

# A JIG FOR PERFECT CIRCLES

Ken Rizza



Plywood, some simple hardware, a pen bushing, and a cutting board combine to make a safe, easy-to-use jig for cutting bowl blanks.

When a local church asked me to make 100 bowls from trees it was cutting down on its property, I knew I would need a circle-cutting jig to make the blanks. Commercially made jigs have their limitations: overhead supports that get in the way, designs that restrict the size of the blank, or high cost.

Thomas Edison said that after many attempts to invent the lightbulb, he was not a failure because he had discovered 10,000 ways *not* to make a lightbulb. Fortunately, I didn't need that many tries to come up with a simple jig to cut perfectly round turning blanks. Using a jig is a lot safer than trying to cut a blank freehand, and having round blanks will save time by eliminating air-cutting bumps while turning.

The jig is basically a sled, riding in the miter slot of a bandsaw table that allows the wood to be rotated past the blade in a full circle. I devised a Lazy Susan that fastens onto the bottom of the log and provides a stable, secure way to pivot the wood into the saw blade (*Photo 1*). The size of your bandsaw table will determine the size of the sled. I have a

19" Grizzly, so I was able to make an 18" × 24" (457mm × 610mm) sled.

### Make the base

Do not make the jig too big—the band-saw's throat size will limit the jig's depth (the direction perpendicular to the blade). The jig's width (the direction in line with the blade) should be limited to the table width, minus 2" (50mm), which provides room for an adjustable stop to center the blank with the blade. The sled and Lazy Susan discs will reduce the cutting height of your bandsaw by a bit more than 1" (25mm).

Once you have settled on a size, cut the sled base from  $\frac{3}{4}$ " (19mm) plywood or medium-density fiberboard (MDF). Align the base on the saw table and attach a runner that will fit into the miter slot. Make a runner from hardwood or buy one made of aluminum or polyethylene. Either way, be sure the runner is a tight fit in the slot with no movement. Position the runner so that when the blade cuts into the base, there will be at least 6" (150mm) of base all around the blade to support the Lazy Susan.

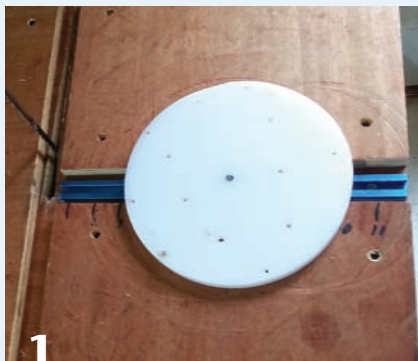
Mount a miter track perpendicular to the blade. It should extend from the edge of the sled to within about 1" (25mm) of the blade. This track determines the maximum radius you can cut. My track is 11½" (29cm) long, so I can cut blanks as large as 23" (58cm) in diameter.

Riding in the track is a pivot pin made from a  $\frac{1}{4}$ " × 1½" (6mm × 38mm) hex-head bolt that is sharpened to a point (*Photo 2*). Add washers so the top of the nut is a hair higher than the base.

Add a second layer of plywood or MDF, this time in separate pieces to end up with about 1" of space around the track with the bolt (*Photo 3*). You could omit the second layer and cut a slot for the track with a router. I like the extra wood because it makes the base more rigid.

### Make the stop

The stop ensures the pivot pin will be properly aligned with the blade. You could ▶



**1** The jig has a runner to fit in the saw's miter slot. A disc made from a cutting board fits over a bolt in a track perpendicular to the blade.



**2** The track holding the pivot pin. Move the pin back and forth to cut blanks of different diameters.



**3** Add a second layer of plywood, leaving space around the blade and pivot track.



**4** A bolt threaded through a piece of angle iron makes a stop to fine-tune the jig's alignment.



**5** Use the jig to cut a circle from the cutting board.

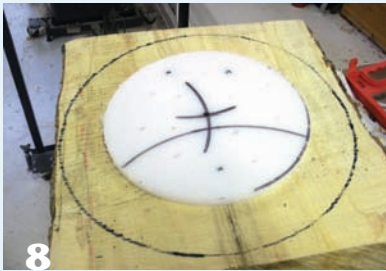


**6** Drill counterbored holes in the discs to serve as mounting holes for the wood blank.





**7** Measure the radius of the blank to be cut and use a socket wrench to lock the pivot pin at that point.



**8** Outline the circle you want to cut, center a disc, and screw it to the wood.



**9** The jig allows you to rotate the blank smoothly into the blade.



**10** Perfect every time.

simply line up the pivot pin and attach a clamp to the saw table to serve as the stop. If the clamp moves at all, however, it will throw off the cut. And, as I learned the hard way, that can cause all kinds of problems. I spent a lot of time cutting away wood with a reciprocating saw to free a blade that got bound in the cut.

After that, I made a simple adjustable stop. I took a small piece of angle iron, drilled it, tapped it to accept a ¼" (6mm) bolt, and mounted it onto the fence guide on the far side of the saw table using two screws. The bolt allows me to fine-tune the position of the pivot pin; I have a knob on the bolt to lock it in place (*Photo 4*). The angle iron is held with two screws, so I can easily remove it.

### Make the Lazy Susan discs

I made my discs from a 15" × 20" (380mm × 508mm) high-density polyethylene cutting board, which will yield at least two large circles or several smaller ones. Turning blanks need to be a larger diameter than the polyethylene circles to avoid cutting the plastic.

Lay out the circles. I use a compass with a waterproof marker in place of the pencil. Drill a ¼" (6mm) hole partway through the center of each circle. From a Slimline pen kit, take the shorter of the two 7mm bushings and carefully grind a slight bevel on its edge. Drive the bushing into the hole until it is nearly flush with the bottom of the disc, using a soft mallet or piece of wood to avoid damaging the metal. The bushing should not go all the way through the plastic.

Use the jig to cut the circles. Set the adjustable stop so the pivot pin aligns with the back of the gullets on the blade's teeth. Measure the radius of a circle. Set the pivot pin that distance from the blade and lock it down with a socket wrench. Pull the sled back. Invert the polyethylene sheet over the pivot pin so the pin fits inside the bushing. Push the sled into the blade until it hits the stop. Rotate the polyethylene to cut it into a perfect circle (*Photo 5*). It should

rotate smoothly and not hang up. Repeat for all the other circles.

Drill holes all over each circle, and countersink them so the screw heads can be recessed (*Photo 6*). You will use two or three of these holes to screw the disc onto the wood blank. The more holes you have, the easier it will be to work around high and low spots on the wood. Once you screw the wood onto the disc, it will not move.

### Cut a circle

Use the marker-equipped compass to draw the largest circle you can on a wood blank. Mark the center, measure the radius, and set the pivot pin to that distance (*Photo 7*). Screw a wood blank onto one of the Lazy Susan discs so it is centered on the circle drawn on the wood (*Photo 8*). Fit the disc over the pivot pin and pull the sled back so the wood is clear of the blade.

When I have a really large blank and need to slide the sled back to mount it onto the pin, I set a roller stand to the height of the bandsaw table and place it next to the saw. This gives the sled some support until I can push it into the blade.

Hold the wood firmly and push the sled into the blade until it hits the stop. Turn the wood clockwise slowly and steadily with your hands on either side of the blade (*Photo 9*). You will get a perfect circle every time (*Photo 10*).

Last but not least, use the right blade. I highly recommend the Timber Wolf AS series, which is designed to cut 6" to 12" (15cm to 30cm) hardwood and softwood, wet or green. The one I use is ¾" (10mm) wide, .032" (.80mm) thick, and has three teeth per inch.

If you mark the blank's center when putting the disc on the wood, mounting the wood onto the lathe will be a snap. You will be able to shape the bowl almost from the get-go. ■

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