1970

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Publication Info

Published in *Notebook*, Volume 2, Issue 2&3, 1970, pages 3-7.
http://www.cas.sc.edu/sciaa/

A METHOD OF REMOVING SOIL PROFILES

by Stanley South

Almost a decade ago John Griffin reported at the Southeastern Archeological Conference on a method of removing soil profiles. This method required the use of a General Electric product RTV-60, a silicone rubber spray utilizing a separate spray catalyst to produce a room temperature vulcanized rubber film. Once this material was sprayed on the profile to be lifted, a backing of fiberglass cloth impregnated with polyester resin was used to impart strength and rigidity to the profile.

In 1963, D. E. Dumond reported on "A Practical Field Method for the Preservation of Soil Profiles from Archeological Cuts" (Dumond 1963: 116). This approach utilized liquid casein glue as the bonding agent for the profile, which was lifted onto narrow plywood strips, and was particularly useful when a long, narrow, strictly stratigraphic, profile section was desired. This article mentioned papers written as early as 1945, dealing with the general removal of soil profiles for study purposes. The concept is clearly not a new one to archeology, yet there has been a relatively minor utilization of the technique by archeologists. Since the results of removal of soil profiles and plan sections of archeological pits, posthole patterns, and profiles are so dramatic, and since they allow the archeologist to excavate his features and stratigraphic layers, yet also be able to carry the impressions he saw back to the laboratory for future reference, it is surprising that more archeologists have not used the technique. This paper presents a simple method for plan and profile removal of archeological features which allows the archeologist to dig his site and have it too.

The technique described here was used at the excavation of the 1670 Charles Towne Site in the summer of 1969. The fortification ditches dug in 1670 as a defense against possible Indian and Spanish attack were located and excavated. The landward fortification ditch was five feet wide and two to four feet deep below the present plowed soil zone. The soil from this ditch was originally thrown into an embankment paralleling the ditch. In the center of the embankment was a palisade, represented by a small ditch in which the palisade had once stood. During the excavation of the ditch drawings and photographs were routinely made, but these are secondary to the visible texture and color of the ditch itself, and so a desire to remove various profiles of the ditch intact arose. The method of accomplishing this is presented here.

The profile as cleaned for photography was water laid sand in the ditch fill itself, against a red subsoil background. For removal of the profile the original red subsoil clay ditch walls were cut into so as to provide a contrasting background against which the ditch profile could be seen. Once this background matrix had been cleaned beyond the limits of the ditch itself, the surface of the profile was sprayed with polyurethane liquid plastic with the brand name of Xpert, a Glidden product (Glidden Coatings and Resins, SCM Corporation, Cleveland, Ohio). Similar products are Superthane Rez (Pittsburgh Plate Glass Industries, Rex Company, Springdale, Pennsylvania), and

Marvethane (Sherwin-Williams Company, Cleveland, Ohio). The theory of applying this plastic by spraying from cans or painting with brushes to the damp profile, was to provide a good bonding agent for the sand and clay profile, and to allow a dry surface for the application of the fiberglass. The plastic coating will be dry within two hours, and a layer of fiberglass of the proper size to cover the desired profile can be cut to fit. The catalyst is added to the polyester resin (which can best be obtained from a surf shop or fiberglass boat supply shop), and this resin is painted on the surface of the polyurethane plastic coated profile. This must be done as quickly as possible, and the fiber material added over this painted surface, and another coat of resin applied over this fiber to insure its becoming thoroughly saturated with the resin. At this point, still within the thirty minute time available before the resin begins to cure, strips of plywood, wooden stakes or other firming background support for the fiberglass profile can be added using strips of fiberglass soaked with resin to bond these to the profile. When this is done and the curing is complete, usually within four hours, the profile can be removed from the ground by carefully pulling the fiberglass from the earthen profile. As it pulls away it will take with it a sixteenth of an inch or so of the clay and sand, complete with worm holes, roots, pebbles, etc. After coating the surface with plastic spray, the profile is ready to be taken to the laboratory for study or exhibit purposes, providing an exact reference for the photographs, notes and drawings made in the field. Although it was not done at Charles Towne, plan lifting of posthold patterns can be accomplished in the same manner, and theoretically, by using a series of overlapping or joining fiberglass lifts, an entire Indian house floor pattern could be removed as it is revealed on the shovel schnitted surface in the field, and re-assembled in the exhibit hall or laboratory.

Five ditch profiles were lifted in one afternoon through the above method. It was found that the use of the plastic was not absolutely necessary when a batch of polyester resin was left over from applying to one profile. In order to save the resin it was quickly slapped against a nonplastic coated profile and the results were not noticeably different from those profiles treated with the polyurethane plastic. With this discovery the process was seen as a very simple process, outlined as follows.

1. Clean profile to be lifted with trowel, cutting beyond the feature to be revealed so as to have a subsoil background for features (as in the case of sectioning ditches and pits).

2. Spray or paint on with a brush a polyurethane coating, RTV-60 (General Electric Silicone Products Department, Waterford, New York), Elmer's Glue-All (The Borden Chemical Company, New York, N. Y.), or liquid casein glue. This step apparently is optional, and can be eliminated if tests reveal it is not necessary in certain soils.

3. Apply a coating of polyester resin, then a layer of fiberglass, then a second coat of resin. Place supporting backing against fiberglass with strips, and allow to cure.

4. When the fiberglass profile is removed the surface can be sprayed with a polyurethane resin spray to secure the loose sand particles. The profile is then ready for exhibit or study in the laboratory, and can be conveniently stored by suspending from the wall, like paintings.

This method of lifting soil profiles is a simple one, and has many possibilities not yet tried. The advantages over other methods is in the simplicity, and large areas can be lifted successfully.

A charcoal corncob pit was also lifted successfully using the polyurethane resin spray and liquid. The cobs near the surface of the pit were exposed, photographed; the pit was vertically bisected and half of the cobs were removed. At this point it was thought that the removal of the remaining half pit for exhibit purposes might be undertaken. The area around the pit was excavated to a depth below the level of the bottom of the pit, leaving the pit in a circular block on a pedestal. Excavation of the surrounding clay subsoil around the pit was facilitated by using a back-hoe that was on hand for another purpose. At this point the cobs were sprayed with polyurethane resin, and to insure adequate penetration it was flowed onto the cobs and surface of the pit with a brush. The entire pedestal was also quickly coated with the resin. Once this was set up, a metal plate was slipped beneath the pedestal, which was undercut with the trowel, and the pedestal was laid on its side on the metal sheet. This was then loaded onto a station wagon for transporting back to the laboratory, where it arrived in undamaged condition with no cracks. The polyurethane coating acts as a membrane similar to an eggshell, providing considerable strength and support for fragile corncobs, preventing their spilling out of the pit even when transported on their side, a position which would normally not be considered when dealing with the delicate charcoal cobs.

There are no doubt many instances where the use of polyurethane liquids and sprays will be found to be effectively used by the archeologist as more experiments are tried on removing archeological features, profiles and other data from the field to the laboratory. The steps described here are only a beginning toward more complete data recording and recovery from archeological sites, allowing the archeologist to have his cake and eat it too.

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Fig. 1. Profile of the West Fortification Ditch at Charles Towne Before application of Fiberglass Resin

Fig. 2. Fiberglass Resin Applied to a Profile with Stakes Used as Supports

Fig. 3. Lifted Profile for Use as Data, Teaching Aid, or Exhibit Purposes

Fig. 4. Sectioned Corncob Pit Before Treatment with Polyurethane Resin for Removal

Fig. 5. Corncob Pit in Laboratory Awaiting Use in Exhibit