

# INVENTIONS & INNOVATION

## Success Story



## METHOD OF CONSTRUCTING INSULATED HOMES

### Benefits

- ◆ Offers among the highest resistance ratings available in its R-40 walls and R-50 roof/ceiling
- ◆ Increases stability through its superstructure reinforced with concrete and steel
- ◆ Can be built faster than traditional wood-frame homes
- ◆ Has saved 200 million Btu from 10 homes constructed in 2000
- ◆ Has saved 15 billion Btu and more than \$200,000 in energy costs cumulatively through 2000 from the construction of 210 homes

### Applications

Can be used to construct single-family residences, multi-family dwellings, and small commercial buildings.

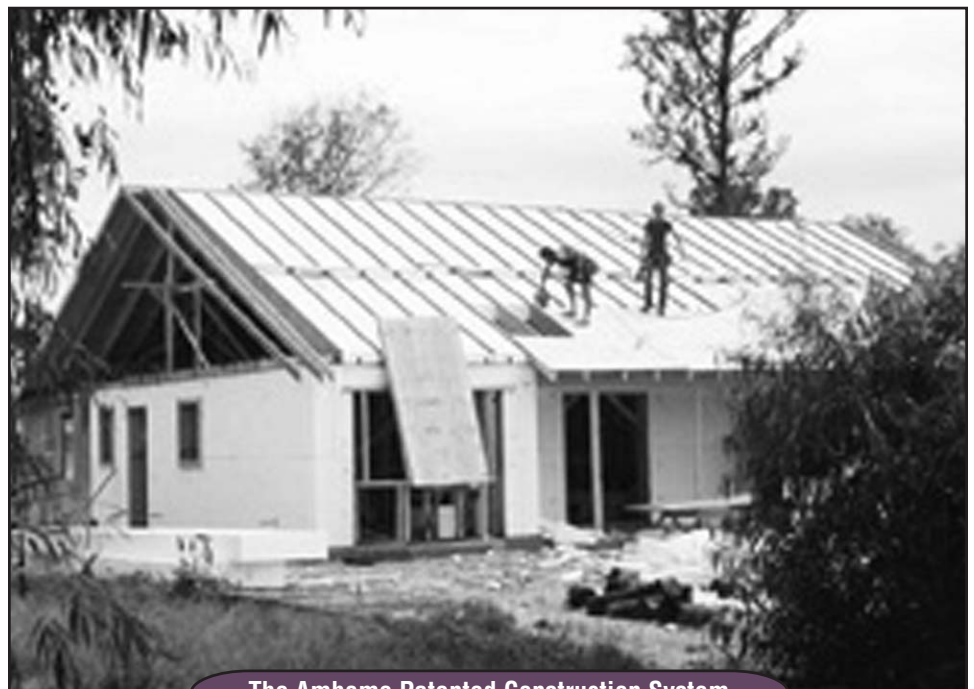
“Our clients brag about 60% or more savings on their current electric bills as opposed to their former residences of similar size, built conventionally.”

– Carl Hebinck  
President  
Amhome USA, Inc.

## An Innovative Building System That Is Energy Efficient, Structurally Sound, and Easily Constructed

The concerns of the home-building industry center around increasing productivity in the construction process, improving the quality of the American home, expanding opportunities for affordable home ownership, enhancing the competitive position of the United States relative to global markets, and ensuring the cost-effective and energy-efficient operation and maintenance of the home.

With the help of a grant from the U.S. Department of Energy's Inventions & Innovation Program, Carl Hebinck of Amhome USA, Inc., developed a method of constructing buildings that are both energy efficient and structurally sound. Amhome is an innovative construction system that integrates the walls and roof to yield a super insulated home that is structurally sound and easy to construct. Shell construction labor is reduced by 30% to 40%; productivity is increased through the ease and speed of construction; energy efficiency of the walls and roof are increased; and the solid concrete post-and-pillar construction is durable and low-maintenance.



The Amhome Patented Construction System



## Technology Description

A new home built using the Amhome system consists of a patented exterior wall system made of expanded polystyrene (EPS) foam insulation panels with an internal steel-reinforced concrete post-and-beam design. To incorporate the concrete post-and-beam structure, sections of EPS panels are cored forming cores and grooves. Once the panels are raised and temporarily shored, reinforcement steel bars are placed in the cores and grooves, which are then filled with concrete. Door and window frames are attached to the columns by long galvanized spikes that are installed before the concrete pour. When the concrete cures, the temporary supports are removed and the EPS forms remain in place, providing a permanent insulated R-40 wall.

The roof is constructed by using resource-efficient composite material roof rafters that create high-volume cathedral spaces. The patented R-50 roof insulation system is EPS slabs sandwiched between the rafters, with the space above the insulation vented by soffit and ridge vents. A radiant barrier that is also attached on top of the roof insulation and a whole-house fan assist in summertime cooling. A fresh air duct in the return plenum of the air handler provides positive ventilation for indoor air quality, while energy-efficient doors, and the HVAC system complete the Amhome system.

The system's primary innovation is the way the walls and roof are constructed. Less labor is required to construct the home compared with traditional wood-frame-houses.

## Economic Success and Market Potential

The Amhome technology can be applied to a wide range of structures. Foundation options include slab-on-grade, basements, over crawl spaces, or on stilts. One-, two-, and three-story structures range from 800 to 13,000 square feet. Amhome homes have been built in 18 states and the Cayman Islands and have been featured in articles in several national magazines. An expanded market potential may also exist in the commercial building market. Amhome markets its structures in three ways. There are licensed and qualified Amhome Licensee Builders across the US. Amhome kits may be purchased directly with assistance available from trained crews or technicians from Amhome. In Florida, Amhome USA may erect the Amhome portion of the house in cooperation with the buyer's local contractor. With 90% of the market, wood dominates the estimated one million new single-family homes built each year in the U.S. The instability of timber supplies, concern over quality issues, and public awareness of energy efficiency are creating opportunities for products such as Amhome.

## Environmental Impact

An Amhome home:

- Uses 35% less wood than frame homes, saving old growth timber;
- Uses young growth timber to manufacture rafters and ridge beams;
- Uses recycled insulation in the roof;
- Requires only a few cubic yards of petroleum to make the wall and roof insulation for average Amhomes; and
- Consumes considerably less energy, significantly reducing emissions into the atmosphere from its effective walls, roof, windows, door, screens, heat-recovery units, and radiant-foil.



The Inventions and Innovation Program works with inventors of energy-related technologies to establish technical performance and to conduct early development. Ideas that have significant energy-savings impact and market potential are chosen for financial assistance through a competitive solicitation process. Technical guidance and commercialization support are also extended to successful applicants.

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