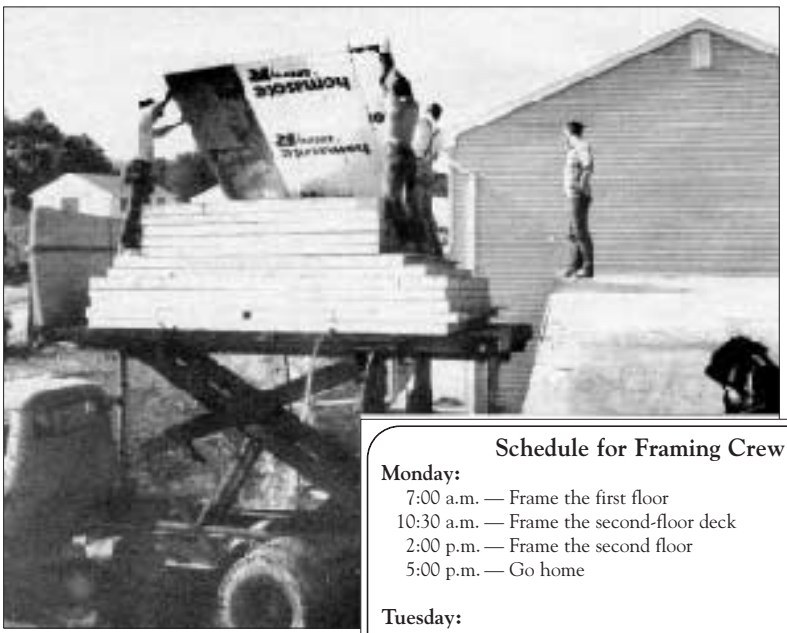
FAST & ACCURATE FRAMING THE PANELIZED WAY



Factory-made panels for the second floor of this home in Maiden Creek, Pa., come right off the truck with the help of a scissors lift -- and a willing crew.

Schedule for Framing Crew

Monday:
7:00 a.m. — Frame the first floor
10:30 a.m. — Frame the second-floor deck
2:00 p.m. — Frame the second floor
5:00 p.m. — Go home

Tuesday:
7:00 a.m. — Erect roof trusses
1:00 p.m. — Sheath Roof

Wednesday:
7:00 a.m. — Complete interior framing – kitchen soffits, etc.
1:00 p.m. — Start on second house

PANELIZERS PROMISE PREMIUM SHELLS, SALABLE DESIGNS, AND FEW HASSLES. CAN THEY DELIVER?

by Gary Mayk

What sounds like an ambitious schedule for any four-man framing crew becomes routine with one simple ingredient: factory-made wall panels. With these panels - already squared and sheathed - and with factory-made roof trusses, Lot No. 187 in Maiden Creek Estates in Maiden Creek, Pa., will go from completed foundation to completely framed 2,200-square-foot house in 2-1/2 days.

Project foreman Hank Mengel rolls his eyes when asked if he'll ever go back to stick-building. "Oh, no," he says. "Never." It's no wonder. At Maiden Creek Estates, crews are framing a house in half the time of stick-building crews down the street. In a competitive area like this, speed is important. So are quality and cost containment, and Mengel says the factory-made panels give him an edge in several ways:

- A truer product. Factory-squared panels combine with laser-leveled foundations to almost guarantee plumb walls.
- Uniform openings. Windows and doors always fit, and openings are almost always in the precise location.
- Dry materials. Panels and materials don't sit in the yard or on site, exposed to the elements, for days or even weeks on end.
- Better materials. Panel manufacturer H.M. Stauffer and Sons of Leola, Pa., culls out wood that doesn't grade. Usable cut-offs go into panels as cripples below windows or in T-braces, not as wall studs.
- Lower overhead. Maiden Creek developer Jim Saunders is building 70 units a year with a skeleton crew. The time needed from subcontracting crews is also reduced because the panels are only erected, not constructed, on site.
- Less waste. "We save $500 a house on waste disposal," Mengel says. A building lot with panelized construction has a fraction of the scrap generated by on-site framing.
- Easy customizing. The panel factory's design department uses computers to add custom features to otherwise stock plans. Computerized stress analysis assures that even unusual vaulted and cathedral designs will stand up.

What If I'm a Small Builder?

Like many panelizers, Stauffer primarily serves big developments due to the economy of scale. Its newly acquired division, Hilton Lifetime Homes, however, is good to the small guys. The small builder gets the same service and same technology from the same facilities. "We have an advisory program to walk the inexperienced builder through our process," says Paul Sheak, general manager of Hilton Lifetime Homes.

In buying Hilton, Stauffer was acknowledging a dilemma facing builders in the Pennsylvania market and nationwide: The pool of skilled construction workers was shrinking, and the workers who remained became

A SMALL BUILDER TAKES A BIG STEP WITH PANELS

Bricktown, N.J., custom builder John Carnesi trades successfully under a name that seems bigger than his company: Atlantic Cedar Development Corp. Typically, Carnesi has one or two people on his payroll. He subs out most of his work, and to keep his overhead, paperwork, and headaches down, he buys panelized homes.

Carnesi is a builder/dealer for Hilton Lifetime Homes of Leola, Pa. For his franchise and initial advertising material, he paid $3,000. When he sold his first house, the fee was refunded. With some customers, Carnesi negotiates directly. With others, he uses Hilton's staff to negotiate contents and price. In all cases, the customer pays him for his services, and in most cases, the customer pays Hilton directly for materials. As a builder/dealer, he earns a commission on the materials customers buy. He also will earn a commission on materials for Hilton homes bought and erected by other builders in his area, although so far, the idea has yet to catch on.

After buying the home packages -- from basic framing to complete package with kitchen and bath -- he says he won't return to stick building except when it's demanded. Here's what he has to say about panelized construction:

Completeness. "I've been a builder for ten years. I've been building panelized homes for about four years; I've done quite a few. Hilton can manage anything, from a ranch to a 50-unit condo development. I'm just doing single family. The biggest I've done is a 4,000-square-foot, two-story contemporary. Hilton can supply everything - tubs, ceramic tile, cabinets for the kitchen and bath. But buyers don't have to take the whole package."

Ease of assembly. "Even a do-it-yourselfer who's half a carpenter can do it. It's as easy as ABC. We frame a house in about four days.

"With the trim package, we save installation time. Trim sets are already mitered and assembled. They come to us picture framed - that's how we nail them up."

Quality. "These panels are perfect. I know with a 2,000-square-foot floor plan, if these frames are out of square 1/8 of an inch, it's a lot. The openings - they're right on the money.

"These are stronger and better. We can have panels built from any material we want. They sheathe ours in 1/2-inch fir or CDX fir, and then 1/2-inch Ultra-R on top of that. I can get the same R value in 3-1/2 inches as most builders are getting in 2x6 studs. I'm getting R-20, and actually most of them are only getting R-19 with 2x6s."

Buyer resistance. "The only problem is that people confuse it with modular, and it's not. At first, when you talk about panelized, they say they are not interested in it. They think the windows come installed, and the plumbing and electrical are in. But the panels just come sheathed."

Customer-factory contract. "It cuts my paperwork. People can get a 2% discount for paying cash for materials. They can get a 1% discount for paying cash in two stages.

"As a builder/dealer, I get a commission for all the materials the customer buys. It equals the discount I would get at the lumberyard."

Returning to stick-built. "No way. But if buyers say they still want a stick-built, we'll build it for them." -GM

more expensive to hire. This was especially true in the cyclical home-building business.

The solution: Sell as complete a product as possible, using lower-cost factory labor in place of higher-priced field labor. The key was to maintain - or improve - quality. Now, in effect, Hilton sells smaller builders not just materials, but labor, too.

Can You Build This for Me?

Builders often mail in nothing more than a basic floor plan and a picture from a magazine. "Can you build this?" they'll ask. "How much?" At no charge, Hilton supplies a "not-more-than" cost. The factory's fees start with design. For $850, Hilton will spec out the design from even the crudest of drawings.

Builders can buy just the framing and truss-roof system; a complete package that includes bath, kitchen, and interior finish trim; or any combination. If the house is ordered in any of several levels, the $850 fee is refunded at delivery.

"Hilton's niche," Sheak says, "is the single-family builder who's inexperienced or needs a lot of technical help, or the builder who's done it all and says he's not interested in the little incidentals of ordering and managing loads. The minimum we sell is a shell package of rough-framed wall panels and a roof system. We don't do foundations, rough wiring or plumbing, Sheetrock, or interior finish such as paint, carpet, or sheet goods. Everything else, we are able to supply."

Builder's preferences on materials vary by region, so Sheak supplies according to a builder's specs. Materials will vary even on the standard Hilton designs, depending on where the house is going.

Hilton's contract is designed to reduce builder paperwork. "We contract with the customer," Sheak explains, even if the builder comes directly to Hilton to request a package. Hilton will even negotiate with the customer on appearance and content. Payments for materials are made by the customer to Hilton on a cash-in-advance, cash-on-delivery, or bank-assignment basis. Buyers can earn cash discounts. Buyers also must pay the builder for work performed. "That helps the builder's cash flow," Sheak says. (See "A Small Builder Takes a Big Step With Panels," above.)

Step No. 1: Computer-Aided Design

Hilton works out the design in the Stauffer design center. The computer-aided design includes stress analysis of all component -- something a small builder might not otherwise be able to afford. "Then we send the plans to inspectors," Sheak says, to make sure they meet code and get a state seal. The staff deals with code officials from Massachusetts to Virginia. He says panel manufacturers in other areas also get to know what's expected by regional and even local officials.

Jim Estakhrian of the design staff explains that for panels to fit, quality control is paramount. "By the time we get a panel out the door, about ten people are involved from the architect to the construction people. What you see on the architectural drawing may not be the final product." The computer may say the original design has a weakness. "We will make recommendations, and if they want to follow them, fine; if not, that's their decision."

Sheak says, "Even on prints that we don't originate, we take the responsibility of verifying basic bearing conditions, such as on the headers."

For the roof system, a computer program comes up with truss shape and quantity. Trusses can be standard models or custom designs.

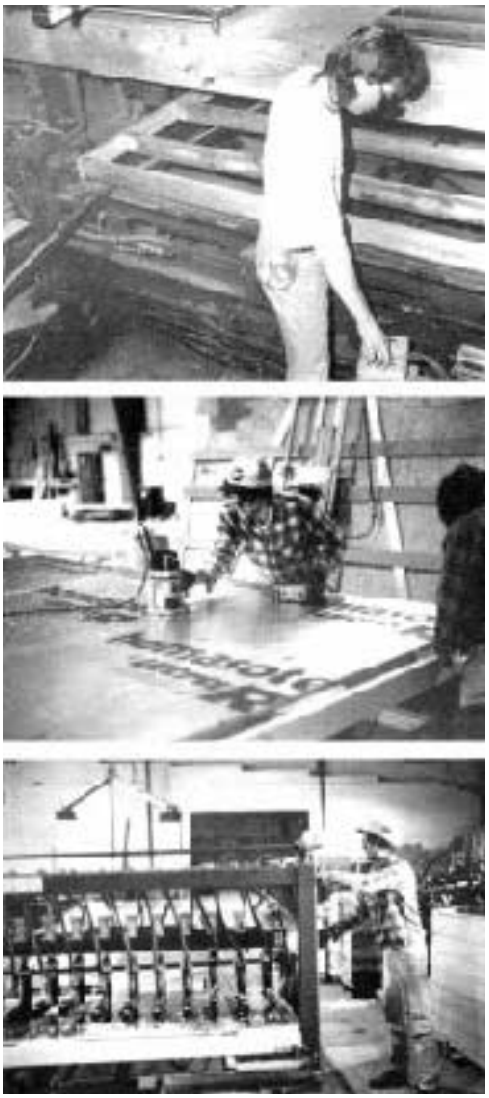


Figure 1. *Interior and exterior walls can be either nailed by hand with pneumatics or squared and nailed on a Morgan Frame Nailer (top). After sheathing is laid on, a router is used to cut window and door openings (middle), and a "gang nailer" attaches the sheathing with staples (bottom).*

Step No. 2: The Cutting Room

"We do not cut, drill, or screw a piece of lumber unless it's sold," Sheak says. "We want to fabricate before delivery. That means a nice, fresh product. It turns gray if left to sit in the yard. Code inspectors don't want to see that."

Cutting orders are grouped by project. The orders are then moved to production of trusses in the Leola plant, or into panels at the Myerstown plant, about an hour to the north. Radial arm saws, over-sized tables, and jigs assure fast and accurate cuts. Sorting of off-grade lumber takes place here - something a stick builder has to do on site.

Paperwork is grouped by floor and then into interior and exterior walls. A pull list tells cutting room employees which lumber to cut. The cut list is drawn to match the pull list. Bottom plate drawings show the location of studs, cripples, jacks, and T-4 braces (2x4 construction) or T-6 braces (2x6 construction) where walls will intersect. For clarity, some panels get a drawing with full-face view. The factory notes any odd-sized panels or members.

A small plywood label identifies each bundle after cutting and before staging for the interior and exterior assembly lines. A letter code allows quick identification in the factory of interior and exterior wall bundles.

Step No. 3: The Assembly Line

The plant has two exterior lines, an interior line, and a sub-assembly section for door and window openings. On the less mechanized line, workers on each side of a roller-equipped table line up studs, cripples, jacks, T-4s, and prefabricated openings in a jig, according to markings. They tighten the jig and nail with hand-held pneumatics.

On the other exterior line, a Morgan frame nailer enables one man to build one wall in one minute (see Figure 1). The labeled parts are laid overhead, where they're easily read and reached. Studs are placed between top and bottom plates, then hydraulically grasped and nailed. The press of a button

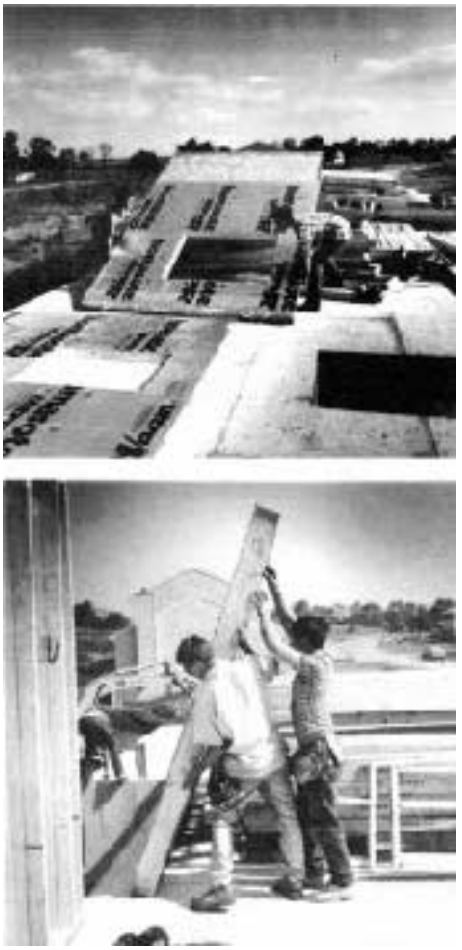


Figure 2. *The framing crew places panels as close as possible to their location (top), then raises and nails them in place (bottom).*

advances the panel to the proper spacing - say, a standard 16 inches - until the nailers line up with the stud markings on the plates. The process is repeated until all the studs are nailed.

Next comes a crucial point in panelization: the squaring table. A jig makes sure the panel is square and grasps it. A metal diagonal T-brace is nailed to maintain squareness. Sheathing of the builder's choice goes on top, with corner panels and front panels getting waferboard at the builder's request. Other panels typically get foam board. Some panels get a corner of waferboard when openings prevent the use of a metal brace for stability. Hand-held pneumatic nailers tack the sheathing, including over openings. Workers rout out openings in far less time than they would need to cut sheathing to size, as site builders do. A pneumatic gang nailer delivers 10,000 pounds of pressure to complete the stapling.

Interior panel assembly is done in jigs with hand-held pneumatics, much as on the less mechanized of the two exterior lines. Interior panels get bracing only at the request of the builder. All interior panels are finished open-faced.

Completed panels are grouped and labeled according to the assembly plan. Panels remain in the yard until shipment.

Step No. 4: At the Site

Panels arrive by pre-arranged schedule. When the truck arrives, the framing crew should have the first-floor deck in place, and lines should be struck for aligning bottom plates. Panels can be removed from the truck in bundles by forklift, or crews can unload panels separately. Because they're no longer than 8 feet, most panels can be handled comfortably by two framers (see Figure 2).

A floor plan identifies each panel by dimension and number. Crews lay the panels around the perimeter as close as possible to assembly position. After tilting up each panel, crews align it and nail. Interior panels are raised and nailed last. The framing crew must also nail on a second top plate. One floor takes about 3 1/2 hours for a house of 2,000 square feet.

With the first floor complete, carpenters frame the second-floor deck. This lumber is usually bought from the panel maker. Some builders prefer traditional dimensional lumber, while others order manufactured joists. The manufacturer delivers tongue-and-groove subflooring as ordered.

When second-floor panels arrive, typically in the afternoon, crews have enough time to unload and erect them before quitting time. A truck delivers the second-floor panels by scissors lift. Panels are arranged as first-floor panels were, and they are erected in the same order.

Roof trusses and sheathing arrive the next day for installation in the traditional manner. All that remains is finish framing: kitchen valances, for instance, or special framing to accommodate tubs.

The home – 2 1/2 days after setting the sill -- is now ready for roofing and mechanical subs. In addition, it is square and true. The process deviates little from conventional stick-building, but the benefits can be worthwhile. ■

Gary Mayk is editor of the eastern edition of The Journal of Light Construction.