

SAWMILL FORUM

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What is the normal speed range for a properly tensioned saw? One of the guys is trying to tell me that our saw is tensioned to run from 300 to 550 rpm, that sounds like too wide a speed range based on what I read in your article about harmonics and tension wobble.

That is way too much range. Setting the correct range depends on the size of the saw. If you were running a 48" saw at 500 RPM, which is too slow anyway, and you hammered it for 500, it would probably still work at 300 which is still too slow because it needs so little tension that there really isn't much of a difference between putting in enough tension for way too slow or putting in enough tension for even slower than way too slow.

But if you hammer a 60" saw at 550, which is a normal speed for that size, it would not run properly at 300 because that is way too slow for the amount of tension to make a 60" saw run properly at 550 RPM.

Let's remember that RPM is just the language that hammermen use to communicate with their customers. Saws should not be tensioned for a specific RPM but rather a specific rim speed otherwise known as surface feet per minute (SFPM).

Most experienced hammermen can usually convert RPM to rim speed in their head because they do it so much. But here is a simple equation that anyone with a calculator can use:

$$D \times 3.14 \times \text{RPM} / 12 = \text{SFPM}$$

Diameter times 3.14, times RPM, divided by 12 equals rim speed in SFPM. Remember that the ideal rim speed for frozen and unfrozen hardwood is 8,000 to 9,000 SFPM while the ideal speed for softwoods is 9,000 to 10,000 SFPM.

If you know the rim speed you want and you are trying to figure out what RPM your saw needs, to get to that rim speed, you just essentially turn the equation around backwards.

$$\text{SFPM} \times 12 / D / 3.14 = \text{RPM}$$

or Desired rim speed times 12, divided by diameter, and divided by 3.14 equals RPM.

Now I will let you in on a little saw doctor's secret. The exact speed your saw runs is a lot less important than you think. Let's talk in SFPM for a bit here. If you run what I would call a normal speed (8,000 to 9,000 SFPM for hardwoods) then I would put in what I refer to as a normal amount of tension. If you run slower than that I would put in a smaller amount of tension for a saw that runs slow. And if you are running faster than that I would put in a little extra for a saw that runs a little too fast. Now I will also adjust that amount of tension for a saw that is being fed very hard. So for a saw at a normal speed, that is being fed extra hard, I might put in about the same amount of tension as I would for a saw that is running a little too fast.

It is a common myth that the tension is all related to centrifugal force. I don't believe that. Whether it is a circular saw or a band saw, what happens is that the rim of the part of the saw that is in the cut at any given moment is stretching while it is in the cut. If you want the rim of the saw to remain straight while it is in the cut and being stretched, you must stretch the body of the saw to compensate for the stretch that is going to happen at the rim.

Another dirty little secret is that in the old days, saw doctors wanted to know the exact RPM so that if there was ever a question, and they were able to find any inaccuracy in your stated RPM, it would give them an easy out. You told me you were running 550 RPM so I hammered it for that. Now that I am at your mill, the tachometer says you are really running your saw at 563 RPM. No wonder it won't run right.

As you all know, troubleshooting sawmills can be a bit complicated at times. When we think of troubleshooting, we assume that the goal is merely to find out what's wrong so that we can resolve the problem and get back to being

productive. Unfortunately, especially in the old days, there were times when troubleshooting a mill was more about trying to figure out who to blame than it was about resolving problems. Given all of the myths and mis-information in the sawmill, even as recently at the 1980s there was so much confusion and so little logic that people thought the best way to solve the problem was to first figure out who to blame.

Of course one of the reasons there was so much confusion was that saw doctors tended to keep what they were doing a big secret and in return the millwrights didn't want to share their knowledge either. When the sawyer had a problem, he first had to figure out whether to blame the saw doctor or the millwright, because he was sure it couldn't be his fault. And there were times when it seemed that everyone involved was concentrating more on blaming everyone else than trying to figure out exactly what was wrong.

On the other hand, how will you ever figure out what's wrong when you think that the lead is there to counteract the saw's natural tendency to run out of the log and when you think you should adjust the lead every morning based on whether your poorly hammered saw is heating at the rim or in the body? And let's not forget the old widely-misused theory that the saw should be dished towards the log side and then miraculously stand up straight when you bring it up to speed. Under those conditions about all you can do

is to play the blame game.





The other thing to consider is that the RPM range relative to how a saw is hammered is directly related to where the anvilman leaves the tension for any given speed. So, I am working on a saw that is running at a normal speed. Let's say a 56" saw running at 550 RPM, which would be 8,059 SFPM. I would give that saw what I call a normal amount of tension (or stretch in the body). If I am on the lower end of that normal amount of tension, the saw would run fine at 550 and also run fine at 500 or even 475, but it might start running into problems at 600 or 625. On the other hand, if I left the tension at the higher end of the normal range, it would run fine at 550 and have no problems at 625, but 500 would be a struggle for it.

It would be nice to always leave the tension exactly in the middle of the range, but life doesn't always go that way for a saw doctor or anyone else.

Remember that the definition of a properly hammered saw is a saw that is flat on the log side, has an acceptable amount of wobble and has the right amount of tension in the right location. Having two out of three of those conditions doesn't work. You need all three at the same time. The way I like to put up saws, I have no leeway for the flatness on the log side. It is either flat or it's not. And I also have no leeway



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following the 2014 Vermont Expo in May. Any NELA member interested in being considered by the committee should submit a letter of interest or resume to: NELA Nominating Committee, PO Box 69, Old Forge, NY 13420. Please call Joe Phaneuf at the NELA office with any questions.

2014 Northeastern Forest Products Equipment Expo—Essex Junction, VT

Exhibit space at the 2014 Loggers' Expo is going fast, but great exhibit space is still available, both inside and outside. Visit the Expo website at www.northernlogger.com for a live map of available space and a current listing of exhibitors. The Vermont Expo will be held at the Champlain Valley Exposition in Essex Junction, Vermont on May 9-10. Look for information regarding the Annual Loggers' Banquet sponsored by Farm Credit and the numerous educational opportunities being offered at these shows in next month's issue of *The Northern Logger*.

Expo Seminars

Scheduling is nearly complete for workshops to be offered at the upcoming Expo this spring. Continuing Education Credits will be sought for those participating in northeast voluntary certification or state licensing programs. Look for full details in your February issue of *The Northern Logger*.

William J. Cox Memorial Scholarship

The deadline for scholarship applications to the William J. Cox Memorial Fund is March 20th. The Fund was created to provide awards through a needs-based scholarship program

for college students supported by business owners or employees in the forest products industry in NY, NH, VT, CT, MA, ME and PA. Interested parties need make application verifying eligibility and financial need; including a copy of their current year FAFSA. Application forms can be found online at www.northernlogger.com or obtained from the NELA office.

NELA Annual Scholarship Contest

NELA's Scholarship Program is unique in that the entrant has a choice of several media to utilize in preparing their submission. Written, captioned photo, audio or video essay formats are permissible to present the applicant's view on "What the Public Needs to Know About the Forest Products Industry." Essays and applications are due in the NELA office no later than March 29. Application forms can be found online at www.northernlogger.com or obtained from the NELA office.

SAWMILL FORUM

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for the amount of wobble. It is either within spec (+/- .015" or better) or it's not. So that leaves the amount of tension as a little bit of a grey area. If the flatness is good and the wobble is good, changing the tension at that point will also most likely change the flatness and the amount of wobble. So if my tension happens to be at one end of the range or the other when the flatness and wobble are where I want them, I am looking at a saw that is ready to get crated up and go back to the mill to get to work. Of course if the tension is out of range, it really doesn't matter how good the rest of the saw is, it needs more work and that's what is going to happen.

It is best to know what the actual speed is and then hammer it for that speed. Then the hammerman has the option of leaving the saw at the higher end or lower end of the spectrum for that speed. If you leave the tension exactly in the middle of the range I suppose there might be as much as 50 RPM leeway in both directions. But if you know the real speed of the saw, there isn't much need to leave the tension exactly in the middle of the range.

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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