



The Band Saw- the Lathe's Best Supporting Actor

By

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After World War II, GI's returned to America and a period of prosperity and ambition swept a nation that entered the war digging out of the Great Depression. Power tools moved from the industrial market to the consumer market. One of the tool lines to emerge was the Delta HomeCraft line of stationary tools in 1949. My grandfather, James F. Palma¹ purchased a Delta HomeCraft joiner, drill press and band saw. I have the bandsaw and the drill press today, although neither sees any daily service anymore.

These tools, as well as offerings from several other manufacturers, created the advent of the home workshop in America. These shops turned out furniture, birdhouses, and with the addition of wood lathes from companies such as Sears and Rockwell, turned table legs and spindles for these home projects.

Surprisingly, with the multitude of books and articles on using the wood lathe, the bandsaw seems to be the silent partner in this marriage². Yet, whether one is turning between centers, bowls or vessels, the bandsaw is often the tool that prepares the wood before it goes on the lathe. Let's take a look at this tool and some tips for turners looking to get more potential out of a bandsaw.

How Turners Use a Bandsaw

Turners use a bandsaw differently from other woodworkers. Our uses mostly fall into these categories:

¹ Actually his name was "Wilber" Palma but he didn't like it so he made up "James F" with the "F" not standing for anything, as the family story goes.

² Mark Duginske's "The Band Saw Book" is the undisputed work on the bandsaw generally and required reading for anyone who owns (or borrows) this tool.

- Roughing out a circle when turning bowls, vessels, and boxes from both dry and green wood³,
- Ripping and crosscutting spindle stock, often from logs or green wood,
- Taking rectangular wood and making it square to create spindle stock,
- Knocking corners off square stock to make “getting to round” a faster proposition,
- Cutting off the unwanted part of the spindle when parting at the lathe isn’t the solution,
- Some other stuff.⁴

Green wood presents unique opportunities for woodturners, but it may not be especially friendly to the bandsaw. The teeth of a bandsaw are designed to cut wood and the space (called the gullet) has the job of carrying the sawdust out of the cut and exposing fresh wood for the tooth behind it. When cutting $\frac{3}{4}$ ” kiln dried hardwood, most bandsaw blades, and more importantly their gullets, can clear the path for the teeth and help make the cutting action efficient. However, do the math. A standard Delta 14” bandsaw with a blade with 4 teeth per inch must perform this task 374 times each time the blade goes around the saw. Looking at it more specifically, a typical 14 inch woodworking bandsaw runs at 3000 surface feet per minute. With 4 teeth per inch that is 12,000 cuts per minute. The gullet has to travel about $\frac{1}{2}$ ” to clear the work with its load of sawdust.

A green 6 inch high bowl blank (small by comparison to what some people cut on a bandsaw) has to travel through 5 $\frac{3}{4}$ inches and carry wet wood that seems to expand and become fibrous as it is moving. It’s a lot tougher job. So feed rate, blade selection, and horsepower become very important considerations for turners making bowl blanks. Added to that, your typical bowl orientation results in ripping and crosscutting as you make a disk, resulting in two different tasks for the same blade.

Strive to cut with a flat (or at least multi-point of contact) edge on the table at all times. A bandsaw blade can “self-feed” and the teeth of the blade can grab the work, rotate it into the blade and either stall the blade, bend it, or worse yet, throw your hand into the path of the blade. So don’t cut round work on a bandsaw. Use a “v” block, sled, clamp, attached board or some other form of support for the work that prevents any form of rotation.

When making square stock from a log, attach a board or choose a side with multiple points of contact. Always keep the flat side down. Then get a second flat side, and you have an “L” to put against the fence on your bandsaw. This allows you to rotate the work and achieve 4 flat sides for your spindle stock. This technique allows turners to convert firewood into spindle stock. Many turners have created beautiful spalted wood spindles.

I personally do not cut the corners off of spindle blanks before I put a blank between centers. I know many turners use that technique. If you do, the bandsaw table can be tipped to a 45 degree angle and you can make 4 sides into 8. This takes some of the pounding out of the initial roughing process.

³ Although woodturners take it for granted, most disciplines of woodworking (possibly some types of chair making come to mind as a possible exception) only use air or kiln dry wood, so the concept of cutting green wood at all, especially in a circle is not something we share with most woodworkers.

⁴ Having attended law school I was trained never to write my way into a corner and keep some “wiggle room”. That skill was honed to a razor edge after 30+ years as a tax lawyer to always create a helpful loophole when you get the opportunity.

Bandsaw Blade Selection

Bandsaw blades have a very stressful life. They must compress on the inside of the wheel and stretch on the outside, absorb flex as they are turned around cylinders, and sustain the front to back deflection of a cut, all while doing so under 15,000 to 20,000 psi of tension. That is why I subscribe to buying high quality blades. They are made of better steel, maybe even more than one type of steel, may have hardened teeth, with softer main blade bodies, and are more precisely set (like a handsaw). Bandsaw blades are “set” which basically means that the teeth are alternately bent to create “kerf” or opening wider than the blade itself.

Your choice of blades is somewhat different from other bandsaw users as well. Normally wood workers talk about making sure at least three teeth are in the wood at one time and they are cutting dry wood. Their blade choice relies on some of the same factors that go into choosing a table saw blade. With turners we have thicker blanks. That results in all too many teeth engaged in the wood at one time. Gullet clearance is the issue, not teeth engagement. So turners must slow down their feed rate to allow clearance. Hook tooth blades are just that, a hook that cuts very aggressively and clears the gullet better than a standard blade. Skip tooth blades allow clearing, yet are less aggressive. As a slower feed rate is needed to clear the gullets anyway, I feel that skip tooth blades are the best choice for woodturners. Turners are also not trying to turn tight radii. Any width blade is adequate to make the circles that turners make. Blade deflection (front to back) is the larger concern. So, wider blades with fewer teeth are generally the best for turners. A 3/8” to 1/2” wide blade is often the blade of choice on even medium size saws.

Some questions to ask before choosing a blade may include:

- Will you be cutting green wood or dry wood?
- Are you cross cutting blanks to length?
- Will you be ripping wood for pepper mills, box blanks, or spindle projects?
- What else do you do besides turning? Furniture work? General wood working? Tools and jigs?

So what does Mark (Palma, not necessarily Duginske) suggest⁵:

1. Slow down your feed rate when cutting bowl blanks. Let the gullets clear the wood from the blank and listen to the blade. If you hear the blade bogging down in the wood slow down the feed rate even further.
2. If you have a lower power band saw do not cut thick green bowl blanks. Borrow someone else’s saw.
3. If you like to turn green wood, buy a skip tooth blade.
4. Blade deflection isn’t your friend. I use a 3/8” 3-tooth skip tooth blade for blank preparation. A 3/8 inch blade can cut as small as a 1 1/2 circle⁶.

⁵ Please note I have a Delta 14 inch saw with no riser block and a 3/4 horsepower motor so I base my recommendations on that equipment.

⁶ A 1/2 inch blade can cut a 2 1/2 inch circle, a 3/4 inch blade can cut only as small as a 5 1/2 inch circle and a 1 inch blade jumps to a 7 inch circle, so as size goes up, your minimum cutting circle jumps dramatically.

5. When I am not doing blank preparation, I switch to a ¼ inch 6 tpi Swedish blade that is very well made. It costs about what two ordinary blades cost but it is worth it.
6. Don't try to use "McBlade"⁷. Take the time to switch from your general woodworking blade to your thicker blade when cutting green bowl blanks.
7. I use a ¼ inch 6 tooth blade for general work and cross cutting dry wood.
8. Use an expensive blade. I believe it is money well spent.
9. Blades get dull. Sometimes you need to replace them before they break. I do a little test cut in ¾ inch hardwood. If I cannot cut the minimum diameter circle or if I need excessive feed force, then it's time to change blades.
10. Recycle or dispose of old blades. They do not self-sharpen on the shelf. Dirty, rusty and dull blades are not something to keep around your shop.
11. You may need more than one bandsaw (hey, we all love tools)!

Adjusting a Bandsaw⁸

A well-adjusted saw is a thing of beauty; a poorly adjusted saw is pure aggravation and possibly dangerous. I am lucky; my Delta stays in adjustment well. My neighbor seems to have a bandsaw that falls out of adjustment every cut. A member of my woodturning club says "A tuned bandsaw is like a tuned violin; it just sings"⁹. Here is how I adjust my Delta 14" bandsaw:

1. Unplug the saw.
2. Back off the upper and lower guides and the thrust bearings so that the blade is free from both.
3. Take the blade tension off (the big knob on the back side of the top wheel).
4. Open the doors and take off the blade.
5. I scrub the tires with a green 3M Scotchbrite pad to get any sawdust off the tires. This is a good time to inspect the tires. Mine are still domed slightly in the middle and show no cracks so I just keep singing along with them.
6. I install the blade and put just enough tension on it so that I can hand turn the blade and it doesn't fall off.
7. Check to see if the blade is tracking on the center of the tire. I find that tracking, once set seems to hold on my saw. If not, use the wingnut on the back to adjust tracking.¹⁰
8. Put on a little more tension and spin the wheel by hand and see if everything seems right and smooth.
9. Then set the guides to the correct clearance. As there are different types of guides, do not guess, get the specifications for your guide type (metal, composite, ceramic, roller or something else¹¹).

⁷ I mean no disrespect to McDonald's Corporation. I hold them in the highest regard. Their ability to create a consistent product should be envied. It's just sometimes you cannot be that consistent with our hobby.

⁸ There are numerous articles and book chapters on this topic so I will only provide a brief overview.

⁹ Thank you to Ron Bartz for those eloquent words.

¹⁰ Some articles talk about checking your wheels to see if they are in alignment; mine are so I do not discuss it. If your blade will not track and your tires are in good shape check wheel alignment.

¹¹ Like how I gave myself some leeway; law school trains my profession well.

10. Set the guides to align (front to back) with the back edge of the gullet (the solid part of the blade). Remember that blade deflection will push the blade back somewhat. Tighten the wingnut that locks in the adjustment (upper guide only).
11. Set the thrust bearing for the proper clearance. Normally you do not want the thrust bearing to touch, but just engage as soon as a board is put against the wood. For my saw, the thickness of a dollar bill is about right. Tighten the wingnut that locks in the thrust bearing adjustment (upper bearing only).
12. Spin the wheels manually and see if everything looks correct.
13. Close the doors, put the table pin back in, put in the table insert and then see if the table is 90 degrees to the blade. Adjust if needed.
14. Plug in the saw. Turn it on and off to see if everything sounds right. When it is off, see if the guides are aligned correctly to the blade and if the thrust bearings look correct (if they have moved it is your tracking, unplug the saw, back off the guides and bearings and start over).
15. When everything runs right and stays in adjustment, take an oil stone and hold it against the back of the running blade. You are taking off the bump caused by the blade being welded into a circle. Next take the oil stone at 45 degrees to each side of the blade back, and then start arching back and forth until you have rounded off the back of the blade. This will let you cut better circles.
16. Adjust your tension to the correct setting for the thickness of the blade you have chosen.

Tips for Bowl Blanks

Start by examining the wood before you ever put it on the saw or consider cutting anything. Look for cracks, debris or something else that could cause a problem. Make sure the bottom of the blank is flat or does not rock on the table. If needed, flatten the bottom with a power plane (a very helpful tool for turners), chisel or some other tool that cuts away unwanted wood. Lay out your circle either on the blank itself or by affixing a disk to the top of the blank. Keep a center point for future reference. Make sure the blank is in contact with the table in multiple places and will not bind when the disk is cut. Set the upper blade guide within $\frac{1}{2}$ inch of the top of the wood.

Consider making a few relief cuts so that the blade is not trapped in the wood for the full circle. Remember that a 6 inch bowl blank has 18" of cutting around its circumference. That is a long way to back up with a stuck blade. Never back up a running saw. Basically the tracking adjustment keeps the blade from falling off. If you try to back up a running saw you may pull the blade right off the saw. Enter the wood in such a way that you are aligned with the cut and will not bind the blade at the start of the circle. Listen to the blade and do not overfeed the cut. You can see if the sawdust is clearing the cut. If yes, your feed rate is ok; if not, slow down. Leave sawdust or offcuts where they fall until you finish the cut; do not get distracted.

Tips for Spindle Stock

Spindle stock is usually straightforward. Get a flat side on the bottom and chalk out or use something to get an approximate straight line. Set the upper blade guide within $\frac{1}{2}$ " of the top of

the wood. Freehand cut the first side. Now with two straight sides you can keep one on the table and one against the fence. Keep rotating the stock, always keeping a flat against the table and one against the fence.

When crosscutting stock I suggest using a sled. This keeps the stock square and prevents a blank from binding. Never use a fence and a sled together; it is dangerous. Use a fence to cut with the grain (rip cut) and sled to crosscut the grain. You can use a wood hand screw clamp as a sled; the flats act as a sled. This works on a round cylinder to make a safe cut.

Being Safe

Safety isn't something to take lightly. Bandsaws are indiscriminate; they cut wood or flesh equally well. Eye protection, hearing protection, and dust collection are important.

Make sure the bandsaw is located on a flat floor. Do not cut on a bandsaw that wobbles. Make sure the floor is clear around the saw. Make sure there are no trip hazards, such as cords, cut-off pieces or general debris. Have a table or work surface next to the saw (preferably on the left side) so you have a place to set down and stage your work to cut from. Never open the wheel covers or adjust the saw if it's plugged in. If you hear a clicking, grinding, or squealing noise, shut off the saw and find out what is going on. Clicking usually means a kinked blade. Grinding usually means that the blade teeth are touching the blade guides and there is an adjustment problem. Squealing can be a loose belt, a stuck blade or a tire problem.

The upper blade guide is an integral safety device. You wouldn't leave your tool rest 3" from your work; don't leave your upper blade guide inches away. Adjust the upper blade guide every time you change stock dimensions. ½ inch should be the maximum space between the top of the stock and your work. Under no circumstances should you be able to put a finger in the gap.

Never reach across a running blade. Respect the area in front of the blade. Don't sweep off debris with your hand, try to dislodge a sliver of wood that falls into the blade slot, or do anything else that puts your hands in harm's way. Accidents happen in an instant. Stop the saw before entering the area around the blade.

Safety starts with a clear head. Don't be in a rush, or operate a bandsaw if you are frustrated or in any way impaired. Keep your fingers out of the path of the blade, no matter how far away from the blade you think they are. Blades can break. Don't panic. Turn off the saw, wait for everything to stop and then unplug the saw. Assess what happened, and go through the blade changing steps outlined above.

Always use push sticks and keep your fingers a 6" bowl blank away from the blade. Recognize that you must slow down when exiting the cut. You don't want 6" of exposed blade inches (or less) from your hands.

Listen to your saw blade. It can tell you a lot. You can tell if the gullets are clearing the wood by listening to the saw. With wet wood you will hear if the gullets are clogging. If you feel the saw slowing down, back off on your feed rate and let the gullets clear.

Have a plan to support the work at all times. Be careful with small pieces or use some sort of push stick to keep your fingers clear.

Bandsaws create dust. Clean out the cabinet; use a dust collector system. Dust collects around the bottom wheel, so be careful. Never open the wheel doors when the bandsaw is running or if the saw is plugged in. The wheel doors are critical to keep you away from a spinning blade.

Make sure your bandsaw is properly tuned, the blade has correct tension and you have the correct size sharp blade in the saw. Just as dull turning tools are dangerous, the same applies to dull bandsaw blades. Take the time to put in the correct blade, tension it properly and recycle old blades so that you don't mistake them for sharp ones.