SAWMILL FORUM

CASEY CREAMER

SAW DOCTOR

How do you hammer a circular saw?

In a word: carefully. At first blush your question sounds quite broad because saws have individual characteristics and histories of use (and abuse), and therefore each saw will be hammered differently based on what it looks like when it comes into my shop. Of course, the finished product should look basically the same as any other saw, other than a few differences for different speeds and requirements.

In this case you asked how do I hammer "a" saw, so I will take the next saw I have in line to be hammered and describe the entire process from start to finish. Of course we have to start out by first describing what this saw--and any saw--should look like when I am done with it. Specifically, they should all be flat on the log side, with an acceptable amount of wobble, and the right amount of tension in the right location. These characteristics are not usually visible to the naked eye, but they're what saw doctors look for when analyzing any saw.

So now that we know where we want to end up on this trip, it is time to figure out where we're starting from. In other words, what does the saw look like upon inspection after pulling it out of the crate and cleaning it? And of course we need to know the hand and speed the saw will be running at.

The first thing I do when I remove the saw from its crate is to stand it on the floor and just give it a little shake. In fact, every time the saw is in my hands and standing on the floor, I tend to give it that same little shake. What I am doing is trying to feel the tension in the saw. You can't tell everything you need to know about the tension just by giving it a shake, but it is an important piece of the puzzle and if you shake it every time it is on the floor it will also give you partial clues about how the saw is progressing as you work.

When I shake this saw, it does feel a bit too stiff, meaning it is possibly lacking tension. Or it might be bent so bad that I can't yet feel the tension that is there. I will certainly find this information during the initial inspection.

As I put the saw onto the cleaning bench, I do notice that the collar line on the board side of the saw looks a little suspicious. So I will notify the customer so that he can check his collars just in case there is a problem there.

I have cleaned both sides of the saw with a wire cup brush on a grinder and am applying a thin coat of WD-40. WD-40 will not only prevent rust, but it will also make the saw easier to handle on my various benches, make it slide easier on my anvils, and also make my straight edges last a little longer.

This saw is 56" 6X7 gauge, with 52 style F teeth, right hand, running at 600 RPM or approximately 8,800 SFPM. The fact that it is 6X7 instead of 7X8 will account for some of the stiffness that I felt when I gave it a shake, but not necessarily all of it. I measured the thickness of the shanks and they are about 5 gauge which means they have very little wear on them. I always check the thickness of the shanks before hammering because the saw could have the wrong size shanks in it, or the shanks could be worn out. Either way, if it needs a set of shanks they should be changed before the saw is hammered because a new set of shanks will dramatically change the tension.

The vee grooves appear to be relatively centered and the back clearance angle of the bits is correct. These are two issues that I can't correct if there is a problem. But I can certainly advise the customer as to how the saw will behave if it has either of those two problems.

The next thing I do is perform the "tighten the nut trick." Generally, if the rim of the saw moves when you go from hand tight to wrench tight, it is an indication that you have some collar trouble. In this case I know my collars on my test arbor are okay, so if I detect any movement at the rim as a result of tightening the nut, it means there is some sort of bend in the eye that I need to look for. In this case the rim moves only two thousandths towards the log side

when I tighten the nut. That's not bad, but it is enough to remind me to look closely at the eye for any irregularities.

When I check the runout (wobble) on the rim I find plus/minus .007." My running tolerance is plus/minus .015" or better. By checking with my long straight edge in a vertical position, from 6:00 to 12:00 I find that the saw is dished about .300" towards the board side. Now I will take it off the test arbor and put it on the bench where I am going to check the tension, and also find the highest part of the bend or the bend that is the highest, either of which could be causing the dish.

To check the tension on the bench, with the saw in the horizontal tension check position, I lift the saw at 6:00 and place the long straight edge from 9:00 to 3:00. In this check I am looking for drop of the saw from the straight edge. The more drop, the more tension, but with this check I am not as concerned with the amount of drop as I am with the fact that it does indeed have some drop which indicates that it does have positive tension instead of neutral or negative tension. If the tension was neutral, there would be no drop at the center to the long straight edge. If it had negative tension, the center would rise to the straight edge and the rims at 3:00 and 9:00 would fall away from the straight edge. In this case, the straight edge touches at the rim and the center drops, so I have verified that we have positive tension.

Next, with the saw still in the tension checking position I put the 12" straight edge across the eye. A finished saw would show flat here. This saw shows that it is a little high in the eye. Is that a tension issue or a bend in the eye? That is a question that will be answered during this process. I now slide that short straight edge out from the eye towards the rim at 3:00. I am looking to see where the most drop is to indicate the location of the tension. The amount of tension is important, but I think the location of it is even more important. In this case, it does show that the bulk of the tension is in the right place. Now I check with my curved tension gauge and it shows that this saw is a little low on tension for the 8,800 SFPM it is running.

Next I put the saw into the vertical position on the bench and use my 12" straight edge to look for bends in the saw, and more specifically—determine which bend is the most prominent and most likely the major cause of the dish.

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It appears that the worst bend is out near the rim. If I take that bend out with a hammer, it will also affect the tension in that it will take some of it out by stretching the rim. Since I have already indicated that this saw is low on tension, that is not the way I want to go.

I have two choices at this point. I can add tension to the saw and then straighten it by using leveling rolls on the stretcher roll so that the straightening process doesn't affect the tension. Or I can look for a way to straighten the saw with a hammer in an area where it will gain some tension as a result.

With the saw standing on the pin, I check the eye with the straight edge and find that the eye is high, meaning that it contains a slight bend. This is also likely the cause of the slight movement at the rim when tightening the nut on the test arbor. I also checked the eye on the board side to look for a corresponding hollow area to confirm that it is a bend instead of a tension problem. Finding one, I conclude that a slight bend in the eye is causing the problem.

I decide to straighten the eye first because I know the saw will gain some needed tension as a result, and the eye needs to be straight anyway.

I hit it once in the eye and it is still high, so I am going to hit it again and just a little bit harder.

The eye is now flat when standing on the pin. The eye is also now flat when checking for tension and also the tension in the body is now looking a lot better.

I am going to look again at straightening the saw. But first I am going to go to the test arbor to see what else has changed. The saw now shakes better when standing on the floor, at least for a heavy gauge saw.

The saw is now plus or minus .020" and the two extreme points are now diametrically opposed. The saw is still dished towards the board side, but only about a .100" now instead of .300" It is a sizable bend but it is still up fairly high on the blade so I am going to use the leveling roll on my stretcher roll to level the ridge out near the rim.

I like where the tension is now and I don't want to pull tension out of the saw by straightening the saw out on the outer rim with a hammer. So this is a perfect time to use the leveling roll. After using the leveling roll on the bend I put the long straight edge on the saw while it is still on the pin just to see if it looks straight enough to make it worth taking a trip to the test arbor for a more definitive look. I don't need to check the tension because what I just did would not have changed the tension and the last time I checked, the tension looked fine.

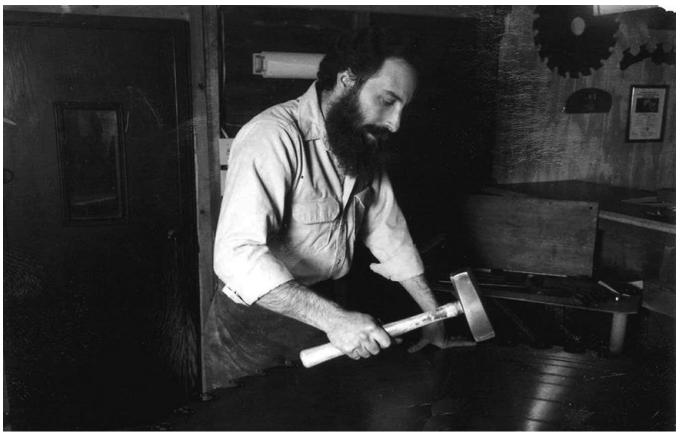
On the test arbor I first repeat the tighten the nut trick and see that the rim no longer moves a detectable amount when I tighten the nut. In checking the runout (wobble) I find the saw

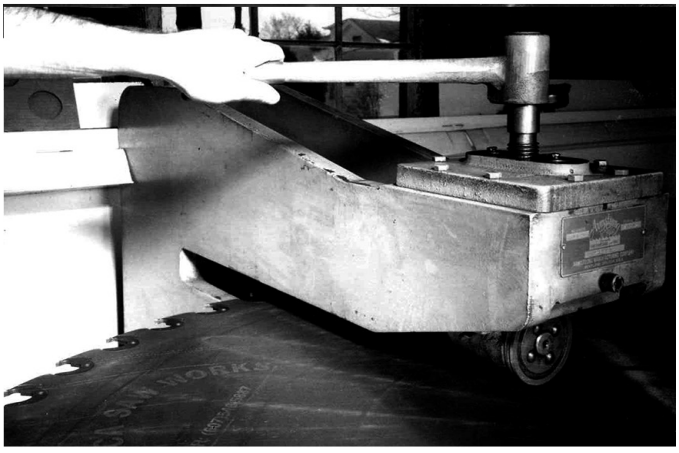
to now be at plus/minus .013". When I check it with the long straight edge it is just about .005" off of being flat on the log side. I am going to try and touch it up just a little bit without making it worse, I hope.

Note that a saw showing .005" off of being flat on the log side would possibly run okay. But flat would run that much better and I don't send them out until they are flat. Some mills might not even notice the difference, while others would see it right away in their production and the accuracy of their lumber. If I send them all out flat, then I don't have to keep track of which mills can get away with a saw that is not quite right.

I put the saw on the pin and looked to see if I could find anything else to fix. I found a little bit of a ridge just a little bit outside the collar line. It doesn't go all the way around which means when I put it down, it should help a little in the wobble department. Of course the wobble is inside of the running tolerance at plus/minus .013", so I don't want to help it too much or it will easily go too far and get worse. I will fix it with a hammer so that it will gain a little more tension which will be fine because although the saw has enough tension now, it is at the minimal amount that will work.

After hitting that short ridge outside the collar line, I take the saw right to the test arbor to get a close check on it. At this point in the process, I am only trying to make very miniscule changes in the saw. There is no point in doing anything other than going directly to the test arbor to get the most definitive look at the saw and be able to measure the tiniest of changes.





Tension can be added with a hammer (top) or a stretcher roll.

As I roll the saw on the floor on my way to the test arbor I give it yet another shake and notice that it is feeling even better yet.

On the test arbor I find that the saw is now plus or minus .007" and flat on the log side with the right amount of tension in the right location. It is now time to put some more WD-40 on it, clean it up, put it back in the crate and away it goes.

That was the process on this particular saw. This was randomly just the next saw in the line to be worked on. Fortunately it was a relatively normal saw, and representative of what most saws should look like when they come into my shop, as opposed to one that is so bad that it no longer fits in the crate. That can happen when the sawyer mistakenly makes a set during a cut, or it can result from a log rolling over on the saw.

I suspect this presentation of the details of hammering a saw might have bored some readers, but if you liked reading it, please let me know and I will try to pick another random saw another time and again describe the entire process with a different set of variables affecting the process.

Questions about sawmills and their operation should be sent to Forum, *The Northern Logger,* P.O. Box 69, Old Forge, NY 13420, FAX #315-369-3736.

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