

Energy Efficiency Can be Built In From the Start

The insulating properties of building envelopes can significantly impact the energy efficiency of the building operation. The construction industry is continually inventing systems to increase the efficiency of buildings and decrease negative environmental impacts to move toward more green building offerings.



Mary Warner Cook

Insulated Concrete Forms, or ICF, is one system that contributes to creating a green building. The system consists of interlocking units of synthetic block that create a form which is filled with concrete and often reinforced with rebar. The **Lego-like** system of walls, floors or roofs are left in place to provide thermal insulation, sound-proofing and increased energy efficiency. This system accelerates construction and can be installed at low temperatures. At the recently completed **Ronald McDonald House** in Charleston, **Pray Construction** used ICF on the building's shell and one major interior wall. Most of the work was completed with below-freezing climate conditions. The expedited construction resulted in a significant schedule adjustment. The energy-efficient building will help the nonprofit organization keep heating and cooling costs reduced and make a difference in our environment.

Another energy-efficient building shell system that is becoming more common in our market is a closed cell

spray foam insulation process. **MVB Bank** is one of the largest applications of this system in the commercial market.

"We built a high-performance building skin," explained Pray Construction Project Manager **Ken Cooper**. "We used architectural precast concrete panels attached to a structural steel frame. Foam insulation was sprayed to the concrete panels on the interior, then finished with drywall. "We installed double thermally broken windows so the 30,000-square-foot building, with a 7,500-square-foot footprint, is essentially skinned with energy efficiency."

A building system that has been used in Europe for more than 20 years, but nascent and rarely used in the United States, is a cross-laminated timber, or CLT. This is an engineered wood building system designed to be a viable alternative to concrete, masonry and steel in many applications. The system is made of layers of dried lumber stacked crosswise in layers and bonded under pressure. The cross lamination provides strength and stability and a rigid final product that is usually four to 12 inches thick and can be as long as 40 feet. CLT can weigh up to 1,200 pounds, requiring a crane to set the walls, floors or roofs it creates. It can also be used for lateral or vertical loading systems.

CLT provided structural simplicity, allowing rapid installation, versatile design applications, less weight and waste and it is energy efficient. The solid panels create a tight building envelope, preventing external airflow resulting in a



high thermal performance and energy efficiency. CLT is made from a renewable resource and since they are manufactured specifically for each project, there is little waste. Other benefits afforded CLT are its cost-competitiveness and fire-resistant properties.

While CLT is gaining popularity in North America, the lack of manufacturers in close proximity and its obscurity in the marketplace mean this product has been slow to gain traction. There are only a few commercial and residential applications in the country

and the closest U.S. CLT products are located in West Coast plants. The landmark project is a 10-story apartment building in Melbourne, Australia built in 2013. Among the few projects in the United States is an elementary school in Franklin, West Virginia and the CLT was manufactured in Germany. Given the abundance of forested land in West Virginia, perhaps we need to develop this product in West Virginia.

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