SAWMILL FORUM

CASEY CREAMER

SAW DOCTOR

I am a new sawyer on a circular mill. To clear up an argument we have been having here at the mill, can you tell me which is better, to feed too slow or too fast?

That's an easy one. It is always better to feed at the right feed rate for your saw and the depth of cut at the moment. That is why you have a variable feed control instead of a constant feed speed that some power-fed machines have.

The proper feed rate is really derived from a relationship between the speed of the saw, the number of teeth per inch in the saw, the species being sawn, the gullet size, and the depth of cut. That is known as the "feed and speed relationship."

What you are trying to accomplish is maximum efficiency and accuracy of the cut regardless of whether you are in a high production mill or just a nights and weekends sort of operation. Nobody likes to be inefficient.

For any given depth of cut (along with saw speed, number of teeth and gullet size) there is a mathematical minimum and maximum feed rate. If you can stay within those two, you are feeding correctly.

These saws are meant to make chips, not dust or fine powder. Directly after the chip is cut, it travels down the tooth face and into the gullet (along with the rest of the chips being made by that tooth during that revolution) where it is supposed to stay until that tooth completely exits the cut. Upon exiting the cut, all of the chips in that gullet are supposed to be ejected so that the next time that tooth gets its turn at chip-making, there will be ample room in the gullet for new chips.

The faster you feed (in relation to the speed of the saw) the bigger chips. The slower you feed the smaller the chips. So, when you feed too fast (or above the stated maximum for that saw at that depth of cut) the chips will be so big that they will plug or overload the gullet. When that happens you will stall the saw one way or another. It can shear the lug pins that drive the saw from the collar (thus ruining the taper on the fast collar), it can cause the belts to slip, or even possibly break a mandrel.

If your belts are properly tightened and of sufficient number to transmit the power, you will most likely shear the pins in the collar. After doing that you will have to remove the mandrel and send it to a machine shop to have the collar resurfaced and you will also have to send the saw out to a saw doctor to have the extraneous collar metal properly removed from the collar line of the saw. Don't try to remove that collar metal yourself because that process has to be done in a manner where you only remove the collar metal without removing any of the original saw metal. That is a delicate operation that should be left to a pro.

Underfeeding means that you were not feeding fast enough to make a chip that is big enough to stay in the gullet for the short amount of time it is supposed to stay there. Your teeth are wider than the saw plate. The difference between the width of the tooth (kerf) and the thickness of the saw plate, divided by two is called side clearance. It is divided by two because it is the side clearance per side. If you feed so slow that the chip you make is smaller than the side clearance, it will spill out of the gullet before it has exited the cut for ejection. When the chips (or one might say dust) spill out of the gullet, it is excessively wearing the edge of the shank which in turn will make it even easier for future chips to spill out of the gullet. And worse yet, those chips will get between the blade and the log and create friction, which will heat the saw and force it off line. This is not exactly the best recipe for making good lumber.

There are other undesirable side effects from feeding too slow. When you feed too slow, it is more like you're grinding instead of cutting. That grinding motion will definitely accelerate the wear on the tooth. And of course if you are feeding too slowly, that means that everything that moves and turns during the sawing operation is rotating that many more times per board feet of lumber sawn, so everything will have a shorter life expectancy. Imagine driving down the highway in first gear instead of your highest gear. You will get there, but you will spend a lot more time, and use a lot more fuel. Why would you choose to do that?

You can measure your feed rate in inches of feed per revolution by closely examining one of your boards. You can swage

Swaging the bits.

one tooth a bit high to one side and then measure the distance between successive matching tooth marks or just assume that one bit is a little higher to one side than the rest anyway. In this case you have to look a little closer to see which tooth marks are exact replicas of each other and than measure the distance between them.

Generally, given a normal saw diameter and RPM, that would calculate to 8,000 to 10,000 Surface Feet Per Minute (SFPM), and a normal depth of cut relative to the diameter of the saw, you should see anywhere from 4" to 6" of feed per revolution. That is a big generalization but it is a good ballpark for you to start with. Those who are running one of the old Bellsaws may notice that when they are feeding as fast as their feedworks will possibly go, they are only feeding at 2.5 inches of feed per revolution. Well, that is too slow. But then again they are using a very light mandrel, most likely light power and a collar that has no key or lug pins to positively drive the saw. I consider that to be a design flaw in that particular mill, but sometimes you are stuck with what you have. If you figure out a way to speed up the feedworks, you better also put in a bigger mandrel with proper lug pins. Once you have done that you will find other weak links in the mill because it was designed to be a light duty mill anyway. Bellsaws are good machines as long as you don't exceed their capacity.

Every time your saw is in the cut you have three choices for your feed rate. Underfeed, overfeed, or feed it at the right rate. You decide which makes the most sense to you.

Next month I will talk about the different patterns for inserted tooth circular saws and what their characteristics are.

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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