

Segmented Woodturning II

Keystone Woodturners

Bob Zrebiec

August 17, 2022

Types of Segmented Woodturning

- Closed Segmented



Types of Segmented Woodturning

- Open Segmented



Types of Segmented Woodturning

- Stave Segmented

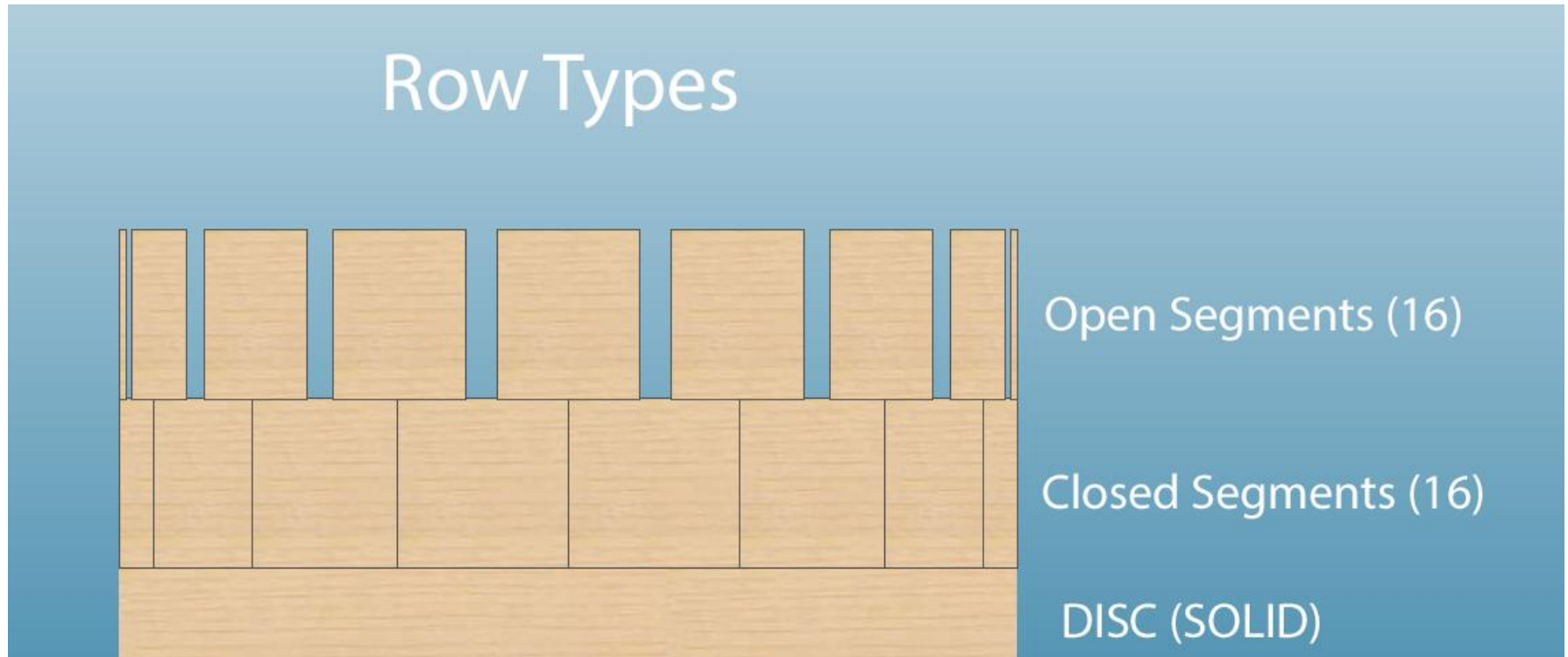


Segmented Woodturning

- Advantages
 - Project can be any size
 - Different woods can be combined
 - Low Material Cost
 - No End Grain Turning
- Disadvantages
 - Tools and Fixtures needed
 - Band Saw, Table Saw or Chop Saw needed
 - Longer Construction Time

Segmented Woodturning Details

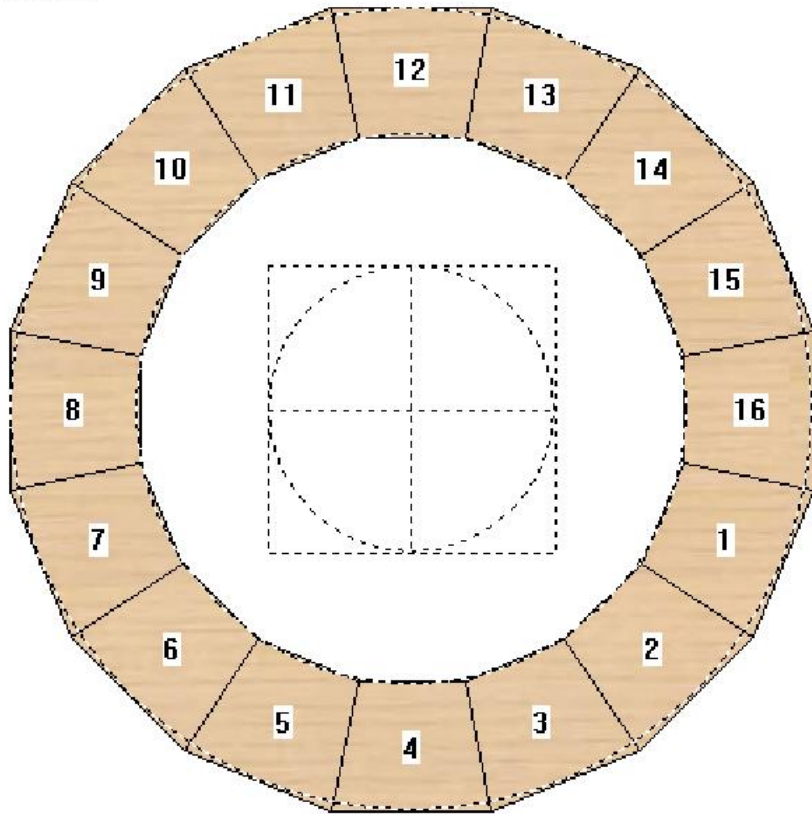
Vessels are made of rows



Row Cross Sections

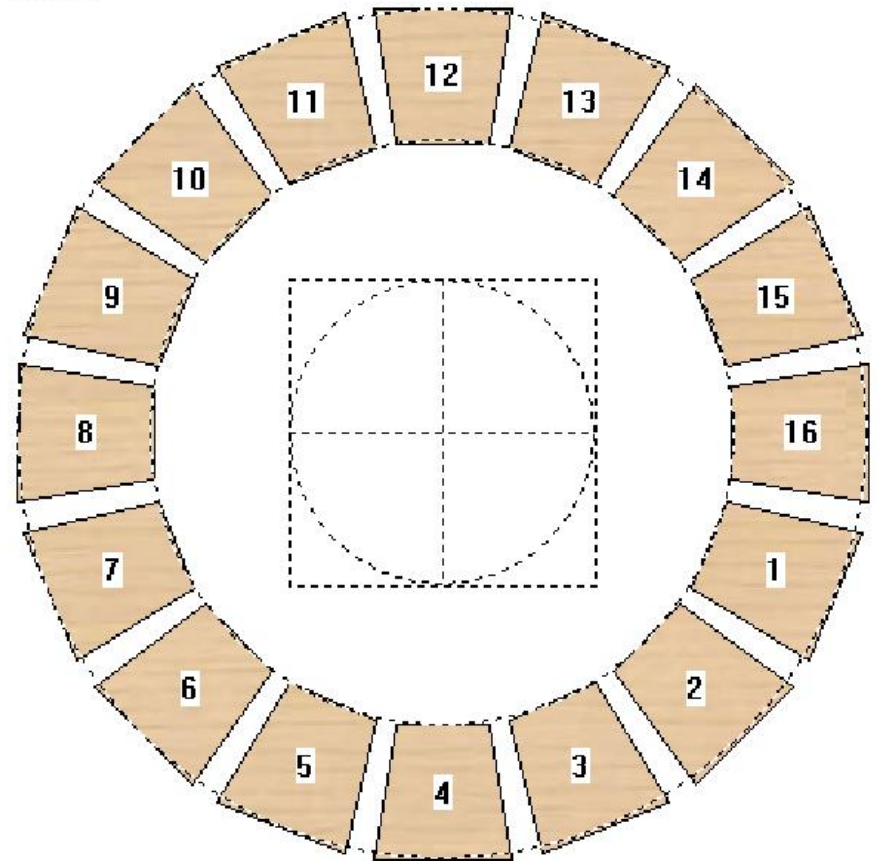
Closed

Row: 1

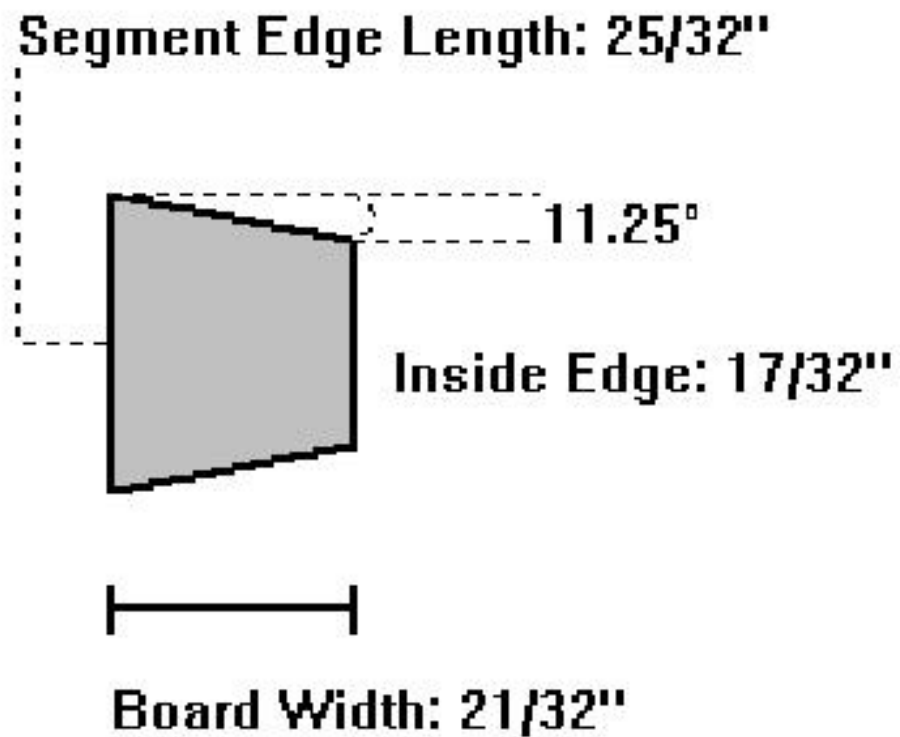


Open

Row: 1



Segment Details



Choose Number of Segments

CLOSED SEGMENT FAMILY



48 Segments

32 Segments

16 Segments

8 Segments












Design Choices

- Unique Design
- Template Based
- Copy an existing work

Design Tools

- Graph Paper – for all designs
- Computer Design Programs – for all designs
 - 3D Design Pro Program
 - Draw and edit 2D wall profiles and then obtain a 3D shaded preview of the vessel
 - Templates for over 100 vessels of all types
 - Can input pictures to trace
 - Exports to Woodturner Design Pro
 - Free download

3D Design Pro Template Choices

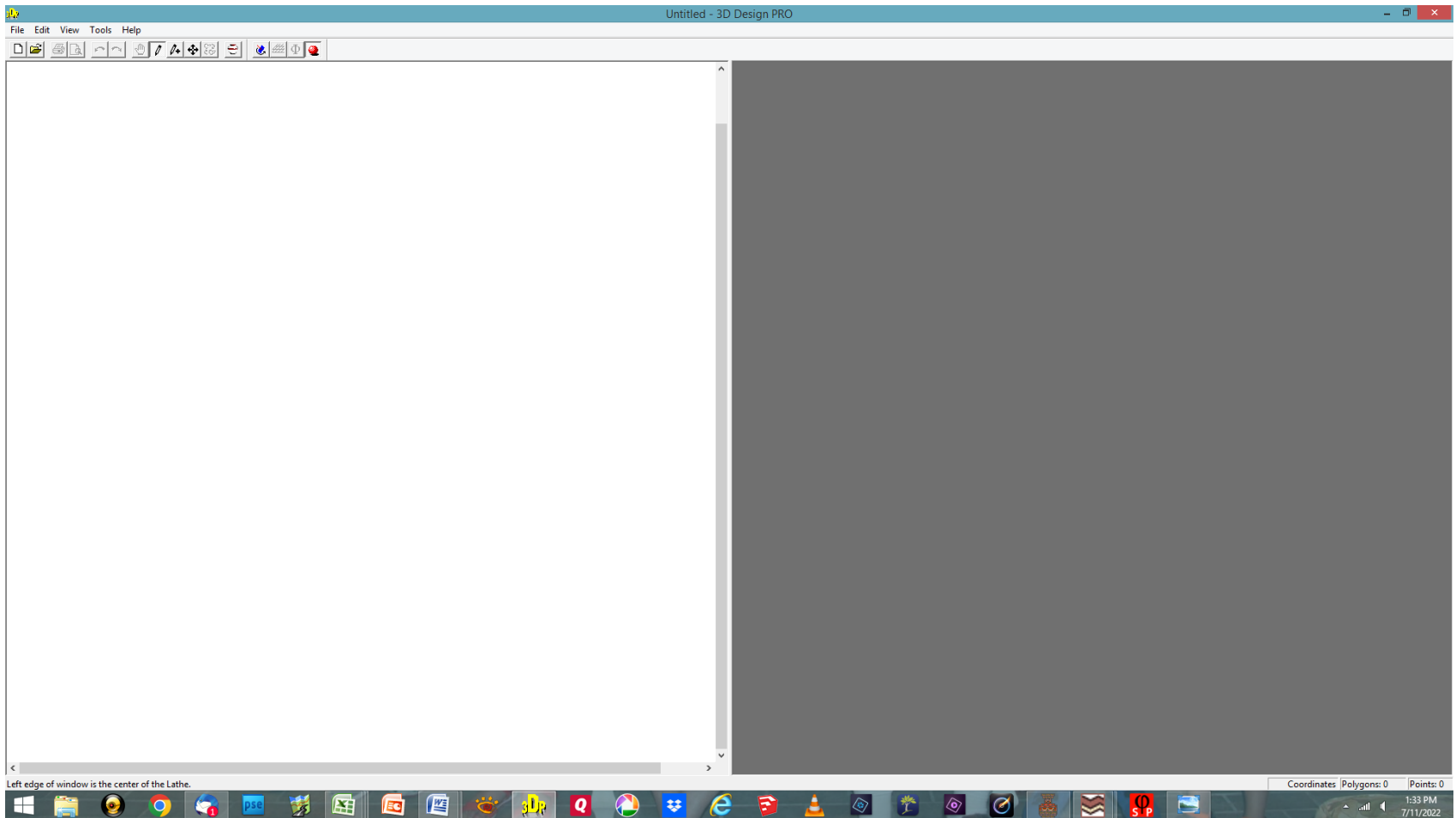
-  Boxes
-  Candlesticks
-  Closed Forms
-  Goblets
-  Hollow Forms
-  Open Forms
-  Peppermills
-  Platters
-  Southwest Vessels
-  Urns
-  Vases

Project To Be Built

- Christmas Bowl for the family for napkins and/or fruit 9 ½" ID, 4" height, maple and walnut woods, open and closed segmentation, suitable for WA, PA, NJ climates. Need 6.
- Desired Shape

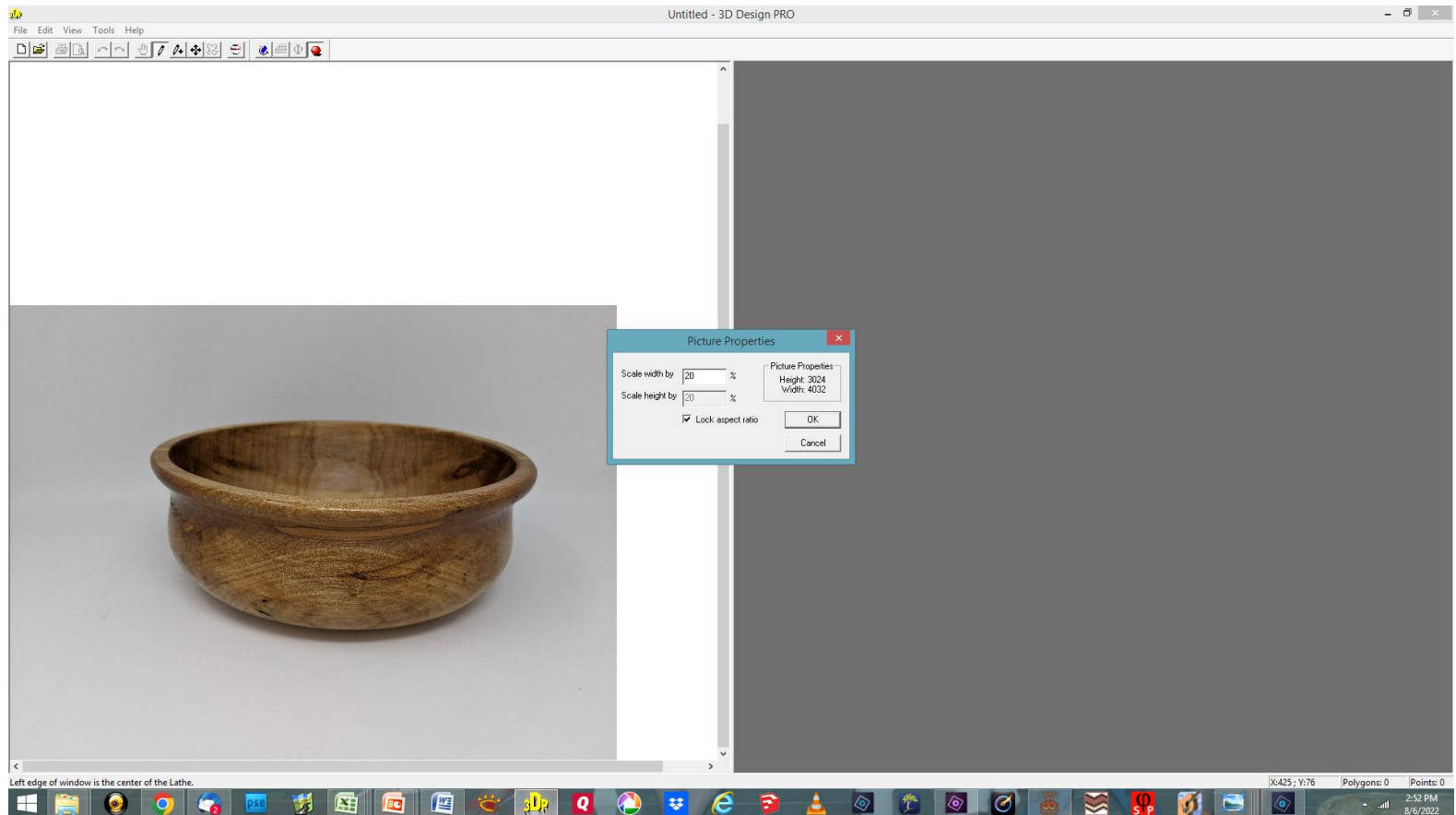


Step 1 – Start 3D Design Pro

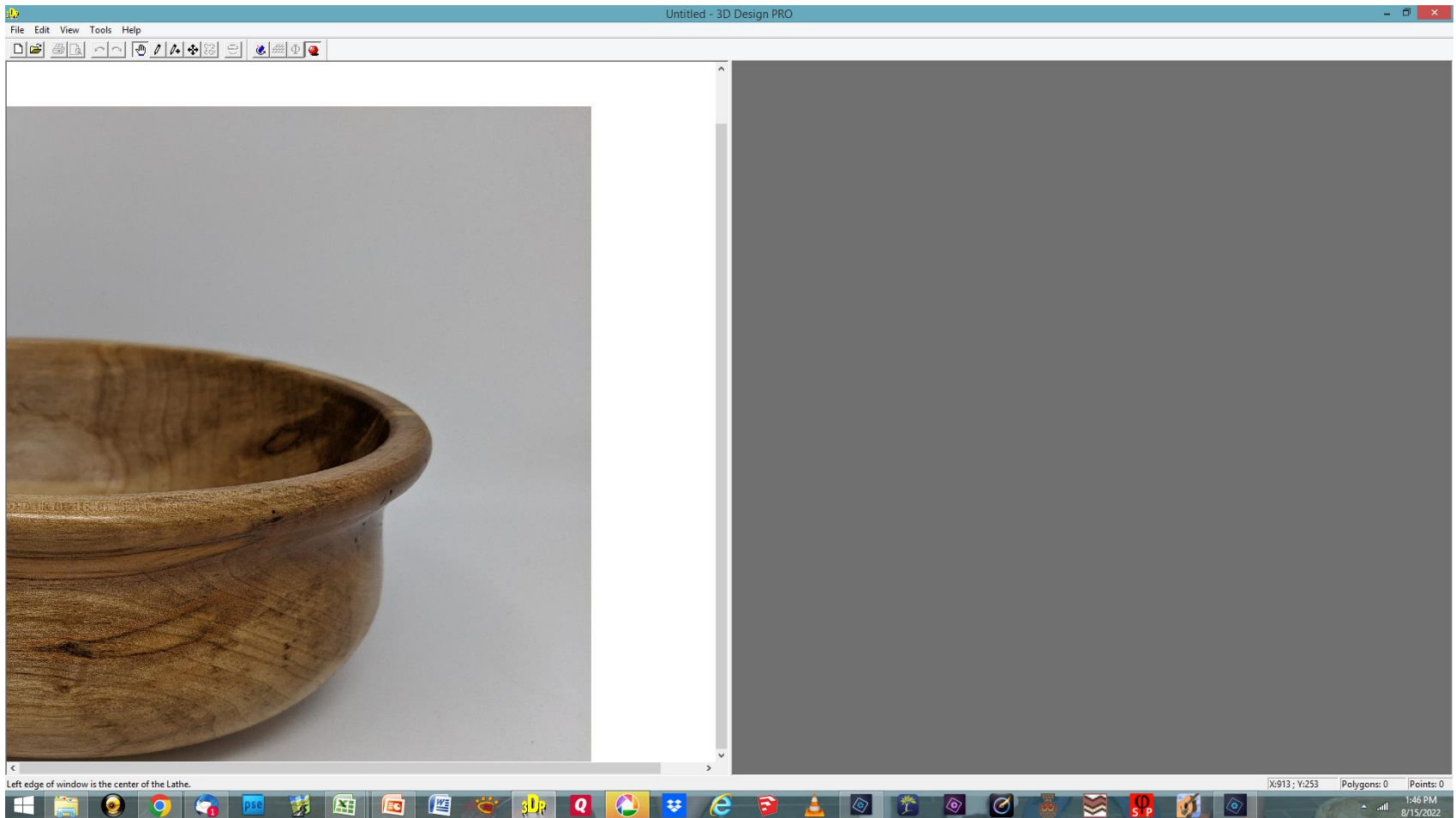


Step 2 – Load Desired Picture

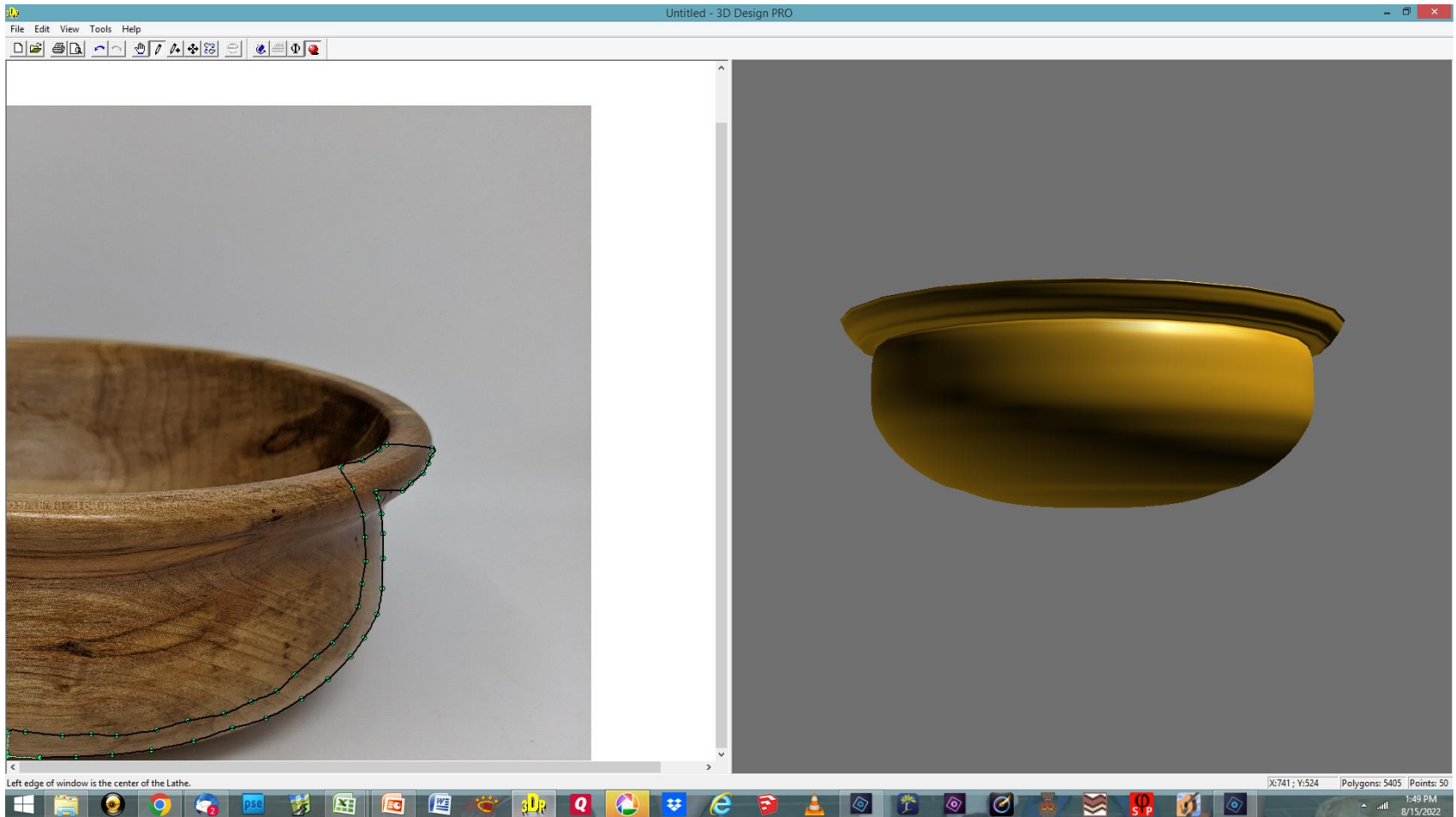
Tools, Background Photo, Add



Step 3 – Increase Width To 40 % And Move Image to Left Side



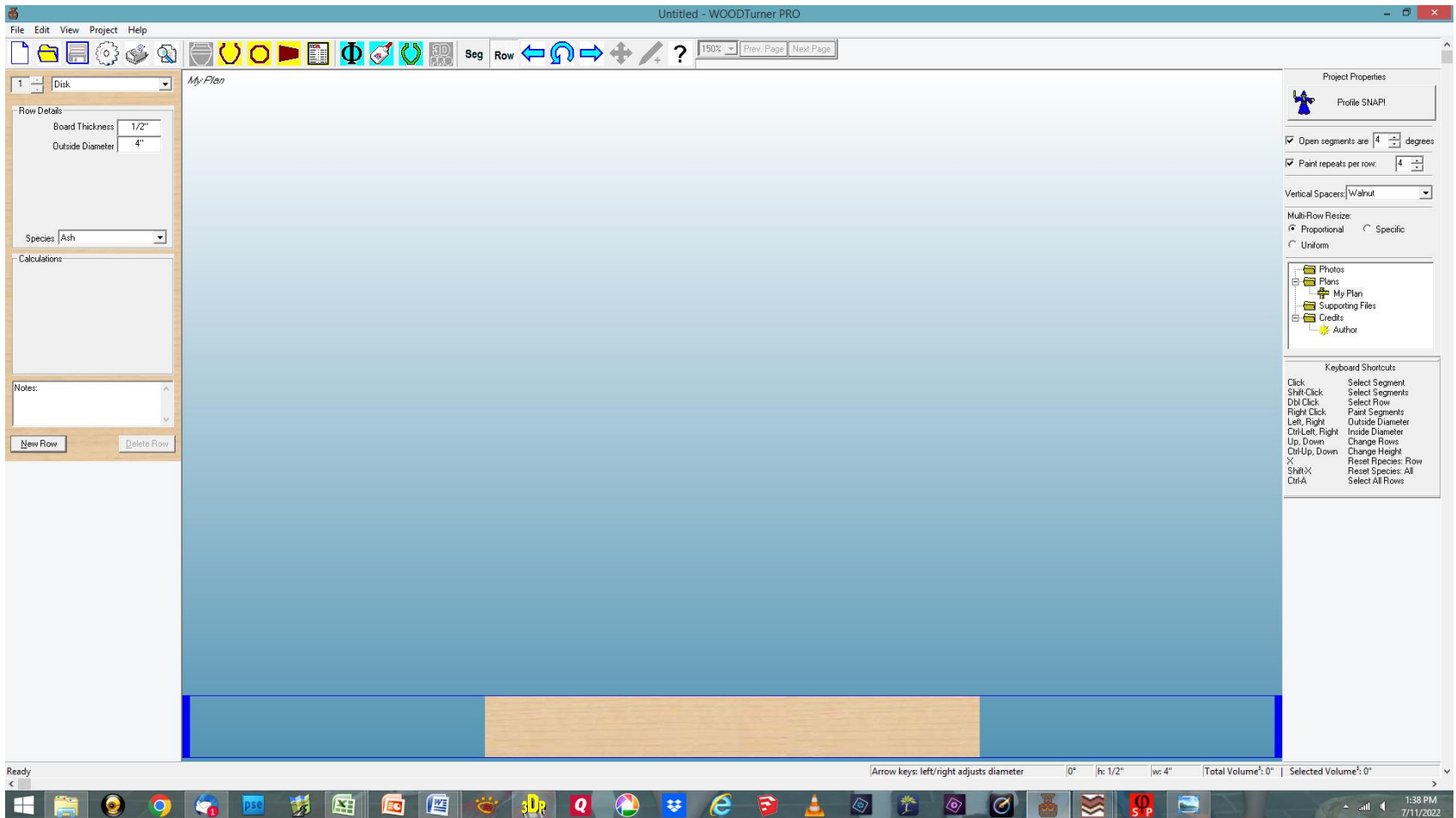
Step 4 – Use Pencil Tool to Trace Border



Step 5 – Dimension the Pieces

- Pencil and Paper
- Computer Program
- I Use Woodturner Pro a \$79 program if purchased separately or \$ 139 with Segment Pro and Lamination Pro. I use both for larger projects.

Step 6 Open Woodturner Pro



Menu Details

- Left Side

1 Flat

Row Details

Segments	16
Board Thickness	1/2"
Outside Diameter	4"
Inside Diameter	2-3/4"
Vertical Spacers	0"

Species: Walnut

Calculations

Segment Edge Length	25/32"
Board Width	21/32"
Economy Board Length	12-25/32"
Grain Match Board Length	14-23/32"
Miter Angle	11.25°

Notes:

New Row Delete Row

Right Side

Project Properties

Profile SNAP!

☒ Open segments are 4 degrees

☒ Paint repeats per row: 4

Vertical Spacers: Walnut

Multi-Row Resize:

☒ Proportional ☐ Specific

☐ Uniform

Photos

Plans

My Plan

Supporting Files

Credits

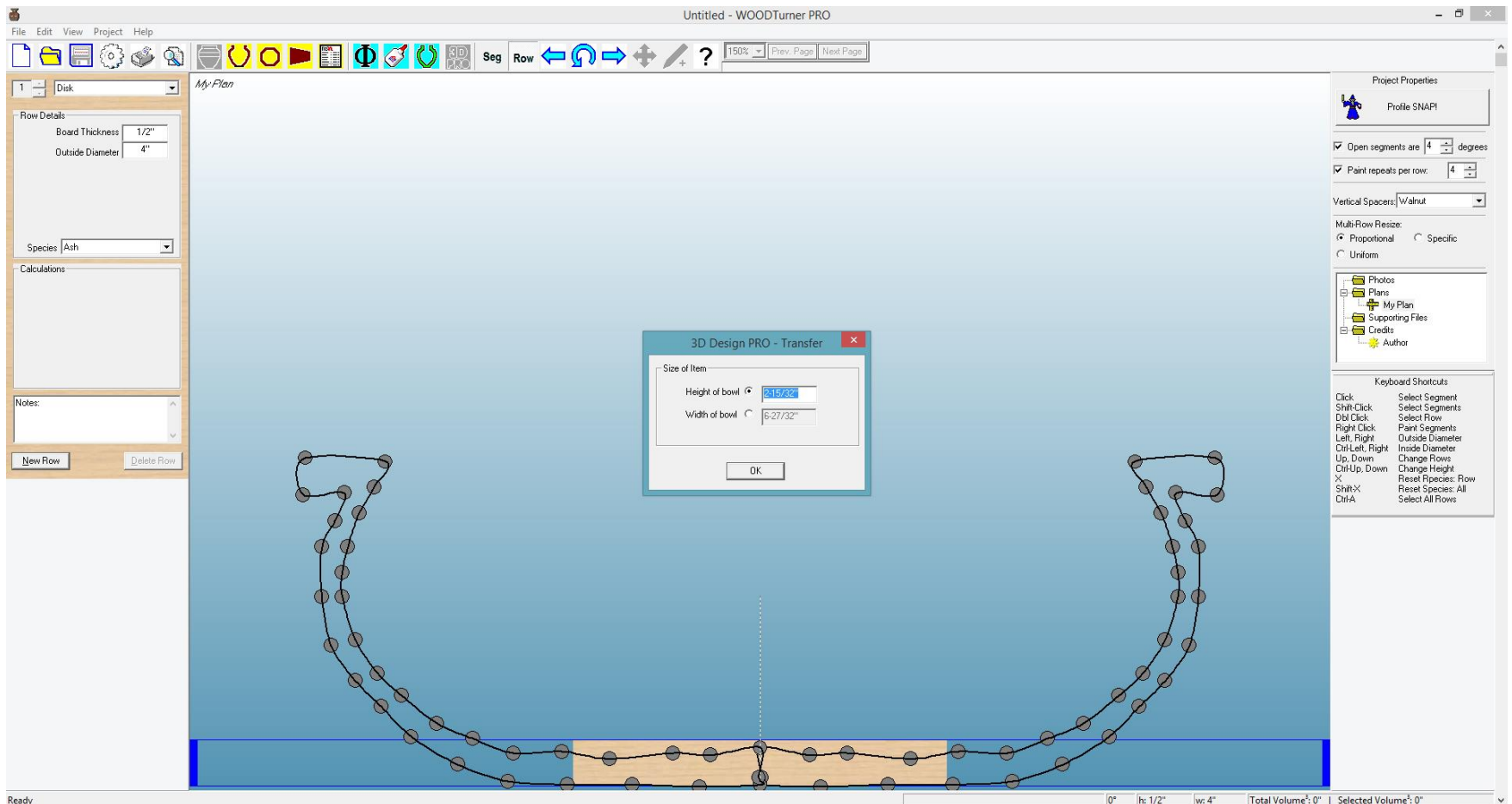
Author

Keyboard Shortcuts

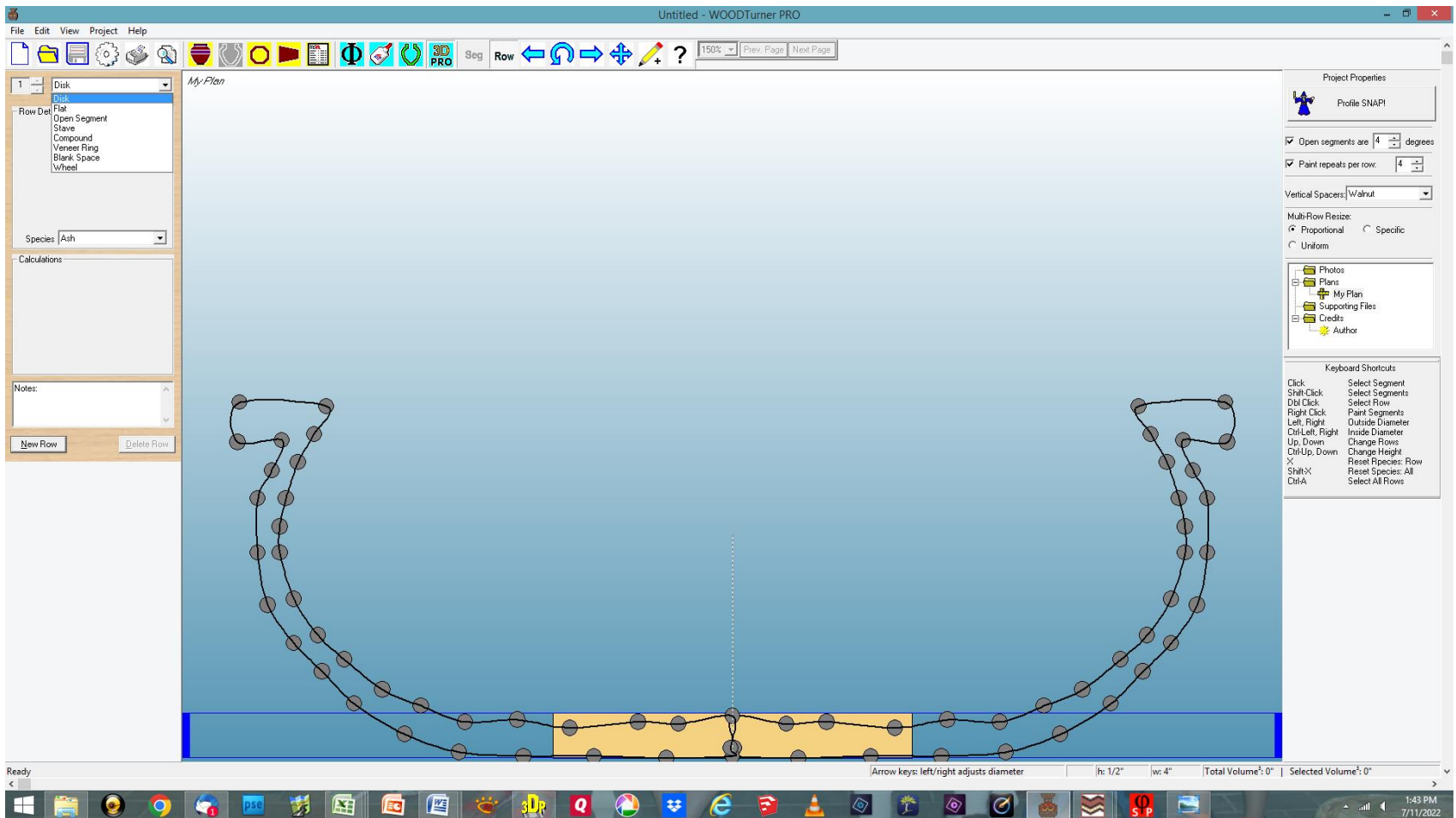
Click	Select Segment
Shift-Click	Select Segments
Db1 Click	Select Row
Right Click	Paint Segments
Left, Right	Outside Diameter
Ctrl-Left, Right	Inside Diameter
Up, Down	Change Rows
Ctrl-Up, Down	Change Height
X	Reset Species: Row
Shift-X	Reset Species: All
Ctrl-A	Select All Rows

Step 7 Input 3D Pro image

In 3D Pro, File, Transfer to Woodturner Pro



Step 8 – Enter Desired Height of Bowl



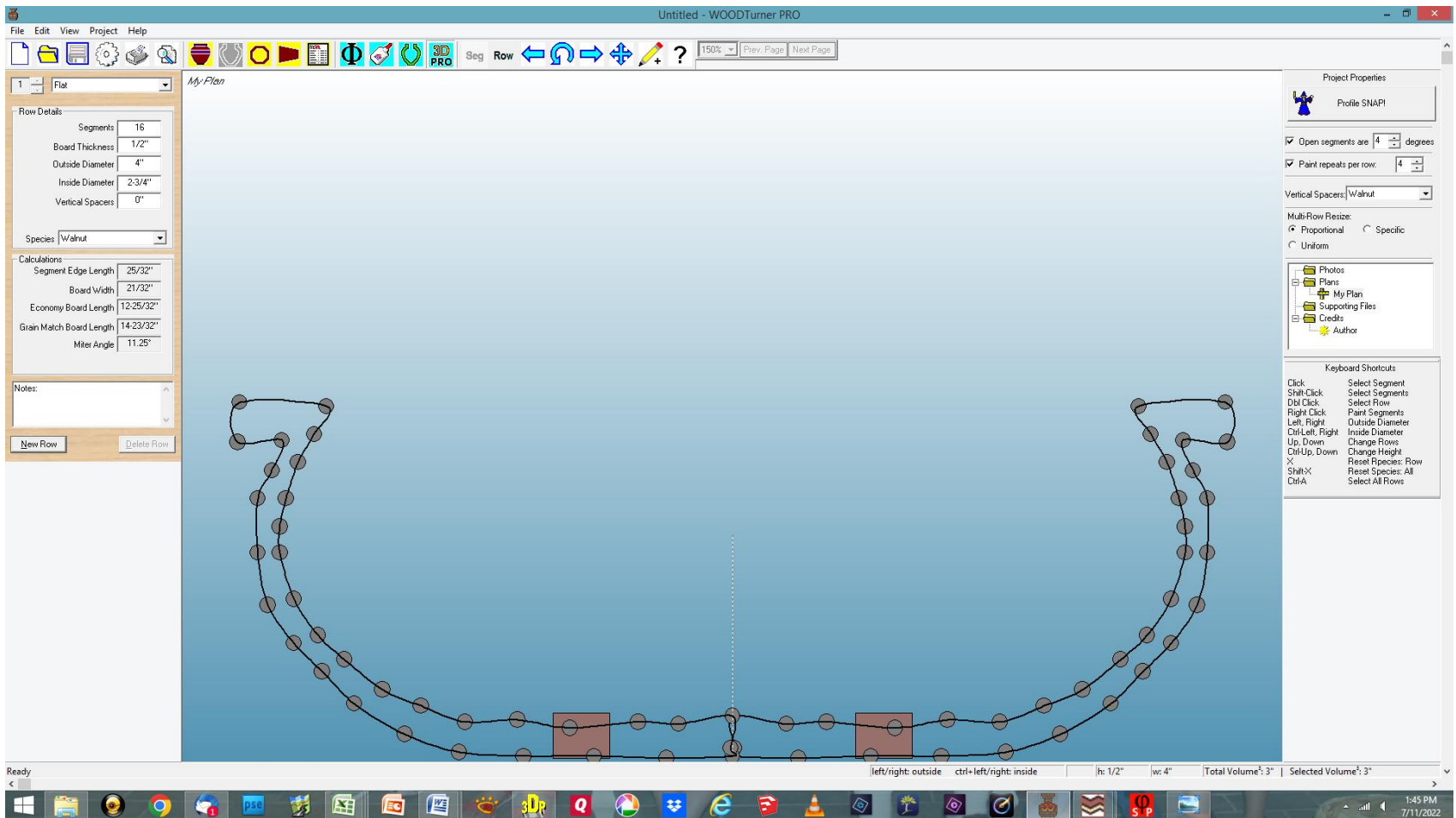
Step 9 – Set Bowl Parameters

- Type of Each Row (Disk, Flat, Open)
- Thickness of each row
- Number of segments of each row
- Number of degrees for open segments
- Type of wood for each segment

Step 10 – Enter Bottom Row (1)

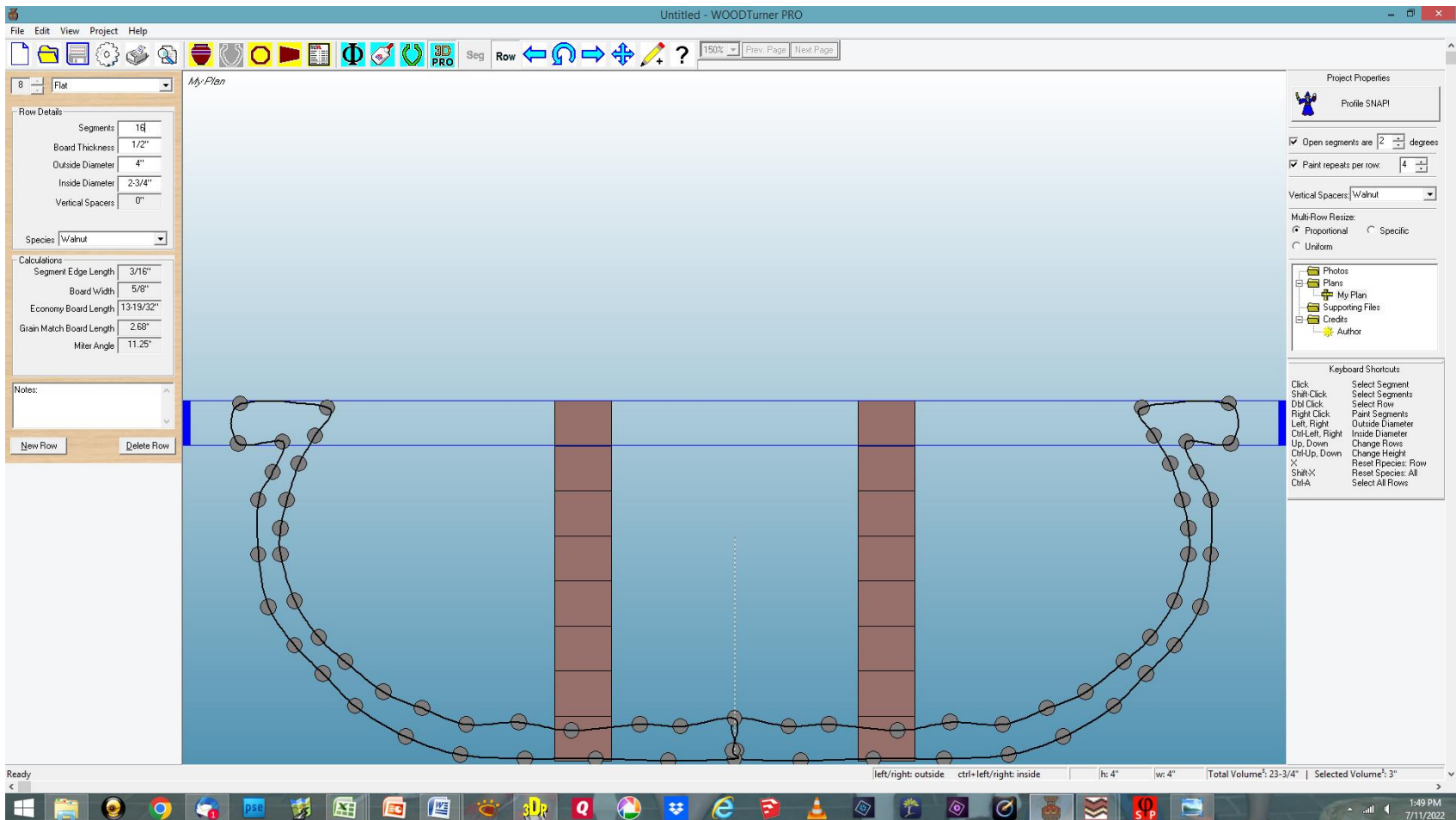
- Since Diameter will be $>4''$ a floating bottom will be used. A $\frac{1}{4}''$ plywood disc will fit into a $\frac{1}{4}''$ rabbit. Row 2 will secure the disc in place
- Row thickness will be $\frac{1}{2}''$ for all rows
- Bottom row will be walnut
- Bottom row will have 16 segments and be closed

Step 11 – The Bottom Row (1)

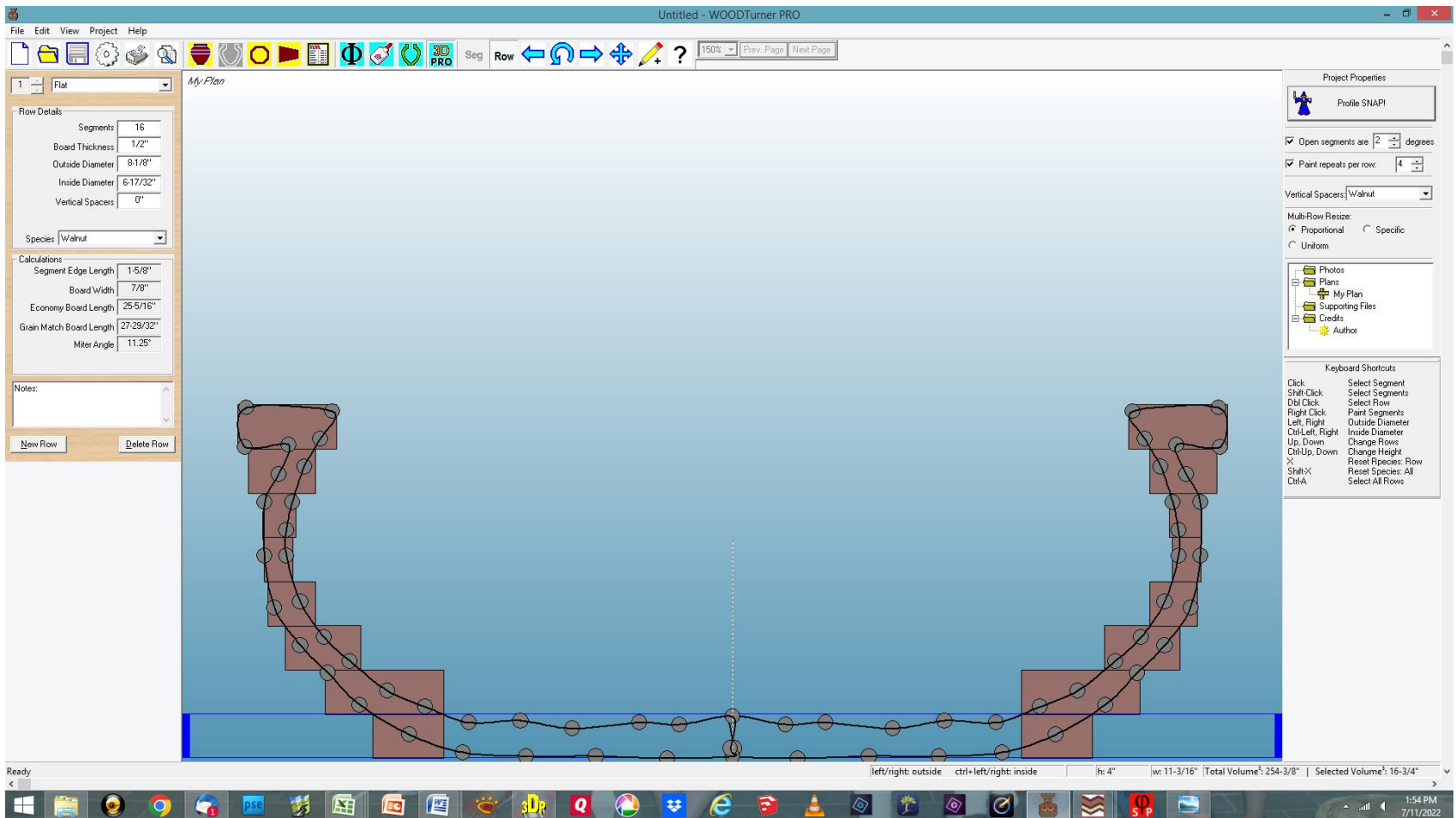


Step 12 – Add 7 Additional Rows

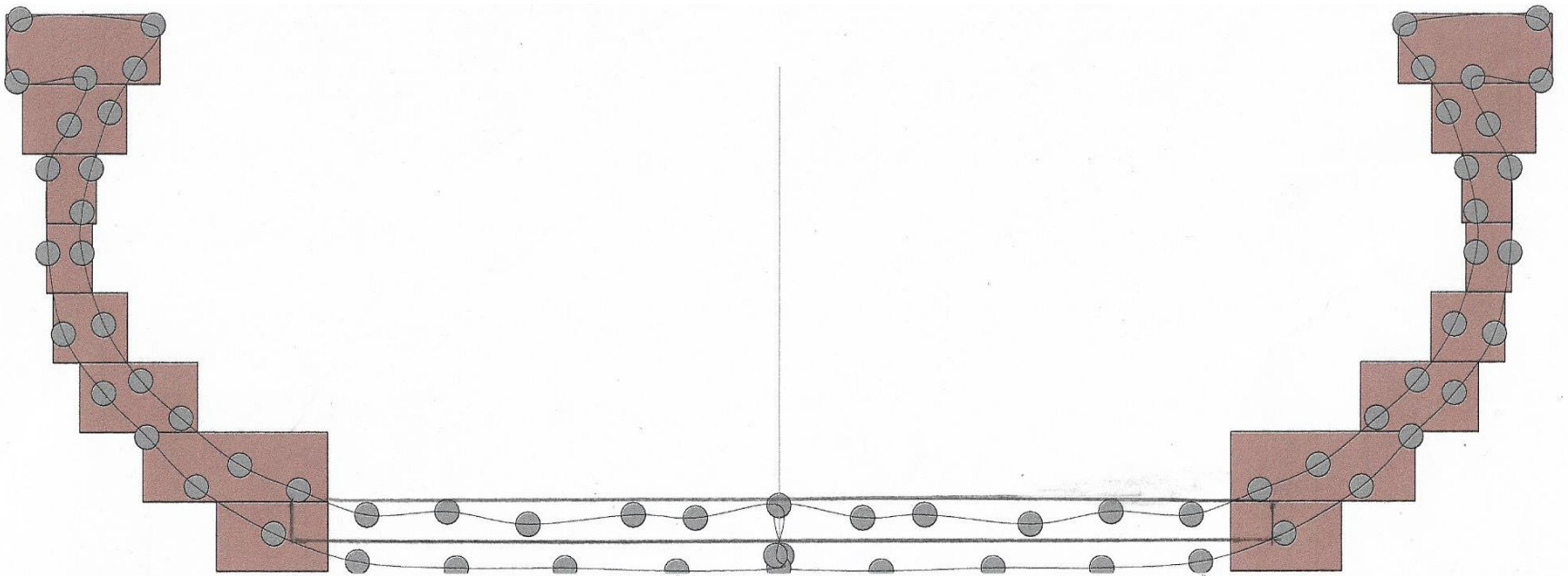
Rows 2 to 7 Open 48 segment, 2 degrees, Row 8 Closed 16 Segment



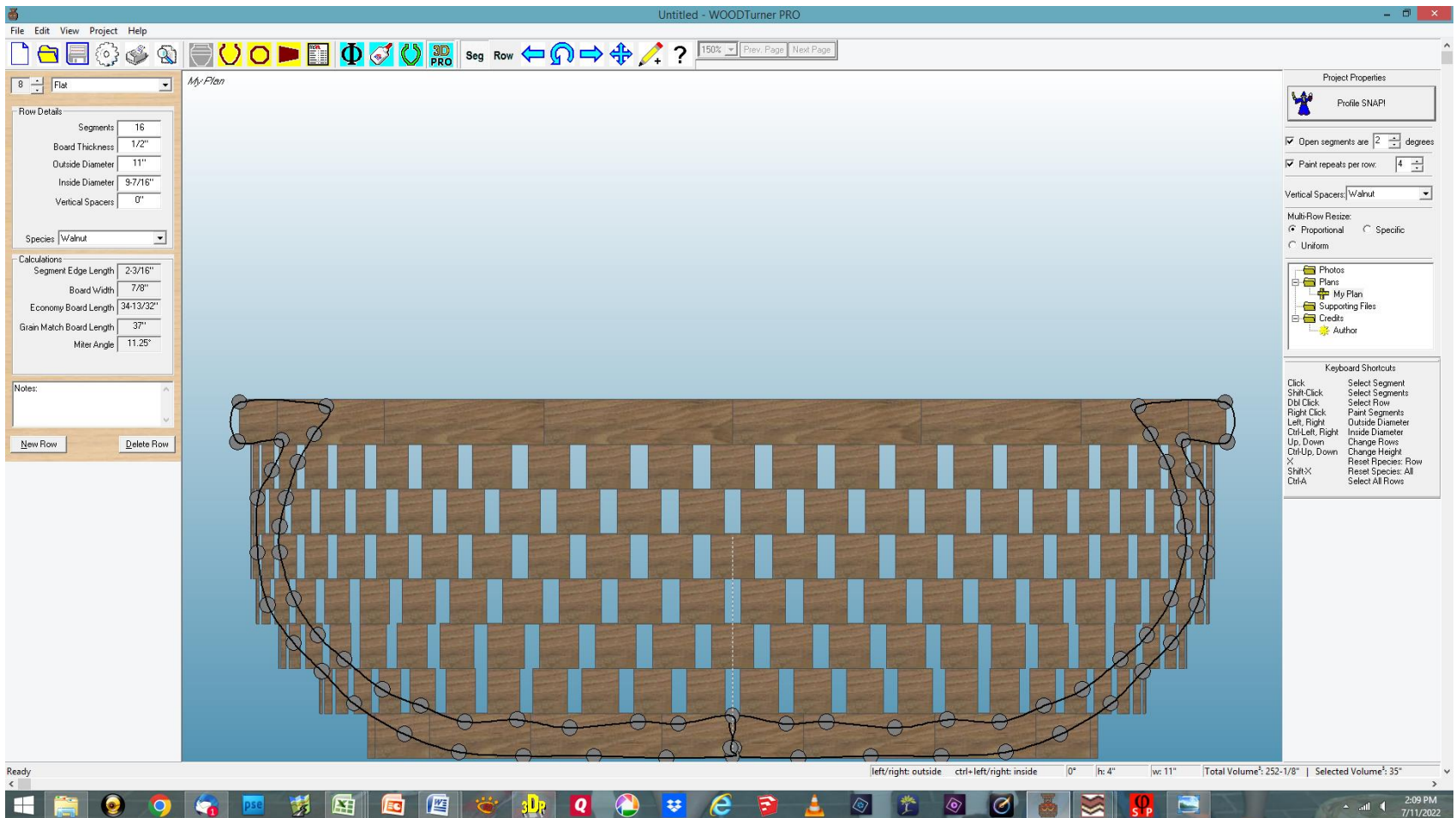
Step 13- Use Profile Snap



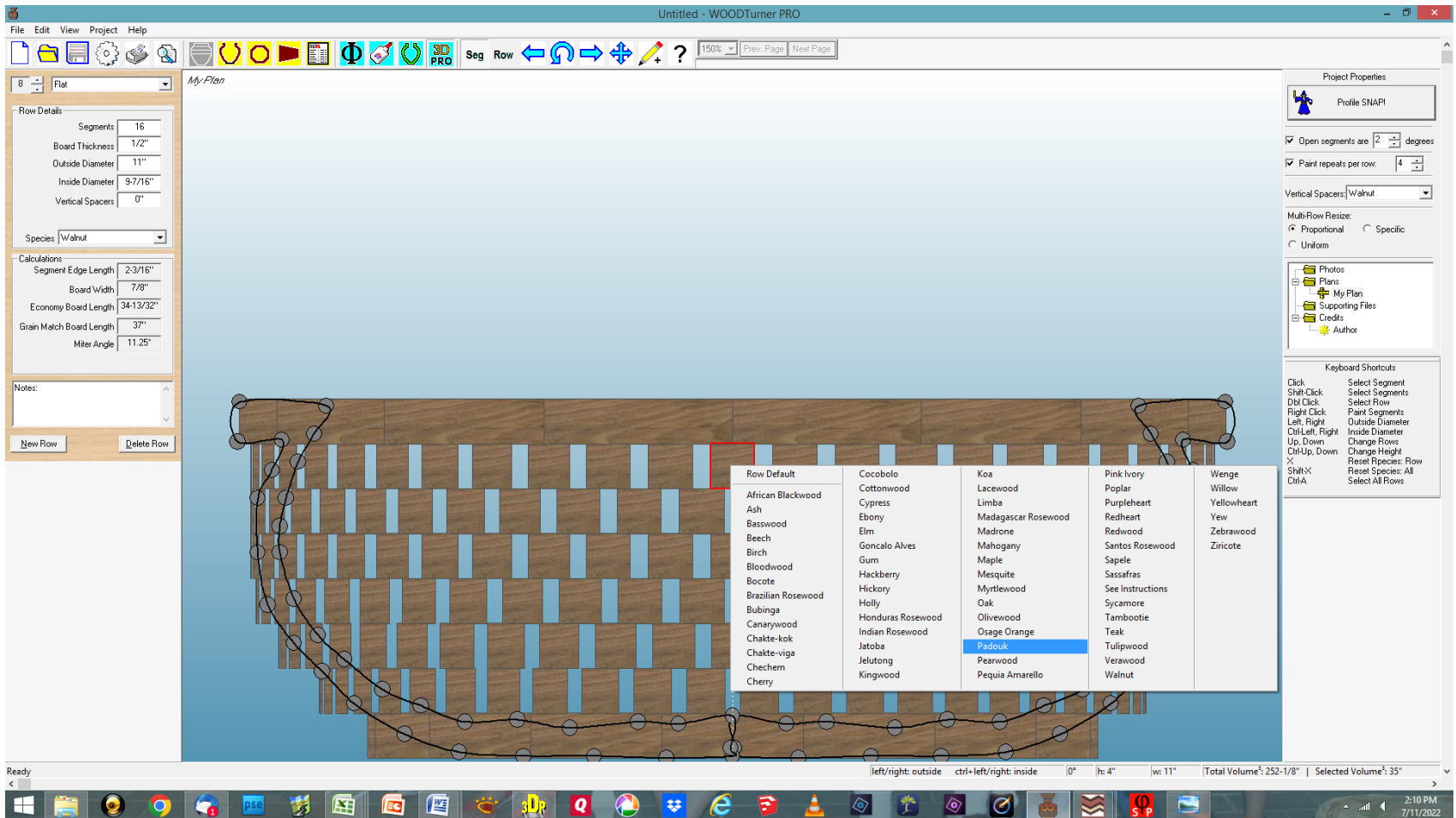
Step 14 – Show Floating Disc In Cutaway View



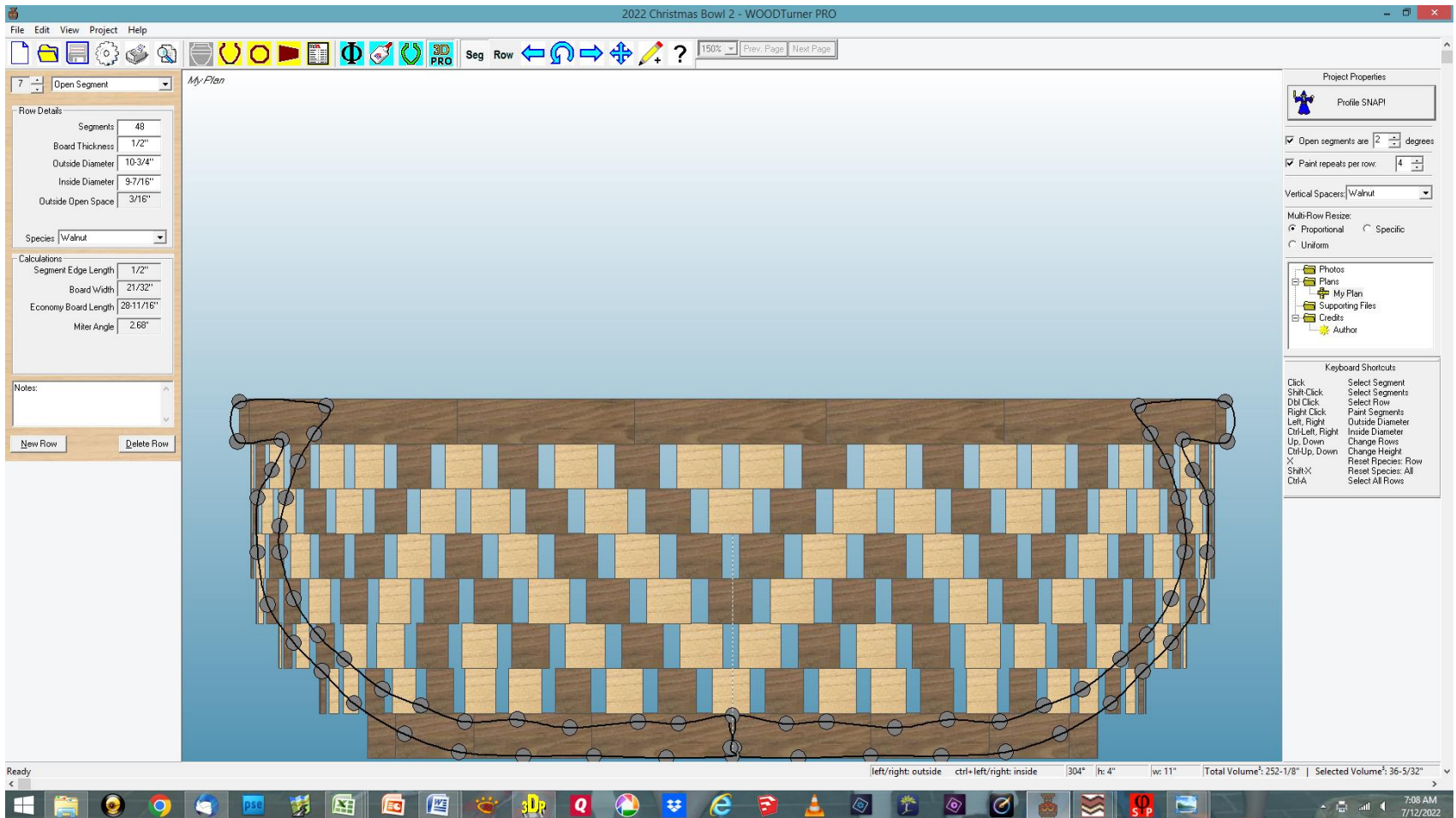
Step 15 – Work with Vessel View



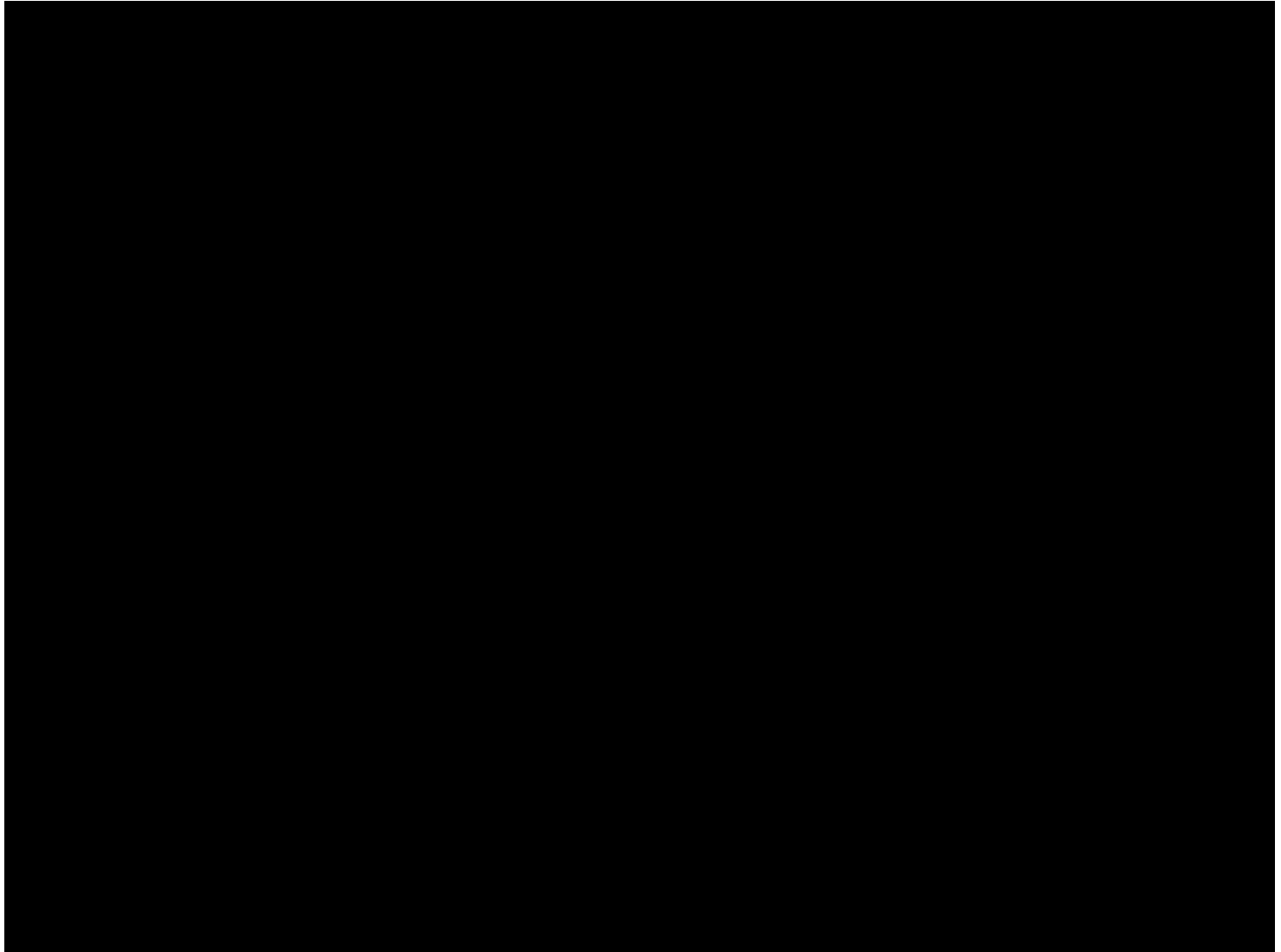
Step 16 – Design Pattern



Step 17 – Complete Pattern



Step 18 – Check Pattern



Step 19 – Convert Summary View

2022 Christmas Bowl 2 - WOODTurner PRO

File Edit View Project Help

Ctrl+N
Ctrl+O
Ctrl+S

New
Open...
Save
Save As...
export to 3D Design PRO...
export to Excel (CSV)...
Print...
Print Preview
Print Setup...
Options...
Download Projects...
1 2022 Christmas Bowl 2
2 2022 Christmas Bowl
3 2022 Christmas Bowl 48 Disc Base
4 2022 Christmas Bowl 36
5 Napkin Holder open walnut padauk
6 Napkin Holder closed walnut padauk yellowheart
Exit

Ctrl+P

Notes:
New Row Delete Row

Cutting Summary - 2022 Christmas Bowl 2

Type	Species (Default)	Segs	Board Thickness	Outside Diameter	Inside Diameter	Edge Length	Vertical Spacer	Board Width	Econ Bd Length	Grain Match	Miter Angle	Blade Tilt	Slope	S1	S2	S3	S4	S5
Walnut	Walnut	16	1/2"	11"	9-7/16"	2-3/16"		7/8"	34-13/32"	37"	11.25°				16			
Walnut	Walnut	48	1/2"	10-3/4"	9-7/16"	1/2"	3/16"	21/32"	28-11/16"		2.68°			28	20			
Walnut	Walnut	48	1/2"	10-3/4"	9-3/4"	1/2"	3/16"	1/2"	29-1/32"		2.68°			28	20			
Walnut	Walnut	48	1/2"	10-3/4"	9-3/4"	1/2"	3/16"	1/2"	29-1/32"		2.68°			20	28			
Walnut	Walnut	48	1/2"	10-5/8"	9-7/16"	1/2"	3/16"	19/32"	28-17/32"		2.68°			20	28			
Walnut	Walnut	48	1/2"	10-1/8"	8-13/32"	15/32"	3/16"	27/32"	26-27/32"		2.68°			28	20			
Walnut	Walnut	48	1/2"	9-7/32"	6-17/32"	7/16"	3/16"	1-11/32"	23-23/32"		2.68°			28	20			
Walnut	Walnut	16	1/2"	8-1/8"	6-17/32"	1-5/8"		7/8"	25-5/16"	27-29/32"	11.25°				16			

Project Properties

Profile SNAP!

Open segments are 2 degrees

Paint repeats per row: 4

Vertical Spacers: Walnut

Multi-Row Resize: Proportional Specific Uniform

Photos
Plans
My Plans
Supporting Files
Credits
Author

Keyboard Shortcuts

Click Select Segment
Shift-Click Select Segments
Ctrl-Click Select Row
Right Click Paint Segments
Left, Right Outside Diameter
Ctrl-Left, Right Inside Diameter
Up, Down Change Rows
Ctrl-Up, Down Change Height
X Reset Species: Row
Shift-X Reset Species: All
Ctrl-A Select All Rows

left/right: outside ctrl+left/right: inside | h: 4" | w: 11" | Total Volume³: 252-1/8" | Selected Volume³: 35"

2:45 PM 7/11/2022

Step 20 – Build Cutting Spreadsheet

2022 Christmas Bowl 2 Summary Simplified Final

Row	Type	Segs.	Board Thickness	Segment	Setup	Cut	Walnut Segs	Economy Walnut	Economy Maple	Board Length
				Edge Length	Edge Length	Board Width		Board Length	Maple Segs	
8	Closed Seg	16	0.5	2.19	2.284	"7/8"	16	39		
7	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
6	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
5	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
4	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
3	Open Seg	48	0.5	0.47	0.564	"7/8"	20	11	28	16
2	Open Seg	48	0.5	0.43	0.524	" 1 3/8"	20	10	28	15
1	Closed Seg	16	0.5	1.62	1.714	"7/8"	16	30		

Floating Disc 1/4" thick approx 7" dia (float in Row 1 rabbet)

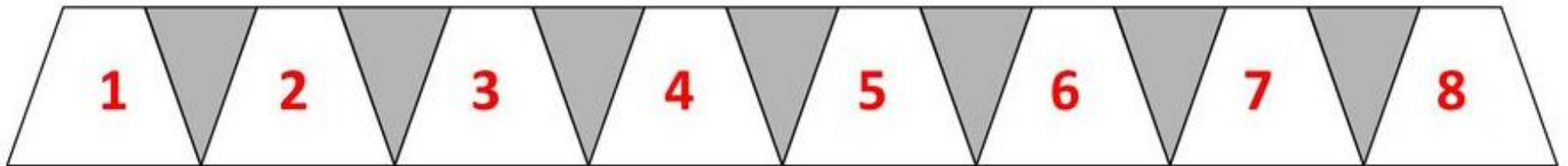
Saw Blade Diablo 10" Ultimate Cut 90 teeth 3/32" thick (.09375)

Determine How To Cut

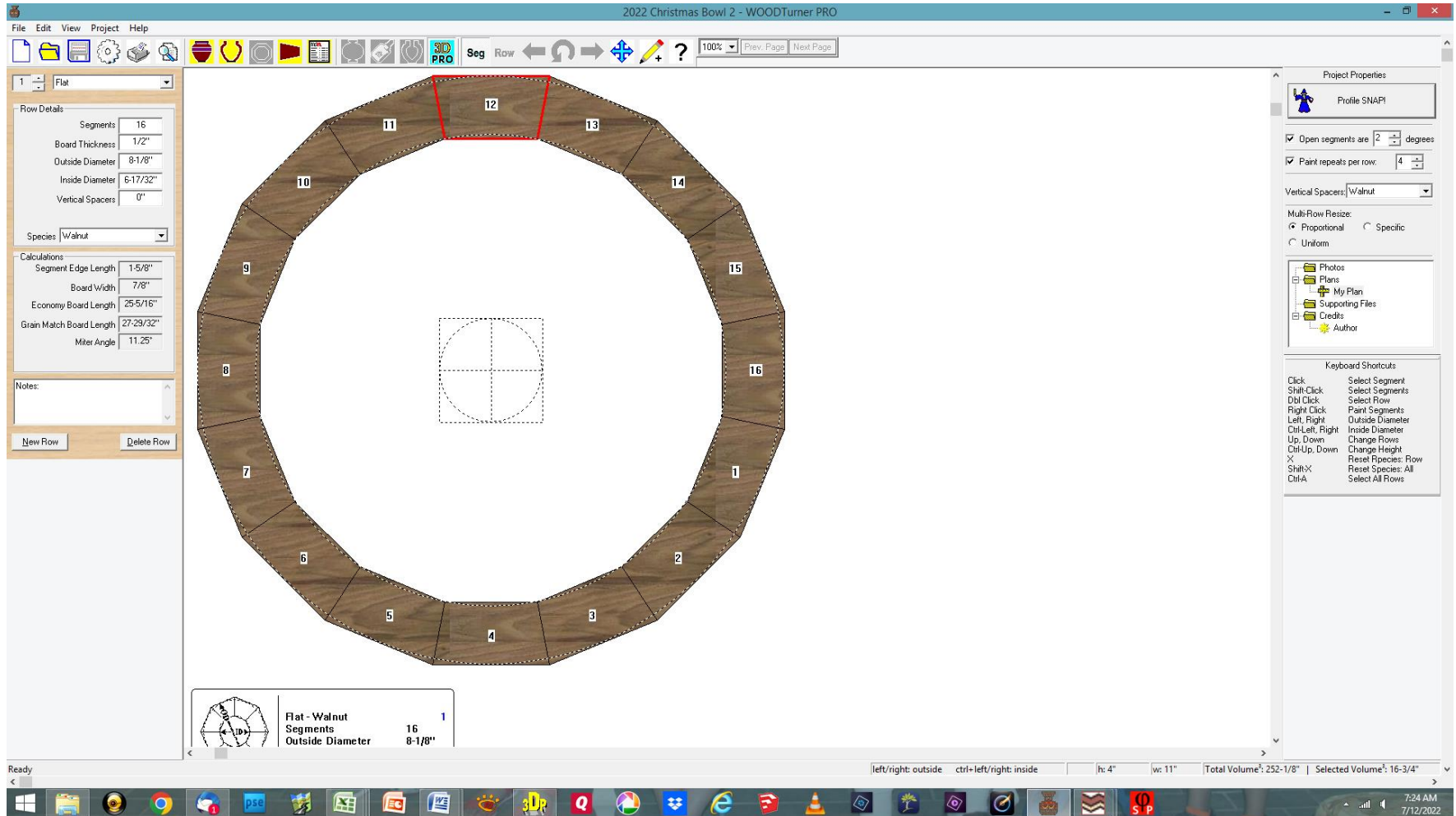
- Economy – uses least wood



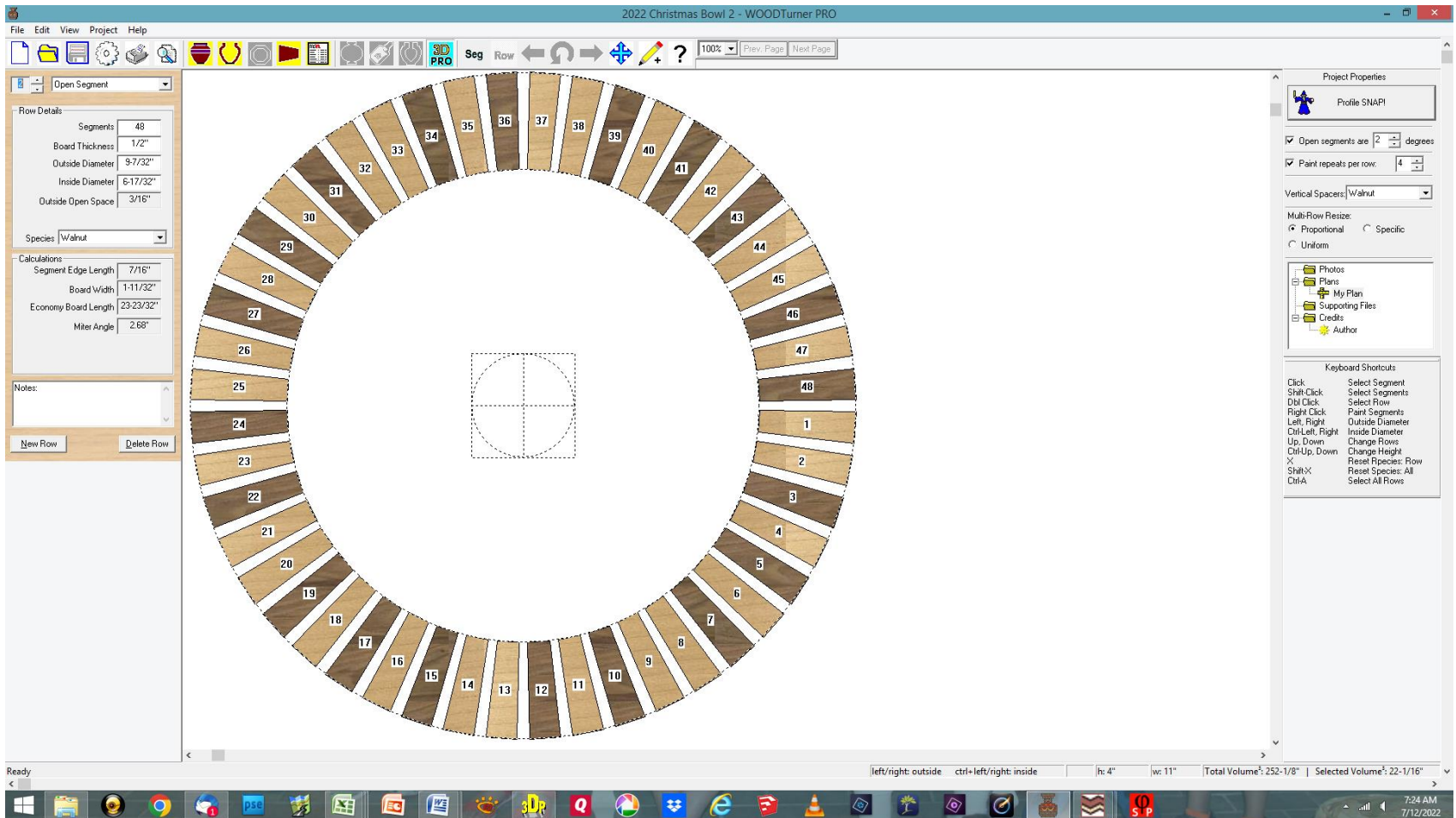
- Grain Matching – Best for highly figured wood



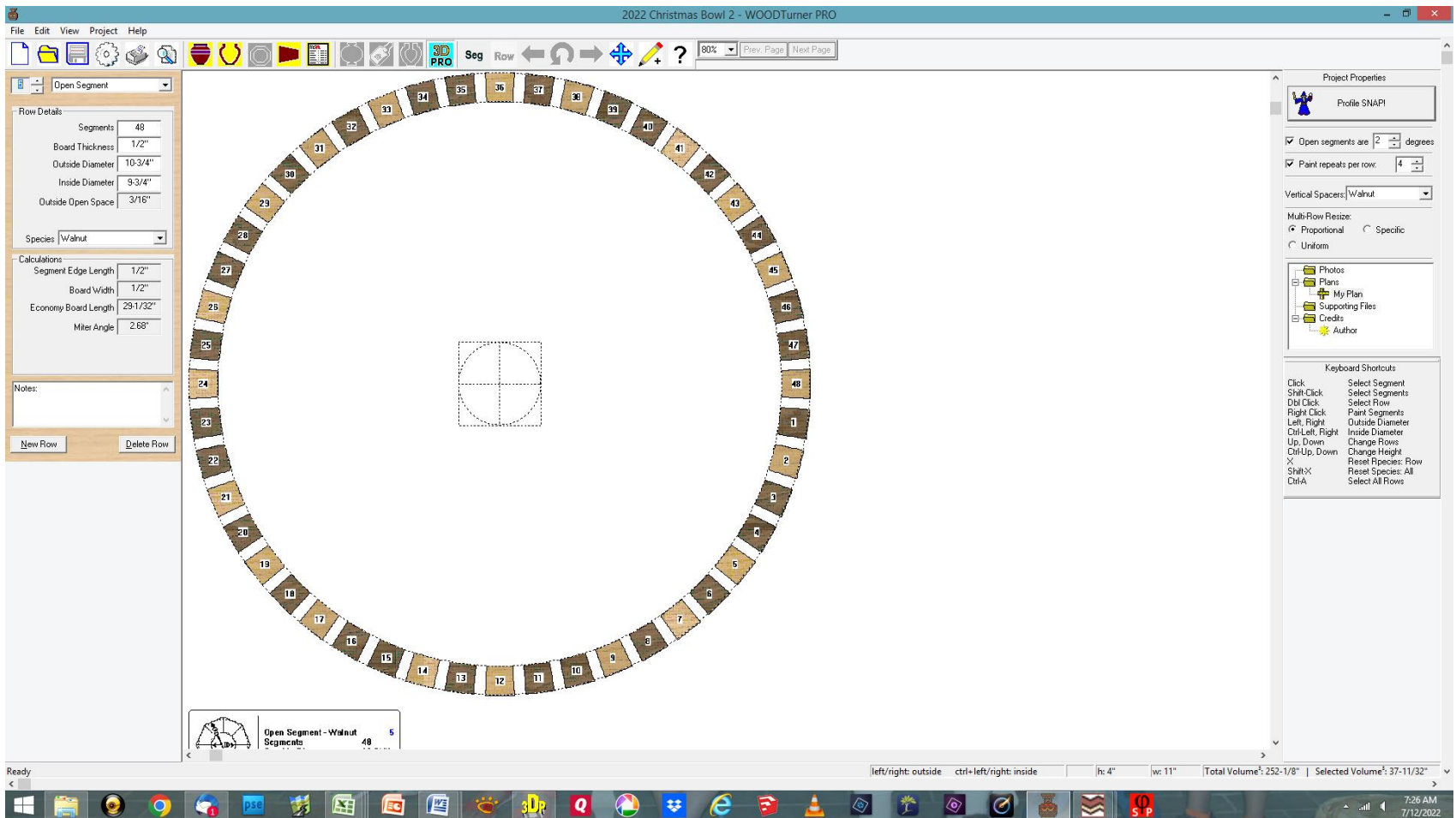
Step 21 – Print Out Ring Views



Step 22 – Print Out 48 Segment Rings

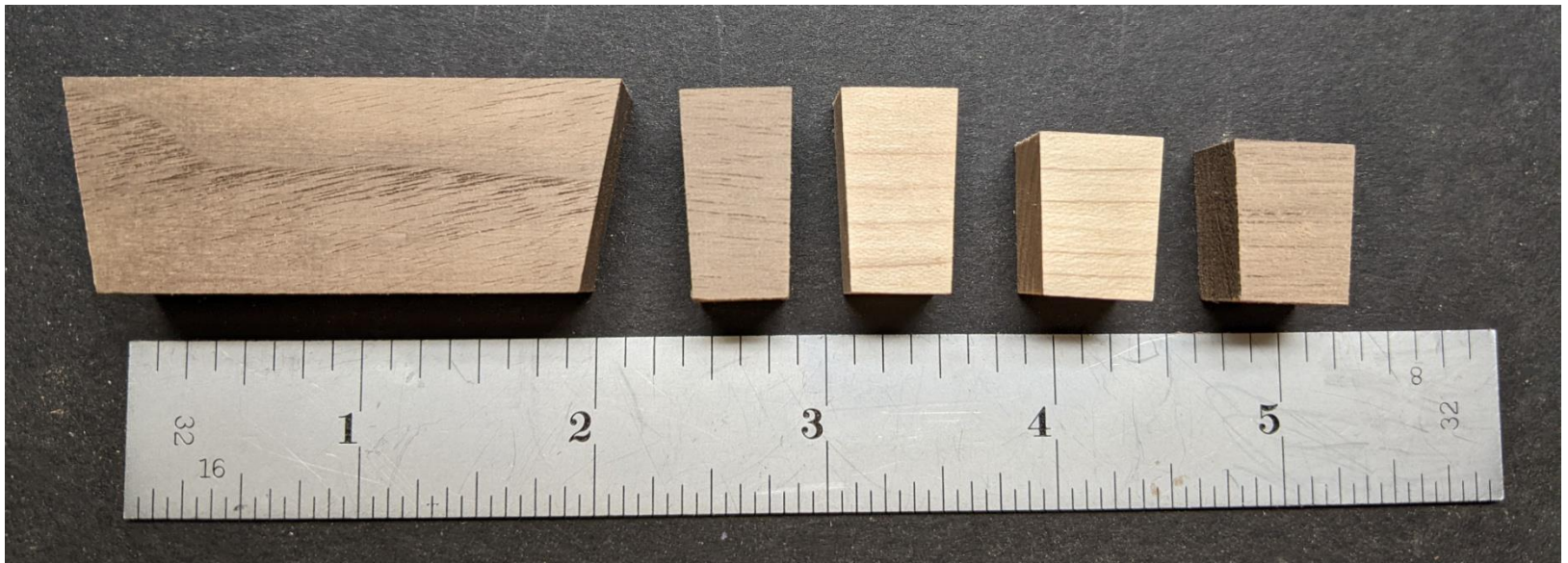


Step 23 – Print Out 48 Segment Rings



Step 24 – Construction Decision

- Segments are very small



- Will Use Jerry Bennett's Wedgie Sled

Jerry Bennett's Wedgie Sled

- Developed by Jerry Bennett – Plans are Free
- I made mine but they can be purchased online
- Can be used with table and/or band saws
- Consists of three parts
 - Sliding Sled
 - Zero Clearance Strip
 - Saw Stop
- Usually used with wedgies and plates

My Wedgie Sled



This Project Requires

- 2 Wedgies and Plates



16 Segment Closed

9.25" Plate \$ 49.99, Wedgie 12.99



48 Segment Open 2 degrees

11.75" Plate \$ 69.99, Wedgie 12.99

I mounted both Plates on $\frac{3}{4}$ " MDF Boards attached to 6" faceplates

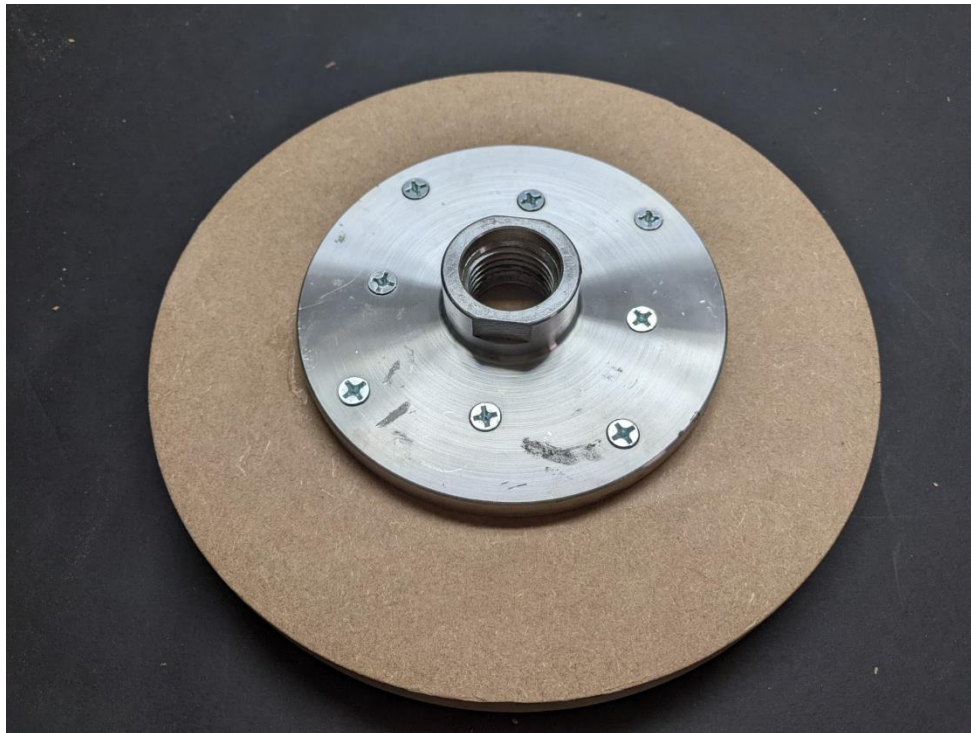
Construction Step 1

- Cut wood to thickness, width and length



Construction Step 2

- Make Waste Block – $\frac{3}{4}$ " MDF secured to 6" Faceplate



Construction Step 3

- Mount Waste Block and check for flatness



Construction Step 4

- Install Wedgie Sled and Zero Clearance Strip



Construction Step 5

- Check Saw Blade for 90 degrees



Row 1 Details

2022 Christmas Bowl 2 Summary Simplified Final

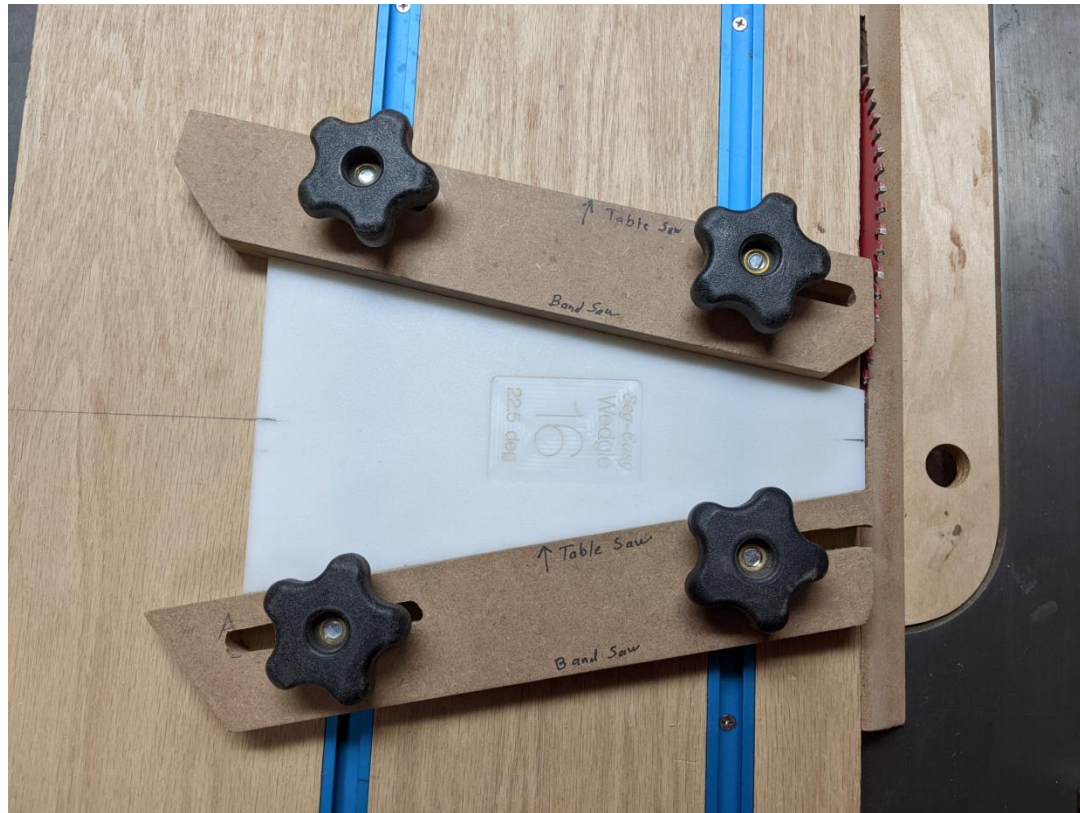
Row	Type	Segs.	Board Thickness	Segment	Setup	Cut	Walnut Segs	Economy Walnut	Economy Maple	Board Length
				Edge Length	Edge Length	Board Width		Board Length	Maple Segs	
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7	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
6	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
5	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
4	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
3	Open Seg	48	0.5	0.47	0.564	"7/8"	20	11	28	16
2	Open Seg	48	0.5	0.43	0.524	" 1 3/8"	20	10	28	15
1	Closed Seg	16	0.5	1.62	1.714	"7/8"	16	30		

Floating Disc 1/4" thick approx 7" dia (float in Row 1 rabbet)

Saw Blade Diablo 10" Ultimate Cut 90 teeth 3/32" thick (.09375)

Construction Step 6

- Use 16 Closed Segment Wedgie and set Sled for 1st row, 16 segments



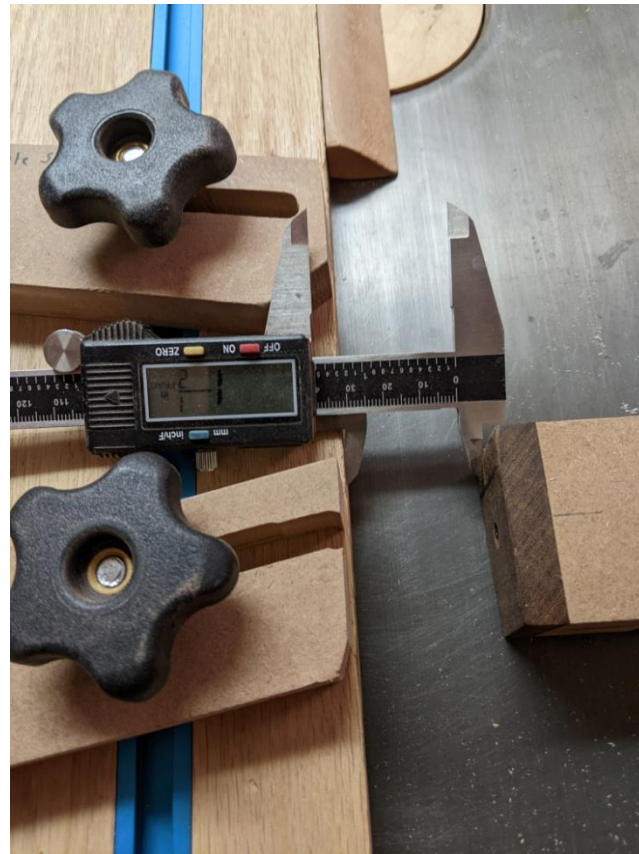
Construction Step 7

- Find strip for 1st row (Walnut, ½" thick, 7/8" wide, and 30" long)
- Mark top and one edge with pencil/chalk
- Set height of saw blade 1/8" higher than strip



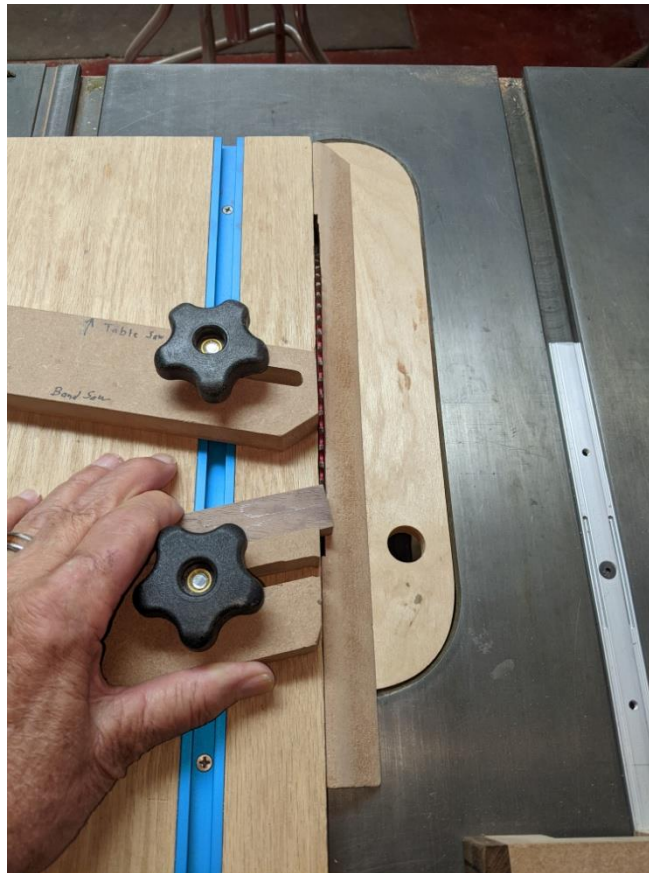
Construction Step 8

- Use calipers to set Saw Stop for Setup Edge Length Between Sled and Saw Stop for Row 1

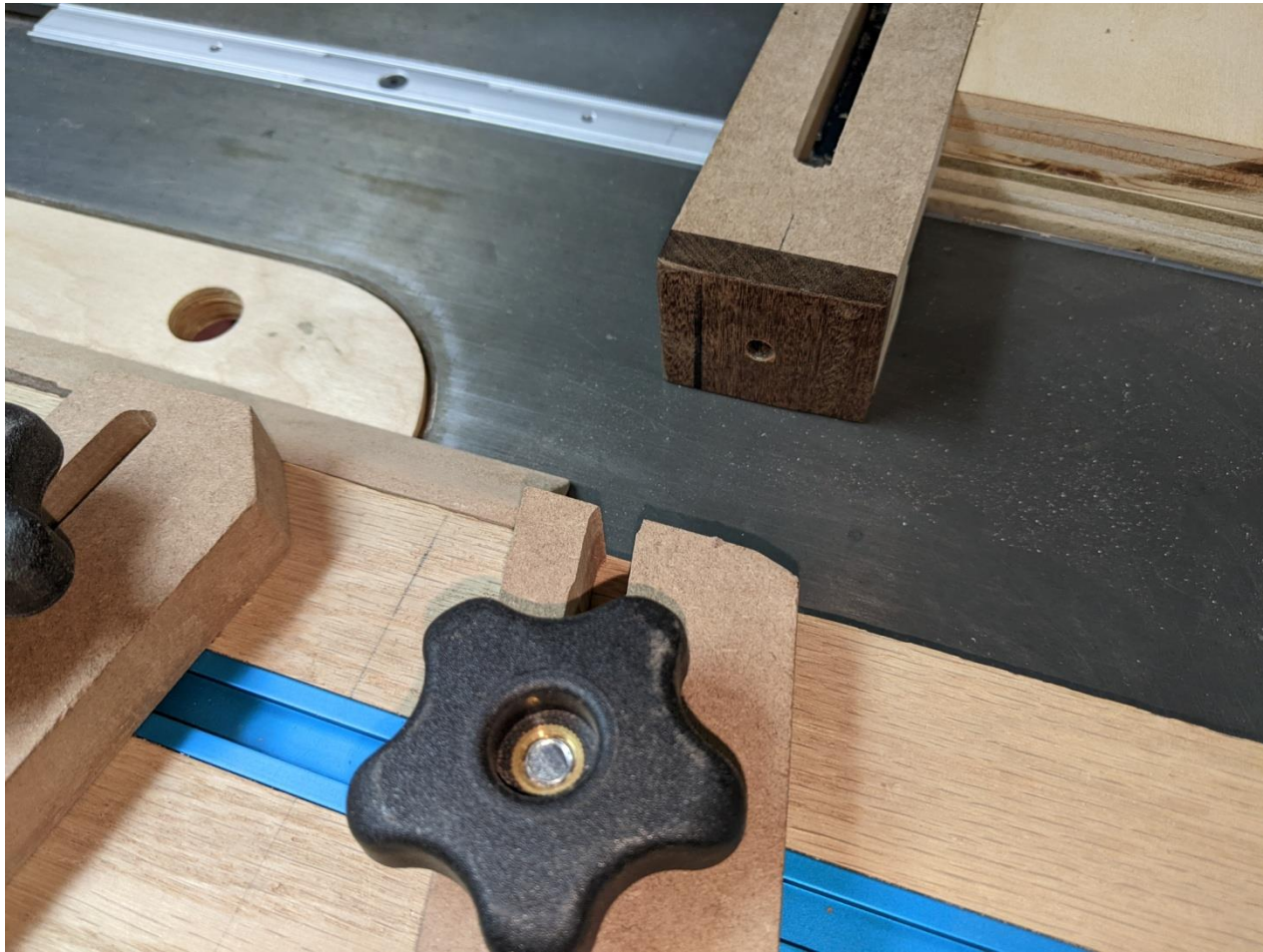


Construction Step 9

- Make First Cut on Lower Fence

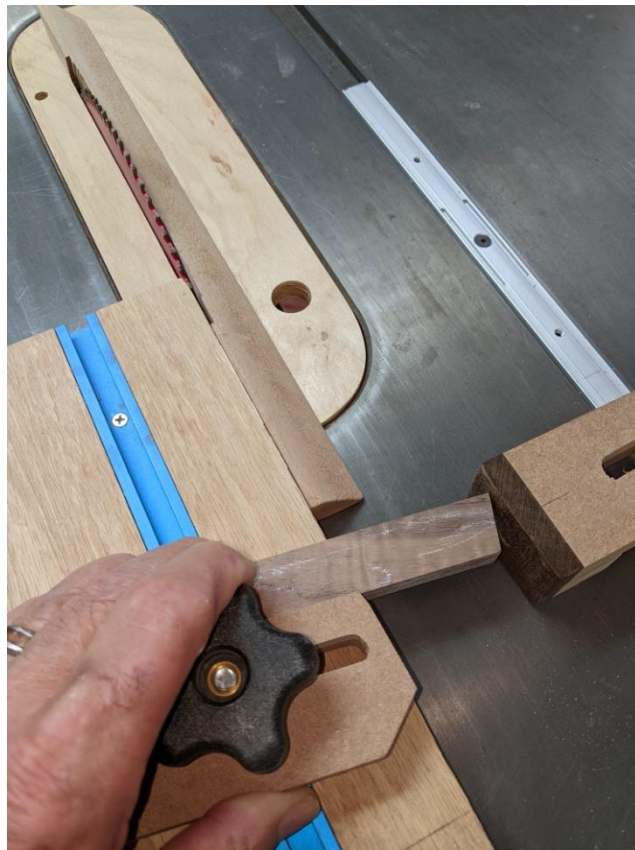


Align Segment Edge To Mark



Construction Step 9

- Make Second Cut on Upper Fence



Construction Step 10

- Cut out all 16 segments in the row



Construction Step 11

- Lightly Sand Segments Remark if Necessary



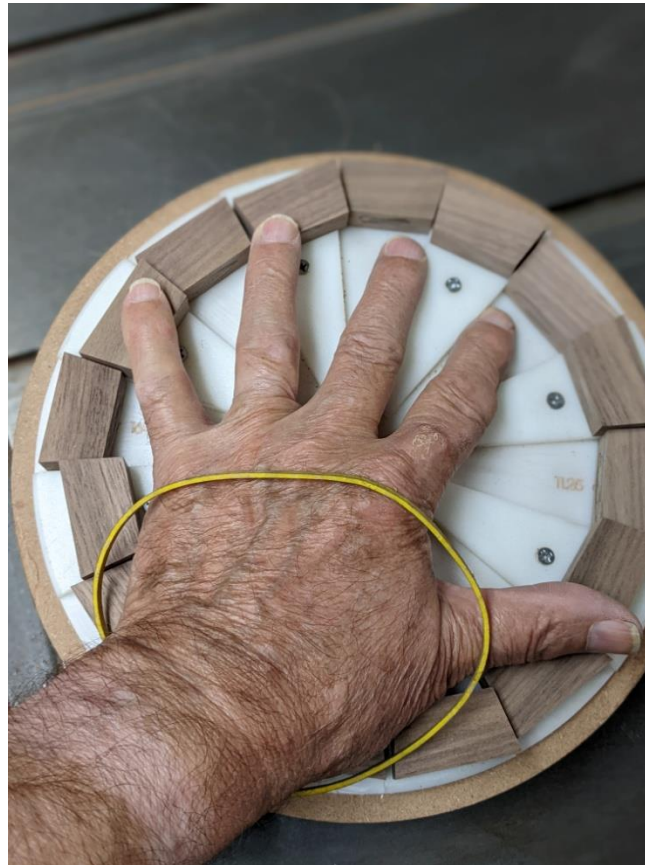
Construction Step 12

- Put Segments in Wedgie Plate



Construction Step 12

- Add Rubber Band Around Segments



Mount Tailstock Live Center



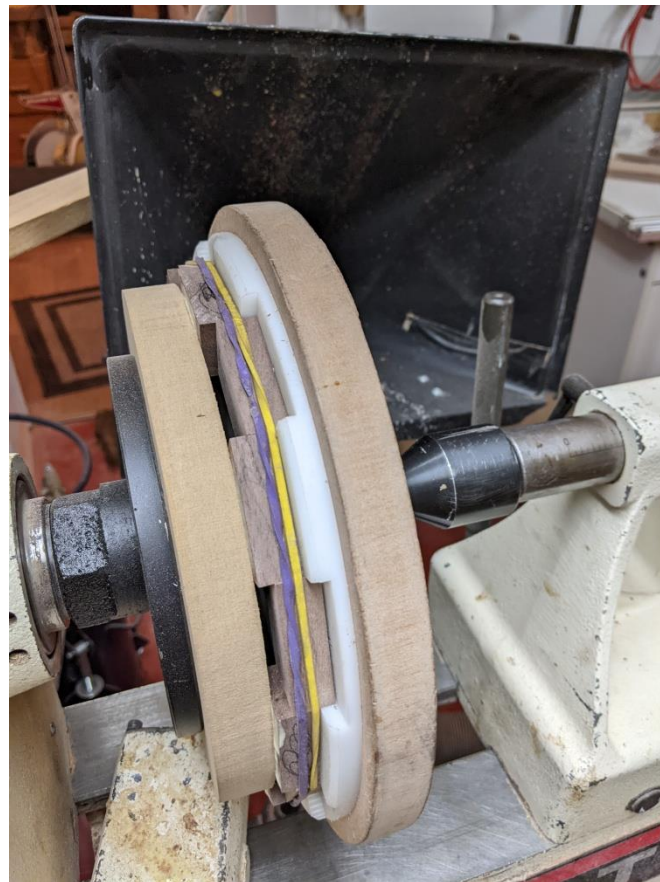
Construction Step 13

- Add Glue To Raised Segments



Construction Step 14

- Mount Wedgie Plate To Tailstock and Press Into Waste Block



Construction Step 15

- Wait 10 Minutes Then Remove Wedgie Plate



Construction Step 16

- Remove Segment, Clean Glue from Waste Block, Glue Three Sides and Press In Place



Construction Step 17

- Complete all segments



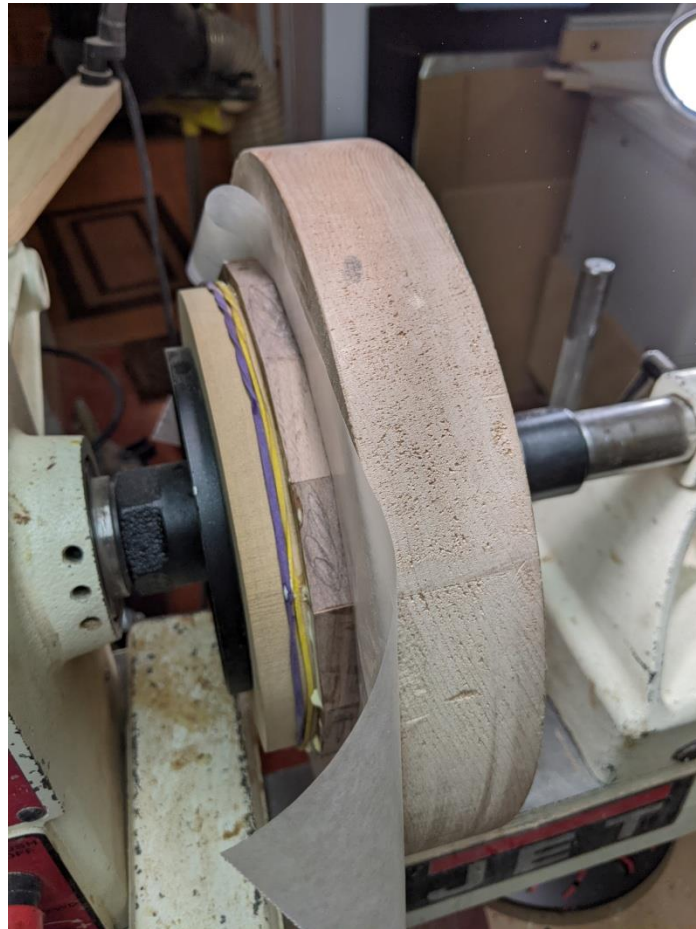
Compression Block

- Hard Maple 12" Diameter, 1 $\frac{3}{4}$ " Thick, Mounted on Faceplate



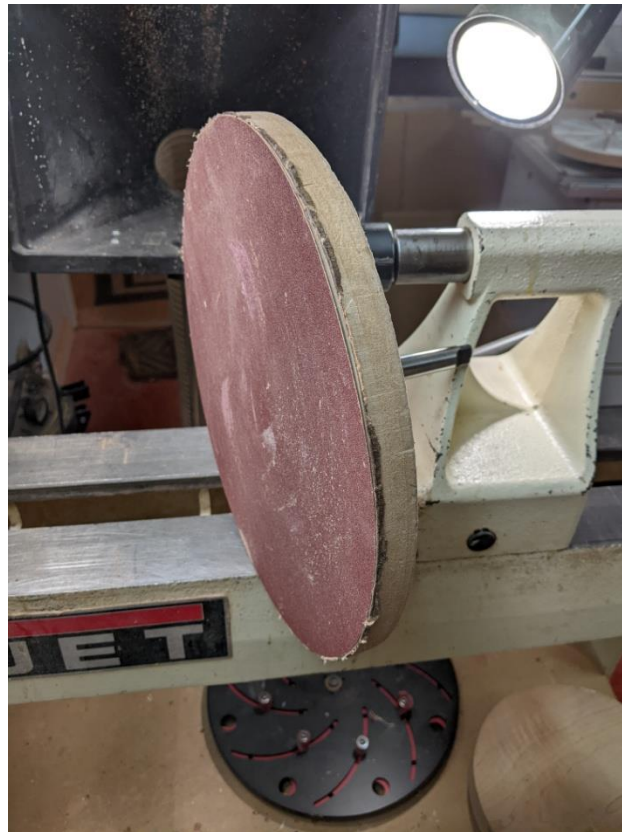
Construction Step 18

- Mount Compression Block and Press Ring



Sanding Block

- 80 grit, 12" Diameter, $\frac{3}{4}$ " MDF mounted on Faceplate with Handle



Construction Step 19

- After 30 Minutes Remove Compression Block
Sand Row Flat (Remove Marks)



Construction Step 20

- Cut Out Floating Base



Construction Step 21

- Let First Row Dry Overnight Then Cut Rabbet



Construction Step 22

- Place Base In Rabbet and Secure with CA Glue In Two Places



Row 2 Details

2022 Christmas Bowl 2 Summary Simplified Final

Row	Type	Segs.	Board Thickness	Segment Edge Length	Setup Edge Length	Cut Board Width	Walnut Segs	Economy Walnut	Economy Maple	
								Board Length	Board Length	
8	Closed Seg	16	0.5	2.19	2.284	"7/8"	16	39		
7	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
6	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
5	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
4	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
3	Open Seg	48	0.5	0.47	0.564	"7/8"	20	11	28	16
2	Open Seg	48	0.5	0.43	0.524	" 1 3/8"	20	10	28	15
1	Closed Seg	16	0.5	1.62	1.714	"7/8"	16	30		

Floating Disc 1/4" thick approx 7" dia (float in Row 1 rabbet)

Saw Blade Diablo 10" Ultimate Cut 90 teeth 3/32" thick (.09375)

Construction Step 23

- Row 2 is Open Segmented
- Set Up Wedgie Sled for 48 Open Segments



Construction Step 24

- Use calipers to set Saw Stop for Setup Edge Length Between Sled and Saw Stop for Row 2

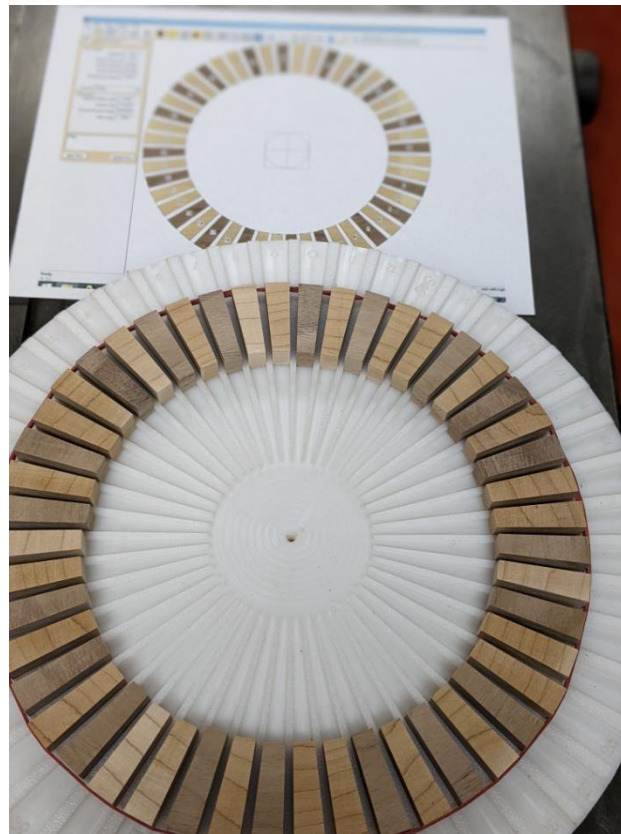


Construction Step 25

- Using same procedures as for Row 1
- Cut 20 Walnut Segments
- Cut 28 Maple Segments
- Sand all Segments
- Place in 48 Segment Open Wedgie Plate
- Place Rubber Bands Around Segments

Segment Placement

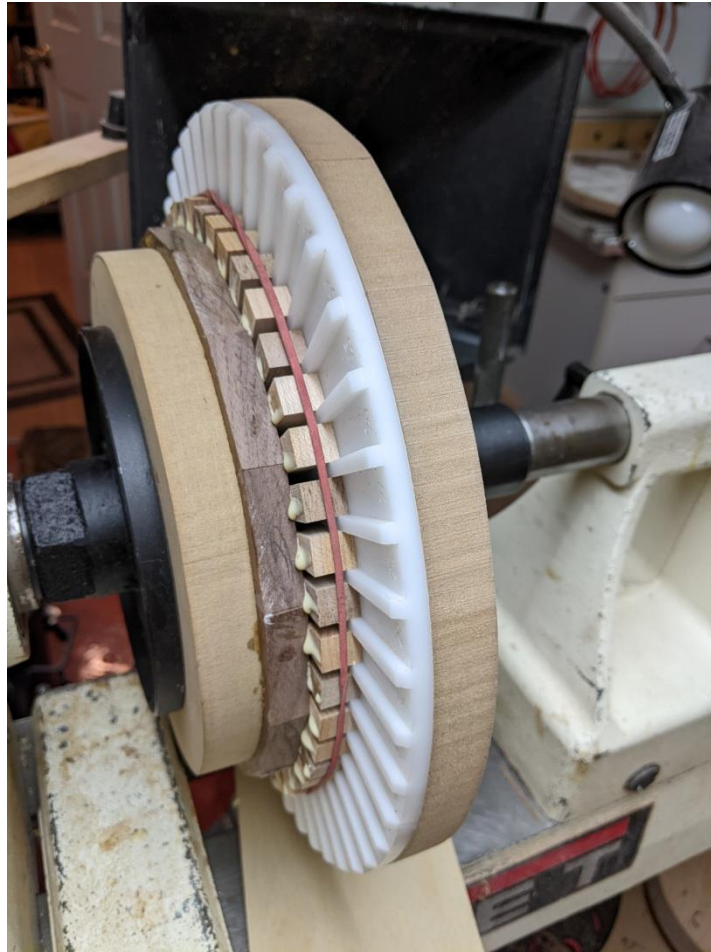
- Use Row 2 Segment Ring Printout As Guide



Construction Step 26

- Apply Glue to All Segments
- Mount Plate On Tailstock
- Orient Plate To Row 1
- Compress Plate To Row 1

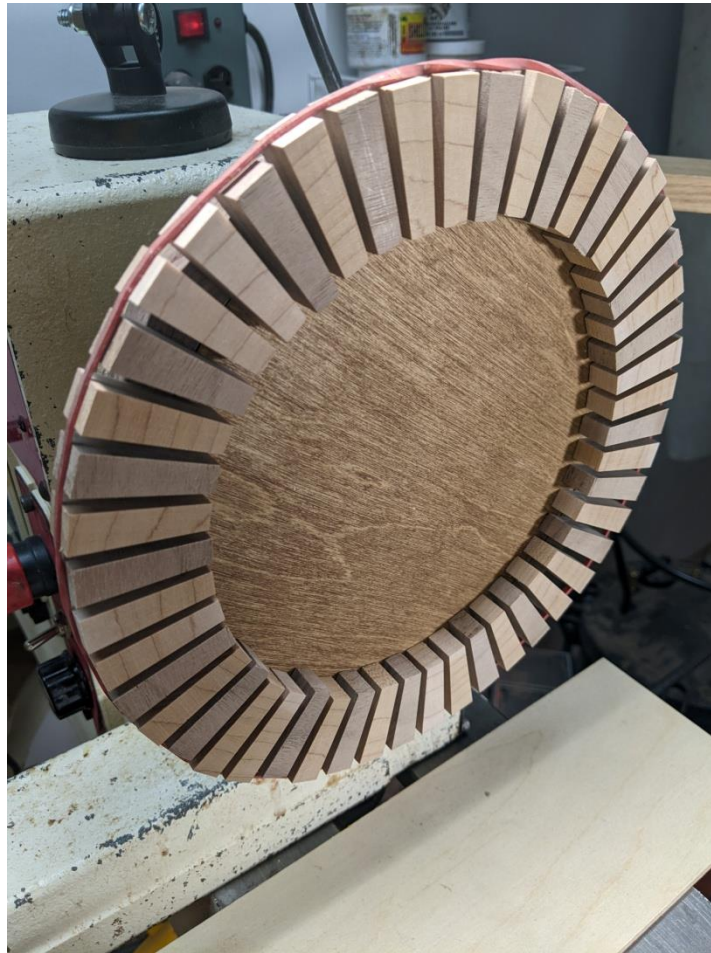
Row 2 Mounted



Construction Steps 27 and 28

- After 10 Minutes remove plate
- Clean Glue from Between Segments
- After 20 minutes Sand Surface Flat

Row 2 Completed



Row 3

2022 Christmas Bowl 2 Summary Simplified Final

Row	Type	Segs.	Board Thickness	Segment Edge Length	Setup Edge Length	Cut Board Width	Walnut Segs	Economy Walnut	Maple Segs	Economy Maple
								Board Length		Board Length
8	Closed Seg	16	0.5	2.19	2.284	"7/8"	16	39		
7	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
6	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
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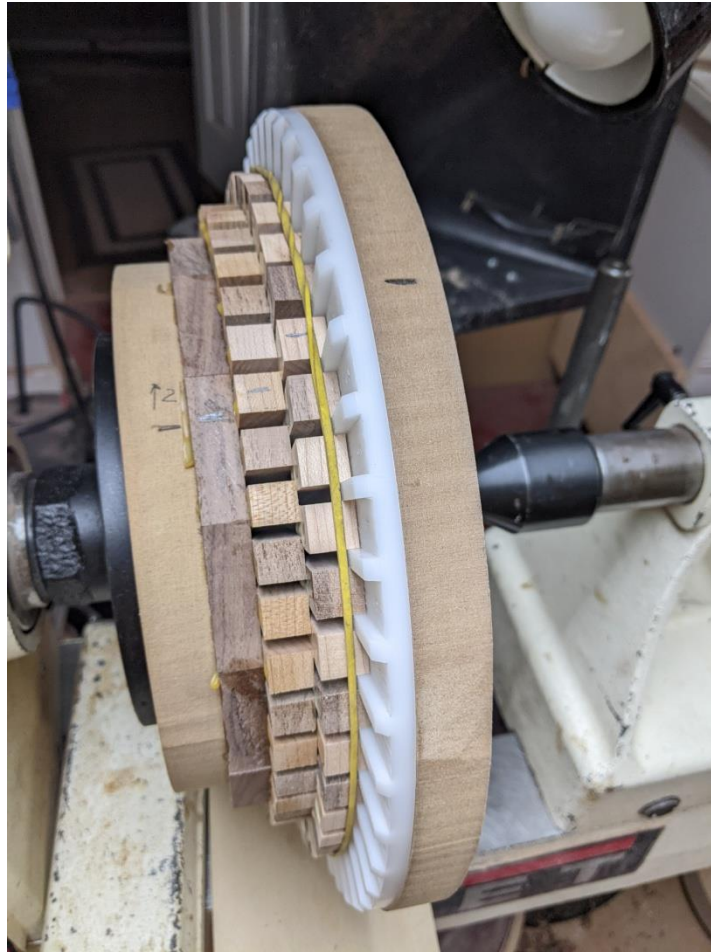
Floating Disc 1/4" thick approx 7" dia (float in Row 1 rabbet)

Saw Blade Diablo 10" Ultimate Cut 90 teeth 3/32" thick (.09375)

Construction Step 29

- Using same procedures as for Row 2
- Cut 20 Walnut Segments
- Cut 28 Maple Segments
- Sand all Segments
- Place in 48 Segment Open Wedgie Plate
- Place Rubber Bands Around Segments
- Apply Glue to Segments
- Mount Plate, Align and Compress To Row 2

Row 3 Mounted and Aligned



Construction Steps 30 and 31

- Cleanout Glue Below Segments
- After 10 Minutes remove plate
- Clean Glue from Between Segments
- After 20 minutes Sand Surface Flat

Row 3 Completed



Rows 4 and 5

2022 Christmas Bowl 2 Summary Simplified Final

Row	Type	Segs.	Board Thickness	Segment Edge Length	Setup Edge Length	Cut Board Width	Walnut Segs	Economy Walnut	Maple Segs	Economy Maple
								Board Length		Board Length
8	Closed Seg	16	0.5	2.19	2.284	"7/8"	16	39		
7	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
6	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
5	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
4	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
3	Open Seg	48	0.5	0.47	0.564	"7/8"	20	11	28	16
2	Open Seg	48	0.5	0.43	0.524	" 1 3/8"	20	10	28	15
1	Closed Seg	16	0.5	1.62	1.714	"7/8"	16	30		

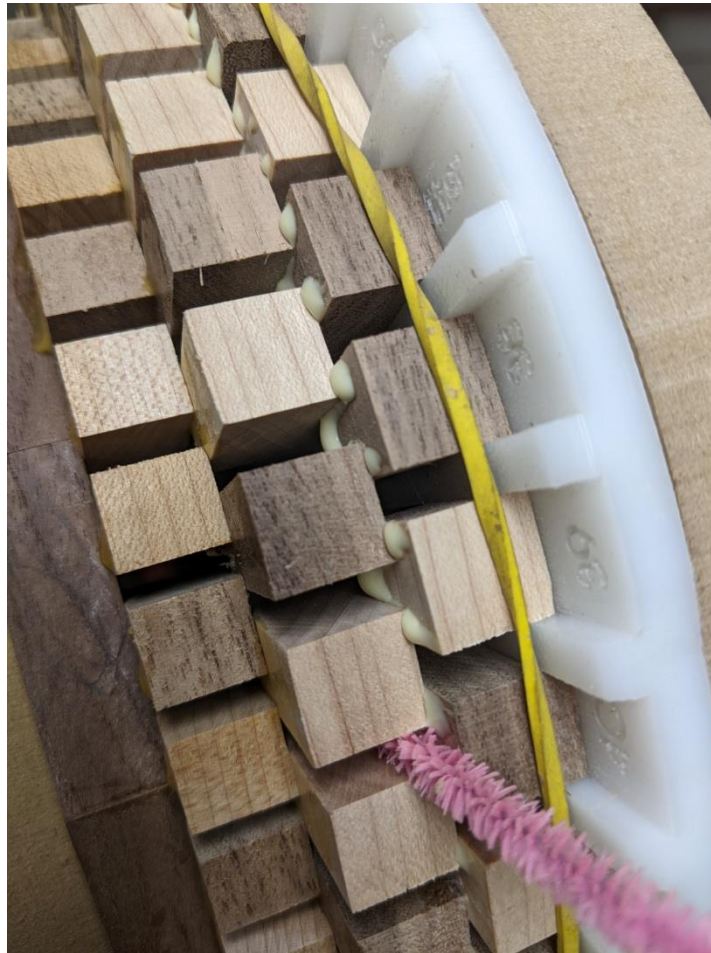
Floating Disc 1/4" thick approx 7" dia (float in Row 1 rabbet)

Saw Blade Diablo 10" Ultimate Cut 90 teeth 3/32" thick (.09375)

Construction Step 32

- Using same procedures as for Row 2
- Cut 28 Walnut Segments
- Cut 20 Maple Segments
- Sand all Segments
- Place in 48 Segment Open Wedgie Plate
- Place Rubber Bands Around Segments
- Apply Glue to Segments
- Mount Plate, Align and Compress To Row 3

Row 4 Mounted And Aligned



Construction Steps 33 And 34

- Cleanout Glue Below Segments
- After 10 Minutes remove plate
- Clean Glue from Between Segments
- After 20 minutes Sand Surface Flat

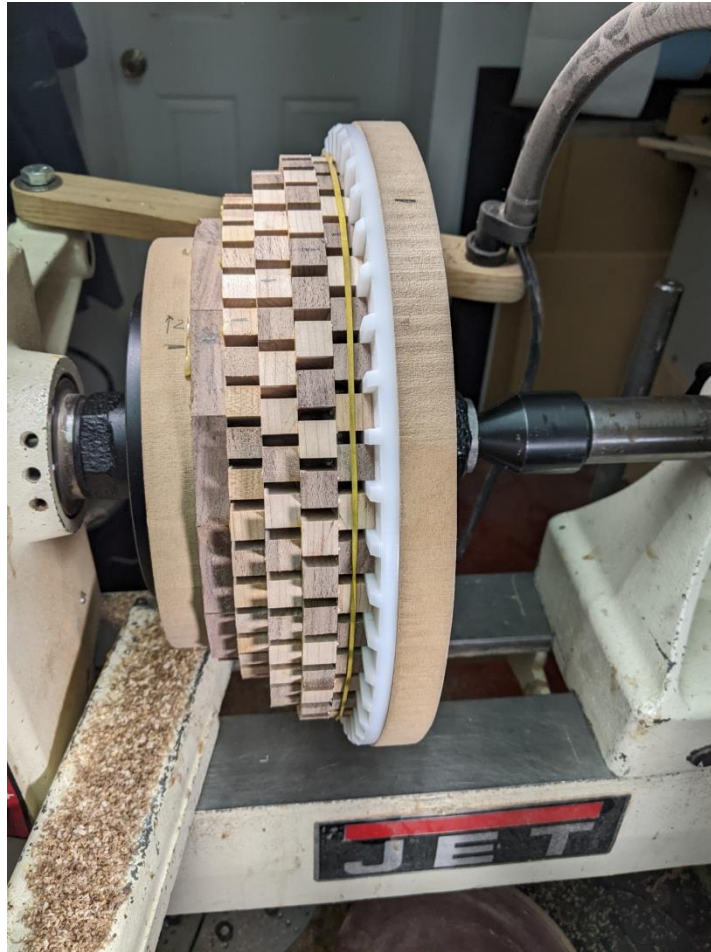
Construction Step 35

- Upon Completion of Row 4
- Turn Inside Rows 2 and 3

Row 4 Completed Rows 2 and 3 Turned Inside



Row 5 Mounted And Aligned



Rows 6 And 7

2022 Christmas Bowl 2 Summary Simplified Final

Row	Type	Segs.	Segment		Setup Edge Length	Cut Board Width	Walnut Segs	Economy		Maple Segs	Economy Maple Board Length
			Board Thickness	Edge Length				Walnut Board Length	Maple Board Length		
8	Closed Seg	16	0.5	2.19	2.284	"7/8"	16	39			
7	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16	
6	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16	
5	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12	
4	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12	
3	Open Seg	48	0.5	0.47	0.564	"7/8"	20	11	28	16	
2	Open Seg	48	0.5	0.43	0.524	" 1 3/8"	20	10	28	15	
1	Closed Seg	16	0.5	1.62	1.714	"7/8"	16	30			

Floating Disc 1/4" thick approx 7" dia (float in Row 1 rabbet)

Saw Blade Diablo 10" Ultimate Cut 90 teeth 3/32" thick (.09375)

Glue Application



Row 6 Mounted And Aligned



Row 7 Completed



Row 8

2022 Christmas Bowl 2 Summary Simplified Final

Row	Type	Segs.	Board Thickness	Segment Edge Length	Setup Edge Length	Cut Board Width	Walnut Segs	Economy Walnut	Maple Segs	Economy Maple
								Board Length		Board Length
8	Closed Seg	16	0.5	2.19	2.284	"7/8"	16	39		
7	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
6	Open Seg	48	0.5	0.5	0.594	"11/16"	20	12	28	16
5	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
4	Open Seg	48	0.5	0.5	0.594	"11/16"	28	16	20	12
3	Open Seg	48	0.5	0.47	0.564	"7/8"	20	11	28	16
2	Open Seg	48	0.5	0.43	0.524	" 1 3/8"	20	10	28	15
1	Closed Seg	16	0.5	1.62	1.714	"7/8"	16	30		

Floating Disc 1/4" thick approx 7" dia (float in Row 1 rabbet)

Saw Blade Diablo 10" Ultimate Cut 90 teeth 3/32" thick (.09375)

Row 8 Construction

- Cut 16 Segments to Setup Edge Length and Sand



Row 8 Construction

- Glue Up Segments In Pairs



Row 8 Construction

- Glue Up Pairs in Pairs



Row 8 Construction

- Glue Up In Halves



Row 8 Construction

- Glue Up Row



Row 8 Construction

- Sand Row Flat



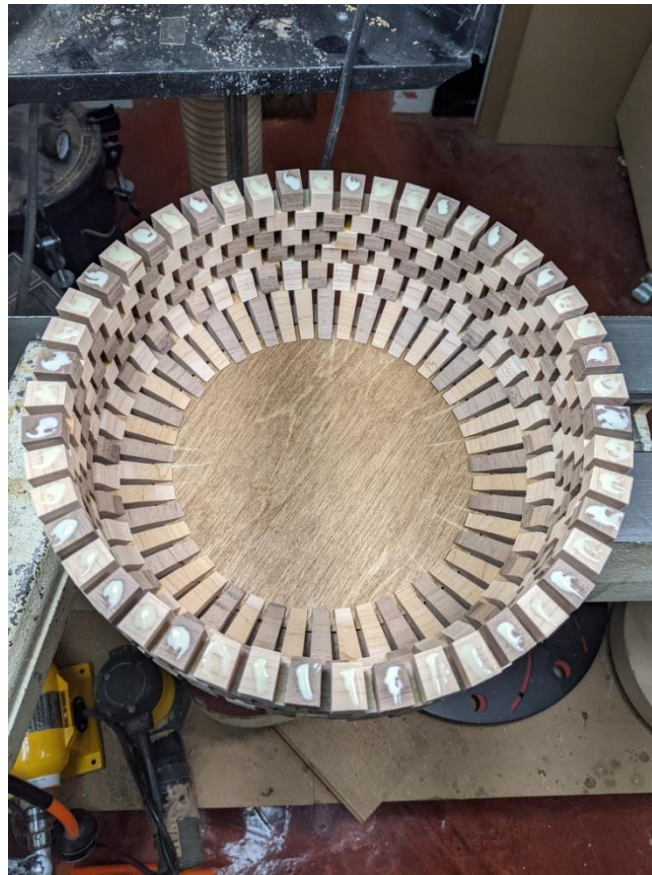
Row 8 Construction

- Mount on Cole Jaws Reverse Chucked



Row 8 Construction

- Apply Glue to Row 7



Row 8 Construction

- Compress Row 8 To Row 7



Turning The Bowl



Turning The Bowl

- Turn the Outside



Outside Turned To Shape



Turn The Inside To Shape



Sand to 220 Grit



Apply Finish To Mounted Bowl

- One Coat Spray Shellac, 3 Coats Spray Poly



Separate Bowl From Waste Block

- Reinstall Cole Jaws and Reverse Chuck



Reverse Bowl and Finish Base



Apply Finish To Base



Bowl Is Complete

