophosphate solution, proprietary engine degreaser, or one of the proprietary detergents designed for removing oil from concrete.
- G. Thoroughly rinse with clean, clear water and allow to dry.
- H. For heavy staining, try one of the following methods:
 1. Method 1:
 - a. Mix 1 pound 6 ounces of sodium orthophosphate in 1 gallon of water, or 7 ounces sodium hydroxide in 1 gallon of water.
 - b. Add enough whiting to the solution to make a thick paste.
 - c. Thoroughly wet the concrete with clean, clear water.
 - d. Spread the poultice over the stain using a wood or plastic spatula and allow to dry about 24 hours. 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.
 - e. Brush off the dried paste and scrub the concrete with clean, clear water.
 - f. Using a stiff bristle brush, scrub the surface with scouring powder and clean water to remove any residual staining.
 - g. Thoroughly rinse the area with clean, clear water and allow to dry.
 - h. Repeat the process as necessary to sufficiently remove the stain.

-OR-
 2. Method 2 (USE ONLY WITH GOOD VENTILATION):
 - a. Mix mineral spirits with filler material to make a thick paste the consistency of oatmeal.
 - b. Follow procedures 3.02 H.1.c-h. above.

-OR-
 3. Method 3 (USE ONLY WITH GOOD VENTILATION):

- a. Mix 1 part acetone and 1 part amyl acetate in a glass or ceramic bowl.
- b. Saturate a white cloth in this solution (above) or in trichloroethylene.
- c. Apply the saturated bandage to the stained area, extending it well beyond the boundaries of the stain.
- d. Dry-heat a slab of concrete and lay it over the bandage. The heat is intended to draw the oil out of the slab, through the bandage and into the concrete slab.

NOTE: TO AVOID THE DANGER OF APPROACHING THE FLASH POINT, DO NOT WARM THE SLAB TO A TEMPERATURE GREATER THAN YOU CAN COMFORTABLY HOLD IN YOUR HANDS.

-OR-

- e. Use a heated glass pane instead of a concrete slab. The glass will NOT absorb the oil, but drive the oil deeper into the concrete where it will not show.
- f. Add more liquid to the bandage occasionally. Note: If the oil spreads beyond the edges of the bandage, the bandage is not big enough.
- g. Method For Driveways and Parking Lots: The above methods should be adequate, but since these surfaces may be large and offer no problem with ventilation, the following method may be more effective:
 - h. Saturate the area (plus about 6 inches more beyond the stained edges) with mineral spirits.
 - i. Cover the area with one of the absorbent powdered materials listed above such as fuller's earth, talc, cornmeal, cornstarch or cat litter.
 - j. Leave it in place for about 24 hours.
 - k. Brush or sweep the absorbent material away and repeat if necessary.

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