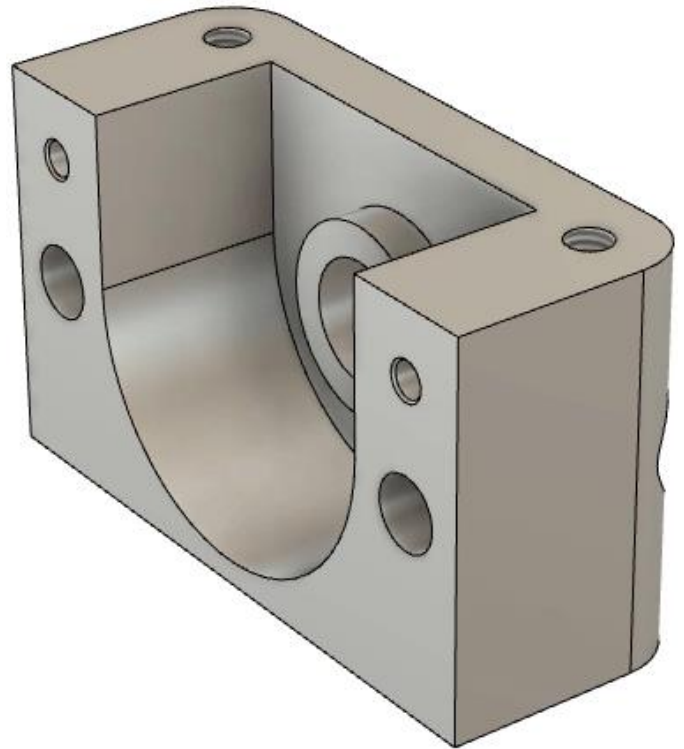


Finalize a 3D Model from a blueprint

In this module, you'll use the Hole tool to create a couple different types of holes.

Learning objectives:

- Add tapped holes.
- Review a design.



The completed exercise

1. Continue with the *Engine Case RH.f3d* file from the previous module.



Figure 1. Continue with the file from the previous module

2. Right-click the face shown in the image on the right and choose Create Sketch from the menu.

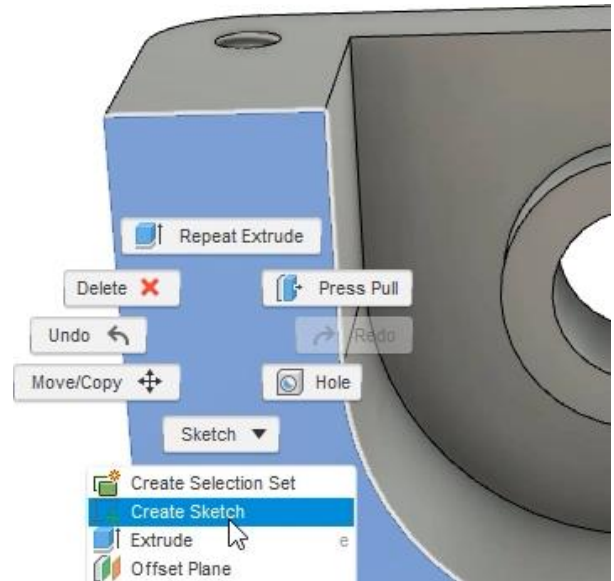


Figure 2. Create a new sketch

3. Click Create> Point.

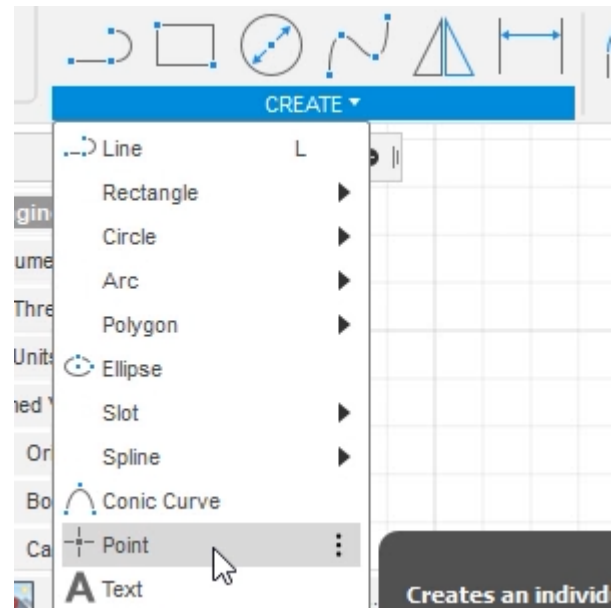


Figure 3. Open the Point tool

4. Use the image on the right as a guide to place two points into the sketch, then press Enter.

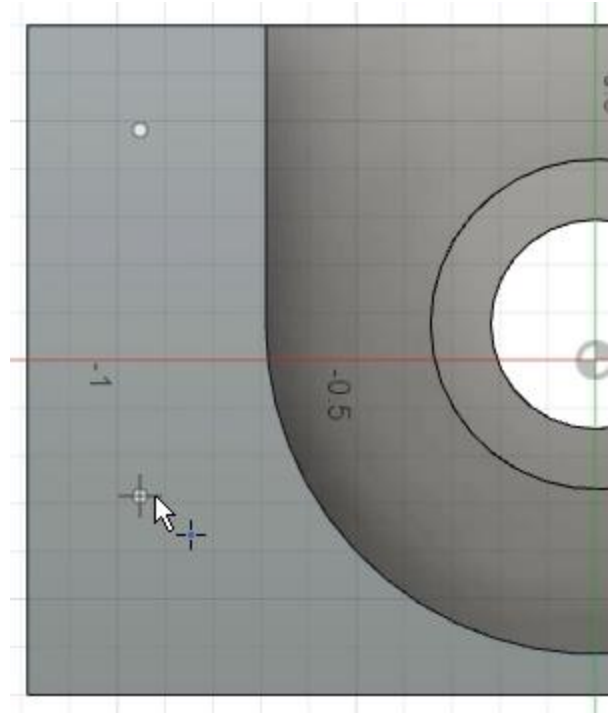


Figure 4. Place two points

5. Select the two points, then click Constraints> Horizontal/Vertical to Add a Vertical constraint between them. These points will be the center for the holes shown on the blueprints.

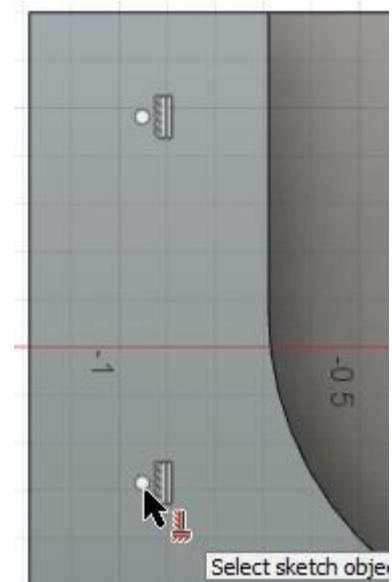


Figure 5. Add a Vertical constraint to the two points

6. Press D to open the Dimension tool and use the information found on the blueprints to correctly position the center of the holes.

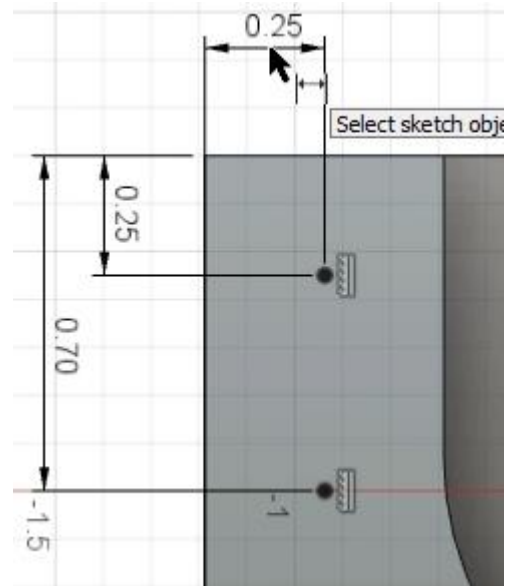


Figure 6. Add dimensions to the holes' centers

7. Repeat Steps 3 through 6 to draw two more points on the other side of the part. Use the Horizontal/Vertical tool to add a vertical constraint between the two points and horizontal constraints to the points you drew earlier.

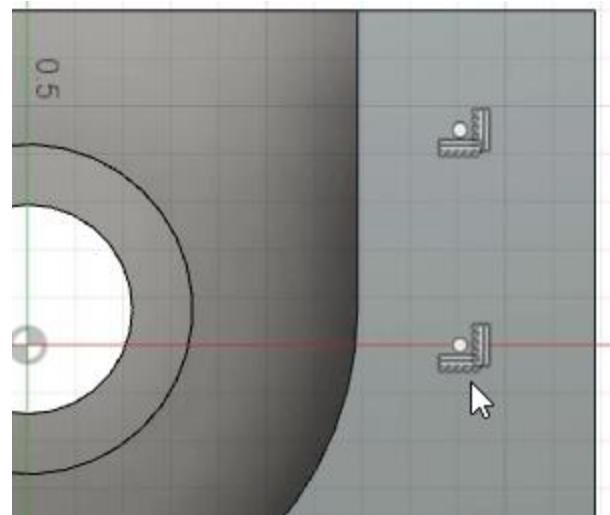


Figure 7. Draw and constrain two more points

- 8.** Press D to open the Dimension tool and use the measurements on the blueprints to dimension the new point. If you have trouble selecting the intended line, hover your cursor over the intended selection, hold the left mouse button, then choose the intended selection from the menu.

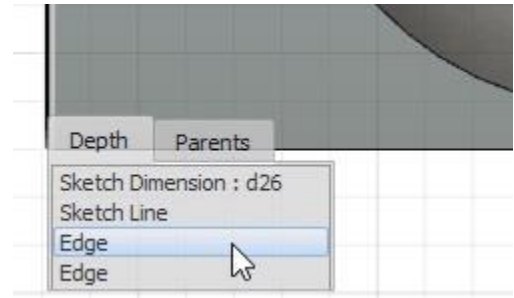


Figure 8. Dimension the new points

- 9.** Finish the sketch after the four points are correctly positioned.



Figure 9. Finish the sketch

- 10.** Click Create> Hole.



Figure 10. Open the Hole tool

- 11.** Choose the From Sketch (Multiple Holes) option in the Hole dialog.

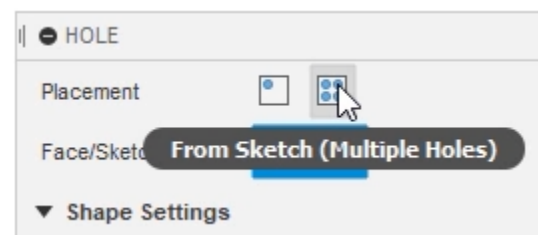


Figure 11. Choose the hole placement type

- 12.** Select the top two points for the location of the first two holes.

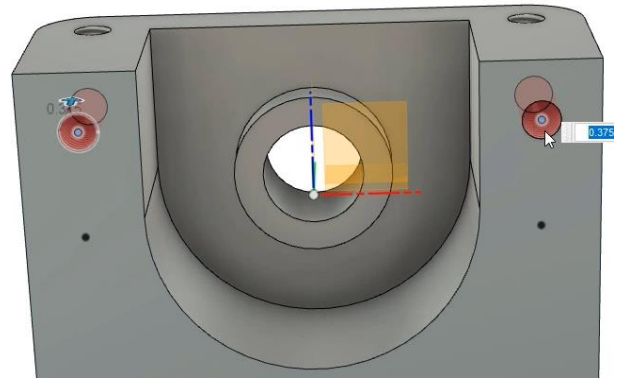


Figure 12. Choose the Sketch Points selection

- 13.** Use the information found on the blueprints to properly configure the holes, then OK the dialog.

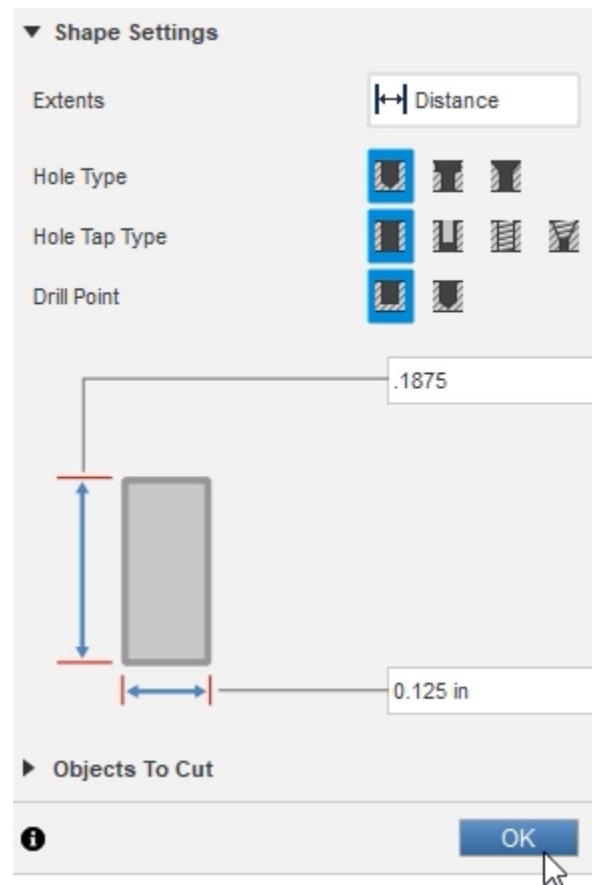


Figure 13. Configure the holes

- 14.** A chamfer needs to be added to the top of the holes. Click Modify> Chamfer to open the Chamfer tool.

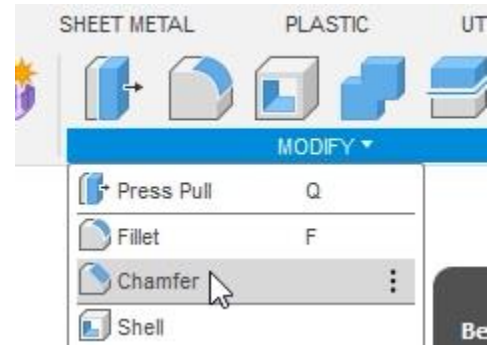


Figure 14. Open the Chamfer tool

- 15.** Select the edge on both holes as the dialog's Edges/Faces/Features Selection.

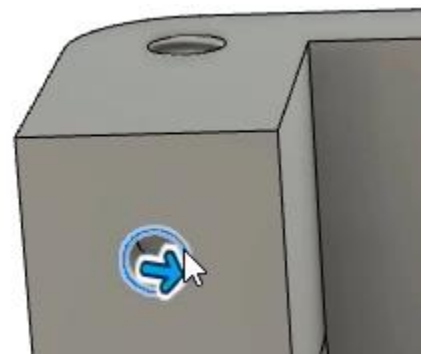


Figure 15. Select the edges

- 16.** Enter **0.01 inches** into the dialog's measurement box, then OK the dialog.

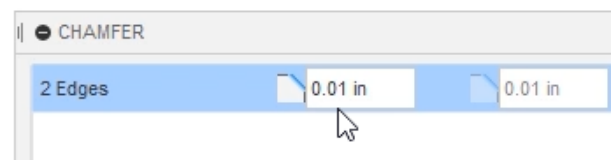


Figure 16. Specify the chamfer's dimension

- 17.** Expand the Browser's Sketches folder and turn on the visibility for the sketch with the points.

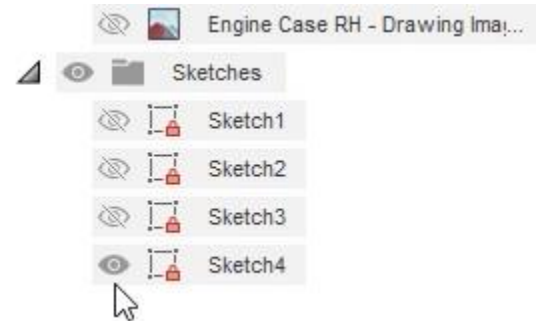


Figure 17. Show the points' sketch

- 18.** Create a new sketch on the face shown in the image on the right.

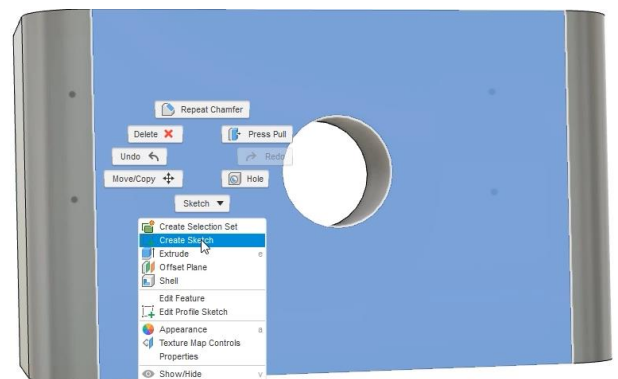


Figure 18. Create a new sketch

- 19.** Click Create> Project/Include> Project.

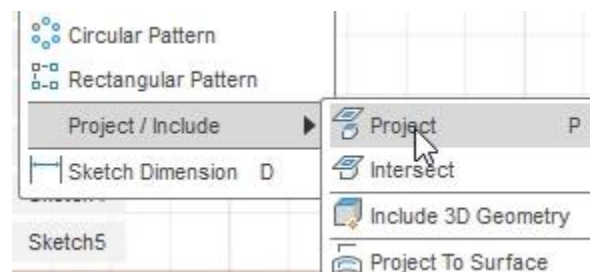


Figure 19. Open the Project tool

- 20.** Select the two bottom points in the previous sketch to project them onto the current sketch. OK the dialog, then finish the sketch. Use the Browser to turn off the visibility for the points' sketch.

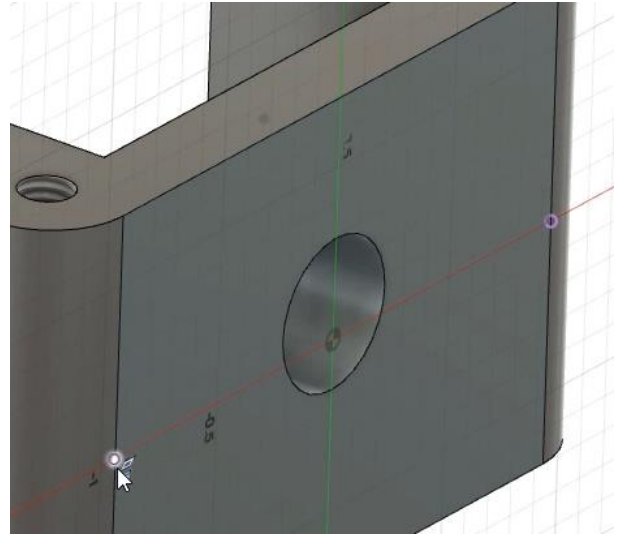


Figure 20. Project the points

- 21.** Press H to open the Hole tool and select the two points you projected into the sketch.

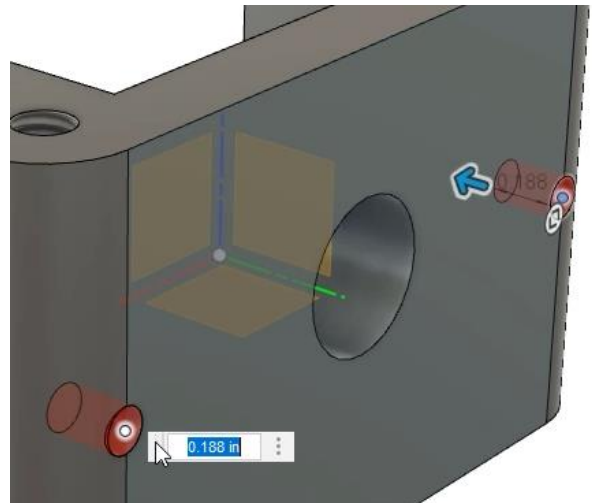


Figure 21. Create the holes

- 22.** Use the information found on the blueprints to properly configure the holes, then OK the dialog.

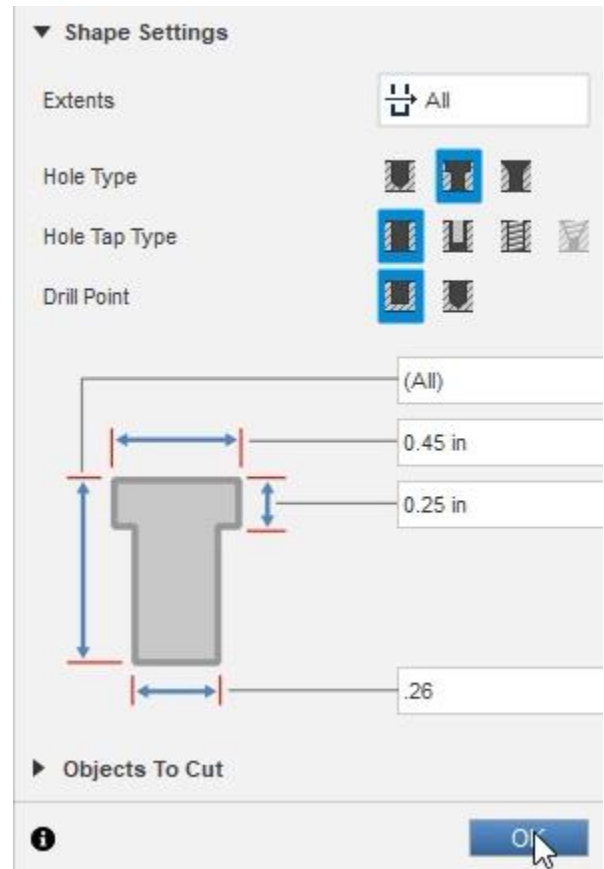


Figure 22. Configure the holes

- 23.** The holes and counterbores are created in a single step. Save the file.

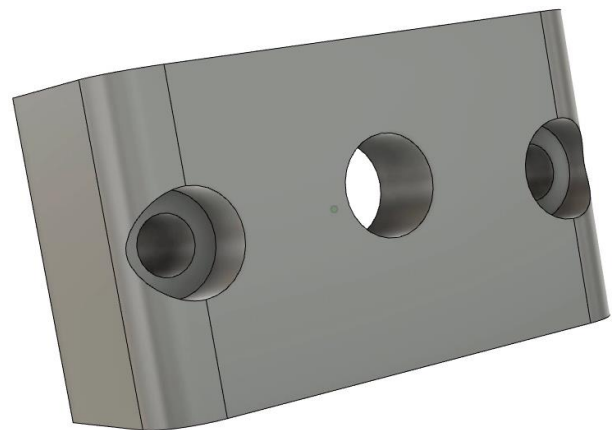


Figure 23. Inspect the result

24. Click Inspect> Section Analysis.

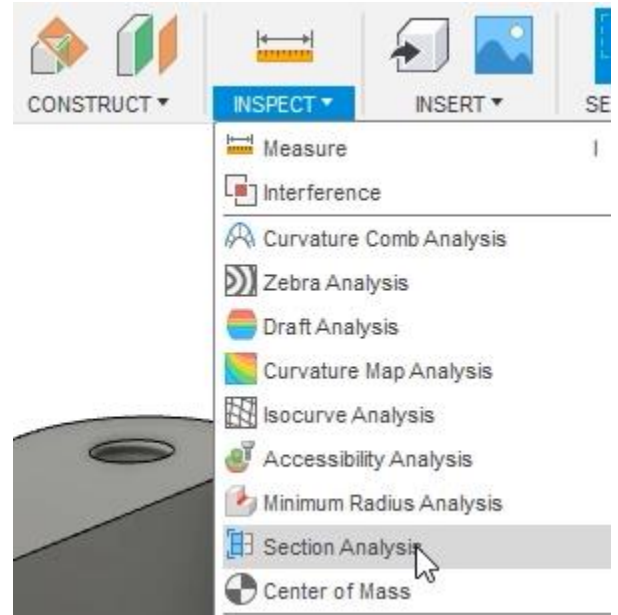


Figure 24. Open the Section Analysis tool

25. For the Section Analysis dialog's Face selection, choose the YZ plane.

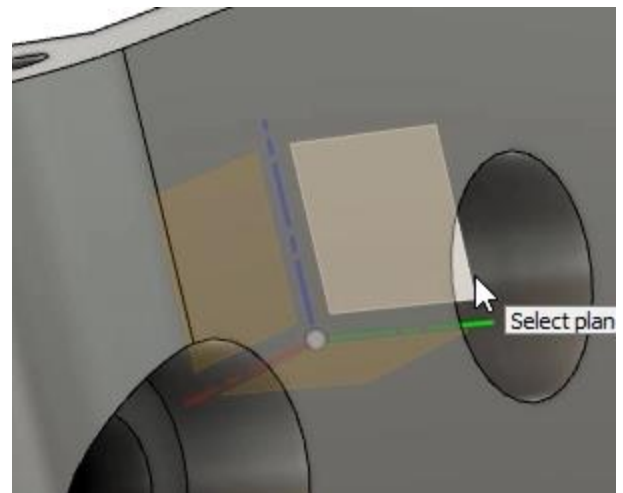


Figure 25. Choose the plane

- 26.** Compare the section analysis to Section B-B on the blueprint.

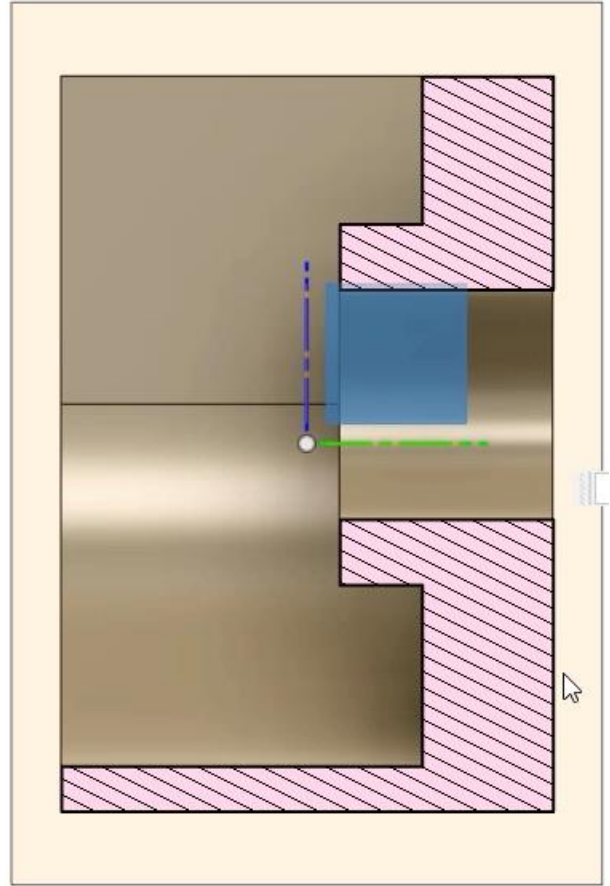


Figure 26. Compare the section analyses

- 27.** Drag the on-screen manipulator to move the section plane to the center of the holes you created in this module. This section should mirror the blueprint's Section A-A.

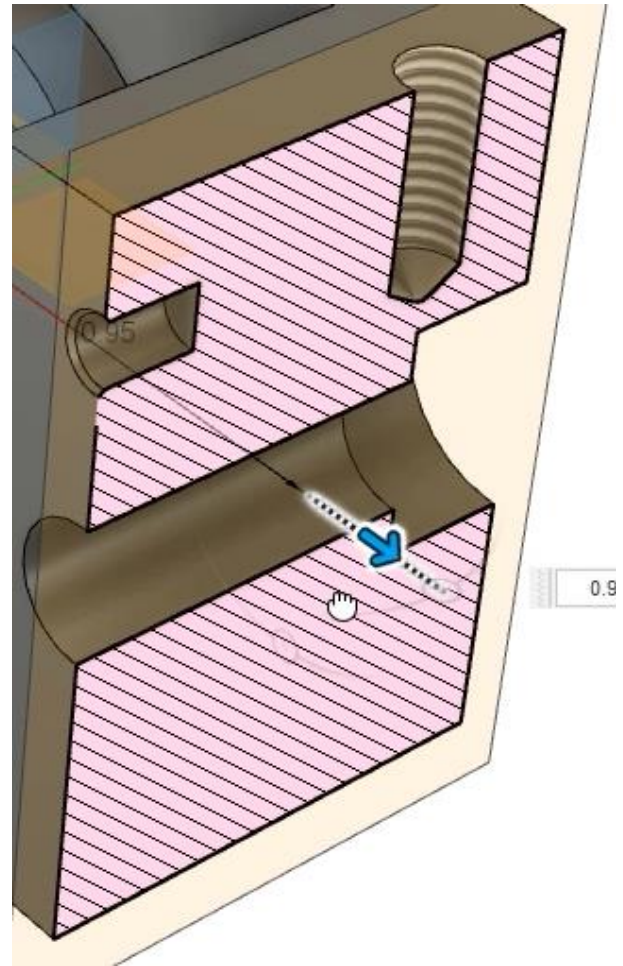


Figure 27. Adjust the section plane

- 28.** Use the on-screen manipulator's rotation handle to rotate the view 180°. The section view should now perfectly match the blueprints Section A-A. Compare this section view to the blueprint and make sure they match perfectly. Cancel the dialog after you finish comparing the two.

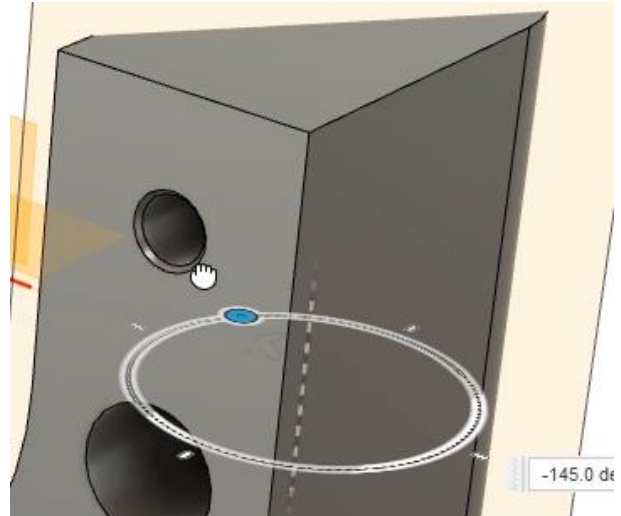


Figure 28. Rotate the section view

- 29.** Click Inspect> Measure to open the Measure tool. Use this tool to measure the modeled geometry to make sure it matches the blueprint's geometry. Close the dialog after you finish measuring the model.

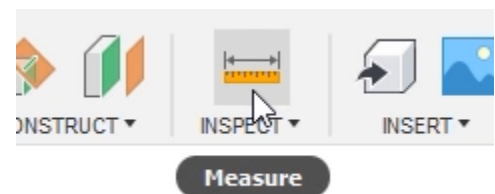


Figure 29. Measure the model

- 30.** Select the Browser's top level, right-click it, then choose Physical Material.

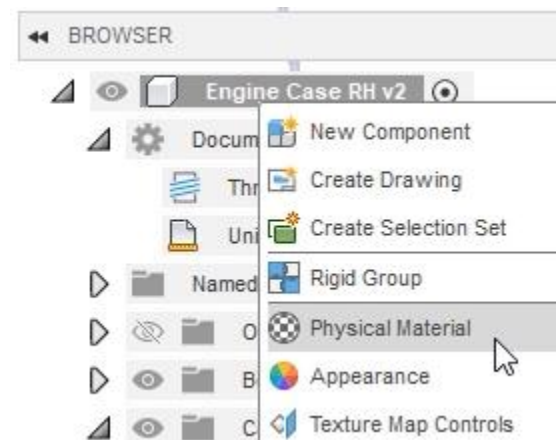


Figure 30. Open the Physical Material dialog

- 31.** In the Physical Material dialog, expand the Metal folder and locate The Aluminum 6061.

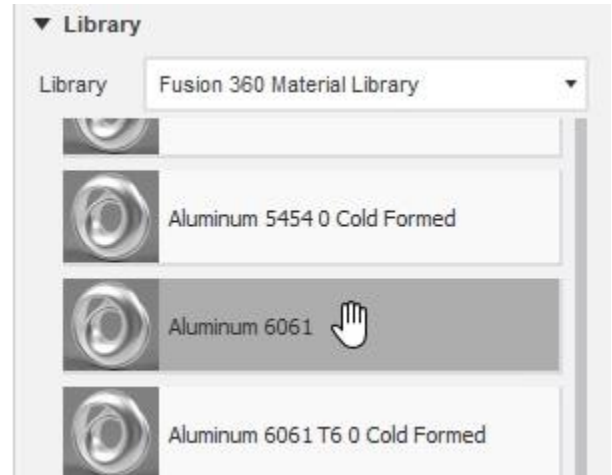


Figure 31. Locate the Aluminum 6061 material

- 32.** Drag and drop the Aluminum 6061 material's swatch onto the existing swatch in the dialog's In This Design section. Close the dialog.

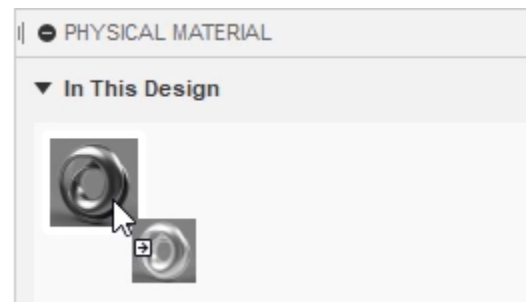


Figure 32. Apply the material

- 33.** Expand the Browser's Bodies folder and right-click Body1. Choose Properties from the menu.

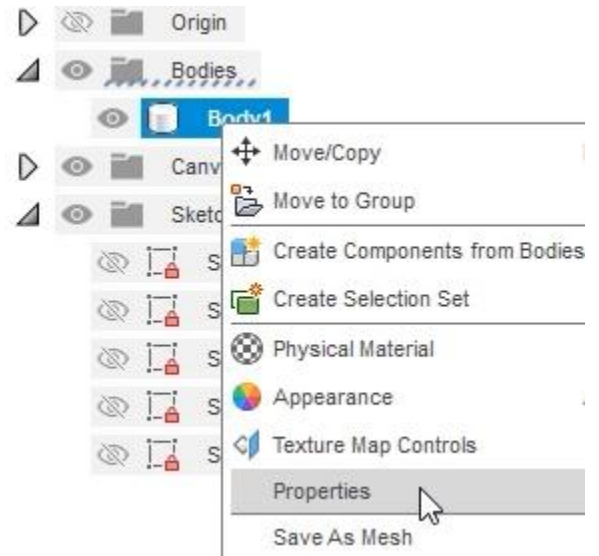


Figure 33. View Body1's properties

- 34.** Notice that the material and mass have been updated to reflect the Aluminum 6061 material you applied. Save the design and continue to the next module.

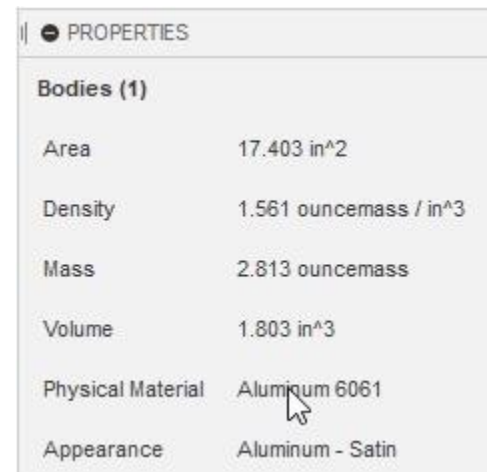


Figure 34. Inspect the properties