Ann Milkovich McKee

# Stonewalling America

## Simulated Stone Products

The term simulated masonry covers a number of products manufactured to imitate the appearance and characteristics of stone. These products are made from various materials, including cement, minerals, epoxy, and fiberglass, among others. They can be cast in specific shapes or applied directly onto a building substrate, molded or shaped to resemble the texture of masonry, and struck to create mortar joints.

### *Origins and Development*

The attempt to imitate masonry and stone is not a modern phenomenon. Cast stone, which is often considered a form of simulated masonry, has been used in the United States since the last quarter of the 19th century. Another product, rockfaced concrete block, gained popularity in the early 20th century. Simulated masonry is similar to both cast stone and concrete block in that it, too, mimics another material, but its construction technique made it a more flexible product. Rather than being a modular system cast on site, simulated masonry was usually manufactured on site and applied as a facing material. The process allowed for maximum flexibility to adapt to specific and sometimes unexpected site conditions. While simulated masonry products were marketed for new construction, they were also widely used on existing buildings. They were seen as an easy way to update a building or construct a new building without incurring the cost of actual stone construction while conveying a sense of permanence.

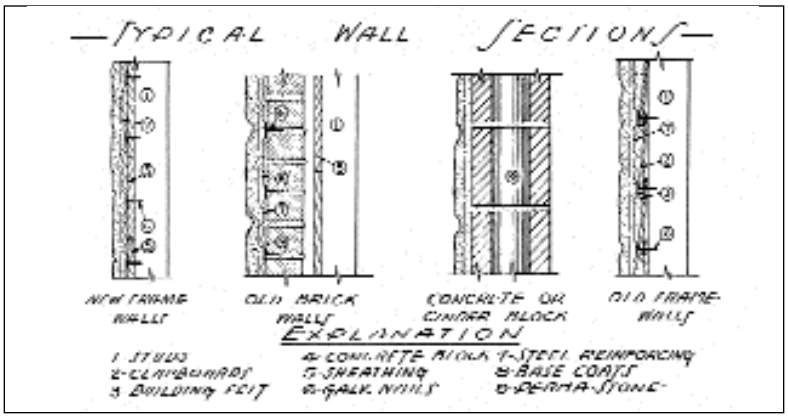

*Perma-Stone, a molded wall facing made of aggregates, cement, crushed quartz, mineral colors, and metallic hardeners, was suitable for both new construction and renovation.* Perma-Stone *catalogue, 1954. Courtesy of Michael Cheek.*

Simulated masonry played a large role in the changing aesthetics of the American public beginning in the 1930s. Of the simulated masonries that could be applied directly to a building, probably the best known is Perma-Stone, which was touted as the "originator of moulded stone wall-facing." Beginning in 1929, the Perma-Stone Company, based in Columbus, Ohio, sold and marketed its patented and trademarked product through the use of licensed and trained dealers. The company provided the molds and materials (portland cement, aggregate, crushed quartz, mineral colors, and metallic hardeners) necessary for the job, but the dealers manufactured and installed the materials. The company's success spawned many competitors attempting to capture a share of the growing market for this type of remodeling process.

Another successful cement-based simulated masonry was Formstone, a product of the Lasting Products Company in Baltimore. Formstone was first available in 1937, the same year that Lasting Products obtained a patent for its process. The company was responsible for the manufacture and distribution of the specific tools and materials necessary to complete a Formstone project. The actual on-site work was done by registered contractors who had been trained by the company.

Simulated masonry products were often hailed as thoroughly modern inventions. Rostone, made from pressurized shale, alkaline earths, quarry waste (lime), and water, was first produced in 1933 for the Century of Progress Exhibition by the Rostone Company in Lafayette, Indiana. Rostone was used to create the Wieboldt-Rostone House (Walter Scholer, 1933), one of 10 houses designed to exhibit modern building materials and innovative construction methods. Rostone was manufactured as prefabricated panels and shipped to the site for construction by trained contractors.

In addition to cement, many other materials have been used as the base for simulated masonry products. By 1960, for instance, fiber-reinforced plastic panels were available. One product, Terox,




*Top,a worker hand-presses a final Perma-Stone coat to a wall surface.*

*Bottom, Perma-Stone could be applied to many new and existing substrates.*

was "moulded in dies cast from selected quarry stone." As with other products, pigments were used to match the desired stone color.

### Manufacturing Process

There are two categories of simulated stone: products manufactured off site and those mixed on site. Both types of simulated masonry can be applied to existing conditions or used as part of new construction on almost any building type.

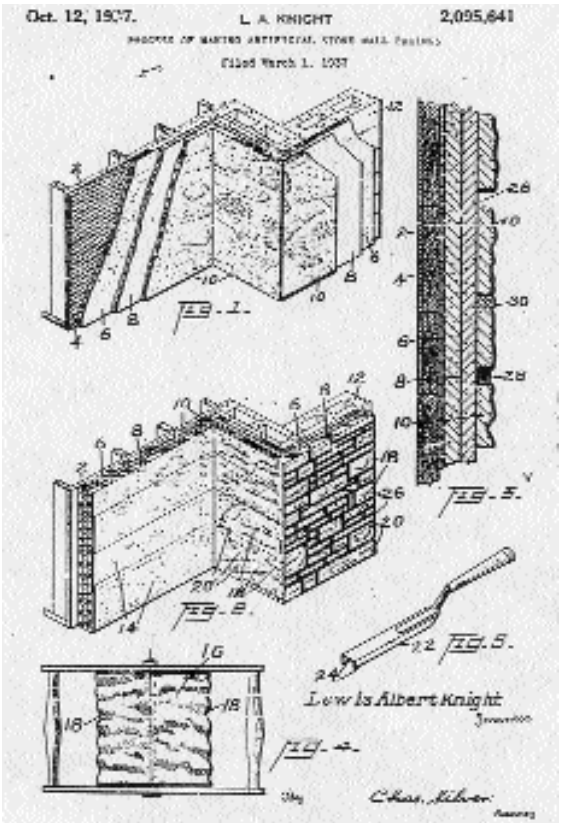
Rostone not only simulated stone in appearance, but also its manufacturing process closely recreated the formation of natural stone. No portland cement was used in its manufacture; rather, it was made from natural ingredients that underwent a chemical reaction to form a new material. The manufacturing process began with drying, pulverizing, and finely grinding shale. Lime and then water were added, and the resulting mixture was placed in molds or hand-formed into specified shapes. To induce the necessary chemical reaction, the molded mixture was hardened through exposure to heat. The material could be colored during the manufacturing process, and afterward the surface could be finished in a variety of textures. On cooling, Rostone components were ready for shipment to the job site.

### Uses and Methods of Installation

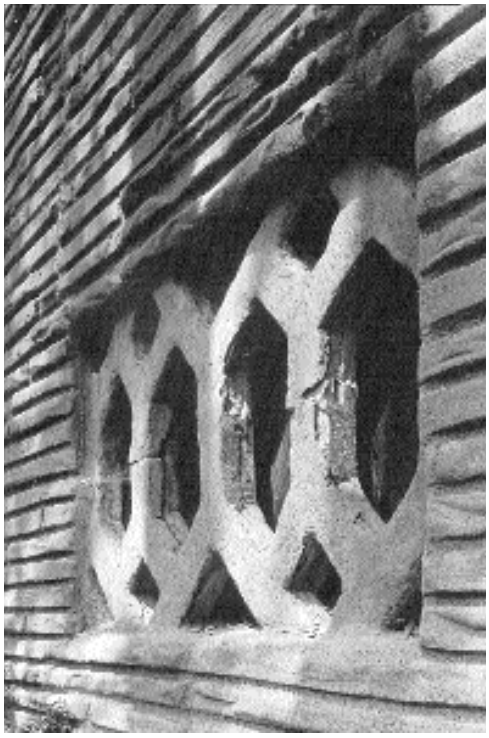
Simulated masonry was often used as a remodeling material, but it also could be used for new construction. Relying on the stereotypical perception of stone as signifying wealth, stability, and grandeur, these products were sold as the modern version of a natural stone. They provided an inexpensive way for middle-class America to enjoy the prominence of a "stone" house. Many companies stressed the opportunity to update a house or building to a level, or class, that would never be possible without their product. Advertisements also routinely proclaimed that simulated masonry was maintenance free, fireproof, and energy efficient. All these properties appealed to buyers seeking an inexpensive way to modernize buildings by covering over deteriorating facades.

Perma-Stone was marketed for new construction, but the majority of its applications were in remodeling or renovation projects. Formstone, on the other hand, appears to have been used more widely for new construction. The Rostone Company initially marketed its simulated masonry as a "modernization" material for storefronts. Schemes for gas stations built of Rostone were also proposed, but whether any were actually built is unclear. The company also targeted the residential market for the use of Rostone on exterior and interior walls, floors, roofs, and decorative elements such as door surrounds and fireplace mantels.

Rostone panels were produced as standardized 16"x 24" sheets either 1" or 1 1/4" thick; custom sizes and shapes were available for an additional cost. The panels could be finished with three different surface textures: honed, a polished surface; natural, a slightly rough finish that mimicked natural stone; and shot blast, a moderately rough surface. Rostone could be made in any color, but earth tones were most popular. Greens, pinks, and reds were used as accent colors in




*The finished surface of Formstone, patented in 1937 by Lewis A.Knight, was tooled to produce polychromatic effects.*



*In 1950 the Wieboldt-Rostone House was covered with Perma-Stone, shown in poor condition. Photo by Jack E. Boucher, HABS, NPS.*

carved designs and to convey a multidimensional look.

In modernization and remodeling projects, Rostone panels were applied directly over the existing wall surface. When Rostone was used in new construction, the panels were attached to a steel frame with specially designed clips. The joints were filled with a mastic, thus providing an easily maintained system.

Perma-Stone, a cementitious material, is produced on site and applied directly to the building in a process similar to that of applying stucco. Used extensively for remodeling, Perma-Stone provides a stonelike concrete veneer that can be "permanently" attached to wood or steel lath or applied directly onto concrete and masonry.

To install Perma-Stone, metal or wood lath is secured to the building to provide a base for attachment. The application process is a three-part procedure. A first coat, referred to as a brown coat, is applied over the lath. Before it sets, it is grooved to provide additional surface area for the next coat. Once dry, the second coat (the scratch coat) is applied. While the second coat is still wet, the finish coat is applied through the use of pressure molds designed to imitate the look of natural stone. Minor hand finishing and application of a final membrane coating to serve as a water repellent complete the job.

In the direct application technique, Perma-Stone can be applied to curved surfaces as well as broad flat ones. The "stone" wall can be laid up in random, broken, or coursed ashlar. Joints can be raked, beaded, or pointed. Because color is added directly into the product on site, the color choice is unlimited and can vary. This provides the opportunity to develop interesting strata and varied stone colors. The texture of the finished simulated stone is restricted only by the molds and the amount of hand finishing a mason is willing to do.

As a frontrunner in the simulated masonry industry, the Perma-Stone Company zealously protected its patented and trademarked product and did not hesitate to pursue court injunctions against those who tried to use it without permission. Perma-Stone held several patents covering its product recipe, pressure casting procedure and molds, and membrane-curing technique. To ensure quality control, only licensed dealers and contractors are permitted to use the process, molds, and materials. Today the Perma-Stone Company still maintains a registered trademark for Perma-Stone products.

The philosophy behind Formstone was to provide a process for making an artificial stone facing that used the tools of masons and cement finishers and could be readily carried out by them. The procedure and finished installations have some similarities with Perma-Stone, in that Formstone too is a cementitious material applied in a multilayer process. Where the two differ markedly is in the formulation of the "stones" and finishing procedures.

In the case of an existing building, the walls are covered by a perforated lath of wood or metal if they were not masonry (no lath is needed if the wall is masonry or stone). A layer of cement mortar 3/8" to 3/4" thick is applied over the lath, and the surface of this layer is scored before it sets and dries. A second layer, typically 1/4" to 3/8" thick, is applied. While this layer is still plastic, the finish layer is applied. The finish layer, also ranging from 1/4" to 3/8" thick, can be formed with two or more colored or shaded mortar cements that are distributed to produce the polychromatic effects desired to achieve the appearance of stone.

Before the material in the top two layers has set, a waxed paper or other nonadhering material is placed on the wall. A cast aluminum roller with a crinkled surface is passed over the waxed paper, creating a crinkled

*Perma-Stone promised "Beauty, Permanence, Solidity" on the interior as well as the exterior. Perma-Stone of Montréal LImitée brochure, undated.*

*The door surround on the Wieboldt-Rostone House (Walter Scholer, 1933) is the only area of the exterior where the original building material,Rostone, a precast form of simulated masonry, is intact.*

impression in the mortar. Several rollers of different sizes or textures could be used on the same project to achieve the desired effect. After the waxed paper is removed, the crinkled surface is scored with guide lines for the "mortar joints." Grooves are cut into the top layer with a chasing tool, which has two parallel cutting edges allowing for the creation of a mortar joint mimicking those found in natural stone construction. The groove may be left unfinished or may be pointed with mortar.

A variety of finishes can be created with different textures (using different rollers) and colors. Most tinting is created by adding color into the mortar mix, but surface color could also be achieved by dashing colored powdered materials such as "mica, oxide pigments, stone dust, slate dust or chips of mineral or artificial stone ... on the outer layer. This produces a speckled surface, simulating particular natural rocks or stones." The powdered material is placed on the surface either before the waxed paper is applied or after the texture of the stone has been created and the wax paper removed.

Formstone seems to have been marketed as a product to refurbish and modernize existing buildings of any type. It was promoted as a material that could solve problems of deteriorating masonry and stone structures and poor insulation. Purchasers received a 20-year guarantee and assurances that the wall facing was "maintenance free." Baltimore, with its large number of brick buildings of an indigenous soft brick, became the "Formstone capital of the world."

Simulated masonry products reached their zenith during the 1950s, but by the early 1980s interest in such products had nearly ceased. Other products such as vinyl and aluminum siding were mass-produced and more economically installed on both new and existing construction. More importantly, these new products appealed to the changing public aesthetics. However, both Perma-Stone and Formstone are still being produced in small quantities today. The countless examples of simulated masonry across America are reminders of the public's penchant for remodeling houses.

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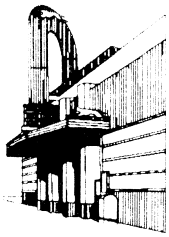
Bruce S. Kaskel

# The Metal and Glass Curtain Wall



The era following the World War II saw the development of new technologies that had a fundamental effect on the curtain wall. Principal to these new technologies were improvements in aluminum, glass, sealants, and insulation materials.

Aluminum was first isolated in 1825 but was not produced on a large scale until after 1889, when Charles Martin Hall was granted a patent for a process by which aluminum could be made on a commercial scale. By the 1920s, aluminum was being incorporated into building details such as doors, windows, trim, and exterior signage. Although aluminum costs three to four times as much as a comparable steel section, architects still found frequent cases where the expenditure was justified.

The onset of World War II saw aluminum production soar, since it was the principal material of many war materials. During the war, more than 200 factories produced a multitude of aluminum shapes. After the war, the abundant production capacity created a demand for new aluminum