

# Gang-Cutting RAFTERS

Specialized tools and  
production techniques  
make for much faster  
roof cutting

In the '60s and '70s, California tract builders were all gang-cutting their rafters. Since then, trusses have taken over in that market, and production cutting has become a dying art. Yet in many areas, carpenters continue to stick-frame roofs, and it's surprising how many of them cut rafters one piece at a time. Unlike most carpenters who gang-cut rafters, I did not learn this technique on the West Coast. About 20 years ago I got a job working for a builder on Cape Cod and he production-cut all his roofs. I eventually moved back to eastern Pennsylvania and became a framing contractor, where I continue to gang-cut my roofs.

It doesn't matter whether there are 20 or 200 rafters to cut: It's always faster to gang them together and cut them all at once. When I frame a roof, the actual cutting time for the rafters is usually less than 15 minutes. This doesn't include layout or stacking the lumber on racks, but I'd be laying out the cuts and stacking the material on sawhorses anyway. To help with the heavy work, we use an all-terrain forklift. Once the rafters are cut, we lift them to the roof all at once.

by John Harman





**Figure 1.** The rafters are supported by a pair of simple racks and are kept upright by the triangular blocks at the ends.



**Figure 2.** Layout is done on the outer pieces (right), and a chalk line is used to transfer the cut lines to the pieces in between (below).



## Setting Up

The first thing we do is build a set of temporary racks. They don't have to be elaborate, just sturdy and stable. I take a couple of 2x10s or 2x12s and brace the ends so they won't roll over (see Figure 1). It takes less than a minute to build a set of racks. We build them low because they're more stable that way and it's a comfortable height to cut from. It's easier if you put the racks on a level surface, but they don't have to be perfectly level. The racks can run slightly up or down hill. The important thing is for the top edges to be in the same plane.

The racks are usually about 14 feet long, but I'll make them longer if there are a lot of rafters to cut. Long racks can get kind of shaky under a heavy load of lumber, so if there are enough rafters I'll put a third rack under the middle of the stack.

**Racking.** Putting the lumber on the racks is called racking. To save time, I rack the entire roof package at once. This includes commons plus hip and valley jacks. It doesn't matter if the rafters are more than one length; they can still be in the same rack. One rack should be within a foot or so of the head cut and the other should be under the seat cut. If there are enough different lengths, we may build an intermediate rack to support one end of the shorter pieces. We could use a different set of racks for the shorter rafters, but there isn't always space to do it and it would require us to lay out an extra set of cuts. It's usually easier to do everything at once.

Since the birdsmouth is on the bottom of the rafter, we rack them with the crown side down. It's very important to stack the rafters tight; I use a hammer to beat them together. If the rafters are exposed, we'll use a piece of scrap to protect them from dents. We nail blocks to both ends of

the racks to keep the rafters together. The blocks are shorter than the rafters so they won't interfere with the saw.

### Laying Out the Cuts

As with any roof-cutting project, there's a certain amount of prep work involved. I figure out all the cuts at home the night before I cut the roof. That way I don't waste time on the job or get distracted and make a mistake that ruins a whole pile of lumber. The last thing I want is to tell a builder to order 100 more 2x10s because I cut all the rafters 9 inches short.

However you figure the lengths, you have to put the cut lines on the bottom of the rafters. It's like working upside down, so it takes some getting used to. I mark the head cuts, seat cuts, and tail cuts on the two outside rafters and use a chalk line to transfer the marks to the rafters in between (Figure 2, previous page). I mark the head first, then determine rafter length and the seat cut from there.

Rafters of more than one length and for more than one roof pitch can be stacked in the same rack. I use 12-inch spacer blocks to separate different groups of rafters on the rack (Figure 3). This speeds the process because it allows us to fill the racks and get more cutting done in each setup. This also allows us to make the same cuts on one end but different cuts on the others.

### Production Cutting

The idea behind this method is to run the saw through all the rafters in a single pass. We do the head cuts first, the tail cuts second, and the birdsmouths third. Circular saws do not have the depth of cut to gang-cut the heads and tails. Instead, we use an adjustable table attachment on a chainsaw to make the long straight cuts (Figure 4).



**Figure 3.** Twelve-inch spacer blocks separate groups of rafters on the racks so that different cuts can be made, increasing the efficiency of both the stacking and cutting operations.



**Figure 4.** A chainsaw has enough depth of cut to cut heads and tails in a single pass. This saw is attached to a custom-made shoe; an off-the-shelf model is available from Big Foot Tools.



**Figure 5.** A swing-table saw makes possible the steep angles required for birdsmouths. Here, the birdsmouths on 50 rafters are made with just two long cuts.



**Figure 6.** Here, the author uses a custom-made dado saw to hog out birdsmouths in a single pass.

We always make the head cuts first. That way we can recut them if the angle is a little bit off. A 2x4 nailed to the top of the rafters makes a good fence for the saw. We usually cut the tails before doing the seat and heel cuts because there's nowhere to nail the fence if the birdsmouths are already made.

We use a slow, smooth cutting action and let the saw do the work. The table should be held tight to the top of the rafters. If one side of the table comes off the work, the pitch will be wrong and there will be gaps where the rafter hits the ridge. A good coating of silicone spray on all chains, blades, and tables reduces friction and keeps blades sharper longer.

**Birdsmouth.** The birdsmouth is the last thing we cut before uncracking the rafters. If the roof pitch is steeper than 6/12, I'll remove the triangular piece of waste material by making a pair of bevel cuts with worm-drive saws. I'll set up a standard saw for the heel cut and another one with an oversized blade and a swing cut table for the seat cut. The swing table is necessary because a conventional saw will not bevel more

than 50 degrees, and seat cuts are often much steeper than that (Figure 5). For example, the seat cut for a 6-pitch roof is 63.5 degrees. The swing cut saw I use takes a 10<sup>1</sup>/<sub>4</sub>-inch blade and will cut up to a 75-degree bevel.

If the roof is 6/12 or less I use a dado saw to cut the birdsmouth in a single pass (Figure 6). I don't use it if the roof is steeper because the cut will be so deep that it would strain the saw to make it in a single pass.

At one time you could buy a kit that allowed you to put dado blades on a worm-drive saw. No one has sold anything like this for years. I got a local machine shop to take a standard worm-drive and turn it into a dado saw. It's not worth doing unless you make your living cutting roofs. It's cheaper, safer, and only a little slower to make all the seat cuts using a swing table.

## Hip and Valley Jacks

There are different ways to gang-cut hip and valley jacks. How I do it depends on the combination of parts I need. Most of the houses I frame have both hips and valleys. I gang-cut the fill as common rafters and then cut a

## Rafter Cutting Tools

A standard circular saw will do for some ganged cuts, but you'll need specialized saws to make the others. The head and tail cuts are too deep to make with a circular blade. The only way to make them is with some kind of chainsaw. If you're going to production-cut the birdsmouths, you'll need a circular saw that bevels more than normal and has an oversized blade.

**Cutting with a chain.** At one time I used a Prazi Beam Cutter (Prazi USA; 800/262-0211; [www.praziusa.com](http://www.praziusa.com)), a \$140 chainsaw attachment that bolts on to a circular saw (see photo). I haven't used it, but a similar product is available from Muskegon Power Tool (Linear Link VCS-12; 800/635-5465; [www.linearlink.com](http://www.linearlink.com)). I rarely use a Beam Cutter anymore because the chain comes up through the work and splinters the layout line. These days I use a gas-powered chainsaw with a specialized shoe and beveling attachment. I cut with the top of the bar; that way, the line remains intact and the chips and dust go down instead of up in my face.

A friend of mine uses a \$265 off-the-

shelf attachment called the Headcutter (Big Foot Tools; 702/565-9954; [www.bigfootsaws.com](http://www.bigfootsaws.com)). I had a local welder custom-fabricate a similar device out of aluminum for me. The Headcutter bolts onto the bar of the chainsaw. The attachment I use is more stable because it bolts right through the bar of the saw.

**Specialized circular saw.** Another tool that's necessary for gang-cutting rafters is

10<sup>1</sup>/<sub>4</sub>-inch swing-table kit costs about \$300 and fits Skil and Bosch bodies. You can buy a complete saw with swing table and guard for between \$425 and \$525, depending on which body you choose. Big Foot also makes a 14-inch model called the Big Boy, which comes with a 72-degree swing table and costs around \$800. It's available with a Bosch body.



A Prazi Beam Cutter can be attached to a standard worm-drive saw. This one is being used to make tail cuts. The saw pulls the blade up through the work, which is why there are so many chips piled on top.

a swing-table saw. It consists of a standard worm-drive body equipped with an oversized blade and specialized base. The blade increases the depth of cut, and the base tilts well beyond the usual 45 or 50 degrees so you can make the steep bevel cuts required for birdsmouths.

Big Foot makes swing tables and swing-table saws. Their 75-degree

Pairis Products (760/868-0973; [www.bestconstructiontools.com](http://www.bestconstructiontools.com)) sells a swing table that can be added to an existing saw.

Some of my saws have been rewired to run on 220 volts. It gives us a little more cutting power because there's less voltage drop at the end of a long extension cord.

— J.H.

hip jack and valley jack out of each one. The bevel cuts are made one at a time but taking the pieces out of commons allows me to gang-cut the heads and tails.

**Hip jacks first.** There are usually more hips than valleys, so it's necessary to cut more hip jacks than valley jacks. When I need extra hip jacks, I'll make tail cuts on both ends of some boards and cut two hip jacks out of each one. The birdsmouths are cut from above, so they have to face up on both ends of the boards (Figure 7). The bevel cuts are made one at a time with a worm-drive saw. It takes two cuts and there will be a small piece of waste from the middle of the board.



**Figure 7.** Hip and valley jacks are usually cut from commons. In this case, the author only needs hip jacks, so he has put tails on both ends and will get two hip jacks out of each board.



**Figure 8.** Hip jacks are laid out in pairs, lefts and rights (left). In the photo at right, the three shortest pairs for two hips have been marked. The offcuts will be long enough to produce the next three pairs.



**Figure 9.** The bevel is ready to be cut on this pair of hip jacks. The birdsmouths have already been cut on the other end.

**Valley jacks only.** It's rare around here, but sometimes a roof will have commons and valleys but no hips. In that case, I will gang-cut heads on both ends of some boards and get two valley jacks out of each one. If you figure the overall length correctly and make the head cuts parallel to each other, you can get two valley jacks with only a single bevel cut and no waste in between. The other way to do it is to use two bevel cuts to get the valley jacks and make the head cuts closer to the ends.

**Layout tips.** It's easy to lose track of which hip and valley jacks have already been cut. To avoid this problem, I lay out all the bevel cuts while the boards are still in the rack. That way I can look at the pile and see if all the pieces are there.

For example, if there are two hips, there will be four of the shortest hip jacks, two lefts and two rights. I'll take these pieces out of the first four boards in the rack. Measuring up from the heel cut, I draw a line across the bottom edge of the board to indicate where the rafter will end and mark it with a slash to indicate which way the bevel runs. The jacks are laid out in pairs, so there will always be the correct number of lefts

and rights (Figure 8). The next shortest set of jacks comes from the next four boards. I continue to lay out the jacks this way until the marks approach the midpoint of the boards. At that point I reverse direction and start measuring off the other end of the group. This allows me to get two jacks out of each board with only a small amount of waste in the middle.

Cutting the upper end of hip jacks is simply a matter of rolling the boards down one at a time, marking the roof pitch on the side (Figure 9), and making the cut with a saw that has been set to the proper bevel. I never have to guess which way to make the bevel cut, because it's already marked on the bottom edge of the board. It's a very fast and efficient way to cut hip jacks.

The tools and techniques are important, but not as important as having a good understanding of roof framing and how parts go together. Gang-cutting may seem complicated at first, but if you start with simple roofs and work your way up it soon becomes second nature. 

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