BY MARK CURRIE

SETTING TRUSSES: TIPS FROM THE TRACTS

Roof trusses are definitely here to stay — they're common almost everywhere and dominate roof framing in the big tract developments in the western U.S., where I work. Trusses have established themselves because they save both time and materials.

So why doesn't everyone use trusses? One reason is that on some jobs, you're simply better off cutting rafters. These include roofs with lots of hips and valleys, flat roofs, and many simple, small buildings and additions where using trusses just doesn't save labor.

But it's clear to me that many contractors don't use trusses on jobs where they should. Once you know what precautions to take, trusses work beautifully on most roofs and offer some very real advantages. The keys are to plan your work well, watch out for a few common snags along the way, and install the trusses efficiently but not frantically.

Ordering and Storing Trusses

The fun part of trusses is putting them up, watching the roof take shape in a matter of hours. But the smoothness of that day's work will depend on your care in ordering, storing, and lifting the trusses so that on framing day everything is ready to roll.

Ordering. There are two main things to remember in ordering trusses: Do it early, and do it with a finalized, detailed building plan. I take a copy of the building plans (after confirming that no more changes will be made) to the truss company, where a truss designer goes over the plan with me, specifies the trusses, and makes up an order list.

It's worth calling the truss maker's attention to anything unusual, such as differing overhangs at opposite ends of a span, oddly shaped cathedral ceilings, and any skylight or other shafts that will run through the roof framing. Sometimes the plans call for exposed rafter tails to be attached later; in that case, the truss will end flush with the outside of the top plate. Such details should be obvious from the plan, but it doesn't hurt to call attention to them. Once you've taken delivery of the trusses, they're yours, so better safe than sorry.

PRE-CUT BLOCKING AND A COOL HEAD KEEP THE JOB RUNNING SMOOTHLY

Figure 1. *To get the job underway, the crane first sets a bundle of trusses near one end of the building, resting them across the two sidewalls and the gable-end wall (left). The carpenters then spread the trusses evenly across the walls, starting at the opposite end and working back (right).*

Delivery and storage. Trusses should come banded in "bunks" of three or four bundles, each bundle marked somehow — some companies spray-paint numbers, others use both numbers and color codes — to indicate the area of the roof where each bundle goes. The truss maker should also supply a corresponding map of the roof. My main concern on delivery day is to make sure the trusses are dropped in a convenient place — one that is far enough (say, 20 to 25 feet) from the building foundation to allow a crane and other vehicles to fit through, but close enough that the crane can easily swing the trusses from the staging area to the roof. Make sure the bunks lie flat to prevent warping and also to prevent a bundle from shifting and injuring someone.

I check to see that every bundle marked on the roof map does indeed arrive, and to familiarize myself with where the various bundles are so I can quickly tell the crane operator where each bundle goes.

Schedule the crane. About the only time I ever see anyone lifting trusses by hand is when the framer didn't line up a crane operator in time, or is doing his first truss job and simply doesn't know any better. To me it makes no sense to hoist trusses by hand. If you have only a few trusses, you might as well frame the roof conventionally. If you have more than a few, it's smarter to pay $100 for an hour of crane time than to reduce yourself and your crew to dog-weary soldiers after four or five hours of hard lifting.

Besides a crane, the other common option for lifting trusses is a Pettibone, a small, high-lifting forklift common on tract sites in California. Most large framing outfits own a Pettibone, but they can also be rented by the week — a sensible move if you're going to be lifting a lot of trusses on multiple houses. If you're doing just one or two houses, however, renting a crane is usually smarter. A crane is faster, has longer reach, comes with an operator, and can be rented by the hour.

A few days before the roof is to go up, I double-check my bundles to verify that I have a bundle for every mapped section of roof. I measure each bundle with the tape to make sure it will actually fit the span it's mapped for, and finally, I examine the frame once more for any irregularities I'll need to account for (see "Sniffing Out Trouble," page 32). I also make sure I have all the blocking and bracing the

Figure 2. *Truss roof framing typically starts with a gable-end truss, recognizable by the vertical members.*

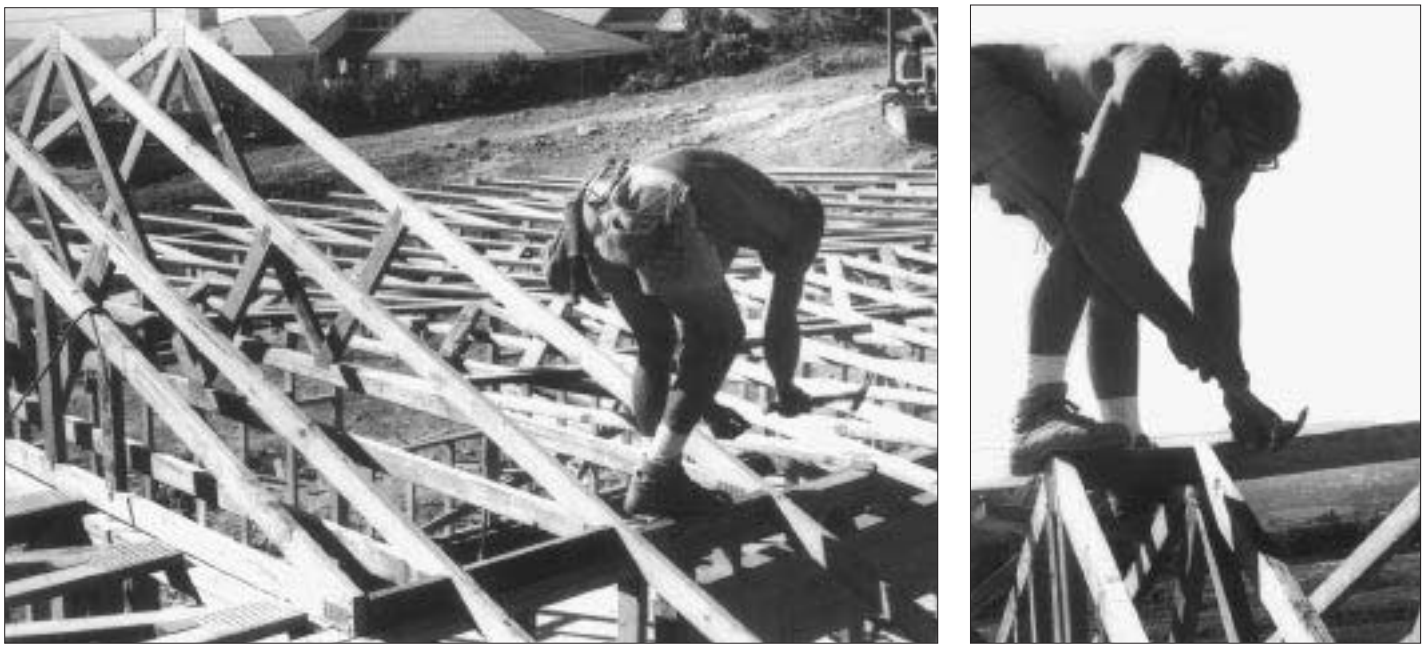

Figure 3. *Installing the supplied blocking as each truss is set automatically maintains the proper spacing — although on-center dimensions should be verified every few trusses. The author's crew always installs plate blocks first (left), then goes back to install ridge blocking (right).*

truss maker was supposed to give me. Knowing all that, I can sleep easy the night before the crane shows up.

Putting Them Up

You have to stay on the ball mentally to make sure the relatively straightforward task of erecting trusses goes smoothly. What follows is the system I worked out in the California tracts. It's fast *and* accurate.

Spreading the trusses. The first step is to get the trusses on the roof, known as "spreading" the trusses (Figure 1). This is mainly the crane or lift operator's job, though you'll obviously have to direct where everything goes. Have the trusses for each section of roof put at the end of the roof from which you'll start. Then break open the bundle and, with a crew member atop each exterior framing wall, drag the first truss along the top plates to the far end. When you get there, flip the truss over so it lies down with the top pointing over and resting on the end wall. Bring the other trusses down the same way, leaving them at roughly the required on-center interval, which is usually 2 feet, and resting each truss on top of the previous one, like a series of fallen dominoes. When you've laid out all the trusses, the first one to tip up is the last one you laid down — it will be lying on top.

Blocking. Before tipping up any trusses, you have to get your blocking in order. All blocking and permanent bracing should be supplied by the truss maker. At a minimum, this includes blocking to nail between the trusses along the top plates as well as between the ridge points.

To run an efficient truss operation, it's vital to distribute all the blocks and braces so that they're easy to find when you start tipping up the trusses. Most framers nail ledger boards just below the top plates of the exterior walls, then bang a toe-nail into each piece of plate blocking and hang them all by their toe-nails, so to speak, from the ledger board. Then, when you're up on the walls tipping up the trusses, you just reach down to the ledger every time you need a piece of blocking.

Ridge blocking is difficult to install once the trusses are up, so we toe-nail one end of each block to the top of the truss while the trusses are still spread out and lying on top of the walls. We attach the blocking to the down side of each ridge with a single toe-nail; the blocks sort of dangle there until we tip up the trusses, after which we can nail them off.

Framing. Once all our blocks are made handy, we're ready to erect the trusses. First, we raise and plumb the end truss — usually a gable truss — securing it with a pair of long, *very* straight 2x4s set on edge against and nailed heavily into the gable-end wall framing (Figure 2).

Once the gable truss is in place, we put the first block down and toe-nail it flush with the top of the gable-end truss. The block is held for the time being by that one toe-nail. Next, we tip up the first truss, check it for end-to-end alignment, pull it against the end of the block we've just installed, and then reach over the truss and shoot a pair of toe-nails through the truss's bottom chord into the top plate. After adjusting the block to make sure it's in position, we reach over the truss again and drive two face nails through the rafter's far side into the block (Figure 3). That first block should now be snug. Then we grab the next block, toe-nail down through its top edge into the face of the truss we just raised, and continue as before.

At the far end, we turn around and work back to finish off the nailing schedule; this is called back-nailing. Reach over to drive a toe-nail through the bottom chord of each truss into the top plate, then face-nail through the truss into the bottom part of every block — the end that so far has only that top toe-nail in it.

On most roofs, the process requires two crew members, one on each wall, working their way down the top plates installing the blocking as they go. A single crew member can finish up the ridge blocks once the ends are secure. (On a narrow span, one person can do the whole blocking job, working first one plate then the other; on a big span, you might have a third person at the

Sniffing Out Trouble

Even more than with conventional framing, the accuracy and ease of framing a truss roof depends largely on the precision of the foundation sub and wall framing crews. Whether you frame the walls yourself or a separate crew frames walls to make way for the truss crew (as is common on tract jobs), it's vital that both the foundation and the walls have the dimensions called for in the plans. Otherwise, you'll find yourself faced with one of the following problems.

Slab out of square or wrong dimension. If the slab is out of square or — worse — of the wrong dimensions, the wall framers may not frame the exterior bearing walls at the proper spans. If this happens you've got big trouble, because you generally can't rest a truss more than an inch to the outside or more than a couple of inches to the inside of its intended bearing point without greatly compromising its structural integrity.

We did one job where the foundation sub had badly misread the plans and poured the slab almost a foot too narrow — after the trusses had been ordered. The solution? The wall framers cantilevered the wall plates out past the foundation, after which a foundation sub was called in to pour new footings beneath the walls.

Interior partition walls too high. If the framers build interior partitions too high, or if the slab is poured with a hump in the middle, the top plates of interior walls might be higher than the top plates of the exterior bearing walls. The result is that the trusses won't bear properly, and will therefore be structurally unsound. They'll also exert a downward pressure on the interior wall, which will crack the finished drywall, and might even crack the slab beneath the wall.

Don't try to remedy this situation by forcing the ends of the trusses down to the exterior wall, then nailing the dickens out of them. Those truss ends will be constantly pulling upward and may someday pull the exterior wall or the roof out of line. Instead, build up the exterior wall plates to the same elevation.

The smart way to avoid this problem is to frame any interior walls that run parallel to the exterior walls intentionally short by using framing-quality 1x4s for their top plates. This leaves you enough leeway to duck under most out-of-level mistakes. (But leave the other walls — those running perpendicular to the bearing walls — at full height, so you'll have something to nail the ceiling backing to.)

— M.C.

ridge fastening the ridge blocks as the job proceeds.)

It's smart to decide first which wall will be the "reference wall" — the wall that will serve to determine whether the trusses are properly set, end-to-end. It's vital that you consistently use one wall for this, rather than switch back and forth, or you'll end up with overhangs and a ridge that wander back and forth. Pick the wall with the straightest top plate.

We don't lay out and mark the walls in any way; we just use the blocking to get the proper spacing. We always work with our backs to the end we're working from, and we always nail back *toward* the work already in place, so that we're constantly snugging everything up.

Keep Your Mind Focused

Truss roofs let you get real momentum going, which is the key to their efficiency — but also their greatest danger. Precisely because the roof is going up so quickly, you can get in bad trouble if you let your mind just go along for the ride.

I once saw a foreman on a large job try to go too fast and end with near disaster. It was a huge building, about 60 feet wide and nearly 400 feet long, requiring some 200 trusses. This foreman, who had about a dozen men on the roof, seemed determined to do the whole job before lunch. He had his guys leapfrogging from one truss to the next: block, tip, nail, block, tip, nail. The sound of nailing was incessant.

It wasn't until they had about 75 trusses up that someone noticed the trusses seemed to be leaning a bit and thought to pull out a tape. A quick measurement revealed that the trusses were 24 inches on-center along the bearing walls, but *not* along the ridge. The problem? The gangplates joining the top webs at the peak were not quite flush, and the added thickness had caused an error to accumulate. By the time the crew noticed, the trusses were leaning about 3 inches out of plumb — not much on a 60-foot-wide truss, but enough to make it structurally unsound. To fix the problem, the crew had to rip out every fourth ridge block, shave a bit off the end, and then get the block back in. (They didn't finish by lunch.)

The first lesson of this story is obvious: Measure as you go along. I make it standard practice to measure both bearing points and peaks every three or four trusses. If you're off a little at that point, it'll only be 1/8 or 1/4 inch; you'll still be basically plumb, and the roof sheathers and drywallers will still hit something solid every 24 inches. To correct things, all you need to do is take the 1/8 or 1/4 inch off the next block.

The larger moral of the story, however, is not to let your mind go to sleep just because your body is doing a routine, repetitive task. The beauty of trusses is that they "automate" the framing process. But they can't automate your thinking process. You have to know where everything is, think ahead to the next step, and constantly make sure that everything is square, plumb, and on-center. ■

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