tending and Stamping

Creating the look of historical masonry

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by Howard Jancy, CSI, CDT, and Steve Chmelar

n 2002, new owners purchased the Thomas Healy House, a Federalist architectural style home listed on the National Register of Historic Places. Located in Ottumwa, Iowa, the house was first built in 1865 by Healy, a hardware store owner and one of the first settlers of the town.

The new owners repaired and renovated its interior, before focusing on the outside during the summer of 2006. The house's exterior was lightly blasted to gently coax the many layers of paint from the brick and stone. Once exposed, the warmth and integrity of the ruddy brick and natural limestone provided the impetus for the design of a garage not just a typical one, but a 'carriage house' style reminiscent of the time and place Thomas Healy experienced in the budding community of Ottumwa.

The materials and processes discussed in this case study lend themselves to both residential and commercial projects, and can be applied to many different substrates including concrete, cement board, drywall, plywood, and foam board. The finished product is suitable for attractive interior walls and durable enough to withstand the elements when used outside.

Cost savings generally drive use of these systems over brick and stone, in addition to the broad palette of colors and patterns available—particularly when one considers the freestyle hand-carving possibilities with the cementitious wall mix. Contractors experienced with stucco, plaster, or exterior insulation and finish system (EIFS) can easily install these alternative products. (See Figure 1, on page 86 for examples of commercial applications.)

Constructing the base

While planning construction of the carriage house, the owners found brick and stone to be cost-prohibitive. With the help of a local building materials supplier, they selected several products, which offered economy and ease of construction when combined with traditional wood frame

materials. Additionally, these products provided an impressive yet realistic faux finish, complementing the brick and limestone façade of the 143-year-old house.

Construction of the 'stick-built' structure commenced with placing a concrete slab for the carriage house and driveway. Oriented strandboard (OSB) or wafer board was attached to the framing and covered with a geo-textile fabric wrap; then, 12.7-mm (0.5-in.) expanded polystyrene (EPS) foam board was attached with spray adhesive and mechanical fasteners.

The EPS foam board was the base for the carriage house's installation of the faux brick and stone. Its smooth surface was lightly rasped open to improve penetration and adhesion of the acrylic primer. After rasping, an adhesive-backed 113-g (4-oz) plastic mesh was attached to the EPS foam board. The mesh's primary function is to help bridge the joints between pieces of EPS and increase its impact-resistance; it also improves the adhesion of the scratch coat over the foam board. The acrylic primer was applied with a pump-up sprayer and allowed to dry, before troweling on a cementitious, polymer-modified scratch coat approximately 1.6 to 3.2 mm (0.063 to 0.125 in.) thick over the mesh and foam board.



A pair of household scissors can easily cut the stencil to make it fit wall, window, and door dimensions.

A pre-packaged product, the scratch coat is mixed with water. Once cured, it is extremely wear- and weatherresistant—it even holds up to foot and automobile traffic when used to resurface existing concrete sidewalks, driveways, and patios. The scratch coat becomes the exposed mortar joint for the face bricks.

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The cementitious scratch coat is available in medium gray or white, and can be integrally colored by adding a premeasured powdered pack during mixing. The owners chose a light sand color for the scratch coat to match the house's actual mortar. A damp sponge was used to gently rub the



Installers remove the backing paper, as they apply the stencil.

scratch coat's surface, before it completely dried. This final touch created a slightly rough or 'sanded' finish to mimic the weathered appearance of the actual brick mortar; the rough profile also enabled better adhesion of the topcoat that creates the face brick. After the scratch coat cured for 24 hours and was dry, an adhesive-backed stencil with a face brick pattern was adhered to it.

A 1.02-mm (40-mil) membrane flashing was placed long before the EPS insulation was installed. All windows and passage doors were detailed with 229-mm (9-in.) wide 'peel-and-stick' flashing.

Stenciling brick

The stencil creates the appearance of a face brick 57 x 191 mm (2.25 x 7.5 in.) and a mortar joint 12.7 mm wide—exactly the same dimensions as the house's brick and mortar joints. A laminated paper about 0.56 mm (22 mil) thick, the stencil is pliable, yet strong, and available in rolls of 46 m² (500 sf), approximately 0.9 m (36 in.) wide. (Other patterns include various brick, stone, and cobble configurations.) It cuts easily with household scissors to fit wall dimensions and adjust for openings such as doors and windows.

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Preparations for applying the stencil include locating level horizontal reference lines. Using laser-leveling tools to establish the mortar joints' location helps develop a realistic look, which is important to creating the illusion of actual brick. The stencil's backing paper is removed after measuring and cutting. Installers applied the stencil to the wall starting at the bottom row and working from a corner to the approximate centerline of the wall. They then placed the stencil from the opposite corner, again working toward the center. This method of application ensured the bricks attractively wrapped the corners, creating a brick pattern bond



With a footprint of 7.3 x 8.5 m (24 x 28 ft), the carriage house provided ample room for two cars, extra storage, and an office upstairs. Typical construction techniques for a wood-framed building were practiced—the installation of simulated brick and stone required no significant alterations. While this article uses a residential case study as a backdrop, commercial applications abound.

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The topcoat is gunned over the stencil and scratch coat (left). Once the topcoat dries, the stencil is pulled away (right).

known as a Dutch Corner. Where the two sheets of stencil met in the middle, they were trimmed to create full-sized bricks. In this way, the stencil offers unique features—it can be cut to fit a specific location and dimension, and to



produce an interesting pattern. Stencil scraps can be used to add mortar joints to the pattern. (For stencil designs, see Figure 2 on page 88.)

After the stencils were properly adhered, the same cementitious material used previously as a scratch coat was applied as a topcoat over the stenciled surface to create the face bricks. This topcoat was integrally colored during mixing to closely match the real brick's shade, and was applied using an air-driven texture gun.

The texture gun consists of a hopper or reservoir with an adjustable nozzle and trigger mechanism that allows the application of thickened materials such as stucco, plaster, and cementitious overlays. It is powered using a small air compressor capable of delivering approximately 241 kPa (35 psi) of pressure. By adjusting the mix water, air pressure, and nozzle orifice size, the finish can be sprayed as smooth as an 'eggshell'—a term used in the paint industry to describe paint that is slightly rough, mimicking an actual eggshell's texture.

The topcoat completely covered the stencil and scratch coat. The stencil was pulled from the surface as soon as the topcoat dried enough so the material did not sag or run. Removing the stencil revealed the colored scratch coat, now appearing as a realistic mortar joint seemingly securing an equally natural-looking face brick. (See Figure 3.)

Vertical action

The house's 0.9-m high natural stone foundation was duplicated on the carriage house using a pre-packaged, cementitious wall mix. This lightweight mix is specifically formulated for stamping and texturing vertical surfaces, and

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is applied up to 25.4 mm (1 in.) thick in a single lift over prepared substrates such as concrete, drywall, cement board, and plywood. Effective on interior and exterior vertical surfaces, it is imprinted with a stamping tool or carved for a more custom stone effect.

The first step was rasping the foam board, which improves primer performance. A metal mesh lath was screw-fastened to the framing beneath to:

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- improve the scratch coat's adhesion over the smooth foam board;
- provide a mechanical bond for the vertical wall mix; and
- increase impact-resistance of applied materials.

The primer was spray-applied over the metal mesh lath and foam board and allowed to dry. At this point, the same material used under the face brick was applied as the scratch coat. Instead of using a trowel, it was sprayed with

> a texture gun to a thickness of approximately 1.6 mm, allowing some of the metal mesh lath to remain exposed. The material was allowed to dry before priming again, prior to the wall mix's vertical application.

> The wall mix was combined with water using a heavy-duty drill and mixing paddle. This gray material can be integrally colored during mixing and/or topically stained after it hardens and dries. For the carriage house installation, the vertical wall mix remained uncolored.

> Using a hawk (a small flat pan with a handle attached on the underside to hold the mortar-like material) and trowel, the vertical wall mix was applied starting from the bottom. The joint depth of the vertical stamping tool typically dictates the application depth of the vertical wall mix. For example, if the stamping tool creates a joint 12.7 mm deep, the vertical wall mix must be applied slightly greater than or equal to 12.7 mm.

> This project used a custom vertical stamping tool that imprinted a variable grout line 12.7 to 19 mm (0.5 to 0.75 in.) deep; therefore, the vertical wall mix was installed 19 mm deep. Application of the wall mix terminated at the lowest face brick grout line protected by masking tape.

The surface was first textured with a flexible skin or mat to create an irregular face similar in appearance to the natural limestone. Imprinting with a more rigid stamping tool immediately followed, which added texture and created realistic-looking mortar joints. A clear liquid release agent was spray-applied to (\bullet)



The surface is first textured (left) and then imprinted with a stamping tool (center). A liquid release agent is spray-applied to the wall mix and tools prior to use (right). Depending on humidity, temperature, and overlay, stamping can take up to an hour.

the vertical wall mix and to various texturing and stamping tools immediately before their use. (See Figure 4.)

Stamping time takes up to an hour, but varies widely depending on temperature, humidity, and overlay thickness. Application techniques and batch sizes should be adjusted to accommodate hot and cool weather conditions—ideal application temperature is between 7 and 30 C (45 and 85 F). In this project, stamping began as soon as the mixture had

set sufficiently to achieve a clean impression without tearing the surface. A fixed point or edge was used to guide placement of the stamping tools. Snapping a string line would also have worked.

The stamping tool was pushed into the wall mix until the material was uniformly distributed along the tool's surface. Uniform distribution is achieved when the stamping tool resists deeper embedment. The vertical stamping tool was



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When working with the wall mix for vertical applications, carving tools, such as those used to sculpt and cut artists' clay, are very useful. Surface imperfections and joint shape may be smoothed or contoured with a finger or a dampened 25.4- to 76.2-mm (1- to 3-in.) paintbrush.

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The carriage house's finished wall is evocative of the budding Ottumwa community in 1865.

hand-pressed but not aggressively tamped. For outside corners, stamping was done past the edge of the corner; then with the tool still in place, it was gently pivoted around the corner onto the adjacent surface to produce a natural-looking continuation of the grout lines around the corner. Vertical grout lines too close to the corner's edge were smoothed over and filled by hand.

If desired, the vertical wall mix can be hand-carved or sculpted between six and 24 hours after installation to remove imperfections or as the primary creative technique (instead of texturing with a vertical stamp tool). As with stamping time, carving time ranges widely depending on temperature, humidity, and overlay thickness. (See Figure 5.)

The wall mix is self-curing, and does not require application of a liquid curing compound. However, during hot weather or windy conditions, fog misting or polyethylene sheets may be used to minimize plastic shrinkage cracking. Curing time varies with ambient temperature and humidity. A full 28-day cure is required before exposure to freeze–thaw cycling. For natural-looking color variations, the wall mix can be topically colored with acid- or water-based stains—after curing for seven days at 21 C (70 F).

Other considerations

The maximum applied thickness of the material for face brick application is 4.78 mm (3/16 in.); therefore, mortar joints are shallow. With real brick, mortar joints could be much deeper or tooled in different ways for various looks. In this case, the owners will topically color the face brick in a random fashion, whereas real brick can be manufactured with color and texture variation.

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In the above photos, this application is using a damp sponge to gently rub the scratch coat's surface before it completely dries. The result is a 'sanded' finish that matches the weathered appearance of actual brick mortar.

During installation, environmental conditions should be considered. Once mixed with water, the various pre-packaged overlay materials have a working time of about 20 to 30 minutes. High temperatures, wind, and/or low humidity can shorten this period, so installers should not mix more product than those conditions allow. Once mixed, the materials cannot be re-tempered with more water to extend working time or workability—adding extra water can be detrimental as it impacts durability and can cause color variations and plastic shrinkage cracks.



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A complete carriage house

Construction of the carriage house and framing, and application of the simulated bricks and stones, were accomplished by the homeowners with local labor and material consulting. Once the carriage house was framed, approximately 352 hours of labor elapsed between installation of the foam board and the limestone foundation wall. About 116 m² (1250 sf) of simulated

finishes were then created by the stenciling process and stamping of the vertical wall mix.

Approximate material costs for stenciled face brick are under a dollar per square foot for the scratch coat (including acrylic primer, plastic mesh, and color pack) and about a dollar per square foot for the topcoat (including stencil and color pack). For stamped limestone, costs are typically under a dollar per square foot for the scratch coat (including primer and metal mesh lath) and less than three dollars per square foot for the wall mix (including primer).

According to the distributor, actual masonry would cost \$13–\$15/sf, with real stone for the foundation estimated at more than \$20/sf. In the small community surrounding the project discussed in this article, it could also have been difficult to find a mason who performs this type of stonework, and locate a source of real stone close enough to avoid high shipping costs. In a larger, metropolitan area, these cost issues may be different.

The owners anticipate a service life of 20 to 25 years, with periodic cleaning and sealing, very similar to synthetic stuccos and other siding materials. Of course, a life expectancy comparable to real brick and stone is not anticipated. Brick and stone are structural materials, whereas the various overlays are durable surface treatments whose integrity is somewhat a function of that of the underlying structure. Aesthetically, however, the faux finish strongly duplicates real masonry.

The carriage house is almost complete. The wood structure was built over the summer and fall of 2006. Construction stopped in winter, as the specified cementitious materials work better when installed and cured at consistent temperatures at or above 10 C (50 F). Faux brick and stone application took place in the summer and fall of 2007, and was halted with the onset of cold weather. In this case, period of completion is longer than average, as most of the



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The Benefits of Sponge Blasting

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he brick and stone house was coated with several layers of paint. The owners selected a paint removal process that was greener, cleaner, and gentler in comparison to using traditional blasting media such as sand, slag, plastic, and steel. These blasting materials can release paint and contaminated abrasive residues into the jobsite requiring control and clean up. A newer approach for paint and coating removal uses a sponge-based media combined with abrasive grit.

Sponge blasting systems use an abrasive grit (e.g. steel, aluminum oxide, plastic, walnut hulls) covered or encapsulated with water-based urethane foam, creating the system's sponge-like quality. The grit combined with foam abrasive may be used over brick, stone, metal, and concrete. It is even possible to utilize just a foam abrasive without grit to clean delicate surfaces.

For the house restoration, the owners used two different types of grit. The softer abrasive grit of walnut hulls was used on most of the house to avoid damaging the underlying brick and stone while removing the paint. Areas of the brick protected from the elements by overhanging eaves or under the porch required more aggressive blasting with aluminum oxide (which is approximately five times harder than walnut hulls) to remove the paint.

The key feature of the foam, with or without grit, is it absorbs and retains the blasted residues and

contamination, and provides excellent dust control, particularly if the system is applied wet.

Equipment

The equipment consists of various portable units, which deliver, collect, and clean the spent abrasive media and abraded residues. By adjusting air pressure and the type of cleaning medium, sponge blasting can be used to remove soot on wallpaper to high-performance coatings on steel and concrete. A sifting unit with course to fine screens separates the residues for proper disposal, allowing reuse of the reclaimed foam abrasive or simply sweeping up and discarding everything. The abrasive medium can be reclaimed and reused several times.

Advantages

The biggest advantage of this process is the dramatic reduction in air-borne dust and contamination. The cleaner quality of the materials allows work to proceed with minimal disruption and in less time inside as well as outside. Labor and hazardous waste disposal costs may also be reduced compared to traditional abrasive or chemical cleaning.

Proper precautions should be taken to ensure inhalation of dust and particulate matter is avoided. Additional protective measures should be exercised when stripping lead chromate- or zinc chromate-based paints. Proper personal protective equipment should always be used.



The technique of hand-carving can be used to create a more custom 'stone' effect, as shown in the above photos.

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Before and after: Prior to sand-blasting, the Thomas Healy House was painted white (left). Sand-blasting gently removed the layers of paint from the brick and stone to reveal the house's rosy brick and natural limestone (right).

construction was done by the two homeowners with their own full-time jobs. Details still to be constructed include the following:

- random face bricks are to be topically colored to create an aged look and break up the solid red color's monotony;
- mortar joints of the stamped limestone foundation will be tuck-pointed; and
- windowsills will be fabricated by applying the topcoat over foam stock, which will then be mechanically fastened to the carriage house.

These tasks will further enhance the realistic appearance of the simulated brick and stone structure. Much to their satisfaction, the homeowners have successfully created an old look with new materials.

Additional Information

B2010-Exterior Wall Exterior Skin

C3010—Other Wall Finishes

Authors

Howard Jancy, CSI, CDT, is a business development manager for Butterfield Color, a manufacturer of coloring materials and related products for the decorative treatment of new or existing concrete. Butterfield is also a registered provider with the American Institute of Architects (AIA) continuing education system. He is a founding board member of the Decorative Concrete Council (DCC), an affiliate of the American Society of Concrete Contractors (ASCC), and has more than 20 years of experience in the decorative concrete industry. Jancy can be contacted by e-mail at howard@butterfieldcolor.com. Steve Chmelar is vice-president of commercial sales at Carroll

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Key Words

Divisions 07,09 Cementitious coatings Faux finishes Stencils Vertical stamping

Abstract

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This article details the construction of a two-car garage (or 'carriage house,' as the owners call it), with the specific intent of complementing the Federalist architectural style of their house, originally constructed in 1865 and listed with the National Register of Historic Places. Cementitious overlays, pre-cut stencils, and vertical stamping tools were used to create the look of face bricks and a natural stone foundation. The materials and processes provided substantial cost savings over the use of actual masonry and stone, and were installed with local labor.