Turning the Perfect Sphere - Rick Bryant

Why turn a sphere?

Spheres can be a part or the purpose of many turning projects as shown in the picture below.

A simple example is a wooden baseball which is the basis for this document.

Create a blank cylinder.

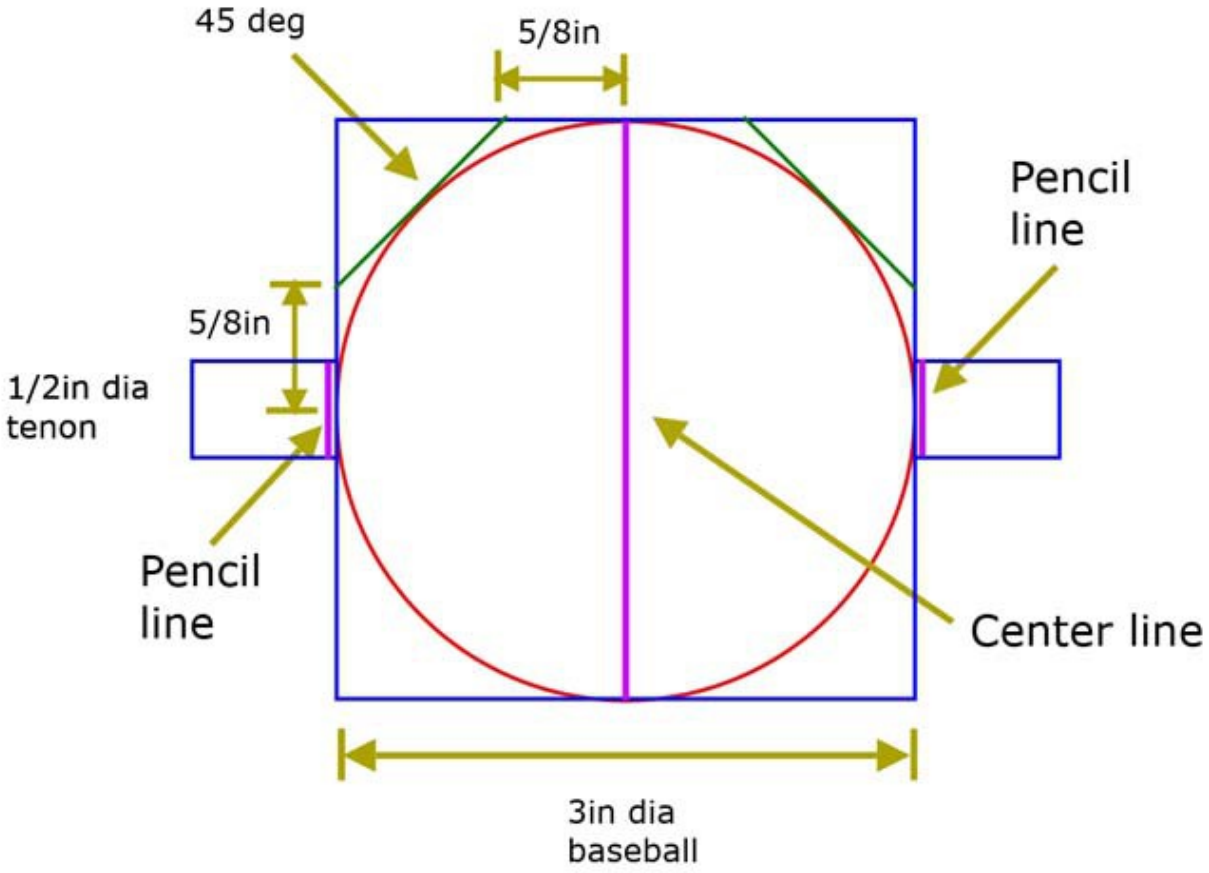
Start by turning a cylinder 3in diameter. Length is optional, but 4in long is a good size. Any additional length will eventually be turned away.

Mount the blank between centers, ideally with some type of safety center like a Steb center in the headstock. This will allow the piece to spin in case of a catch.

Start to shape the cylinder

See Figure 1 for overall dimensions. If the cylinder diameter is different than 3in the dimensions need to be re-calculated.

Figure 1



Mark a line down the middle of the cylinder which will be the center line for the sphere. DO NOT turn or erase this line.

Mark lines spaced at 5/8in either side of the center line. This dimension is for a 3in diameter baseball. If a different diameter is turned, this dimension will need to be re-calculated

Mark lines at 1 1/2in either side of the center line. These will be the sides of the sphere. If the diameter of the baseball is different than 3in, these lines need to be ½ the diameter being turned.

Turn a tenon of 1/2in diameter on either end of the cylinder stopping at the lines marked above. Draw a line around the tenon to denote the side of the cylinder. This will be used for later shaping.

Mark a 5/8in diameter circle on the side of the cylinder. This will be 3/8in line above the 1/2in diameter tenon.

Draw a pencil line around the end of the tenon, used for shaping to avoid making the sphere too small after the tenon is removed.

Cut off the corners

Turn off the corners to make a 45 deg line which joins the 5/8in mark either side of the center line and the 5/8in diameter circle drawn on the sides of the cylinder.

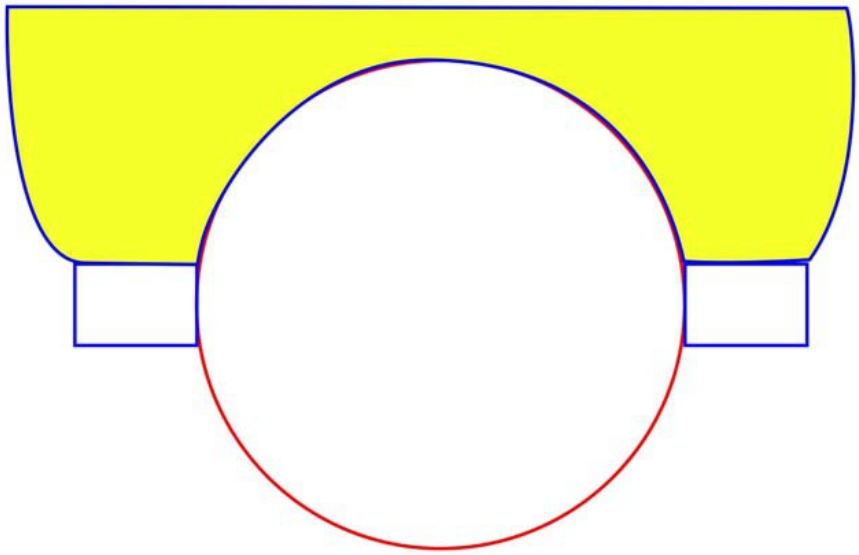
Note - if the corners are turned beyond the 5/8in marks the baseball will be smaller than 3in diameter.

Shape the sphere

The 45 deg line is a fast way to remove most of the waste. There are several ways to create the sphere

1. Eyeball the shape. Seems easy, but takes skill and practice to get a perfect sphere.
2. Use a template as shown in Figure 2 below. The template will be held close to the turning to see where material needs to be removed to match the template outline.
3. Use some existing object with a consistent hole such as a washer, or plumbing fixture.

Figure 2



Once the initial spherical shape is completed, cut off the tenons – being careful to cut outside the pencil lines.

Remount the sphere

The remnant of the tenons needs to be removed and this area shaped.

You need some method to mount the sphere sufficient to drive the wood, but ideally leaving no marks, especially if a catch causes the wood to spin between the mounts.

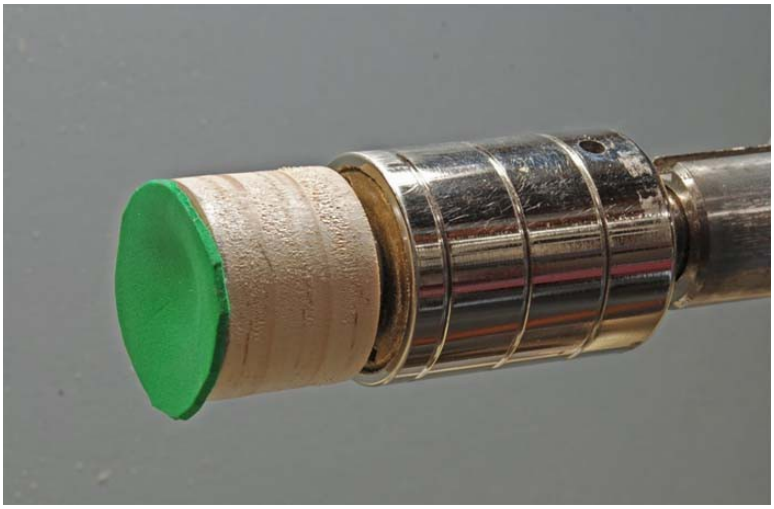
To illustrate, this is a jam chuck made from a piece of scrap about 1in diameter hollowed out. The shape does not have to be exact. The middle needs to be deep enough so contact is mostly on the outside rim.

In the picture below the jam chuck is held in a collet chuck, but can be held in spigot jaws or a Morse taper made with the hollowed end.

This picture does not have any protective material to prevent marking the wood.

This picture shows a jam chuck made to screw onto a OneWay live center which uses 3/4in dia x 10 tpi thread. Needs to register on the flange so it runs trued.

This jam chuck has a piece of rubber material for grip and to avoid marking the sphere.



Insert the sphere between the jam chucks so the tenon remnants are now facing the operator. The center line drawn at the beginning should now be parallel to the lathe bed ways.

Turn away the tenon remnants watching the far side of the work so you can see when the “ghost” has been removed.

Then sand going through the grits to achieve final shape and finish.

Between each grit rotate the sphere between the jam chucks.

After sanding, burning the surface with some of the shavings.