

# A Segmented Turning Project for Beginners

## Polka Dot Bowl



This project is a beginner's guide to making a 6 ½ inch wide laminated feature ring bowl. I call this bowl the "polka dot" bowl due to the ovals that are featured in the middle ring of this bowl. You will be able to shape these "dots" into various different sizes and shapes as you turn the bowl.

This is a very simple segmented bowl as it has only 3 layers and uses 6-sided segmented rings for the middle and top rings. This project is easy to make with basic woodworking skills and tools.

This document will walk you through all the steps to cut the materials and to create the glue-up for the segmented bowl. I will also give you some tips on how to proceed on the actual turning of the bowl.

Please read all the instructions first before you begin the project. It is best to ensure that you have the proper tools and woods before you start in order to succeed at this project. It will also enable you to feel confident with the project and to question any uncertainties that you have before you start. Best of luck!!

### Required Woods

In this project, we use 3 different woods for contrast; a dark colored wood for the base and top rim, a light colored wood for the body and a third color for the feature dots. As you may be able to tell from the picture, I've used walnut for the dark wood, maple for the light wood, and in this example, bloodwood for the dots. It would be easy to use other woods for the dots, how about using cherry, purpleheart, or something like zebrawood. But of course, you can choose any woods that you would like.

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I expect that you could use 2 colors but the contrast will not be a significant, however, if all you have is 2 colors, go for it!

## BASE



The first piece to prepare is the base. It is a solid disk of walnut (not segmented) and is a circle that is 6 ½ inches in diameter and at least ¾ inches thick. If you use a thicker piece of wood for the base, it will give you more room for playing with the final shape of the bowl. I typically use 1 x 7 inch walnut board and cut the piece where the length is equal to the width. Then I use a straightedge (ruler) to make a line from opposite corners. This gives me the center of the piece. I then use a compass to make the largest circle possible on this board. Cut the circle out using a band saw. You could, of course, use any other tool that works to make this cut.

## MIDDLE RING

The middle ring is our feature ring. It's very simple to make. It uses 2 pieces of wood that are laminated to create a single piece of wood for the middle ring segments.

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The laminated piece is made from two pieces of wood that are glued together. We are using our light colored body wood and our feature colored wood. To make the stock for the middle ring, you will need 2 sticks of wood that are  $\frac{3}{4}$  inch high and ~30" long. The light colored body wood needs to be  $\frac{3}{4}$  inch wide and the feature colored wood should be  $\frac{1}{2}$  inch wide. The boards do need to square on all sides. Once these 2 boards are glued together, they will form a blank that is  $1 \frac{1}{4}$  " wide.

Apply a light coat of glue on each side of the boards and glue them together. As you can see in the next picture, I'm using Titebond II glue. I find that any of the woodworking PVA glues to work well for this project. Use lots of clamps to ensure a solid contact along the full length of the boards. You can also see that I'm doing the glue up on a sheet of plastic. This way the squeeze out of glue will not mess up or stick to anything in the shop.



The glue will need to set up before moving the stock to the cutting stage. I recommend a minimum of several hours but I prefer to just leave it to dry overnight.

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Once the blank is dry, we will cut it into 6 segments with a 30-degree angle on each side. The long side of the segment is the only critical measurement and it is 3 7/8 inches long. But it is critical to cut the segments where the featured colored wood is going to be on the outside of our segments for the entire ring. This means that you cannot flip over the blank as is usually done in cutting segments. After each cut of the blank, you must re-cut the blank to get the proper orientation for the next segment.

**NOTE: The key to this project is this middle layer. It is made of a ring where the featured colored wood is on the outside of the ring. When the ring is turned on the lathe, the featured colored wood becomes shaped into the dots. This ring is turned on the lathe until the base wood is revealed and then you will be able to size and shape the “polka dots”.**

The feature ring laminated stock must be cut so that the featured colored wood is on the outside of the final ring as shown in the next picture.



The easiest way to make these segments is to cut them on a chop saw or a sliding miter saw. Adjust the saw to cut at 30 degrees. To proceed, you need to cut the end of the laminated stick to the 30-degree angle. I cut the minimum amount of wood off this end allowing me to have the most amount of wood for my feature ring.

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In this picture, you can see that I've cut the end of the stick to the 30-degree angle and am now preparing to cut my first segment. I've ensured that the feature color is going to be on the outside of the ring when it is glued up.

You can also see the stop block, which I have clamped to my table saw fence. The stop block ensures that all my segments are cut to the same length.

The easiest way to the segments is on a chop saw or a sliding miter saw. It is easy to set the saw to cut at 30 degrees. The first step would be to line up the start of the stick with the blade so that the first cut takes the minimum of the wood off but leaves you with a 30 degree angle with the feature color on the outside of the ring. Then you measure the long side to the 3 7/8 inch length and put it back onto the saw and make the next cut. You will need to then re-cut the blank to get the proper first angle in order to keep the feature color on the outside of the ring. If you were to just flip the board over, you would be setting up the light color wood to be on the outside. This would be incorrect!!

As an alternative cutting tool, you could use a table saw to make the segments. You could use a miter gauge; either the factory one or something like an Incra or Vega (which are extremely accurate). But when I use a table to make segments, I like to use a cutting sled. You can easily make your own cutting sled, which is a very safe and exact way to make segments.

If you are interested in making your own cutting sled, you can look on the Woodturning Online web site ([www.woodturningonline.com](http://www.woodturningonline.com)) in the Articles section, under Segmented Turning. Both Kevin Neeley and William Kandler have excellent descriptions on how they make their sleds.

### TOP RING

The top ring is made from the dark wood that you've selected. The top ring is also made of 6 segments.

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To start, you will need a stick of dark wood that is  $1\frac{3}{4}$  inch wide and 24" long and at least  $\frac{3}{4}$  inch thick. It should be square on all sides. The stick should be cut into 6 segments with a 30-degree angle on each side. The long side of the segment is the only critical measurement and it is  $3\frac{7}{8}$  inches long.

The easiest way to do this is on a chop saw or a sliding miter saw. It is easy to set the saw to cut at 30 degrees. To proceed, you line up the start of the stick with the blade so that the first cut takes the minimum of the wood off but leaves you with a 30-degree angle. Then you measure the long side to the  $3\frac{7}{8}$  inch length and put it back onto the saw upside down from the last cut. This means that both angles are pointing inwards. Flipping the stick over after each cut ensures that you have correctly cut segments. I usually set up a stop block to preserve the length measurement so that each piece is the same size.

NOTE: In the cutting of the top ring, you can flip over the stock getting the most efficient cutting. We were not able to do this with our feature ring, as it would have put every other segment of our feature colored wood on the inside of our ring.

As an alternative, you could use a table saw to make the segments. You could use a miter gauge; either the factory one or something like an Incra or Vega miter tool (which are extremely accurate). But when I use a table to make segments, I like a sled. You can make your own sled, which is a very safe and exact way to make segments.

After you have cut the top ring pieces, you should now have all the parts as listed in the Parts List below.

## Parts List

- 1 – Bottom piece - ~  $6\frac{1}{2}$ " to 7" round piece
- 6 – Laminated segments - ~  $3\frac{7}{8}$ " on long side (Middle ring)  
(with the feature colored wood on the outside of all the segments)
- 6 – Dark wood segments - ~  $3\frac{7}{8}$ " on long side (Top ring)

## Turner Supplied Items

- 3" faceplate (to fit your lathe)
- wood (3x3" maple about 6 to 8" long) to build a glue block
- Titebond II glue (Titebond I or III would do)
- some sandpaper (various grits for bowl sanding)
- bowl gouge ( $\frac{3}{8}$ " recommended, but use what you have)
- Parting tool (any size)
- Compass

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## 1) Make a Work Surface for Gluing

Choose a nice flat surface to glue up your rings. I recommend either wax paper or sheet plastic on top of your surface. The plastic surface will prevent the glue and the segments from sticking to your work surface.

*To make a more permanent solution, take 1-foot square pieces of plywood and cover them with sheet plastic. I staple the plastic on the bottom with a staple gun. The reason to do this is that the glue will not stick to the plastic. When the glue dries, it can be pulled off with your fingers.*

## 2) Glue Top Ring

Starting with the top ring, check all the pieces and lightly sand any raised edges (most saws leave some fuzzy edges). Do a dry fit and layout all the pieces to see how they will fit in the ring. Look at the grain and move the pieces around until you like the way that they look.

Using Titebond glue (you can use Titebond I, II or III, any woodworking PVA glue will work well for this project), apply glue to one end of a segmented piece. Press the glued piece to a second piece and rub them back and forth to spread the glue until both surfaces are completely covered. I like to then put the two pieces on the glue board and hold one piece down while rubbing the second one against it. After rubbing for several seconds, the excess glue will be forced out of the joint and you will feel a slight suction building up. This means that you can now line up the pieces with the outside edges matched and leave them on your covered flat surface until they dry.

Do this to a second set and let them dry for ~30 minutes to dry. After about 30 minutes, add a third segment to each set of two glued segments. Follow the same process of rubbing until the slight suction occurs. This will now create two-½ ring. Let the ½ rings dry overnight as seen in the next picture.

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### 3) Glue Middle Ring

We will now glue the middle ring. The steps for gluing the middle ring will be identical to the top ring. Follow those same instructions.

### 4) Fitting and Gluing ½ Rings

When the ½ rings for both the top and middle rings are dry, we can glue them together to make complete rings. First dry fit the ½ rings to see if you have a tight joint. The joints must be tight or the glue will not hold and a large glue line will be visible in the finish turning. There are many effective ways to adjust the fit of the ½ rings if they are not perfect (and they seldom are perfect after the glue-up). You should choose the best way based on the machines in your shop or that are available to you. I will list several of the options for you.

- a) Place a sheet of 80 or 100 grit sandpaper on a perfectly flat surface. Take your ½ ring and hold it perfectly vertical. Place the ring on the sandpaper and sand it back and forth ensuring that both ends of the ring are flat on the sandpaper at the same time. Sand both rings until the gap is closed. (This is the slowest and most tedious way)
- b) If you have access to a disk sander, place the ½ ring flat on the table and lightly press the ring into the sander ensuring that both ends of the ring hit the sandpaper at the same time. You should be striving to take off the minimum amount of wood possible to get the rings to fit. This happens very quickly with this type of machine.



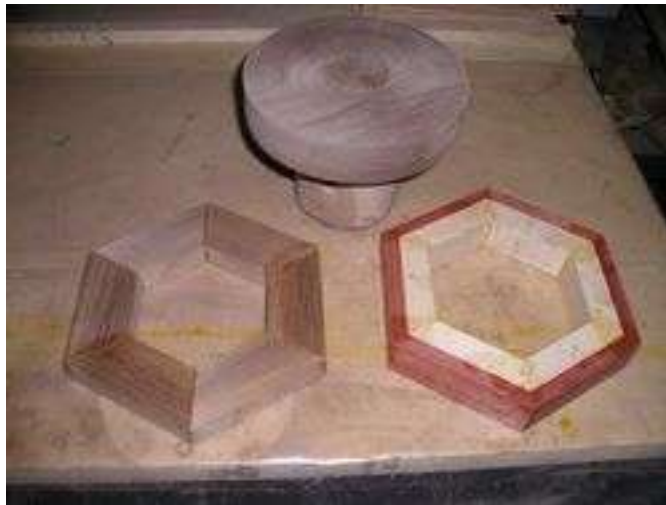
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You can easily build a 12" sanding setup to work on your lathe by using a faceplate attached to a 12" disk of MDF that has been cut flat with a gouge. 12" sanding disks are available at most stores that have woodworking supplies. You will also need to be a bed out of wood that is parallel to the bed of the lathe.

- c) If you have a table saw or radial arm saw, Sears sells a 10" sanding wheel that replaces your saw blade. I have used one of these successfully. The speed of your table saw is much faster than a sanding disk machine. You will need to be careful for the right hand side of the ring rising from the table. Also, the wood will be cut much faster with this sanding device. You only want the minimum amount to be taken off, so go slowly and carefully.

The sanding wheel has 60 grit (coarse) on one side and 100 grit (medium) on the other. The part number is Sears item #00922723000. It can be purchased in the stores or one the Sears website for \$16.99, often with a rebate, making the shipping cost free.

When the 1/2 rings are sanded such that there are no gaps between them, use the same glue and rub method to glue the 1/2 rings together into full rings. Let dry overnight.



In the above picture, you can see the middle and top rings glued up. You can also see our base mounted to the glue block. See the next step to make the glue block.

### 5) Making the Glue Block

Now we need to make a suitable glue block for attaching the segmented bowl. To do this we will use a small faceplate (3") made to fit your lathe. Attach a piece of fine-grained

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hardwood that measures ~3" square (or round) by 3 to 4 inches long. Maple is an excellent selection but cherry or poplar will do also. I try to stay away from woods with large open grain, like ash, and oak because it is harder to get a strong glue joint. I also try to avoid hardwoods like walnut, as it's really soft. Please do not use any softwoods (pine, fir, redwood, etc.) as they are not reliable in this situation.

Use strong screws, preferably #10 or #12 screws that are 1" to 1 1/2" long, you will need to decide what will fit the holes in your faceplate. The bigger (#12) and the longer (1 1/2") screws will be the strongest and the safest. Once the block of hardwood is attached to your faceplate, put it onto your lathe and round it up (at least the business end of the glue block).



The first step is to face up the outside of the glue block so that it is flat. I usually use a bowl gouge and check the flatness with a straightedge ruler. The next step is to face the end of the glue block and with the lathe running very slow, make a pencil mark about 1/8" to 3/16" in from the edge of the rounded glue block. Now use a parting tool to cut on the inside of this line about 1/4" deep. Widen the recess on the inside of the block until you can get your bowl gouge in to clean up the middle of the block. The goal here is to leave an outer ring proud of the inner surface, meaning cutting the inside of the glue block into a recess which is below the surface of the outer ring of the glue block.

When you are done, you will have a glue block with a raised edge for gluing (the center having been all cut away). Measure the outside diameter of the glue block and keep this number for use in the next step. I've marked the lip of the glue block with a red magic marker. This is the part of the glue block that will receive glue when you attach your base.

## 6) Glue Bottom Ring to Glue Block

Now we are ready to start the assembly of the segmented bowl. Take your bottom ring and using a compass, draw 3 or so circles around the inside of the ring. Make them slightly larger than the diameter of your glue block. These lines will be used to help you center the glue block onto the bottom ring. Now apply Titebond II glue to the raised edge on your glue block. Set the glue block onto the bottom ring and center it using the circles that you just made. Apply a little weight to the top of the faceplate to ensure a solid

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connection with the base. Let the glue block dry completely, I usually just let it dry overnight.

I've occasionally seen other people use CA glue here. When they did that, they used the heavy CA glue, making sure that there were no voids and then followed it up with a spray of accelerant. This allowed them to move to the next step without the long wait for the Titebond II to dry. I personally don't use this method. I've had pieces come apart on the lathe and also have friends who have experienced the same thing. I don't personally believe that CA glue is strong enough in this situation due to the size and weight of this large bowl.



## 7) Flatten Bottom Ring

Once the glue on the bottom ring is dry, mount the glue block with the bottom ring attached to it onto your lathe. Our goal will now be to ensure that the bottom ring is flat. My first step is to run the lathe on slow, often times I'm able to tell right away if the bottom is flat. More times than not however, the blank is just a little off and needs to be flattened.

I use my bowl gouge to lightly cut the bottom starting from the outside and cutting to the inside. After taking a very light cut across the surface, I shut off the lathe and check the results. If the cut is even all around the blank, then it's close to being flat. If parts of the blank did not get cut, then I automatically know that the blank is not true. To check, I take a steel ruler and hold it across the blank to see if any more cutting is necessary. Often times, I will need to hold a small flashlight under the bottom of the ruler to see if any light is coming through in gaps underneath the straightedge.

I'll keep cutting until the base is flat as measured by the ruler and then lightly sand the edges of the ring where the next ring will mate. Once the bottom ring is flat and sanded, I run the lathe slow and using a pencil make several marks to create circles on the bottom ring to allow me to center the next ring.

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## 8) Glue Middle Ring to Assembly

With the bottom ring flat, we can start thinking about attaching the middle ring.

However, the middle ring must be flat too! If your glue up went well and there is no squeeze out of glue, it may be flat enough to just glue it to the bottom ring. This does not happen often but if so, then spread Titebond II onto the bottom of the middle ring and then place it onto the base. Using the circular pencil rings from the last step, I center the middle ring. Then I turn it upside down on my covered flat surface and clamp it. I use  $\frac{3}{4}$ " pipe clamps with large Mastrodon jaws. But before I got the clamps, I used another small board and a bucket of nails. You could use a paint can or anything heavy enough to apply pressure. Let the ring dry completely here.

**NOTE: Do not use CA glue on this step!**

If your middle ring is not flat, you must flatten it before you can glue it to the bottom ring. There are many ways to do this, let me share some of them.

- a) Use a thickness sander. If you don't have one, you might be able to borrow some time on one. I have one and it makes this part of the job a 5-minute easy effort.
- b) Use a set of cole jaws on a scroll chuck to hold the ring on your lathe. Take a 2-foot length of straight wood (could be a 2x4 or a 1" thick piece of hardwood) and attach a 3" sanding belt to it using staples at the very ends where you will not use it. I've also used my jigsaw and cut handholds into the ends. Press the sanding board against the spinning ring until your steel ruler shows that the ring is flat.
- c) Use a 12" sanding disk glued to an MDF board attached to a faceplate. Spin the sanding disk on your lathe and holding the ring against the disk until the ring is flat.

## 9) Flatten Top of Middle Ring

Once your middle ring is glued to the bottom ring and the glue has completely dried, put the assembly back on the lathe and flatten the middle ring just like we did the base. Use a straightedge ruler to tell that the job was done properly. Then make a new set of pencil circles on the middle ring to help glue on the top ring.

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## 10) Flatten Top Ring

Flatten the top ring (if needed) as we did the middle ring. Once it is flat, glue it to the middle ring and let dry. Once it is dry, you now have a finished blank.



In the above picture, you can see that I've got all the rings assembled and that they are being glued together. You need to use some form of clamping (or weight) to ensure the best glue joint. In this picture, I'm using a board on top of my faceplate to spread the weight of a cutout milk jig containing 16-penny nails.

## 11) Turn the Outside of the Bowl

When turning to a bowl shape, I start on the outside at the top ring and start taking small cuts. The goal is to make the top ring round. I try not to take off more wood than is necessary to make the ring round. When cutting the top ring, I start on the outside of the bowl and cut towards the base. This is to ensure that I don't break off large pieces of the top ring (not like this has ever happened to me 😊)

You can see that my first step is to use a pencil mark to show me where a full circle starts which helps my initial cuts into the top ring.

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Then I work on the middle ring to make it round. I take small cuts with the bowl gouge cutting from the base towards the top. Then I cut the base round, it seems to cut best with the gouge cutting from the base towards the top ring. Once all the rings are round, you can start thinking about shape. In the following picture shows the middle and top rings after they were made round. You can start seeing some of the middle rings inside body color (the white maple wood).



In this design, the bulk of the design work is in shaping the middle ring. There is quite a bit of extra wood in this design to allow you to shape the bowl any way that you'd like.

The best way to approach cutting the center ring is to use your bowl gouge and to cut from the middle towards the top and the middle towards the bottom. It will feel like you are cutting a bead on a spindle turning. And in fact, this is exactly what you are doing!

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Only two cuts affect the size and the shape of the “dots”. The first is the amount that you cut out of the middle of the ring. The deeper that you cut into the center, the more body wood will be visible on each end of the dot, controlling its length. Of course, if you cut too much, you will cut the dot away completely.

The second cut is how much you remove from the intersections of the base and the top ring. Cutting here will control the height of the dot. You must cut enough to expose the body color in order to reveal the contrast in the woods.



In the above picture, you can see that I’ve exposed the top and bottom of the dot. I’ve also cut the center down so that the body is exposed between the segments. Now I can do any fine-tuning to shape the dot further.

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## 12) Turn the Inside of the Bowl

Once the outside shape has been completely turned; follow the same steps for turning the inside. Remember to round each ring first before cutting to finish thickness.



The bowl gouge will work best cutting like a normal bowl from the outside rim to the center of the bowl. I typically make the wall thickness about  $\frac{1}{4}$ " to  $\frac{3}{8}$ " thick but you can go thicker or thinner. In the above picture, you can see that the top ring is ~~not~~ cut circular but the middle ring is not yet there. I've also cut very little into the bottom at this point.

The most important thing in bowls is to keep the wall thickness consistent from top to bottom. That means to have the inside wall run parallel to the outside wall. In this bowl since the outside is shaped much like a bead, it may be difficult for you to turn the inside curve to match the outside. The cut necessary here is an undercutting one. If your turning skills do not enable you to undertake this cutting operation, skip it!! The bowl will be quite beautiful without it!

In my opinion it is much more important to get a finished bowl on your first attempt than to worry about getting a perfect one. Evaluate the bowl when you are done and learn from the experience. Use this new knowledge for a better bowl on your second and future attempts. Learning comes from progressive steps of experimentation; it doesn't need to happen all at once!

## 13) Sand the Bowl and Part it off

After you have turned the bowl, sand it. I typically start at 100 grit and go through 600 grit. Once you have sanded both the inside and the outside, part the bowl off just below the lip the glue block. Be careful doing this as you only have to cut the  $\frac{1}{4}$ " to  $\frac{3}{8}$ " thick outside wall of the glue block. Once the bowl is removed from the glue block, you can sand the bottom flat or if there is enough wood on the bottom of your bowl, you can reverse chuck the bowl and finish the bottom of the bowl.



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In the above picture you can see that I've mounted the bowl onto a Cole Plate setup using the expansion of the rubber feet to hold the bowl on the lathe. You can also see just the thinnest amount of the glue block (the raised outside rim) on the bottom of the bowl. In fact, you can also see my centering lines. I'll now use my bowl gouge to clean up the bottom of the bowl and undercut it so that it sits squarely on a flat surface.

When the bowl is completely turned and sanded, apply a finish to it. I like using a Tung Oil finish and after 3 or 4 coats (with complete drying and light sanding between coats) a nice light shine appears.

Other finishes suitable for woodturnings include; lacquer, shellac, salad bowl finish and friction polish (like French polish). Overtime you will probably experiment with many of these finishes and determine which one you prefer. If you want to increase the shine or to remove any remaining bits of dust, use a buffer wheel setup going through the tripoli, white diamond and carnauba wax courses.



Your bowl is now ready for using!!

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I hope that you enjoyed this beginner's segmented turning project. If you have any questions or comments, please send them to [info@woodturningonline.com](mailto:info@woodturningonline.com). We're also thrilled when you send us pictures of your finished project!!

Sincerely,

Dennis Daudelin  
Woodturning Online