How to make Wedgie Wedges
With Carbide Create v7 729

The Wedgie Sled and Wedgie Wedge was invented by Jerry Bennett. His website is www.segeasy.com. Check out his site for the plans to make a Wedgie Sled for segmented turning.

This document is how to design the Wedgie Wedges used with the Wedgie Sled. I used Carbide Create v7 729 to make the wedges. I will show how to design the Wedgie Wedges for the most popular sizes which are:

12 Segments per ring 30 Degree
16 Segments per ring 22.5 Degree
20 Segments per ring 18 Degree
24 Segments per ring 15 Degree

The instructions to make these four Wedgie Wedges can be used to make any number of segments per ring you want by following my instructions. See additional segment sizes toward end of document.

The Wedgie Wedges are all 12 inches long and vary in width. The 12 inch size makes the Wedgie Segments compatible with Wedgie Sled. The maximum size board for the Wedge Sled is about 2 inches. You can slice off part of the front fence on the back side to gain a little bit wider board. You could create a custom sled and size your Wedgie Segments to fit a larger sled. The size is not important but the angles are.

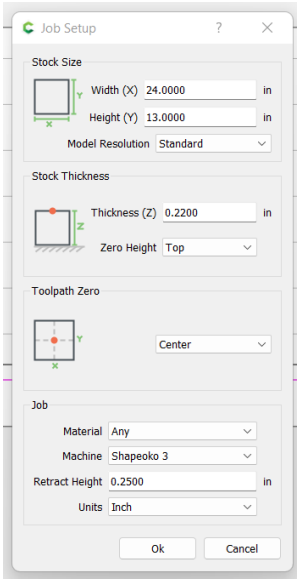
The Wedgie Sled has two fixed pivots 4 inches apart. The fences are 2 inches wide leaving about 2 inches for the Wedgie Wedge to fit into. So the shorter the short side of the Wedgie Wedge the further the it fits between the fences. Optimal design would have the short side between 2 inches to 1.75”. However that would make the base of the Wedgie Wedge much larger and take more material to make the Wedgie Wedges. So this design is a compromise between efficiency of size and waste of material. The principles of construction can be used for custom sizes.

I created a project in Carbide Create using ¼” maple 3 ply plywood. The material can be any plywood, hdpe, or mdf. However mdf tends to be unstable because of its tendency to swell with weather conditions. Plywood is more stable and hdpe is even more stable. The project material size is 13 inches height by 24 inches wide. My plywood was 0.22 inches thick. Change these parameters for your setup.

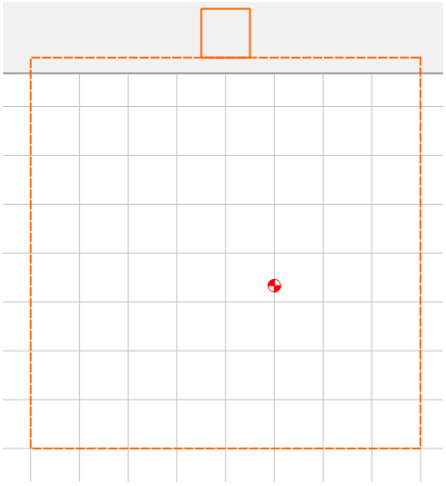
I used an SO3 XXL for this project. If you have a standard size Shapeoko then break up the wedges into one or two at a time. The method to construct the wedge is the same.

12 Segments per ring 30 Degree Design

To create the 12 segment 30 degree Wedgie Wedge start by creating a new project. Make your project 13 inches by 24 inches. My material was 0.22 inch thick 3 ply maple plywood. Change your dimensions as necessary.



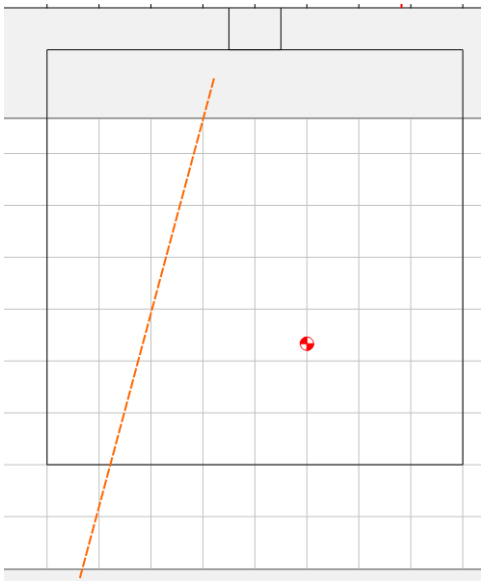
With the job setup create two rectangles. The first is 12 inches by 12 inches. The second is 1.5 inches by 1.5 inches. Place the second rectangle centered on top of the first rectangle.



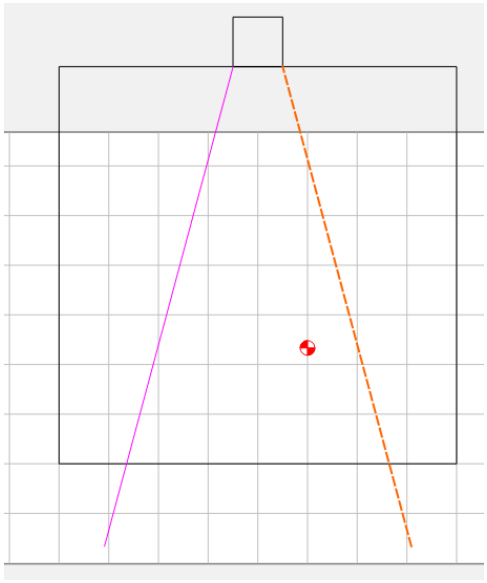
The reason to create the two rectangles is the top of the Wedgie Wedge needs to be 1.5 inches and the length of the wedge is 12 inches.

Create a horizontal poly line that is about 13 inches long. The length is not important because later it will be trimmed. After the poly line is created use the rotate tool to change the angle of the horizontal line to 75 degrees.

Now move the top node of the poly line to connect with the lower left corner of the 1.5 x 1.5 inch rectangle.

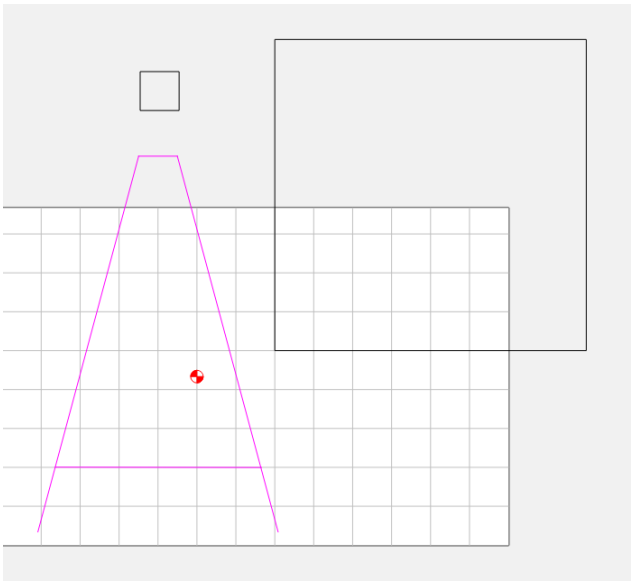


Then copy the first poly line and paste it. Then use the horizontal mirror tool to reverse the direction of the second poly line. Then move the top node of the second poly line to connect to the right hand lower node of the 1.5 x 1.5 inch rectangle.

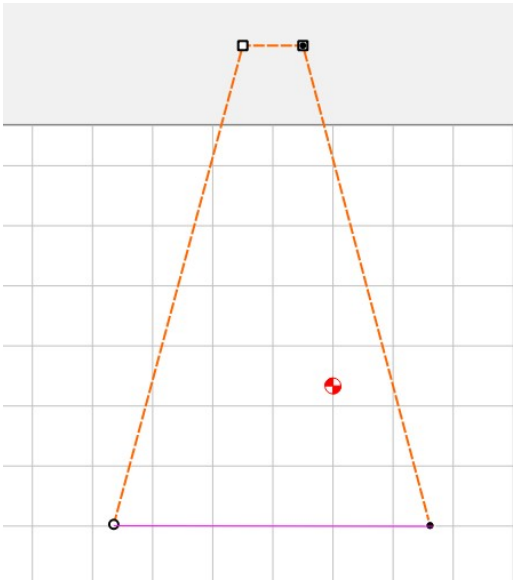


Draw a poly line that connects to the lower left node of the 1.5 x 1.5 rectangle and connect to the lower right corner of the 1.5 x 1.5 inch rectangle. Move the 1.5 x 1.5 inch rectangle away but keep it for the next wedge. Now draw another poly line that connects along the lower edge of the 12 x 12 inch box from the left hand first poly line to the right hand second poly line. If you are not perfect we will correct it later with the trim vectors tool. The poly line must be perfectly horizontal. The bottom poly line is better to be long. Then move the 12 x 12 inch rectangle out of the way and you should have 4 poly lines forming a triangle with a flat top.

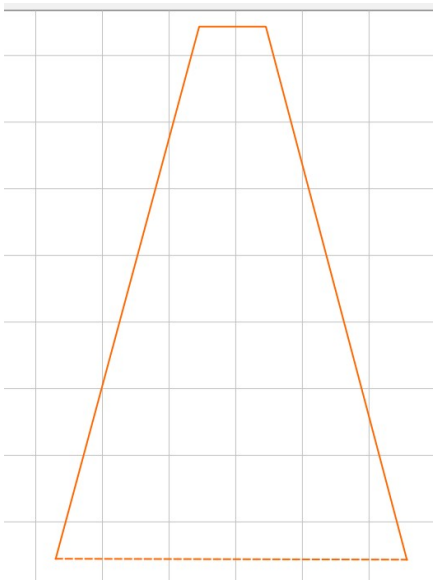
You should have something similar to this.



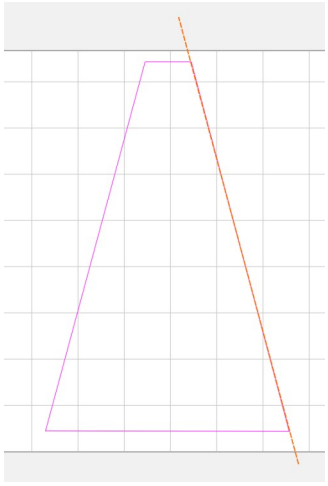
Select the four poly lines and use the trim vector tool. You will see dots where the poly lines meet. Select outside the object to remove the unwanted part of the poly line.



This forms a closed vector select the whole structure and group it.



The 12 segment 30 degree Wedgie Wedge is formed. To double check you did not change the angle when connecting the nodes draw a poly line and rotate it to 75 degrees and move it along side the left side. If good then horizontal mirror the poly line and check the right side. The length of the wedge is not important but the angle is the most critical thing. Only fractions of the angle changing will not create good segments.

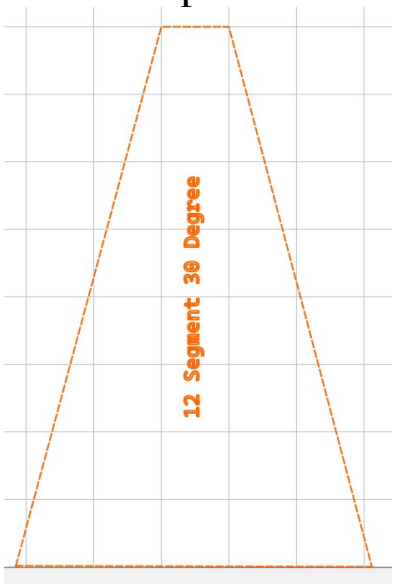


If the checks are good you are finished with the wedge. If the checks are not good then start over. The 75 degree angle is critical to making segments that line up without gaps.

Now the wedge is complete use the text tool to mark the wedge. This is important because you will be making multiple wedges. I used the text tool as follows:

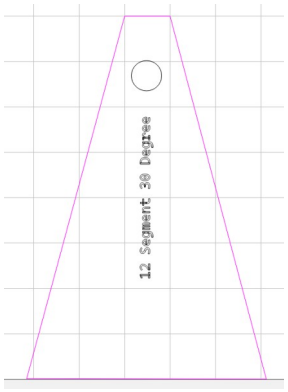
12 Segment 30 Degree 0.5 inch text

I then rotated the text 90 degrees. Move the text inside the wedge. Select the text first and then select the wedge second. Then use the alignment tool to center the text up and down and side to side.



The line on the bottom of the object is the bottom of the workspace and is not part of the design. Please ignore the overlapping sides.

The next step is optional. Place a 1 inch circle one inch from the top so you can hang the wedges.



Create the other 3 wedges just like the 12 segment one. Arrange the wedges by rotating every other one 180 degrees to save space on the work piece. Check the text because during flipping you may need to mirror for the text to be readable by humans.

Here are the parameters of the 4 wedge segments

12 Segment 30 Degree Wedgie Wedge
180-30=150 150 divided by 2=75

16 segment 22.5 Degree Wedgie Wedge
180-22.5=157.5 157.5 divided by 2=78.75

20 segment 18 Degree Wedgie Wedge
180-20=160 160 divided by 2=80

24 segment 15 Degree Wedgie Wedge
180-15=165 165 divided by 2=82.5

Create the tool paths. First select all 4 of the text lines and use a vcarve tool path. I used a 60 degree vee bit and the “t” for max depth. Use whatever bit you prefer.

Then select the four 1 inch circles and create a tool path. Use the pocket. Enter starting depth top and the bottom with a “t”. The “t” is a new feature that is interpreted as use stock bottom. The advantage of the “t” is if you change the stock depth you only have to save the c2d file to update the tool path. If you choose use stock bottom and you change the material depth you have to manually edit each tool path you used “use stock bottom” to update the tool path.

Select the four wedges and create a tool path. Use the contour with an outside cut. Again use the “t” as the depth. Edit your tabs sizes. In v7 the tabs are defined but are not added in the tool path like in earlier versions. After you complete the contour tool path go to design and select the Tab button and place your tabs on the top and bottom of the wedges. Do not place tabs on the sides because during removal of the tabs you might change the angles. You could also use the tape and glue method to secure your project and in that case you do not need tabs. However this is a big project and will require a lot of tape and glue. I used the #251 ¼ inch down cut bit. Use your favorite bit. An up cut bit will leave a more ragged top edge.

Save the project.

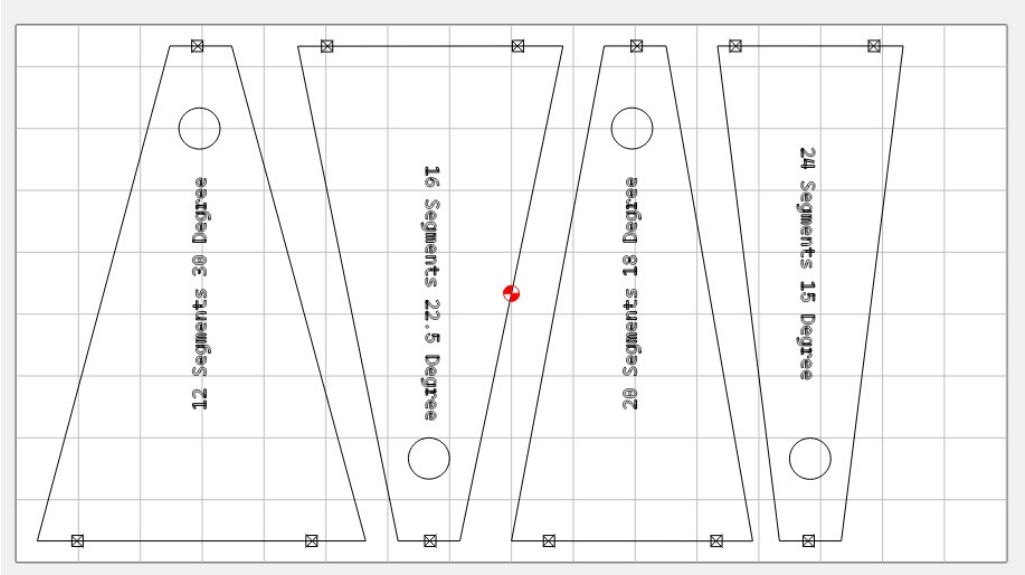
Now the project is ready to cut.

After the project is cut remove the tabs and give the wedges a light sanding. I applied dewaxed shellac and then painted the text with black acrylic paint for contrast. This step is optional. If you paint the text let it dry and sand off the excess paint. Apply another coat of shellac and let it dry. Recommend a top coat or two of spray polyurethane finish. This step is optional but recommended.

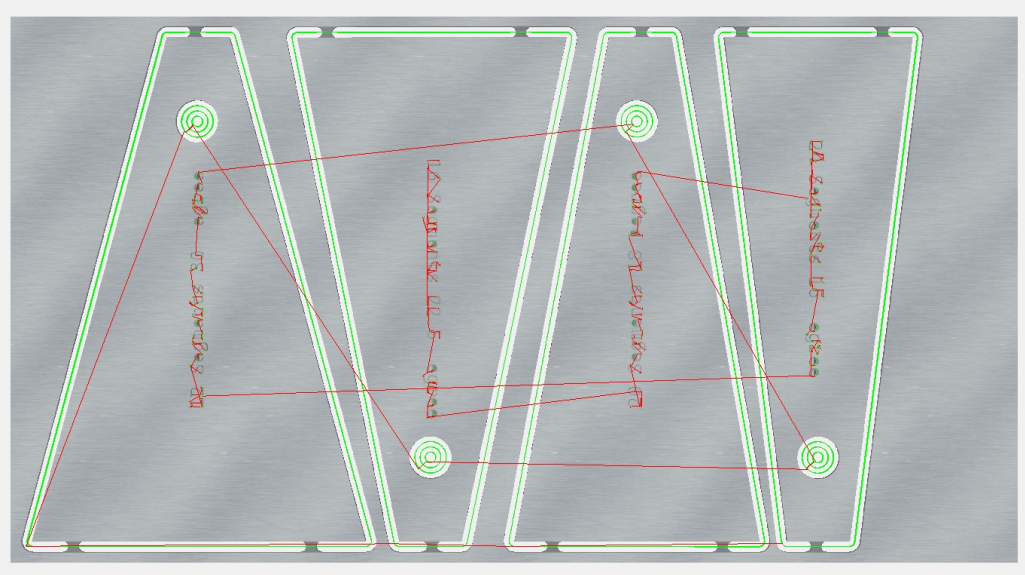
Here are some additional Wedgie Wedge parameters

10 Segments per ring 36 Degree
32 Segments per ring 11.25 Degree
36 Segments per ring 10 Degree
40 Segments per ring 9 Degree
48 Segments per ring 7.5 Degree

Here is a screen shot of the project



Here is the simulation

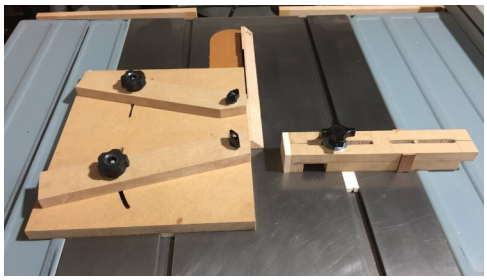


Formulas to calculate angles for wedges:

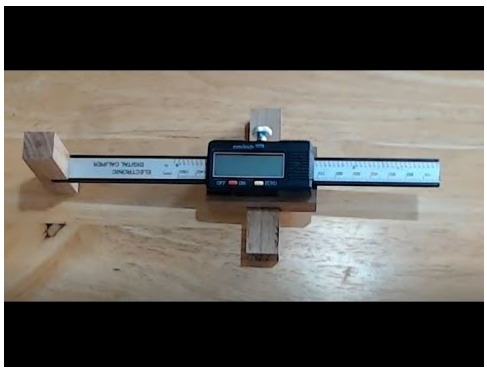
Triangles 3 side angles add up to 180 degrees.
Formula to determine side angles of Wedgie Wedges:
180 minus (angle)=(less than 180) divided by 2=Side Angles

An isosceles triangle is a triangle with (at least) two equal sides.
The Wedgie Wedges are isosceles triangles with the flattening of the top to use in the Wedgie Sled.

Here is a Wedgie Sled setup for cutting segments for segmented turning. The set up consists of the sled, segment stop (right) and an angled piece by the blade to make segments slide away from the blade after cutting.



Here is an optional stop with a digital caliper. To use the digital stop cut a sample segment. Measure it with a digital caliper. Zero the stop caliper and then move the stop the required measurement. Make another test cut and measure. Adjust until the desired length is cut.



Here are some Wedgie Wedges in hdpe