

What's the deal with SIPs?

□ BY GARRET K. WOODWARD □

Just a couple miles from the bustling center of Biltmore Village, high up a quiet wooded hillside, contractor Bob Callahan is hard at work on his latest project, a 2,700-square-foot home.

"We're building a better product than what others may find out there," he smiled.

Standing within the large two-story structure, Callahan (of BuiltSmart by bob) points out every green building detail of the abode, from mini-split HVAC heating/cooling equipment to custom wood work from trees harvested on the property, energy efficient windows to money saving lighting fixtures. But, he's most proud of what supports all of these items, the skeleton of the entire building – structural insulated panels (SIPs).

"Buildings account for 39 percent of the energy used in the country, and with green building we can not only save energy, but also money in the process," he said. "And with SIPs, you can provide a structure that is air tight and contains more insulation for a better, more efficient building."

These SIPs are made up of three layers, an oriented strand board (OSB) outer skin, expanded polystyrene (EPS) core and another panel of OSB. When put together (kind of like an ice cream sandwich), an extremely strong panel is the result, one that requires no additional frame or skeleton for extra



Located near Biltmore Village, this residential home utilizes green materials, with the key to the structure being structural insulated panels (SIPs). Bob Callahan (below). Garret K. Woodward photos

support (contrasted with beams placed high up in stick framed houses).

"EPS is basically like beer cooler foam, but it is made with heat and steam, and contains no chlorofluorocarbons (CFCs). The foam gives you more insulation than is required to meet code, and makes the walls and ceiling as air tight as you can get," Callahan said. "With the two OSB layers that make up the panels, you can eliminate a lot of the wood needed in stick framing. This cuts down on thermal transfer through the framing."

SIP homes are as much as 15 times more airtight than stick framing. Callahan noted that with conventional spray foam insulation, you never are completely able to get every nook and cranny, and you also have extra wood within stick framing that doesn't get insulated, resulting in compromises in the heating, cooling and air quality

itself.

"With stick framing you get all those leaks in a house, and that's where your fresh air tends to come from, through the wood and all sorts of nasty dust, chemicals and glue within the walls," he said. "With SIPs, there is no air leakage, so with a heat or energy recovery ventilator, you can pull fresh, filtered air from the outside. This also means you can use smaller heating and cooling units due to no thermal transmission within the walls."

When putting up a SIPs building, Callahan advises that it is easier when one has enough space on the property to be able to layout the large panels to prep them, and

also allow for a crane to come to lift and sit the walls and roof.

"One of the walls we lifted was 2,000 pounds and the crane 48 feet away," he said. "But, if you can provide that space, you can have the walls and roof up in record time. Three lifts with the crane and we had the main roof done."

And with SIPs being prefabricated in the factory, there is little to no onsite waste headed for a landfill. In terms of design, one is able to expand on spacing more, seeing as with SIPs there is no need for support beams, leaving endless opportunities for wide open, vaulted ceilings. The double layers of OSB, versus having only



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one in stick framed homes, provides a strong structure for wind and snow loads one will experience in the mountains of Western North Carolina.

"You also get rid of mold issues common here in the South, and you increase the longevity of the home itself, from a 100-year house to a 150 to 200-year house – these SIPs aren't going anywhere," Callahan chuckled.

In recent years, the "tiny house" movement has taken the green building industry by storm. People are not only looking for more efficient ways to build and save resources, they're also downsizing their lives in general. But, there still is a majority of society that wants enough space to properly suit their growing families. That said, SIPs provide energy savings within a larger structure, where one could feasibly have a 2,700-square-foot home but still function – monetarily and sustainably – on a smaller scale.

"I looked at smaller homes, at tiny homes, but I also looked at the realities of the market," Callahan said. "A lot of people aren't ready to do a tiny home, but those same people would buy a house that is comfortable, energy efficient and would save them money."

Walls: 8" SIP panels, R30
Roof: 10" SIP panel at R38 + 1" poly-isocyanurate panels at R6 = R44 total
Basement: concrete walls = R25 (R10 continuous from foam sheets and R15 from the fiberglass batt in the framed wall and the under floor foam sheets yielded R15 at the outer 4' wide perimeter and R10 in the middle. The foam for foundation and under slab is Owens Corning XPS (HCFC free) and R5/inch.)
Projected whole house HERS score: 55 or less
Project blower door test: 0.60ACH50 or lower
Projected HVAC costs: \$40/month
Projected total electric bill: \$85-100/month

Suppliers
Windows: Anderson 100 series from Pro Build (Scott Lewis)
Mini-split HVAC equipment: Samsung (Mikhail Lebed, Quality Comfort)
Designer: Aaron Wilson, Wilson Architects
Cabinet box material: Columbia Forest Products
Cabinetry: Case Green Cabinetry
SIPs: Premier SIPs

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