Creating custom-designed concrete flatwork

By **Dacher L. Frohmader**

A Las Vegas contractor explains his procedures for coloring and texture-stamping concrete flatwork

This concrete pool deck was created using two different random-stone patterns. The bands of small random stone break up the expanse of larger stone to create visual interest and define areas.

For the past 23 years, Frank Rusk of Rusk Concrete Textures, Las Vegas, has been transforming conventional concrete flatwork into works of art. Using coloring agents and texture-stamping tools, he creates tile, slate, stone, and other custom-designed patterns in concrete. Applications range from residential patios, pool decks, walkways, and drives to high-traffic commercial areas. Customers are attracted to Rusk's flatwork for more than its beauty. They also find it easier to maintain and less expensive to install than most of the materials it imitates.

As with any highly visible and detailed work, adherence to proven, reliable techniques is key to a successful product. In this article, Rusk explains the basic steps he follows to custom-design concrete flatwork.

Before you begin

Before placing concrete for a coloring and texturing project, it's important to consider the following details:

Thoroughly compact the subbase. Make certain that the base material is compactible, stable, and porous enough to allow adequate drainage. Rusk uses a minimum of 4 inches of Type II gravel / sand / soil mix—also known as ABC mix—under all his work. The aggregate size is ¾ inch. He uses material uncontaminated by chemical salts, such as sulfates, that could later leach into the concrete and discolor or otherwise damage the finished product. After leveling the base, water it then machine-compact it to a density of about 95%.

Select forms. Rusk prefers plastic flatwork forms because they don't rust, so there's no chance of discoloring the concrete. The forms also are easy to clean, which helps prevent contamination of the finished work.

Provide adequate pitch. Because textures tend to hold water in indentations, resulting in salt and dirt buildup, plan for a minimum pitch of ¼ inch per foot. If spotting or water-borne salt buildup occurs—especially in hard water areas—a solution of vinegar and water works well as a cleaner and will not harm colors.

Protect adjacent areas. Cover any adjacent concrete or building elements with plastic (Figure 1). This will ensure against accidental staining damage from the coloring agents and reduce cleanup time. If there are any existing stains or other damage before you begin work, make sure the customer is aware of them to avoid disputes after the job is done.

Plan ahead. When planning the size and configuration of the project, consider access to the work area, the capacity of your crew, and the concrete set time. This can help avoid serious delays or slowdowns during concrete placement and finishing.

Mix design

Rusk uses a standard 2500- to 3000-psi concrete in most of his work. He has found that using a ¾-inch, well-graded aggregate results in a stronger, more crack-resistant product. He avoids using pea-gravel aggregate.

Concrete mixes for exterior flatwork must be proportioned to be durable, meeting local requirements for exposure. Consult the manufacturer of the color hardener to resolve questions about compatibility of coloring agents and other admixtures. Also, do not use fly ash because it can react with some coloring agents and cause discoloration and blotching. Calcium chloride can cause color instability or distortions under some conditions. If accelerator is specified, use high-early-strength concrete instead.

Placing and finishing

Because Rusk works in the arid Las Vegas area, he finds it necessary to prewet the base material before placing concrete. He then follows conventional placing procedures, making sure to limit voids by careful consolidation.

Floating techniques differ from those used for finishing conventional concrete. Rusk has found that a bull float with ¼-inch raised notches does the best job. The tool uniformly pushes large aggregate below the surface.

Texture stamping requires a smooth, plastic surface for consistent imprinting. Work the surface with the float until this condition is achieved.

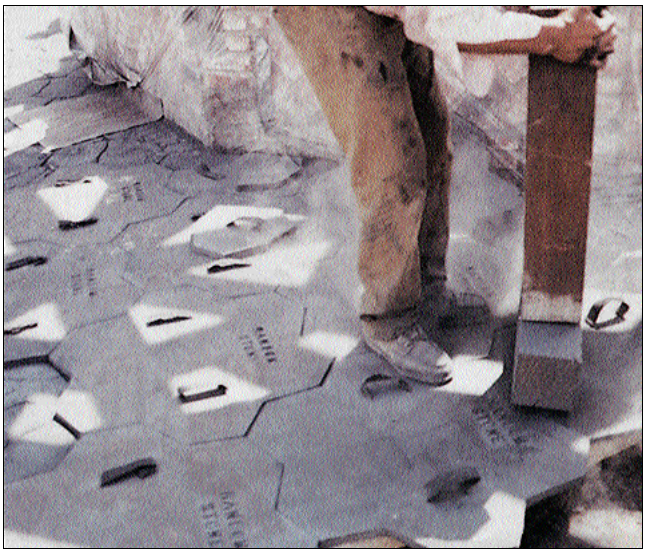

Figure 1. *After placing the stamping tools, tamp them using just enough force to impress the texture into the concrete surface. Notice that the brick walls in the background are covered with plastic to prevent accidental staining from the coloring agents.*

Figure 2. *Workers use special edger/jointer tools to cut bordering strips in fresh concrete. These strips will be patterned differently from the inside areas.*

Applying color hardener

For most jobs, Rusk uses two or more colors to create special effects and enhance the relieved appearance of the textured work. He first uses a powdered color hardener made of portland cement, silica, and metallic-oxide colors. Worked into the top surface of the concrete, the hardener increases surface strength to 5000 to 8000 psi. Rusk recommends purchasing coloring materials from one supplier to maintain a high level of consistency.

Broadcast sufficient color hardener to cover the work area. When using dark colors, a 60-pound sack of hardener typically covers 60 to 100 square feet. When using lighter colors, a 60-pound sack may cover only 40 to 50 square feet.

The first coat of color hardener should be applied heavily and distributed evenly. As in any operation where powdered materials are used, workers should wear particle masks to prevent inhalation of materials.

After allowing the hardener to sit for a few minutes, work it into the concrete bleedwater with a conventional bull float. Pay special attention to edges, where concrete tends to dry quickly. The goal is to integrate the color hardener thoroughly into the concrete, forming a consistent and uniformly plastic surface. When the first floating operation is complete, dust again with color hardener to eliminate any blotching or irregularities. Float the surface again, then trowel to a smooth finish.

Applying colored release agent

Because texture-stamping tools require the use of a release agent or bond breaker, Rusk uses a colored release agent to complement or enhance the color of the hardener used. Applying this powdered agent properly is difficult. It requires experience in determining how much release agent to use and a steady, consistent broadcasting technique to produce professional-looking results.

Dust the area with an even layer of colored release agent. Because the impressions made by the stamping tools vary in depth, the agent penetrates some areas better than others, resulting in a variegated color pattern. About 15% to 20% of the release agent remains in the finished work.

Figure 3. *The bands of concrete in this walkway are being patterned before the larger concrete sections are placed. On detailed projects, separate pours can make it easier to place concrete of contrasting patterns or colors. Workers wear particle masks so they won't inhale powdered release agent.*

Texture stamping

Texture-stamping tools usually are made of a strong, flexible polyurethane elastomer. Some tools are custom-made by casting over the subject material with layers of liquid latex. The pattern produced by the stamping tools should be pleasing in appearance without looking haphazard or unprofessional.

Knowing where to place control joints is essential to overall appearance. Try to place them so they become a part of the texture or pattern, or create a pattern that uses contraction (control) joints as boundaries. When forming a tile pattern, for example, cut the impressions of tile grout lines deeper to serve as joints. To guide placement of stamping tools and joints, snap chalk lines on the concrete surface as work progresses.

After the joints are cut, begin placing the stamping tools. Have enough tools onsite to form a row across the work area, plus two extra tools. These extra tools allow you to begin placing the next row of tools in proper relationship with the preceding row before removing any tools for reuse. Place the tools on the concrete surface carefully, making sure they line up with the chalk lines. Never drop the tools into place. This can disturb the powdered release agent. Temporarily remove form stakes or other projections during stamping, so the tools can lie flat.

To impress the texture into the concrete surface, pound the tools with a tamper (see Figure 1). Apply even, overlapping blows using only enough force to impress the texture. Try to keep the tamper parallel with the stamping tool to avoid imperfections in the pattern. For the same reason, be careful when walking on the tools. After placing the first tool, check to make sure it will release easily. If it sticks, apply more release agent, then replace the tool exactly where it was and retamp.

To remove the stamping tools, slowly, carefully lift them from the surface, keeping them as flat as possible. Rotations and slippage will result in smearing. After the tools are removed, you may notice slight imperfections in texture or obscured control joints. These usually can be repaired using hand tools.

After allowing the concrete to cure for a day or two, lightly pressure-wash the work area with a mild acid solution to remove excess release agent. To help preserve the flatwork's color and texture, Rusk recommends applying an acrylic or solvent-based sealer to the concrete surface.

Special effects

Using multiple patterns or colors, combining patterned and smooth concrete, or combining colored and plain concrete are among the many options to consider. Rusk uses paint shields and plastic sheeting to mask off areas of different colors, and places tin over plastic sheeting to protect a nonpatterned area while using stamping tools. This allows the slab to be placed monolithically. Light troweling after the patterned sections are completed removes any marks on the nonpatterned surfaces. Rusk makes his own edger / deep jointer tools (in 6-, 8-, 12-, and 18-inch widths) and uses them to cut borders that are patterned or colored differently from inside areas (Figure 2).

An alternative method is to place contrasting sections of concrete on separate days (Figure 3). For example, you can place concrete for a picture-frame edging using one color or pattern the first day, then fill the inside area the next day with concrete that is colored or patterned another way. Larger or highly detailed jobs may benefit from the added control multiple placements offer.

Vertical surfaces

Texture stamping also can be done on vertical surfaces, either as a continuation of horizontal texturing or as an independent project. Most of the same techniques are used. The primary difference is in the placement of the materials.

Place the concrete and allow it to set before the texturing job, forming a work surface. Next, mix the color hardener with water and apply like a plaster. After smooth-finishing the hardener layer, apply the release agent by throwing it evenly against the surface. Be sure that adjacent floor or slab surfaces are covered to prevent accidental staining.

Apply the stamping tool, placing it gently onto the surface. Some manufacturers offer a more flexible texture-stamping tool for vertical surfaces, but the tools used for flatwork also work well. Tamp the tool evenly and consistently (a wooden block and mallet work well), and remove it carefully. Touch-up work on edges and corners is an essential finishing touch, but requires patience as well as practice.

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