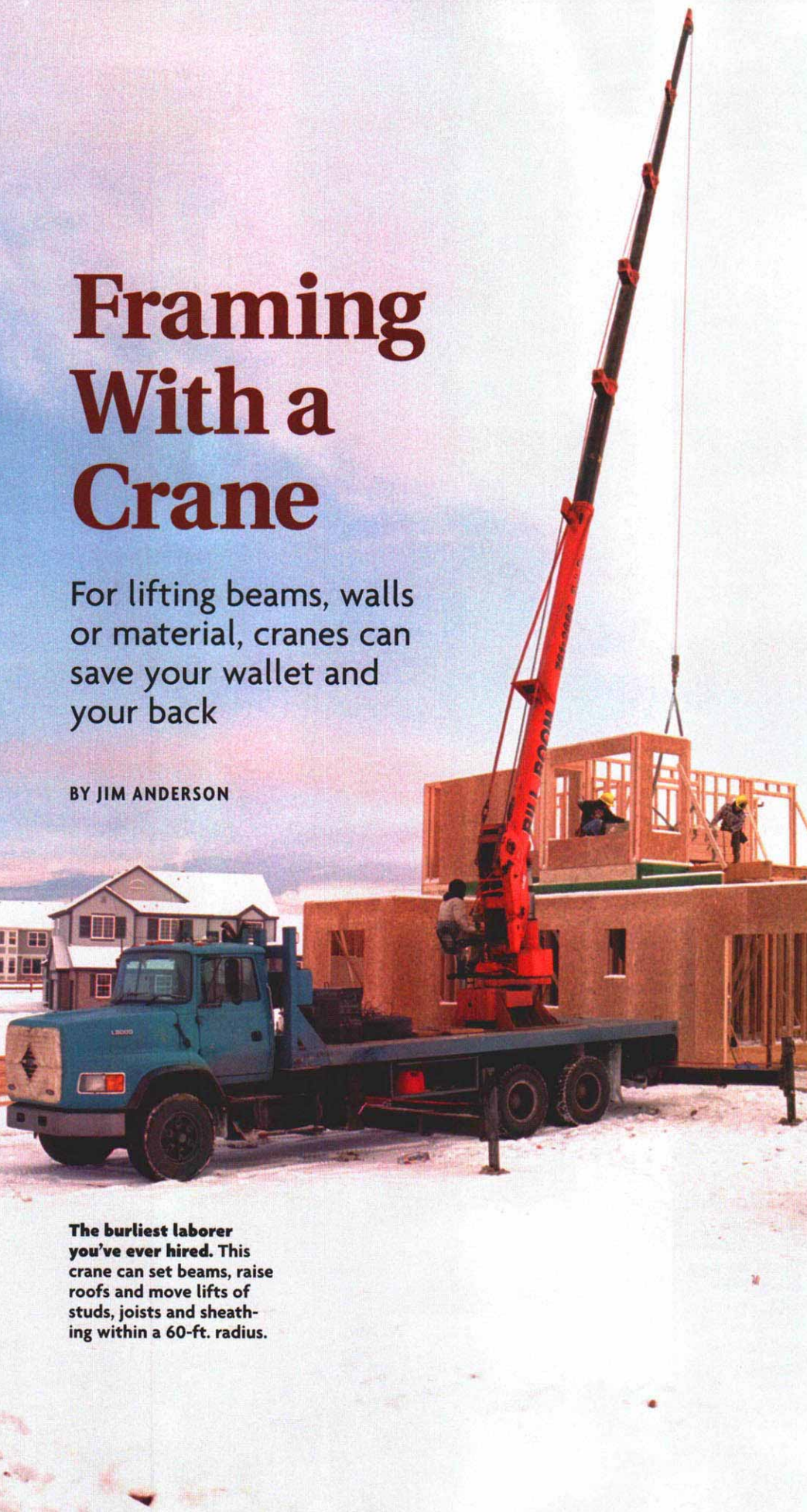


Framing With a Crane

For lifting beams, walls or material, cranes can save your wallet and your back

BY JIM ANDERSON

The burliest laborer you've ever hired. This crane can set beams, raise roofs and move lifts of studs, joists and sheathing within a 60-ft. radius.



The other day, I kept an eye on the three-man framing crew working across the street. Two of the guys spent the day in the mud, hauling material for the second floor into the house. When my crew was rolling up for the day, the other crew had carried most of the lumber inside the house but still needed to pull it up to the second floor. It cost this crew about \$300 in labor just to get the studs in the door.

I'd have hired a crane for this job and moved all that lumber in about an hour, which would have cost me \$125. Even if there were no money savings, saving wear and tear on my body and those of my crew would make the crane worthwhile.

I started to think of better ways to use a crane six years ago when my brother and I went into business framing houses. We carried most of the material the hard way, but we hired a crane to set the steel I-beams.

It occurred to us that although the crane company charged us for a full hour of crane time, setting those three steel beams took 20 minutes. With that realization, we decided to fill the other 40 minutes of that hour by using the crane as our laborer (photo left).

My brother has moved on, and I now have my own two-helper crew. I still call in a crane several times for an average house. Where I work, in the suburbs south of Denver, Colorado, cranes are pretty common. The ones that I hire usually have no move-in fee, just a one-hour minimum charge of about \$125.

Preparation is key to making the most of crane time

Before the crane arrives, I try to ensure that the lumber is dumped fairly close to the house, but not where it will be in the crane's way. When the crane does arrive, I discuss the sequence of the lift with the operator and crew. For efficiency, everybody has to know what's coming next.

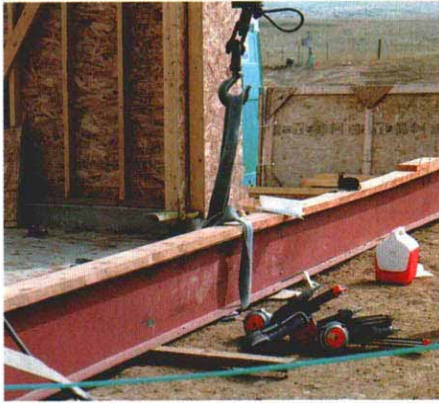
One crew member stays near the material to rig it to the crane (photos pp. 78-79). The other two stay near where the material will be installed. To avoid confusion, one of these carpenters is the designated signaler (sidebar pp. 76-77), while the other jockeys the load into position.

Most of the houses that my crew and I frame have three to five steel beams holding up the first floor. These beams are the first things that the crane sets (top photos, facing page). We either have the Lally columns cut to length or have ready temporary posts. Long 2x4s are on hand to brace the I-beam to the mudsills once it's in place.

We set the beam that's farthest back in the building first, then move sequentially to the

MAKE THE MOST OF CRANE TIME

Although framers commonly hire cranes to set steel, the author makes the most of the crane's presence by using it to raise walls and to move material.



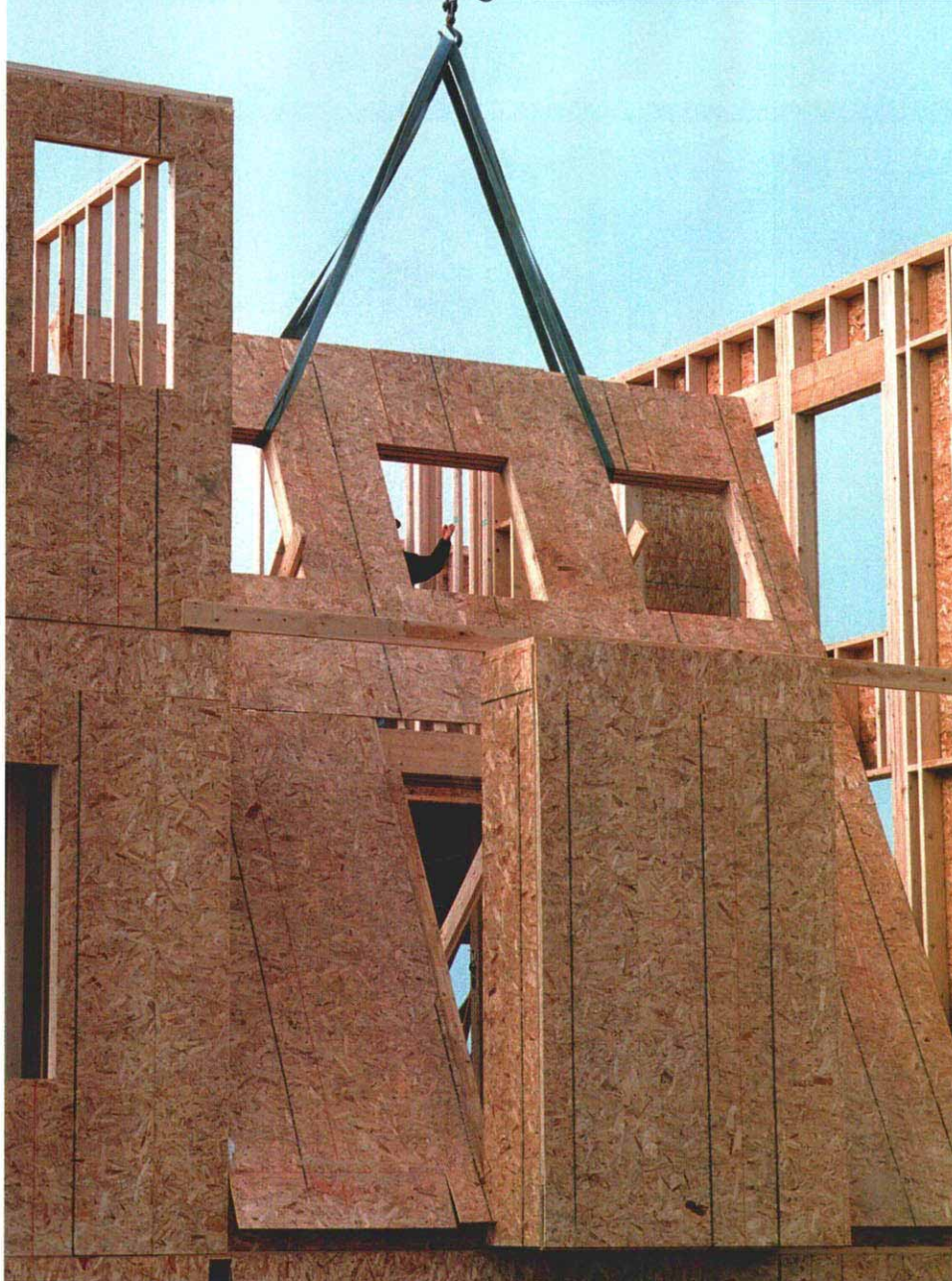
The steel is ready to go when the crane arrives. The wood sills to which the joists will be nailed are already attached to the steel, and the joist locations are marked.



A crane makes short work of raising top-heavy garage walls. Once the wall is set over the anchor bolts, the crane steadies the wall until it's tied to the others and braced.



Be prepared for the crane's second visit. This second-floor staging area is framed to provide storage space for crane-lifted studs and sheathing. Because stored material would otherwise be in the way, the author also frames the walls before the crane arrives.

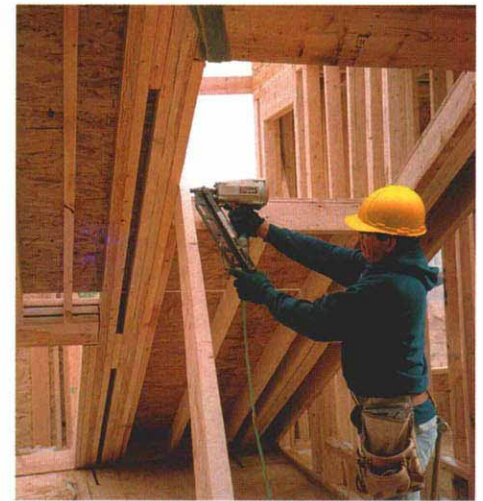


front. This process avoids swinging anything over set beams, eliminating the chance of dropping one beam and taking out two.

We stack any scrap from the basement on a piece of sheathing. We lift this scrap out of the hole with the crane and swing it right over to the Dumpster.

Any built-up wood or laminated veneer lumber (LVL) beams are nailed together, and any necessary hangers are installed beforehand. As we work back to front, I set these beams in sequence with the steel.

The stacks of floor joists are next (photo bottom left, p. 78), and after they have all been set on the foundation walls, we move as much of the material as we can closer to the

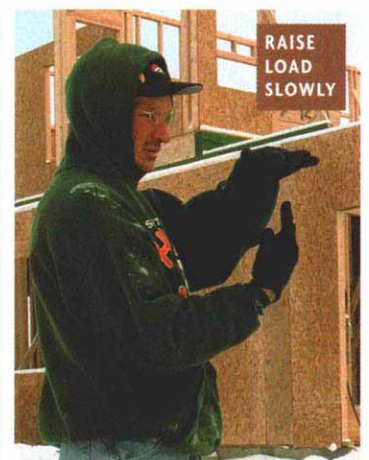
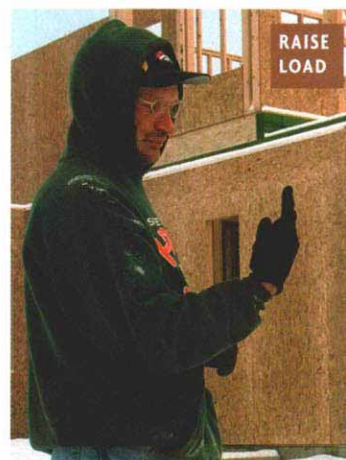


Two straps are used to raise tall walls. Had there been no windows, the crew would have cut small holes in the sheathing for the straps. With the walls partially raised and shored for safety, the braces are tacked so that they can pivot as the wall rises.

GETTING THE CRANE TO DO WHAT YOU NEED IS AS SIMPLE AS POINTING YOUR FINGER

There are standard hand signals that all crane operators and the people who hire them should know. Additionally, three rules and a suggestion can make communication a sure thing.

1. Keep your signal in one place.
2. If you can't see the operator through a maze of studs, trusses or bracing, the operator can't see you. Make eye contact, and then make your signals in front of your face.
3. If your gloves and clothing are of similar colors, make your signals away from your body where the operator can see. Another way to communicate with the operator is with two-way radios.



To raise or lower a load, point up or down and rotate your finger. To move the load slowly, put your opposite hand above or below your signal, as if you're pointing at your palm. When the load is down, a quick circle with the hand signals that all is clear and that the hook can be dropped to free the load.

house. We put the lifts of floor sheathing on top of 2x4 stickers about 3 ft. from the front of the house, allowing room to work but putting it within easy reach. Then we use the crane to move the rim-joist material to the top of the stacks of sheathing. We cut the rims here, using the sheathing stacks as 1500-lb. sawhorses.

While you're setting the steel, have the garage walls ready to lift

Most of the houses we frame have three-car garages with one single door and one double door. A typical garage-door wall is 30 ft. long and 10 ft. tall, with an 18-ft. and a 9-ft. double-LVL header (center photos, p. 75). I never want to lift a wall like this one by hand. Before the crane arrives, we frame and stand the sidewalls that we can easily lift by hand. We also frame the front wall but leave it on the ground for the crane to lift.

The crane lifts the wall and swings it to the garage foundation. As it gets close, we guide the anchor bolts into the holes we've drilled for them in the bottom plate, then down the wall. Now the crane holds the wall in place as we nail the corners, tie in the plates and nail on some braces. With the wall set and braced, we give the "all finished" signal and send the crane home. This entire lift—I-beams to garage wall—usually takes only about an hour.

Lifting with a crane beats carrying material to the second floor

After we've framed the first-floor walls, we build a section of the second floor to serve as a staging area for our next lift. This area is usually a corner that's, say, 500 sq. ft. to

Crane safety is mostly common sense

Cranes offer immediate safety benefits by lifting heavy loads that you might otherwise attempt to manhandle. And by reducing the repetitive toting and lifting of construction, they can foster long-term benefits in the form of healthy backs, knees and shoulders.

However, cranes bring with them some danger, simply because they carry heavy things overhead. Obeying three rules should get you home safe after every day of crane work.

- Wear a hard hat: OSHA requires it.
 - Don't stand under suspended loads.
 - Don't become trapped between the load and a wall or a drop-off. A sudden horizontal movement of the load could crush you or send you flying.
- J. A.

800 sq. ft. (bottom photo, p. 75). We also frame most of the walls around this area before placing any material here. This prep work saves having to move lumber to make room to frame the walls.

Once this staging area is done, I call the crane again to lift the studs, the plates and the sheathing for the second-floor walls, as well as the balance of the second-floor joists and beams.

Full lifts of studs or of oriented-strand-board (OSB) sheathing are pretty heavy

loads that should never be set in the middle of a joist span. We set lifts of material on 2x4s to spread the weight and to leave room to remove the straps once the crane lets go of the load. We always set our material on or near the main bearing beams and walls below the floor. If for some reason a load must be set midspan, we split it into smaller bundles that can be spread out. We sometimes build a temporary wall below the floor to help spread the load to more joists.

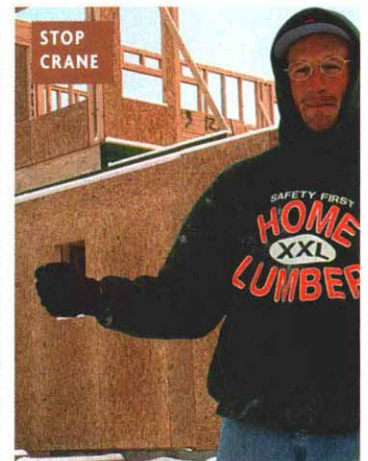
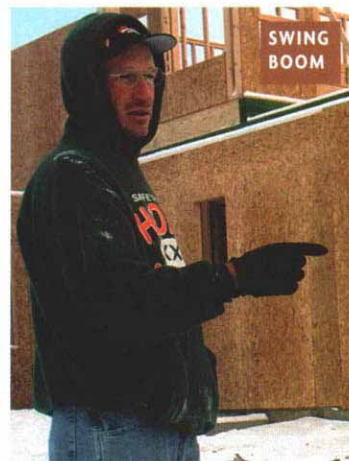
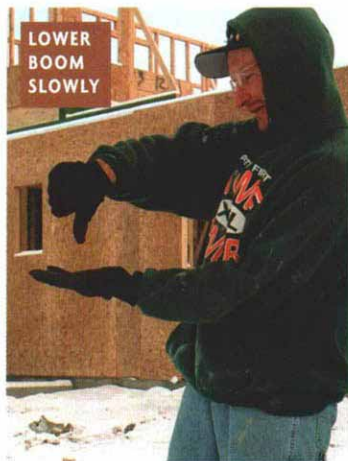
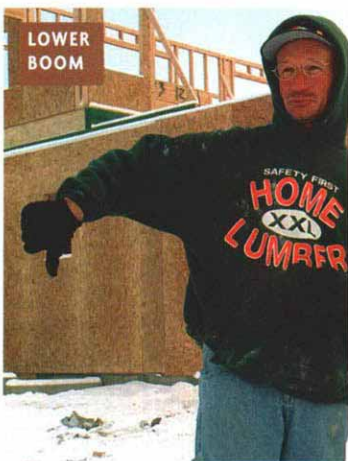
During this lift, we set any second-floor steel or built-up LVLs. Commonly, there is a beam that runs between two walls, each end supported by posts made of studs or by Lally columns enclosed within pockets in the wall. Although we frame these walls with their top plates uninterrupted, we leave the posts out until we set the beam.

To set a beam that runs between walls, we pull down one end and slide it far enough into its pocket that the beam's other end clears the wall plate. Then we have the crane operator lower the beam, and we seesaw it into place (photo top right, p. 75). With the crane snugging the beam to the underside of the top plates, we tip in the supporting columns.

Raising balloon-frame walls

The only first-floor walls we don't lift by hand are any tall, balloon-frame walls, such as those of rooms with very high ceilings (photo top left, facing page). We frame and sheathe these walls with the other walls but leave them flat until the crane comes again. For safety alone, lifting these walls is worth hiring a crane.

With the wall's bottom plate on its layout line, we secure it to the deck about every 4 ft.



Raising or lowering the boom moves a load toward or away from the crane. Thumb up moves the load toward the crane. Thumb down moves the load away. Either gesture pointed at the opposite palm means to go slowly. To move the load without raising or lowering it, point your thumb up or down while opening and closing your fist.

Swinging the boom is as simple as pointing where you need to move the load. Finally, the most important signal is a closed fist, for stopping the crane. Additional signals are used to guide the larger cranes used on commercial jobs, but these six signals and their variations should get you through most residential work.

A WELL-RIGGED JOB GOES SMOOTHLY AND SAFELY

Three kinds of rigging equipment get us through any house. The most frequently used are nylon straps, followed by steel cables and four-chain rigging.

Nylon straps are rigged in two ways

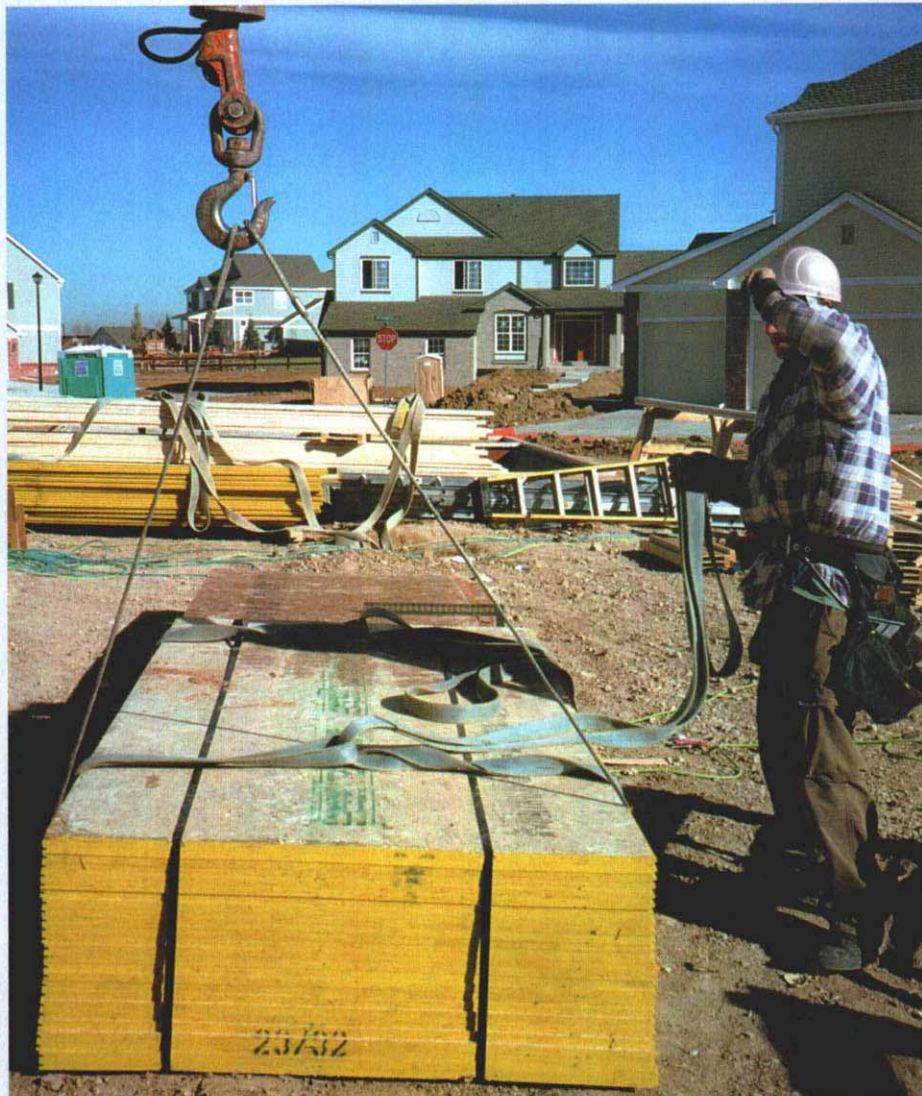


Choke-rigging tightens as the crane lifts. Choke rigs limit movement within lifts such as studs or sheathing, and they keep beams from slipping out of single straps. To avoid excessive flexing, I-joists (below left) are choked in about one-quarter of the joists' length from each end.

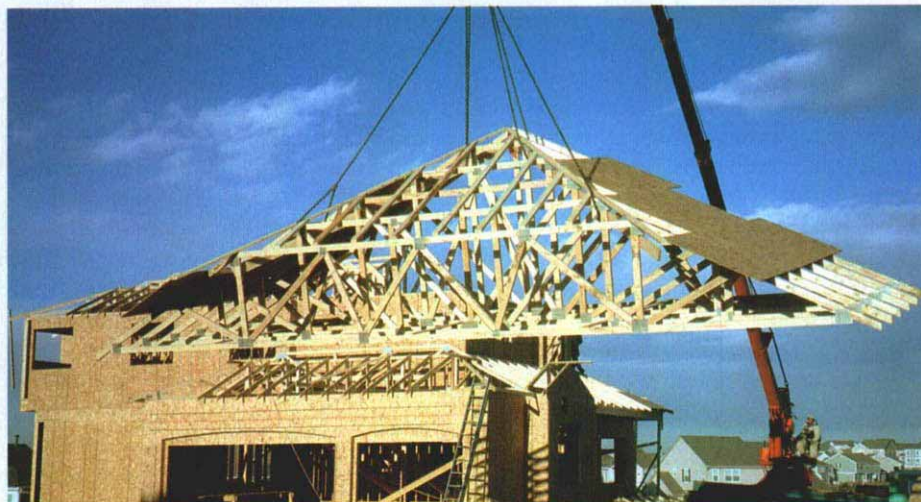


Cradle-rigging simply runs the strap under the load in a U-shape. Cradle rigs unhook quickly, but they allow movement within the load. Great for trusses and walls, they should never be used to lift studs or joists overhead.

Cables and four-chain rigs are less common



Steel cables can damage the edges of material. They're limited to raising single trusses and sliding under material dropped directly onto the ground so that it can be raised enough to get a strap below.



Four-chain rigs raise the roof. Hooked to the crane with a ring, each chain can be snubbed to a length that will enable a preassembled truss rack to fly level.

using pieces of the steel strap that bands lifts of lumber. This strap acts as a hinge, keeping the wall from kicking out during the lift.

We stop the lift about a third of the way up to attach the braces that will steady the raised wall (photo top right, p. 76). These braces go about two-thirds of the way up the wall. Once the braces are nailed to the wall, we stand it up the rest of the way, then plumb and brace it before unhooking the crane.

The final lift sets the roof trusses

With the second-floor walls plumbed and lined, it's time for the crane again. This time, it will lift our sheathing, roof-framing lumber, prebuilt truss racks (photo bottom right, facing page) and any single trusses. First, we swing up the roof sheathing and set it in three or four spots on the second floor. Then we send up the lumber for framing dormers and valleys. This lumber is usually set in the main hallway of the upper level, where we have room to maneuver long pieces up into the roof framing.

When the site and truss design allow, we assemble, sheathe and brace the trusses into 6-ft. to 18-ft. roof sections on the ground (bottom photo). We can set a simple gable roof, preassembled into two to three sections, in about a half-hour.

There's a lot to say about setting trusses, two articles' worth, in fact. They've already been published in *FHB* #99 (pp. 50-55) and *FHB* #100 (pp. 76-81).

Our total crane time on an average house is about 4½ hours. In most cases, we hire a 3-ton crane. These cranes have 90-ft. booms that will reach about 60 ft. with most loads that we see in residential construction. Only once have we needed a larger crane. If you aren't sure of the size crane that you need, call the crane company and describe your lift. They'll know.

There are two other advantages to hiring a crane. The first is safety. We once helped another framer attempt to raise a large wall by hand. It got away from us, pinning one of my employees below. Added to his pain and disability is the fact that my worker's comp premiums went up 50%.

The second advantage is job-site security. Using a crane to lift material into the house as soon as possible makes it less accessible to thieves. They'll likely head across the street to the house where the lumber is still sitting where it was delivered, conveniently right next to the curb. □

Jim Anderson owns Great White Construction in Littleton, Colorado. Photos by Mike Rogers, except where noted.