

Left: Project architect Doug Gilpin and Rich Baker of Tidewater Preservation discuss the extent of the failed stucco at Morven Park.



CHARLES STECK

Like icing on a cake, a smooth coat of stucco adds a handsome finishing touch to a building's exterior. A relatively inexpensive cladding, stucco—a cementitious coating—has dressed mundane brick, fieldstone, and wood structures for centuries, giving them the appearance of wealth and stature. More important, stucco in good condition protects the building from the elements, but if it is not properly maintained, it can lead to problems. A visit to a complex project reveals the techniques, as well as



Left: Tidewater Preservation replaced Morven Park's failing stucco. Far left: Today the house museum resembles its 1903 appearance with its new cladding.

Restored

BY PAUL KELSEY WILLIAMS

A 250-year-old house in Leesburg, Virginia, receives a much needed facelift.

some of the challenges, that a Virginia-based restoration firm faced when reviving this historic facade.

Home to two governors, Morven Park in Leesburg, Virginia, stands as a fascinating example of building accretion. It is composed of remodelings, additions, and expansions from different eras—even the bridging of different houses—all literally joined together over the past 250 years under an even covering of painted and patched stucco. The house evolved from a 1750 fieldstone farmhouse to its current turn-of-the-last-century mansion through seven ambitious building campaigns—one of which was undertaken in 1850 by Maryland Governor Thomas Swann, who added a series of four Italianate towers to an 1825 Greek Revival portico addition. Understandably, such a metamorphosis resulted in an almost constant maintenance of the stucco, which often failed at key joints where different building materials met, allowing water to infiltrate.

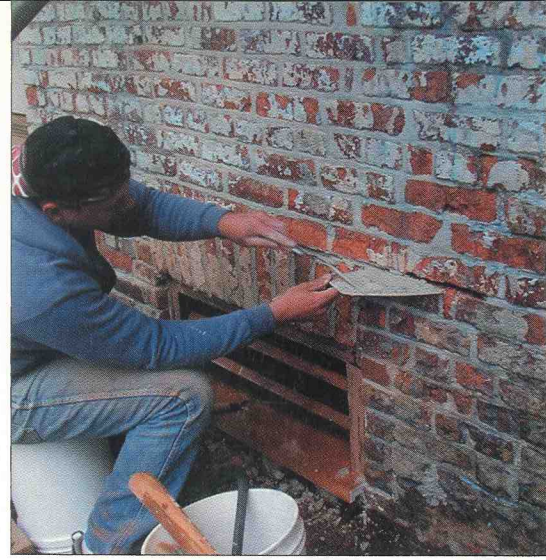


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When the staff discovered that the stucco's bond to the subsurface was completely lost in places, they contracted Tidewater Preservation based in nearby Fredericksburg, Virginia, to remove the failing stucco and replicate a new finish similar to the period between 1903 and 1944 when Virginia Governor Westmoreland Davis resided in the house. One of many phases of the overall interior and exterior restoration, the stucco project had to be completed in one summer to avoid freezing mortar if temperatures dipped below 32 F.

Tidewater Preservation Founder and President Frederick Ecker II began the project by reviewing the research of Jana Riggle, a historic preservation graduate student, who had completed an intensive study on the mansion's many quirky additions and expansions. Her work offered the Tidewater Preservation team clues about the different materials they could expect to find under the stucco.

The 1903 lime-based stucco had been patched repeatedly with incompatible materials such as portland cement, which promotes cracking and spalling (flaking)



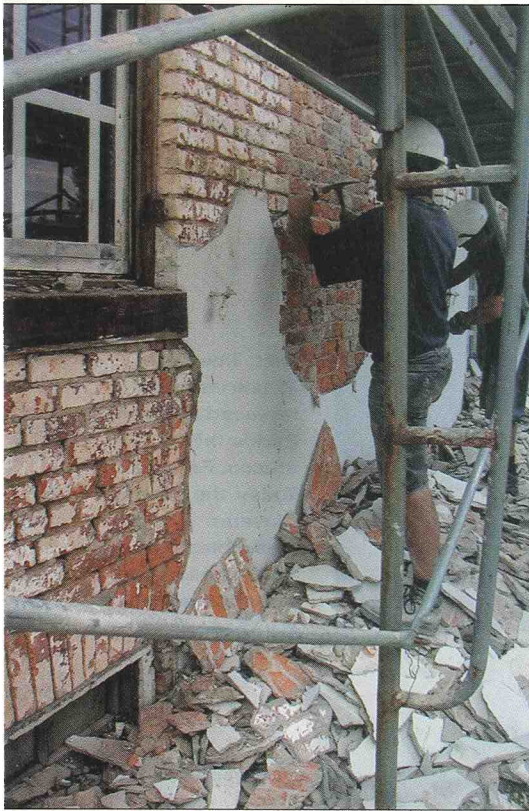
Before the crew could apply the stucco, all the subsurfaces were subject to restoration such as repointing brick.

“because it’s a harder material than the original stucco,” says Morven Park Executive Director Will O’Keefe. “In my 11 years as director, we had a cyclical patching and painting requirement every three to four years with a rapidly deteriorating surface that created numerous water leaks all throughout the mansion.” These quick fixes failed to save the stucco, and the exterior repairs were scheduled first to prevent any further damage to the house’s interior spaces.

Under the Surface

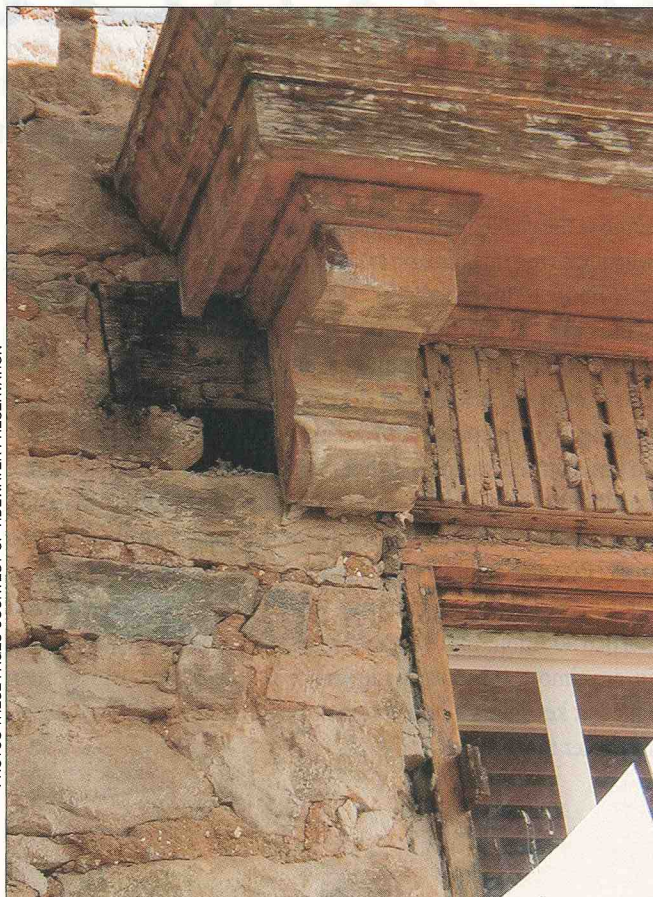
Tidewater Preservation’s first task on site was to determine what materials lay under the stucco. By boring a series of cores through the exterior, the crew found stucco supported by wood siding, wood sheathing, fieldstone, brick, and both chicken wire and galvanized wire mesh used as supporting lath. In some cases, entire sections of wood had rotted away—leaving only the stucco. “Built-in gutters on the mansion had failed repeatedly,” says Ecker, “creating the perfect condition for wood rot between the exterior stucco and the interior plaster walls.” Lab analysis of the core samples revealed that the 1903 stucco was lime-based and cream colored. They also discovered that more than 20 layers of paint covered the exterior walls.

While Tidewater Preservation installed scaffolding on the exterior, O’Keefe and his staff prepared the interior of the house, which they expected would be



The crew removed the stucco using crowbars. Once the stucco was off, the underlying wood around doors and windows showed signs of rot and had to be replaced.

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Workers applied the scratch coat directly onto large surfaces of brick and stone.

subject to moderate to heavy vibrations during the stucco removal. They stored away furniture, paintings, and small decorative items, and carefully supported crystal chandeliers and heavy plaster ceiling medallions with scaffolding.

Removal and Repair

The Tidewater crew began to remove the stucco in various areas by prying with small crowbars placed between the subsurface and the deepest layer of stucco, being careful to minimize damage to the underlying surface whether composed of wood, brick, or stone. Windows and doors had been removed as part of the overall restoration, and were replaced with plywood or Plexiglas to prevent damage. Before workers lowered large pieces of stucco to the ground, they first shielded portions of the façade and wood detailing with plywood to protect it from falling stucco. Stucco that had been applied over chicken wire proved to be the most difficult sections to remove, according to Ecker, because it necessitated cutting old wire while simultaneously removing portions of hard, heavy stucco, a process that often took two workers to perform in concert. Tidewater Preservation carted off tons of stucco that, fortunately, could be disposed of on the 1,200-acre heavily wooded property. (The discarded stucco will later be used as road bedding on the grounds.)



Once the crew had pried all the old stucco off the building—a methodical exercise that took several months—the underlying materials needed to be repaired. This meant repointing brick and stone, replacing rotten wood, and, in some cases, fabricating new wood supports in anticipation of the newly applied stucco.

Color Match

During the removal phase, Tidewater focused on matching the original color of the stucco by experimenting with local sands from a nearby quarry. By re-creating the original composition of cream-colored, lime-based stucco, the newly applied stucco would emulate the 1903 color of the house, eliminating the need for painting. The key to matching the stucco color, Ecker advises, is to use local sand, as would have been done 100 years ago. Similar to stone, sand color changes when quarried from different levels within the same quarry, so he suggests ordering enough sand all at once to complete the entire job.

The commercial sands on the mod-

Historical Facts

IN THE PAST STUCCO WAS MADE FROM FINE SAND TAKEN FROM RIVER BEDS. TODAY MOST STUCCO IS MADE FROM “MANUFACTURED” SAND THAT PRODUCES A MUCH LARGER GRAIN SIZE. THESE PHYSICAL AND VISUAL QUALITIES ARE VERY DIFFERENT AND THIS AFFECTS HOW THE STUCCO WORKS AS WELL AS THE WAY IT LOOKS.

Tidewater's Stucco Recipe

Scratch Coat

Portland cement 1 part
Mason's lime (type S) 1 part
Sand 3 parts

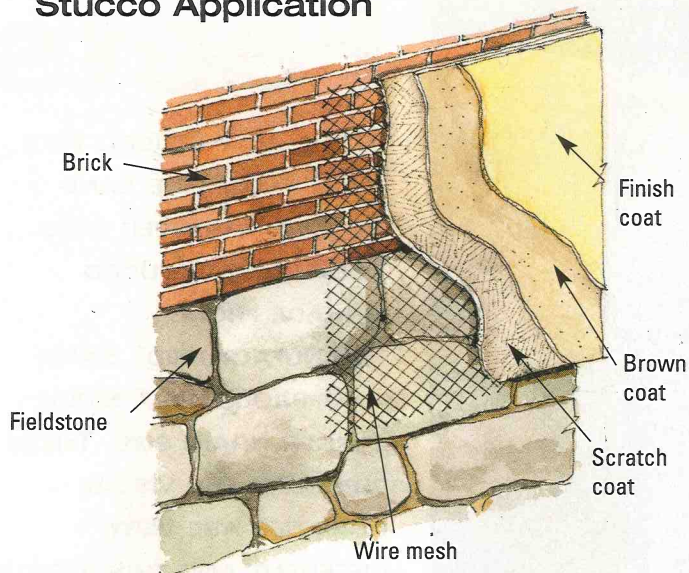
Brown Coat

Portland cement 1 part
Mason's lime (type S) 1 part
Sand 4 parts

Finish Coat

Portland cement 1 part
Mason's lime (type S) 2 parts
Sand 5 1/2 parts

Stucco Application



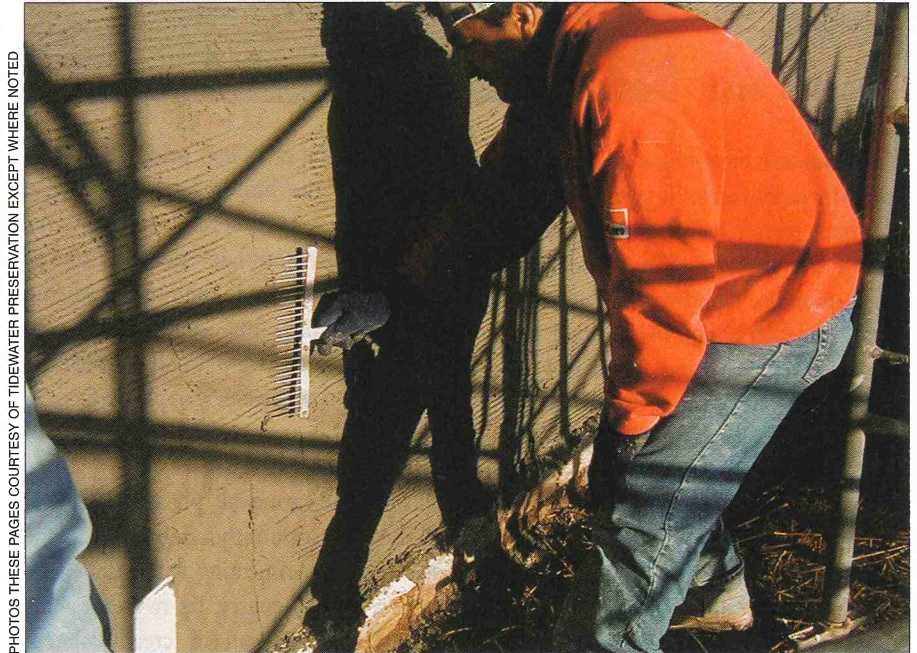
Wire mesh is needed where different materials meet.



No wire mesh was required when the subsurface was one material.



Above: Where two different materials met, wire mesh was used as a base for the stucco. Right: One layer of stucco is raked to create a "key" or rough surface to hold the next.



PHOTOS THESE PAGES COURTESY OF TIDEWATER PRESERVATION EXCEPT WHERE NOTED

ern market tend to be too "washed" to be a good match, Ecker says, because their individual grains are too large and because they don't have the color produced by natural sand's "fines." (The sand early masons used would have come from river beds, which still yield a much finer grain.) Tidewater sifted the sand mixture to separate these fine, cream-colored granules in order to create a

smooth finish on the surface of the mansion. Most of today's stucco is artificially colored with tints that can vary from batch to batch. Stucco is also commonly composed of a premixed acrylic or latex base, neither of which is suitable for historic restoration as they tend to be far too inflexible for the soft building materials, such as lime, used in older construction.

Stucco Application

Tidewater applied galvanized mesh screening to several sections of the repaired subsurface of Morven Park, specifically on portions that included joints of different building materials—where a solid stone wall met a wood surface, for example. This screen covered any exterior wood siding or wood sheathing to

provide a solid base for the stucco. Large areas of brick or stone provided a sufficient base for trowelling the stucco directly onto these surfaces.

Tidewater mixed the lime-based stucco on site and, using steel floats (a flat masonry tool with a handle), troweled it on in three stages: a 3/8" thick scratch coat that covers and evens out the subsurface; a 1/4" thick "brown" coat; and finally, a 1/4" thick top coat that serves as both the building's exterior surface and its final finish (see stucco recipe page 75). The scratch coat is raked or combed to provide a key (rough surface) for the brown coat. Each coat takes about 24 hours to set up before the next layer can be applied. Often an entire wall had to be stuccoed at one time to prevent discoloration of the final surface. Historically, a stucco job did not include expansion joints (which allow movement in the stucco), unlike new construction, which does. To maintain the historical look of the stucco, the team chose not to incorporate any such joints onto the building.

Melissa York, director of educational

programs at the estate, made a concerted effort to keep Morven Park open to the public during its two-year restoration. She saw the project as an opportunity to educate visitors about how major maintenance and periodic care are just as critical to Morven Park as they should be for their homes. Tour guides and docents at the mansion received updates from the restoration crew on the progress of the stucco removal and reapplication and convey the inherent surprises and problems encountered along the way. Today Morven Park greets visitors with a creamy smooth, handsome cloak of stucco as inviting as icing on a cake. 🍰

Paul Kelsey Williams is president of Kelsey & Associates, Architectural Historians, (202) 462-3389, washingtonhistory.com. Special thanks to Tidewater Preservation; see page 108 for contact information.

When Stucco Fails

➤ Assess the damage. Is it spalling, bulging, or missing?

Unsound areas that have lost their key will echo when tapped gently with a wooden or acrylic hammer.

➤ Test the stucco to determine its composition.

Hydrochloric acid will dissolve lime-based stucco, but not portland cement.

➤ Choose a stucco mix compatible with historic stucco.

Portland cement stucco is much harder than lime-rich stucco.

➤ Keep in mind durability, color, texture, and finish when replacing stucco.

—National Park Service
Preservation Brief # 22



Above: Stucco was removed carefully from this window hood. Right: Today this same window is picture-perfect after its final coat of stucco.



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