MAKE YOUR OWN INEXPENSIVE SELF-POWERED ROTARY SANDERS

In 2017 Rudy Lopez was one of AWA's featured professional turners. He put on a wonderful demonstration, and followed it up with 3 days of hands-on classes for about 15 of our members. Not only did he demonstrate a number of new woodturning ideas, he also showed us several of the homemade tools he has made for himself. I have made my own versions of some of them, including Rudy's grinder jig, and his self-powered rotary sander.

Rudy provided excellent directions for making the grinder jig, but no directions for making the self-powered rotary sander; perhaps because he felt it was so darned easy to make that no directions would be needed? It is much easier than it first appeared, but I supposed that some members of AWA would like to have a pictorial "How To." I know I would have liked one. So here it is.

Here's a picture of Rudy's dual-headed sander which he passed it around for his demonstration attendees to see.

I went to Home Depot and bought a 10-foot length of 3/4-inch plastic electrical conduit. As I recall, it cost less than $3.00. I cut it into eight equal lengths. In retrospect, I could have cut it into 10 lengths.

The next step is to flatten both ends of the conduit. Pre-set the jaws of your bench vise to the diameter of the pipe, so that once you heat the pipe, you don't waste valuable time adjusting the vise jaws.

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Next I pulled out my cheap Harbor Freight heat gun, and heated one end of the pipe. I was worried about making the plastic too soft, and it was a good thing I worried; it is very easy to melt it quickly. The correct amount of heat is just enough to make it soft enough to compress the end, but not so much as to go from pliable to melted. Go slow in the first end, and you'll quickly figure out the proper amount of heat. I learned to look for a tiny shade of browning along the margin of the heated portion.

Once the pipe is heated, place the heated end in the vise and quickly squeeze it flat. Don't squeeze beyond just causing the two sides to meet. If you overtighten, you can flatten it out so thin it has no strength, and widens way out beyond what is usable. (Even done properly, the flattened sides may need to be ground back to the diameter of the conduit.)

Bend the conduit to about 45 degrees, and hold it for a minute or so until it cools enough to set.

Here's what the end looks like after flattening -- complete with the imprint of the bench vise jaws. This was the first conduit I heated, and you can see that I over-cooked it a bit. It browned up quite nicely, but it didn't seem to affect its strength. This conduit is very tough stuff.

Now, repeat the heating, flattening, and bending of the other end of the conduit. Try, for aesthetic reasons, to keep the two ends bent on the same axis. It doesn't matter a bit if they are not quite on the same axis, but it sure looks better if they are. Do as I say, not as I did on my first one!

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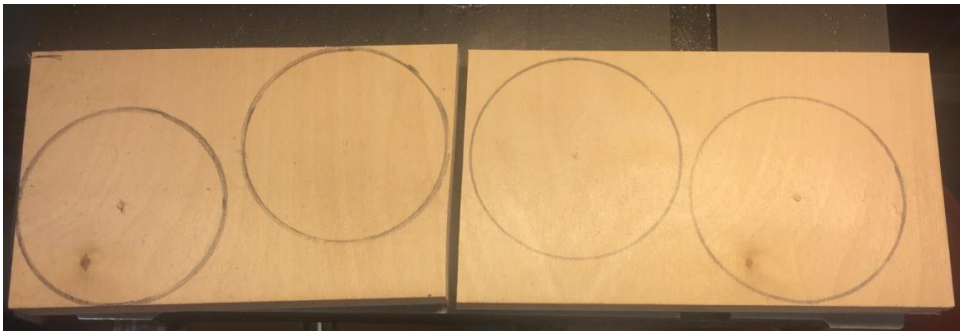
Drill a 5/16-inch hole in each end of the conduit.

Use a disk sander or belt sander to round the edges. Make sure to slightly soften the edges. The plastic can cut you if you don't soften the edges.

The handle part is finished. You can lay it aside and start working on the rotary sanding pads. This was the part I thought would be tough to figure out, but it worked out to be quite easy.

I used 3/4-inch thick Baltic Birch plywood scraps to make the rotary disks. I used a pencil compass to draw 3-inch circles on the plywood, and then cut the circles out on a bandsaw.



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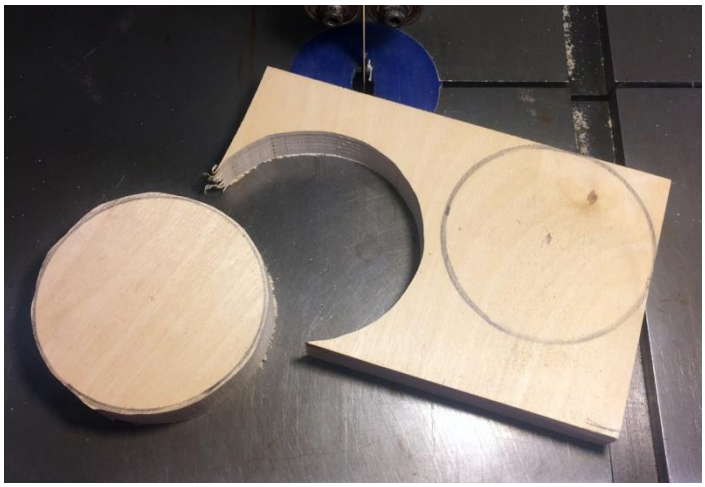


Be reasonably careful cutting out your disks, but don't worry if they're not exactly circular. You'll be turning them perfectly round on your lathe. Oh, that reminds me, be sure to mark you compass center well, because you will need that center mark when you mount the disks on your lathe.

Next, drill a hole 3/8-inches deep, (and no deeper) using whatever bit fits your screw chuck. The threads of the screw chuck are much longer than needed, so you will probably need to put a plywood spacer behind the disk to stabilize it while you turn the disk round. I didn't want to drill the hole all the way through the disk, which may have been foolish in retrospect, and I made extra work for myself because I didn't want that little hole under my sanding disk. But this is how I did it. In retrospect, I could easily have used the screw chuck for the whole process, but I didn't. I used the screw chuck to make the disk round; then I reversed the disk and gripped it in grooved jaws to bevel the rotary disk.

Here's a picture of the rotary disk being rounded while mounted on the screw chuck. Note the lack of a hole in the front side. Once I got half the disk rounded true, I dismounted the disk from the screw chuck and mounted it in grooved jaws to cut the back-side bevel.

I gripped the rounded edge by about 1/16-inches in the grooved jaws, using a spacer block behind the disk. The spacer block was slightly smaller than the jaws, but assured that the disk I was turning stayed perpendicular to the axis of the lathe.

I used a carbide cutter, simply because it produces the best surface on Baltic Birch plywood.

I normally use a gouge for most of my work, but carbide definitely has its advantages in some situations.

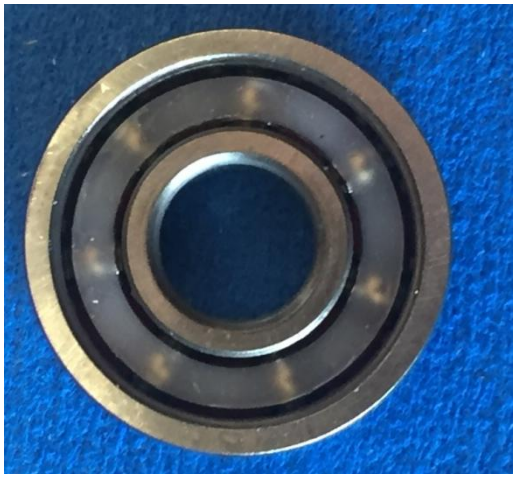
Here is the shaped sanding disk. Note the screw chuck hole in the backside, and the bevel up to a 1/16-inch ring gripped in the jaws. Here you can see the spacer block behind the disk. I created extra work for myself by not just using the screw chuck throughout. Leave the disk mounted

because the next step is to inlet the backside of the rotary disk to make room for the bearing and nut that holds the bearing in place.

The skateboard bearing is sealed on one side, and is 7 mm thick by 22 mm in diameter. The inner bearing race has an 8 mm hole, which accepts a 5/16-inch bolt loosely, but not too loose (0.025 inches of play). The slight bit of play is immaterial in this application, because the bearing is gripped from front to back in this application, which keeps it from wobbling.

Here is the "top" side of the bearing. You can see the red rubber seal that will keep sawdust out of the bearing race. The backside does not have the rubber seal, but it is "buried" in the rotary sanding disk where no sawdust should reach it.

Here is the backside of the bearing. You can see the seven ball bearings inside the race, and covered with a nylon retainer that has plenty of room for application of bearing grease, if you ever need it. I don't think this application will ever call for a re-greasing of the bearings unless you are a total turning addict who cranks out thousands of bowls.



You can set your calipers to 22 mm, or you can run the jaws up against the bearing, and the calipers will set themselves at 22 mm. Even cheap plastic calipers can do this. Look carefully, and you'll see they are exactly on 22 mm.

Oh, you are wondering where to buy skateboard bearings? I got mine through Amazon.com. I bought good quality bearings: Bones Bearings' Red Bearings brand, in an eight pack. No spacers. The cost was $12, which included shipping. That's $1.50 per rotating sanding disk.

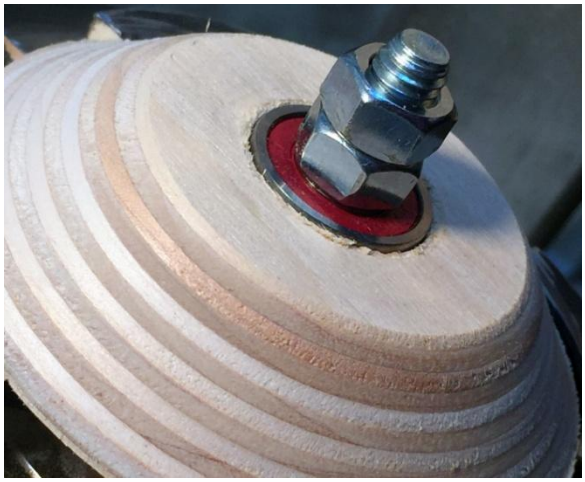
Next, you transfer the 22 mm diameter to the backside of the rotary sanding disk. The cheap plastic calipers won't scribe the plywood, but a sharp awl did the trick just fine, once I knew where to hold it.

The hole needs to be cut 7 mm deep -- the thickness of the bearing. Too deep, and you can throw away that rotary sanding disk; or you can, I suppose, jury rig a spacer behind the bearing to bring it back flush with the back of the wooden disk. It is really very easy to sneak up on the 7 mm depth.

Once you have bored the snug hole for the bearing, you'll need to bore the center out a bit deeper to accept the 5/16-inch-bolt's head, which is holding the bearing.

Don't get too sloppy with the width of the relief hole for the bolt head. You need a good ledge for the bearing to seat itself on. You do need to go deep enough to make sure the bolt head doesn't bottom out. It is an easy trial and error.

Put the bearing and bolt head in place, and spin the bolt. If there is any resistance, it is most likely due to the bolt-head hole being too shallow or too narrow.



Don't forget to do the spin test, or you'll be quite unhappy with yourself later when your rotary sander doesn't spin. It should spin freely. If not, relieve the bolt-head hole a bit more.

Once the bearing spins freely, remove it, and drill three pilot holes for the retainer screws that will hold the bearing and bolt head in place. You want the head of the retainer screws to reach out over the outer bearing race, but not much further, lest you compress the sealed bearing cover.

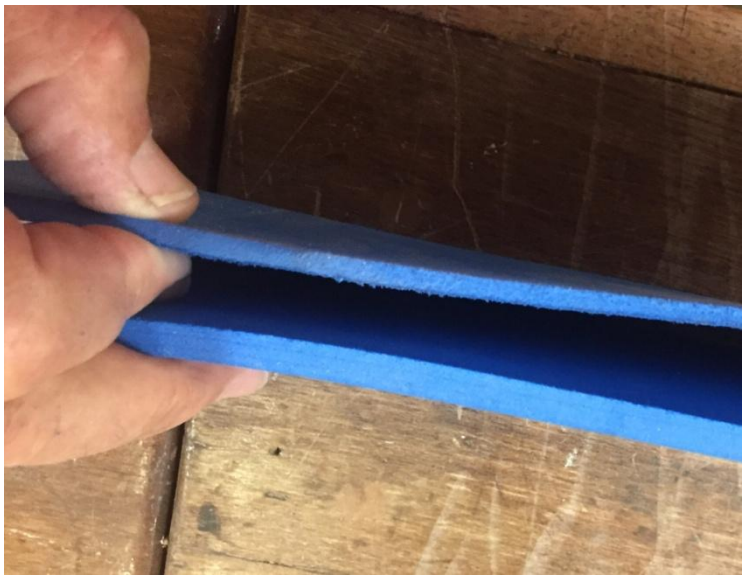
Next, replace the bearing assembly, and screw it into place.

At this point, your bearing assembly is installed in the sanding disk, and this step is finished.

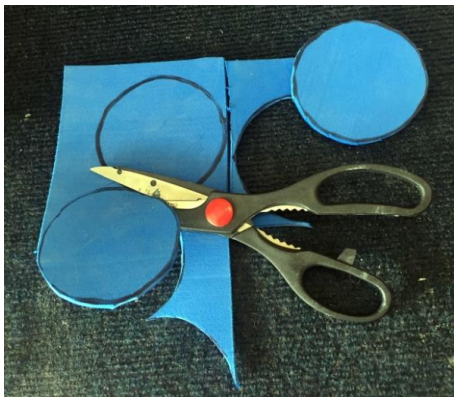
The next step will be to put a dense foam pad on the face of the rotary sanding disk.

But where do you get the dense foam? The foam floor mats that you put on your shop floor, tile by tile, to keep your feet from hurting from hours of standing on the concrete floor are ideal, they're just too thick by twice. So what to do? Resaw the foam on your bandsaw! Really.

That's right, it is easy to resaw it. But you have to sandwich the flexible foam between two pieces of plywood to keep it behaving during the resawing process. No need to use any fasteners or anything, just use a bit of finger pressure against the outside plywood, so the sandwich stays snug against the bandsaw's rip fence. It works like a charm, and the cut is amazingly smooth.



The different thickness of the two pieces is not an accident. One side of the floor pad is smooth, but the other side is pebble grained. I resawed twice to remove the pebble grain. Bet you didn't know and wouldn't believe that you could resaw a flexible foam pad so thinly. I approached the project with great caution, and my first bit of cutting was done with fingers well back, and a very slow feed. It was all unnecessary, IF YOU KEEP the plywood sandwich blocks firmly in place. All bets are off if you neglect to do that.



Next, use one of your wooden rotary disks as an outline, and draw circles on the foam. Then cut the foam out with a pair of shop scissors from Harbor Freight. The foam cuts very easily, but it does dull the scissors rather quickly, so a free pair of scissors from Harbor Freight is just the ticket for this task.

Now that you have your foam backing ready, it is time to glue it onto the Baltic Birch plywood sanding disks. What glue should you use? A sticky glue that will adhere well to wood and to foam. I just happened to have some indoor-outdoor carpet adhesive left over, so I used it. It works very well.

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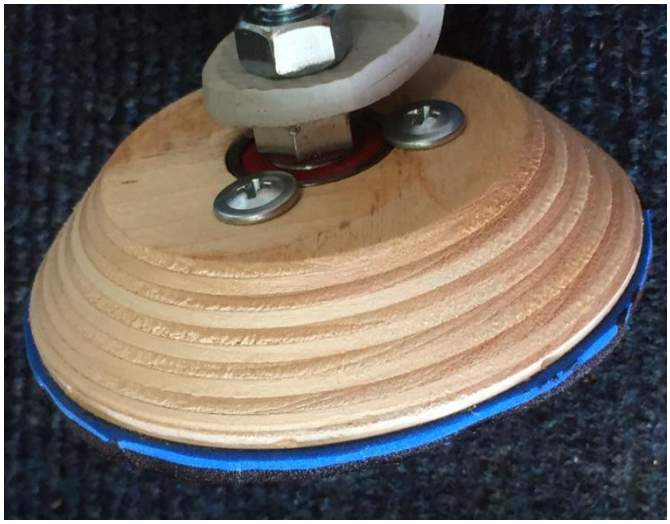
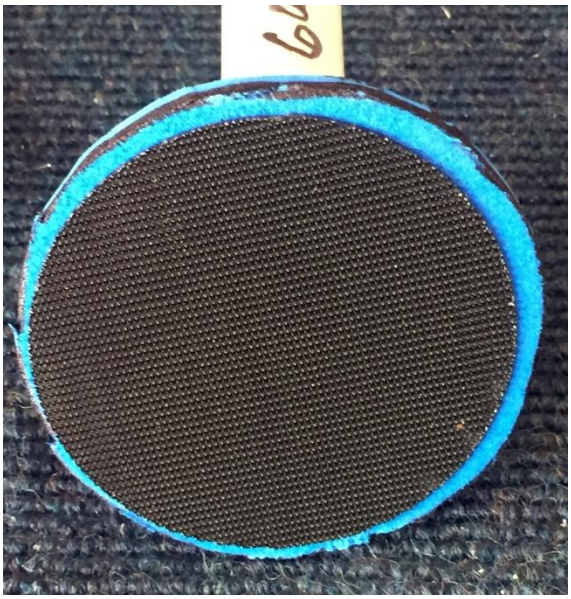
And here is the foam pad glued to the rotary sanding disk. The foam overlaps the wood by about the width of my felt tip marker; which was an intentional feature -- discovered after the fact.





Next is the Velcro backing. This is the hook part of the Velcro. I got the heavy-duty 3-inch Velcro disks from Vince's WoodNWonders. They are the best I could find; and they have a peel off sticky back that is as tenacious as a pit bull. Good stuff; and the most expensive part of these inexpensive sanders. Note the overlap of the foam pad beyond the Velcro. Not to worry. The sandpaper overlaps everything, and it gives the sanders a softer edge.

Finally, here is the sanding head, with 600 grit Velcro backed sandpaper, also from Vince's. I have under $8.00 invested in each of my double headed self-powered rotary sanders. I made up a whole set so I can just leave them loaded with grits from 80 up through 600. It was a fun project.

-- Marvin Fretwell, 05-2017