

A Guide to Lathe Maintenance

by Brent English

President, Robust Tools. Copyright 2023

Practice Safe Turning: This is not meant to be a safety guide, but having a nicely maintained lathe is a great start to a safe day's turning. Remember to wear rugged face protection, stay out of the line of fire, and don't turn crappy wood.

Vibration: All lathes will vibrate if you have out of balance work and run the speed to fast. In fact, you should use vibration as an indication to slow down, or to balance your work. Please remember, the wood will break long before the lathe will. Broken wood flying off a lathe is not to be trifled with and should be avoided at all costs. For systemic vibration problems, start with the legs:

All four feet should be carrying about the same weight. This is far more important than having your lathe level. Think of it like a chair with one leg too short. It will always wobble when you shift your weight, which is what happens when you have out of balance work spinning. The weight is shifting from leg to leg.

To get all four legs carrying the same weight you may: 1) adjust leveling pads if present, 2) shim one leg or 3) do other leg adjustments.

If you have leveling pads, loosen one on the tailstock end so that you know that leg is not carrying weight. Put something slightly off balance on the lathe and start at your lowest RPM. Turn up the RPM until the lathe starts to vibrate just a little bit. Then apply pressure to the loose leveling pad until it the lathe smooths out as good as you can make it.

If you don't have leveling pads, reach down and feel which leg is bouncing by placing your finger on the foot of the lathe and on the floor at the same time. Cut a shim from hardwood into a narrow wedge shape (like the kind you use when installing windows or doors) and tap it under the foot until the lathe stops vibrating. If you go too far, you will make another leg bounce and end up chasing the problem.

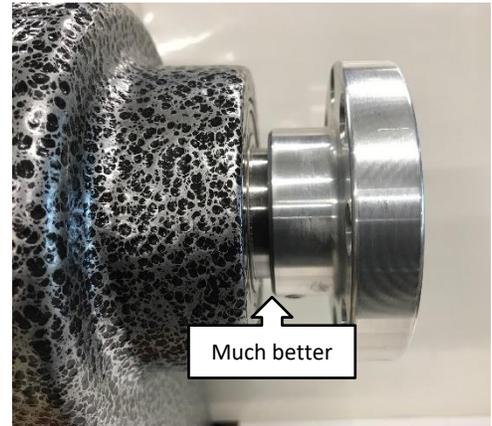


Robust brand lathes are leveled by a "settling" procedure wherein the bolts attaching the leg assemblies are loosened from the bed, allowing the legs to settle evenly to the floor. If you have a Robust lathe, please consult your manual for more instructions.

Hard rubber pads are good for minimizing minor vibration. You want them about 1/8" to 1/4" thick. Thick soft rubber pads won't do much good as your lathe will just float on the rubber. At Robust we use 4" wide "baler belting". It is available at most farm stores by the foot. Industrial conveyor belting can also be good.

Other sources of vibration include worn out or dirty drive belts and loose components. For instance, are your headstock bolts tight? Is your tailstock clamped down securely? Do you have the quill locked?

If your work is not tight on the spindle, you will most certainly get vibration. Here's some common ailments: The work is loose in the chuck. Morse tapers are dirty or bugged and not seating (more on that below). Perhaps the faceplate screws are not

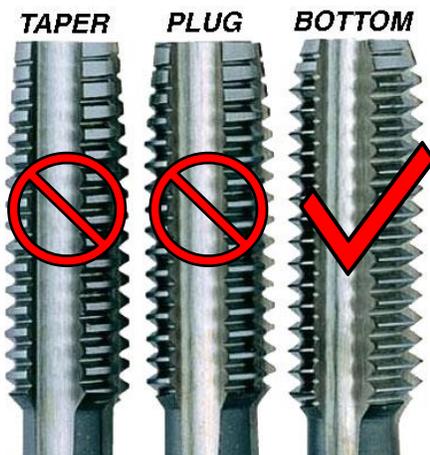


tight. Also check that chucks and faceplates are seated on the spindle shoulder. If not, you'll most certainly have vibration. Some folks use a thin nylon washer between the spindle shoulder and the chuck or faceplate to help the components seat. The washer also has some benefit for keeping the chuck or faceplate from jamming on the spindle. If your chucks or faceplate won't seat, see the next section on spindle maintenance.

Bolting a lathe down and/or adding weight: Adding weight or bolting a lathe to the floor will certainly make the lathe more stable, and may improve the experience at the lathe for the turner. It's important not to impart a twist on the lathe bed as that will negatively affect alignment. But if you're adding weight and/or bolting the lathe to the floor to mitigate a weak or light weight lathe you may be setting yourself up for a false sense of security. If the lathe is shaking, that's nature's way of telling you to slow down and/or get things more balanced. The wood will fail before the lathe will, and failed wood flying off the lathe is not to be trifled with.

Spindle Thread Maintenance: The threads on your spindle, chucks and faceplates must be clean and burr-free. **If your chuck or faceplate doesn't spin on freely: STOP AND FIX IT.**

Every time you put something on the spindle you should clean the threads of



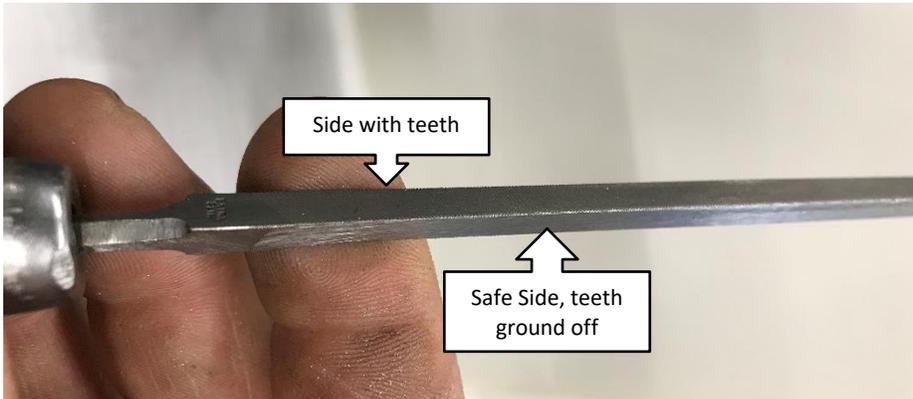
the spindle and the item you are threading on with compressed air. Visually inspect both items for debris. Put a drop of mineral oil on the spindle every now and then. Mineral oil generally won't stain your wood.

Buy a bottoming style tap and periodically run the tap into your chucks and face plates to clean out the threads. Why get a bottom



tap? It has full size threads almost to the end, and it will do the best job of cleaning your chuck inserts, which are often not a through-hole. Use some cutting oil if you have it, any other oil or even wax if you don't. It's OK to run your parts on the tap, rather than running the taps into your parts – see picture to the right showing the tap being held in a vice. Be sure to start the tap straight.

If your spindle is burred up, get a small three corner file and remove the teeth on one side with your grinder or belt sander. You only need to grind off enough to keep the teeth from cutting. Try to keep this "safe side" nice and true. Before filing, visually inspect the spindle. Gently file off the offending burrs with a side of the file with teeth, keeping the safe side on the good side of the thread. The safe side helps locate the file in the thread and keeps you from filing good material while you're cleaning up the burr.

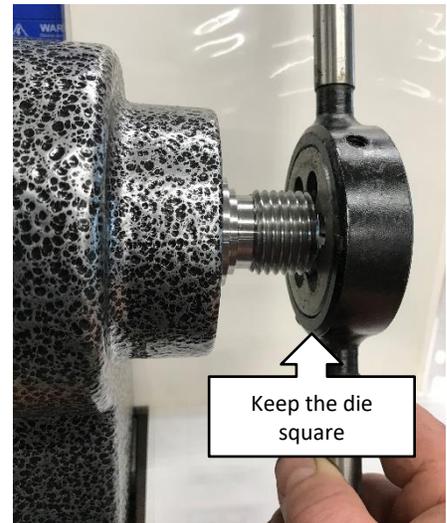


Three things to keep in mind when filing:

- 1) All files need handles (you can even turn your own). This keeps the tang from poking into your flesh.
- 2) A dull file is the same as no file, only more frustrating.
- 3) When using a file, do not use lubrication.

In extreme cases you may need to get a rethreading die and run over the spindle threads. Again, using cutting oil or some other oil or wax for lubrication when you use the die. Be sure to start the die straight, you don't want to cross thread it. If you're careful, you can use the end of the quill gently pressed against the face of the die to keep it square.

If your chuck or face plate has set screws (aka: grub screws) to keep it from unthreading when turning in reverse, make darn sure you have them backed out before threading the faceplate or chuck on or off the spindle. Otherwise, you can make quite a mess of your threads.



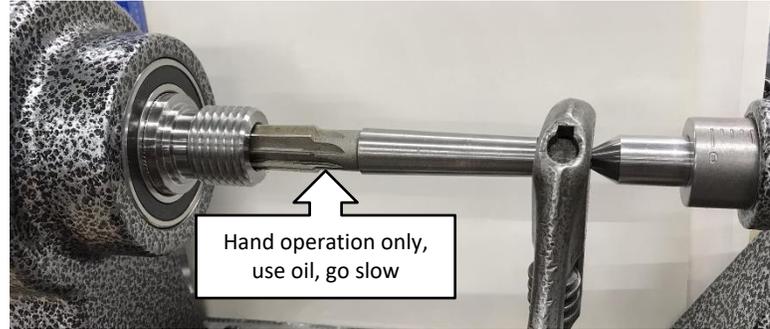
Morse Taper Maintenance: Morse tapers need to be clean and burr-free to work properly. If they are not, the inserted component can spin which may damage both the internal and external tapers.

The "BIG KAISER Morse Taper Spindle Cleaner" is a pretty good item for getting debris out of internal tapers. A quick wipe with your hand or a rag usually suffices for the shank. If your spindle or tailstock tapers have burrs or galls from things spinning in them (usually caused

because parts weren't clean when you used them last), get a Morse taper hand reamer of the appropriate size and use it to clean the internal tapers. When you use the reamer, you're not looking to fully restore a shiny internal surface, you just want to get the high spots off. Going too deep enlarges your taper, and you could get it so big that your accessories will no longer grip. When using the reamer, apply cutting oil liberally. Again, if you don't have cutting oil, use some other oil or wax.



Like a dull file, a dull reamer is the same as no reamer. Use a center opposite of the Morse taper you are reaming to keep the reamer lined up (the reamer has a hole in the end for this purpose). Do not ream under power. Use a wrench on the tang to turn the reamer. Use light pressure, lots of oil, and go slow.



For the external taper (shank), light work with a smooth-cut file is usually all you need. Concentrate only on the burrs and high spots, and leave good surfaces alone.

Spindle Bearings: Most spindle bearings these days are lubricated for life. If spindle bearings go bad, replacement is the only viable option. If you are not familiar with pressing bearings on and off, get some experienced help and consult your user manual. You may need to send the spindle to the manufacturer for this service, and that's what we advise for Robust lathes.

Belts: Modern belts last a long time. Most newer lathes use poly-groove v-belts which are very durable, do a great job of transferring power, and seldom stretch. Keep them clean **AND PROPERLY PLACED ON THE PULLEYS** and they will work a long time. The biggest reasons belts fail is improper tension and trying to run the lathe with the spindle lock engaged.



Keep your belts and pulleys clean. Loosen the belt, and turn it inside out. Clean out the ribs on the belt with a small stiff brush and do the same on the pulley surfaces. Tension on the belt should be snug, but not overly tight. Overtightening the belts stresses the bearings on the spindle and motor and will shorten their life.

If your belt is slipping under heavy cuts, don't put on belt dressing. Dressing just collects dust, makes the belt slick and will worsen your problem. If your belt is good shape, clean and properly tensioned, and you are frequently slipping your belt, it's time to either sharpen your tools, change your turning technique or get a bigger lathe. In fact, having your belt a bit on the loose side may improve safety when doing difficult operations like coring.

Old style v-belts can get dry, crack and glaze over. A fresh one can make a world of difference in how smooth and strong your lathe runs. If you have a Reeves variable speed drive, keeping a good belt on it is important for smooth operation. Speaking of Reeves drives, take the time to check your owner's manual and lubricate them accordingly.

Tailstock Quill: If your quill is not going in and out easily, remove the quill and clean and lubricate the mechanism. Spray grease is handy for the threads and inside of the bore in the tailstock that the quill travels in. Sometimes burrs form along the slot that the quill lock rides in. For instance, drilling with a Forstner bit can create enough twisting force to raise a burr on the edge of the slot. It doesn't take much of a burr to cause the quill to bind. Take a file and remove the burr. Filing a small chamfer on the edge of the slot is a good idea.



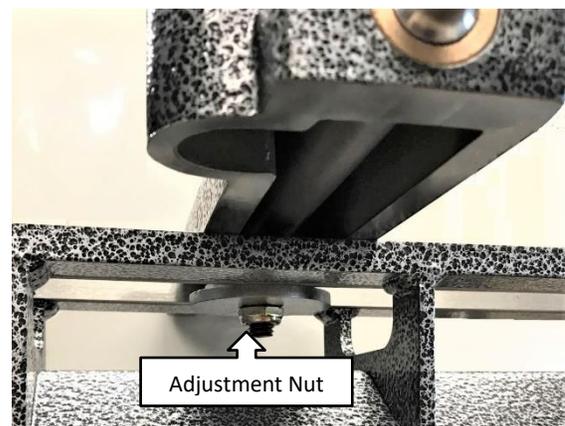
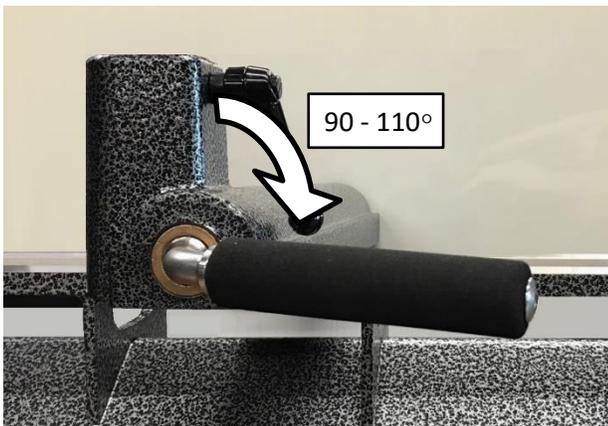
Cast Iron Tool Rests: Cast iron tool rests are notorious for getting nicks and dings. A sharp file will usually clean up the surface quickly. You need to file the whole surface evenly, otherwise you'll end up with a low spot, which may affect your turning. You can also use your belt sander. Sand along the length of the toolrest. Put on a fresh belt, say 60 to 80 grit. If you also use the belt sander for wood, be careful about sparks. If your toolrest are topped with a hardened rod, and you still manage to get a ding, the belt sander may be your only option.

To reduce dings in your cast iron toolrest, "soften" or round the corners of you skewers, scrapers and bedans so they won't dig in.

Careful! Sparks and sawdust don't mix



Locking Levers and Cams: The locking levers for your banjo and tailstock should be adjusted so that they rotate about 90 -110 degrees from vertical when locked. You'll get your best locking action there.



To adjust where the locking lever stops, adjust the nut underneath the ways that holds the keeper on. Cams and the locking mechanisms generally work best if they are dry and free of grease or dirt. Light lubrication is OK, but wipe off any excess with a paper towel. This is a place where WD-40 works well. Simply spray it on and wipe it off.

Lathe Bed Maintenance: 3M Scotch Brite works great for routine cleaning of the lathe bed and the bottoms of the sliding components. If your lathe bed has gotten rusty, block sand it. Use fresh coarse paper, like 80 or 120 grit. First spray the ways with WD-40 and then block sand. Wipe them clean and treat them with Paraffin or paste wax. Slide the banjo and tailstock around so that the wax gets picked up on their bottom surfaces. Go hi-tech if you want, but basic waxes work just fine. Avoid silicone-based lubricants, you'll like waxes better.

Alignment: Center alignment isn't all that fussy for most spindle turning, but there are two places where it can be critical. First, if you are holding something on a faceplate or chuck and use your live center, you'll want good alignment. Second, for accurate hole drilling.

A frequent cause of misalignment is debris stuck to the bottom of the headstock or tailstock. A very small amount can make a big difference. If a thorough cleaning does not re-establish alignment, look to your lathe bed.

Having the lathe bed level isn't all that important. It's much more important that the lathe bed is not twisted. Yes, cast iron lathe beds twist just as bad as fabricated ones. You may need to adjust your legs to remove the twist. The bigger the swing you have, the more a twisted bed affects alignment. You'll need a precise level to do this, or just run your centers next to each other and adjust the legs until the centers line up.

A third thing to consider is normal play in the components. There is a tenon underneath the tailstock that runs in between the ways. There is some play in the fit, otherwise you wouldn't be able to slide the tailstock. The same holds true if you have a sliding headstock. You may be able to just loosen the tailstock or headstock and reposition them to align the centers.

Lathe Maintenance Tool Kit: Here are a few things to have in your tool kit to keep your lathe in good order:

- Paraffin or paste wax for lathe bed and underside of banjo, tailstock and sliding headstock
- Sharp three corner file with one side ground safe for deburring spindle threads
- Bottoming tap the same size as your spindle for cleaning chuck and face plate internal threads
- Spray grease for quill
- Scotch Brite for cleaning lathe bed and underside of banjo, tailstock and sliding headstock
- Small stiff brush for cleaning belt and pulleys
- Mineral oil for lubricating spindle threads
- Light lube oil, like WD-40 or 3-in-1
- BIG KAISER Morse Taper Spindle Cleaner or similar
- Morse taper reamer
- Single cut file (aka: mill file or bastard file). A sharp one.
- General hand tools needed to maintain your lathe (wrenches, screwdrivers, Allen wrenches).

Closing words of wisdom: Cleaned and oiled is always better than dirty and dry.