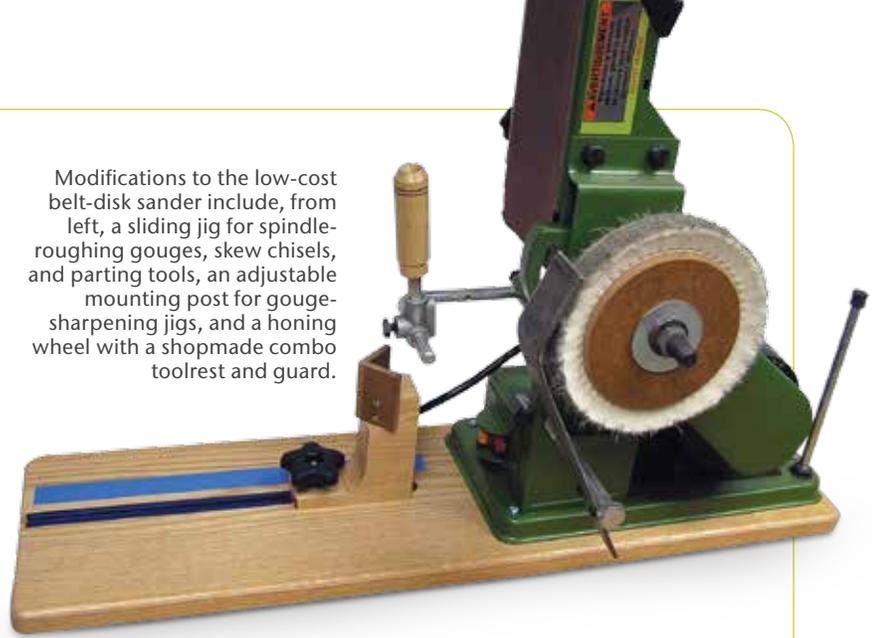


D.I.Y.

Belt Sharpening System

Jim Echter

Modifications to the low-cost belt-disk sander include, from left, a sliding jig for spindle-roughing gouges, skew chisels, and parting tools, an adjustable mounting post for gouge-sharpening jigs, and a honing wheel with a shopmade combo toolrest and guard.



While researching sharpening systems for woodturners, belt systems piqued my interest. For years I have been sharpening on an 8" two-wheel dry grinder equipped with a jig for gouges on one wheel, and an adjustable-angle platform for scrapers on the other. But the argument for a flat grind instead of the usual hollow grind made sense to me, so I decided to buy a belt-disk sanding machine and modify it to my purposes.



1 A catalog photo showing the Harbor Freight belt-disk sander fully assembled. Watch for a sale coupon before you buy it.



2 For this modification, unpack the parts but do not mount the disk sander or its table. Also, remove the back cover and bottom dust port, the sanding-belt guard, and the drive-belt cover.

I possess the frugality gene, which means I needed to find a machine within my limited tool budget. Luckily a couple of members of my local AAW chapter, who also have the frugality gene, discovered that an effective system could be built using an imported belt-disk sander. So off I went to the Harbor Freight store with my 20% off coupon from the Sunday newspaper. I came home with their combination 4" × 36" belt/6" disk sander, catalog number 97181, for about \$100 (*Photo 1*). The modifications included:

- dismantling the sander table for parts to make a jig-mounting post for gouge sharpening (*Photos 2, 3, 4, 5, 6, 17*) ▶

Jig post and socket



3

Dismantle the disk sander's side table and extract these parts, which we used to make a post and socket to hold jigs for the abrasive belt.



4

Assemble the salvaged parts like this.



5

(5) Install the parts into the front table hole and tighten the side screw. Between the side screw and the front screw, the post can be positioned to suit the sharpening jig you use.



6

Turn a jig socket to slip over the upright post; my post was .470" in diameter so I could drill a 1/2" hole. The jig's ball pivot fits into the socket on top of the turning. *Photo 17 shows how this works.*

Honing disk and guard



7

The 1/2" arbor will need a nylon spacer to connect it to the metric disk shaft. Drill out the spacer to match the disk sander side shaft. Drill clearance holes to match the arbor set screws.



8

Use the long bolt and the 1/8" steel bar to make the combo toolrest and guard for the buffing wheel. Drill two 5/32" holes in the mounting bolt. Drill 13/64" clearance holes in the steel bar.



9

Tap the 5/32" holes in the bolt for two 10-32 x 1/2" machine screws for mounting the steel guard bar.



10

Run the long bolt into the hole in the machine base, then screw the steel bar to it. Bend the bar at 2" for about 30° or what looks right against your wheel.



11

To stiffen the buffing wheel, turn a pair of support disks from 1/4" hardboard and back them up with the fender washers. These disks are about 4 1/2" in diameter.

- extending the disk-sander shaft to mount a buffing wheel for honing (Photos 7, 11)
- making and mounting a combo guard and toolrest for the honing wheel (Photos 8, 9, 10)
- making an adjustable tool holder for spindle-roughing gouges, skew chisels, and parting tools (Photos 12, 13, 16)
- twisting the drive belt to reverse the direction of the sanding belt and honing wheel (Photos 14, 15) With this setup, the belt and disk both run away from

the sharp tool edge, eliminating the risk of a dangerous catch. Bowl and spindle gouges can be sharpened in the same manner using the same jigs as you would with grinding wheels. Since the belt runs away from the edge, a quick touch to the buffing wheel, charged with polishing compound, will remove the wire burr. Once you start using this system to sharpen metal tools, never sand wood with it. Wood dust and metal sharpening sparks do not mix. And

always remember to wear your safety glasses.

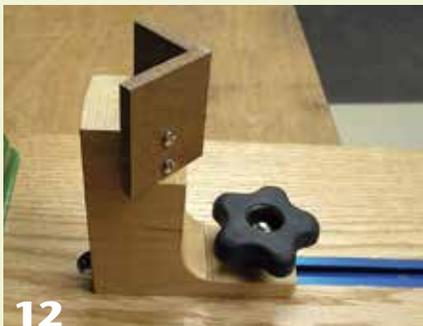
The beauty of this system is that you can change belt grits quickly. Use a coarse-grit belt to change the profile of a tool and a fine-grit belt for putting on a fresh sharp edge. Charge the buffing wheel with an abrasive polishing compound. Just a light touch will remove the wire edge and you are quickly back at the lathe, enjoying the sweetness of a sharp tool.

Getting started

This system was easy to build. It took longer driving to my local hardware stores to purchase the parts than the actual build time. Listed below are the parts I had to buy, a grand total of about \$20 less the arbor, which I already owned.

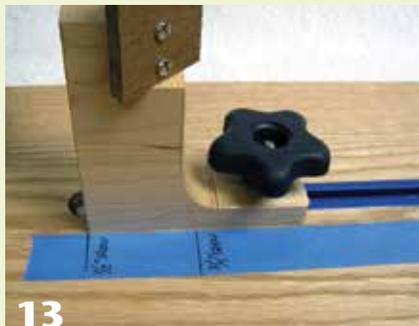
- One 12 mm × 130 mm bolt
- Two 10-32 × ½" machine screws
- One .500 OD × .385 ID × 1" nylon spacer
- One 6" buffing wheel and polishing compound
- One ½" arbor
- One 1½" wide × 1/8" thick × 9" long steel bar stock
- Two ½" fender washers
- One 8" × 28" hardwood board
- One 12" T-Channel
- One T-Bolt
- One Knob to suit
- Five #8 × 1¼" panhead screws for mounting sander to board

Adjustable tool holder



12

The sliding V block that holds the handle of the tool being sharpened is a piece of 1½" maple with ¼" hardboard scraps forming the pocket. It slides in a 12" length of T-channel in a routed groove that is centered on the abrasive belt (not on the board).



13

Drill a ¼" hole for the T-bolt and plastic locking knob, and drill a second hole near the front for a small piece of ¼" dowel to help track the V block. Marks on the blue tape index the V block for different tools.

Reverse direction



14

To reverse the direction of the sanding belt and honing wheel, loosen the motor bolts and twist the drive belt into a figure eight. Remount the drive-belt cover.



15

Tighten the motor mount bolts but let the motor twist as much as it can to minimize wear on the twisted belt.

Jim Echter is a professional turner who lives near Rochester, NY. He specializes in making tools for fiber artists, turning custom architectural pieces, and teaching. Jim's home club is the Finger Lakes Woodturners Association, and his website is truecreations.biz.

The machine in action



Here is the machine in action, sharpening a skew chisel. For easy repeatability, the sliding V block indexes against marks on the blue tape. I removed the rubber feet from the sander and used five #8 x 1/4" panhead screws to mount the sander on the wooden base.



The Tru-Grind gouge-sharpening jig pivots in the socket turned into the top of the jig-holding sleeve.

Pioneers of belt sharpening Jon Siegel



(Above) Woodcraft introduced the belt-buff concept 40 years ago with this Mark II system.

(Left) On the Big Tree Tools flat-platen belt machine, both sides of a skew chisel can be ground and sharpened from a single jig position. The belt machine works equally well if the edge of the skew is straight or curved.

Photo courtesy Guild of New Hampshire Woodworkers

Woodcraft Supply popularized the belt-buff sharpening concept in the 1970s with their Mark II system, which featured a 2" (5 cm) belt running over a large round contact wheel. Today, those machines are collectors' items. When new, they were expensive—\$1,400 when corrected for inflation. After using the Woodcraft machine and liking its results, I decided to make my own. It needed to be portable for teaching, to have a flat platen instead of a round contact wheel, an incrementally adjustable pocket jig, and a much lower speed.

I retained several things from the Woodcraft design: a five-second belt change, pocket jigs instead of a platform, the ability to sharpen and buff on the same machine, and upward belt travel, away from the edge. This quest led me to converting low-cost imported 4" x 36" (10 cm x 90 cm) belt sanders. I sold more than 200 through my company, Big Tree Tools LLC.

Last year, we decided to stop making the machines. Woodworkers continued to ask about them, however, and I reconsidered how I could further the belt-sharpening revolution. I have assembled a team to design a new and better belt machine that will be capable of sharpening most woodworking hand tools. Having already built hundreds of the previous models, we have good ideas about what we need to improve.

Advantages of a belt machine

Converting woodworkers from wheels to belts involves big changes, but the advantages are huge:

- Grinding wheels run too fast, overheating the steel, intimidating beginners, and sometimes causing accidents.
- It is time-consuming to change the grit in a grinder wheel system; turners will settle for using the same grit for everything, which limits versatility. Belts can be changed in five seconds.
- With a belt-buff system, chisels can be sharpened in ten seconds (including setup and deburring). This eliminates sharpening procrastination and fosters turning with truly sharp tools.
- A belt-buff system virtually eliminates time-consuming hand-honing, while accurate jigs assure repeatable setups that allow you to remove the minimum amount of metal.

Our new machines will be ready for market late next year. In the meantime, consider following our approach, as developed by Jim Echter in his DIY belt-sharpening system article. You will be delighted to have evolved beyond the stone age of sharpening.

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