Insulated Concrete Forms for Residential Construction

Over the past two years, we've seen a heightened awareness of the devastating effects severe weather and hurricanes have on the lives and homes of Americans and people around the world. As a result, energy costs and insurance rates are rising beyond reasonable levels for most home owners. The positive benefit is that increased news stories, trade articles and seminars informing of alternative ways to build better structures are also getting more attention. Across the country, there is a major shift in concern for the environment and more people wanting to build environmentally friendly structures.

Insulated Concrete Forms, commonly referred to as ICFs are an excellent way to achieve EarthCraft House, ENERGY STAR or LEED verification points and allow you virtually unlimited design flexibility combined with tremendous structural strength. (The 2007 EarthCraft House tiered worksheet gives added point value for ICFs.) Your company can benefit from learning more about this innovative construction alternative.

ICFs offer a dynamic source of new business for builders interested in opportunities to exchange old, inefficient methods of construction for improved energy efficient building systems. A recent report indicates more children and adults are experiencing asthma and respiratory diseases as a result of poor indoor air quality. ICF construction can contribute to healthier homes with improved indoor air quality and sound resistance. Another benefit is a building envelope that is super energy-efficient, able to resist extreme weather-related events and gives your customers greater access to mortgage money through energy-efficient mortgage programs.

ICF construction begins with standard poured concrete footings and slabs with rebar placed at intervals as required by building design and codes. Typically, form placement is started at the corners, is worked toward the center of the wall and then attached to the footing with foam adhesive or by setting the first course in wet concrete. Subsequent courses of forms are placed in a running bond or stack bond position. As the forms are stacked, the proper reinforcement is achieved by placing vertical and horizontal rebar as required by design.

Window and door openings are formed with "bucks" to the rough opening dimensions, braced and installed during the form stacking process. The ICFs are stacked to 10 or 12 feet high, braced to ensure straight walls, checked for plumb and then poured with appropriate concrete mix and slump. The top of the wall is leveled off, and anchor bolts are placed to secure the top plate.

Electrical and plumbing lines fit easily and in accordance with code requirements by simply cutting a channel into the foam with a hot knife and placing the wiring or pipes into the wall. Interior and exterior finishes can be screwed directly into the studs. Any stucco, siding, brick, stone or other finish can easily be secured. The cost is only slightly more than current stick frame construction.

ICFs are the easiest way to form and build a super-insulated reinforced concrete wall. The insulating concrete forms stay in place as an integral component of the wall assembly. They are generally made of high-density expanded polystyrene and either galvanized welded steel or plastic reinforcing studs. The steel studs are 1.5 inches wide and are spaced from 12 inches to 6 inches on center.

Forms are either pre-formed, interlocking, completely assembled labor-saving blocks from the factory, or they arrive as separate panels that are assembled on site. They range in size from one to two feet high and four feet long. The largest form, 24 inches x 48 inches, creates eight square feet of wall area and requires only four courses to stack an eight-foot wall, resulting in very rapid installations. ICFs replace

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the normal wood studs, sheathing, house wrap and insulation in one easy step.

Most ICF companies manufacture 90-degree and 45-degree corners. The forms come in various sizes, typically six, eight and 10 feet thick, which indicate the concrete core dimension. Curved walls are possible with minor cutting of the forms in strategic places and bending the form into place. Some ICFs have full-length studs that allow easy attachment of finishes versus others that have small attachment points.

ICFs have various fire ratings, ranging from two to four hours. When utilizing forms for fire-rated walls, it's important to verify that the company has independent laboratory testing and certification. Some forms have a superior fire resistance, providing a minimum four-hour (ASTM-E119) class A fire wall rating before any wall covering is applied. ICFs are also excellent for sound resistance and provide an easy solution to building common fire walls in townhouse and apartment units.

Although it looks new and different, anyone with some construction experience can quickly learn to use ICFs. An ideal crew has a mix of concrete and framing experience. ICFs weigh only a few pounds, making for easy installation. Most ICF companies have certified training classes for both home owners and general contractors and will provide you with the field training and support needed to complete almost any project.

For more information on how the EarthCraft House program addresses ICFs, visit the Builder Information section of www.earthcrafthouse.org.

Victor Keller with American Polysteel Southeast Distributors contributed to this article.