



# Designing With Colored Concrete Masonry



# DESIGNING WITH

# colored



The CMU colors used on the Alpenglow Elementary School in Eagle River, Alaska, were selected to help the school fit into its beautiful surroundings.



Calm colors and simple patterns allow students to read and study without distraction at this elementary school in Forest, Va.

Concrete masonry units are beautiful. But while most designers and builders are aware of the strength, economy, fire resistance and other performance advantages of CMU construction, they often overlook its aesthetic potential. This may be changing, however, as an increasing number of architects are discovering the design potential of concrete masonry.

Statistics from the National Concrete Masonry Association (NCMA) indicate the architectural concrete masonry units are the fastest-growing segment of the industry's production. Their share of CMU production has more than doubled since 1990.

While the architectural CMU category also includes textured and specially shaped units, it is the growing use of colored CMU that has captivated the imagination of designers. The architectural theorist, John Ruskin said over 100 years ago, "Architectural color is to be as beautiful as its form," and creative designers are using colored CMU to create the image and express the spirit of their buildings.

Colored CMU are available in a wide spectrum of standard and custom colors to satisfy almost any design requirement. Subtle earth-tone colors can be used to blend a building into its environment, or more vivid colors can be used to

# concrete masonry

create visibility and a more unique identity for a building. By using white cement and sand, delicate pastel colors also can be made.

While many walls are constructed in a monolithic color, several shades of colored CMU can be combined in a wall to create special effects. For example, accent colors can be used to create fascia and decorative panels or to accentuate lintels, columns, and other architectural features. Color blends can give a subtle texture to a wall or reduce its visual mass. And on many innovative projects, patterns and intricate coursing have been constructed with colored CMU to create uniquely decorated walls.

These techniques are a time-honored masonry tradition and have been used with clay brick for millennia. But when constructed in the larger scale afforded by concrete block, they take on a new feel that is more expressive of our current times and architectural fashions.

**Quality control and integral color**  
The use of color CMU also has been stimulated by improved manufacturing techniques. In the past, many builders avoided the use of concrete masonry for exterior architectural applications due to the potential for color variation and leakage. Computer-controlled color dosing systems together with new curing methods and better quality-control assure greater CMU uniformity and color consistency. In addition, high-performance water repellents can be applied to walls or added to the concrete and mortar mixes. With these improvements, colored CMU can now be used as



The bright colors and checkerboard CMU coursing add visual flair to the entertainment district surrounding the Seattle Children's Theater.

an exposed finish in most climates and building types.

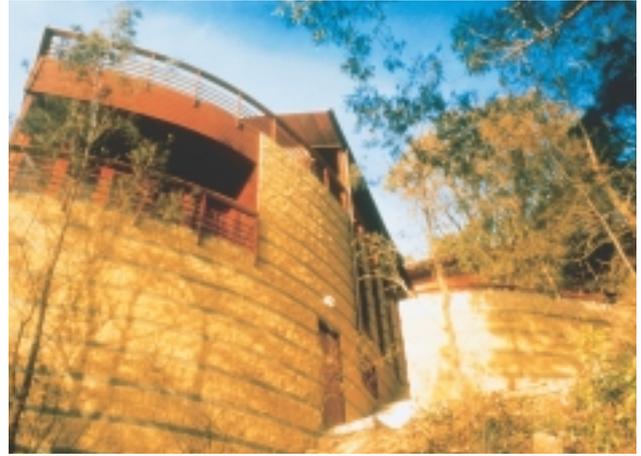
Since it is no longer necessary to paint or coat the units with texture-filler to avoid water penetration, the intrinsic beauty of the concrete masonry surface can be left exposed. In contrast to a painted or coated surface, exposed CMU have a more natural appearance, compared to natural stone and other traditional building materials. Furthermore, not having to paint or coat a colored CMU wall saves time and money during construction. Additional savings accrue throughout the lifetime of the building, since colored concrete is a permanent material that requires little or no maintenance. This also offers an



Smooth-faced and split-faced colored concrete brick are mixed to create an attractive facade at Limoilou College, Charlesbourg, Quebec.



For this private residence in Ontario, Canada, rock-face CMU offer the appearance of stone.



This custom residence in Sydney, Australia, is evidence of the growing international interest in colored CMU.

environmental benefit, since the integral color pigments typically used in colored CMU are nontoxic and contain none of the solvents associated with painting and repainting.

The pigments are blended into the concrete mix before the block are formed. The traditional tinting technique has been to manually weigh and add concentrated powdered pigments into each batch of concrete. New types of granulated and liquid pigments, combined with computer-

controlled dosing equipment, simplify production. Block manufacturers can program their systems to automatically blend a few primary shades of granulated pigments to produce an assortment of hues. In addition, the new pigment systems are virtually dust-free, so block plants stay cleaner. The most common pigments are made from iron oxide, either recycled from metal or refined from naturally occurring ore deposits, then specially processed for mixing into concrete.

The extremely small particles of pigment bond with the cement and last as long as the concrete.

### **Not just the same old block**

Along with a choice of hues, architects also can specify from an expanded selection of styles, textures, sizes, and shapes. In addition to such classic styles as precision (smooth-faced), split-faced, fluted, striated, slumped and scored block, there are several new candidates. New techniques are available for sandblasting

## Specifying colored concrete masonry

In general, colored CMU can be specified and installed in the same way as other high-quality construction. Observe American Concrete Institute and National Concrete Masonry Association recommendations and other applicable industry guidelines.

To assure uniform colors, all CMU used on a particular project should be produced with consistent manufacturing and curing techniques and with cement and aggregates from a single source. Pigments should comply with ASTM C979 *Pigments for Integrally Colored Concrete*, which establishes criteria for the pigment's resistance to weather and light and its compatibility with concrete.

Most CMU producers offer a selection of standard colors, but can produce custom colors to match special design requirements. The leading pigment manufacturers have fully-equipped color laboratories to analyze and formulate special colors for producers.

Specify the submittal of samples showing the range of each CMU to be used on the job. On jobs with critical appearance tolerances or unique requirements, specify a mock-up to demonstrate that the materials and workmanship to be used will produce the desired results.

Mortar can be tinted with the same pigments used in the CMU to match or complement the hue of the masonry units. Washing a wall while mortar is still fresh can smear pigments and cement across the face of colored CMU. Instead, let mortar splatters harden for seven to 14 days, then remove them with a chisel, trowel, or stiff brush and water.

Prior to further cleaning, allow mortar to continue curing for at least three weeks (four in winter). If a proprietary cleaning agent is used, follow the manufacturer's instructions. Pre-wet the wall, test the cleaning agent on a small, inconspicuous area, and check the effects prior to proceeding. Begin cleaning at the top and work down. Do not use muriatic (hydrochloric) acid on colored CMU or mortar.

Efflorescence, a white crystalline deposit that can form on concrete surfaces, can be especially visible on colored CMU surfaces. To minimize the potential for efflorescence, detail and build the wall to avoid penetration of water into the masonry, and keep the top of the wall covered when work is stopped.

Efflorescence is easiest to remove if it is cleaned promptly after it appears. A water repellent or clear glaze coating also can help reduce water penetration; test any surface-applied treatment or coating before proceeding with the application to determine the effect on masonry appearance. Caulking materials used to seal joints can be specified in colors to match the masonry.

As with any natural material, some variation in appearance is a normal design feature of CMU and mortar, whether colored or not. Mortar lightens as it cures; allow up to 28 days for this process to occur.



Arches and other traditional masonry detailing are realized in colored concrete brick at Herelle Place, Longueuil, Quebec.



Several shades and textures of colored CMU were combined with glazed CMU and other decorative building materials to make this school an exciting environment for learning.

or tumbling block to give them a softer, more antiquated appearance or to simulate quarried stone. By masking the concrete surface before blasting, sandblasting can be used to etch signage or graphics into the face of a colored CMU wall.

Some manufacturers produce CMU with two or more concrete colors mixed together to create multi-colored, variegated, or “flashed” units. A multi-colored effect also can be achieved by exposing the aggregate in the concrete. To accomplish this, the coarse aggregate in the concrete mix is selected to complement or contrast with the colored cement matrix. In split-faced units, the selected aggregate imparts a flecked, granite-like appearance; in ground-faced or burnished-face units, the effect is similar to a terrazzo finish.

In addition to standard 8x8x16-inch units, colored CMU are now available in a variety of sizes. In some parts of North America, for example, colored concrete brick now outsell clay brick. Block in 4-inch half-high sizes are gaining popularity. And the use of lightweight aggregates also makes it feasible for masons to handle oversized block to speed construction.

At the large end of the range, CMU veneer units are available in sizes up to 16x24 inches to create a monumental scale for a facade. To complete the monumental look, block also are available with beveled edges to create reveals and with special shapes to form water tables, sills, or corbels. Other special units can be used to create round columns or curved walls.

Many concrete block producers manufacture concrete masonry retaining wall units and interlocking concrete pavers. Since these can be colored to match the CMU used to construct the building, it becomes possible for a designer to coordinate the appearance of a building and the surrounding sitework.

### Design possibilities

While the variety of CMU colors and styles available today expands the designer’s palette, the real excitement is the increased willingness of so many designers to use concrete masonry in new and creative ways. In the words of one mason, it seems like “no one is building ‘four-cornered’ buildings anymore.” Instead, computer-aided drafting is making it



Four colors of CMU are used to create this mural of the San Francisco skyline on a highway sound barrier wall near San Francisco.

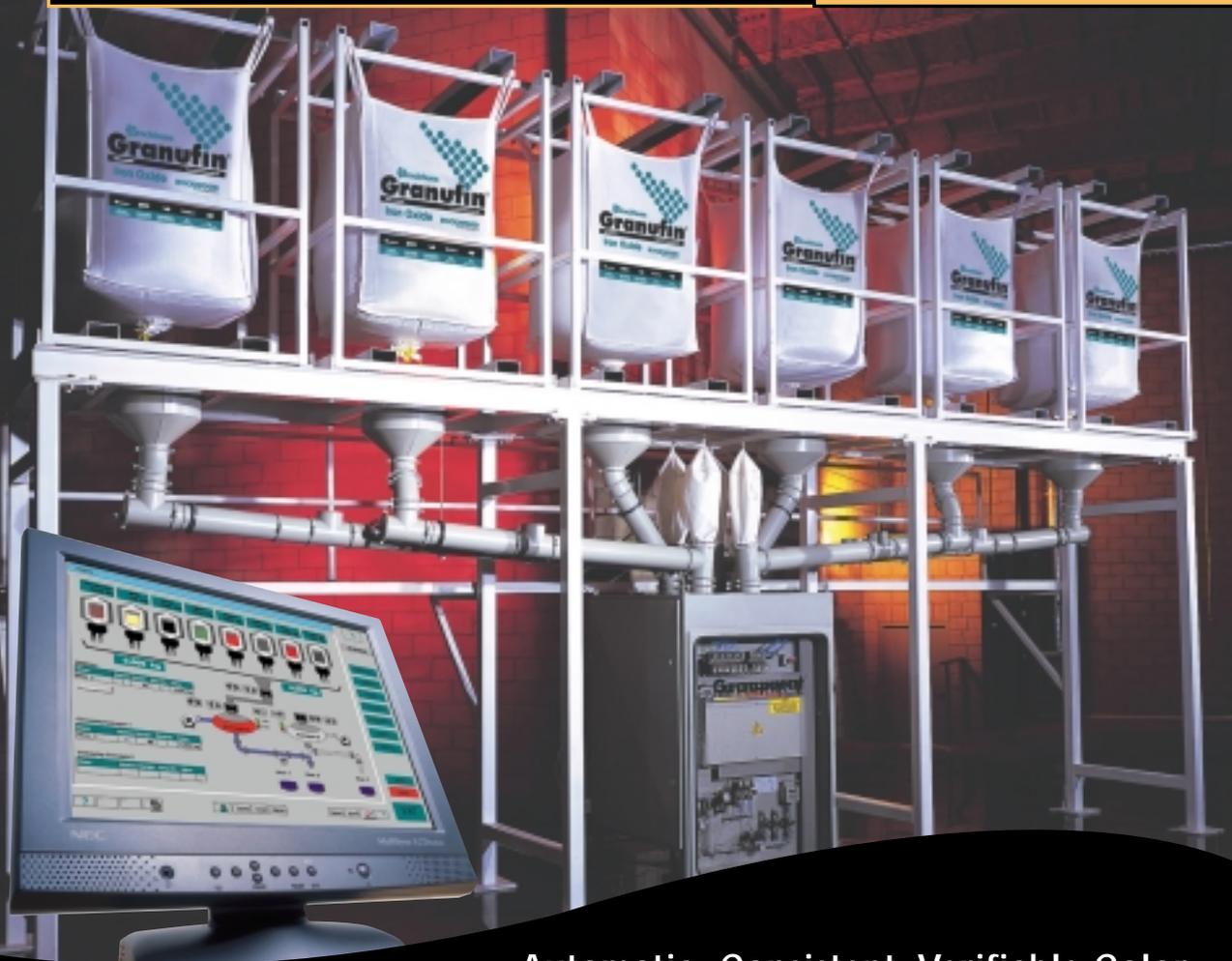
easier to design complex masonry patterns and special motifs. Colored CMU are increasingly popular as an interior finish material. And other designers are combining colored CMU with glazed CMU, glass block, clay brick, and other building materials in innovative ways.

Of course, some designers will continue to favor the appearance of plain gray CMU. But even with gray concrete masonry, adding a little color can assure you of getting just the right shade of gray you want.

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