Creating a Safety Program

After a visit from OSHA, a design-build contractor learns how to do things by the book

by Andrew DiGiammo

Until a few years ago, I — like most builders and remodelers — didn't give safety on the job a whole lot of thought. But then I got a call from my job-site foreman that changed everything. "You better get down here," he said. "OSHA's here."

In hindsight, OSHA's visit shouldn't have been a surprise. We were working on a multifamily project, a series of townhomes in a busy part of town. And we were setting trusses with a crane. Any inspector could have seen from half a mile away that there was dangerous work in progress. Even so, we weren't ready.

First the inspector asked to speak to whoever was in charge of safety — the designated "responsible person." My crew just stared at him, dumbfounded. We had no such person on site. Next he asked to see our written safety plan. We didn't have one of those, either. Then he walked around the site looking for violations. Those were easy to find, because we were setting trusses without following OSHA's rules for that activity. But he also found other, less obvious violations.

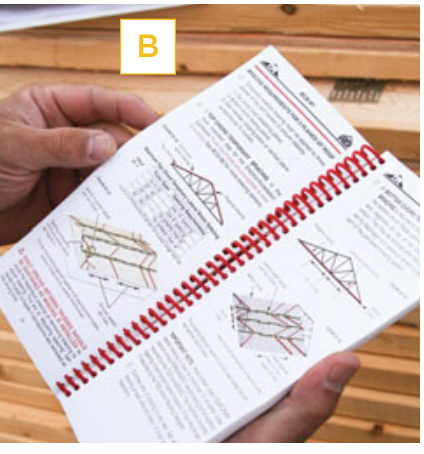
It's tempting to think that inspectors are just trying to rack up citations for every possible thing that might be wrong on your site. In truth, their goal is to get you to change your policies and practices — to put someone in charge of safety, to create a written safety plan, to really satisfy all the safety requirements, especially the ones designed to prevent serious injuries like falls and electrocutions. The citations they write are supposed to get your attention. And in our case, they did.

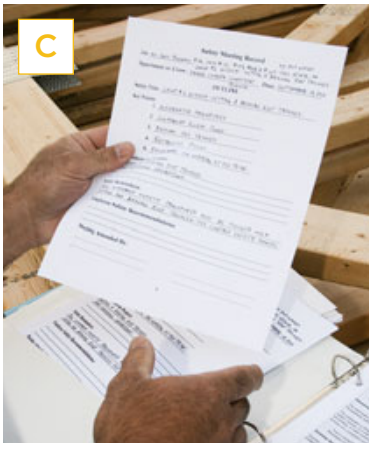
I was cited for not having my workers trained in safe practices — a "serious violation" with a $2,000 fine. I was also cited for not properly bracing the trusses and for putting my workers at risk of falling from the trusses — two more $2,000 fines. We also got popped for using stepladders "for purposes they were not designed for." And we were fined for unprotected openings (such as a 1-foot-wide hole in the concrete slab floor), improper electrical cords, and tripping hazards.

All of these violations would be easy to find on just about any residential job. So if you're a typical residential contractor and OSHA shows up on your site, you'll probably get socked in roughly the same way.

An Informal Hearing

Taken together, the fines added up to $9,600. But OSHA gives first-time offenders the opportunity to come into the agency's office and informally resolve the complaint. So after I received the official paperwork in the mail, I went to the office in Braintree, Mass., and sat down with an OSHA official in his office, one on one. The meeting was not confrontational at all — the official was friendly, even supportive. I didn't get the feeling that OSHA was interested in punishing me, as long as I cooperated and agreed to bring my company into line with the rules. I was able to settle the violations for a $4,700 fine (less than half the original amount). And the agency let me set up a payment plan, so I didn't have to pay everything at once.





At sunrise, the author meets with his foreman and crew to discuss safety practices for the day's roof framing process (A). The plan includes methods explained in a Wood Truss Council of America training pamphlet (B). To help focus the talk, the author brings a simple outline handout for each crew member (C).

What I did have to do immediately was create a written safety plan. OSHA had let me know beforehand that my meeting would go better if I showed up with a written plan in hand, so I had purchased a generic one on the Internet and customized it with some of my company's details. That's the plan I still use today. Even though it's boilerplate, I've found it to be practical and useful for training my crew and planning out the methods we use on any particular task.

The safety plan is a fat document — almost 400 pages. But my employees don't have to read and study the whole thing in one go. Short individual chapters and sections cover the basics of various operations on the job. So the day before we're framing walls, for instance, or setting trusses, I can say, "Take a look at such-and-such a chapter this afternoon, and we're going to talk about it in the morning." It's been an effective way to keep everybody aware of the rules.

Getting Into Compliance

The written plan was step one. Training — for myself, my foreman, and my crew — was step two. OSHA requires that you formally designate one person to be responsible for managing safety at your company. Big companies should have somebody on staff whose only task is to make sure safety is in order. Small residential companies who barely have the cash to make payroll can't afford a dedicated safety officer, but someone has to step up and fill that role. In my company, that person is me. You also have to have a "competent person" at every job site who knows the safety rules and is familiar with the written plan. My foreman, Frank Camara, is the "competent person" on most of our sites, though one of my other supervisors, Peter LaTour, can also fill that role.

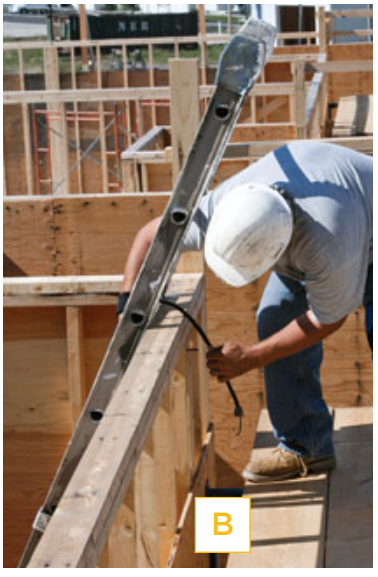
The "competent person" has to take a 10-hour formal training class from a qualified OSHA-accredited trainer. But I decided to go a step further and send most of my staff to the class. Now most of my employees carry a card in their wallets certifying that they've been trained in safety practices. Next time an OSHA inspector shows up, they'll be able to show not only their copies of our safety plan, but training cards as well.

Beyond the training and the organizational adjustments, I had to invest in some equipment. I spent some money on scaffolding, including outrigger staging like that shown at the top of the facing page.

I also bought personal protective equipment for my workers. Each employee has a "safety bag" containing the important gear: a hard hat, goggles, gloves, hearing protection, and a fall-protection harness. Workers keep their copies of the safety plan in this bag, too.

Creating a Safety Program

I'm not going to try to describe all the safety rules contained in the 10-hour OSHA course, or all the items covered in our written plan. You should take the course yourself, and you need your own written plan. But I do want to explain how we now handle safety in the situation we first got busted for: setting trusses. This fall, we happened to be framing a roof on the same development where I was previously cited for violations. So we had a chance to do everything right that we had been doing wrong the day we got in trouble with OSHA. The photos in this story are from that day's work, with our full safety plan in place.



Previously, the author paid thousands of dollars in OSHA fines for fall-protection violations on this job site, because his crew was walking the top plates to set trusses and accessing the plate using stepladders. Now the crew sets up OSHA-compliant scaffolding with railings and toeboards at the building eaves (A) and uses extension ladders to access the staging (B). At inside corners, the author uses the building's side walls to support the staging planks (C).

Special Rules for Residential

Back in the 1990s, during a boom in home building, OSHA started to increase its enforcement activity on residential sites. But when the agency got a lot of negative feedback from home builders, it ended up admitting that the rules for industrial or commercial sites didn't really make sense for house framing. So it developed some rules just for residential framing — in particular for the type of work where scaffolding or fall-protection harnesses are not practical.

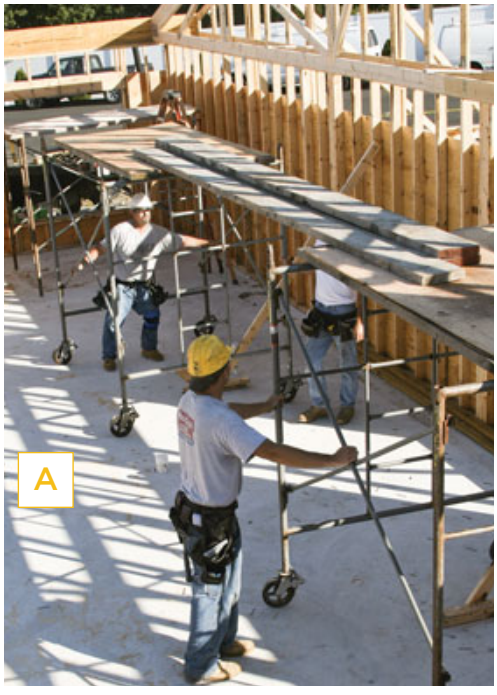
Setting trusses is one example of this kind of work. You can't use a fall-protection harness, because there's nothing to tie off to. You can't really use a scaffold for most of the work, either, because it would get in the way of the trusses. And some carpenters will have to climb up on the trusses to install spacers and bracing before the trusses themselves are stable. OSHA calls this "leading edge" work; other examples are sheathing a roof or floor frame and standing second-story walls.

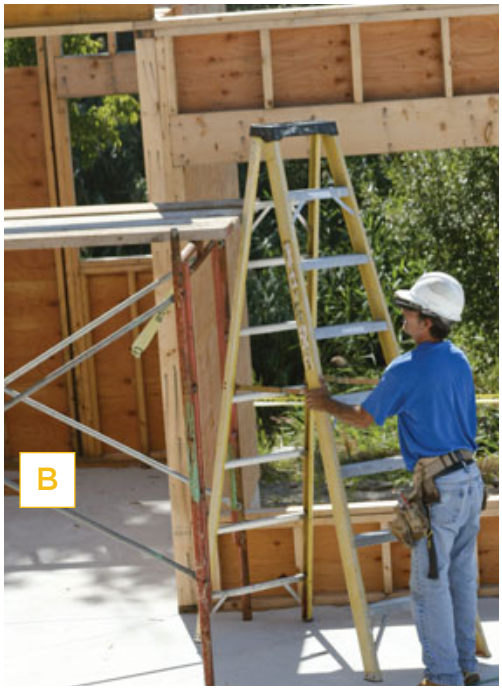
So, rather than insist on traditional scaffolding and tie-off rules for these activities, OSHA allows builders to use alternative safe practices — methods that rely on planning, supervision, and organization. You still have to have a written safety plan in place, with a designated "competent person" in charge on site. But how you set the trusses — the exact process that you use — is your responsibility.

Morning Meeting

On the day the crew was setting trusses, I held a safety meeting first thing to explain our methods for that site, that day. This meeting is not just a formality — I can't stress enough the practical importance of the morning safety briefing. It's especially crucial in a case like this, where you can't rely on conventional methods to ensure your workers' safety. If you put a bunch of guys out on the job who don't have a big-picture awareness of the project as a whole, they won't appreciate the serious danger posed by a 300-pound truss swinging over their heads and coming into place, or the risk associated with stacking a series of unstable trusses on the walls. I need every member of the crew to understand both his own purpose and the overall significance of the day's activities. Too often on residential sites, this kind of knowledge is lacking.

At our meeting, each crew member got a copy of notes I'd written up in the form of an outline. I'd actually prepared a more extensive handout, but my computer had crashed the night before and I couldn't print, so I quickly photocopied some blank





Fall-protection harnesses and industrial scaffolding are not practical when setting roof trusses. For workers assigned to the center of the trusses, the crew sets up rolling pipe staging to move along with the framing operation (A). Step-ladders are the most practical way to access this staging (B).

meeting forms and entered in my main points by hand. That was good enough for our purposes.

Of course I could remember what I needed to discuss without any notes, but they served as documentation: I had the men sign their copies and pass them in to show they were present at the meeting. That way, if someone got injured and OSHA asked me, "Was that guy briefed?" I would be able to prove that yes, he was.

The outline also helped the guys stay on the same page with me as I conducted my talk. It highlighted the main points of our safety plan for that day:

- Alternative procedures
- Controlled access zones
- Bracing the trusses
- Restricted duties
- Procedures for working at the peak

So let's go over what I talked about.

Alternative Procedures

I started off by reminding everyone that the safety rules we always practice were still in effect. We have standard operating procedures for ladder safety and cord safety, for making sure there are no holes in the deck that someone could trip on or fall into, for keeping the site cleaned up, and so forth. The crew knows these rules because they're in our safety manual and we've discussed them at previous meetings.

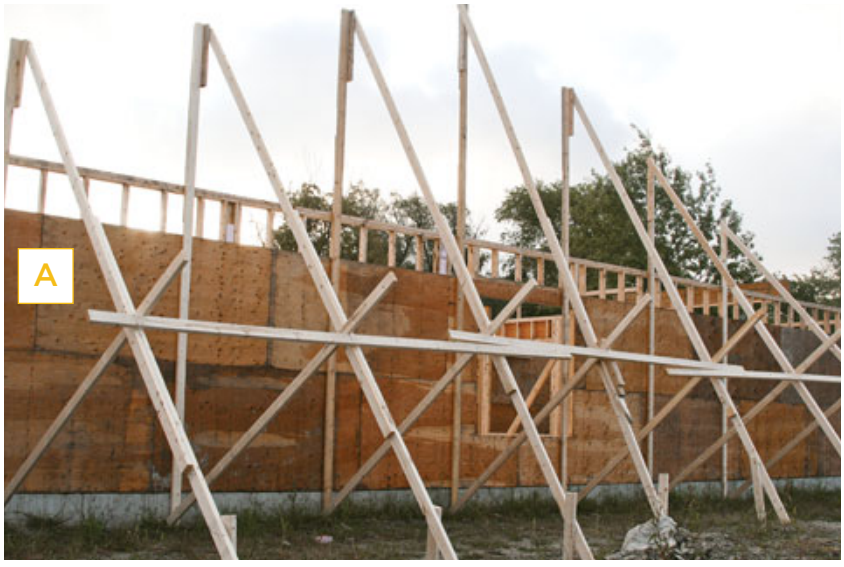
Since we had set up scaffolding — complete with railings supported by outriggers — along the building's outside walls, the men working at the ends of the trusses would be covered by our standard safety program. But we needed alternative procedures for the men working the peaks of the trusses, and these were methods I had devised for this particular situation. I stressed to the guys that understanding and sticking to this plan — even though it wasn't in our printed safety manual — was critical to everybody's safety that day. The actual components of the plan were the other four items in my outline.

Controlled Access Zone

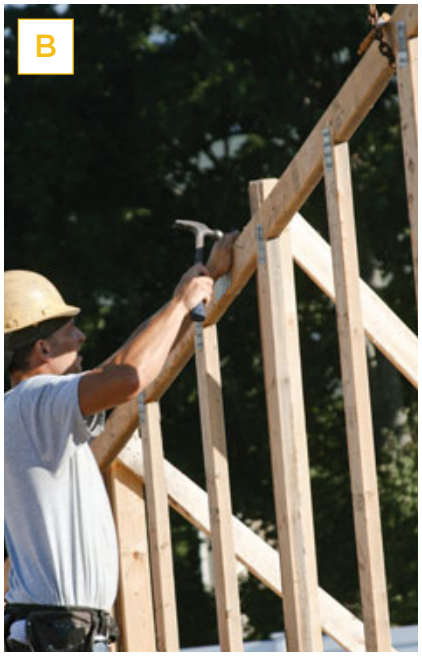
The CAZ — as it's usually called — is especially important on a job like this. We mark the area with caution tape and put up "Keep Out" signs. This keeps random people from being exposed to the hazard of the trusses swinging overhead or to the risk that the whole set of trusses could topple before they're braced. We don't want curious homeowners wandering into the danger zone to see what's going on, or subs moving around on their own business. We keep everyone out who's not involved in the work.

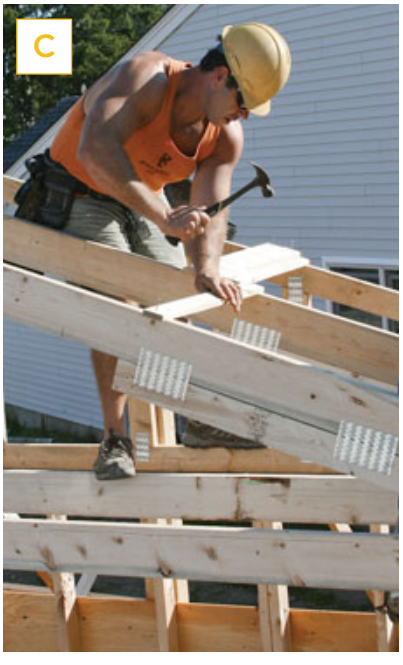
The "competent person" (Frank) is responsible for controlling access to the zone; nobody can enter the CAZ without his permission. Furthermore, nobody can enter it without being briefed by either me or Frank on his specific job inside that zone, and on the special risks present there. Also, anyone entering the CAZ has to be equipped with a hard hat and any other protective gear needed for the work.

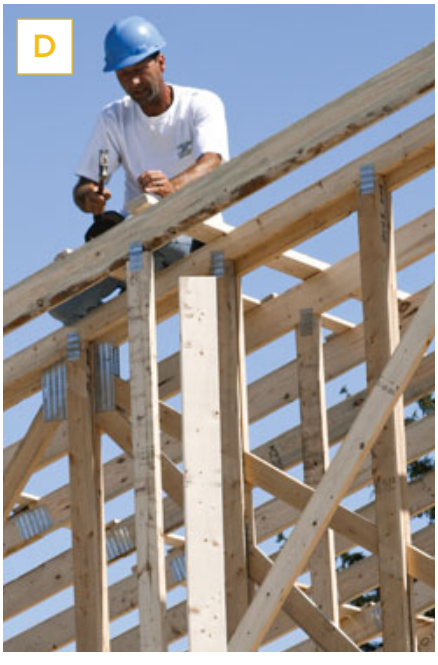
The caution tape and signs also help to keep the crew alert and focused on getting the job done efficiently and safely. That's the whole point of alternative procedures: Since you aren't protected by a passive measure like a railing or harness, you have to use



Workers framing roofs with trusses have been injured and killed by the domino-like collapse that can occur when one truss leans against the next and the whole set topples. To prevent this from happening, the author's crew has already set up a series of vertical supports and an array of diagonal braces that run back to the ground at the gable end (A). The gable truss is nailed to these braces as soon as it's set (B). Precut 1x2 spacers 24 inches long are nailed between trusses as each truss is set (C), then temporary structural bracing is nailed across the top chords (D).







active measures that emphasize alertness, attention, and understanding of the process.

Restricted Duties

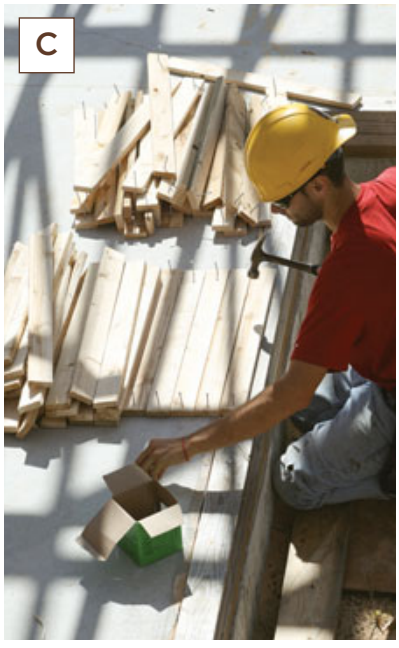
Part of my function as owner and safety officer is to figure out each day which crew member should be placed where. And then, as I mentioned earlier, each person is briefed on his particular role. On this day, I placed John Muncy on the ground, outside the walls. John is actually my painter, so I don't need him swinging a hammer. But he pays attention to detail, so his job was to hitch the trusses to the spreader bar, man the control rope, and work signals with the crane operator.

(As this article was going to press, OSHA released a new rule that requires training and testing for the "signal person" and "qualified rigger" in crane operations. Although my crew members appear to be in compliance, I may need to update my procedures — by giving everyone a written quiz to document their understanding of crane procedures, for instance.)

I put brothers Rick and Roger Conlon at the two outside walls, working the ends of the trusses from the OSHA-compliant staging. It's helpful to have a guy at each end; I've seen projects where a single carpenter has to deal with both wall plates, and it's slow and tiring as well as dangerous for one person to have to continually climb up and down and run back and forth. With two men, each has a stable platform to work from and neither has to do a lot of climbing up and down.

I placed Carlos Saraiva on the deck inside the walls, where he could cut and pre-nail spacers to go between the trusses and also supply everyone on the staging and trusses with spacers, bracing, nails, and anything else they might need. That way, nobody

Staging a Truss Job



To eliminate any hazard to people not involved in the roof framing work, the crew marks out a controlled access zone (A); the crew foreman, as the designated "competent person" for the site, decides who is or is not permitted to enter this marked-off area.

So that work progresses both safely and efficiently, each crew member is assigned a specific task and workstation in accordance with the company's safety plan for truss framing. A worker on the ground is assigned the task of hooking trusses up to the crane spreader bar (B). Another ground-level worker prepares spacers and bracing material (C) and keeps the other carpenters supplied with nails and anything else they need. At midlevel, a carpenter is assigned to each wall plate, working from outrigger staging set up on the outside walls (D, next page) or from rolling pipe staging on the deck. Also at midlevel, in the center of the truss span, a carpenter works from the rolling staging, installing spacers and bracing on the lower truss chords and helping to pass material to the carpenters assigned to work at the top of the trusses (E, next page). Finally, two skilled carpenters handle the "leading edge" work at the top of the trusses, installing spacers and bracing and unhooking each truss from the crane after it is set (F, next page).

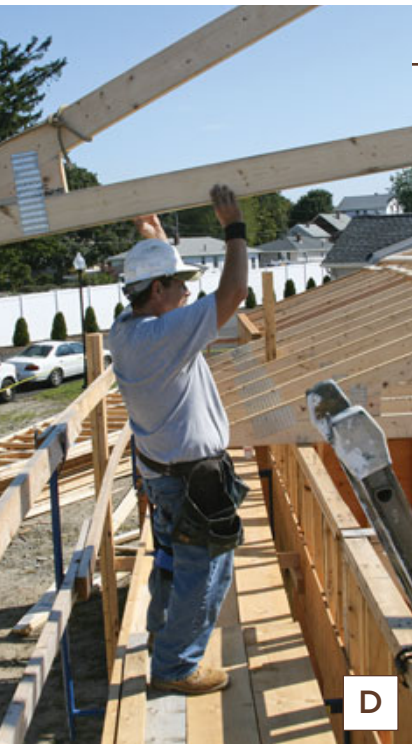
would have to climb up and down to fetch anything, which greatly reduced the risk of falling. Also, by keeping everyone supplied, Carlos helped keep the whole job flowing smoothly — and the crew definitely kept him busy.

I put Eric Dougherty at the center of the trusses on 6-foot-high rolling staging, installing spacers and bracing for that part of the trusses and feeding supplies to the carpenters at the peak — again, to reduce the risk to the guys up top.

At the peak, I stationed two of my best carpenters — foreman Frank, the "competent person," and Peter LaTour. Peter is actually a qualified supervisor himself — I had brought him over from another job for that day's framing, and if Frank had been out for some reason, Peter could have run the job.

It's important to have highly skilled and responsible people working the peak. Those carpenters have to walk on the trusses before the complete bracing system is installed, and they need to know what they're doing. Sometimes you'll see only one person at the peak, but this is another place where I'm more comfortable with two. There's much less climbing around and the trusses are stabilized sooner, reducing the time everyone is exposed to unbraced framing.

By making sure that everyone is assigned to a specific limited task, I make it easy for each person to focus on his own work and his own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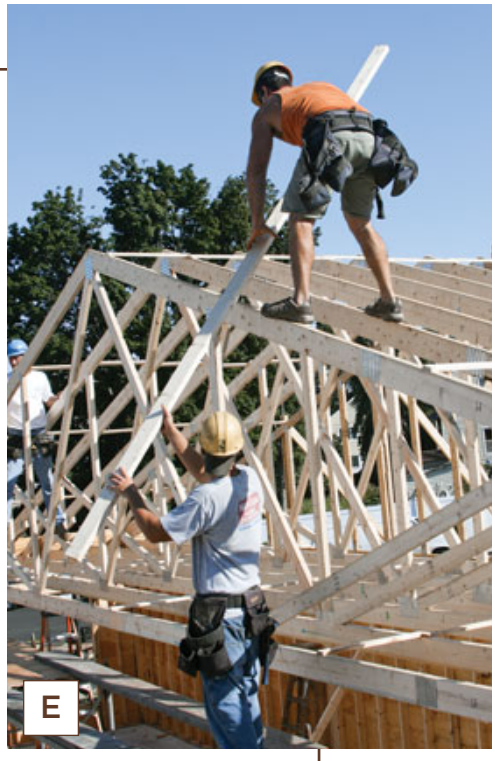
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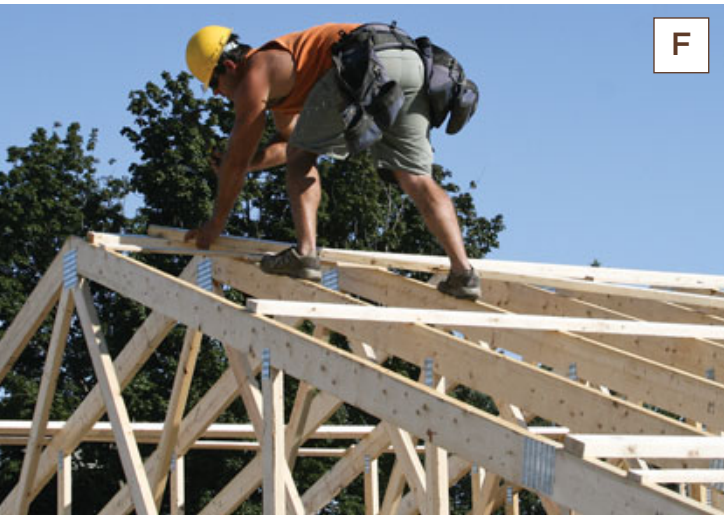
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safety. If for some reason we need to switch a worker to a different task — for instance, if someone has to leave and we need a replacement — we brief that person on his new role before he begins.

Truss Bracing

Effective bracing is key to safety on a roof truss job. I had worked out a general concept of bracing for that day's job, and at the meeting I made sure everyone understood it. Not only is it important for workers to know their own tasks; I want each carpenter to understand how his assignment relates to the overall concept. If everybody understands what we are trying to achieve, the whole crew can recognize and prevent any problems that might arise.

Any truss roof needs permanent bracing as part of the structure — bracing that will remain in place in service. For the top surface of the roof, the sheathing serves that purpose, and for the lower chords that make up the ceiling of the room below, the drywall may suffice (although there is usually some 2x4 bracing installed across those lower chords for added strength). In addition, most truss roofs have bracing nailed across the web chords at specified locations. All of that is part of the engineered strength of the truss roof — the system that allows trusses to serve as a strong structure, using less material than a rafter-framed roof to achieve equivalent or greater structural capacity.

But during construction, before all those stiffening elements are in place, the trusses are unstable. OSHA's concern is that while workers are up on the trusses, applying force with their weight and their movement, something may cause the whole stack to collapse like a row of dominoes — and that can kill or injure several people at once. Those accidents are more common than you might think. It has never happened on my job, but I'm aware that it's a major risk.

So we try to get temporary bracing in place as soon as possible, to stabilize the whole system in the same way that the permanent bracing will stabilize it later. Until we get that temporary bracing in place, though, we're vulnerable. Our goal is to shrink this window of vulnerability. It's my job to plan the whole temporary bracing system in advance and to teach it to my supervisor and crew.

I based our system on guidelines in a 2003 pamphlet from the Wood Truss Council of America, "Building Component Safety Information" (BCSI 1-03), which costs $10 at amazon.com. You can also get an updated version, in print or as a PDF file, from the Structural Building Components Association, at sbcindustry.com/bcsi.php.

The first step is bracing the gable-end truss; unless the gable trusses are firmly secured, the braces on the rest of the trusses won't be fully effective. We first install vertical struts aligned with the locations where the rooftop bracing will be set, then run long 2x4 braces from the tops of the verticals diagonally back to stakes in the ground. These diagonals are themselves cross-braced and braced back to the foundation with additional diagonals. All of this takes several hours, so we do it the day before setting the trusses. On the day we set the trusses, we set the gable-end truss first and secure it to the uprights in the bracing system. That anchors the entire roof system back to solid ground.

As soon as four to six trusses are in place, the crew runs temporary 2x4 bracing in three planes: one set of braces across the top chords, where the sheathing will go later; one set along the horizontal plane of the bottom chords; and one along the interior web chords. Once the bracing is in place, the roof system is rock-solid and it's safe for workers to get on the roof to install the plywood sheathing.

Procedures for Working at the Peak

Two carpenters have to move up and down along the top chords of the trusses, setting spacers, installing bracing, and unhooking the crane. And they have to do this work before the whole system is fully braced. They're in a risky position, especially at the beginning; there is no way to tie them off to anything, or to give them a conventional scaffold to work from.

To make this work safer, we stabilize the trusses as much as possible before the men climb on them. As each truss is placed, the crew attaches 2-foot spacers to set the truss spacing. But those spacers are not bracing — they're not strong enough to provide adequate structural stability. Still, they add some stability, and we get them in place before unhooking the crane. As soon as enough trusses are in place to provide room for the temporary structural braces, the crew sets those braces, working from the bottom up.

Also, on this job, we set up rolling pipe staging with plywood and plank platforms below the work area. The plan was to move this staging along as the work progressed, so that it would remain below the leading edge and provide a midheight platform to break the fall of anybody who slipped. Since it was only 6 feet off the ground, the rules did not require railings for it — which is good, because railings would have gotten in the way of the trusses. The rolling staging also provided a midheight work platform for Eric, so he could pass materials to the guys at the peak and assist them in any other way they needed.

Cost-Effectiveness

I'm sure that if he wanted to, an OSHA inspector could find one or another minor technical flaw in our safety program on this roof framing job. That day's work doesn't represent perfection. But it is what I call a "perfect try." And we have put in place what OSHA asked us to: a written safety plan, a chain of responsibility, a good-faith effort to comply with the rules, and our best attempt at safe practices. I'd be comfortable if someone showed up to inspect any our sites, and I would have no trouble explaining why we proceed as we do.

A good safety program is about more than equipment, and it's about more than rules. It has to do with *awareness:* Safety should be actively managed in the same way that every other aspect of a project is managed. This requires skill. At my company, having a capable and intelligent foreman like Frank has been a real plus. Frank has a talent for organizing the work on site, and he knows how to manage the crew's activities as well as his own movements. He never seems to be rushing, yet the work always moves at a good pace. On our sites, organizing for safety seems to dovetail with organizing for productivity.

People sometimes complain about the cost of OSHA compliance on the job. And it's true that this stuff does cost money. I've invested thousands of dollars in safety harnesses, scaffolding, and the like. The temporary bracing alone on this job cost me hundreds of dollars in materials.

But you also have to consider the payback. This was a very efficient framing job — there was nothing haphazard about it. The meeting at the beginning of the day helped to focus the crew members' minds and got them all on the same page. The scaffolding at the ends of the trusses and the rolling staging in the middle took a while to set up, but in the long run they saved us time and money. For instance, hitting the minimum time I had budgeted for having the crane on site saved me $500 — the very least I would have had to pay to bring it back for a second day.

Also, keep in mind that the scaffolding at the eaves served multiple phases of the work. The roofers could work from it when they applied their first courses of shingles, and the trim carpenters could work from it when they ran soffit and fascia. The comfort of working on a secure platform really improves our efficiency, especially when we're working two or more stories off the ground. A lot of jobs go faster when you have good scaffolding.

And then, of course, you have to back out the cost of injuries. I've had guys hurt on the job before, and even a relatively minor injury carries a significant cost. I get hit with increased comp premiums, and I have the cost of replacing that worker while he's out of work. Why not spend that money up front on safety training and equipment?

And there's one other way my company has benefitted from having a good safety program. During this recession, I've branched out into commercial work. In the commercial world, safety plans and OSHA inspections are a given. Having a squared-away safety program has helped me compete in that market as a professional.

So on balance, even though we were initially forced into compliance because of an OSHA inspection, I believe that developing a good safety program has been extremely beneficial to my company in all sorts of ways.

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