Raising Finished Walls

Siding, trimming and painting are easier when the walls are still flat on the deck

by Jean Dunbar

Wary of building for themselves, but sensitive to value and architectural quality, homebuyers in Lexington, Virginia, have run out of vintage houses to buy. My husband Peter Sils and I decided to build a spec house that would appeal directly to these frustrated, design-conscious shoppers. We planned to offer them a new house built in the design tradition of historic Lexington.

From the first, we felt that the house could blend in only if its design made reference to the vernacular architecture of this part of Virginia—country houses, marked by rectilinear shapes and by wings that had usually been built on as additions. The problem was how to make such a design affordable.

A T-shaped house would require twice as many walls as a more cost-effective rectangle. Moreover, to be ready for sale in the spring, the house had to be built during the winter, when stagings would be slippery and dangerous, and hours would be lost tediously clearing away snow. We could count on everyone inching up and down slick ladders in clumsy cold-weather clothes. Oddly enough, this program, together with our steep site, led us to choose a decidedly untraditional method of building—on-site prefabrication.

On-site prefabrication—Peter had always sheathed walls before raising them to avoid hauling sheathing up ladders and to ensure that the walls stayed square while they were being raised. Figuring that the only reasons he had stopped wall assembly at sheathing were habit and extra weight, he decided to complete each wall—right down to the windows and siding—flat on the deck, and then raise it.

What made raising the extra weight of finished walls possible was a pair of Hoitsma Walking Jacks (Hoitsma, 263 East 23rd St., P. O. Box 595, Paterson, N. J, 07544-0595). They work like automobile jacks. Attached to 2x4s and placed under the upper edge of a wall, they raise a wall in slow increments as their lever handles are worked.

Siding, trimming and painting would prove faster and more precise when done with the walls flat on the deck (bottom photo, facing page) than when done from a ladder. Not only could walls be built efficiently even by less-experienced workers, but skilled workers also would have an easier time with tricky eave and rake details. The ease with which friezeboards, vergeboards and cornice crown could be added would make them affordable for a spec house.

Best of all, prefabricating meant that we could start selling the house early. Because each prefabricated wall section would rise up complete, the house would start to look finished long before it was even under roof (top photo, facing page), giving potential customers a sense of the house.

Leveling the deck—Because a prefabricated wall is squared before it is raised, the wall will not be plumb if the deck is not level. Before the deck was sheathed, Peter and his crew checked it with a water level. Wherever the foundation dipped down, they drove cedar shims between the mudsill and the rim joist to level it. They wedged shims under any floor joists that had been forced up, and then sheathed the deck.

Building wall sections—Wall sections were completed and raised one at a time. Once each section was laid out and framed, it was ready to be straightened, squared and sheathed. The crew made sure that the bottom of the wall was exactly on the chalkline—3½ in. in from the edge of the rim joist—and positioned correctly, side to side. Then, to prevent the bottom from kicking out when the wall was being raised and to keep the wall straight, Peter toenailed the bottom plate to the deck. He drove nails from the inside of the wall out to keep them from pulling out during the raising. Because the finished wall would be heavy, he used 16ds, driven into every other joist.

Once the wall was straight and accurately positioned, the crew squared it by measuring the diagonals and then knocking the top to the left or to the right until the diagonals measured the same. To keep the wall square while it was being sheathed, Peter toenailed the top plate to the deck with a 16d.

We used plywood sheathing for the walls. Most sheathing products have sufficient rigidity and strength to keep a wall square and strong as jacks slowly raise it, but products such as rigid foam cannot be walked on while the wall is being built. The trickiest part of sheathing the wall was figuring out where to position the first course of plywood so that it would drop down and cover the rim joist and sill. Peter added together the width of the rim joist with the thickness of the sill and the thickness of the deck sheathing and then subtracted ¼ in. to allow for any irregularities in the foundation. He located the top of the first course of plywood by extending the tape measure below the bottom plate to exactly the dimension he had determined and measuring up 4 ft. He snapped chalklines at that point, and the crew ran courses of plywood above and below it.

Next they cut out the window openings, being careful not to leave any plywood overhanging the framing. When the sheathing was complete, a crew member swept the wall to clear away sawdust and nails. Then the crew covered the wall with Tyvek, letting it run about 2 ft. long on the corners and taking care not to lose their footing on its slippery surface.

To prepare the wall for window installation, they pulled the toenail holding the top plate to the deck and swept the narrow strip of deck below the wall. Then they levered the wall up with a crowbar and rested the top plates on 2x blocking to gain enough space between wall and deck for the window jambs to clear.

Each window was pressed up to its header and squared, but merely tacked into place at the top and on each side. Then the drip cap was installed. We used pre-primed windows to reduce labor and protect the windows from winter weather. As soon as the windows were in, siding could begin.

Making a story pole—Because the sheathing that covered the rim joist would have no framing behind it until the wall was raised, the bottom two courses of siding could not be put on until after the wall was stood up. We wanted the bottom of the bottom course to end up about 1 in. below the sill. After measuring the depth of the deck and the sill, Peter added an inch, measured this distance up from the bottom of the story pole and marked this point. The bottom of the bottom plate thus became the reference point for installing the siding, thus ensuring that the siding would line up all around the house.

Aiming for a 6-in. exposure, Peter calculated the courses and marked them on the pole. He fit them in as evenly as possible between the tops and bottoms of windows, and between the bottoms of the windows and the first course (for more on clapboard layout see *FHB* #47, pp. 48-52).

Installing siding—On wall sections that contained doors, the crew could not install siding

Unaccustomed to seeing finished walls rise up without a house behind them, passersby slammed on their brakes when they saw this spec house in Lexington, Virginia. An advantage of prefabing walls is that prospective homebuyers get a sense of the finished product long before it's finished.

before raising. Like windows, door jambs extend ½ in. beyond the framing on the inside. But unlike windows, the doors run all the way to the floor, and because the bottom plate was toenailed to the deck, there was no way to shim up the wall at the bottom to provide clearance for the door jambs. So walls with doors were sheathed, but not sided.

On the walls that would be sided, the challenge was to align the ends of the courses carefully enough to guarantee that the corner boards, which could not go on until the walls were raised, would fit precisely. On gable-end walls, which were raised first, the siding stopped 4 in. short of the corner to allow for a 5⅛-in. wide corner board (the extra ⅛ in. allowed some leeway). The corner boards were a full 1-in. thick.

To locate siding precisely on these walls, Peter selected two straight studs and tacked one onto each end of the wall. He measured between them to make sure they were exactly parallel. The inside edges of these studs served as the ending points of the siding. Peter transferred the markings from the story pole to the studs, and with the crew's help, snapped lines between them.

On the eave walls, which would be raised

If you've ever painted a soffit while perched on a ladder, with paint dripping in your face and your neck aching from craning upward, you can appreciate another advantage of prefabing walls: kneeling down to paint soffits.

after the gable-end walls were in place, the siding was run nearly to the edge of the wall. Here the crew used two 6-ft. lengths of 1-in. by 1-in. aluminum angle, one tacked on each end, to align the ends of the clapboards (bottom photo). As they sided up the wall, the crew avoided nailing too closely to the angles because that would have clamped them to the sheathing and made them difficult to remove. When the siding had reached the top of the angle, the crew slid the angle up. They aligned it with the siding already in place, retacked it and finished siding the wall.

The actual installation of the siding was surprisingly rapid. One man cut the siding, and two men snapped lines and nailed it down (top photo below). Between windows, and between corners and windows, the pieces of siding were all cut the same length. With the lengths of siding fixed, adjustments were made only in the position of the window they ran into: the tacks holding the window temporarily in place were removed so the window could be adjusted slightly to accommodate the siding. When the wall had been sided, the crew nailed any windows firmly in place, swept the wall thoroughly, and caulked around the windows.

Once siding and windows were installed, we stained the wall completely. Because the nails would have to be covered by the opaque stain we had chosen, we did not bother to pre-stain the siding. Occasionally there was too much moisture—either from frost or from precipitation—on the siding for it to accept finish. In those cases the wall section was raised first and stained later.

Windows were tacked in place temporarily. Then, the clapboards that butted into the windows were all cut the same length and were used to square up the windows. After the siding was installed, the windows were nailed permanently.

Clapboards had to be neatly aligned so that the corner boards, which couldn't be installed until after the walls were raised, would fit precisely. On eave walls, where the clapboards ran to the end of the framing, aluminum angles were used as a jig to align the ends of the siding.

Raising first-floor walls—The next step was to raise the finished walls with the wall jacks. A wall jack moves up a 2x4 much like a pump-jack. The crew was careful, therefore, to select knot-free, yellow pine 2x4s that would hold up well under repeated use.

The jacks were positioned about 3 ft. from each end of the wall to be raised. Each jack has a raised metal edge in front that hooks behind the top plates to keep it from slipping out as the wall goes up. Levering the wall up slightly with a two-by-four, the crew inserted the jacks under the top of the wall. They then tacked blocks to the deck around the base of each 2x4 to keep it from kicking out as the wall was raised. These preparations were made thoughtfully and carefully for a simple reason: no one could figure out any way to lower a jack while it had a load on it. Once the raising began, there was no turning back.

Raising the wall was simply a matter of pumping the levers at about the same rate to ensure that the ends of the wall rose together (photo facing page). To veteran framers who had lifted countless heavy walls by hand, the ease with which the walls floated upward seemed like magic.

None of the walls that the crew raised on the first floor measured more than 22 ft. in length, and they had no problem lifting them with two jacks. (Hoitsma recommends that jacks be no further apart than 8 ft.) The only perplexity was why these wall jacks are not more commonly used by carpenters—especially considering that they cost under $100 per jack.

Each wall was braced after it was raised, but as soon as an adjacent wall went up, the crew nailed the two together. Because the siding length was already set, the corners of the framing had to be extra tight to ensure that the cornerboards fit well, so they used 30d nails to secure the corners. The only other adjustment peculiar to the prefabrication process was that, once each wall was in place, the sheathing below the wall had to be nailed to the rim joist and sided.

The second floor—After framing the interior partitions, straightening and leveling walls, the crew framed the second-floor deck. Before sheathing it, however, they sheathed and sided the rim joist. Doing this by bending over from the deck after it was sheathed would have been dangerous. Instead, they worked from stepladders set up inside the house, leaning over the rim joist to take measurements, snap chalklines and nail. The rim-joist sheathing was cut so that it was about ¼ in. below the top of the joist, and the last clapboard was installed so that its top was below the top of the rim joist. This way, the bottom of the first

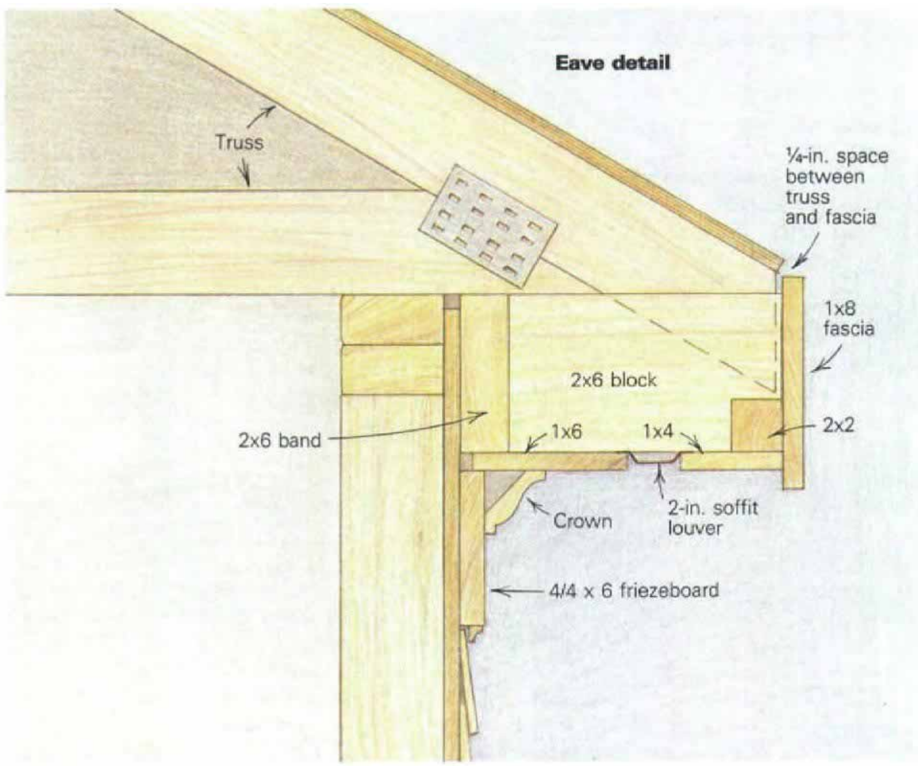
With the added weight of plywood, windows, siding and soffits, even a short wall quickly becomes too heavy to raise by hand. But a pair of wall jacks, braced at the bottom and levered at the same rate, make short work of the task.

clapboard on the second-floor wall would extend far enough past the bottom plate to hook over the siding on the rim joist, when the wall was raised. That one clapboard—at the bottom of the second floor—had to be nailed off later from a ladder.

Second-floor gable-end walls—If the gable walls were to go up with trim already installed, each wall would have to be tied securely to its gable-end truss. To tie the two together, the crew ran the plywood sheathing 2 ft. above the top plate onto the truss. The remainder of the gable was covered with ½-in. foam sheathing, rather than with plywood, to reduce weight.

The trim itself also helped to hold truss and wall together. Two by six blocking and two 2x6 fly rafters support the 1x8 rakeboard and the 12-in. soffit. A 4/4 by 12-in. friezeboard was run under the soffit with crown molding covering the joint between the soffit and the frieze. The friezeboard extended down to the wall and strengthened the connection between truss and the wall.

With soffits and rake attached, the gable-end sections were wider at their tops than the



Drawing: Chuck Lockhart

While the term "prefabrication" may bring to mind trailer parks, mobile homes and wide loads on the highway, this house clearly benefited from the time-saving techniques used to build it.

space between their adjacent side-walls; this was another reason to raise gable-end walls first. Despite the use of foam sheathing, these walls were terribly heavy. Raising the two 22-ft. long gable ends of the house was a particularly nervous business. Under their extreme weight, the 2x4s that the jacks rode on bent threateningly—and staying out from under the wall as it went up naturally proved to be difficult.

The safe way to put up a wall of this extra length and weight would have been to use a third jack or to hire a crane to hoist it into place; two wall jacks were simply inadequate for the task at hand.

The ends of the siding on the second-floor wall had to line up with the siding on the first floor. After each wall was framed, a crew member leaned over the edge of the deck, placed a straightedge along the ends of the clapboards on the wall below, and with a second straightedge, transferred the line onto the second-floor wall.

Second-floor eave walls—Peter and the crew built the soffits on the eave walls before raising them. But the soffits were longer than the walls themselves because they had to meet the rake on the gable end. Therefore, the walls had to be built about 2 ft. to the side of their final locations, and then be slid into place after raising. Consequently, the ends of the first-floor siding could not serve as a guide for aligning the clapboards above. Instead, the crew measured the length of the siding on the first-floor walls and cut the second-floor siding to the same measurements.

Once each wall was sided and any windows were installed, we built and attached the soffits, a tricky task because they had to meet perfectly at the corners, and the top of the fascia had to line up with the plane of the roof. Careful truss design was the key to success, especially because the intersecting roofs of the house had different pitches, yet their fascias and soffits had to line up.

Our trusses were calculated so that their tails came down into the soffit, where the ends were then nailed into the 2x6 blocks supporting the soffit (drawing previous page). The blocks were set at two-foot intervals, and a ¼-in. space between the end of the truss and the back of the fascia permitted any necessary adjustment.

The framing for the soffits consisted of these 2x6 blocks nailed to a 2x6 band, which in turn was nailed to the wall. The front ends of the block were notched to receive a 2x2, running the length of the soffit to tie the blocks together.

The crew nailed this soffit together as a unit before attaching it to the wall. Putting the length of it against the top of the wall to keep it straight, they nailed a 1x6 to the bottom of the 2x6 blocks; that formed the inner part of the soffit. After that, they attached a 2-in. aluminum soffit louver and finally, a 1x4. Next, they flipped the soffit, fully assembled, onto the wall.

To locate it side to side, they left the dimension of the rake overhang plus the thickness of the gable-end wall at each end. Because the tops of the 2x6 blocks would be flush with the top of the wall, finding the correct height for the soffit was no problem. Once it was nailed in place, the crew nailed the fascia over the ends of the 2x6 blocks, and nailed the 6-in. friezeboard below the soffit. Then they ran the crown molding between the soffit and frieze. They even attached the gutters.

As the side walls were raised, the overhang acted as a beam to keep the wall absolutely straight. Once it was raised, the crew braced it with 2x4s, then used the wall jack sideways to shift the wall over 2 ft. into its final resting place. Much of the excitement of prefabrication was watching the corner of two completely assembled and finished walls interlock, as if we were snapping together a toy house instead of a real one.

Finishing up—Finishing the rest of the house was much like finishing any house. The roof went on as usual, missing cornerboards were nailed on, the exterior doors were installed and unstained areas finally got their stain. The crew moved to the interior.

When we looked at the results of prefabrication, we liked what we saw (photo above). The process had demanded some extra calculation, but once the system was worked out, four men had been able to frame, sheath and raise approximately 38 ft. of finished wall per day. □

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