Bowl from Multiple Boards

Written by John Di Stefano

This document describes the construction of bowls from multiple boards and the associated software which provides calculations to use for cutting the rings. The rings are stacked and glued according to directions provided in the software.

The preferred number of 3 or 4 boards are generally constructed to a thickness of 8 to 12 millimetres (3/8 to 1/2 inch).

Begin the process by selecting pieces of timber, preferably of different color. The pieces in figure1 are 50x20 mm and will be used to construct two half boards 125x250x50 mm. When the half boards are butted together, they will make a square board of 250x250x50 millimetres (10x10x2 inch). This will give a bowl with a rim diameter of 250 mm or 10 inches.

Figure 1: Raw timber ready to cut and glue

Figure2 shows the constructed board with the centre NOT glued and held by tape only. The two 50 mm thick boards will each be cut into four boards; a total of eight thin half boards.

Figure 2: Timber glued up in a board 50mm thick

I prefer to cut the two half boards on a band saw using a saw blade of 12mm (1/2 inch) width for stability.

We need the final four boards to be 10 to 8 mm thick. This should be achievable from the initial 50mm thick stock.

The thin boards should be machined through the thicknesser to ensure the saw marks are removed and that the boards are perfectly flat.

Figure 3: Four 8mm thick boards

Figure3 shows the half boards taped in the centre into full boards of 250x250mm.

We are now ready to transcribe the necessary circles which will determine the location of the band saw cuts to create our rings. The rings will overlap from board to board and there will be plenty of timber for gluing as we stack our rings to build the bowl. What we are trying to achieve is best represented by the image in Figure 4 which shows the stacked rings with each color representing the rings cut from one board.

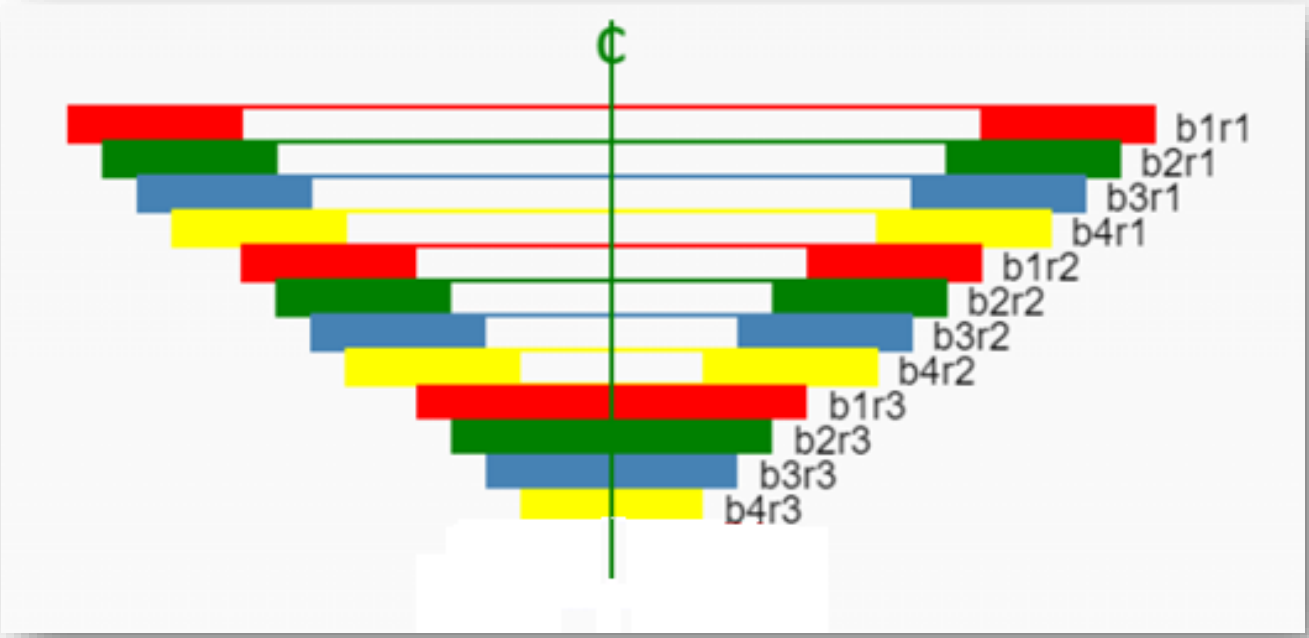

Figure 4: Computer generated ring stack.

All the red rings represent one board, all the green rings another board, and so on. Once we have drawn the rings on all four boards the boards are cut on a band saw with the table at the horizontal.

Angled cuts are NOT necessary in this process.

Since we have constructed half boards, it is a simple procedure of presenting the half boards to the band saw blade and cutting the half rings. Because of the smallness of the inner circles a relatively thin saw blade should be used. A 6mm wide saw blade is recommended. Wider blades will have difficulty getting around the arcs of small circles.

Label each ring as shown in figure4;

b1r1 – board 1, ring 1
b2r1 – board 2, ring 1
etc…

App; Bowl from Multiple Boards

BOWL FROM
A BOARD

The software is accessible from my website;
https://www.johndistefano.com.au

When you have access to my website,
click the icon labelled **Bowl from a Board** located near the top of my home page;

The app provides access to two modules;

- **Bowl from a Board**, and
- **Bowl from Multiple Boards**

The following describes the use of **Bowl from Multiple Boards**. *Bowl from a Board* is described in its own document.

The software requires three simple inputs;

- number of boards,
- board thickness and
- maximum bowl diameter.

Units can be set to mm or inch.

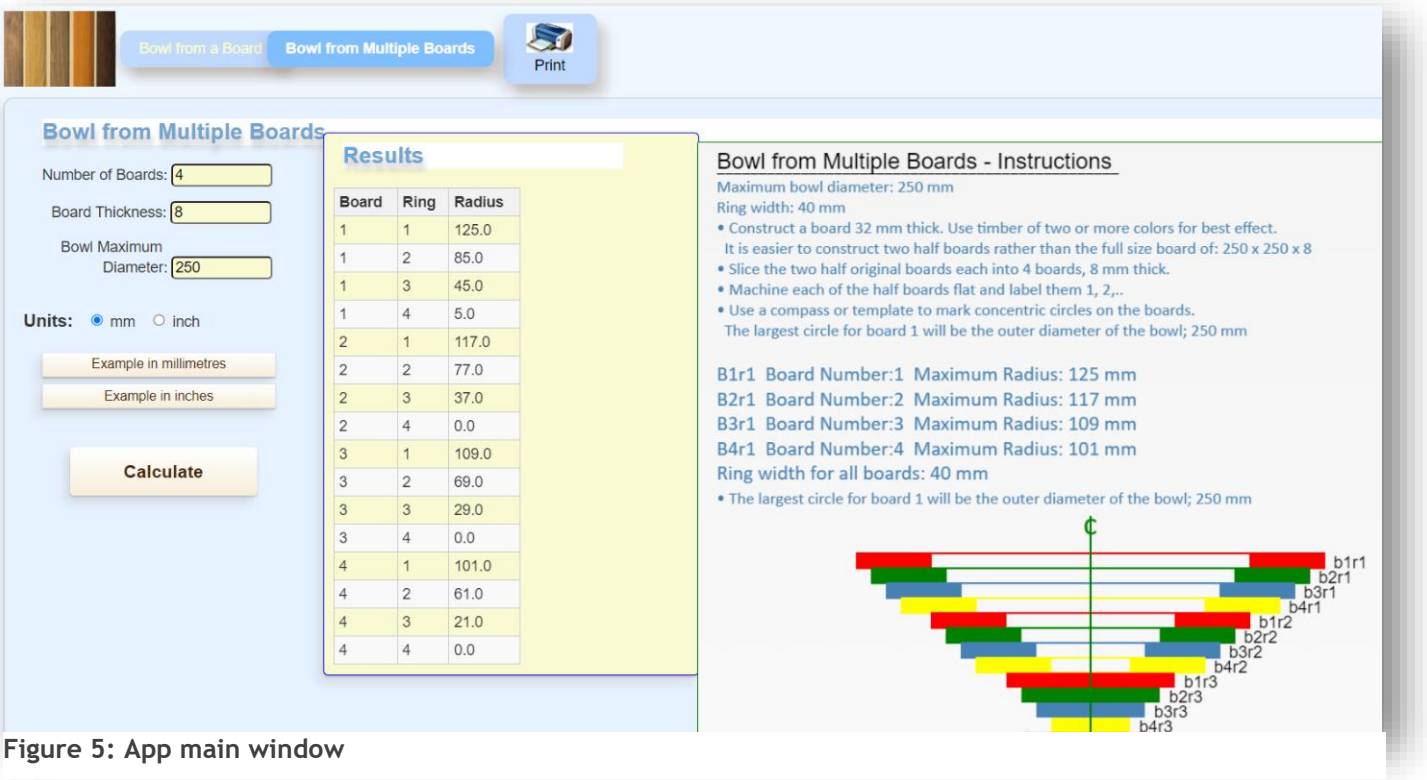

Figure 5: App main window

Enter the three values in their respective boxes. Press the **Calculate** button for the software to perform the necessary calculations and display the results.

Mouse click the Print button to send the instructions to your printer.

Drawing the Rings

Using the instructions given by the software and adopting the example given by Figure5, the maximum radius for board 1 is 125 mm. Set the compass to 125 mm and draw the first circle on board 1. From the first circle mark off the distance of the ring width, 40 mm in this instance, towards the centre of the board. These marks represent the radii for additional circles to be drawn on the board. Depending on the size of your board you should have three, four or five concentric circles on the board.

Do the same for each other board. Begin each board using the maximum radius given in the instruction sheet. Then use the ring width value to step down to the next radii.

In addition, some of the small inner discs will probably not be used. Consider the size of the bottom of your bowl to determine which of the smaller discs will be discarded and which will be used.

Cutting the Rings

Once you have drawn circles on all the boards, the rings are ready to be cut. As stated earlier, use a 6mm blade and cut on a horizontal band saw table.

Keep some order in your boards and rings by labelling each ring. Appropriate labelling will make glueing/stacking the rings easier and less prone to error.

Figure 6: Boards cut and rings ready for gluing and stacking.

Glueing the Rings

- Glue all the matching half rings into full rings. Allow time for the glue to dry before moving or handling the rings.
- Lightly sand all the rings when dry and generally ensure they are perfectly flat. A drum sander is the best for this process. If that is not available a sanding block will do.
- Starting with the largest ring (b1r1) apply the glue liberally to the surface of the ring and stack the next ring (b2r1) on top of it.
- Centre the stacked rings manually. Apply glue to the top of ring 2 (b2r1) and stack the next ring (b3r1).
- Your ring stack will be like an inverted cone progressively stacking and glueing smaller rings on top of each other.

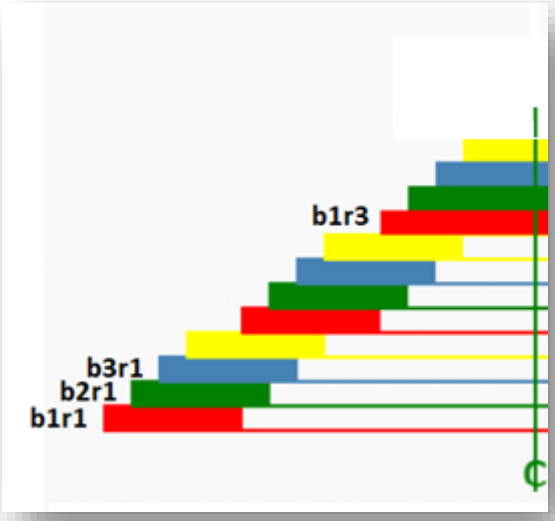

Figure 7: Stacking/glueing the rings

The first solid disk to be stacked is b1r3.
Glue and stack any additional solid disks as necessary. You decide how many solid discs are needed depending on how you wish to construct the bottom of the bowl.
Place a **heavy weight at the top of the stack** and allow glue to dry.

Preparing the Base

Create a waste block on which to glue your bowl. Use a piece of 25 mm thick pine, or similar soft timber with the same diameter as the bottom disc. For me the simplest way of doing this is to cut the pine roughly round, drill a 9mm hole in the centre and mount on a screw chuck, as shown in figure 8.

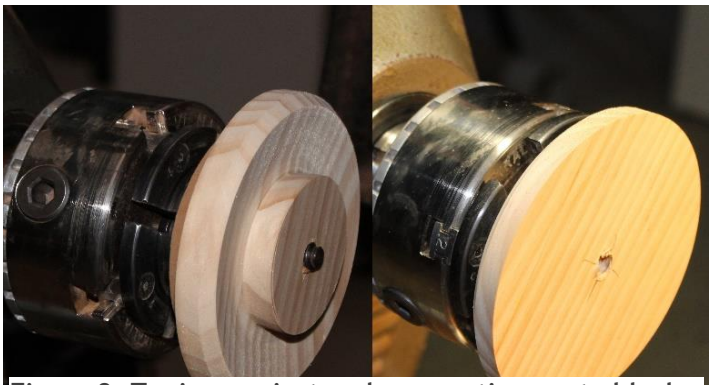

Figure 8: Tuning a spigot and remounting waste block.

Turn the spigot to match your chuck.
Mount on the chuck and turn the base perfectly flat.

Apply glue to the base and mount the base and chuck on top of the ring stack. Allow all glue to dry.

We are now ready to turn the bowl to the required thickness. Given the size of the bowl, 250x250 mm, I would suggest that this bowl be turned to a wall thickness of 8mm.

Turn the bowl to its final shape. Sand through the various grits. I generally start with 120 grit sandpaper and follow through the grits to about 1000 grit. Use your favorite polish to finish the bowl. My preferred finish for bowls is two coats of clear lacquer diluted a little with turpentine. I brush the clear lacquer on the bowl copiously and dry any excess lacquer with a rag and allow to dry for an hour or two. Apply a second coat. When suitably dry, polish with a soft rag inside and out.

All we have left to do is to remove the waste wood at the bottom of the bowl. Mount the bowl on a vacuum chuck or bowl jaws and remove the waste wood. Sand and polish the base.

Note that I added a couple of refinements to my bowl that I did not mention in the explanation above. I added a walnut base and rim to my bowl. At the base I used a small disc of walnut, 8mm thick, to match the bottom disc. I also constructed a 12-piece segmented ring and glued that to the top. The darker color of the walnut at the top and bottom gave the bowl a little extra in size and more pleasing appearance.

Figure 9: The finished bowl, from four boards.

The software is free of charge and should be employed for private use only, and not for commercial profit.

About the author: When I retired in 2003, I joined the **Wonthaggi Woodcrafters** in an excellent part of Victoria, Australia known as Bass Coast. The club and its generous members gave me the opportunity to learn the craft of woodturning and within a few years I had purchased my own lathe and equipped myself with other essential pieces of workshop machinery, such as a band saw and table saw. But woodcraft is not my only interest. Most of my working life was spent running my own software business developing software for education and the love of writing code never left me. Now, having the freedom of not having to work, I have the time to pursue various interests. As you can gauge from this article, I have combined my woodworking skills and my computing skills. With a little understanding of the relevant geometry and the associated mathematics I have written the software described above to assist me, and hopefully you too, in building bowls from a board.

Also see the related software and documentation on how to make a bowl from a single board.

If you are also interested in **Segmented Turning** see **Segmented Turning Helper** (also available from my website).