

Some of the Latest and Greatest in Concrete Homes

In the last issue of *Shotcrete*, the Sustainability feature was titled “Is It Time for Shotcrete Homes?” Demand for energy-efficient, durable structures constructed with materials that have the lowest possible energy footprint is rapidly increasing. Using the shotcrete method of constructing such structures is one piece of the total solution to this demand.

Looking at this topic on a broader basis begs the following question: What would a home constructed of cement-based products look like? One answer is to look to The New American Home®. Each year, the National Association of Home Builders (NAHB) constructs a new model home to display the latest in building technologies and design techniques.

The New American Home 2007, built by Homes by Carmen Dominguez and designed by Bloodgood Sharp Buster Architects & Planners, creates an efficient structure without compromising aesthetics, by incorporating the latest in cement-based products—the building material of choice for sustainable development. It features a wide array of energy-efficient, sustainable design elements that streamline the construction process and create economies in the long-term maintenance of the home.

Cement-based solutions provided a simplified construction process with limited waste, an efficient thermal envelope that cuts energy costs significantly throughout the lifetime of the average home, and the durability to make this innovative structure stand for generations as a symbol of creative and sustainable design. As a result of using cement-based products and other sustainable design elements, the U.S. Department of Energy reported that The New American Home “uses approximately 73% less energy for heating and cooling and 54% less energy for water heating compared to a traditionally constructed house of comparable size in the Hot-Humid climate region.”



TX Active

The most fascinating application used in The New American Home is a building material with benefits that, at first glance, are invisible to the naked eye. The exterior would appear to be traditional cement-based stucco walls, which have long been known for their durable, beautiful, low-maintenance finish. The stucco used in the New American Home, however, features one of the most revolutionary sustainable building applications in the world—TX Active—a new photocatalytic cement technology that is self-cleaning and reduces air pollution.

This self-cleaning, smog-eating material is manufactured by introducing admixtures, TX Arca and TX Aria, into the traditional cement mixture. The admixture TX Arca destroys pollutants that come into direct contact with the material, which will keep the building’s surface area clean without expending materials for building maintenance. The admixture TX Aria breaks down airborne pollutants, such as smog, that pollute the air around the surface of the building. TX Active will not only reduce maintenance to limit the overall energy footprint but also reduce the pollution in the air around the home.

Fiber-Cement Siding

To complement the stucco and provide a durable exterior, The New American Home incorporated fiber-cement siding as a low-cost, low-maintenance alternative to wood siding. This sustainable application of cement-based materials has the appearance of wood but none of the drawbacks of traditional wood siding. Applying this attractive material to a building is one of the easiest ways to use cement-based products to fortify a home or business. Approaching 10% residential market share, this fiber-cement siding will not rot, buckle, or warp. Fiber-cement siding is also proven to hold paint for a longer duration than wood siding and is resistant to termites and fire, a major consideration in many regions of the U.S.

Insulated Precast Concrete

The backbone of The New American Home is an insulated precast concrete wall system that provides the structure with a solid thermal envelop. Compared with wood and steel, concrete structures allow minimal temperature fluctuations due to its high thermal mass. Consequently, heating, ventilating, and air-conditioning can be designed with smaller-capacity equipment, saving money and resources. The New American Home will enjoy these benefits with precast construction; and to provide additional insulation, a continuous layer of Styrofoam is sandwiched between precast slabs throughout the structure for optimal energy performance. Operating The New American Home will require less overall energy for heating and cooling, significantly reducing the environmental footprint of the building over its life cycle.

Precast concrete walls provide additional energy benefits that do not show up on monthly energy bills. By constructing the panels in a factory, less material is required because precise mixture proportions and tighter tolerances are achievable. This significantly limits waste from the construction process by lowering the overall use of materials for any structure built with this type of wall system. The preassembled panels also expedite

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the construction process, decreasing the number of labor hours necessary to complete the project. This translates directly into a reduction of overall cost to complete precast projects.

Concrete Makes Sustainability Happen

The New American Home 2007 demonstrates the versatility of cement-based products in the construction process and its many cutting-edge sustainable design applications.

Cement-based products play a key role in solidifying the structure of the building, as well as creating the home's attractive outward appearance while significantly contributing to its sustainable features.

We thank the Portland Cement Association for sharing this information. For more case studies on projects answering the sustainability challenge with cement-based products, visit www.cement.org/Briefingkit/case_studies.asp.