

Building Walls in the Shop

by Nick Hurt

A few years ago I took a hard look at how we put up houses, and thought there has to be a safer, more efficient way to build.

Consider conventional practice: After lifting up a framed and sheathed wall, and building the roof, someone sets up staging and moves it all around the house for running soffit and fascia. Then he moves it all the way around the house again for siding. Then a painter moves it all the way around to stain. Every day is spent trudging over the soft, uneven terrain of a freshly excavated site. Every day countless manhours are spent covering material, kicking aside scraps, chasing blowing trash across the neighbor's lawn, carrying tools and material up and down ladders, setting up new work stations, running to the lumberyard for another pound of nails, and securing the site. Then there's the weather: Walking icy planks or working under the drip line has never been my idea of fun. And every time a carpenter digs out a wet pile of lumber from under a snow drift, he never fails to complain that the lumber's no good.

While I wanted to get away from these hassles, I still wanted a method that wouldn't be too different from stickbuilding, because that's what I know. So I set out to eliminate my troubles one at a time.

To get away from using scaffolding, I started building completed wall panels on site, including siding and soffits, and lifting them up with wall jacks. I built three houses this way,



In a converted barn, Hurt's crew frames and sides walls flat on the bed of a house trailer. Above, one carpenter cuts a full bundle of cedar clapboards with a 15-inch chop saw, while another installs the siding over foam sheathing and housewrap.

but we got caught by the rain before the siding had been stained. As a result, the siding got soaked, and the clapboards shrank, opening gaps at the butt joints.

This inspired us to eliminate the weather problems by moving parts of the process indoors. We set up "shop" in a vacant barn on a nearby farm.

Wall System

We have completed seven houses in the shop and have a smooth system down. We can start building the walls at any time, before or after the foundation hole is dug. Just

before the walls are completed, we send two guys to the site to frame and deck the floor.

The walls are framed just as they would be on site, except in the shop we work on the bed of an old 8-foot-wide house trailer. Because the trailer is only 8 feet wide, I don't need a special permit to travel on state roads. The walls are stacked on the trailer with pieces of 2-inch rigid foam between each wall section to protect the siding, trim, and windows.

It takes two to three carpenters one day to complete a wall. The

walls are constructed with 2x4 studs, 7/16-inch OSB sheathing, 1-inch rigid foam, and housewrap. We leave the housewrap long on three sides to lap the rim joist and the corners.

We used to use let-in metal bracing, without wood sheathing, so the walls would be light enough to lift by hand, but we never felt very good about the final product. Wood sheathing provides better resistance to racking, allows us to square the walls precisely, gives us something to kneel on when siding, and gives us a substrate on which to install exterior lighting and trim.

Before installing the windows, we snap layout lines for the siding on the housewrap, and then install the soffit and fascia using a 2x4 ladder for lookouts. We use a rafter tail pattern and a framing square to position the ladder, and snap a line. The soffit, vent, and 5/4 clear cedar soffit go in very smoothly, compared with working over your head on scaffolding. The soffits come out dead straight. There's never a need to reassure yourself by asking how things look from the ground.

While the walls are flat, we install the windows, cedar trim, and cedar siding nailed with stainless-steel, ring-shank nails. We leave the corner boards off until the walls are erected, but we screw on a temporary straightedge to butt the siding to.

We save an enormous amount of labor by siding the walls flat. We used to need two people

Building finished wall panels

in the shop streamlines stickbuilding

for this contractor



Step 1: Three carpenters can lift a 34-foot 2x4-stud wall sheathed with foam. Lumber strapping is nailed to the bottom plate and to the rim joist to keep the base of the wall from kicking out as it's raised into place.



Step 2: After lifting a wall into place, the crew plumbs and braces the corners.



Step 3: A carpenter scabs the top plates to lap at the corners, while another straightens and nails the bottom plate to the deck.

on staging to hold up long clapboards, and one on the ground cutting. Inevitably, when a piece was miscut, it would have to be passed back down to the cut man, while the two guys waited. A single clapboard could easily take three people five minutes to install. This kind of time adds up quickly.

In the shop, we can square the walls precisely so the corner boards and casing are perfectly parallel to each other. As a result, each piece of siding in a run is identical. With a 15-inch chop saw, one guy can cut a bundle of clapboards at once, while one guy installs.

As a final step at the end of each day, we stain the siding and trim. Working in the barn, we don't have dust blowing around, and we don't worry about rain. Because the walls are flat, we don't get drips. Rather than becoming a separate operation, staining becomes one more part of a natural progression of building the walls that goes hand in hand with framing and siding.

Advantages of a Shop

Working in the shop, we always work on level ground. We don't spend much time breaking down workstations or setting them up. We

can store materials easily, and keep track of our scraps. As a result we generate very little waste.

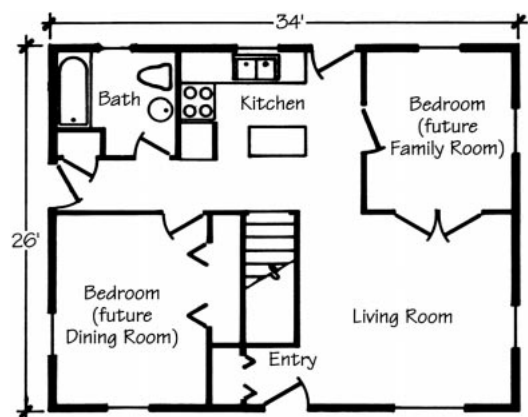
We rip down scrap OSB and foam sheathing on the table saw, and take these to the site in a bundle to sheath the rim joists. On a two-story house, we will reach over the edge of the second floor deck before the walls go up, and bring up a few courses of clapboards. Then all we have to add later is one course of clapboard, which we can do quickly from a ladder. We also chop up the foam scraps to fit between the joists to further insulate the rim joist. We use scrap lumber for blocking, cripples, and soffit lookouts. The only pieces we don't use are under 8 inches long.

I can now buy building materials in larger quantities since I have a place to store them without rehandling them. This saves considerably. I not only get a better price, but I get material that hasn't been pawed through at the yard.

When to Use a Crane

At the site, the walls can be raised by hand, with wall jacks, or with a crane. Without sheathing, 2x4 walls are light. A 34-foot wall can be rolled across the deck on 4-inch PVC drain pipe, and lifted by three

Expandable Floorplan

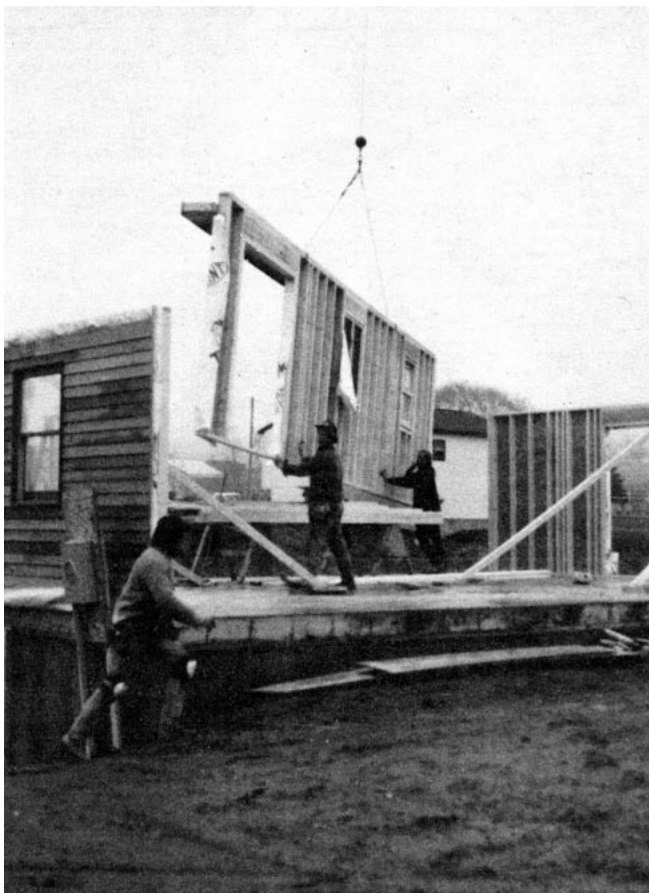


First Floor Plan

A popular house in the affordable range is a 34x26 Cape with a shed dormer. Most of our houses sell to families who have one small child and plans for more. We leave the upstairs unfinished to become bedrooms later. (The upstairs can be called an attic, if FHA financing is involved). We also build a full basement with a flush girder to extend the headroom, and an interior frame wall insulated with fiberglass, which can be finished at a later date.

To make the transition upstairs or down, no alterations need to be made to the first floor layout: The entrance opens into the living room. There is a combination kitchen/dining room at the back, and two bedrooms, one at each end. One bedroom opens onto the living room, and can be used as a future family room. The other downstairs bedroom can be converted to a formal dining room after the upstairs is completed.

We keep the systems simple — poured concrete foundations, direct bearing framing, 2x10 floor joists, 150-amp service. To satisfy energy requirements, the house has R-30 ceilings, R-18 walls, low-e thermal-pane windows, and a Heatmaker boiler for heat and hot water. — N.H.



After building several houses with let-in bracing, the author went back to using structural sheathing. The walls are stronger but heavier, and require a crane on site. Here the crane lifts a side wall while two carpenters steer it into place.

people. It takes at least three hours to stand up the walls. With labor rates between \$12.50 and \$15 per hour for a carpenter, the base cost to lift the walls by hand is between \$112 and \$135.

With sheathing, however, the walls are heavy, and we have switched to using a crane. Fortunately, the sheathing provides enough support so that the walls can be picked up by the top plates.

With a crane, raising four walls off a trailer takes us one hour. I can hire a 100-foot tree crane for \$100 to complete the job. I still need one guy to work with the crane operator, however, and I keep the other two busy until we need to tie the walls together and frame the roof. So I actually spend somewhat more money with the crane. But we're ready to frame the roof much sooner, the job is safer, things run a lot smoother, and I end up with a better product because of the structural sheathing. We also have the crane lift ceiling joists and rafters onto the top plates.

Recently, we've started building the gable-end walls in the shop, and lifting these into place with the crane, too. We have to build the gable end in one section and then cut it into 8-foot pieces to fit on the trailer. Working on the flat allows us to complete the rake eaves in place.

On one project, we installed decorative shingles with minimal effort. This took a little figuring to get everything to line up, but it went very smoothly.

From this point on, we frame the roof in conventional fashion. I've considered using trusses, but I'd rather frame the roof myself when I can. I'm a stickbuilder by trade, I'm not interested in just assembling panels and trusses.

Affordable Design

I've kept the house designs simple, and as a result, I've been able to break into a more affordable housing market. This has worked out well because, while house sales in New England are slow, there's always a need for "affordable" homes – those in the \$90,000 to \$120,000 range (see "Expandable Floorplan").

This house design sells. I'm now producing and selling houses in a slow economy faster than I did in the boom years. I've had almost no requests for anything different, so I can streamline production in the shop. But each house is still built one at a time, so I can offer my clients quality and flexibility. Even in the "affordable" range, the housing market still favors the custom builder. ■

Nick Hurt is a builder in Milton, Vt.