

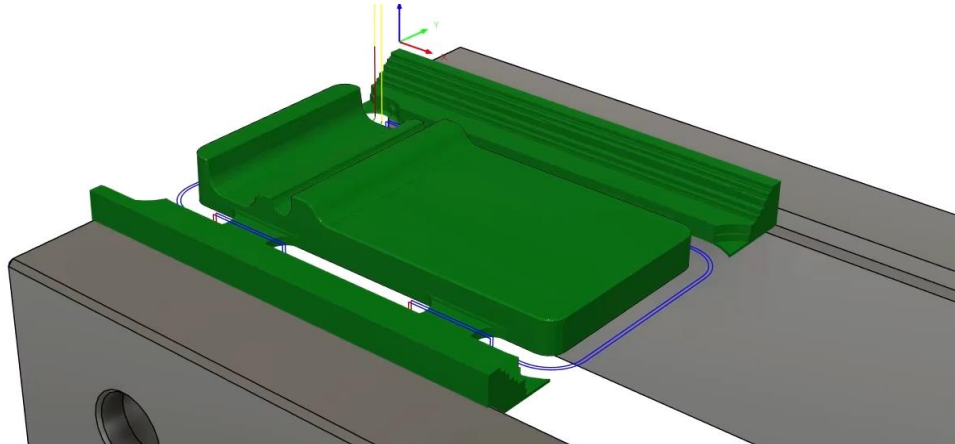
## Step-by-step guide

### Chamfer edges on the base model

Create and compare a few 2D options for cutting a part's 3D chamfer.

#### Learning objectives:

- Create a Chamfer toolpath to deburr edges.



*The completed exercise*

1. Continue with your file from the previous video or open the supplied *Cell Phone Stand INCH – Debur.f3d* file. It's better to use your file if you can because the supplied file's links to the external parent file are broken.

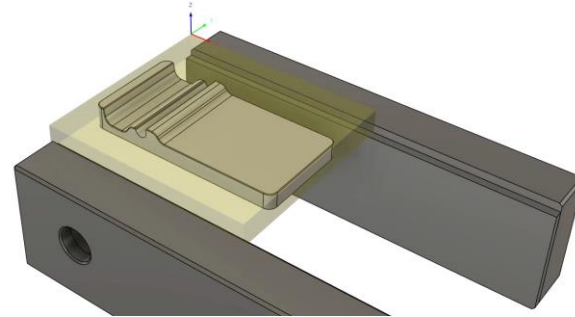


Figure 1. Open the file

2. Notice the Scallop toolpath gouges the stock. These gouges put high loads onto the tool, which means they need to be addressed.

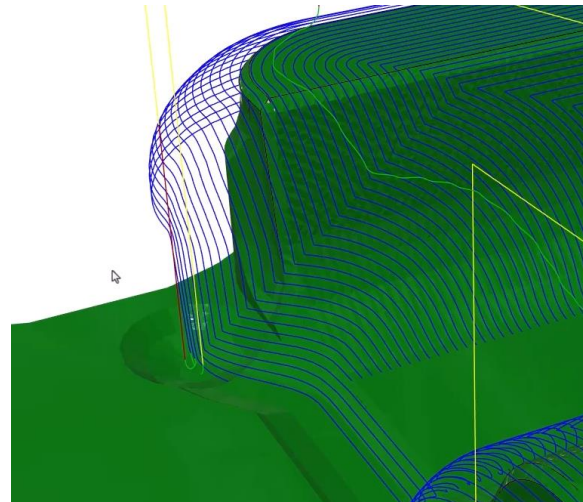


Figure 2. Inspect the in-process stock

3. Inspect the chamfers and notice that they could be more precise if they were cut by a different operation.



*Figure 3. Inspect the in-process stock*

4. A 2D Chamfer operation could be used to cut the model's chamfers. Click 2D> 2D Chamfer.

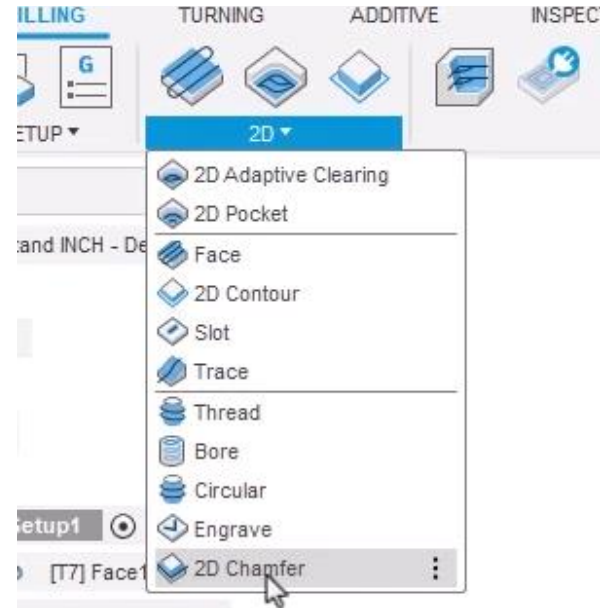


Figure 4. Create a 2D Chamfer operation

5. Click the dialog's Select to choose an appropriate tool for this operation.

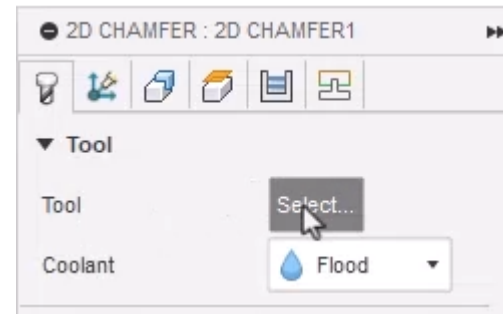


Figure 5. Click Select

6. Navigate to the Learn CAM 90 – INCH tool library and select Tool 4.



Figure 6. Choose the tool

7. Click the Select Tool dialog's Select.

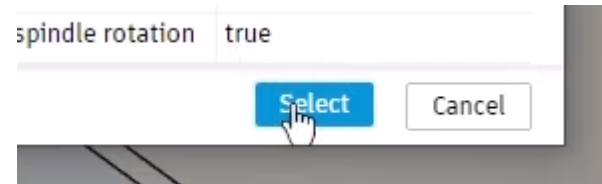


Figure 7. Click Select

8. Select all the horizontal edges shown in the image on the right and notice that Fusion previews a flat, planar selection. This 2D operation cannot machine the fillets' chamfers. OK the dialog.

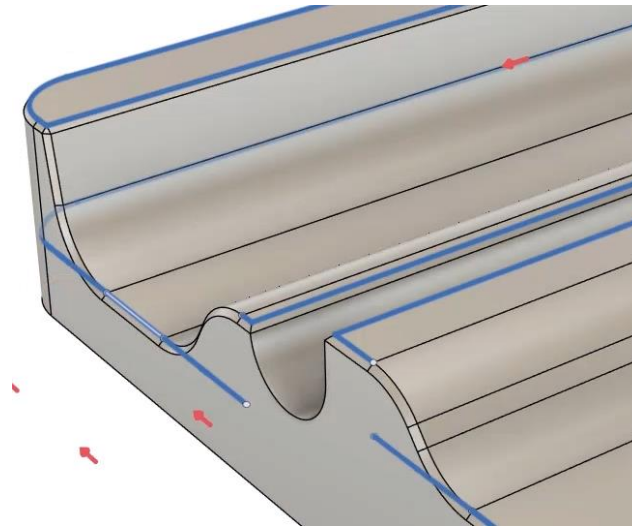


Figure 8. Select the edges

9. Click the Browser's warning icon to learn about the issue.



Figure 9. Click the warning icon

10. The warning dialog mentions that the toolpath is empty. Click the dialog's Close.

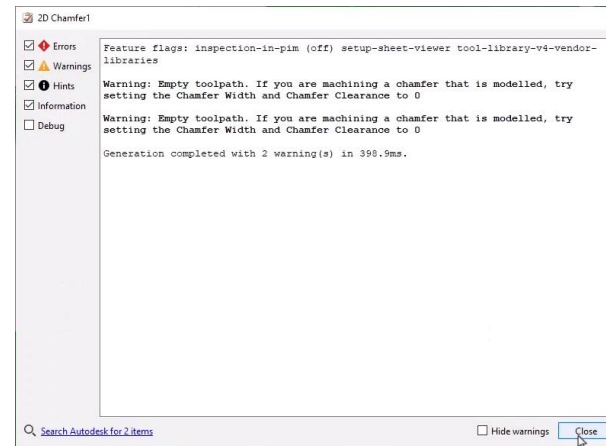


Figure 10. Learn about the warning

11. The Trace operation could be used to cut the model's chamfers. Click 2D> Trace.

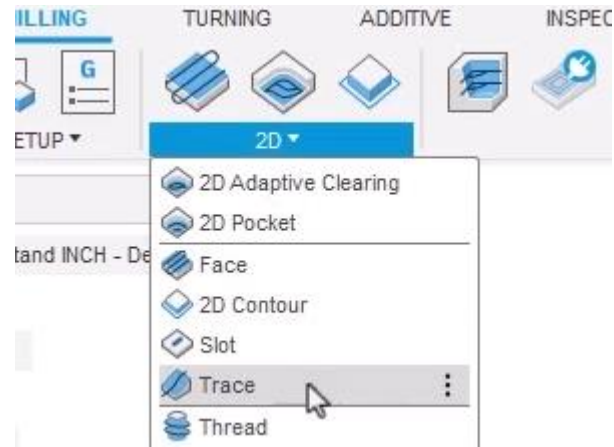
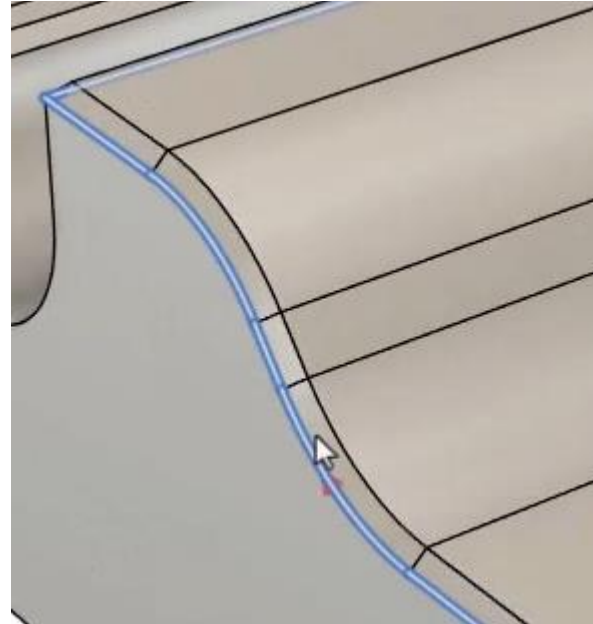


Figure 11. Create a Trace operation



12. Continue to the dialog's Geometry tab and select the edge shown in the image on the right as the Curve Selection. OK the dialog to generate the toolpath preview using the default parameters.



*Figure 12. Select the edge*

13. Inspect the toolpath preview and notice the tool gouges the stock body.

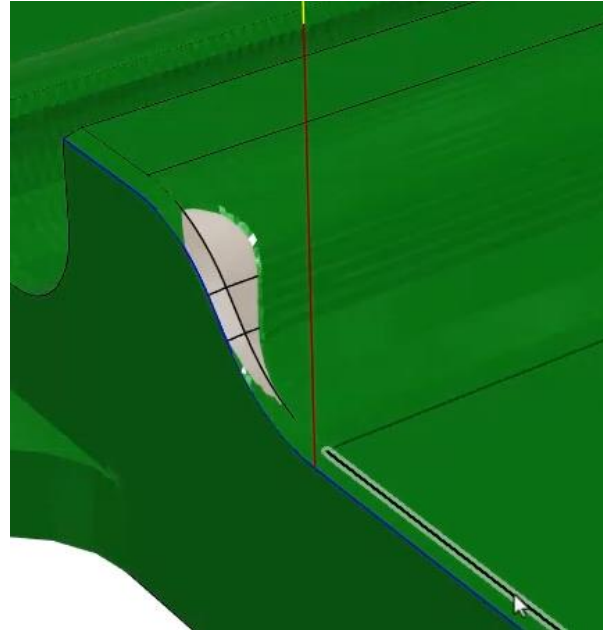


Figure 13. Inspect the toolpath preview

14. Right-click and delete the 2D Chamfer and Trace operations.



Figure 14. Delete the unnecessary operations

15. Before creating a 3D toolpath to cut the model's chamfers, a 2D toolpath can remove material from the model's perimeter. Click 2D> 2D Contour.

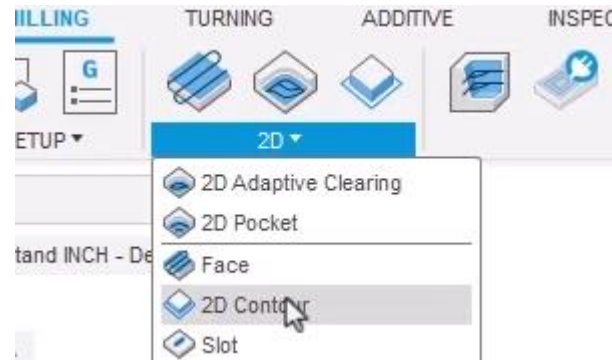


Figure 15. Create a 2D Contour operation

16. Navigate to the 2D Contour dialog's Geometry tab, then select the edge shown in the image on the right as the Contour Selection.

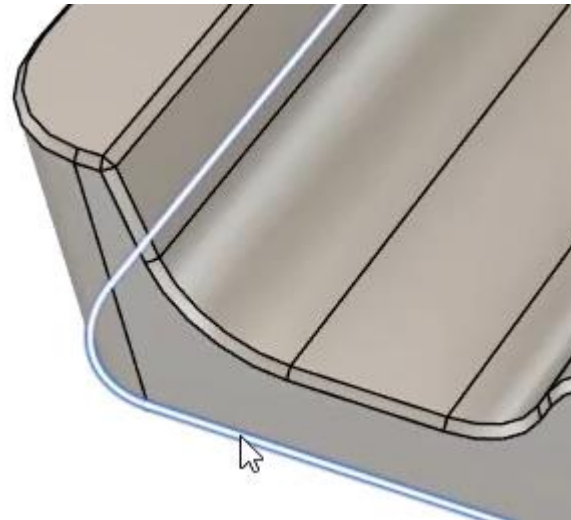


Figure 16. Select the edge

17. Continue to the Heights tab and choose the Selection option in the Bottom Height section's From menu.

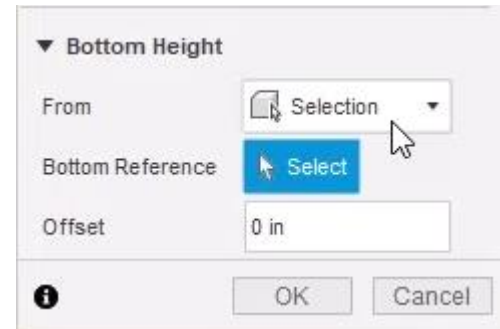


Figure 17. Change the Bottom Height type

18. For the Bottom Height section's Bottom Reference selection, choose the edge shown in the image on the right.

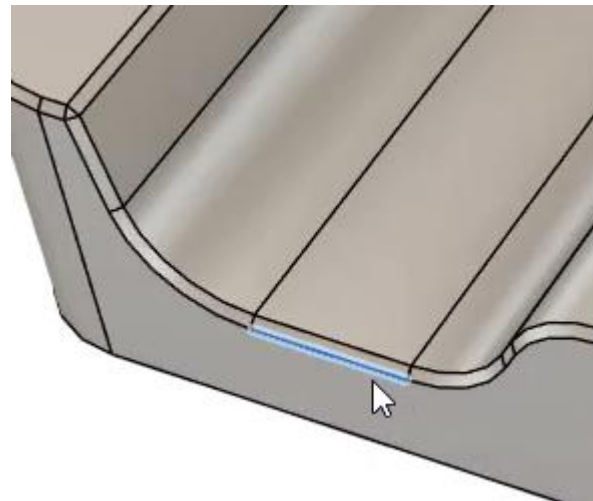


Figure 18. Select the edge

19. Enter **-0.05 inches** into the Offset box so the tool plunges slightly past the bottom reference.

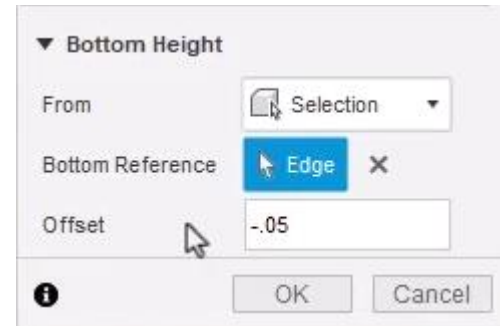


Figure 19. Add an offset

20. Continue to the Passes tab and activate the Stock to Leave option. Enter **0.02 inches** into the Radial Stock to Leave box, then enter **0 inches** into the Axial Stock to Leave box. OK the dialog.

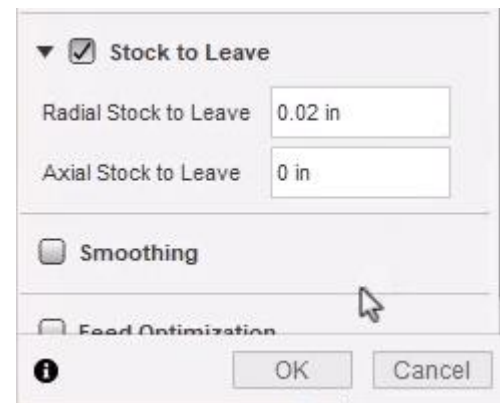


Figure 20. Configure the Stock to Leave option

21. The 2D Contour operation needs to happen before the Scallop operation, which means the setup needs to be reordered. Click and drag the 2D Contour operation above the Scallop operation.



Figure 21. Reorder the setup

22. In the Browser, select the Scallop operation and notice the tool no longer gouges the stock body. The issue you noted in Step 2 is resolved.

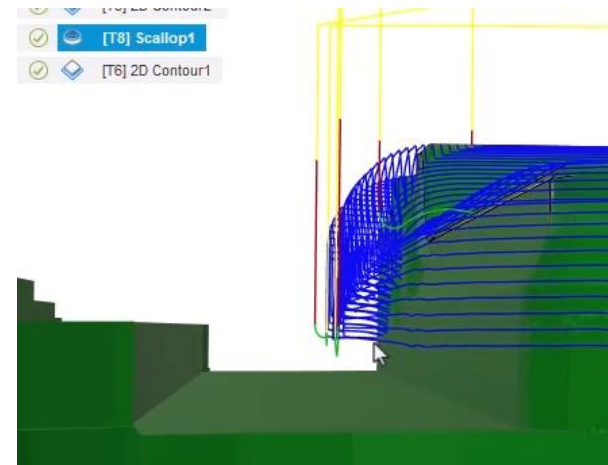


Figure 22. Inspect the toolpath preview

**23.** Other operations could replace the Scallop operation. Exploring the various operations can be a good way to learn their strengths and weaknesses. Create a new Geodesic operation by clicking 3D> Geodesic.

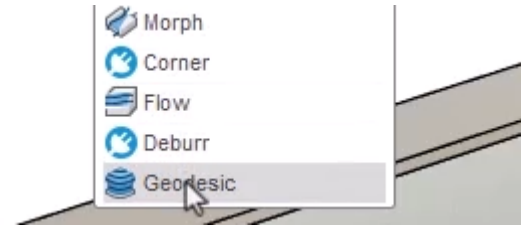


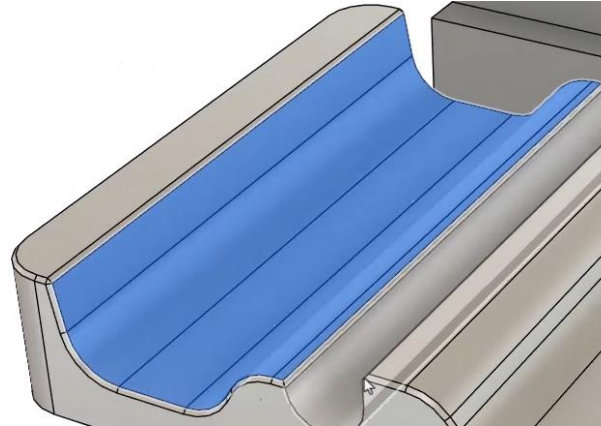
Figure 23. Create a Geodesic operation

**24.** Click the Geodesic dialog's Select to choose the operation's tool. Navigate to the tool library and choose Tool 8, then click the Select Tool dialog's Select.



Figure 24. Choose the operation's tool

- 25.** Continue to the dialog's Geometry tab and select the seven faces that you want to machine as the Drive Surfaces selection.



*Figure 25. Select the faces*

- 26.** Continue to the Passes tab and reduce the Cusp Height value. OK the dialog to generate the toolpath preview.



*Figure 26. Adjust the cusp height*



27. Inspect the preview and notice the strategy that the operation uses to clear the material from the faces you selected in Step 25. This operation might be a good solution if the cusp height and stepover options are adjusted.

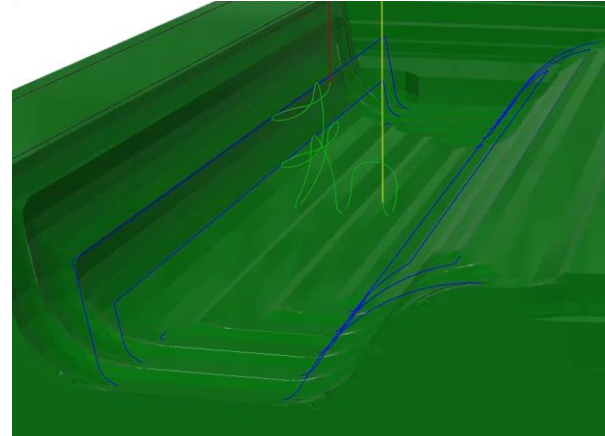


Figure 27. Inspect the toolpath preview

28. Reorder the setup's operations by clicking and dragging the Geodesic operation above the Scallop operation.

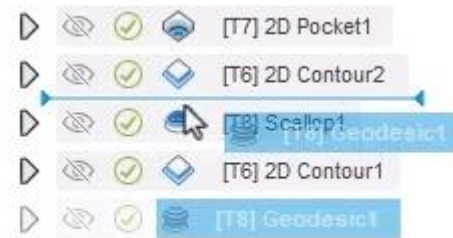


Figure 28. Reorder the setup

29. Edit the Geodesic operation and navigate to the Passes tab. Reduce the Cusp Height value and OK the dialog.



Figure 29. Reduce the Cusp Height value

30. Inspect the toolpath preview and notice the improved surface finish on the floor. However, the surface finish on the angled walls is still not ideal.

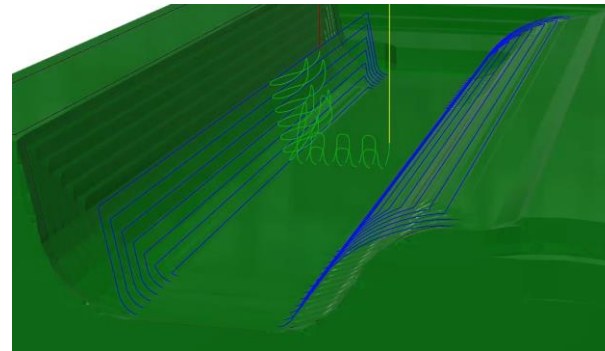


Figure 30. Inspect the toolpath preview

31. Before exploring alternate solutions, right-click and delete the Geodesic operation.

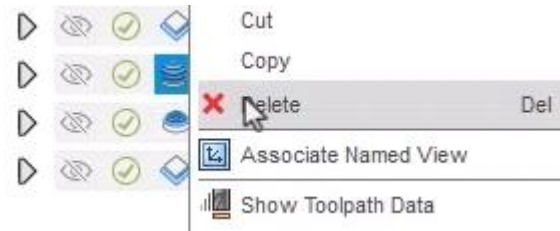


Figure 31. Delete the Geodesic operation

32. Edit the Scallop toolpath and navigate to the Geometry tab. Click the plus icon to create a new Faces selection group.

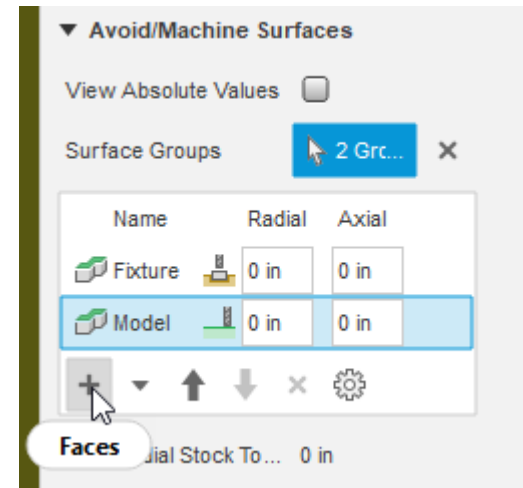


Figure 32. Create a new selection group

- 33.** Select the eight faces around the model's perimeter.

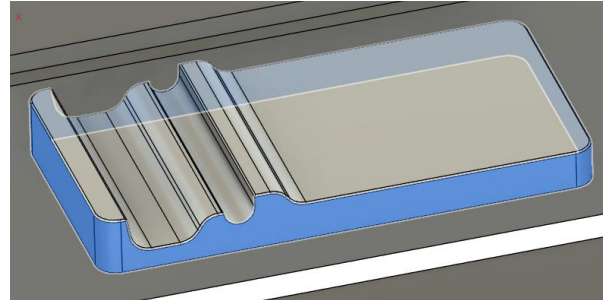


Figure 33. Select the faces

- 34.** Select the Avoid surface option in the Faces dialog so that Fusion avoids the eight faces you selected. OK the Faces dialog.

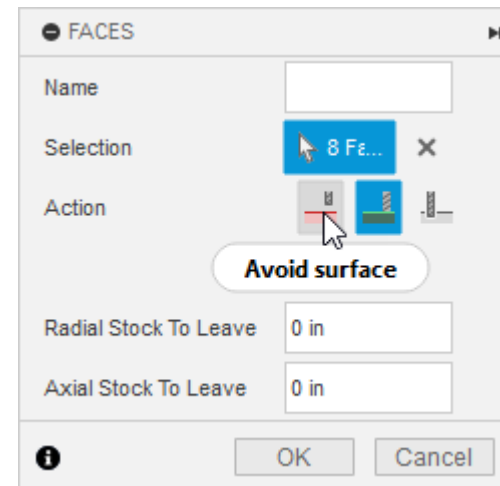
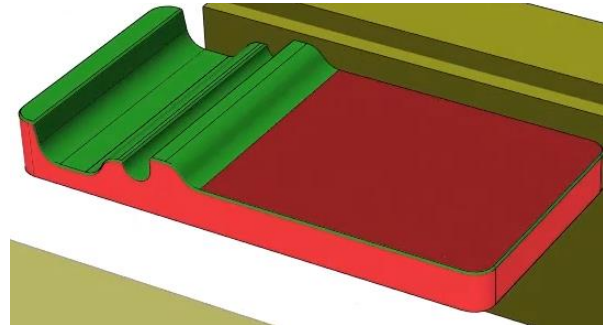


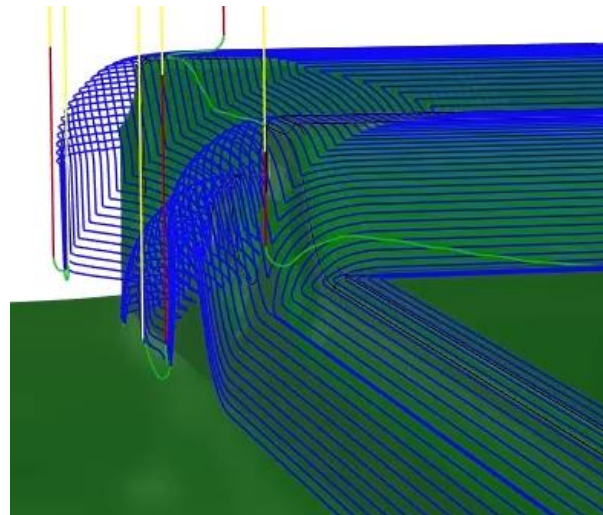
Figure 34. Choose the Avoid surface option

- 35.** Fusion will machine the green faces and avoid the red faces. OK the Scallop dialog to generate the toolpath preview.



*Figure 35. Note the colored faces*

- 36.** Inspect the toolpath preview and notice how the operation avoids the surfaces you selected.



*Figure 36. Inspect the toolpath preview*

37. Right-click the Scallop operation and choose the Machining Time option from the menu.

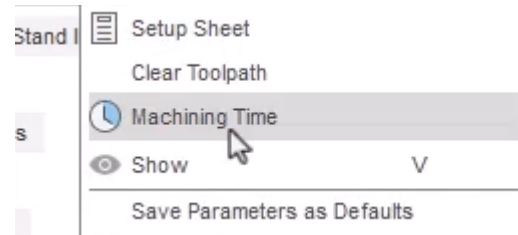


Figure 37. Inspect the operation's machining time

38. Avoiding the surfaces didn't shave too much time off of the operation. Close the Machining Time dialog.

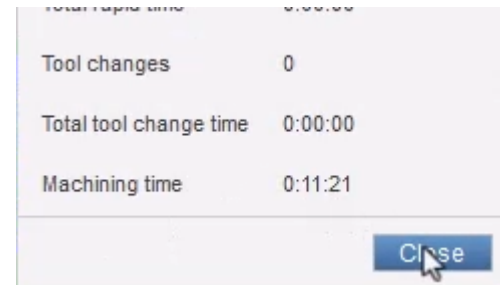
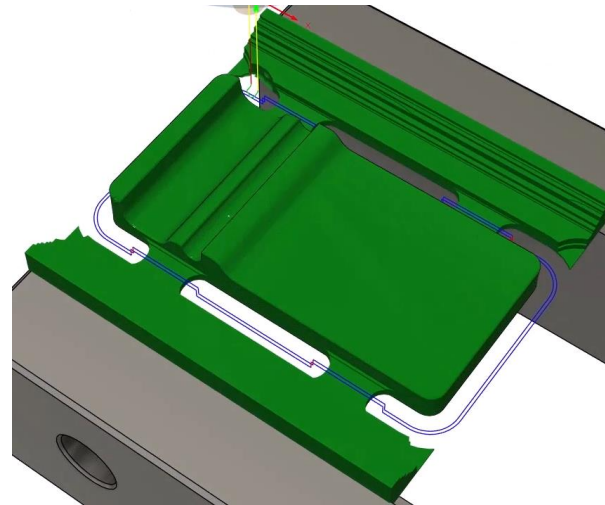


Figure 38. Inspect the machining time information

39. Select the setup's final operation and verify that the current state of the in-process stock looks correct. Save the file.



*Figure 39. Inspect the in-process stock*