Spheres and Balls
Hands on Session
GCWA 2006 Spring Retreat

By Bill Tilson

This is how I make a sphere and/or ball. There are other ways and I am sure that you will develop your own. The following are the major steps in making a blank piece of wood into a sphere or ball.

1. Determine how large of a ball you would like to make. Trim the blank to that length plus a couple of inches.
2. Mount the blank and make it into a cylinder.
3. Measure the diameter of the cylinder with a caliper and transfer that measurement to the cylinder length and mark two lines all around the cylinder. You have just set the size of the ball.
4. Mark a centerline between the two lines you marked in step 3. Now mark a line half way between the centerline and the two outside lines. You should now have the cylinder divided into quarters.
5. Using a parting tool, part on the outside of the two outside lines to a depth that is equal to the distance between any of the adjacent lines on the cylinder.
6. Now using your favorite tool cut from the quarter and three quarter marks to the right and left outside shoulders you did in step 5. This should be about 45 degrees.
7. Now with your parting tool, part on the outside of the two outside lines down leaving about a half inch tenon.
8. Now comes the fun part. Using your favorite tool, cut a little at a time from the centerline to the left and right to make the ball round making sure you leave the tenon and the centerline.
9. As you're rounding the ball, I find it easier to use a "rounding guide" to rub on the ball to check for high and low spots. To do this, stop the lathe and rub the "rounding guide" over the ball's surface. Watch the edge of the "rounding guide" for any gaps against the ball's surface, which means that you have a flat spot or ridge. Mark the ridge area with a pencil and turn on the lathe and cut the pencil mark off. For the "rounding guide" I use something round like a top of a spray can for larger pieces or a piece of PVC for smaller ones.
10. Frequently check the over all roundness of the ball with your calipers – should be the same distance anywhere measured on the ball.

11. To refine the roundness I use a piece of pipe with one end ground at a 30 – 50 degree angle leaving the burr on the inside of the pipe to slowly act as a scraper on the ball to help round out the ball.
12. Go ahead and sand if you want – Remember most of the time sanding will make the ball out of round so be careful. Make sure that you still have the center of the ball marked.
13. Now that you have most of the ball round, part the tenons down to the smallest diameter you can without the ball flying off. Then using a skew, knife, saw, whatever, finish cutting the tenons off.
14. Now mount the ball between two cup centers. I make these from soft wood or use PVC with the ends tapered in at about 45 degrees with a scraper or parting tool. For really soft wood you may have to use some leather as padding.
15. Arrange the ball with the center pencil line running parallel with the length of the lathe's ways and in the center from head to tail stock.
16. Make sure that you have the ball centered in the cups and then make a pencil mark all around the ball at the center point.
17. Using your favorite tool round over the ball down to just where the pencil line disappears. Use the method in step 9-12 to make the ball round.
18. When the ball is turning you can see where the ball isn't round by seeing shadows where the high spots are on the surface.
19. Mark a center line with a pencil, loosen the tail stock and rotate the ball 90 degrees and check for roundness, fix if necessary. You can continue with rotating the ball 90, 45, 22 and checking for roundness and fixing until you are satisfied.

Further information that I found useful for making spheres and balls:

GCWA DVD #280 – Spheres by Larry Brown
GCWA March 2006 Newsletter – Balls, Balls, Balls by Fred Holder
Geometry of Turning a Sphere by Al Hockenbery (for real engineers)
www.woodturner.org
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