

Concrete Evidence Age-Old Material Continues to Reinvent Itself

By Terry Grillo

“There is a species of sand which naturally possesses extraordinary qualities. It is found about Baiae and the territory in the neighborhood of Mount Vesuvius; if mixed with lime and rubble, it hardens as well under water as in ordinary buildings. This seems to arise from the hotness of the earth under these mountains...”

-- Marcus Vitruvius Pollio, from *De architectura* (The Ten Books of Architecture), circa 80-70 B.C.

Roman engineers and architects were the first to master the art of building with concrete. Using a material they called pozzolana—cement fired by the volcanoes in southern Italy—they formed the concrete that has held together structures like the Appian Way, the Roman baths, the Coliseum and the Pantheon for nearly 2,000 years.

Today, concrete has become much more than the foundation material for other, traditionally more attractive materials. Now, builders can make concrete look just like marble, without all that sweat and bother—and cost—of carving up the Italian landscape.

The same goes for brickwork, flagstone, interior and exterior tile, kitchen countertops, and fancy fireplace surrounds. Before it dries, concrete can be molded, stretched, poured, and colored to create just about any space and surface a builder or architect can imagine.

And with concrete leading the construction industry as the most commonly-used product in the world – 7 billion yards of concrete are laid each year – new and innovative products are surfacing each day, redefining the industry as we know it.

Mind the Gap

One of the main concerns typically associated with concrete is drainage. As the urban landscape grows, acres and acres of pavement grow along with it, and anything dropped on it gets washed away into storm drains. Gasoline, oil, chemicals from brake pads, and even the flow of water create environmental concerns.

Pavement is starting to cover up areas that have served to filter and clean rainwater and runoff flows before they reach rivers, lakes, and oceans. Big money is now required to trap, filter, and move runoff from weather that pours down on solid pavement. Some experts are calling storm water runoff one of the largest pollution problems the country is currently facing.

According to Andy Youngs of the California Nevada Concrete Promotion Council, a

new type of concrete could be the best solution for storm water runoff and other drainage problems the industry has seen yet.

“Pervious concrete is our newest product in California, and I think it’s going to be one of our most prevalent ones,” Youngs said. “It solves the problem of toxic rainwater runoff by permitting natural runoff and by developing bacteria in its structure that breaks down toxic chemicals.”

With 15 to 25 percent of pervious concrete consisting of empty space, or “void structure,” three to eight gallons per minute are allowed to pass through each square foot. Youngs said that this rate accounts for more flow than is generated during most rainstorms.

It looks like tightly packed gravel, feels rougher than regular concrete underfoot, and drains water from a gushing hose like a sieve. Water flows right through so storm drains are not needed, in many cases saving homebuilders and owners the time and expense of installing a separate system.

“Pervious concrete provides hardscape without altering the land’s hydrology,” Youngs said.

There’s a growing concern in many parts of the state—particularly critical in Southern California—of water table depletion. Groundwater is not recharged by natural runoff flows that are now channeled to the sea. Pervious concrete pavements let the natural scheme of things take over, and the natural percolation and filtering effect of the soil go to work to do what dirt has done forever—clean the water.

While pervious concrete pavements have been used in Florida and other southeastern states since the 1970s, the idea has been slow to grow in the West. Communities in California are beginning to favorably review the material for its ability to restore groundwater supplies and reduce pollution in waterways and offshore.

“Right now we’re pretty small, probably 1 percent of the market, but that’s a big jump from zero percent four years ago,” said Youngs.

Framework for Success

While pervious concrete is making headlines in the industry for its drainage capabilities, another unique concrete product is quietly coming to the forefront of the construction scene: insulated concrete forms (ICF). The latest in framing construction, ICF work is slowly but surely gaining popularity around the state, and for good reason – ICF houses are cooler, stronger, and more energy-efficient than traditional wood-frame homes.

Like many good ideas, the process is simple. Stay-in-place foam segments sandwich a vertical concrete pour. Drywall is added to the inside and nearly any exterior treatment goes on



the outside, resulting in homes that are stronger, quieter, and more energy-efficient than anything currently available. And they don't look like vertical concrete slabs or Roman temples – unless that's what the client wants.

“Poured concrete walls are not new,” said Randy Daniels, southwest regional manager for Arxx Walls and Foundations. “What's new is the form work—it stays in place.” Daniels said the process is very builder-friendly and once contractors use it, they “really enjoy the whole concept. They'd much rather work with ICF than bang on boards or haul around cinder blocks.”

According to Daniels, interest in ICF has traveled, often by word-of-mouth, from the East Coast, down through the southern U.S. and finally out West. Demand for the product represents a relatively small part of the California market, but it is steadily growing.

“Five years ago the response was, ‘What's that?’ and now people are starting to understand,” he said.

For Sam Gallego, manager of business development for Cemex in Ontario, ICF homes are becoming more and more attractive to clients because just about anything can be done with them. “We've done a tremendous amount of custom homes in Southern California,” Gallego said. “These are fire-safe buildings, which is very important throughout California.”

In early 2006, Cemex had more than 160 homes under construction in the Palm Springs market. The blistering hot summers were costing owners with wood-frame homes more than \$700 a month in electricity for air conditioning. “We were able to reduce that to between \$240 and \$400 a month,” he said.

While ICF construction has been used in Europe since the 1950s, it didn't take hold in the U.S. until in the early 1980s. In part, growth in ICF construction was limited by a slightly higher cost. The process also ran smack into the traditional method of wood frame construction.

However, Jim Niehoff, manager of residential programs at the Portland Cement Association, believes it is only a matter of time before those impressions change for good.

“ICF is ideal for California,” Niehoff said. “It's energy efficient, fire safe, and ICF homes are surprisingly quiet. Property constructed, ICF homes offer superior protection against disasters like hurricanes and earthquakes.”

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