WORKING WITH
Manufactured Stone

This lightweight molded concrete is indistinguishable from natural stone, but needs no supporting foundation

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by Steve Thomas

Contemporary use of manmade stone goes back 30 years or so to the Napa Valley of California. A lightweight concrete mix using pumice as an aggregate was poured into molds cast from locally available stone. While the product was ideal for the local area, this volcanic-looking stone seemed out of place elsewhere in the country, since nobody but the West Coast had volcanoes. Over time, manufacturers sprung up around the country, using molds made from stone available in their local marketplaces.

Now, manufactured substitutes are available for virtually any type of stone, and the products are generally indistinguishable from the real thing.

Pros & Cons

Advantages of manufactured stone abound. It's much quicker and easier to install than real stone, it runs 25% to 35% cheaper, it creates practically no waste, and it permits application to some areas where it would simply not be possible with natural stone. Whereas the genuine article needs a masonry ledge to bear the weight of the stone (which necessitates wider footings, thicker block, forming a shelf in a poured foundation, and so forth), any wall that meets code can bear the weight of manmade stone. No special additional foundation treatments are needed (see Figure 1).

Unlike real stone, manufactured stone is not structural: Its intent is aesthetic, not loadbearing. If you want the surface to look like stone, this is for you. If you want it to bear weight like stone, you'd better hire a mason and bump up your foundation budget.

Thickness and weight. Most of the flat and square-edge manufactured stone styles are 1 1/2 inches thick. Rounded river rock styles tend to be about 3 inches thick.

Whereas three-coat stucco adds about 8 psf to the weight of the wall, manufactured stone usually adds about 12 psf.

Manufacturing

My experience with the manufacturing process comes from Classic Stone, a local company here in Columbus, Ohio. Unlike some stone manufacturers I've encountered, Classic Stone encourages architects, builders, and owners to visit the plant and view the process, believing this will enhance confidence in the product.

The manufacturing process starts with the molds, which are made from the actual stone to be replicated (Figure 2). The more molds the better, so as to avoid a "cookie cutter" effect, or having the same stone appear on the wall near its clone.

Depending on the stone being reproduced, the molds may first be tinted. The fabricator literally sprinkles pigments into the bottom of the molds to replicate the mottled coloring that is common in natural stone. Here in Ohio, much of the local stone has a characteristic stripe, or vein, running through it. This is reproduced by brushing a slurry of pigment across the bottom of the mold.

Next, the molds are filled with a lightweight concrete mix comprising several different grades of aggregate, sand, pigment, water, fillers, cement, and additives. The molds linger briefly on a vibrating table, which forces bubbles out of the wet mix, then are stacked to dry. Once cured, the "stone" is removed from the mold, boxed, and shipped.

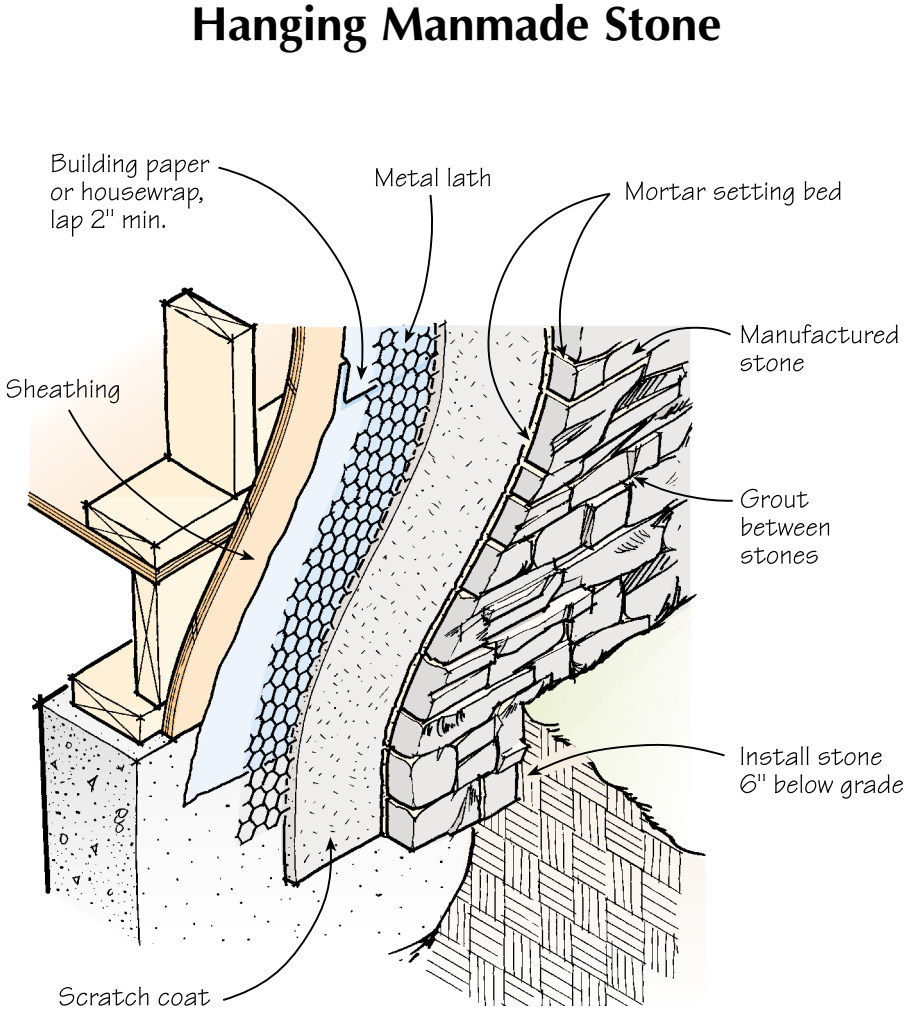

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Figure 1. Installation details for manufactured stone resemble those of three-coat stucco. The photo shows stone mounted on a scratch coat in diamond lath. The product typically adds about 12 psf to the weight of the wall.

Making the stone for flat wall surfaces is a straightforward operation: Gravity and the vibrating table tend to keep the mud in the mold. Making outside 90-degree corners (Figure 3) is more difficult, because the mud tends to slump out of the "up" leg of the mold. Constant working and attention to these pieces is necessary to get a decent corner, and even then the failure rate is higher than desired.

Keeping the mix uniform from batch to batch is a critical part of the operation, to ensure that stone made today matches the stone of the same type made last month. Should the recipe for a batch change, the finished product will look different, and the phone will start to ring.

Ordering

Figuring the amount of stone required for a job is easy, since the stone is typically sold by the square foot. I usually figure out the face square footage of the area to be covered, then deduct for doors and windows. For exterior work, I plan for the stone to go 6 inches or so below final grade — far enough so the bottom of the stone is not exposed when the backfill settles. (Some manufacturers recommend keeping the stone above grade to avoid staining from the soil, but I prefer to see the stone "die" into the grade.)

Corners. Corners (both 90- and 45-degree) are figured by the linear foot, and can also be subtracted out from the face square footage. As a rule of thumb, I deduct half the number of linear feet of corner stone from the flat stone number. So, for example, if I need to cover 437 square feet with flats and 48 linear feet with corners, I'll order 413 square feet of flats (437-24 = 413).

Remember that coverage per box varies from source to source. Always check with the manufacturer. Typically, though, a box of flats will contain so many *square* feet of coverage, while a box of corners will contain so many *linear* feet of coverage.

Waste. In the hands of a skilled installer, manufactured stone creates lit-

PHOTOS COURTESY CLASSIC STONE CORP.

Figure 2. Manufactured stone is cast in molds made from natural stone. First, pigments are sprinkled into the molds (top), then the molds are filled with a cement mix (above). The filled molds are set on vibrating tables to get rid of bubbles.

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Figure 3. Special outside corner stones give the stone veneer the appearance of thickness.

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Figure 4. Like a stucco installation, manufactured stone is installed over a water-resistant paper and galvanized lath (left). A scratch coat (right) provides the flat surface for setting the stone.

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Figure 5. Manmade stone can be cut with the usual mason's tools, like diamond-blade saws (above) and grinders (right).

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tle waste, so there's no need to order lots of extra material. Usually the remnant stone left in a partially-used box is enough to accommodate the fitting and trimming necessary on any job.

Prepping the Wall

The front-end work in new exterior wood-frame construction is exactly the same as if the wall were going to receive stucco (Figure 4). Flashing is mounted atop door and window heads, and Class D building paper (or housewrap) is stapled over the sheathing, starting at the bottom of the wall, with 2-inch overlaps between successive courses. Take care to lap the paper over the upper leg of the window and door head flashings mounted earlier.

Electrical boxes for light fixtures should also be installed and properly flashed. Set the boxes so they project beyond the sheathing face approximately 1 1/2 inches (or the thickness of the particular stone), to permit mounting of porch lights and receptacles flush with the face of the stone. With styles of stone that leave an irregular surface, we may install a mounting block of 2-by cedar, cut out for the receptacle box, to provide a flat surface for the fixture. The block goes directly over the sheathing and is cap-flashed, then the paper is lapped over the flashing. The block should be stained or painted before the stone is hung.

Next, metal lath is nailed up over the paper, and a scratch coat of stucco applied. Some installers take advantage of the wet scratch coat to score the wall lightly with horizontal reference lines for hanging the stone (chalk lines snapped later will do the same thing). This is important for stone patterns that have clear horizontal lines. If you're using "mosaic," or random pattern, stone, the need to maintain horizontal lines goes out the window. This "peanut brittle" style of stone is quick to hang, but you end up with a lot of visible grout due to the irregular shape of the stones.

If the stone is being applied to a clean, unpainted block wall, there's no need to

lath or scratch: The stone can be bonded directly to the block (and the horizontal reference lines are already there). Take care to wire-brush off any splashed-up dirt or mud at the base of the wall near grade before applying the stone. Likewise, if you're working over a poured wall surface, it's very important that any remaining form-release agents (oils) still on the wall be stripped before you attempt to mount stone. These products will prevent you from getting a good bond.

Setting the Stone

The mason should open and lay out several boxes of stone, to have a wide variety of shapes and sizes to choose from. Stones from different boxes should be mixed throughout the installation to ensure uniform color.

The stone is installed by buttering the back with Type M mortar, and squishing it into place on the dried scratch coat surface. If the mud is too wet, the stone will slide down and off the wall; if it's too dry, it will be difficult to spread on the back of the stone.

Cutting. Manufactured stone can be cut, when necessary, with standard mason's tools — a diamond-blade saw for straight cuts and nippers or a grinder for irregular cuts (Figure 5). Cut edges should be placed out of sight — on top of the stone if it occurs above eye level and on the bottom of the stone if below eye level.

Grouting

Grout — typically a soupy Type N mortar — is installed using a grout bag (Figure 6). When the grout is "thumbprint" hard, the joints are struck. Then the wall is brushed down with a dry brush, and the job is done.

The mason must take special care to mix the grout uniformly batch to batch or else the color can change. The color of the grout and the depth to which it's struck (or not struck) can have a dramatic effect on the stone: A colored (usually tan) mortar flush with the face of the stone is my personal favorite. If less expensive gray mortar is used and struck deeply (raked out),

PHOTO COURTESY CLASSIC STONE CORP.

Figure 6. Grout is installed with a grout bag. Drystack stone styles require no grouting, except perhaps to fill small voids.

Manmade or Natural?

PHOTOS COURTESY CULTURED STONE CORP.

Manufactured stone is available in just about any common shape and color.

PHOTOS COURTESY CULTURED STONE CORP.

Figure 7. Accessories like cut sills (left) and archways (right) are available.

the shadow lines will make the stone mounted on the wall appear darker than it actually is.

Cleanup. Any mortar droppings that land on the face of the stone should be allowed to dry, then wire-brushed away. Trying to wipe off wet mortar will only smear the stone. *Never,* under any circumstance, attempt to acid-clean this product: You'll ruin the stone by burning away the face and exposing the aggregate.

Choosing Manufactured Stone

Don't trust the printed literature to select a stone. At a minimum, ask to see a sample of the stone from boxes in inventory. Better yet, visit a job where the stone has been installed.

Not all stones are created equal. If several brands are available in your area, make it a point to look at several jobs in each product, both current and as old as possible. The pigments used to provide base coloration for the stones are expensive, and sometimes smaller firms relent and use cheap pigments. Over time, these stones fade under UV punishment and lose their vibrancy. Do your homework to ensure you're getting what you pay for.

Manufactured stone makes an ideal way to finish off the interior walls of a basement rec room, since you can apply it directly to the masonry, without having to fur out the walls. It also works great to create the appearance of an old stone foundation. Many manufacturers have "seconds" — stones that did not turn out as expected. These are available inexpensively, and are excellent candidates for painting to create the look of an old whitewashed rubble foundation.

Accessory products. Most manufacturers have accessory pieces that are made to resemble cut sills (Figure 7). These come in 36-inch and sometimes 48-inch lengths. In using these, consider the visuals of the finished job *before* you start mounting them: For example, if you' re putting them below a window that's 7 feet wide, you don't want two 3-foot lengths at one side and the remaining foot filled in with a 12-inch piece. Think about where and how the joints will occur before you begin installing.

Other masonry features such as quoins, copings, and arches are also available.

Design note. Remember, the intent of this product is to replicate genuine stone, so use common sense and apply the product only where genuine stone would logically be found. Applying stone to dormers above the roofline, for example, or to the gable end of a porch supported by decorative posts will create an eyesore you'll probably regret.

Steve Thomas *is an estimator with Michael Matrka Inc. in Columbus, Ohio, and has 13 years' experience in the masonry and stucco trades.*

Sources of Supply

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Cultured Stone Corp.
P.O. Box 270
Napa, CA 94559
800/255-1727
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Eldorado Stone Corp.
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