

SAWMILL FORUM

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I had a bit of an accident with my saw. After replacing a bunch of bits and shanks, I turned the saw by hand while watching it between the guides. It seemed okay at that point. Then I started up the diesel and put it in gear. Before I completely opened up the throttle to normal speed I could see that the saw was wobbling like crazy. What do I do now?

The simple answer is to screw up your courage and open the throttle up to your normal speed. You will be amazed when that crazy wobble disappears. I suppose some of you would like an explanation so that you can understand what's going on.

There are only three different ways that a saw that is not hot can wobble, although it is possible to have a combination of two or three of them. (If the saw happens to be hot when it is wobbling, that will fall into the tension category.)

1. Bent saw wobble.
2. Arbor generated wobble.
3. Tension wobble.

You wrote that you turned the saw by hand and it looked okay between the guides. That automatically eliminates numbers one and two because either a bent saw wobble or an arbor generated wobble would show up when turning the saw by hand.

You most likely discovered this wobble when running the saw at about half of its normal RPM. Many people who power their headsaw with an electric motor often notice that after shutting the head saw down, as it is gradually coasting to a stop, there is a point at about half speed where the saw may develop quite a wobble for a moment until it gets below that speed. What you are seeing is a harmonic vibration in the saw. Fortunately it is happening at a speed that you never run so it is not a problem.

Every rotating disk has what is called a "critical speed." Usually that so-called critical speed is faster than the speed your saw would normally run at. If your saw happens to get up to its critical speed it will exhibit quite a wobble and if the saw

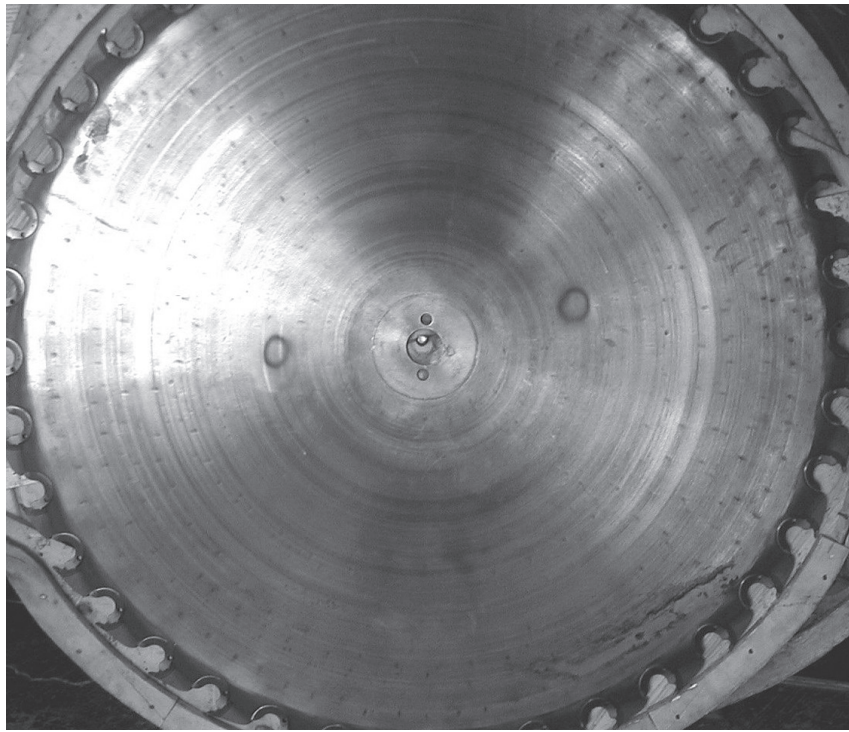
happens to be in the cut at the time, it will develop two or three diametrically opposed blue spots. Large diameter saws usually get two blue spots while smaller diameter saws tend to get three at a time. There also seems to be a direct correlation between the number of blue spots and the number of pin holes being used. Head saws usually use two pin holes at a time while smaller diameter saws often use three. I have seen scrag saws which would normally be considered large diameter saws develop three blue spots because they also happen to be driven by three pins or bolts.

Many of you may have experienced blue spots on your saw while running the saw at its normal speed. What happened there is that your saw first got quite hot. That heat changed the tension in the saw and it got so bad that because of the new amount of tension (or stretch) the critical speed was brought down to the speed the saw normally runs at.

People who play stringed instruments are aware that a harmonic will happen at a certain length of the string. They also notice that they can get another harmonic at precisely half of that length and also a quarter of that length. So, when a saw develops a harmonic vibration at a speed somewhere between normal and zero, at that moment it happens to be at exactly halfway between zero and the "critical speed." If you could put a tachometer on the saw at that moment, you could multiply that speed by two to obtain what that saw's critical speed is given how much tension is in the saw at the moment. You see, when you change the tension, you also alter the critical speed.

Actually knowing what each saw's critical speed is doesn't do you much good because as the saw changes either from getting hot or from someone like me changing the tension, the critical speed changes.

When someone tells me that they have some trim saws that are screaming, I usually advise them to go ahead and change the tension in either direction just so that the critical speed either moves up or down and away from the speed they are running. Of course there can be other causes of screaming



Typical pattern of diametrically opposed blue spots on a saw.

trim saws, but harmonic vibration is an easy one to cure if that happens to be the problem. Sometimes you can quiet down a screaming trim saw simply by cleaning the collars and the collar area of the saw. The other possibility on a screaming trim saw is an aerodynamic vibration. That can sometimes be cured by altering the shape of the shoulders of the saw.

Anytime that you can make a wobble get better or worse just by changing the RPM, you can be sure that you are dealing with a tension wobble. In this particular case it is a tension wobble because you happen to be running the saw at a speed that is wrong for that amount of tension in the saw. If for some silly reason you wanted to run the saw at that speed, you would have to get your local saw smith to change the tension in the saw. Of course in your case, all you have to do is crank it up to the right speed and that tension wobble (harmonic vibration) will disappear.

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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