



How sharp are your saws? You can learn a lot by looking down the tooth edge. Bends, kinks and other defects readily show up.

Sharpening Handsaws

Make your saws cut straight and fast

by Fred Wilder

Someone asked, "Will a sewing needle slide down the tooth edge of a carpenter's handsaw?" It was the end of another day on Attu Island, a barren, wind-swept speck of land at the end of the Aleutian chain. We were a bunch of homesick carpenter Seabees sitting around the stove in a Quonset hut, waiting for lights out. The question hung in the air, and then there was laughter. There wasn't much to do at night, but that last question really scraped the bottom of the barrel for a conversation topic.

Still, we were curious. One of the other carpenters retrieved a

crosscut saw from his tool kit. We gathered around while he placed a needle on the teeth. When he tilted the saw, the needle ran down the edge like a streak of quicksilver. The question had been answered. But I knew it didn't mean that the saw was sharp, just that the blade was straight, and the teeth had been set and filed evenly.

Only the very points of the teeth do any cutting. They could be dull as ditch water and the needle would still slide just as fast because it doesn't ride on the points of the teeth, but between them. Even so, you could say that needle sliding does show something.

Two or three gentle strokes with the jointer—You need only joint the teeth until the file touches the tops of the shortest teeth.

If the needle slides well, you know that you're at least halfway to making a saw ready for the work it was designed to do,

The tools you'll need for sharpening

A jointer, a file, a saw clamp, a saw set, a hammer with a convex face and an adjustable light are the main tools you'll need to sharpen your saw. You can make a perfectly good jointer by attaching an old 6-in. mill file to a block of wood. The file that I use to sharpen sawteeth is a 7-in., double extra-slim taper. It works fine for all teeth sizes. You can either buy an old saw clamp at a flea market or you can make one. You just need some way to put even clamping pressure along the blade.

A saw set bends the teeth so that they cut a kerf wider than the sawblade. My choice of saw sets is a Taintor. It has a thin washer that can be put under the set anvil to change the amount of tooth that is bent over. Saw sets with a fixed anvil height may set large teeth at the right height but will set small teeth too low. The Taintor also has a second plunger that clamps to the saw before the set plunger sets the tooth. This feature reduces the chances for error in holding the saw set on the tooth. I don't know of another saw set with both these features or one that is as comfortable to use. You'll have to keep an eye out for one at a flea market or yard sale, because they haven't been made for years.

Perhaps lighting isn't a tool, but it is important. Natural light is too unpredictable and is often hard to come by in a shop. Most of the time, I file using a shaded 100w bulb suspended on a cord, which allows for adjustment. I've found the best place for a light is in front of me, below the level of my eyes and on the far side of the saw.

Straightening, jointing and setting the saw

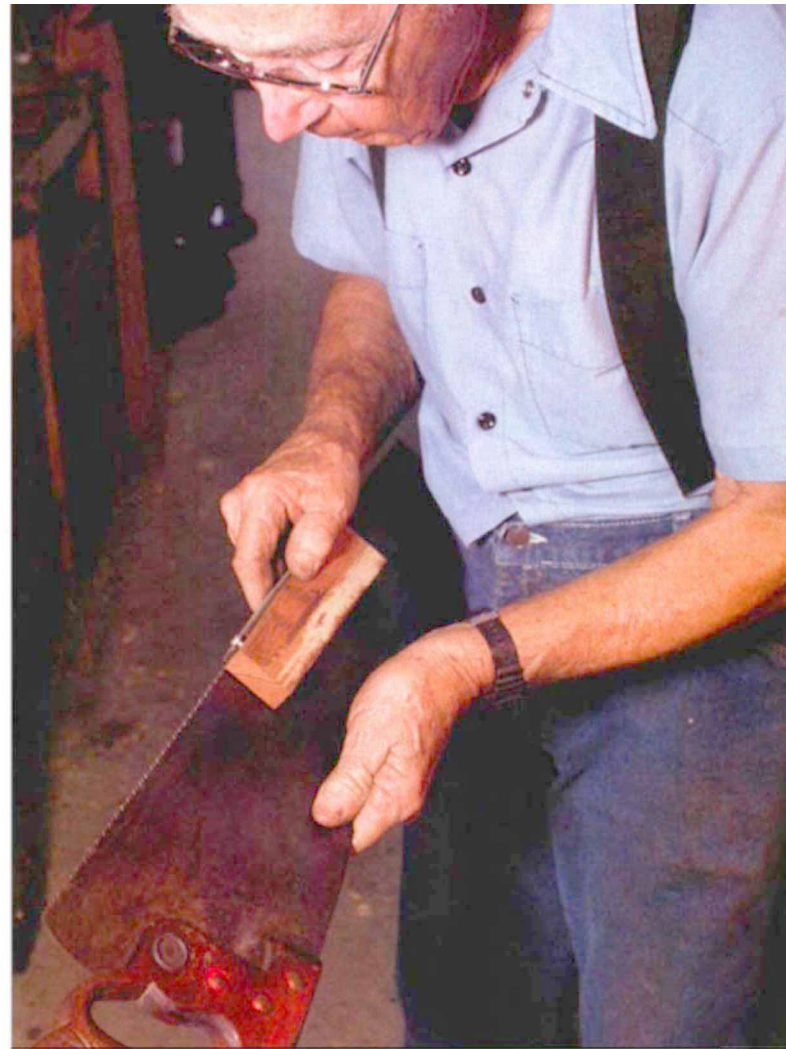
I begin each sharpening by checking the blade for kinks and bends, even on the saws I use regularly (see the photo on the facing page). After I get the blade perfectly straight, I joint and then set the saw. If the saw is just wood dull, it can be filed sharp a time or two without jointing or setting.

No matter how sharp, a saw will cut straight only if it's straight. Take out any bends by flexing the blade against the bend with your hands. Don't worry about overbending the blade. I have bent saws quite severely to straighten them, and I've never had one break.

Unless a kink is severe and obvious, finding its exact location can be hard. Move the blade back and forth along its length in the light. Any kink will show up as a ripple in the reflection. Mark the whole kink with chalk, and then place the saw on a smooth hardwood board and hammer it flat. Any small hammer with a convex face, such as a ball peen, will do. Just don't use a hammer with a flat face because it will leave half-moon dents in your blade.

Before you set the teeth, make sure they are all the same height and the same shape. The jointer cuts the taller teeth even with the shorter ones. Run the jointer from the handle end to the point using light pressure (see the photo above). If a number of teeth remain untouched, make another pass with the jointer in the opposite direction, from point to handle. This will help keep the cut even.

If a saw has been run hard upon a nail or filed unevenly the last



Reshaping jointed teeth before setting

Some teeth may be much shorter than others after jointing. You must reshape them before setting. Pay attention to where the final point should be, and vary the pressure you put on the file accordingly—to the left, the right or down.

These teeth need reshaping. Leave some jointed flat for filing.

These teeth do not need reshaping. You will file out any unevenness when you sharpen them.

Red lines show desired shape of teeth.



near the ends of the blade, or make another short pass at each end.

I prefer to sit down and hold the saw in my lap to set it (see the photo at left). This way, the saw is at an angle, rather than my wrist. The advantage of this will be apparent if you try to set a 12 points-per-inch saw in a clamp: Your wrist won't be the same for a week. Use the teeth near the handle as a guide for how much set you should give the rest. As a general rule, bend the teeth out about half the thickness of the blade. If you cut mostly hard, dry wood, you'll need even less set. Watch the height of the anvil, and only set the top one-third to one-half of the tooth (see the inset photo at left). If it's set too low, the plunger can bend or dimple the saw plate and even break off teeth. Set a few teeth near the handle first, and observe how well they match.

Proceed from handle to point, and then on the other side of the saw, from point to handle. Actually, I can't see that it makes much difference if you start at the point. Mark my advice to habit. Set every other tooth, moving the saw set along with your left hand. Turn the saw around, and set the other half of the teeth.

When you've finished, look at the set of the teeth by holding up the saw flat to the light. All the teeth should be uniform. If not, before you set them again, determine if the problem is the set or the way you're using it.

Filing the teeth to sharp points

How you file the very tips of the teeth is more important than how you file the gullets and faces of the teeth. Only the very tips cut the wood. The gullets and faces just push the severed fibers out of the kerf. In filing, the key is to reduce the jointed flats to points all the same height.

How to hold the file—Put the saw in the clamp, handle to your right, with the teeth about $\frac{3}{8}$ in. above the clamp jaws. Adjust the light so that there is a good reflection from the jointed flats of the teeth, and be sure that you can see them clearly. Position yourself so that the file is an extension of your forearm. Hold the point of the file with your other hand. Filing this way will reduce strain on your wrist and elbow.

Put the file in a tooth gullet, holding it very lightly. Let the file float for a few inches, trying to find the angles before cutting. The angles you need to keep in mind depend on the kind of saw that you're sharpening: crosscut or rip (see the drawing on the facing page). The bright area where the file has cut will tell you how good your angles are.

Reducing the flats to even points—When you're comfortable that you're getting the right cutting angles, make several passes on the back side of the teeth that are set away from you. With just enough pressure to make the file cut, take only as many passes as you need until the jointed flat at the top of the tooth is reduced by about one-half (see the photo at left on the facing page). Continue along the blade until all the teeth have been filed in this way. When I can't quite see a tooth, I have found that my thumbnail reflects light quite well when I put it behind the tooth.

Reverse the saw in the clamp. Position yourself with the file pointing toward the handle (see the photo at right on the facing page). Repeat the operation for the other half of the teeth, again reducing the amount of flat by about a half. When finished, return the sawblade to the original position. This time, file the points until a needle point of brightness remains. Reverse the saw, and do the other teeth the same way.



It's easier to move the saw up your lap than to move the set down the saw (above). Only the top part of the tooth should be bent (left).

time it was sharpened, you will need to joint the teeth much more. In this case, you may end up with unevenly shaped teeth, some full size, some filed very flat. Before you set them, you will need to reshape these teeth (see the drawing on p. 45).

Ideally, the tooth edge should have a slight crown from toe to heel of about $\frac{1}{8}$ in. The crown lets the teeth cut progressively instead of all at once. This makes it easier to start a cut and easier to keep going.

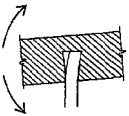
Some saws were manufactured with a crowned tooth edge. To keep this crown, or make one, press down on the jointer harder



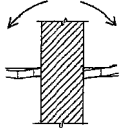
Aim for only half a shine at first. On the first pass (left), file the back of each tooth from the gullet up to the point, reducing the jointed flat by half. On the return pass (above), file the flats to sharp points. Remember that the only angle you change is the direction of the file.

Filing angles

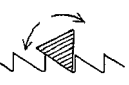
The drawings below show the three angles to consider when filing sawteeth. Angles don't need to be exact but should be as uniform as possible on each saw.



File's vertical angle affects only the ease of cut and the shape of the gullets. For all saws, hold file just under 90°.

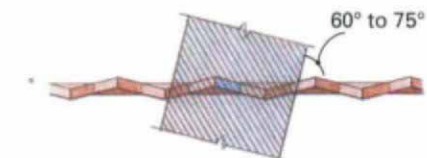


File's horizontal angle determines shape of the points of the teeth.

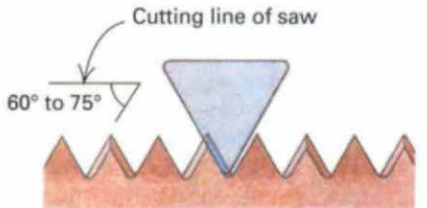


File's axial angle is determined by the tooth's hook. Hook is the angle between the front of the tooth and the cutting line of the saw. The greater the hook, the more aggressive the cut.

Crosscut saw

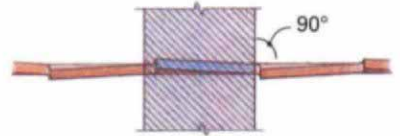


Filing at this angle will make a pointed tooth appropriate for cutting across grain.

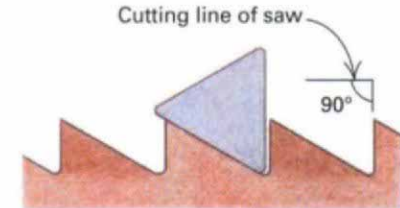


Crosscut teeth with little or no hook

Ripsaw



Filing at this angle will make a chisel-shaped tooth appropriate for ripping.



Ripsaw teeth with strong hook

← Direction of cut

The reason for two or more filings on a side is to keep the teeth all the same size. Although the file should cut mostly on the left of the gullet (the back side of the tooth), it also cuts some of the front side of the adjacent tooth (see the drawing above). If the filed teeth were brought up to sharpness on the first pass, filing the return pass could excessively shorten some of the previously filed teeth.

Sometimes a thin bit of metal clings to the edge of the filed teeth. This is called a feather edge, and it reflects light, giving a false reading of the sharpness of the teeth. After you file the saw, make a cut with all the teeth to rub off the feather edge. Look at the teeth. Some

will show a bit of jointed flat on the tip. File these teeth again. Now find a sewing needle, and answer the original question for yourself. Then you'll know if you jointed and set the teeth evenly. But to see if it's sharp and will cut straight, there's no better test than that first cut. □

Fred Wilder is a forester by education and has worked as a logger and carpenter. He ran workshops for the Civil Conservation Corps from 1939 to 1942 and served as a Seabee during World War II. He is now restoring a pioneer village in St. Petersburg, Fla.