

Design Competition Leads to Advanced Framing & Energy Efficiency

by Libby Maurer

How did a design competition for an in-fill lot in Jacksonville turn into a high performance single family home?

When Bob Esposito, principle designer with True Design Studios, entered the Raised Floor Living Design Challenge, he treated the competition like any other project. "I kind of laughed when we were named winner," he said, thinking back to the November 2009 award ceremony. "As far as I was concerned, I approached it with the same enthusiasm as I would any other project. I studied the design program and applied the fundamentals of architectural design."

Nearly nine months later, Bob's winning design is a model for modern framing techniques geared toward reducing energy consumption. The 1293 sq. ft. single family home features three bedrooms, two baths, a raised structural building component floor system, and several other advanced framing techniques.

The Challenge, issued jointly by the APA and Southern Pine Council, was launched to promote raised floor construction over the traditional concrete slab within the design community. "The goal was to stimulate discussion between builders and designers to use wood products in ways they haven't before," said CW Macomber, project manager for the Raised Floor Living project.

In addition to soliciting innovative raised floor designs, the group also planned to use them to build an actual home in a preselected in-fill lot in Jacksonville. They chose local builder MasterCraft Builder Group to construct it. Aside from the raised floor foundation, other criteria for the contest were set:

- All exterior walls had to be wood frame and fully sheathed with wood structural panels.
- The total conditioned space had to fall within 1200 sq. ft. and 1300 sq. ft.
- 3 bedrooms and 2 full baths
- Unconditioned space:
 - A carport ranging from 200 to 250 sq. ft.
 - A storage room adjacent to carport ranging from 50 to 100 sq. ft.
 - A covered front porch ranging from 50 to 75 sq. ft.
 - A rear deck ranging from 75 to 125 sq. ft.

The criteria further called for an emphasis on affordability and consistency with the "traditional cottage style" look of the existing homes in the neighborhood. Raised Floor Living approached the Northeast Florida Builders Association (NEFBA) to help promote the Challenge. NEFBA President Andy Chambers also happens to be the President of MasterCraft.

Esposito received a \$11,000 prize for winning the competition, and a portion of it was used to cover the cost of securing the permit drawings. True Design Studios then partnered with Jacksonville's Apex Technology, with whom they have a collaborative relationship, to complete the engineering. Apex structural engineer Mike Kozlowski leveraged his position as president of the newly formed Wood Council within NEFBA to engineer some cutting edge design elements. Kozlowski says with the Council's goal to help promote wood frame construction, the team soon broadened its focus to showcase

advanced wood framing techniques that would improve energy performance.

Chambers originally planned to use the house as a model home for his company. But when the Wood Council became involved, Chambers decided to sell the completed home and give the proceeds to NEFBA. "I thought we could use it to showcase some of members' new products and then educate suppliers and the end user about them," he said. Chambers named it the NEFBA 2010 President's Project and began planning a series of on-site events for the building and design community to observe the construction. For Kozlowski, Chambers' new plan was extra incentive to cut costs. "In order to sell, it needed to be affordable. We turned it upside down to make it as cost effective as possible," Kozlowski says.

Advanced Framing Cuts Costs & Energy

In addition to increasing awareness of raised wood foundations, the challenge highlighted ways to reduce energy consumption using advanced framing techniques in the wall and roof components.

Wall Framing. The walls, spaced at 24-inch on center to take advantage of in-line framing, were built with 2x6s so extra insulation could be installed. Headers located below gables or small truss spans were either eliminated or built with a plank orientated 2x_ header. Headers above window and door openings in non-load bearing walls were also eliminated and the space filled with insulation.



Wall Sheathing. Instead of horizontal wall sheathing, 11' vertical sheathing panels run continuously from the top plate to the bottom plate. This technique minimizes energy loss that occurs in the horizontal seams. "The longer panel lengths allow a single sheet to be installed from the roof trusses to the support beam in the floor system. It removed the cost of the typical wall uplift connectors and various blocking requirements," Kozlowski said.

Continued on page 16

How a design competition in Florida became a study in using advanced framing techniques from floor to roof.

"[This project] allowed us to show the marketplace that advanced construction techniques, enhanced energy efficiency, and high quality design can all come together in a budget conscious home."

—Bob Esposito, True Design Studios

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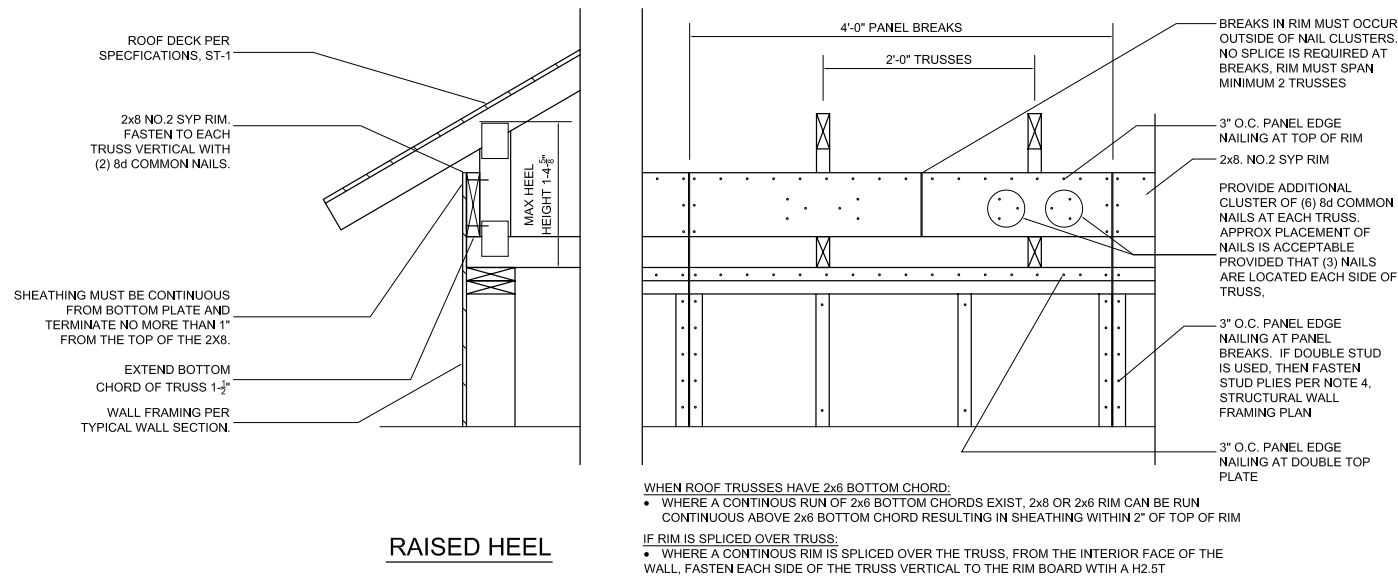
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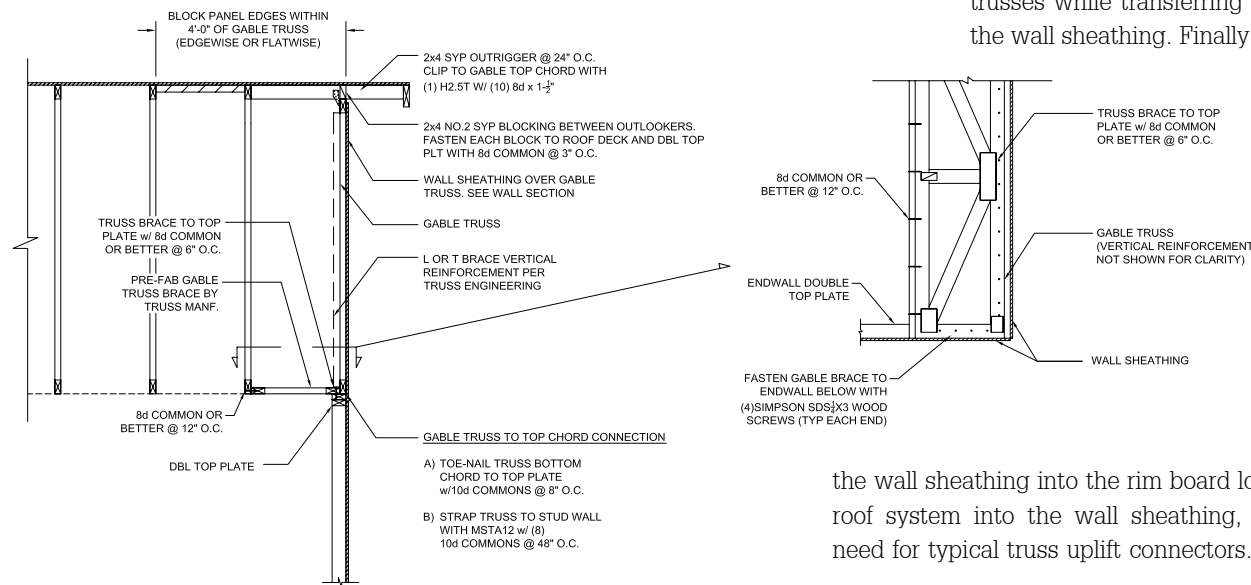
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Roof Framing. Raised heel trusses at height were installed to add a thick layer of insulation in the roof cavity. Kozlowski said the heel configuration was modified by holding back the end vertical 1-1/2" to allow for continuous 2x_ rimboard (see detail above). The rimboard bears directly on the bottom chord and nails into the end vertical of the truss. The vertical wall sheathing extends to the top of this rimboard and braces the trusses while transferring the shear into the wall sheathing. Finally, the nailing of



C1 PRE-FAB TRUSS GABLE BRACING DETAIL

- 1) GABLE TRUSS VERTICALS SHOULD BE SPACED @ 24" O.C. MAX.
- 2) MAX. TRUSS SPACING = 24" O.C.
- 3) OUTLOOKERS, BLOCKING & CUPS MAY BE OMITTED FROM OVERHANG PORTION OF DETAIL FOR NON-DROPPED GABLE TRUSSES W/ 12" OR LESS OVERHANGS.

the wall sheathing into the rim board locks the entire roof system into the wall sheathing, removing the need for typical truss uplift connectors.

Also in the roof, Kozlowski designed a gable brace truss to resist the out of plane wind loads. The truss installs flat between the first two truss bays and runs from wall to wall. This method reduced material and labor cost significantly. "We've been talking about it with framers for a while now, and we ended up wondering why we couldn't just lay a truss flat there," he said.

As an example of how little waste was produced

during framing, it was tough to scare up any loose framing lumber on site. "We had the rough-in trades looking for 2x4s... they couldn't find any!" Chambers recalled.

Raised Floors Contribute to Energy Efficiency

Slab on grade foundations are prevalent in Florida, primarily because they are thought to cost less than raised floor foundations. "It's viewed as cheaper and less complicated," Esposito said.

He says the public should be aware that the advantages of foundations sitting on raised wood foundations range from aesthetic to structural. Esposito says raised floors add an element of sophistication and dimension to homes that slab on grade doesn't. Macomber points out that plumbing, water lines and other mechanical elements are often routed through the concrete, making it difficult or even impossible to reach for repairs or an addition. With this type of raised foundation, however, you can easily access and reroute plumbing.

Raised wood foundations elevate the lower portion of exterior walls above grade. This fact alone significantly reduces the effects of water on the lower portion of the wall. "Especially in humid climates like Florida, when moisture gets trapped in the foundation and has nowhere to go, it can easily climb up into the walls by way of capillary action," said Esposito. And though it wasn't done in this house, raised floors offer a space to house HVAC units and ducting. "Most homeowners have them in their attics, which have tremendous heat. Moving them to a cooler space like under the house makes them much more efficient," Macomber commented.

50% Reduction By 2019

Beyond cutting utility costs, Floridians have cause to adopt energy-conserving building techniques. In 2007, Governor Charlie Crist issued an Executive Order outlining a 50 percent cut in the energy consumption of new residential construction by 2019 (compared to the energy provisions of the 2007 Florida Building Code). The mandate is already in the works; between now and 2019, incremental efficiency goals ranging from five to ten percent have been defined for all new homes.

Macomber believes one of the reasons builders have been reluctant to incorporate advanced framing elements is because the homeowner tends to react to the extra up-front cost, but doesn't necessarily see the downstream savings. "I think the way builders should think about it is if energy costs are lower, homeowners can buy more house." It's important for homeowners to understand that energy efficiency isn't accomplished with one specific change, "it's several small changes that add two percent savings here, maybe five percent there," he said.

After seeing the ways components can be optimized to save material and improve efficiency, Chambers says he intends to use the techniques in future Master Craft homes. "I see now that we can do a lot of these things without adding cost but benefitting the end user tremendously," he said.

A Classroom in the Field

Everyone from architects and engineers to building inspectors came by to see the home during its various phases of construction. APA organized and promoted four on-site events throughout the project. The first was held just after the piers and foundation were set. The second was to show off the wall framing (unsheathed) and the third event displayed the wall sheathing and installed ductwork. The final event was an open house to celebrate its completion. Macomber said on average, 65 to 85 designers, builders and building officials attended the events. "I think it really helped to stimulate their thoughts on different ways to use wood frame construction in efficient ways," Macomber said. Chambers says the house will be listed between \$150,000 and \$175,000.

Aside from the notoriety and recognition following its win, True Design Studios sees the project as a benefit from a marketing standpoint. "It's allowed us to show the marketplace that advanced construction techniques, enhanced energy efficiency, and high quality design can all come together in a budget conscious home," said Esposito.

Kozlowski believes what was accomplished on this project demonstrates what will someday be commonplace in homebuilding. "The advanced framing techniques we used are necessary when you're trying to take wood out and add insulation at the same time," he said. "Our [building] codes don't yet marry structural and energy requirements." And when they do, we'll have the NEFBA President's Project to learn from. **SBC**

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