Resawing on the Bandsaw

For predictable results, use a high fence and a very tight blade

by Ronald Volbrecht

I buy quilted maple for the backs and the sides of the guitars I make from a friend who is a lumber grader. Each year he inspects more than a million board feet of lumber, and if I'm lucky, he will find three good 2½-in.-thick planks. Some of the hardwoods and old-growth spruce I use are no less rare.

When it comes time to resaw these irreplaceable planks, I don't want anything to go wrong. Over the years, I've learned to adjust my bandsaw for consistent resawing with very little waste. I can get finished, 3/32-in.-thick guitar backs from resawn boards that are only ⅛ in. thick.

I do all my resawing on a 21-year-oid Delta 14-in. bandsaw. It has a 6-in. column extension, which allows me to resaw planks that are up to 12¼ in. wide. The boards I resaw are usually 8 in. to 10 in. wide. I use a ½-in. blade with 3 teeth per inch (tpi).

Other than replacing the motor, I have not made any modifications to the saw, and I have no magic tricks. But there is more to getting good results than just running a board through the saw.

I tune my blade, set the guides close to the blade and then make sure that the blade is good and tight (for more on this, see the story on p. 79). I use wrenches to lock down all the adjustment points on the saw so that they can't vibrate loose. Then I feed the plank slowly against a high fence (see the photo on the facing page), judging the feed rate by the sound of the blade.

Blade-tension scales aren't exact. *The author tensions the blade by ear, not by the calibrations on the saw.*

A formula for blade speed

When I switched my motor for one with more horsepower and higher rpms, I had to change the pulleys to reduce the blade speed. Factory blade speed is 3,000 feet per minute (fpm), and I wanted my blade to turn slightly slower than that.

Here's a formula to determine blade speed of any combination of motor and pulleys:
Motor speed x (motor-pulley diameter ÷ saw-pulley diameter) x x wheel diameter (in feet)

For example, this is the formula for blade speed on my 14-in. bandsaw with its new motor:

3,450 rpm x (2 in. ÷ 11 in.) x 3.1415 x 1.167 ft. = 2,299.7 fpm

-R.V.

A heavy-duty motor and new pulleys

When I bought the saw, it had a ½–hp, 1,750-rpm motor, but I soon replaced it with a ¾-hp, 3,450-rpm motor. Because the bigger motor turned faster, I had to change the pulleys to keep the blade running near the factory speed of 3,000 feet per minute (fpm).

I used the formula given in the box above to determine the right combination of pulleys. I kept the 2-in. pulley that came with the motor. That pulley and an 8½-in. pulley on the saw would have given me the right blade speed, but the big pulley wasn't in stock locally. I tried a 12-in. pulley, but the blade ran too slowly (about 2,100 fpm). Each time the weld went through the guides, the saw lurched. I ended up with an 11-in. pulley, which turns the blade at about 2,300 fpm. That's just about right for the work I do.

Choose a good blade, and keep it tight

I use the same type of blade for every cut I make on the bandsaw. It's a ½-in. skip-tooth blade with 3 tpi and a thickness of .025 in. I

Photos except where noted: Dennis Preston

Press the plank against the fence while pushing it through the blade. The right hand pushes the board while the left hand is positioned down low to press the workpiece against the fence. Use a push stick at the end of the cut.

don't think the brand of the blade matters, but the quality of the welds does. I look for blades with good alignment at the weld and no blobs of metal. I check the back of the blade at the weld to make sure there is no offset. Problem welds cause the bandsaw to vibrate, and that makes the results inconsistent. I can tolerate a little offset or lumpiness because I carefully grind these defects smooth with a Dremel Moto-Tool and then dress the blade with a diamond stone.

I determine the correct tension by removing the blade guard on the left-hand column and plucking the blade as if it were a giant guitar string (see the photo at right). The sound will go from a sloppy vibration to a smooth, low tone. At that point, you've reached the proper tension (see the photo on p. 74). For guitar players, the tone roughly corresponds to an E note on a bass guitar. When the blade sounds right, I replace the guard.

I've never bothered to release the blade tension when the saw's not running. In theory, constant tension will shorten the life of the saw's bearings, but I'm still using the originals. I'd rather keep my saw ready to roll than fiddle with blade tension every time I want to use it.

Pluck the blade to check the tension. *Listen for a clear note, roughly an E on a bass guitar. The author replaces the blade guard after tensioning the blade.*

After the blade is tight, I turn the upper wheel by hand to check the blade tracking. I spin the wheel and adjust the thumbscrew near the blade tensioner until the blade runs in the middle of the tires. When the blade tracks true, I tighten the thumbscrew and its locknut with Vise-Grips.

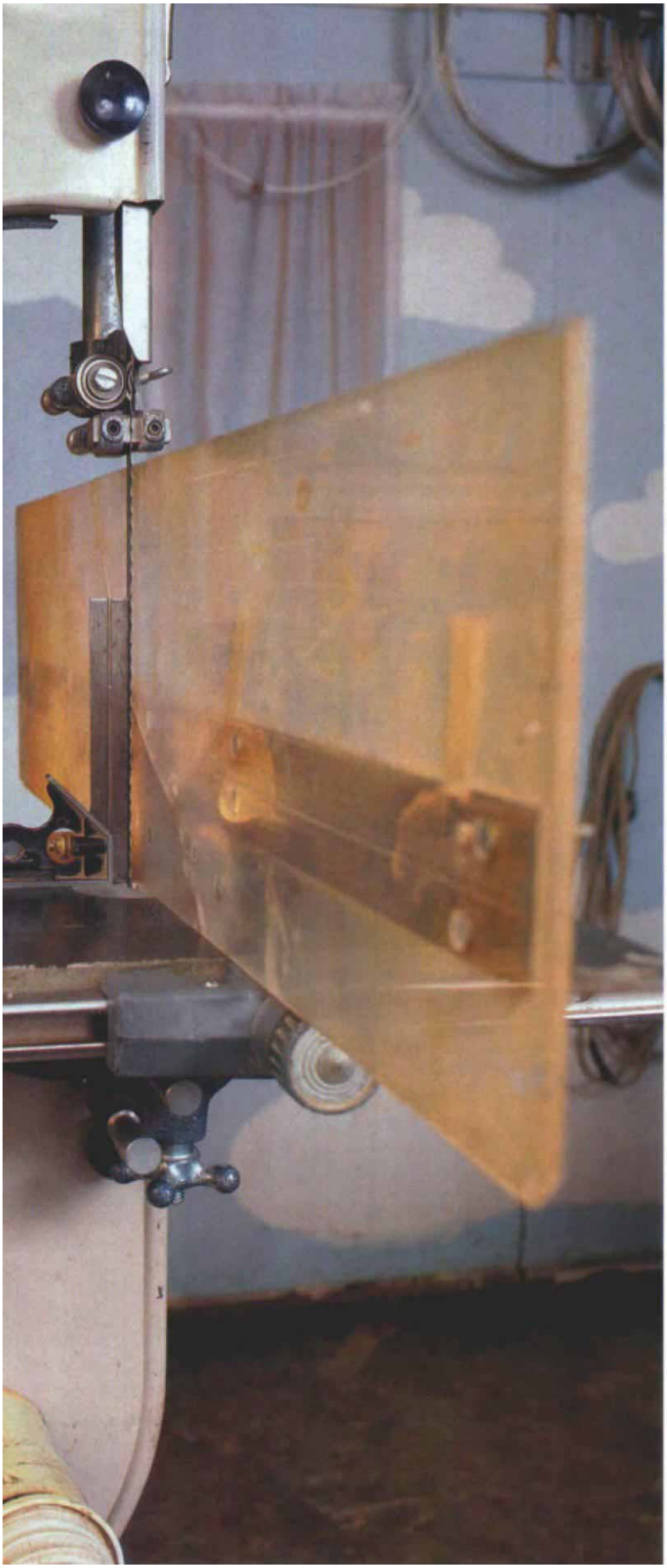
Next I set the table perpendicular to the blade. I raise the guides full height and use a long combination square. I put a light behind the square so I can detect and correct even small discrepancies (see the photo at left on the facing page). I tighten the knobs that lock the table in place with a wrench, so they don't loosen while I'm resawing. Before the next step, I check the squareness again.

Use a wrench to tighten the adjusting screws

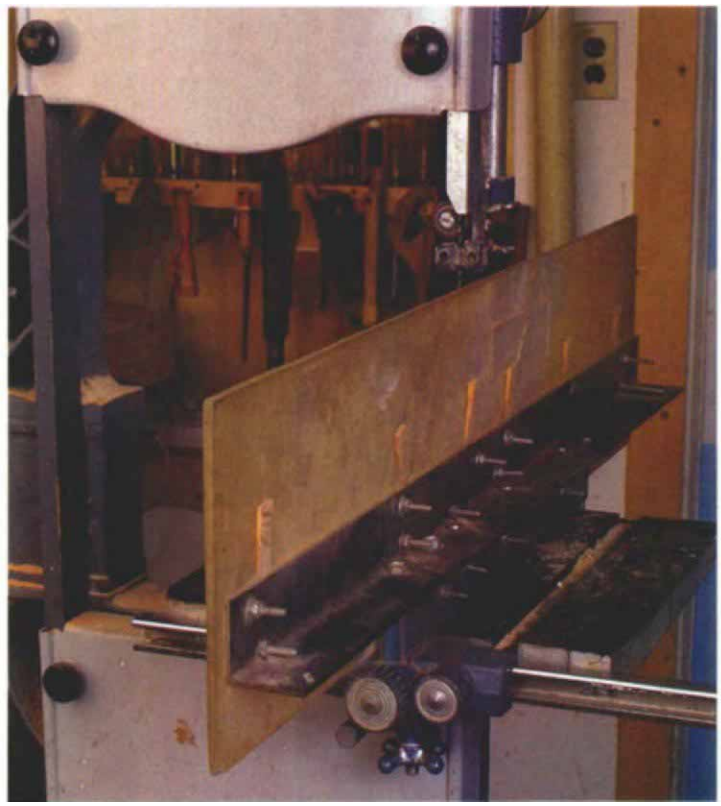
Before I set the blade-guide adjustments, I raise the guide bar so the upper guides are about 9½ in. off the table—high enough to clear my resaw fence. I tighten the thumbscrews that hold the guide bar in place as tightly as I can. For leverage, I use a pair of Vise-Grips. With this kind of pressure, the end of the thumbscrew becomes slightly mushroom-shaped over time. This can cause the guide bar to rotate slightly each time the thumbscrew is tightened, and the motion can twist the blade. To prevent this, I periodically remove the thumbscrews and file the ends square. With the guide bar set, I turn my attention to the guide blocks and thrust bearings. I usually adjust the lower guides first and then the uppers.

Some woodworkers prefer aftermarket guide blocks made of phenolic resin, but I've kept the original steel guide blocks that came with the saw. I prefer that the blade bear against a hard, flat surface, so I grind the guide blocks square and set them close to the blade to minimize its side-to-side motion. Because I clean up the welds on the blades, I can position the guide blocks only .002 in.

Raise the guide bar, and adjust the blocks and thrust bearing. *Set the gap between guide blocks and blade to .002 in., and bring the thrust bearing in light contact with the back of the blade.*



Make the table perpendicular to the blade. The author uses a light behind the square to highlight small misalignments. An out-of-square adjustment can ruin stock.



A wide board needs a high fence. *A length of angle iron bolted to the top of the bandsaw's original fence supports a facing of ¼-in. Plexiglas. Wedges help square Plexiglas to table.*

from the blade. I use a feeler gauge to set the gap, and I tighten the setscrews carefully against the guide blocks so they don't shift. After they're locked in place, I double-check the gap. I locate the blocks just behind the blade gullet (see the photo at right).

Before moving the bearing, I spin it to make sure it turns freely. If necessary, I give it a little oil. If one side of the bearing shows wear on the outer rim, I turn the bearing around. Then I move the bearing up to the back of the blade. It should just touch the blade but not spin until the saw is cutting wood.

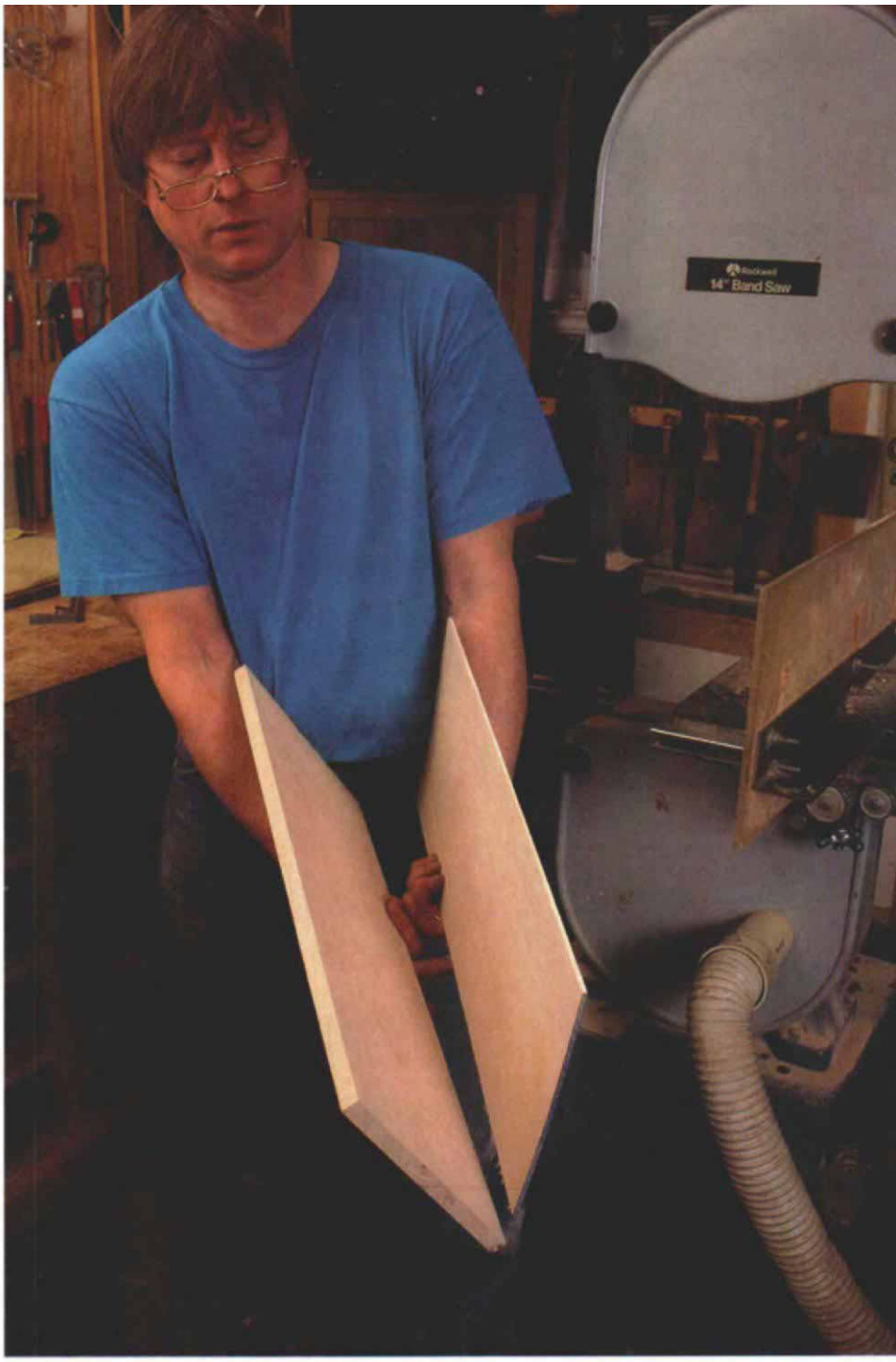
When I first started resawing, I ruined a few boards because my carefully set adjustments vibrated loose. I tightened the adjustments as much as I could by hand, but that wasn't enough. I finally added locknuts to the lower guide adjusting screws. The nuts won't vibrate loose even after hours of resawing. I make them wrench-tight, which would be 20 to 25 ft. lbs. on a torque wrench. On the upper guide adjustments, I use Vise-Grips locked onto the thumbscrews to torque them tightly enough to be vibration-proof. These adjustments make my cuts very precise, but the tolerances are so close they have to be reset each time the guide-bar height is altered

A high fence supports the plank

The resaw fence needs to be almost as high as the piece being sawn. If the fence is too low, when feeding a plank through the saw, the bottom of the board will tend to move away from the fence. The face of the fence must be 90° to the table. Even if the fence is out of square by only ½°, finished boards resawn from wide planks will have a pronounced wedge shape.

I built my resaw fence by adding a 9-in.-high piece of ¼-in. Plex-

***Slow, steady pressure**—The author maintains a steady feed rate as he moves the workpiece through the saw. Stopping even briefly will produce a thin spot in the board.*



***The proof is in the pudding.** By adjusting his bandsaw carefully and feeding the workpiece through the cut steadily, the author gets consistent results like this.*

iglas to the face of the rip fence that came with the saw. I used Plexiglas simply because it was handy. Plywood, Lexan (similar to Plexiglas but stronger) or aluminum might be better. Even a crack in the resaw fence hasn't affected its performance. To better support the Plexiglas, I bolted a length of 3-in. by 3-in. angle iron to the top of the fence (see the photo at right on p. 77).

When I first set up my resaw fence, the original rip fence wasn't square to the table. As a result, the top edge of the resaw fence was out of square. I fixed it by inserting wooden wedges between the Plexiglas and the angle iron (see the photo at right on p. 77). The wedges are about 1½ in. long and taper from 3⁄16 in. to 1⁄16 in. along their length. Each time I set up the fence, I make sure the Plexiglas is square to the table and adjust the wedges as necessary.

You may have to adjust your bandsaw fence for lead or drift. That's when the blade won't make a cut parallel to the edge of the table. To adjust the fence to account for it, I draw a line parallel to the edge of a jointed board and make a freehand cut along the line for about half the length of the board. Then I stop sawing, clamp the board to the table and set up the fence along the jointed edge of the board. Now the fence is parallel to the cut, and the blade will have no drift. I periodically check for drift, but I've never found any on my saw. I hear the same from other woodworkers who use the same saw.

When I'm ready to resaw, I install the fence 1⁄8 in. to the right of the blade and lock it to the table at both ends with the clamps on the original fence. Then I prepare the plank by jointing both edges

Keep your bandsaw singing, not whining

by Anatole Burkin

Like a stringed instrument, a bandsaw likes being under tension to perform well. But too much tension can de-tune your machine. We asked two tool manufacturing representatives to comment on what happens to a bandsaw when too much tension is applied. And we asked how to keep a bandsaw running smoothly.

Louis Brickner, vice president of engineering and product development for Delta International Machinery, says one way to spot overtensioning is to slide the guide bar up and down after tensioning the blade and setting the guide blocks. "If you have to readjust the blocks, it's a clue that you're bending or flexing the machine beyond its design capability," says Brickner.

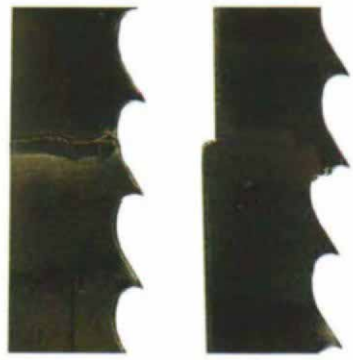
Most woodworkers adjust blades by using the markers on the machine's tensioning adjustment screw and/or listening for a low tone by plucking the blade as it's tightened. Either method should get the blade in the 7,000 to 15,000 psi tension range (the low figure is bare minimum, and the high number is optimum). These numbers apply to carbon steel blades and bimetal blades, which make up the bulk of what's sold for small- to medium-sized bandsaws. If you have an industrial-grade saw, higher tensions may be possible.

The only way to measure the precise tension of your blade is with a tension gauge. You can order one through Starrett, but it will set you back $294.

Brickner also advises against keeping a guide bar raised too far above the work. The upper guide should just clear the surface of what's being cut. That greatly reduces the risk of injury.

A common problem customer's have is tires flying off the bandsaw because the motor they installed runs too fast, says Brickner. To upgrade the motor, pick one that runs at the same speed as the original (1,750 rpm), or change the pulleys after installing a faster motor (see the box on p. 74).

Another problem is using a blade too wide for a 14-in. bandsaw. Machines of this size are not meant for 1-in. or wider blades. Tensioning them can bend or twist the machine. Best results are obtained with blades ½ in. wide or less.



Get rid of the bumps. *Ronald Volbrecht uses a diamond stone to smooth out a rough weld (left) or a Dremel Moto-Tool to feather out a misaligned blade (right).*

As with all machines, proper maintenance can prevent problems and injuries. Brickner says it's important to inspect for wheel-bearing wear regularly. Unplug the machine, take off the blade and pulley belt, and spin the wheels. A clicking noise in the shaft spells bearing trouble.

Ray McPherson, product safety manager at Powermatic, says it's important to inspect the spring in the blade-tensioning screw occasionally. A broken spring can make it easier to overtension a blade.

Some woodworkers touch up bandsaw blade welds with a file or grinder. McPherson cautions against taking off too much metal. "A welded joint is stronger than the rest of the blade simply because there's more metal there. Just don't overdo it (grinding). Make sure the weld is complete and there's metal-to-metal contact," says McPherson.

For a comprehensive book on using and tuning bandsaws, a good source is *Band Saw Basics* by Mark Duginske (Sterling Publishing Co., 1989).

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and one face. I run the jointed face against the fence. When using rare woods, it's important to waste very little. So I run the plank through a thicknessing sander to resurface it after each cut. The sander takes off less wood than a planer and without tearout.

Feed slowly, and support the piece

When resawing, I keep both hands on the piece, as shown in the photo on p. 75. My right hand is on the end grain, pushing the board through the saw (use a push stick for the last few inches of the cut). I keep my left hand low, and I spread out my fingers to press the planks against the fence across a wide area. Slow, constant feed pressure is the key to success. If you stop sawing for a moment, the blade will bite a little deeper.

I start out sawing slowly, listening to the sound of the blade. It should make a smooth, steady rasp with a light blip as the weld goes through the guides. I gradually increase the rate of feed, still listening. I feed steadily and strive to keep the sound of the blade steady as well. If I feed too fast, the sound switches to an uneven scraping as the saw vibrates more rapidly. If I push faster still, the vibration will smooth out, but the blade will wander, making an uneven kerf. I just keep the feed rate slow. It takes me about six minutes to resaw a quilted maple plank 8 in. wide by 3 ft. long.

Ronald Volbrecht builds and repairs guitars. He has built instruments for John Mellencamp, Richie Sambora, Hoyt Axton and other artists. He lives and works in Nashville, Ind.

Photos this page: Scott Phillips