Autoclaved Aerated Concrete

New Kid on the Block
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Autoclaved Aerated Concrete has finally found its way to the hurricane prone, coastal regions of the Lowcountry.

Once upon a time, there were three little pigs who set out to build their own little homes. The first little pig constructed his house of straw, the second chose sticks and the third used autoclaved aerated concrete.

Or at least that’s how Lowcountry home builder Ellis Smith likes to tell the story. In his new millennium version of the children’s classic, not only is the wolf unable to blow the third little pig’s house down, a Category Four hurricane fails as well.

Know in the building industry as ACC, autoclaved aerated concrete can withstand wind gusts of up to 180 mph, lasts more than 200 years without maintenance, offers superior fire protection and acoustic and thermal insulation, is mildew resistant and impenetrable to insects.

Sound like a fairy tale? Not according to contractors in Europe and Asia who have been using this revolutionary building material as an alternative to wood and concrete block for more than 75 years. Here in the Lowcountry, a growing number of homeowners are choosing AAC to reduce the amount of wind and water damage caused by storms. The product has proven so effective, insurance companies in the United State familiar with its benefits now offer substantially discounted premiums for homes built with AAC.

“It’s the only building material on the market that pays you back for using it” said Smith, who built his first AAC home on Daufuskie Island eight years ago. “In addition to lower premiums, you’ll see significant energy savings.”

Manufactured through a process that combines sand, cement, lime, water and aluminum powder, AAC materials contain millions of tiny air cells that provide outstanding thermal insulation, reducing heating and cooling cost by as much as one half.

“I like the idea of a solid wall; it gives the house a different feel” says architect Rick Clanton. “The thick walls are part of the allure of a stucco home.”
“You can carve arches and ellipses into it. You can pain it. You can finish it in stucco, plaster, Hardiplank, cedar singles, cypress boards or brick” says home builder Ellis Smith. “We use it to make fireplaces and outside trim. It’s unbelievably versatile.”

To date, Smith and his son Tommy, owners of Sandcastle Constructors, have built eight homes out of ACC in Hilton Head and Dafuskie with an additional four currently under construction. Their new 8,000 square foot office building on Marshland Road, which will house their construction business is also being built with the innovative product.

“I haven’t been able to find anything negative about this material.” Said Smith, a general contractor with more than 23 years experience in the business. “Along with its many beneficial physical attributes, AAC can reduce the construction time of the structure by 30 percent and its cost by 15 percent.”

A luxury home builder whose average Project runs upwards of $1.5 million, Smith first learned about AAC from well known local architect Rick Clanton of Group 3 Architecture.

“Back in the mid-70’s, I had a professor who thought AAC was going to be the best new thing on the market.” Clanton recalled. “I didn’t hear about it again until about 10 years ago. There are plants all over the world, but it took a long time for somebody to take a gamble on it in the United States.”

“I wouldn’t build a house any other way.” Said Andre De Bruin, who chose AAC for his 4,600 square foot waterfront home in Indigo Run’s River Club. “The weatherproofing and insulation are superior to anything I’ve ever encountered.”

Coupled with high quality roof insulation, the energy savings can be dramatic. Rick Harrington, an estimator and Project manager for Sandcastle, measured the insulation factor for himself when building his own AAC house in Broad Pointe. In the peak of the summer, the temperature in his attic dropped nearly 25ºF after the roof line was sprayed with expanding foam Icynene insulation.

“AAC creates a thermal barrier that keeps out the heat and cold.” He said. “An AAC house is solid. It’s as tight as a tick.”

Bill and Ronelle Peacher, who moved into their 7,000 square foot AAC house in Windmill Harbour two years ago, have the electric bills to prove it. Keeping their air conditioning unit set at 70 to 72 degrees, they have generated an average power bill of $299 a month, the same amount they paid when they lived in a rental house with less than a half the square footage.

“It’s just wonderful.” Ronelle Peacher said. “We’re very happy with it.”

It’s also an alternative to the environmentally conscious. AAC’s outstanding energy efficiency qualifies it as a “green” building material. No pollutants or toxic by products are produced in the manufacturing process and far less energy is required than in the production of competing building materials. In addition, the product is non-combustible, help prevent the spread of fire, and emits no toxic fume when burned.

Claiming title to the highest UL fire ratings in the construction industry, an eight inch thick AAC wall will remain intact after a four hour furnace exposure, followed by a hose stream test exposure of 5 ½ minutes at 45 psi. Smith loves to demonstrate to his clients how the product stays cool even when it is directly exposed to the flame of a blow torch.

“If you feel the other side of the AAC panel, you’ll see it’s not even hot.” Smith said as he held a burning torch to one side of a one inch thick block. “Heat and cold will not penetrate it.”

As a result, AAC walls do not require insulation like concrete block or wood-stud framing. The material’s unique physical structure offers ten time the insulating value of conventional concrete. A recent study showed that an eight inch AAC wall performs much better than a conventional wood-stud wall system with R-30 insulation. Walls typically have a minimum “R” or heat transfer resistance rating of 1 to 1.5.

The material’s inherent insulation mean san AAC house will need a much smaller HVAC system, requiring about 30 percent less tonnage than systems installed in a typical concrete or wood-frame home of the same size.

Its porous internal structure also provides excellent acoustic insulation. The tiny pockets of air in AAC provide dead air space that stops the transfer of noise. It absorbs much more sound than conventional concrete, effectively reducing sound wave transmission. More than 100 mile of highway sound walls have been built with AAC.

Even more important, especially in hurricane prone coastal areas like the Lowcountry, AAC deflects projectile debris and resists moisture penetration caused by wind driven rain or standing water. While a typical wood-frame or stucco house is built to withstand winds of up to 130 mph, AAC is designed to hold up in winds of 160 to 180 mph.

“Insurance rates are set to reflect the future losses we expect to pay to policyholders in a specific area” said Susan Merrill, corporate communications director for South Carolina Farm Bureau Insurance. “In the case of AAC construction, base don the building material and method used by AAC, we anticipate fewer wind related losses for this type of construction compared to usual construction. For this reason, policy premiums for not AAC homes have been at least 15 percent less than premiums charged for houses with usual materials and construction technologies.”

Architects and builders also have hailed AAC’s design versatility and flexibility. Manufactured in various sizes of blocks and panels, AAC is as strong and sustainable as conventional masonry, and as easy to work with as wood. The material can be cut, drilled, nailed, cored, chased and crafted with common hand tools. An electric router can be used to cut channels for pipes and wires. The workability of the product makes on site adjustments a snap.

“It’s a long term, trouble free solution that’s safer and more secure in hurricanes than a standard house” said Clanton, who designs a third of his homes using AAC materials.