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WHITE PAPER

CUSTOM HOLIDAY ORNAMENT

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CUSTOM ORNAMENT

EXTRUDED IMAGE

The first effect that we used to create our custom ornament is the “extruded image” effect. This white paper will walk you through the steps to create an extruded image that then wraps around the ***outer ring*** body of the ornament.

CREATE YOUR IMAGE

1. To accomplish the look of the trees that we have in our ornament, we first need to create the image that will be used in a flat state. In Adobe Illustrator, create a file that is the exact height and width of the surface you are going to map the image to (please reference the chart of dimensions of each of the blank provided surfaces listed below).

2. Create a vector image of the parts that you want to be solid. You can do this many ways, but the easiest way is to import an image and use the live-trace function in Illustrator (live-trace then expand to create vectors). Make sure that the vector objects are closed with no intersecting or overlapping lines. It helps to color in the parts that will be solid to visualize the final result. Also make sure that the thickness of the closed vector is big enough to print.

3. Export the file as a DXF or DWG.

CREATE CUSTOM PART

1. Now that you have your image as a DXF or DWG, you are ready to create your custom part. Open/Import the blank part that you want to modify into Rhino.

2. Choose the surface you want to have the image laid onto. In our case with the trees, it was the outer surface of the outer cylinder. In the blank files there will be a duplicate surface that is already created for this purpose (under the “srf” layer in Rhino file).

3. Enter the command UnrollSrf and follow the on-screen instructions to create a flat “unrolled” copy of that surface (figure1.1).

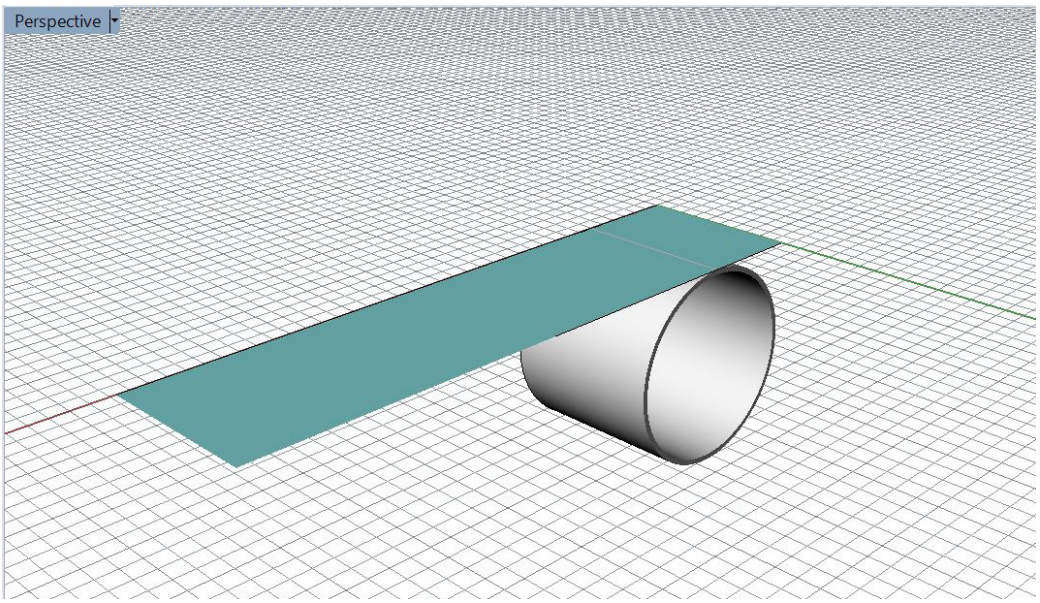


Figure 1.1 *unrolled surface*

4. Import the DXF sketch into rhino and use the move command to line it up with your surface. They should be exactly the same size (figure 1.2).

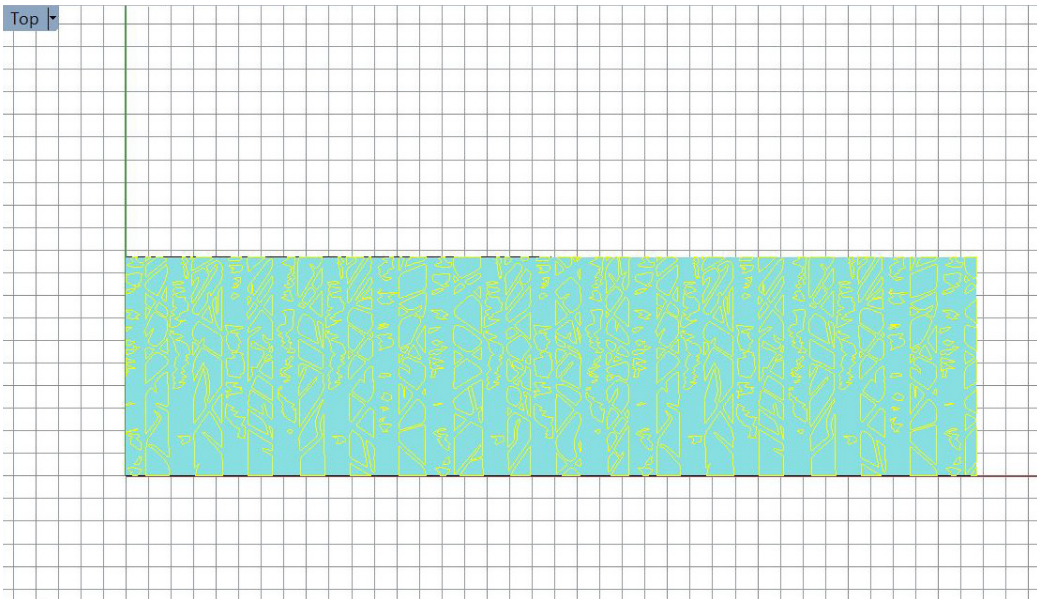


Figure 1.2 *DXF import and image placement over unrolled surface.*

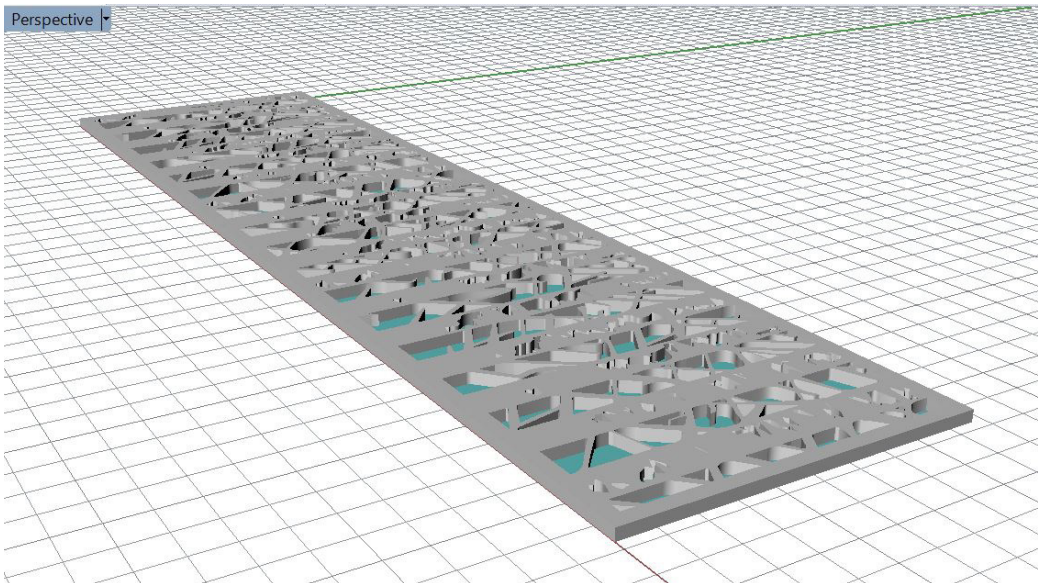


Figure 1.3 *extruded curve from DXF sketch.*

5. Extrude the sketch 2mm with the command ExtrudeCrv. Make sure you have the solid setting on (figure 1.3).

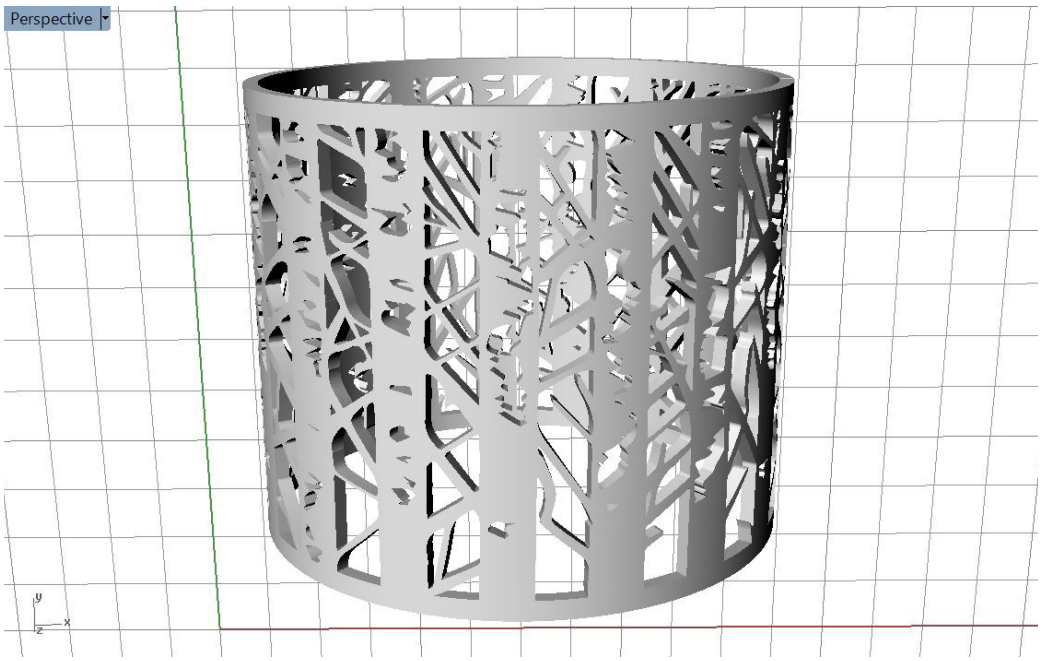


Figure 1.4 *extruded polysurface flowed to the original surface.*

6. Now it's time to make the extruded image fit to the original surface. To do this enter the command FlowAlongSrf and follow the on-screen instructions. Select the unrolled surface as your base surface and the original surface for your target surface. When it is done rendering, the new extruded part should be completely within the original ring part.

7. Delete the original part and surface and save as the new part as a new name.

IMAGE DISPLACEMENT

The second effect that we used to create our custom ornament is the “image displacement” effect. This white paper will walk you through the steps to create an extruded image that then wraps around the ***inner ring*** body of the ornament.

CREATE YOUR IMAGE

1. To accomplish the back-lit photo effect like we did with the painting, you will first need to set up your image. In Photoshop, create a file that is the height and width of the part you are going to map the image to (please reference the chart of dimensions of each of the parts listed below).

2. Place the image file into this new file based on your part dimensions.

3. Size your image or tile it to fill the entire width and height.

4. Save the image as a JPG, PNG, or TIFF.

CREATE YOUR CUSTOM PART

1. Open/Import the blank part that you want to modify into Rhino.

2. Choose surface you want to have the image laid onto. In our case it was the outer surface of the outer cylinder. In the blank files there will be a duplicate surface that is already created for this purpose (under the “srf” layer in Rhino file).

3. Enter the command UnrollSrf and follow the on-screen instructions to create a flat “unrolled” copy of that surface.

4. Select the unrolled surface and enter the command ApplyDisplacement. This will pull up a bunch of option on how to create the surface texture. Upload the image you created and set the white point to .06 in. This height was determined by our tests to be the best range to create a light to dark effect (figure 1.5).

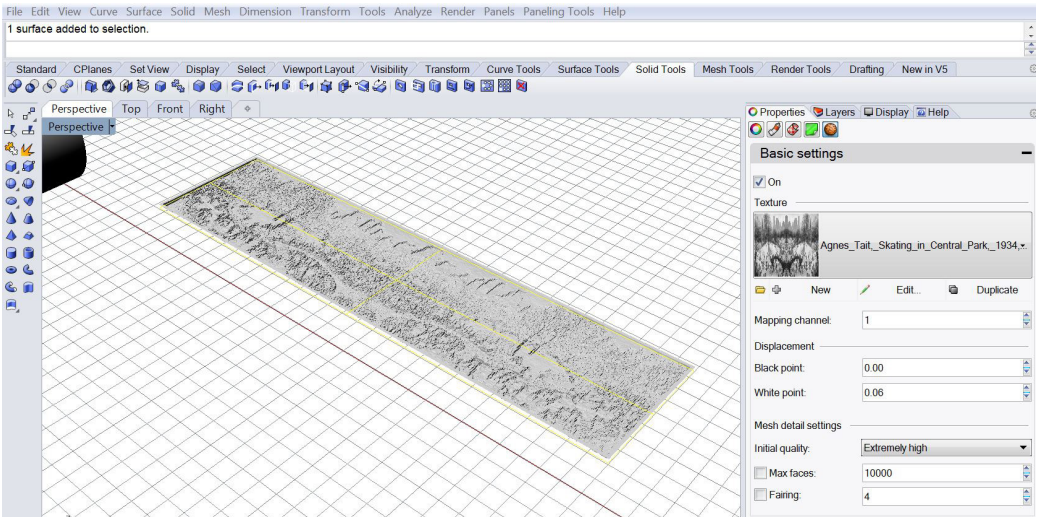


Figure 1.5 *Apply displacement settings on Right hand side.*

5. Once the image displacement is on the surface, you can edit the displacement settings in the Properties tab on the right hand side of the screen. Once in properties, select the displacement icon and the settings for the displacement will appear below. Here you can edit the image resolution, refine sensitivity, and other aspects of the displacement. For our image we wanted high detail, so we adjusted the quality to “Extremely High” and adjusted the mesh memory limit to be higher (the higher the quality, the heavier the file. It will be a very large file if you choose to set the quality to high).

6. When you are happy with your displacement you need to turn this surface mapping into actual 3D data, a mesh. Before this point the image displacement is merely a rendering of the effect and not actually the geometry. To turn your image displacement into a mesh enter the command ExtractRenderMesh (figure 1.6).

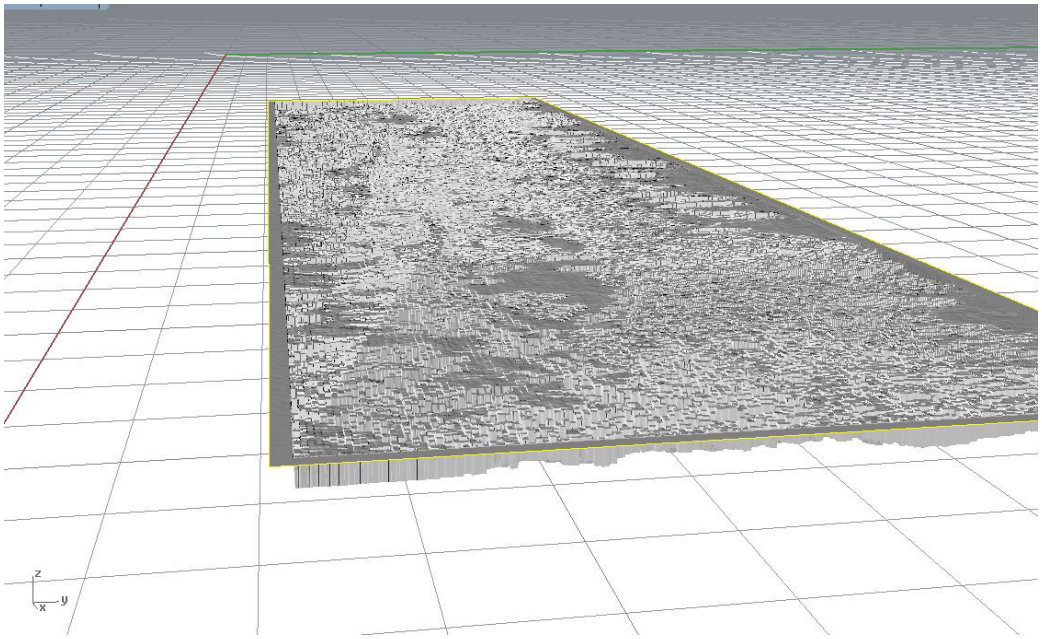


Figure 1.6 *Displacement Map Meshed usign ExtractRenderMesh command.*

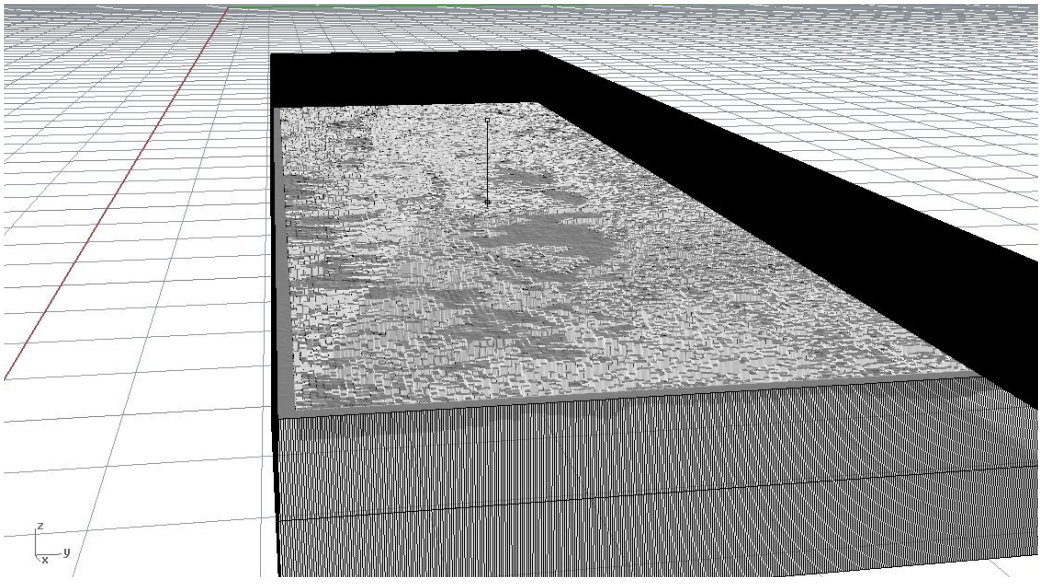


Figure 1.7 *Extruded polysurface from DupBorder command Curve.*

7. Now you have an open Mesh that needs to be closed. Select the mesh and enter the command DupBorder (this will give you a curve that is the edge of the mesh).

8. Select the curve you just created on the mesh edge. Enter the command ExtrudeCrv and extrude the curve 10mm (make sure that the solid setting is OFF, you just want a surface) (fig 1.7)

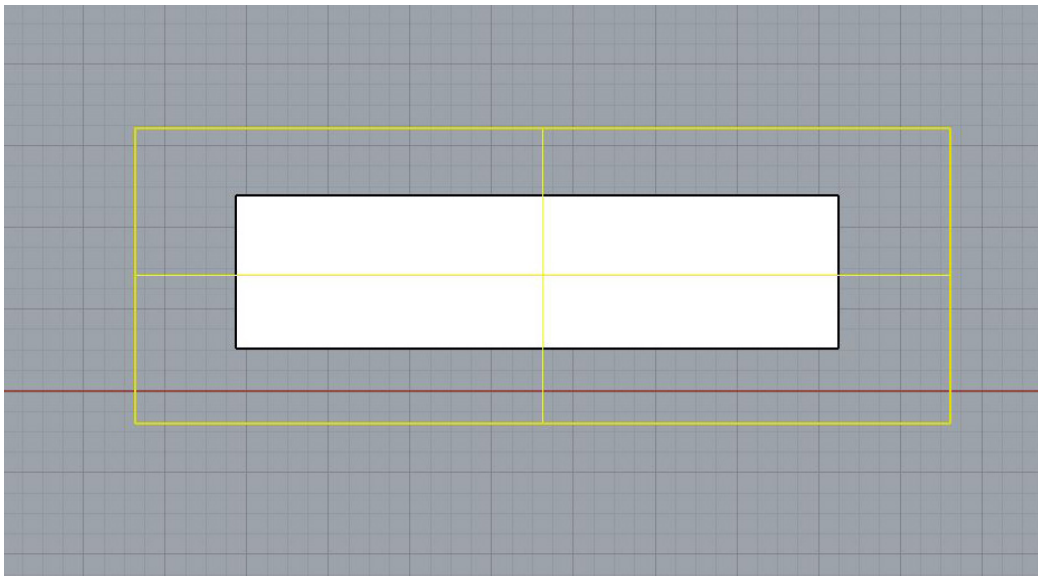


Figure 1.8 *Planar surface extending beyond the unrolled surface.*

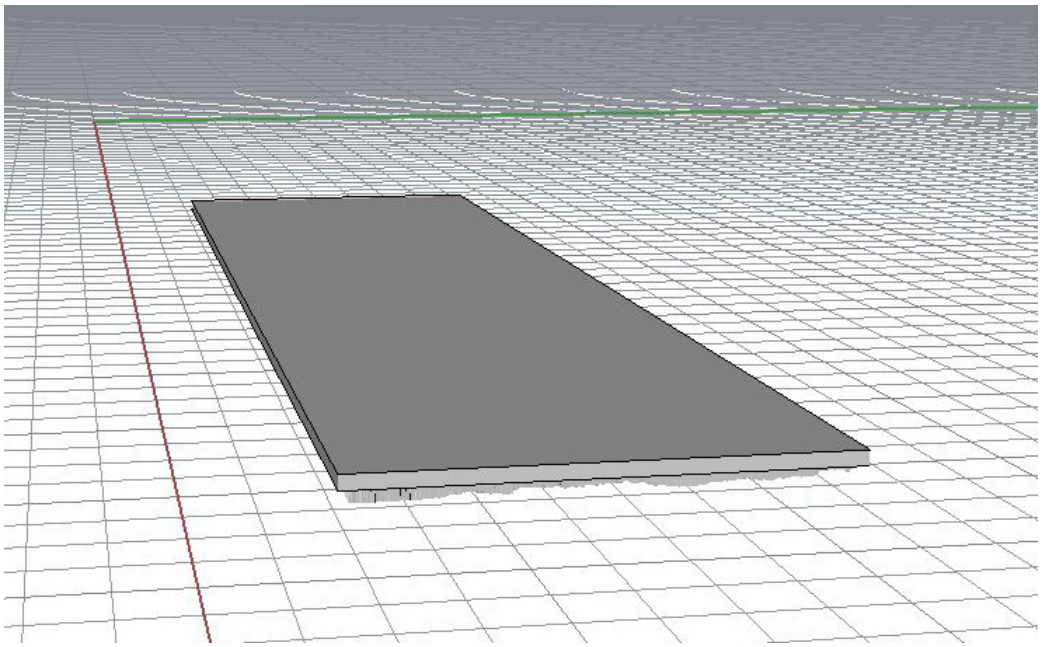


Figure 1.9 *Closed Mesh Object.*

9. Create a planar surface that extends past the unrolled surface on all sides. (figure 1.8).

10. Move the surface you just created to 3mm above the unrolled surface so that it is intersecting the extrusion on all sides.

11. Turn the extrusion and planar surface into a mesh with the command Mesh.

12. Enter the command MeshSplit and split the mesh extrusion with the planar mesh surface.

13. Delete the top of the split extrusion mesh (leave the side of the mesh that connects with the image render mesh).

14. Enter the command MeshSplit again and split the planar mesh surface with the remaining mesh extrusion.

15. Delete the unwanted planar mesh surface (leave the surface that lies within the extrusion to create a closed box).

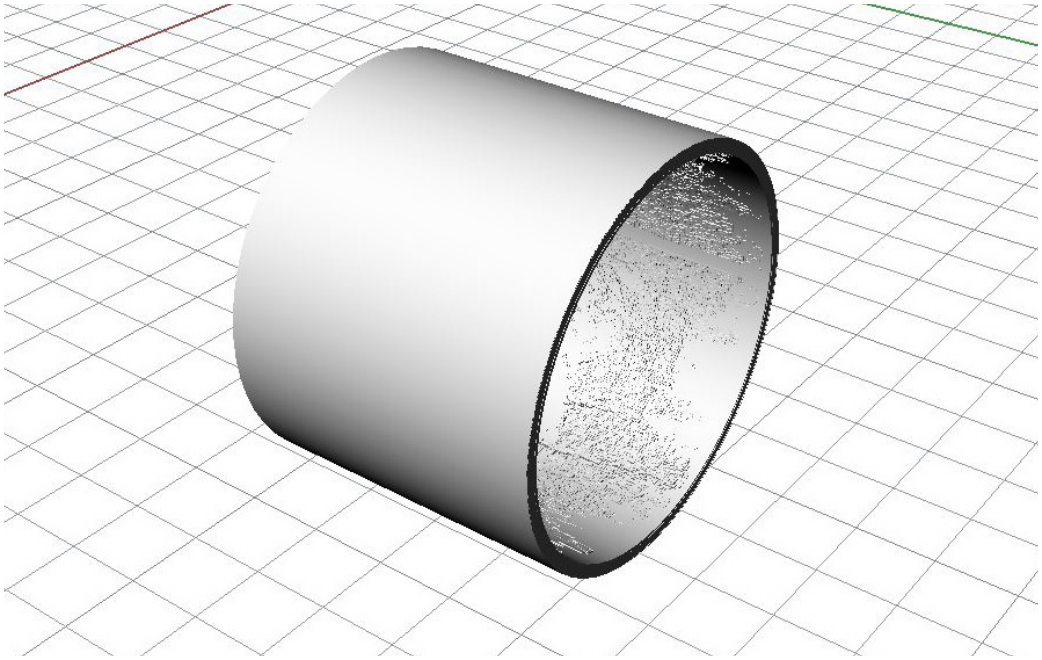
16. Join the three meshes into one closed mesh with the command Join (figure 1.9).

17. To check whether the mesh is closed enter the What command to see details about the object.

1. Once you have a closed mesh you can use the FlowAlongSrf command to wrap the object around the original part. Select the closed mesh and enter the command FlowAlongSrf. Select the unrolled surface as your base surface and the original surface for your target surface (figure 2.0).

2. Delete the original part and surface and save the new part as a new name.

Figure 2.0 *Planar surface extending beyond the unrolled surface.*



JOINING CUSTOMIZED PARTS

Once you have edited the parts you wanted to customize you can join them into one object in the CAD program of your choosing.

There are three parts to the ornament, the outer ring, the inner ring and the top. The outer ring and inner ring are each divided into separate bodies (line-to-line) to aid in customization. When you have completed the editing of the separate bodies, rejoin the bodies together to create a total of three parts.

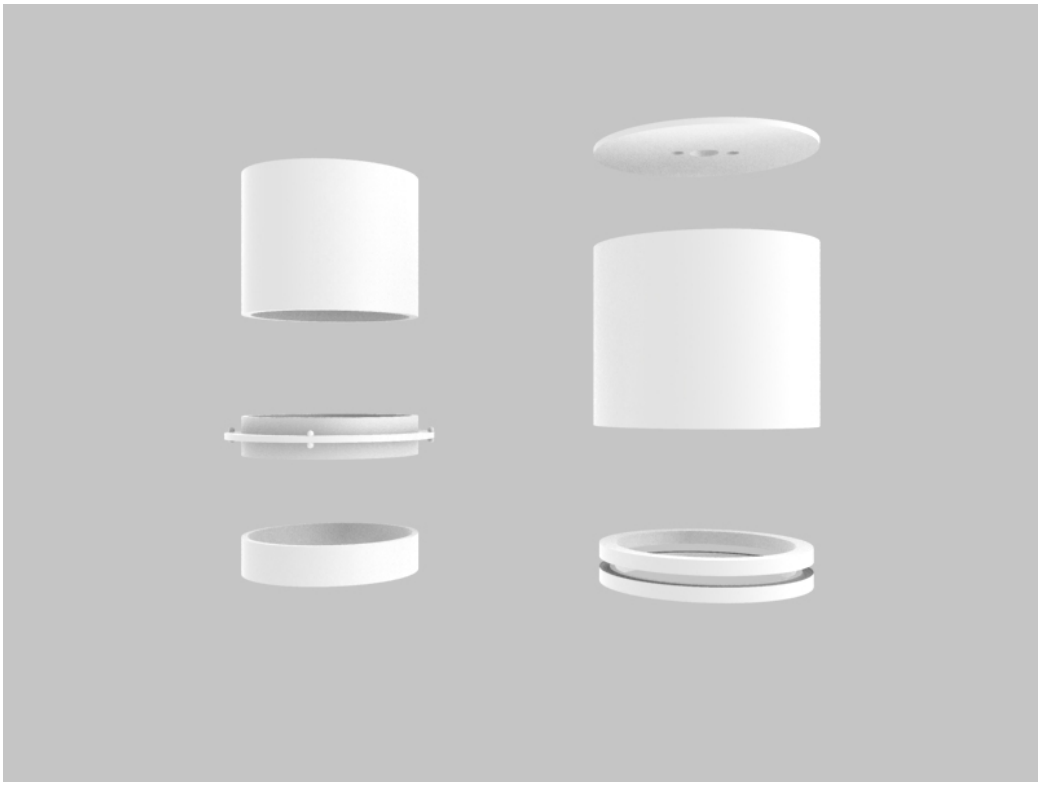


Figure 2.1 *Left hand side is the INNER-RING comprised of 3 bodies. Right hand side is the OUTER-RING comprising of three bodies and the TOP.*

PART	HEIGHT	LENGTH
OUTER-RING	2.42”	9.42”
INNER-RING	1.87”	7.38”
BOTTOM-RING	0.5”	7.38
TOP	3”	3”