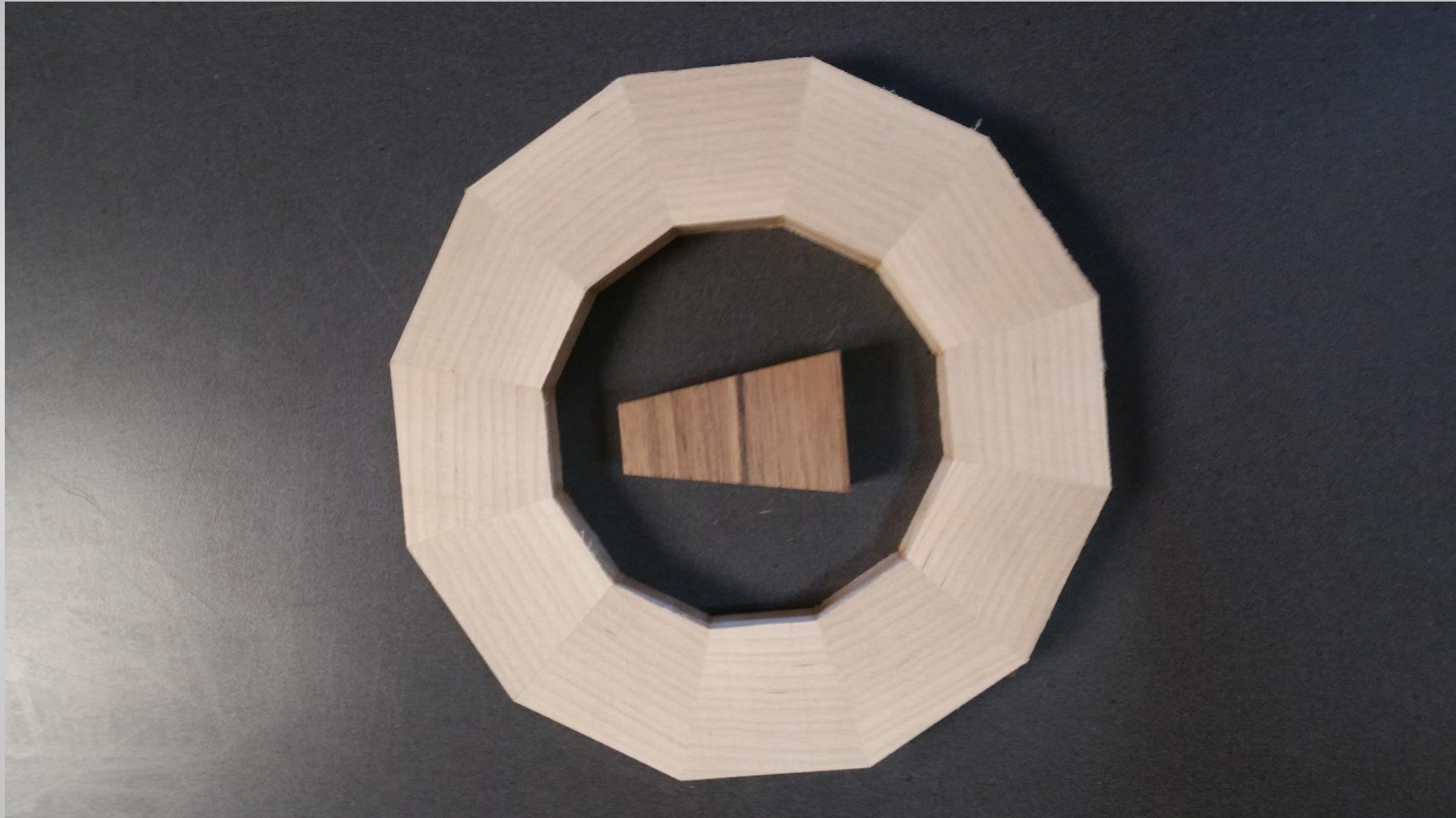


# Introduction To Segmented Wood Turning

Presented By: Pete Marken



# Why Segmented Turning?

- You are not limited to size and form dictated by a block of wood.
- The size and form are determined by your imagination.
- Expensive hollowing systems for turning urns or vases are not required. They can be hollowed in two or more sections and glued together.
- You typically do not have to deal with troublesome end grain.
- Different species of wood can be combined to obtain striking patterns.
- Less wood wasted

# Additional Equipment Considerations

- Table saw for cutting segments (Preferred).
  - ❖ Miter saws can be used but setup time is time consuming. Test rings have to be cut for dialing in the miter angle. This results in wasted wood and time. If you change the number of segments the dialing in process must be done again.
  - ❖ Band saws can be used but the quality of the cut is not as good as a table saw. The saw must be perfectly set up with no blade drift or flutter.
- A very accurate sled for cutting perfect segments.
- Away to center and align rings when gluing and stacking.
- Hose clamps for gluing segments into rings.
- A means of flattening rings for proper stacking.
  - ❖ Drum sander works best. (Avoid using a planer)
  - ❖ You can use Cole jaws with a sanding block on the lathe.







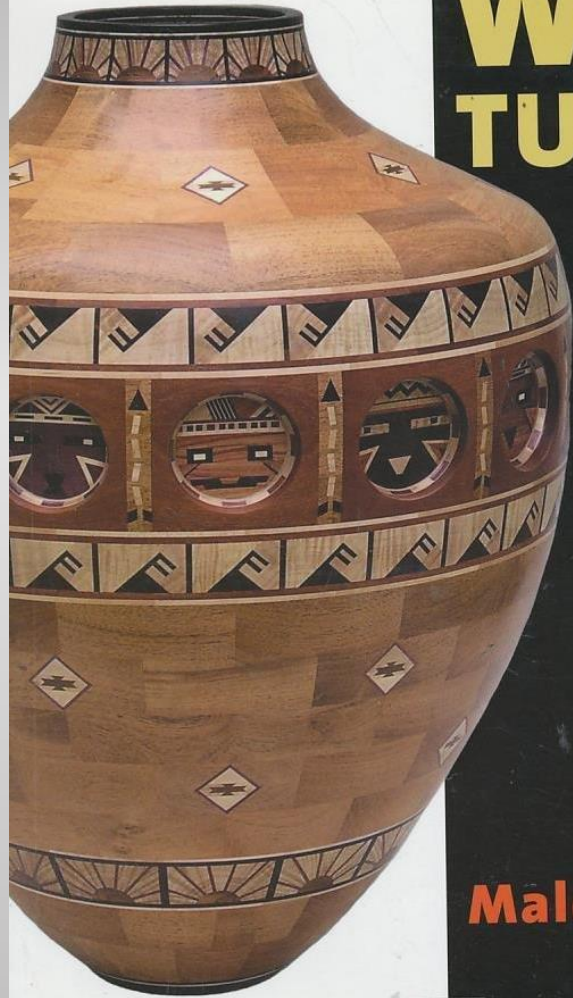


**The Art of**

# SEGMENTED **WOOD TURNING**

A Step-  
by-Step  
Guide

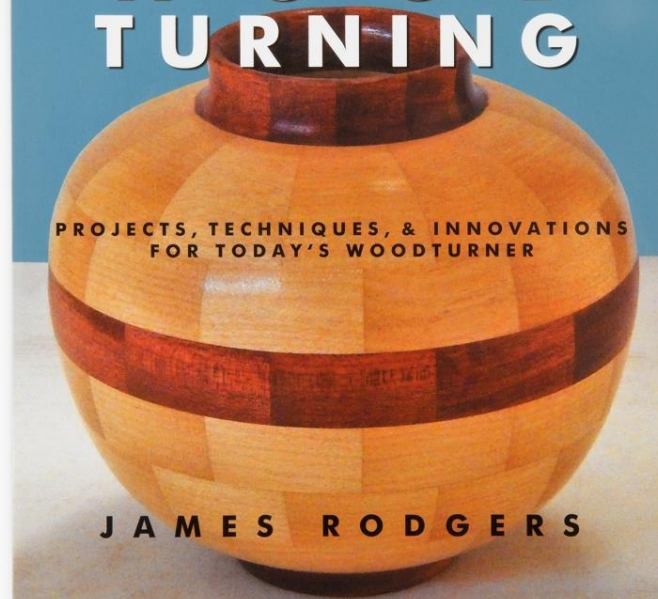
**Malcolm Tibbetts**



THE FUNDAMENTALS OF  
**SEGMENTED  
WOOD  
TURNING**

PROJECTS, TECHNIQUES, & INNOVATIONS  
FOR TODAY'S WOODTURNER

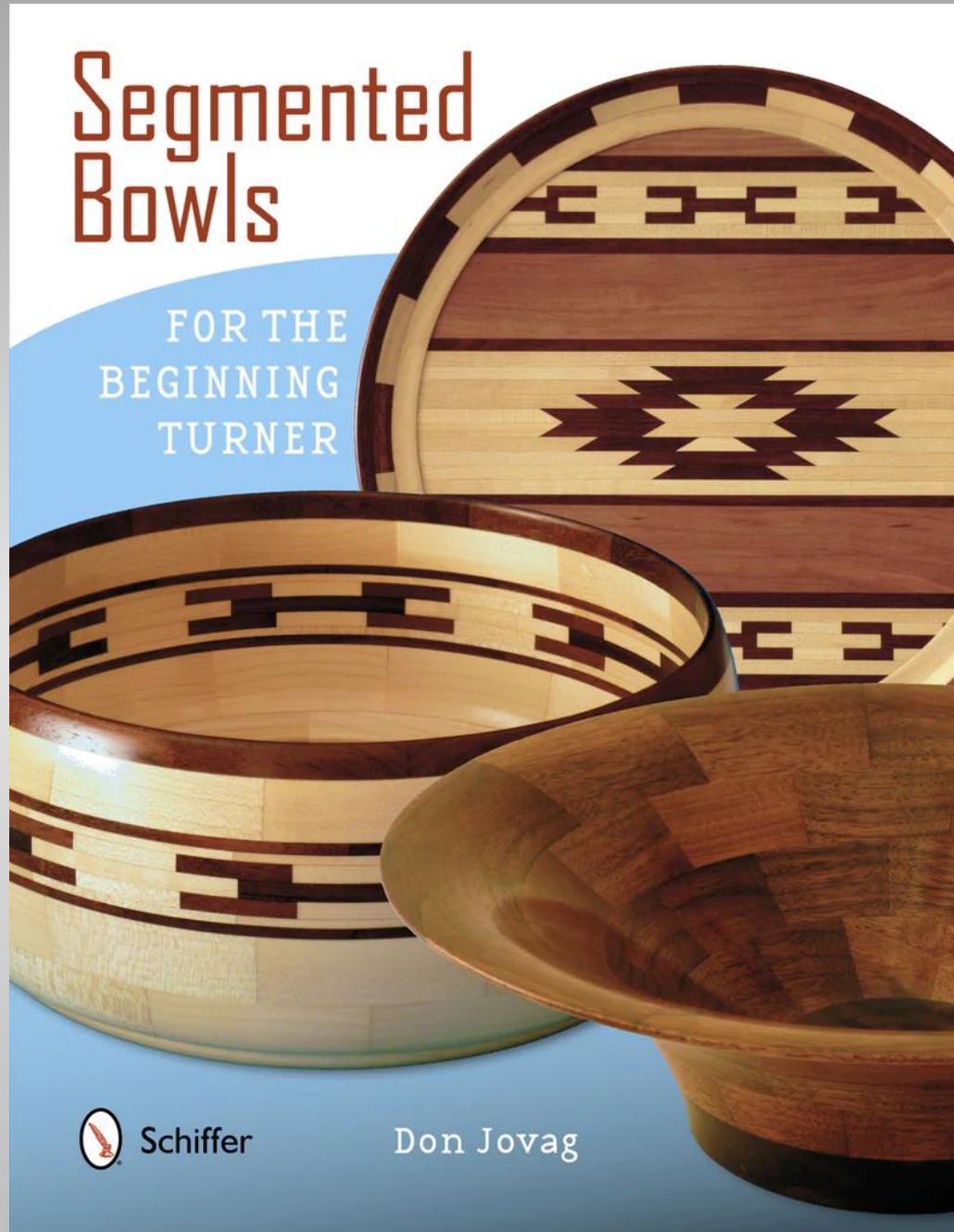
**JAMES RODGERS**





# Segmented Bowls

FOR THE  
BEGINNING  
TURNER



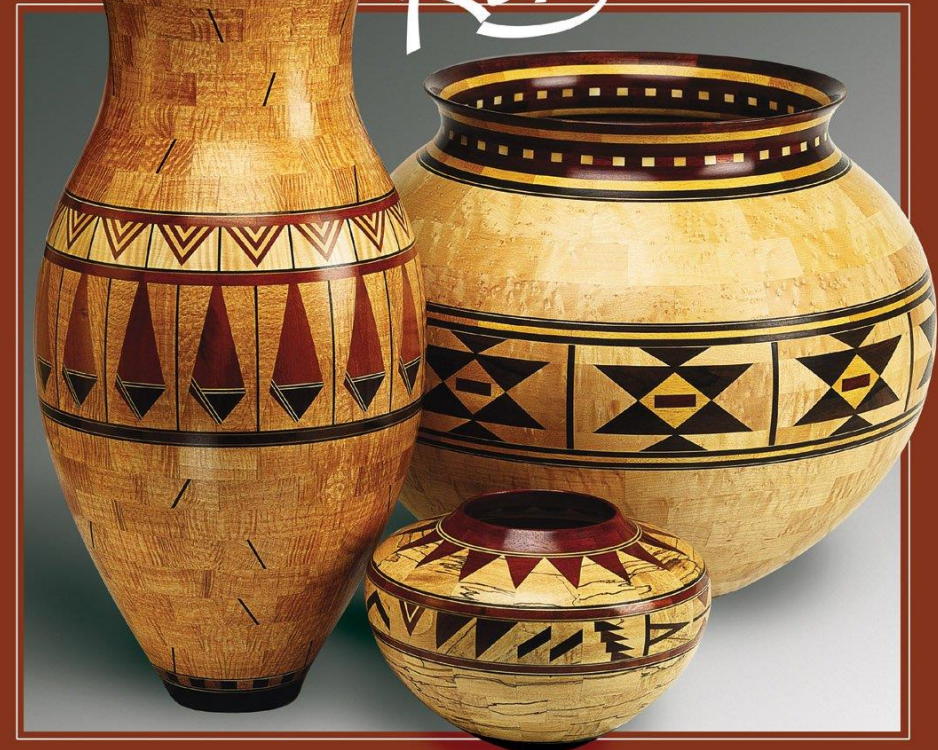
 Schiffer

Don Jovag

# WOODTURNING

with

*Ray Allen*

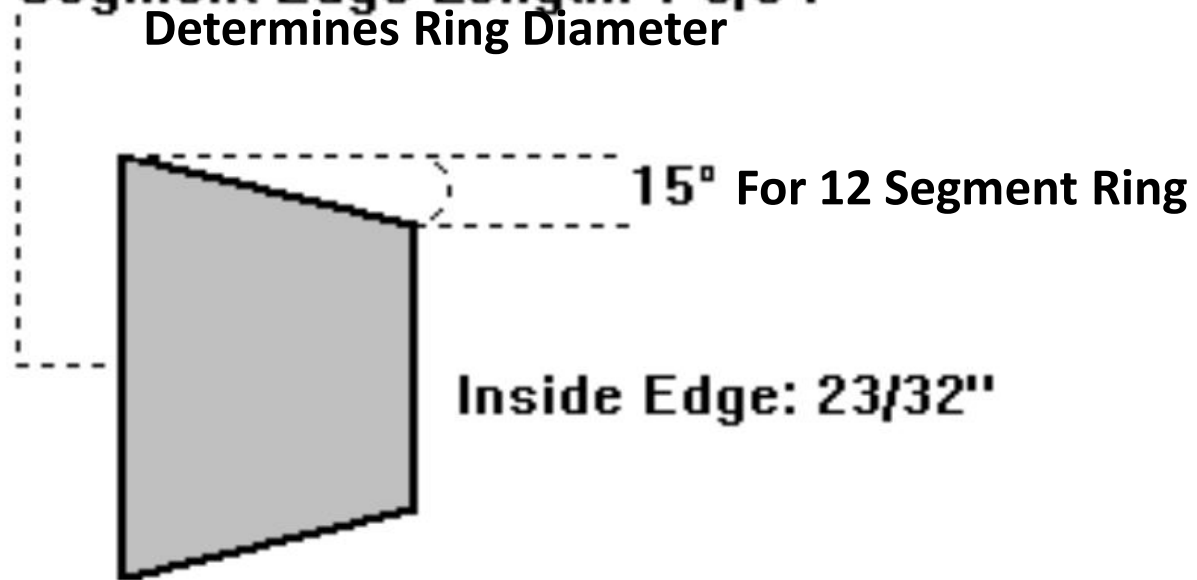


A Master's Designs & Techniques for  
Segmented Bowls & Vessels

DALE L. NISH

# Segment Definitions

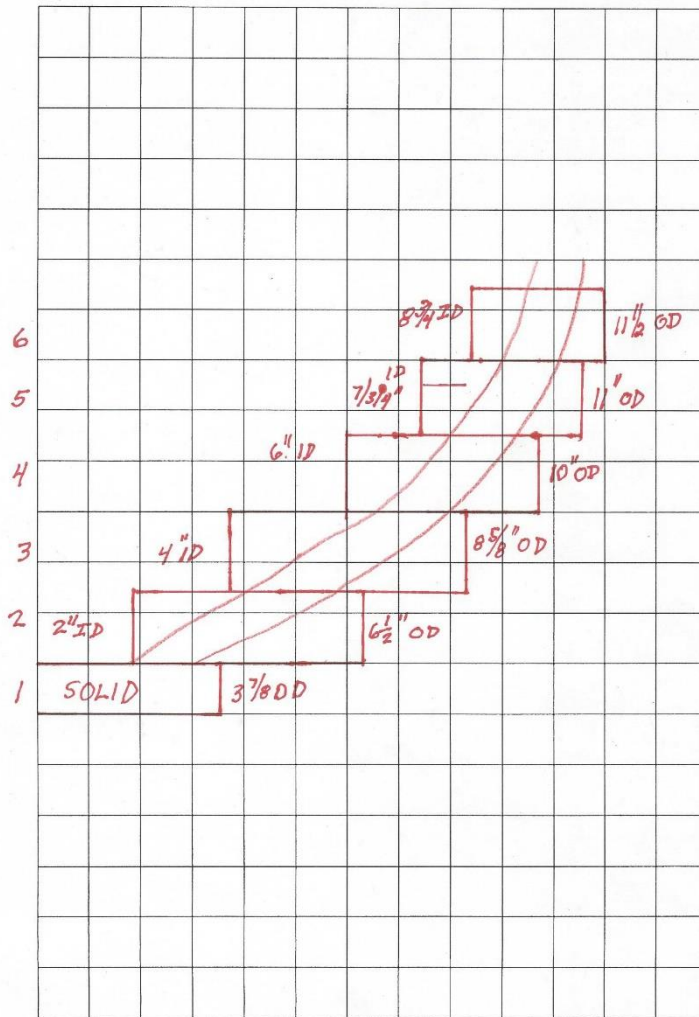
Segment Edge Length:  $1\frac{5}{64}$ "  
Determines Ring Diameter



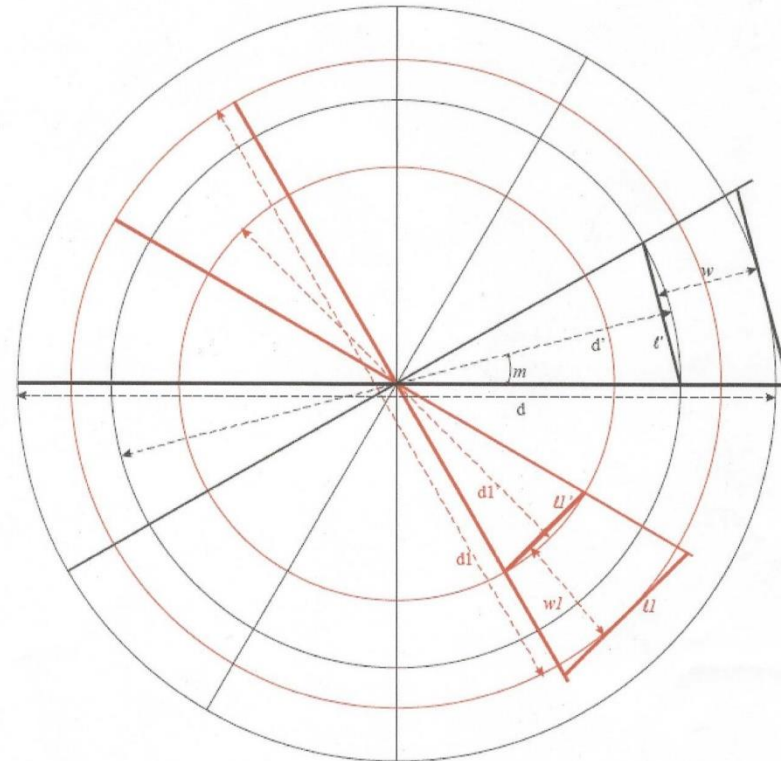
Board Width:  $\frac{43}{64}$ "

Determines Wall  
Thickness

# The Hard Way



Calculation of segments on 2 overlapping rings of different diameters. The OD ( $d$ ,  $d_1$ ) and ID ( $d'$ ,  $d'_1$ ) of each ring are determined from the sketch on page 1. Note that the width of the segments is NOT the difference between the OD and ID.



$n$  = number of sides,  $m$  = miter angle,  $d$  = diameter of ring,  $d'$  = internal diameter of ring,  
 $w$  = width of segments,  $l$  = length of segments,  $l'$  = short length of segments

$$m = 360^\circ/2n$$

$$w = 1/2(d - d' \times \cos m)$$

$$l = d \times \tan m$$

$$l' = d' \times \sin m$$

$$\text{Total board length} = (1 + l') \times (n/2) + (0.125/\cos m) \times n$$

Example: For a ring with 12 segments, 6" OD, 4" ID

$$m = 360^\circ/(2 \times 12) = 15$$

$$w = 1/2(6" - 4" \times \cos 15) = 1.068$$

$$l = 6" \times \tan 15 = 1.608$$

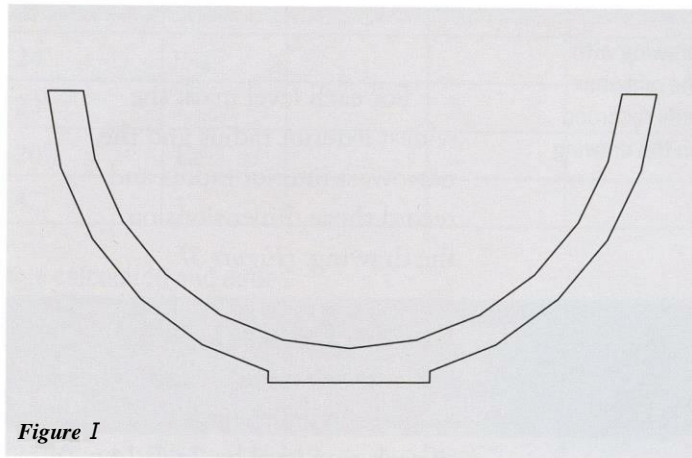
$$l' = 4" \times \sin 15 = 1.035$$

$$\text{Board length} = (1.608 + 1.035) \times (12/2) + (0.125/\cos 15) \times 12 = 17.307$$

Non-italicized are assigned and italicized are calculated.

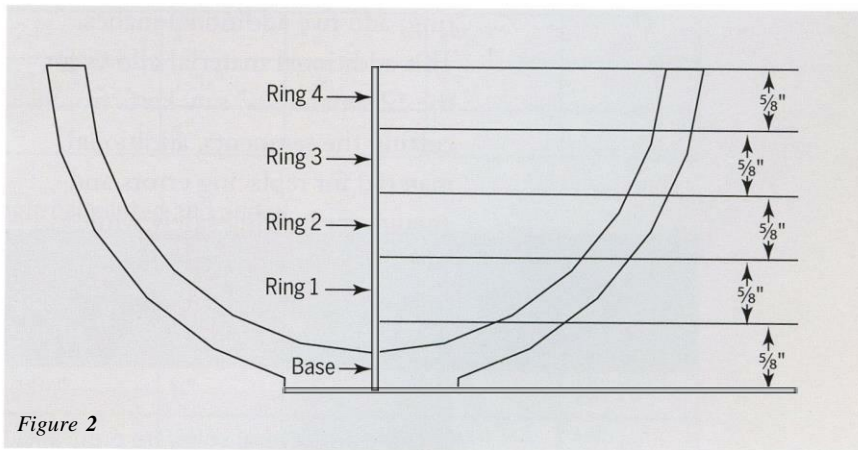
# PAPER & PENCIL PLAN

Use graph paper to sketch out a profile of the vessel to scale



*Figure 1*

A basic bowl drawing with an interior wall added

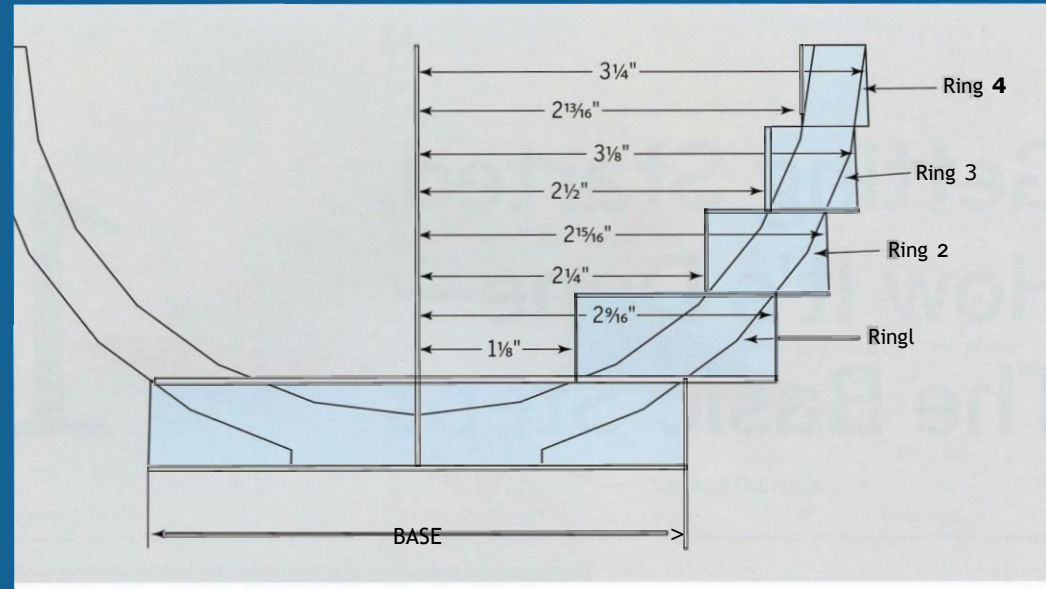


*Figure 2*

Drawing with layers indicated and numbered

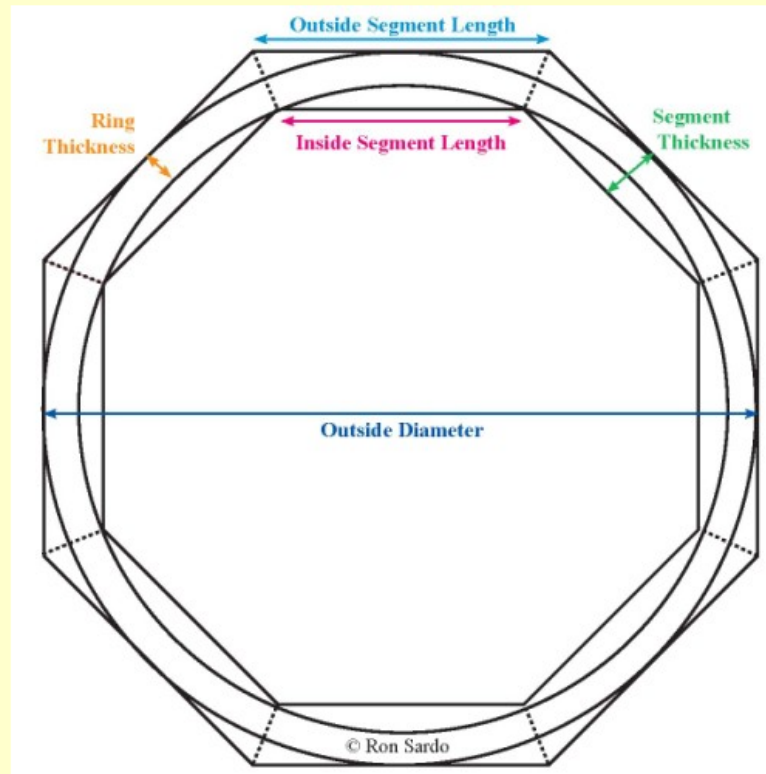
# PAPER & PENCIL PLAN

► Drawing with the max/min radii Recorded on drawing.



Drawing from 'Segmented Wood Turning' by James Rogers

# Segment Calculator



**Input Number of Sides**

12

**Input Outside Diameter**

9

**Input Ring Thickness**

.75

Ring Extra Thickness (fudge factor)

0.1

**Outside Segment Length**

2.4651325703663285

**Inside Segment Length**

1.8893790292484014

**Segment Thickness**

1.0743707340449005

**Cut Angle**

15

Calculate!

Free on-line calculator courtesy of Woodturners Resource

# The Easy Way

Segment PRO

Bowl View Storyboard Paint Themes Settings Share Help

Clear Reset All +/- Image Save Profile Height: 6 in

Profile View

Gridlines: 1 in. or ~25mm Red lines = Golden Ratio

Cutaway View

**Bowl Summary**  
Actual Height: 6.5"  
Max. Diameter: 9.999"  
Total Segments: 96  
Total Rows: 9  
Volume: 188cu. in.

Detail

Bowl View Profiles Plans Summary Rings Species Palettes Categories

Bowl Settings

- Painted Segment
- Feature Ring
- Tornado Bowl
- Novice
- Intermediate
- Advanced

Closed  Open

Isometric View

Segments: 12

Open Seg. Gap: 8°

Spacer Width: 0 in

Add Spacers: Default Rings

Row Thickness: 0.75 in

Wall Width: 0.75 in


Base Thickness: 0.5 in

Palette: Saved Plan

3D: None

Move Feature: 0 in

Diameter: Less More



# Summary Sheet

## Cut list

Row	Board	Length	Segment	Ring	Species	Segs	Thick	Angle	Diameter		Species					
	Width		S.E.L.	Type					Outer	Inner	Maple	Lgth	Walnu	Lgth	Padau	Lgth
1	.00	.0	.000	disk	Walnut	0	.500	.00°	4.3"							
2	1.72	12.7	1.014	closed		16	.500	11.25°	5.1"	1.7"	8	6.3			8	6.3
3	1.67	15.4	1.174	closed		16	.500	11.25°	5.9"	2.6"	8	7.6			8	7.6
4	1.58	17.9	1.317	closed		16	.500	11.25°	6.6"	3.5"	8	8.9			8	8.9
5	1.49	20.3	1.448	closed		16	.500	11.25°	7.3"	4.4"	8	10.1			8	10.1
6	1.42	22.7	1.579	closed		16	.500	11.25°	7.9"	5.2"	8	11.3			8	11.3
7	1.32	24.8	1.691	closed		16	.500	11.25°	8.5"	6"	8	12.3			8	12.3
8	1.18	26.5	1.770	closed		16	.500	11.25°	8.9"	6.7"	8	13.2			8	13.2
9	1.14	27.6	1.830	closed		16	.500	11.25°	9.2"	7.1"	8	13.7			8	13.7
10	1.14	28.4	1.886	closed		16	.500	11.25°	9.5"	7.3"	8	14.2			8	14.2
11	1.16	29.2	1.937	accent		16	.500	11.25°	9.7"	7.6"			16	29.2		
11						160					72	97.6	16	29	72	97.6



# Wedgie Used to Set Up Fences On Sled

Wedgies Available At The Following:

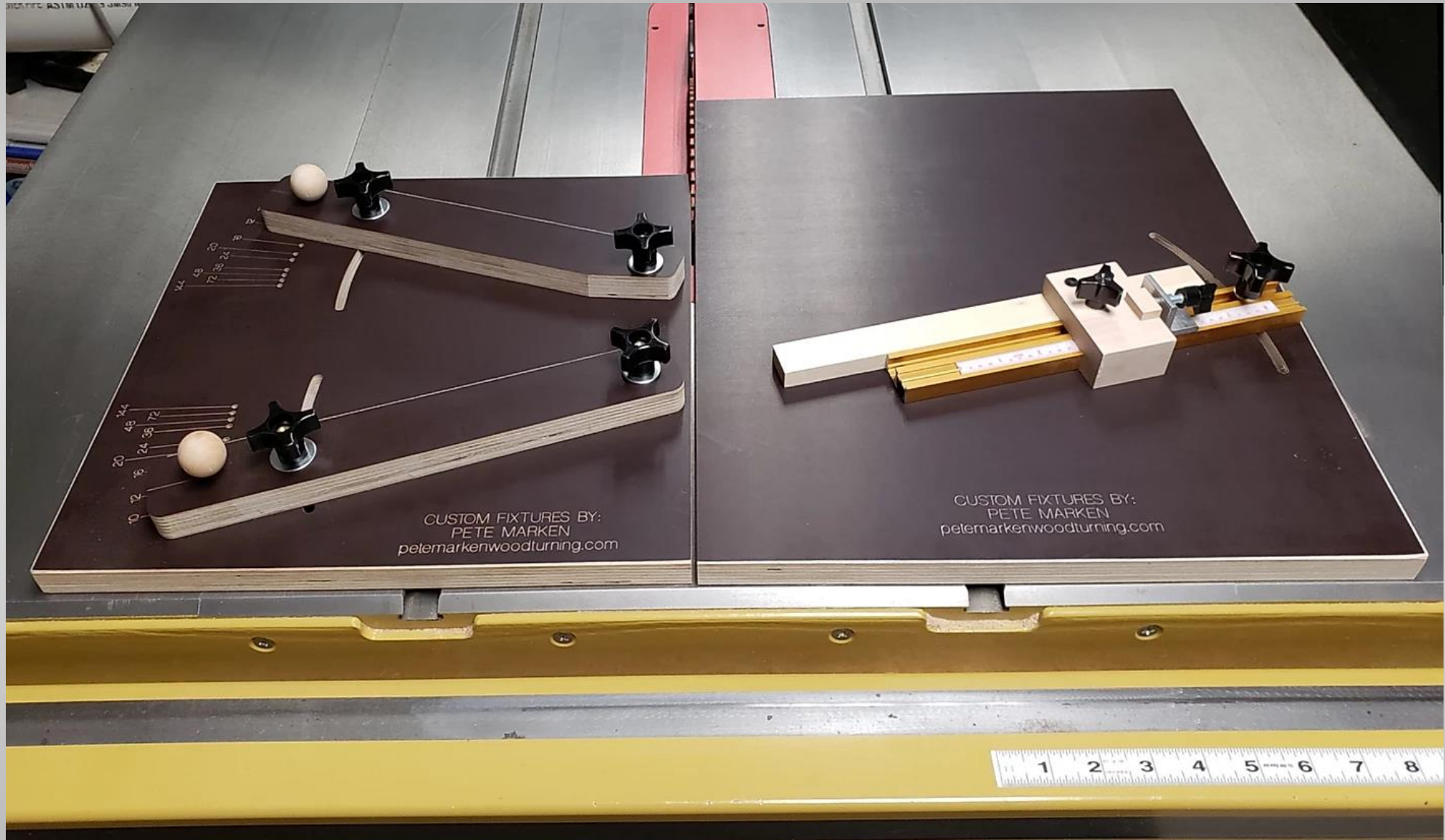
Segeasy.com There are also plans available to make the sled.



The Wedgies work from complimentary angles for precise fitting segments. No more disk sanding to correct slight angle issues. Directly from saw to glue up.

# Wedgie-Less Sled and Cutoff Table

## No wedgies required

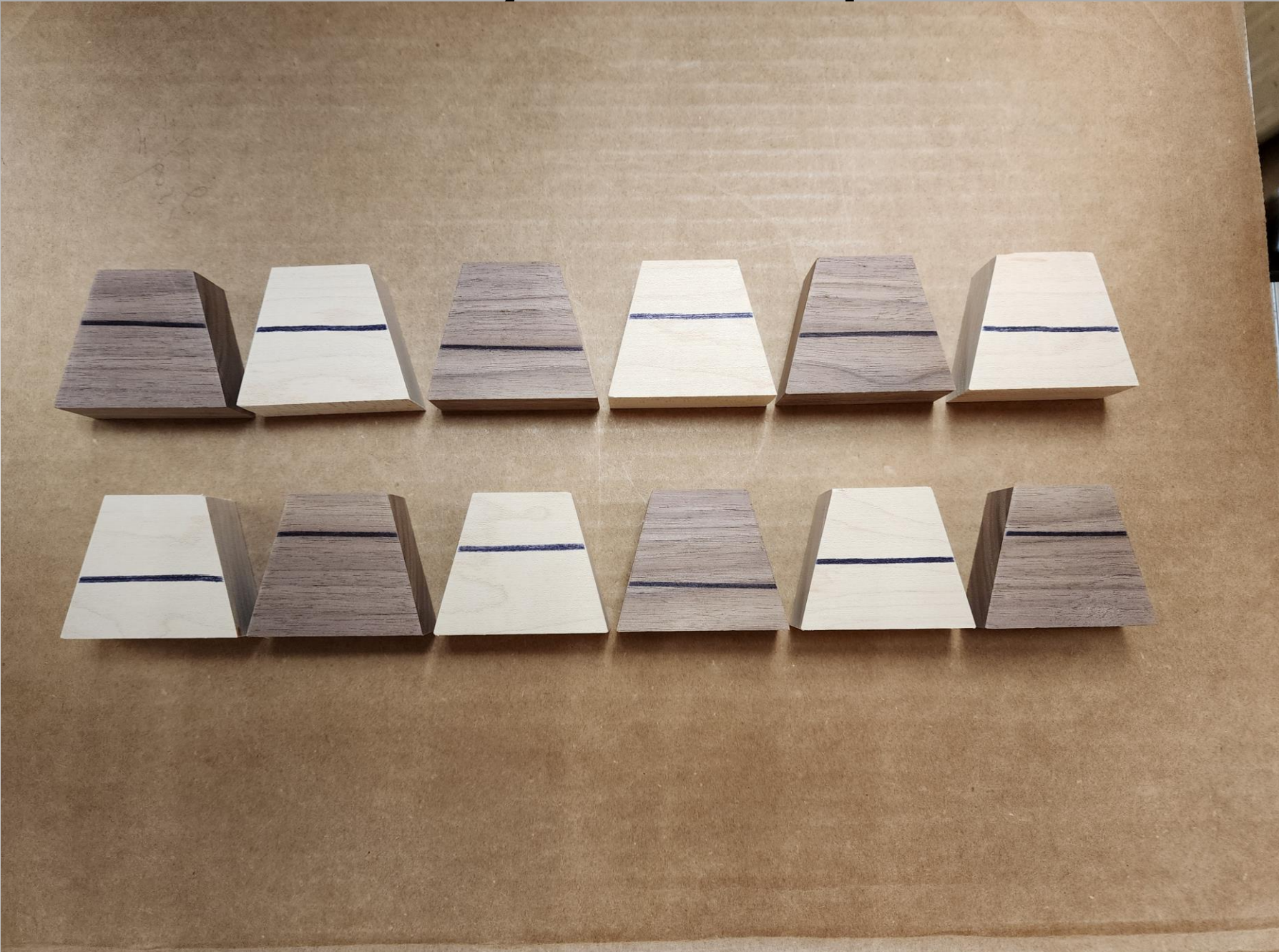


***Cutting Segments  
With The Wedgie-Less Sled***

***By Pete Marken***

**[petemarkenwoodturning.com](http://petemarkenwoodturning.com)**

# Ready For Glue Up

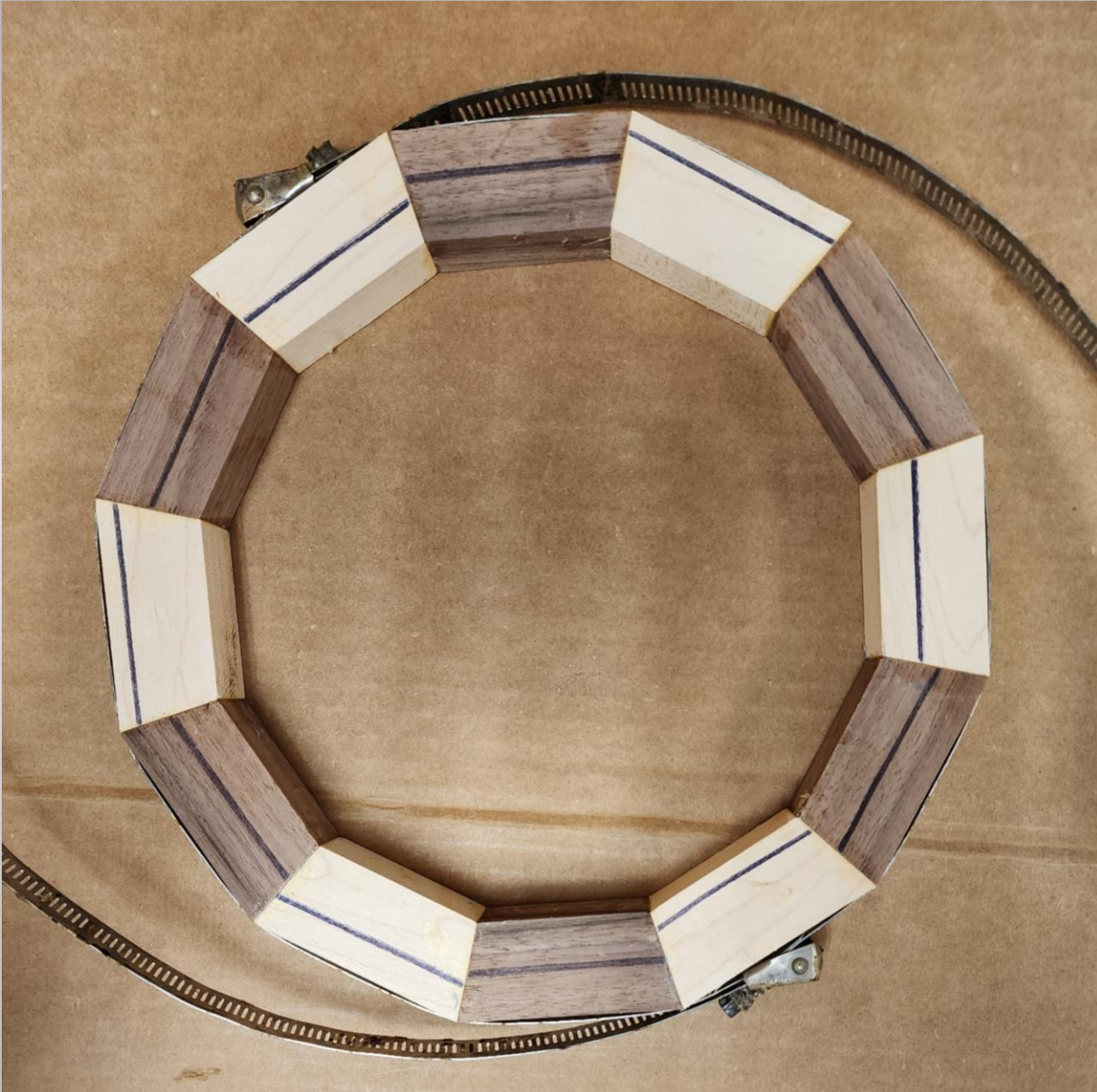


# Corner Alignment

It is very important that the segment corners are aligned properly. If not, there will be gaps between segments due to incorrect angles.



# Ring Glue Up



Segments can be numbered in the order that they were cut for grain orientation. Even numbered segments were cut on the lower fence and odd cut on the upper fence.

Numbering is not necessary, but you do need to alternate lower and upper fence segments.

Most Segmenters prefer either Titebond original or Titebond II extend wood glue.

# Flattening Rings With Drum Sander



**Mark the center of the  
maple segment**



**Glue applied for stacking  
the next ring**





**Center of maple segment aligned  
with bottom ring glue line**



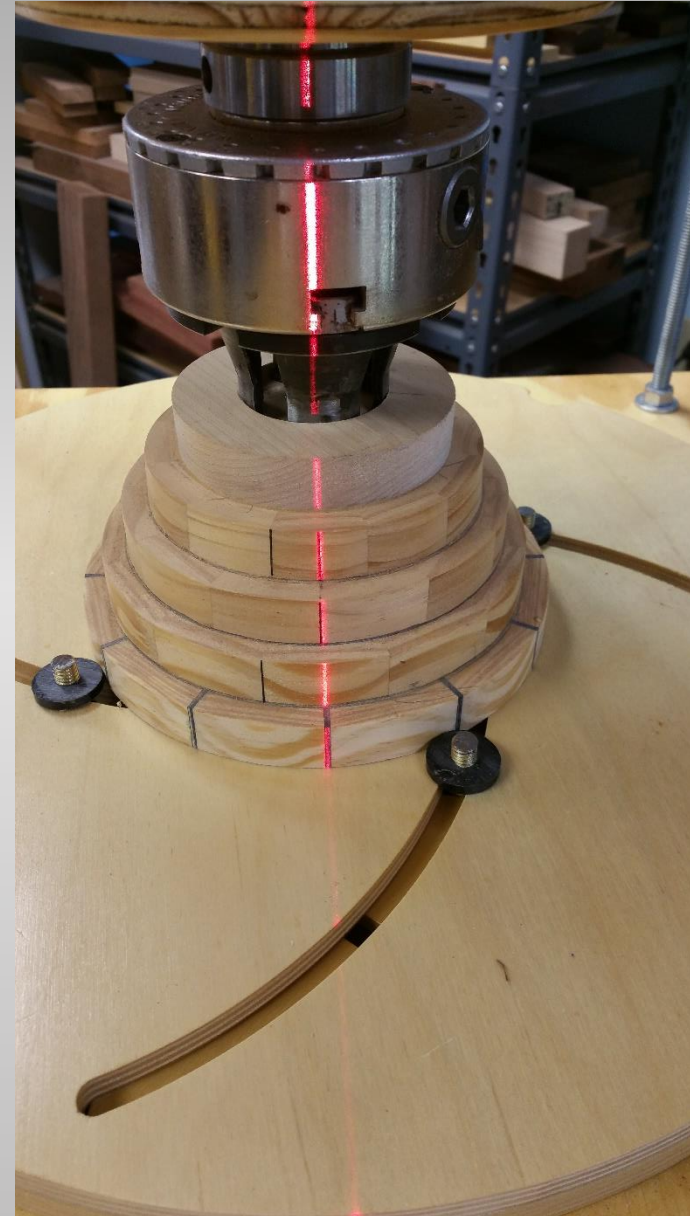
**Approximately 25 pounds of weight  
used for clamping pressure**



# Stacking And Gluing Rings

Since segments are glued together end grain to end grain the rings are not very strong by themselves. By stacking rings in a brick lay pattern the vessel becomes very strong.

To avoid issues with wood movement grain direction should be consistent. Usually side or edge grain being horizontal. Vertical spacers between segments can vary from this rule providing they are thin. Usually  $\frac{1}{4}$ " or less.



The End  
**Questions?**