

Fine-Tuning a Bandsaw

Vibration and wandering cuts are signs your bandsaw needs a checkup

by Robert Vaughan

An improperly adjusted bandsaw will do everything but cut well. It may throw, break or dull blades quickly. Or it may produce cuts that wander like a drunk failing a roadside sobriety test.

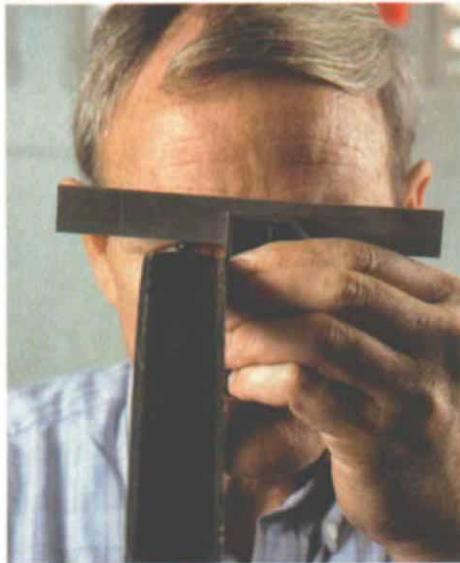
I've performed surgery on a lot of bandsaws, and I have discovered there's no single saw component that causes most ills. Many jumping and tracking problems can be traced directly to worn-out tires. But a vibrating bandsaw may just as likely be handicapped by a beaten-up drive belt. A saw that refuses to cut squarely may be affected by a guidepost that is out of alignment, or the saw may have one of its wheels out of line (see the box on pp. 78-79).

Solving many of these problems doesn't require a lot of fancy equipment. Basic tools such as wrenches, try squares, a file and some washers for shims are often all you need. A few diagnostics and adjusting techniques will bring out the best performance your saw has to offer. The basics include checking your tires for wear, wheel alignment, guidepost alignment and adjusting the guides and blade tension. Begin your tune-up by unplugging your machine.

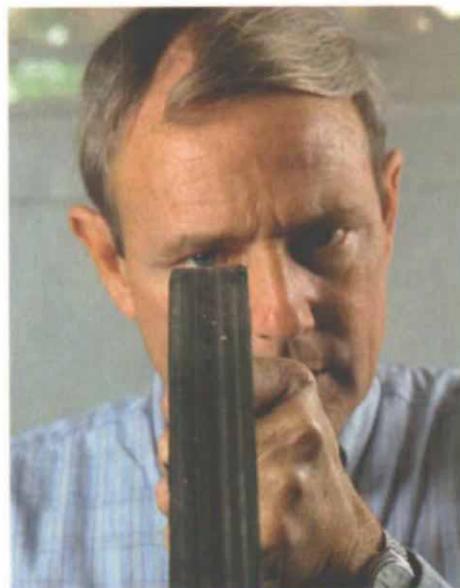
Tires must be smooth and crowned

I begin a tune-up by opening the wheel housings and blasting the works with compressed air to clear out the sawdust. Then I look at the wheels and tires. If a wheel is broken or badly bent, there's not much you can do except replace it.

If your bandsaw tracks poorly or jumps excessively, chances are the tires are worn. The majority of bandsaw tracking and jumping problems begin and end here. Tires should be whole, not missing large chunks, and without hairline cracks.



Tires need a crowned surface. A smooth tire with a slightly crowned surface, like this one, will make a bandsaw track accurately and run smoothly.



Worn-down tires need replacement. The author recommends replacing tires before they get this bad.

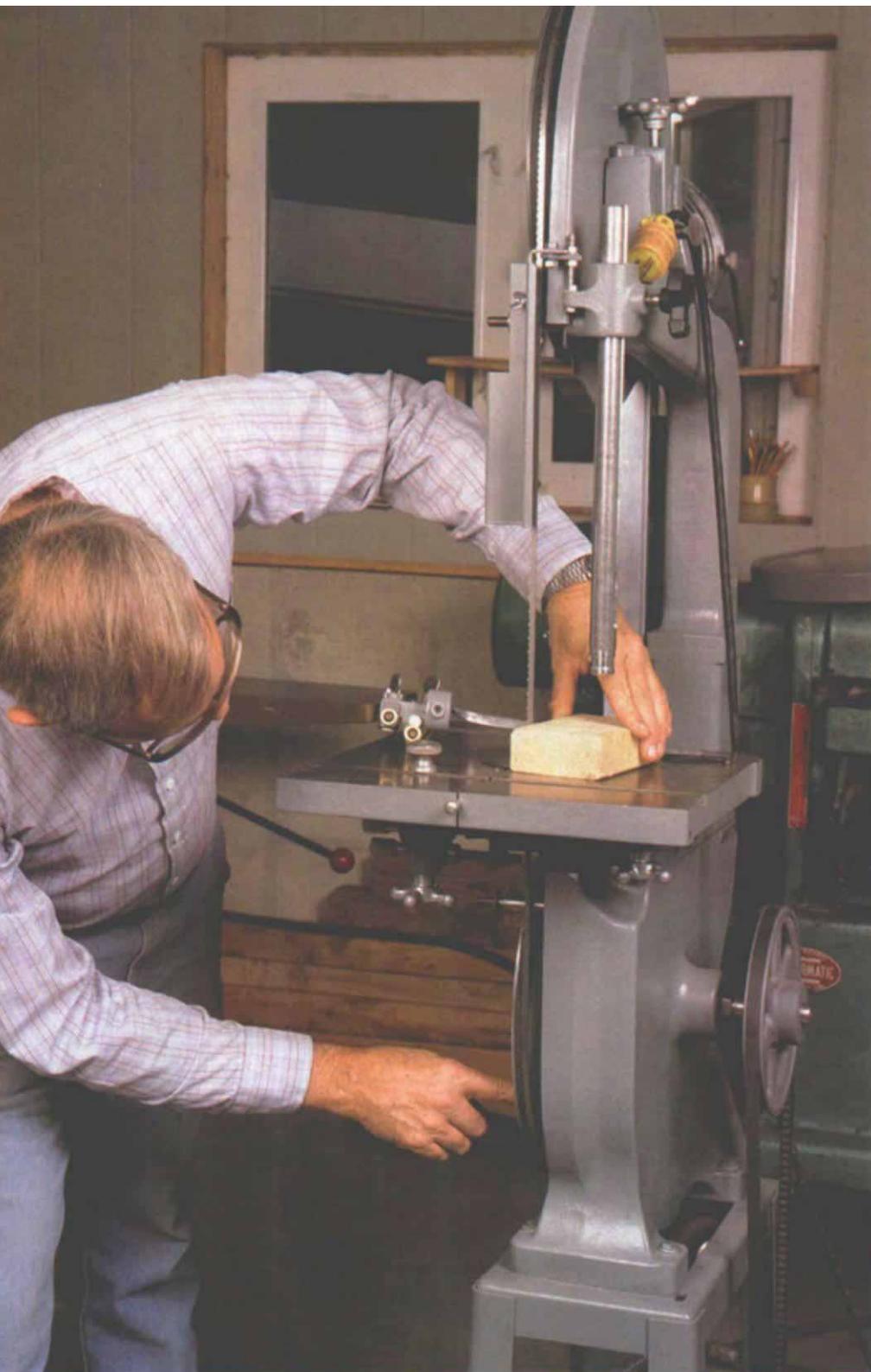
The surface should be smooth, clean and slightly crowned (see the top photo). The crown defines where the blade tracks. Blades have a tendency to wander back and forth on the surface of uncrowned tires. A crown also keeps the teeth from cutting grooves in the tire's surface. A grooved surface will make tracking unpredictable (see the bottom photo).

If you cut a lot of resinous woods, you may have a gummy buildup on the tires, which can create a false crown. That condition can foul the blade's tracking, allowing it to drift. You can check this by turning on the machine and letting it idle.

Check the crown and drive train—To see whether a bandsaw needs its wheels crowned, you don't have to remove the wheel. First remove the wheel guards, and back off the blade-guide components. Install a 1/4-in. blade, and set the tension normally. Adjust the tracking so the blade stays in the middle of the tire when the wheels are turned by hand. With a scrap of wood, push on the back of the blade using the same kind of force you'd use for cutting wood (see the photo at right). Hold the block in place for three or four revolutions of the blade, and then release the pressure against the blade and turn it a few more times.

If the blade's position on the tire surface doesn't change even though the blade deflects slightly from the pressure of the wood block, then the crown is in good shape. If the band moves off the center position under pressure and returns when pressure from the wood block is released, the crown is showing signs of wear but is still functional. If the blade moves and doesn't return to its original position, then crowning is needed. You can do this yourself (see *FWW* #95, pp. 50-53).

Tires need replacing from time to time.



Checking for crown wear—*The author spins the bottom wheel by hand while pushing against the blade with a block of wood using normal cutting pressure. If the crown is in good shape, the blade's position won't change.*

the upper guide components must be readjusted with each change in stock thickness—a nuisance that eventually gets ignored until blades start breaking or cutting-precision deteriorates. For most small bandsaws, there are few, if any, adjusting mechanisms for the guidepost itself. But you can reposition the wheels to compensate for an out-of-line guidepost. This is a tedious, trial-and-error process, but just think of all the time you'll save not having to readjust your guide components every time you raise or lower the guidepost.

Checking the guidepost's alignment starts with the table. Remove the upper guide bracket, and raise the guidepost all the way up. Turn the wheels by hand for a few revolutions to make sure the blade's tracking is properly adjusted. Using two try squares, check to see if the table is perpendicular to the blade (see the photo on p. 78). Adjusting the table side to side is done through the trunnion stops. To adjust it front to back, install flat washers between the trunnion bolts and the bottom of the table to raise a section that suffers from a dip (see the top photo on p. 79). If so equipped, be sure that the taper pin or locking bar is installed in the split of your tabletop. Tabletop flatness in this region is controlled by tapping the pin in or out. Perfection may be elusive here; get it as close as you can.

Lower the guidepost, and check it with the try squares (see the bottom photo on p. 79). The guidepost should also be perpendicular to the table. If it's off by $\frac{1}{16}$ in. or more over 6 in. of height, you'll need to make adjustments.

Some professional-duty bandsaws have separate adjustments for the guidepost travel path. Light-duty machines, such as 14-in. bandsaws, usually have no such provisions. To adjust them, you'll need to be creative and use shims or file down certain components to shift the upper wheel alignment. You are trying to get the blade to run parallel to the guidepost (see the drawings and photos on p. 80).

If your guidepost tilts to the left or right, filing down the tilt adjustment hinge,

Most machines that have less than a 16-in. capacity use a rubber-band type of tire. Larger machines may have tires of a specialized configuration; some have a fitting groove in the middle of the wheel's surface. When ordering replacements, note your saw's model number; I've seen different tires used on similar models.

While you're in the machine's innards, examine the saw's pulleys. Those that are

worn or bent can cause vibration. Worn belts develop knots at the factory joint, creating a bumping sensation. Replace these inexpensive items when they show signs of wear. And check all bolts and setscrews for tightness.

Align the blade to the guidepost

The guidepost should move up and down in a line parallel to the blade. Otherwise,

Troubleshooting guide for bandsaws

Problem	Blade comes off wheels when machine is running.	Blade comes off wheels when backing out of a cut.	Machine jumps when running.	Blade seems to dull very quickly.	Machine cuts truncated cones instead of cylinders.
Causes	Tires need crowning; wheel bearings are loose or worn; wheels are out of line; top wheel carriage is loose.	Wood is pinching blade and dragging it out; blade tooth set has been worn out; tires need crowning; wheel bearings are loose; top wheel carriage is loose; wheels are out of alignment.	Tires need truing; wheels are out of balance; blade has kink in it; drive belt is worn; drive train pulleys are bent; machine is not sitting squarely on floor.	Back guide bearing has moved away from blade; wrong blade for the wood.	Guidepost is out of alignment; blade is not perpendicular to table; upper wheel is out of alignment.

Guidepost alignment procedure- Using try squares, determine whether the blade is perpendicular to the table. Adjust the table's tilt mechanism as needed for side-to-side alignment. Then check front-to-back alignment.

located behind the upper wheel, on one side and shimming the other will get the blade more in line with the guidepost.

If the guidepost tilts fore or aft, you'll need to shim one of the wheels with a washer. Be careful about what kind of washer you use here. If the wheel has a bearing pressed into its hub, standard flat washers will work because the wheel is kept square to the shaft by the bearing. If the wheel doesn't have a bearing, you'll need to use precision machined washers to avoid introducing a wobble, which can be caused by hardware store variety washers that aren't very flat. You can order a machined washer from Delta (part no. 904-061-4982) to fit the 20mm lower shaft of a 14-in. bandsaw.

After shimming a wheel, you will have to square up the blade to the table again. Then check the guidepost alignment. There's a bit of trial and error involved in finding the right amount of shim.

The true test of just how well you've aligned the guidepost will make itself evident when you adjust your guides and then raise or lower the guidepost. If you need little or no adjustment to the guides over the travel of the guidepost, you've done a good job.

All this work will be an exercise in futility if your handsaw's guidepost is flimsy and deflects under normal cutting pressure. To see whether you have this condition, raise the upper guide about



Blade moves in and out when machine is idling.

Ticking blade sound when machine is running.

Blade doesn't cut straight when resawing.

Guides don't close in tightly enough on blade.

Blade drifts and won't follow line.

Scraping noise when upper guide is raised.

Wheels are bent or warped; blade is not welded straight; blade has kink in it; pitch buildup on tires.

Blade weld joint is not ground smooth at sides or back; blade has kink in it; blade is cracked and ready to break.

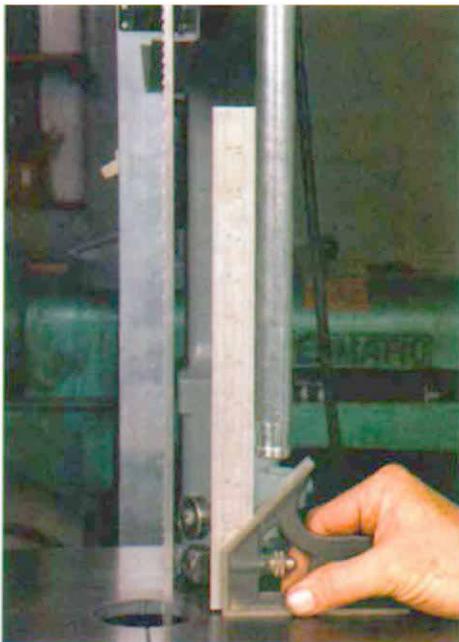
Incorrect blade is being used; wrong tension on blade (too loose); feed rate is too fast; guidepost is misaligned.

Blade guide channels need cleaning; blade guides are grooved or worn.

Not enough set in blade; upper guide is set too high; side guides are set too wide; feed rate is too fast.



Front-to-back adjustment—A flat washer inserted between the table and either the front or back trunnion will help square the table to the blade.



Now check the guidepost. It should be perpendicular to the table. If it's out by $\frac{1}{16}$ in. or more over 6 in. of its height, the saw's performance can be improved by additional adjustments.

$1\frac{1}{2}$ in. off the table, and push against the guidepost. When the guide starts to deflect, you have determined how hard you can push your stock before knocking the blade out of alignment.

Wheels in a twist will cause tracking problems

The wheels of a bandsaw must be in parallel planes. Having them in the same plane (coplanar) is preferable, but it's not necessary. And it's impossible if you have moved a wheel to correct a misaligned guidepost.

Wheels in a twisted configuration will cause the most problems. However, I've seen bandsaws where a good tire crown offset minor wheel misalignment. If your bandsaw has good, crowned tires yet still suffers from tracking problems, check the wheel alignment. Unfortunately, on the most common 14-in. bandsaws, there are no easy adjustments that you can make to correct twisted wheels. You'll need the services of a machinist to modify the upper axle housing. Industrial quality machines have adjustment provisions built into them.

To check alignment, turn the wheels forward by hand for a few turns, and watch where the blade tracks. Next turn the wheels in reverse. If the blade's position on the crown changes, the wheels are in a twist. A pronounced twist will allow the blade to fly off the wheels.

You may find that your wheels are slightly misaligned, but there's no problem directly attributed to that condition. So leave things alone.

Adjusting blade guides

Blade-guide components, like tires, are wear surfaces meant to be replaced or

renewed. There are many varieties of guides, from simple solid-steel blade guides to costly bearing-type guides. All do the same thing: They keep the blade from moving side to side and front to rear when under a load.

Solid-steel guides should be reground flat and filed smooth from time to time. The bearings should be checked for free rotation, and the screws and guide channels should be cleaned regularly to allow quick and easy adjustments. The bottom guides should be checked more frequently than the top guides because they are constantly being flooded with sawdust.

Guide components should never be adjusted so tightly that they constrict blade movement. They should be just close enough to restrict blade deflection under cutting pressure.

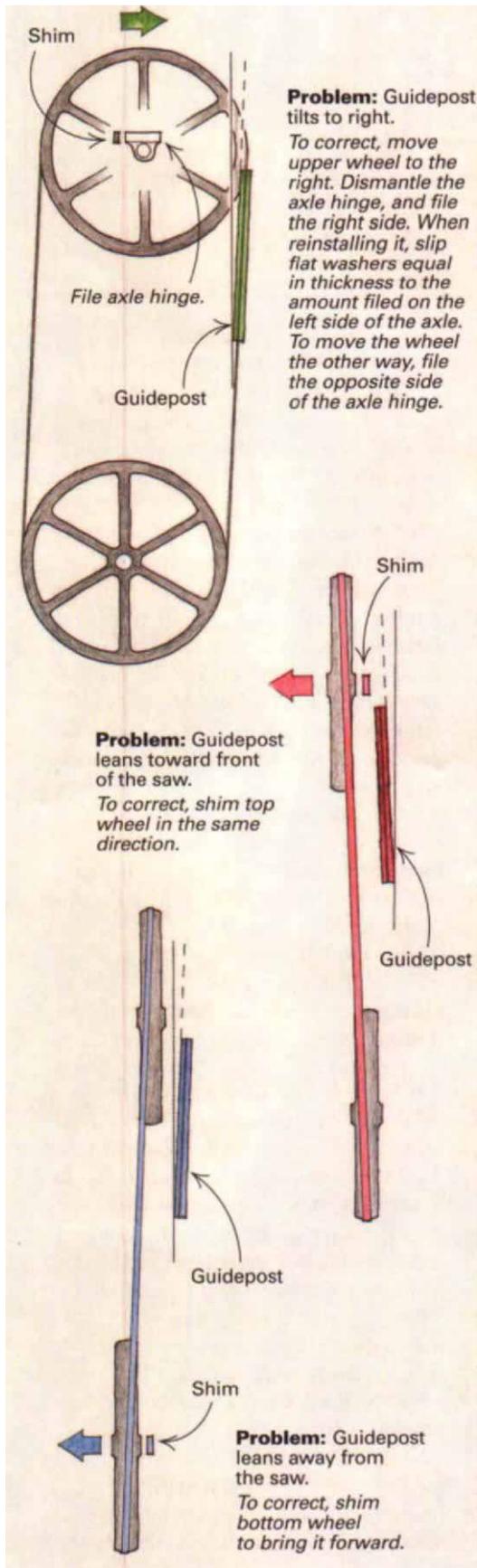
I don't find that it's necessary to use measuring devices to check the clearance between the blade and guide blocks or thrust bearings. I make these adjustments by sight and sound.

Here's a foolproof way to do this. First loosen all the guide components, and move them back from the blade. Adjust the blade tension. No two experts seem to agree on how to make this adjustment, so suit yourself. I get on my tiptoes and sight down the front edge of the blade from the top wheel and tighten the adjusting knob. As the blade tension increases, the blade straightens out. When it stops straightening, I give the adjusting knob a half revolution or so, and I'm there.

Begin adjusting the guides by spinning the top wheel by hand and gently pressing one guide block until it just kisses (but does not deflect) the blade. At

Correcting bandsaw guidepost alignment

You can't adjust a misaligned guidepost on most small bandsaws. The solution is to reposition the wheels so the blade runs parallel to the guidepost. After repositioning the blade, you must again align the table to the blade at 90° by adjusting and/or shimming the trunnions.



Top wheel to right or left



Top wheel toward front



Bottom wheel toward front



the same time, make sure that the guide block is aligned just behind the gullet of the blade's teeth.

Once those components are in position, tighten the lock screws. Then press the opposing guide block until it just touches the blade, and tighten it. Spin the blade by hand some more, and observe the contact against the guide blocks. If the blade rubs constantly, back off the guide blocks just a hair so that the blade runs freely. Adjust the other pair of guide blocks the same way.

To adjust the thrust bearings, I bring one up gently against the blade, spin the blade, back the adjusting screw off until the bearing only ticks against the blade once or twice over the course of a complete revolution. Then I do the other one the same way. All these guide components need to be readjusted each time a new blade is installed.

I don't bother using plastic guide blocks. I think they create friction, don't last and may even smell up the shop when they get overheated.

A few other details

Because machines aren't perfect, I'm always looking for ways to improve them. Simple modifications sometimes make all the difference in the world. For example, I replace adjusting screws on bandsaws with matching socket-head screws and adjusting nuts with wing nuts. The fewer tools you have to hunt down, the faster it is to adjust the machine and change the blades.

If the saw's power switch is located on the stand, then consider relocating it to the arm. That way, you won't have to put your face near the blade to turn the machine on or off. A flexible work light aimed at the blade also comes in handy.

Beef up a flimsy sheet-metal stand with plywood panels screwed and glued on with construction adhesive.

Consider modifying the stand for convenient dust deflection or collection. When positioning a bandsaw in your shop, find a level spot on the floor, or level the saw's legs with shims or some other kind of leveling device. Moving a bandsaw around the shop can distort the frame and create slight misalignments.

Robert Vaughan is a contributing editor to Fine Woodworking magazine, and he repairs and restores woodworking machinery in Roanoke, Va.