Gluing Segments into Rings

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While this task might seem obvious, I have learned many tips and techniques that can make this easier and faster. You might find some of these to be useful.

Part of

The SegMaster Series

The SegMaster Series is a set of short articles provided for woodworkers interested in Segmented Wood Turning. They are short, concise, and filled with tips and techniques that readers may or may not have thought of themselves. They maximize photos and illustrations and can be skimmed quickly or read slowly and studied. They can be printed, taken to the shop, and used as tutorials. Please enjoy them and let me know how they can be improved.

Written By

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Gluing Segments into Rings

You might think that gluing segments into rings is very straightforward and can be done using intuition only. You would be right.

On the other hand, I have developed some tricks and techniques that make it a good bit faster. Maybe you will want to try some. Maybe you will like some of these techniques. Maybe not.

Usually, when I start gluing, I have the exact number of segments for a ring. The segment cutting sled is still on my table saw in case I find a bad segment and need to cut another. This very rarely happens, but it is nice to have the jig set if it does happen.

Do Not Sand the Segments

Some wood turners do. I do not know why. Perhaps they think their disk sander is better than their segment cutting sled.

I often observe little threads from the cuts on my segments – especially with the butternut that I so often use. Sometimes, I carefully sand these away by removing the offending fibers by rubbing the edge on 120 grit sandpaper resting on a flat surface. Sometimes I do not bother. I am not sure how much difference it makes.

Glue

When I went to the Segmenting Symposium, I asked other woodturners what kind of glue I should use. Everyone said, “It doesn’t matter. They are all the same., but I use Titebond ™ “. So that is what I use. But what kind?

I use the standard original version. It is not waterproof, but cleanup is easy and my work is generally not intended for submersion in water.

I once made myself a coffee mug. For that I used the waterproof version. It worked fine, but great care had to be taken to avoid letting is set on surfaces where it was not intended. It really is waterproof. Also soap proof and just about everything-else proof as well.

After finishing my first 16 oz bottle of Titebond ™ original, I bought a gallon. I filled the 16oz bottle ¾ full. I used a damp sponge to wipe the top of the gallon container as well as the top of the 16oz container. Otherwise, the lids will stick.

I usually pour a half inch of glue into a 2oz container. My finger dips easily into one of these and they can be easily covered when not in use.

I remove the lid from the 16oz container to pour the glue. Again, when done, I wipe the top of the 16oz bottle to remove any remaining glue. I do NOT use the spout that comes with the container. It will plug up after a few uses.

Applying the Glue

I wear disposable nitrile gloves when applying glue. The first time I did this was because my fingers were turning yellow. I soon realized that the glue went on more easily as well as protecting my fingers. When done with each ring, I do a cleanup after each ring. I "wash" my hands with the gloves on and then dry them as well as possible. I reuse the gloves until they disintegrate. It helps to clean them frequently.

I use a smooth waterproof surface large enough to accommodate the entire ring. A piece of old countertop works well as does a marble or ceramic tile.

I just recently started assembling the rings on a piece of computer printer paper. I do not know why I did not think of this before. By allowing the segments to stick to the paper, they stay in place better while I am gluing the ring. It also makes cleanup much easier. After clamping, I remove as much of the paper as possible and throw it away. Any left-over paper will come off during the smoothing stage.

I apply glue to both ends of oine segment and place it at the top (12 o'clock position) on the smooth surface with the long edge away from me. If you put a mark on one side of the stock when you were cutting segments, put the marked side up.

Next, I apply glue to the ends of the second piece. I apply this to the right of the first segment (1 o'clock position).

When joining the two pieces, I rub them against each other until excess glue is squeezed out. Often you will feel them start to grab.

Next, I apply glue to the third segment. This one goes to the left (11 o'clock position). TBD Photo of third segment. In this case, I hold the first two segments steady and bub the joint by moving the third segment.

If you work your way around in one direction, the open glue joint will stiffen.

You will most likely find that the final segment does not fit exactly. This is OK if it is not off by too much. If your last segment leaves an opening, leave it for now. If it will not fit, force it into the space. This will displace some segments and cause some openings. Again, do not worry about it for now. Much can be corrected during clamping. It is important to work quickly so that you clamp the ring before the glue on most joints has stiffened.

Clamping the Ring.

I use large hose clamps to clamp my rings. These are available at most building supply stores. You will find that the slots used for the tightening screw do not go the entire length of the clamp. Try to find clams that go as far as you can find. This will allow you to handle a greater range of ring diameters.

I have a broad range of sizes. Between uses, I open them nearly all the way. I hang them on wall hooks for each size. This allows me to quickly grab the size I need.

Place the clamp around the ring and tighten until any gaps in the ring close themselves and the ring rounds itself. Now make sure the bottom is flat. Make sure the clamp is not too tight. Sometimes tapping pieces that are not flat will adjust them. Do not tap if your ring is on a ceramic tile. You WILL break the tile (which is why I no longer have any of my nice 12" ceramic tiles). Run your finger along the bottom of the ring – the side that does not have the marks. This will tell you where there are problem segments. Finally tighten the clamp. Use a marker to label the ring. Out this aside for 4 hours to let the glue harden.

I use a small cordless drill for tightening and loosening the clamps. I mount an appropriately sized socket onto the drill. This saves a huge amount of time.

I do a cleanup after assembling each ring. I use my damp sponge to remove excess glue from the area. Cleanup is easy after making one ring, but after two or more, the spilled glue has started to harden and is much more difficult to remove.

Finally, I rinse my gloved hands to remove excess glue, remove them and put them aside for re-use.

Smoothing the Ring

Your ring must be flat before gluing it to your bowl. Many Segmenters use a drum sander for this. If you happen to have one, use it. I do not have one and I don't miss it (much). There is no room in my shop for one.

Another method is to use a disk sander. I sometimes use this for small rings. You might also have this method of you don't have Cole Jaws for a Nova Chuck. You can easily make a disk sander attachment for your lathe. Fasten a faceplate to a 12" disk and glue a 12" piece of round sandpaper to it.

If you elect to use the disk sander, be sure to rotate the ring as you smooth it or your ring will not be the same thickness for long. Hold the ring against the disk for a few seconds. Move the ring a sixth of a turn

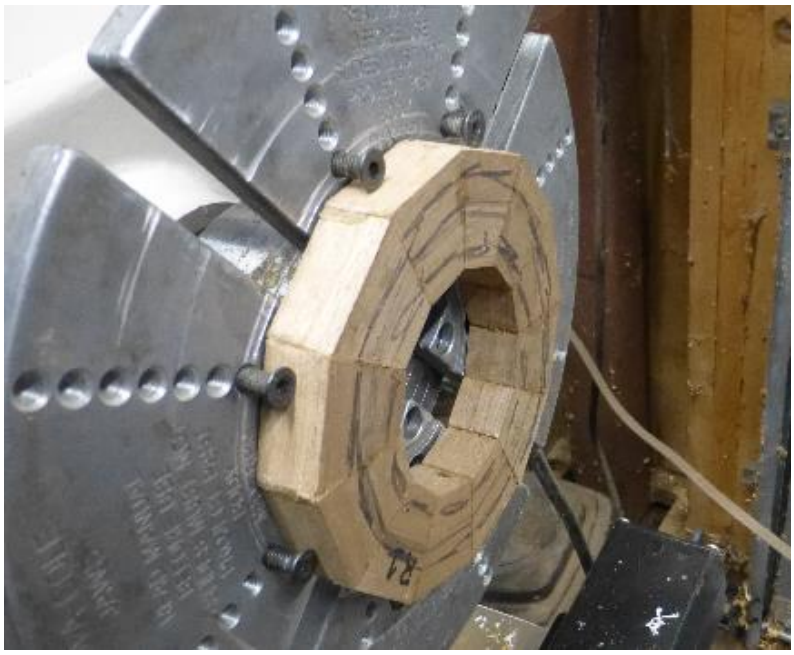
and hold it for another few seconds keep moving the ring and holding it until the ring is flat on one side. Then flip it over and do the other side.

I find that it is much faster to grip the ring in a Nova Chuck with Cole Jaws and use the lathe to flatten and smooth the ring.

I purchased some 8mm x 20 mm flat head screws. I use these instead of the rubber bumpers that came with the Cole Jaws. I put them into the Cole Jaw plates until I just feel them coming through the bottom. They are lower profile than the bumpers and I think they grip better. They certainly leave marks, but I will be turning the outside anyway so the marks will be cut off.

I use my cordless drill for all screws going into the Cole Jaws. The correct size hex driver bit is not included in most sets of driver bits that I have found, so choose your bit set carefully. Fortunately, sets of bits that have start driver bits usually have a star bit that fits perfectly. I use one of those.

I place the ring inside the Cole Jaws and tighten the chuck.



I then mount this onto the lathe and turn the lathe to 400 to 600 RPM. I use a bowl gouge to get it smooth (so that none of the black marks remain).

Next, I smooth and square it with a skew chisel used as a scraper.

I verify that it is flat using a straight edge.

I draw rings on it with a pencil. For thick rings, I put three rings on it as shown. For thin rings, I might use only one. I apply the sanding board very carefully. If you hit the edge with the sandpaper, you can quickly sand away the outside of the ring. This will leave a space when you assemble the rings.

I flip the ring over and smooth the other side the same way. One can verify and set ring thickness at this point as well.

Creating Thinner Rings

I don't try to create rings less than ½" thick. I suspect that they might be hard to flatten during the gluing / clamping process, but I have not tried it.

Generally, if I want ½" thick rings, I start with ¾" rings then trim them down to ½" thickness.

If I need ¼" rings, I make a ¾" ring and smooth both sides. I then mount the ring onto the bowl After the glue has set for several hours, I use a thin cut-off tool to split the ring. I then have two of the ¼" rings.

When a design requires ¼" rings, I often make two bowls at the same time.

Switching Jaws on the Nova Chuck

I frequently change jaws on my Nova Chuck. I want this task to be as fast as possible. I use a small, variable speed, cordless drill with the appropriate bit in it. I also prefer a bit that is slightly magnetized.

When tightening the screws that hold the Cole Jaws to the Nova Chuck, I set the drive force to "4" on my cordless drill. I set my two-speed drill to the slow speed. With the faster speed, the drill sometimes has enough momentum to over-tighten the screw, slowing down the removal process.

When swapping jaws on the Nova Chuck, I lay the replacement jaws on the table next to the chuck. I magnetize the bit by running it over a strong magnet a few times. I put the force setting on my drill to "6" and the speed setting to "High" or "2". The screws come out quickly and stay with the bit due to being magnetized. I transfer the screw into a screw hole on the new jaws. Then when all the previous jaws have been removed, reset my drill to slow speed and "4" force. I place one of the new jaws onto the chuck and drive the two screws home – starting with the outer one.

If all goes well, it takes me 90 seconds to change jaws.

Rings with Many Segments

Sometimes, when clamping rings, the rings are not exactly round when the clamp first goes on. However, as the clamp gets tighter, the rings get rounder as the clamp tightens. This is a reason it is important to work quickly. If you do not, the glue might be too stiff to allow this correction during the clamping process.

This may be why I ran into trouble a bowl made with rings of 36 segments.

The way I solved this was to glue the segments in sets of three. I did not clamp these triplets, but rather made sure that the joints were clean and solid. I let them set up on a very smooth surface, without paper, moving the older ones often to prevent their sticking to the surface. I let the twelve triplets set for a few minutes until they were stiff. At that point, I had 12 segments which I glued together as I would have glued a 12-segment ring. It worked well. My 36-segment ring was perfect.

Dealing with Problems

In this tutorial, I made it sound as if all rings come out perfectly all the time. Sadly, that is not always the case. There can be at least two sources for these problems.

One source is that the sled you use for cutting segments can be slightly off. I wrote a Tutorial on *Correcting Ring Errors* that discusses measuring and correcting these errors.

The other source is – well – I do not really know. Sometimes, for reasons I do not understand, the final segment just does not fit and when you force fit it, there are cracks in some of the joints. I suspect it could be the stock warped or not being held closely enough to the guide bar. In any case, you end up with a ring that has a noticeable crack or two. Again, there is an easy way to fix the ring. This is discussed in the Tutorial on *Correcting Ring Errors.*

Conclusion

In this paper, I explained how to quickly and efficiently glue segments together to make a ring. As you do more segmented work, you will find yourself getting better and faster at this.

Feel free to move onto the next tutorial in the series to get tips and techniques for gluing rings together to make a bowl or other creation.