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PANEL BUILDERS have less need for skilled labor, shorten their installation time, reduce waste, and have less risk of theft on site than their stick-building counterparts.

SMALL BUILDERS may benefit from using panels if their building designs are fairly reproducible.



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PATH

The Payback on Panels

Short installation time, reduced waste — builders reap the benefits of advanced panel systems.

A way to build better and faster — what's not to like? Builders are finding there's a lot to like when building with advanced panel systems.

Panelized wall systems are prefabricated building panels that form a structural "envelope" for the home, eliminating the need for conventional wood framing. Panelized systems can be assembled on-site faster by less skilled laborers.

Despite these and other significant benefits, panelized wall systems capture only about 8% of the market, according to the Wood Promotion

Council. Builders wary of panel systems point to the cost, noting that they have to pay at least as much, and usually slightly more, than they do for stick building their walls. They also express concerns about teaching crews new methods and meeting building codes with a less common product (see the "Considering Codes" sidebar on page 70).

Change is never easy, but there are real benefits to builders willing to make the leap, says Kirk Grundahl, executive director of the Wood Truss Council of America, an international trade association representing structural wood

component manufacturers.

"A lot of the hesitancy about panelized walls is traditional mind set," says Grundahl. "Builders who use them can build homes better and faster."

Curtis Stendel of Panelworks Plus in St. Francis, Minn., wholeheartedly agrees. Stendel, who teaches other builders about advanced panelized construction, says that he and other panel builders find that they not only have less need for skilled labor, but they also shorten their installation time, reduce waste and have less risk of theft on-site than their stick-building counterparts.



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UNSKILLED LABOR can efficiently put a wall panel into place.

PANELIZED SYSTEMS can be assembled on-site faster than traditional wood framing.

BECAUSE MOST OF THE CUTTING is done in a factory, builders have much less waste on-site.

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Different panels for different builders

Advanced panel systems take many different forms. The usefulness of each one depends on the builder and the client.

The most common systems are structural insulated panels (SIPs), which are closed walls made from expanded polystyrene foam core adhered inside and outside to oriented strand board (OSB) or plywood skins. The foam alone has little strength, but when bonded to OSB or plywood, it acts as a bridge to augment the panel's structural capacity.

A variety of materials can be incorpo-

rated into other open- and closed-wall panel systems, including wood studs or light gauge steel with foam insulation, structural concrete, concrete with foam core insulation, aluminum, steel and fiberglass skins.

Advanced panels usually come in modules of 4 feet by 8 feet or greater with a thickness of 4 to 6 inches, depending on the type of panel and the insulation required in that region.

Advanced panels are assembled to form exterior walls or roofs with minimal additional framing. Installation techniques vary by type and manufactur-

er. Typically, connections along the top and bottom of the panel and at panel abutment edges are required.

No standard exists for panels; each system has its own particular connection needs. For example, the connections for a concrete system are vastly different than those for a steel panel, while different types of SIPs have different connection methods.

The pluses of panels

Of course, the builders who use panels didn't switch simply out of curiosity. They were seeking — and are finding —

Brothers — are willing to commit that time because of the time they save in the end. Big builders can easily use panelization because they have specific and repeatable designs.

“You want it to be repeatable because of the time investment necessary to properly develop the factory’s software to cut the panels,” Stevens says.

Small builders may also benefit from using panels if their building designs are fairly reproducible. Because of the difficulties managing wood use and costs, panels provide a way for builders of any size to develop more predictable fixed costs for the project.

“Builders can get a better handle on fixed costs, and managing the quantity of material is always a big issue with wood,” Stevens says. “When using panels, it’s much easier to estimate those numbers.”

The cost of quality

While it may be easier to estimate fixed costs with advanced panels,

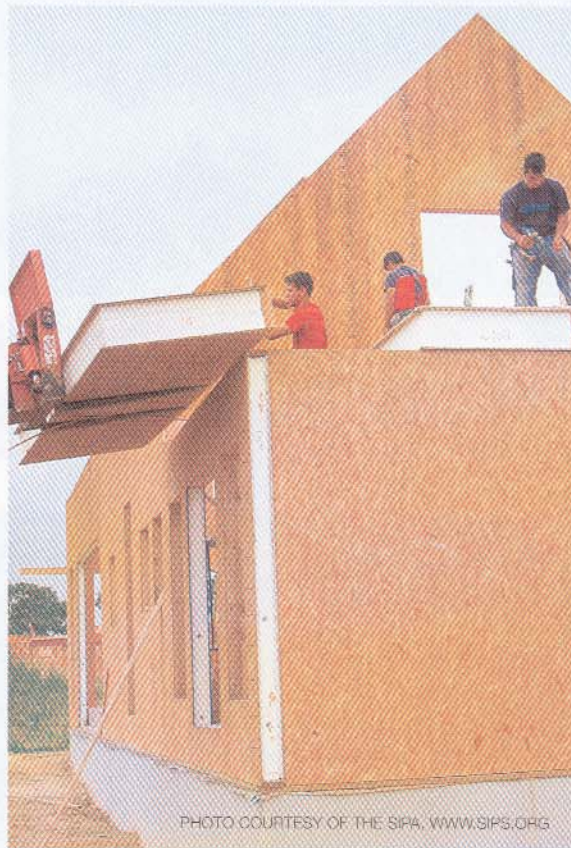


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ADVANCED PANEL SYSTEMS take many different forms, with SIPs being the most common.

do they cost less?

With improved quality and speedier on-site construction time often comes greater material cost, because now the builder pays for partially fabricated walls.

While cost varies greatly with the different types of advanced panels and the size of the structure, most panels are somewhat more expensive per square foot than a stick-built home of comparable size.

Open-wall wood panels are the most cost competitive; they tend to cost slightly more than stick-built construction. Stevens estimates the materials for a wood panel system cost 50 cents more per square foot than a stick-built house. The cost is even higher with many of the closed-wall systems on the market.

CONSIDERING CODES

But what about the local building codes? It’s a question that has slowed down more than one builder who’s considered adopting advanced panel construction. Often, local building codes don’t include prescriptive methods for building with panel systems, so each manufacturer must obtain code approval for each product. Some jurisdictions require an engineer’s review and seal of the structural design, which the manufacturer may be able to provide.

While these obstacles may impact the cost and schedule for a first construction effort, they can be overcome. The Partnership for Advancing Technology in Housing (PATH) provides some industry guidance in its 2003 progress report, *Technology Roadmap: Advanced Panelized Construction*.

In the report, PATH addresses the three typical methods for code compliance. The first is obtaining code approval to develop a consensus standard through a standards-writing organization and then submit it to a building code committee as a reference standard. However, this process can take years for a standardized product, much less panels.

A second, more effective method is direct code adoption, which requires submitting a code change to the model code organizations. In many cases, this results in a prescriptive standard. With

PATH support, prescriptive standards have already been developed for insulating concrete forms and light gauge steel framing. These code provisions provide design flexibility because they are typically adopted directly into the local building code. PATH has recently partnered with the Structural Insulated Panel Association (SIPA) and the NAHB Research Center to develop a prescriptive method for design and code acceptance of structural panels.

The third approach is to obtain a code evaluation report, which typically contains the supporting design or testing results and specifies installation procedures, spans, connections, and related information. These documents, known as Evaluation Service Reports, provide the information building code officials need to determine whether a panel product (or other technology) satisfies code requirements, thus providing an equivalent to code approval.

As with all prescriptive provisions, involving engineers or architects to review and seal the plans can be a good strategy to satisfy specific requirements. Regardless of your approach, bear in mind that code or permitting officials can always delay a project if they are unfamiliar with a particular technology or method. Your best bet: talk with your local building official and secure local approval before you even think about building.

During the transition period, inexperienced crews or poorly coordinated panel dimensions can make the process more costly. However, panel builders say these issues are easily overcome with experience.

"For a typical builder, the proficiency comes after maybe three to five projects," Stendel says. "But for some projects, you get it right the first time and they are off and running. It's not really difficult."

Weighed against the additional cost is the prospect of greater savings — from reduced time for construction, reduced chance of theft and weather delays, less waste and less need for skilled labor. The equation will differ for every builder, but advanced panels may be most cost-effective in those areas where labor is difficult to obtain.

Learning curve

While it may not be difficult, there is a learning curve, as with any change in building methods. That was certainly the case for Scott Bergford, founder and president of Scott Homes in Olympia, Wash. Eleven years ago, Bergford was using the conventional stick building method when a customer asked him to use SIPs.

"We had never even heard about them," says Bergford. He was intrigued by what he learned. To experiment, he built his business partner's home with SIPs. "We had to redo things and we made mistakes, but we worked them out," says Bergford. This decision led to a long-term commitment to panel building.

For Bergford, the biggest difference was learning how to manage utilities while installing wall panels, particularly SIPs that have foam attached to the panels.

Bergford learned he needed more chases in the kitchen walls. The panel provider, Premier Building Systems, was happy to oblige. Bergford and his crews also started using a flexible drill bit to make their own chases to snake wiring through the walls.

"Every once in a while we get a new subcontractor and he doesn't follow the directions and he will have sliced the panel in half," Bergford says. "So now we have learned how to fix a SIP panel once the plumber has destroyed it."

"At this point, I really don't know what we could run up against that we wouldn't know how to fix."

Learn more about advanced panels at www.PATHnet.org. Visit "Quick Clicks," then "Technology Inventory," to learn more about the technology; visit "Newsroom," then "2004 News," to read about PATH's research on developing performance standard criteria for panel connections. **PB**