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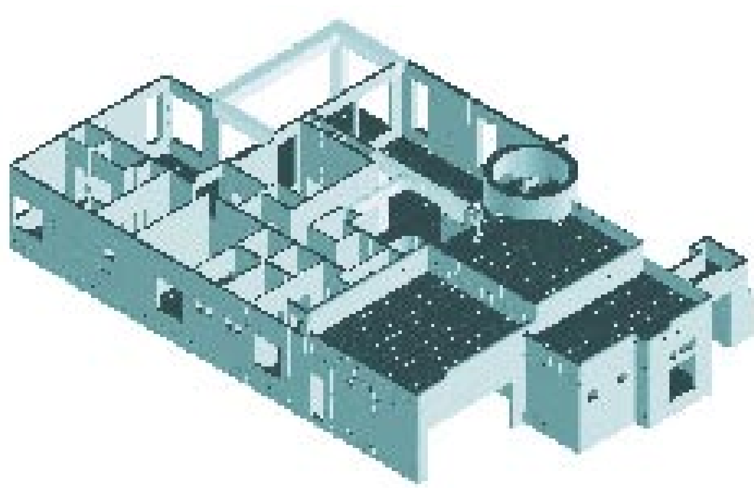
Foam Home

...And the third little pig built his home of polystyrene foam and concrete composite.

Taking shape in the exclusive Hidden Hills community in northeast Scottsdale is the first full-scale home built with revolutionary building technology known as Saebi Alternative Building System (SABS).

SITUATED AMONG OTHER PUEBLO-STYLE HOMES, this innovative structure might not warrant a double take from passing home shoppers. And that's exactly the point. The Tamarisk House project blends in among other conventionally built homes because it's designed to be indistinguishable from other SunCor models.

SABS from Strata International Group represents a technological leap, employing lightweight composite materials in the construction of single-family homes and multi-story buildings. Strata's innovative, sustainable building material is composed of expanded polystyrene foam coated with a structurally reinforced concrete composite. These materials form an incredibly strong bond to withstand building loads. Fibers are disbursed throughout the matrix of the composite, which makes the material three to five times stronger than steel. The foam cores of SABS buildings are over 98% air and provide the means to hold an outer concrete skin that gives the structure its strength. These bonded components are inexpensive to maintain, durable, and



resistant to fire, mold, pests, and earthquakes.

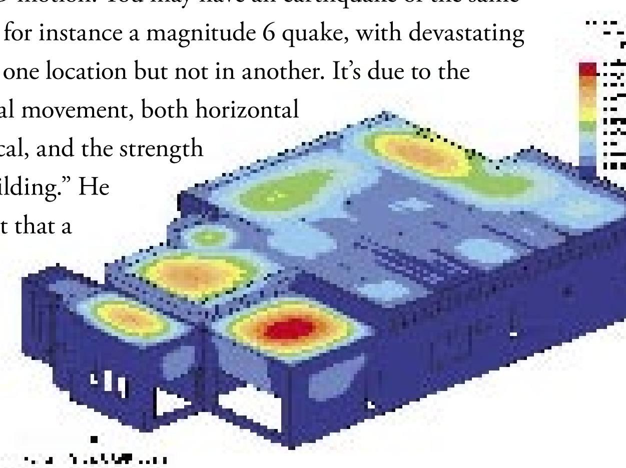
Traditional composite materials have had limited application in the building industry because there have been no practical means for predicting the performance of buildings using composites as structural members. Strata's CEO Nasser Saebi has a Ph.D. in structural engineering and more than 30 years of project management experience. He developed a patented method of predicting the performance of the structural members of an entire building composed of these composites. Saebi spent a decade developing his method, but it wasn't until the last four years that desktop computing advanced to the point where he could simulate the effects of earth movement, wind, snow load, and other natural forces on his composite structures. Saebi explains, "In just two years, the power of PCs has magnified many times, so I'm able to solve problems today that I just couldn't solve then."

Earthquake Resistant Structures

Computer-Aided Design/Computer-Aided Manufacturing (CAD/CAM) is the application of computers in the design and fabrication of building components. Drawings of the proposed building are used in concert with a mathematical program called Finite Element Analysis. FEA is used to predict the performance of the structure against the forces of nature. A performance record of the building is available for review by architects, builders, and local building authorities.

Using FEA computer analysis, Saebi applied Northridge seismic conditions that hit California in 1994 to a 3-story SABS structure model. Saebi discovered that SABS buildings are resistant to earthquakes and can be easily designed to resist extreme earth movements because they are light and strong. SABS uses response spectrum analysis in conjunction with information gathered by instruments from past earthquakes by United States Geological Survey. Engineers can determine how structures react to past real-world earthquakes and apply the results to any new design.

"For the first time, we correlated the behavior of a building directly to seismic motion in three dimensions," Saebi explained. "Current codes consider earthquakes a lateral motion, but it is truly a 3D motion. You may have an earthquake of the same intensity, for instance a magnitude 6 quake, with devastating results in one location but not in another. It's due to the directional movement, both horizontal and vertical, and the strength of the building." He points out that a SABS



structure is rigid and light, allowing the composite building to move with the earth; therefore, it can be designed to withstand earthquake movement. Engineers are now capable of designing SABS structures for use in earthquake-prone regions.

ICC Testing

During the past two years, Strata International has endeavored to prove the viability of Saebi's ideas through a series of durability tests that conform to International Commercial Code (ICC) standards. ICC requires a myriad of tests performed by an independent laboratory for fire, aging, x-rays, water absorption, freeze/thaw, salt spray, water penetration, seismic, and structural strength.

In 2004, RADC Laboratory of Long Beach, California began a series of stringent durability tests to determine the quality control of SABS components. All SABS licensees must conform to these quality control standards for alternative building technology. This ensures builders are using the same specified materials and procedures. More than 100 required tests were executed. For example, specimens were placed in a chamber and tested for 2,000 hours for structural integrity. In one critical test, a fire was started in an interior corner of a room and allowed to burn fifteen minutes to reach a temperature of 2,012º F (1,100º C) with no heat transfered to the exterior of the building. Results showed the coating rated "zero" for flame spread and smoke development, indicating the composite would not permit a fire to spread beyond its immediate confines.

Test results also scored well in the Scottsdale Green Building program. SABS components rated a very high 80-points, indicating sustainability. In terms of energy conservation, materials reduction, and other environmental elements, it proved exceptionally earth-friendly. Saebi buildings conserve raw materials by eliminating the need for conventional structural components such as wood or metal framing, straps, nails, wallboard, stucco, and insulation. SABS structures are energy-efficient, with an energy rating of R40 in the walls and R100 for roofs. Typically found in homes, fiberglass blankets of insulation have a nominal R-value rating of less than half of polystyrene foam. Higher R-values translate into less energy consumption for heating and cooling. SABS replaces every structural component, including walls, floors, and roof, providing a near air-tight-building envelope.

Tamarisk House

The most recent application of SABS is Scottsdale's Tamarisk House. The 3,350-square-foot Santa Fe style house is to be

completed this summer. A small crew has been assembling the prototype building since September of 2004. Initially, eight potential buyers expressed an interest in acquiring the home. The house was ultimately purchased for $805,000.

From concept to completion, Strata applied CAD/CAM in the Tamarisk project. Generated images of the pieces created the house. These images were sent to a cutting room, generating digital instructions that directed a robotic foam cutter to accurately carve the polystyrene shapes required for the building. The end result is a set of building blocks that may be curved, angular, or the more traditional square and rectangular shapes. These individually fashioned pieces are assembled onsite like LEGOs. The rectangular panels range up to four by eight feet. Exterior walls are eight to ten inches thick, and interior walls are four inches thick. Patented roof beams, manufactured out of polystyrene foam and concrete composite, are thirty-inch thick supports.

The SABS box frame design is much stronger than conventional construction. This increases the maximum span without requiring internal supporting walls or posts. "Clear Span" construction provides the designer free reign to use up to 40 feet of unobstructed space between walls.

Special tools, such as nail guns, electric saws, or compressors, are not necessary in the construction of a SABS home. In actuality, the most unusual machine needed during construction is a hotwire tool that is used to cut out windows, doors, or other openings from the foam blocks.

Sol Source Architect, Tom Hahn, is supervising the Tamarisk construction. He states, "There have been challenges building a prototype house; however, any mistakes are easily fixed with a handheld foam gun. It's a forgiving system that can be repaired easily with unskilled labor. I can teach a worker to do the job in two or three days. It's a lot easier than wood frame construction."

International Interest

The use of composites in residential construction has begun to attract worldwide attention. Officials in Turkey are interested in studying a prototype in their home country. Strata will provide its technology to the U.S. market and the global community by contractual relationships with architects, builders, developers, foam companies, and other parties. "In the United States, building materials are plentiful," Saebi says, "but think of a country that doesn't have wood, steel, and other materials for infrastructure; it's very expensive. It can take up to three years in other countries to build just one house. Ours can go up in a matter of days. The applications have tremendous potential."

Saebi technology is shattering century-old, conventional thinking and is breaking into the 21st century providing the world a revolutionary, alternative method of construction. SE

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