



## A Segmented Lidded Box

Many out there will know that I have a passion for all sorts of things having some sort of technical content, this is the main force which has pushed me towards a bit of segmented turning. After several years of resistance (we all know that it is futile) I finally bit the bullet in December 2014, and paid a visit to the workshop of my good friend and well accomplished "segmentalist", Andrew Moore. He took the time to show me how he did his work, and some of the tricks

of the trade that he found useful. I have also watched demonstrations by Sue Harker and Dennis Keeling, much of which taught me a great deal. BUT, I regularly spotted a limitation which I was not prepared to accept in my work, and that was that everything seemed to be made up with segment rings, each of which contained an even number of elements. It just didn't seem right that a limitation of that sort should exist.

So, much experimentation started, and the acquisition of an extra tool was called for. Also, I felt that I wanted to dispel a bit of myth that surrounds segmentation, in that it is difficult, putting many turners off the subject for ever. First, and foremost is the ability to measure an angle with real precision,



to at least one tenth of a degree. A digital protractor was purchased from one of those internet auction sites for £15 including postage, in hindsight, it was an absolute bargain, and I would recommend one of these for any workshop. Also important at this stage is the ability to set up the table on the disc sanding station with accuracy. I did this by modifying the table to give full support at both ends, and could

be accurately adjusted with ease to allow an edge to be sanded correctly.

Next I needed the ability to assemble a segment ring whilst holding it all flat and in correct register until the glue had set. See sample here which IS NOT part of this project. Here I claim



the invention of "The Spider Board", a piece of 40mm kitchen worktop and a set of re-purposed tent pegs. Bent so they can be pushed into pre-drilled holes, they have a natural spring action which will lock themselves in place until you see fit to remove them. When in use, the board gets covered with either cling film or aluminium foil to prevent the work sticking.



So, with all that "minor technology" in place we can now start our project, [A Lidded Box With 3 Layers Of 9 Segment Rings](#). This project came about because I needed to make a lidded box as a competition piece at my club, "Broadland Woodturners". At no time in this description will I tell you what tool to use, in my experience, that is always a personal choice, however, it doesn't hurt to mention what works for me,



leaving you to make your own choice. The photo at the head of this article is my competition piece, and since making it I have found a couple of ways to improve the process, hence I decided to do this write-up. The new piece is to be given to the light of my life for Christmas (I have just put a vacuum chuck on MY prezzie list).

Wood selection is to be Oak for the top and bottom of the box, a 75mm square section, about 90mm long is plenty, plus an Ash batten for the segments. I found a short length in stock which was about 8mm thick by 25mm wide. I do not have a planer / thicknesser, there goes another prezzie on my list, or maybe, I could buy one for SWMBO. I normally get all my timber for this type of work milled at a local window and door manufacturer.

First task is to cut and sand 3 sets of 9 segments, and here we start to dispel the myth. Set the band saw mitre fence to 70 degrees and the rip fence 30mm clear of the blade. Trim the end of the Ash batten, then flip the batten over and cut again. Continue until you have a total of 27 trapezoidal segments. Use the digital protractor to sand and check each end of each segment so as to achieve an accurate 70 degrees. Repeat this



process on each piece, trying to maintain about 33mm on the long edge.

In the 3 photos that show segment cutting and sanding you will see a small clock. Pay attention to the time shown, it gives a clear indication of how long it takes to prepare the segments, 9 minutes to cut them and a further 9 minutes to sand all ends to 70 degrees. Also shown here is the first set of segments on the spider board, all glued up with PVA which has previously been coloured with black acrylic paint. My aim is to accentuate the joints, rather than try to make them disappear.



A small tip learned from the first project:

Put a little sanding sealer on the cut ends of the segments to stop the black glue bleeding into the end grain too much, I have found that it does tend to show on the outside of the finished piece.

Each ring is laid down on the spider board on top of foil or cling film for test fitting, and as necessary, you can then adjust the odd angle until you get a perfect fit. Having

achieved a good fit, **DO NOT** be tempted to take them all off again. Simply remove alternate pieces (one at a time) and put them back in place with glue, do not use too much pressure as that will force all the glue out, I am aiming to see visible glue lines. Each ring needs to be left on the spider board for about an hour, after which it can be removed and the second and third rings can be laid down in a similar way. With the three rings made, use a large sanding disc in the lathe to clean and flatten both sides. Look carefully at all six faces, and choose the best face to become the eventual, top visible surface of the box section, all other faces will be glued, and will never be seen. Put them aside and keep them clean, I use zip top bags for this.

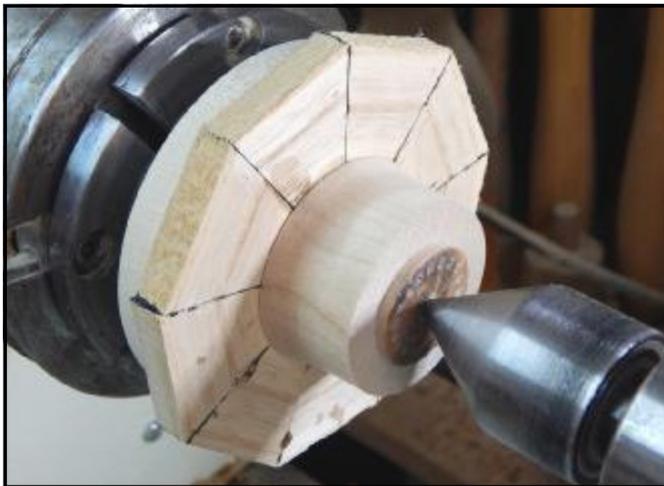
Moving on to the main body of the box, mount the Oak section between centres (spindle





fashion), round off with a spindle roughing gouge and add a dovetail spigot at both ends. With the blank held in 50mm chuck jaws I part off a section, just right of

centre. This will become the lid of the box. The 50mm jaws were used for this project because they offered a very convenient way of reverse chucking the box section later during the final finishing. With the open face



smoothed and trued up using a medium spindle gouge, I realised that the three segment rings I had made for this project were very even and regular, sometimes they are not. This made me think that another opportunity lay open here. I put a scrap blank in the chuck and turned a thin spigot to fit in the centre of each ring, then held the ring in place with another scrap end on the live centre. This allowed me to turn the three rings down to be the same diameter as the piece of Oak I had prepared for the main body. With this little side step completed, I then proceeded to glue the three rings onto the body, knowing that all I had to do was align the outer edges, plus on rings 2 and 3, it is necessary to ensure that



the vertical joints are aligned correctly. Don't forget to get the orientation of your chosen top ring correct.

Measure the chuck jaws and check what size is going to be convenient to use for reverse-chucking the box for final finishing, for me, this is 53mm diameter. With the assembled blank mounted back in the chuck, do a very light skim cut across the outside and the open face with a spindle gouge. Hollow the centre section with a skew to achieve a square cut wall, 53mm diameter with about 32mm depth.



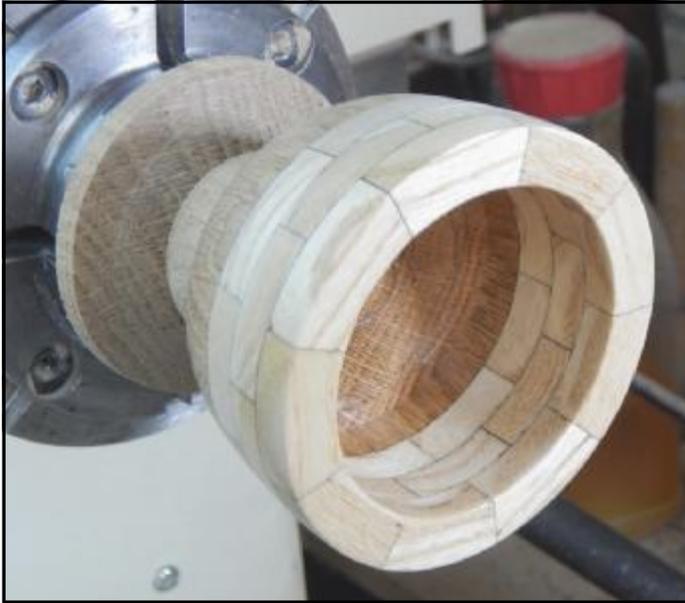
Put the lid section in the chuck, true up, and cut a small spigot section on the open face using a spindle gouge and skew. This spigot needs to be a good tight fit on the hollowed box section. When you are happy with the fit, hollow the centre section of the lid, add decoration, and finally, sand, seal and polish to your satisfaction, taking great care NOT to lose that tight fit on the base section.



With the base section back in the chuck, fit the lid and hold it in place with a slim live centre, cut the outer profile of your apple, reaching as far as you can round to the upper and lower holding points. Remove the tailstock support and gently turn away the last bit on the lid section leaving a nice apple shaped

indentation in the centre of the crown. Don't forget, there is only a little bit of friction now holding this in place, so go gentle. Sand, seal and polish the outer surface of the lid section. Take the lid off, and sand, seal and polish the interior of the box, aiming to





finish so that the lid has a "NASA" fit (lift off). With this type of box, the apple stalk will always be used as the handle, so the lid must not be a tight fit.

Reverse the box on the chuck jaws using a thin spacer ring between the rim of the box and the chuck face (just to hold it away a little). Complete the external turning of the apple with a small spindle gouge, sand, seal and polish. Drill a small (3.5mm) hole in the base, taking great care to NOT drill through to the interior.



Using bits of African Blackwood, make a pip to fit in the bottom, a decorative insert to fit in the inside of the lid, and a stalk for the top of the lid. Drill a 3.5mm hole in the centre of the lid to take the stalk, again, taking great care to NOT drill through to the interior. Glue the Blackwood pieces into the lid section using your favoured brand of adhesive.

At this point I recommend that you take your almost completed work of art into the house and put it aside for a month or so.

During that time you may well find that the edges start to raise on the segments, and you can then carefully mount the base section on your chuck, and re-sand and finish the exterior. Now glue in the final pip in the bottom of the base, and the job is complete.





I hope you have enjoyed this little foray into the world of segmentation. It really isn't the beast that many of you think it is, so why not have a try.



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Also, if you need any further explanation or assistance with any of the procedures I have used, please, do not hesitate to get in touch.

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