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STUCCO

Stucco, sometimes called “harl,” or “render,” is a traditional external lime coat, applied either by throwing (as in traditional Scottish harls) or by floating or troweling onto the surface. In cemeteries stucco was often used to cover brickwork – both family tombs or vaults and small box tombs. These coatings were used for two principal reasons – they help protect the masonry and they also provide an ornamental appearance. Traditional lime stucco has excellent weatherproofing abilities, being vapor permeable yet able to shed water.

Virtually all of the surviving examples of historic stucco are smooth – called smooth renders, flat floated coatings, or sometimes “polite” finishes. They were achieved by pressing back a cast lime harling coat before setting or by applying by float. They sometimes had lines drawn into the surface to imitate ashlar blocks.

This document will provide a brief introduction to stucco preparation and application. The advice of a conservator should be sought if necessary.

Lime Stucco or Cement?

We see quite a bit of modern cement stucco being used on historic masonry, often with disastrous results.

Modern coatings – such as Portland cement – are dense and impermeable, sealing water in the masonry. They are brittle and inflexible, not allowing for any seasonal movement of the structure. The cement stuccos are often seen detached from the wall. In fact, they frequently come off in large sheets, often removing the face of the underlying masonry. Behind this coat there is likely to be serious



Example of modern concrete stucco coming off in large sheets.

deterioration of the underlying masonry units, especially if the masonry is relatively soft, like sandstone or brick.

In contrast, traditional lime-based stucco is soft, flexible, and breathable. Lime whitewash is similar in composition and is entirely suited as a finish coat. When used the whitewash “heals” the surface by flooding into any small cracks. Limewashed structures also tend to stay cleaner.

The “downside” of lime coatings is that their use is more exacting and they don’t allow the use of shortcuts. It can also be difficult to find contractors that have

either the experience with lime coatings – or that are interested to learn. In general, however, the attention to a few essential details will minimize problems. Critical issues include appropriate specifications, careful preparation, the use of appropriate materials, correct application, and adequate curing.

The “upside,” beyond the mechanical suitability of lime stucco, is that while the coatings may require a little more time at the onset, they provide very long-term protection and will significantly reduce maintenance issues.

Formulas and Application

Traditional formulas use either non-hydraulic or hydraulic lime, an aggregate, sometimes a pozzolanic additive (such as brick dust), sometimes hair (for reinforcement), and of course water. The process of mixing, however, is as critical as the actual materials.

A more modern, yet still suitable, mix is recommended as 1 part Riverton natural hydraulic lime to 2 parts fine mason’s sand (by volume). Riverton hydraulic lime is available from ESSROC Cement Corp., Front Royal, Virginia (800-558-8887, x 1832). St. Astier hydraulic limes may also be used and they are available from Virginia Lime Works, Monroe, Virginia (434-929-8113 or <http://www.virginalimeworks.com/>).

Perhaps the easiest to use are prepared mixes. These are available from U.S. Heritage, Chicago, Illinois (773-286-2100 or <http://www.usheritage.com/mortars9.htm>).

An alternative is 1 part of white Portland cement to 2 parts lime putty or 2 parts hydrated mason’s lime (Type S) to 6 parts fine mason’s sand. This type of premixed stucco (with the addition of Portland cement) is also available from Cathedral Stone, Hanover, MD (800-684-0901 or <http://www.cathedralstone.com/datasheets/M60.doc>), as well as U.S. Heritage, Chicago, Illinois (773-286-2100 or <http://www.usheritage.com/mortars9.htm>).

Whatever mix you use, it should have good spreading consistency – allowing firm application without overworking the mortar. It should also not be too wet, since that will cause excessive drying shrinkage (and cracks). This is where using lime putty rather than hydrated mason’s lime is so useful – the lime putty allows exceptional workability without excessive water.

The first step is to ensure that the surface is sound and free of vegetation and other debris. A sound surface is one with relatively flush joints and no loose surface material. While some weathering is acceptable (and to be expected), an excessively uneven face will require that you bring it flush. This may require that eroded or damaged bricks be replaced and large cracks be grouted. All biologicals must be removed, along with dirt, soil, grease, and other foreign materials.

Where there is existing stucco (traditional or cement), loose sections will need to be removed to firm attachment (you may need to carefully use a hammer and masonry chisel). Cut the edge of the sound stucco at an inward angle to provide a dovetail key for the new stucco. Never feather the edges – this will lead to almost immediate failure of the new stucco.

Before applying the lime stucco it is critical that the wall be thoroughly wetted, allowing the masonry to absorb clean water. The goal is to achieve a well dampened – but not wet – surface.

The application should be relatively thin (hence the need to ensure that the surface is relatively flat prior to the stucco application). Significant variations in the thickness of the material will be more likely to cause shrinkage cracks. Generally float applications will consist of at least two applications, although the coatings on some tombs are so thin that one coat will suffice. Where there is existing stucco, the new coat should be applied to the same level as the old – do not feather the new coat over the old. Match the existing texture as completely as possible (this may also necessitate varying the aggregate materials, using local sands).

Where two coats are necessary, the first should be applied to a depth of about 3/8-inch. As it

begins to stiffen, it should be compressed and scoured in place with a wood or poly float, using a circular motion. Avoid excessive working. Lightly key the surface by scratching in a diagonal pattern. This first coat should be allowed to cure for several days, being protected from rain, wind, and the sun. Before applying the second coat, thoroughly wet the surface. The second coat is again applied to a depth no greater than 3/8-inch (never greater than the preceding coat). It, too, should be compressed and scoured in place with a wood or poly float as it stiffens up.

Safety

This information is not offered in lieu of a material safety data sheet (MSDS), but only as a general indicator of safe working practices.

Lime products should be handled with care. Slaked limes are caustic and are irritating or drying to the skin. Avoid skin or eye contact. Avoid inhaling lime dust. Wear clothes that provide maximum skin cover, wear gloves, and use eye protection. Wear a respirator when mixing dry materials.