

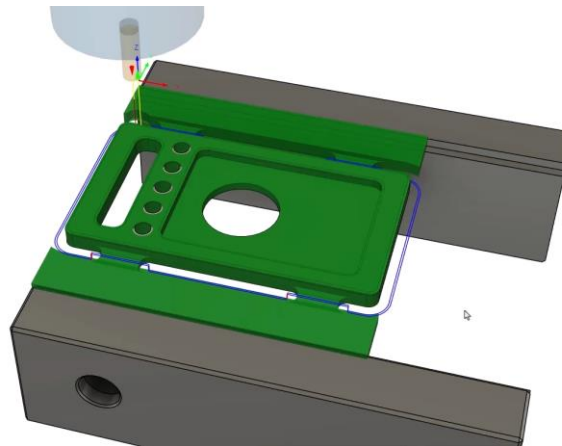
Step-by-step guide

Use finishing toolpaths to finalize a model

Create and customize several toolpaths to cut a part's geometry.

Learning objectives:

- Create a 2D Pocket Finishing toolpath.
- Create a 2D Bore toolpath.
- Create tapped holes.
- Create a 2D Contour toolpath with tabs.



The completed exercise

1. Continue with the file from the previous video or upload the supplied *Cell Phone INCH – Finish.f3d* file. It is important to note that the supplied file will not have active links to the external parent files, so use your own file if possible.

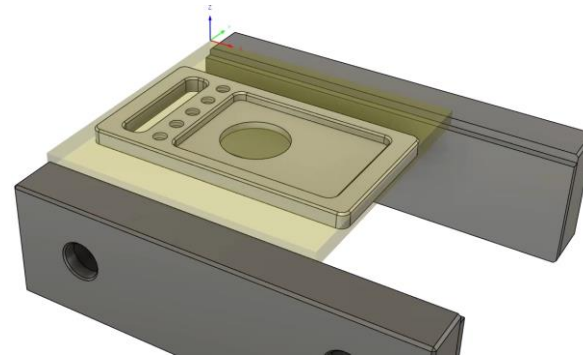


Figure 1. Open the file

2. Create a 2D Pocket operation by clicking 2D> 2D Pocket.



Figure 2. Create a 2D Pocket operation

3. Verify that the 1/4" flat endmill is selected. If this tool is not selected, navigate to the Learn CAM 90 – INCH tool library and choose Tool 6.

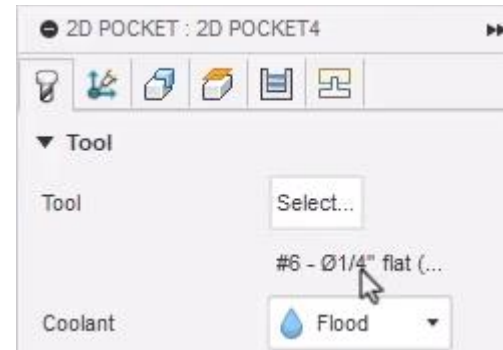


Figure 3. Verify the operation's tool

4. Navigate to the 2D Pocket dialog's Geometry tab and select the face shown in the image on the right.

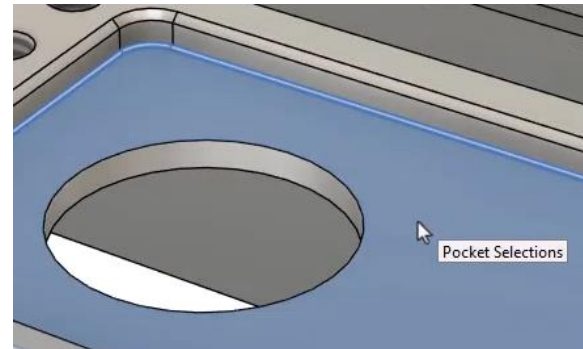


Figure 4. Select the face

5. Continue to the Passes tab and deactivate the Stock to Leave option so that the operation machines down to the modeled geometry. Activate the Finishing Passes option so that the operation's final pass leaves a high-quality surface finish.

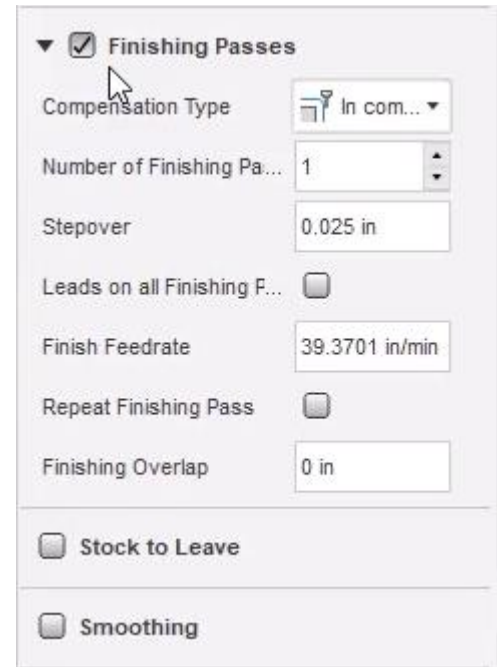


Figure 5. Deactivate the Stock to Leave option

6. Continue to the Linking tab and click Select next to Predrill Positions.

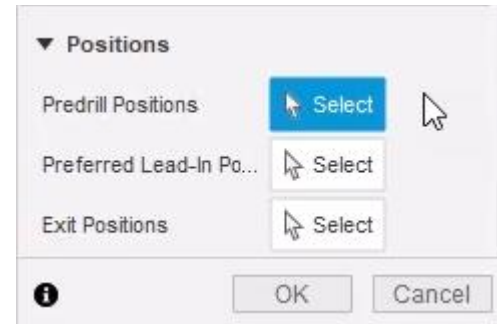


Figure 6. Select a Predrill Position

7. Select the edge shown in the image on the right to identify its center as the predrill position. OK the 2D Pocket dialog to generate the toolpath preview.

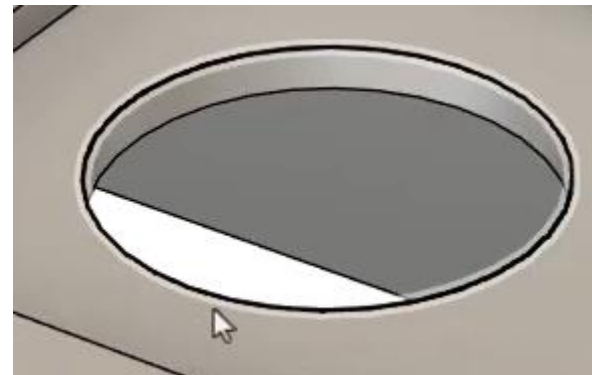


Figure 7. Select the edge

8. Inspect the toolpath preview and note the strategy used to clear the pocket's remaining material.

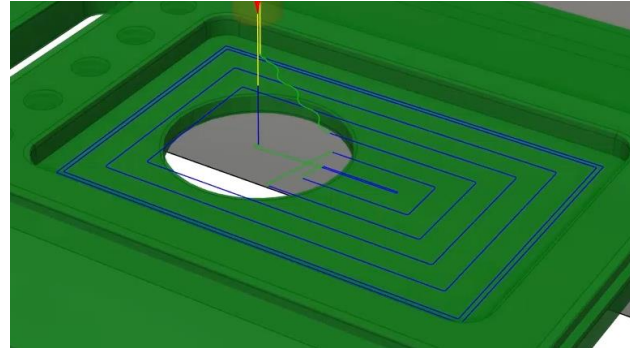


Figure 8. Inspect the toolpath preview

9. A 2D Contour operation could be used to finish the slot you roughed in the previous video. Click 2D> 2D Contour.



Figure 9. Create a 2D Contour operation

10. Navigate to the 2D Contour dialog's Geometry tab and select the edge shown in the image on the right.

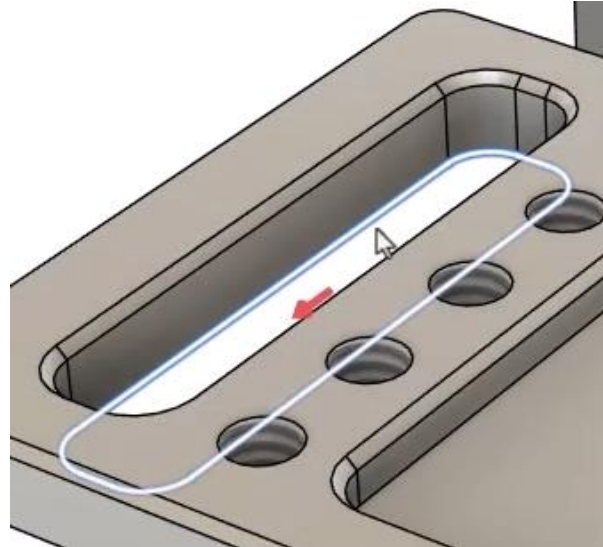


Figure 10. Select the edge

11. Continue to the Heights tab and enter **-0.05 inches** into the Bottom Height section's Offset box. OK the dialog to generate the toolpath preview.

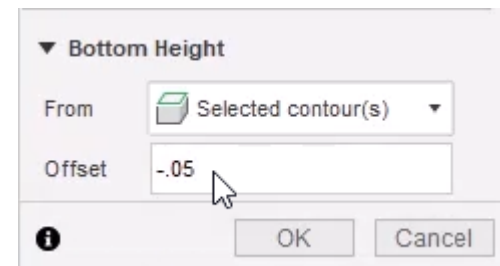


Figure 11. Enter a Bottom Height offset

12. Notice the operation removes all of the extra material from the slot's walls.

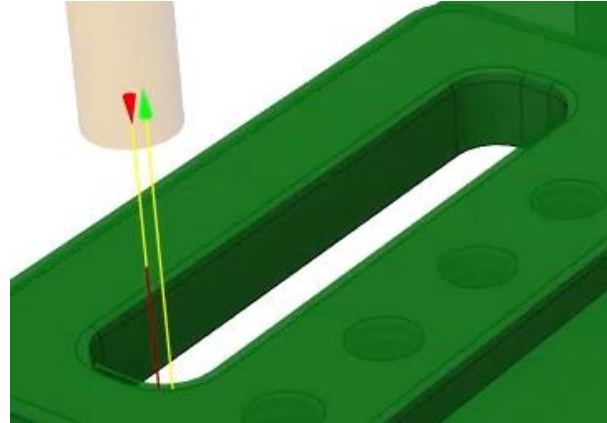


Figure 12. Inspect the toolpath preview

13. A Bore operation can be used to cut the large pocket's hole. Click 2D> Bore.

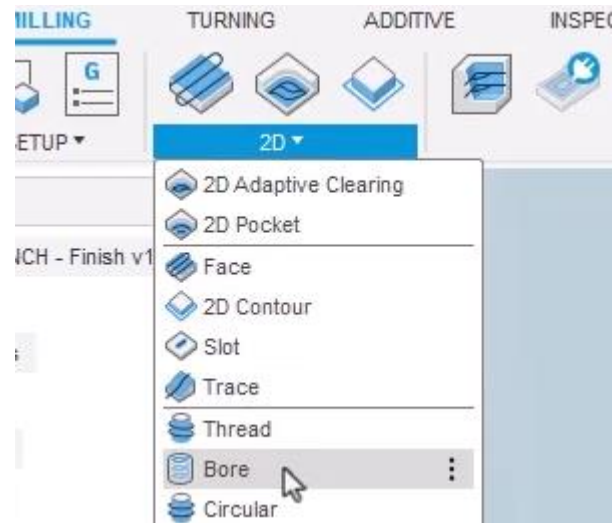


Figure 13. Create a Bore operation

14. Navigate to the Bore dialog's Geometry tab and select the face shown in the image on the right as the dialog's Circular Face Selection.

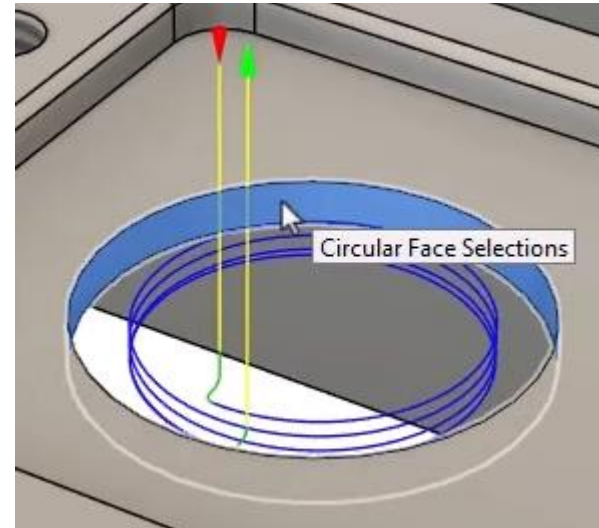


Figure 14. Select the face

15. Continue to the Heights tab and enter **-0.05 inches** into the Bottom Height section's Offset box. OK the dialog.

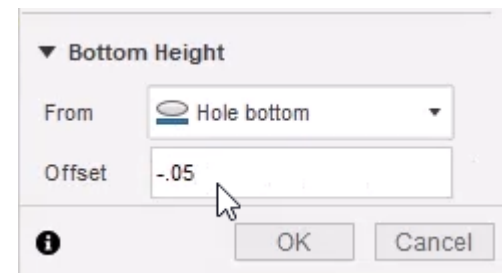


Figure 15. Adjust the bottom height

16. To begin creating the model's tapped holes, create a Drill operation. Click Drilling> Drill.

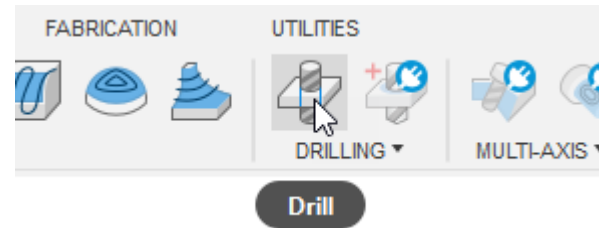


Figure 16. Create a Drill operation

17. Click the dialog's Select to choose an appropriate tool for the operation, then navigate to the Learn CAM 90 – INCH tool library. Select Tool 1 which is a 1/4" Spot Drill. Click the Select Tool dialog's Select.

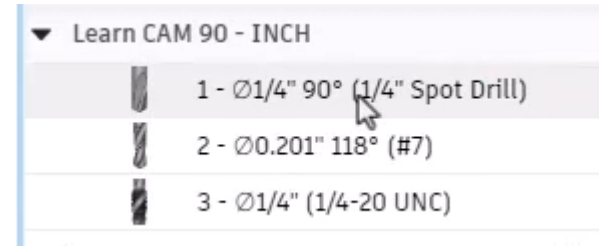


Figure 17. Select the operation's tool

18. Navigate to the Drill dialog's Geometry tab and select the five hole faces shown in the image on the right.

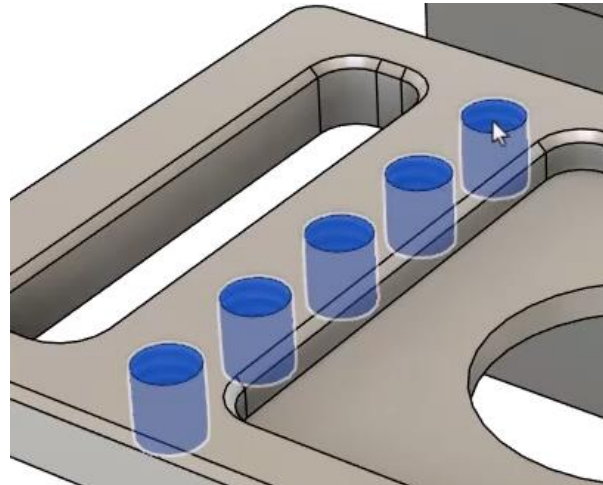


Figure 18. Select the hole faces

19. Continue to the Heights tab and choose the To chamfer diameter option from the Bottom Height section's From menu.

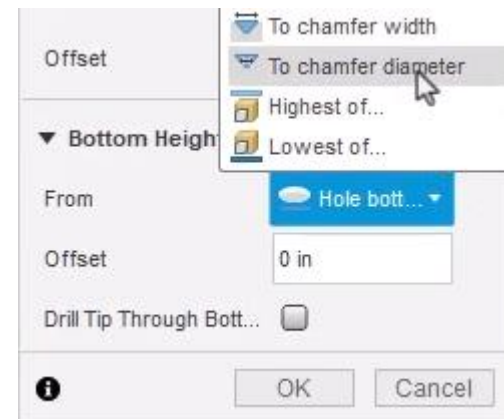


Figure 19. Change the height type

20. Reduce the Chamfer Diameter value to **0.2 inches**. OK the dialog to generate the toolpath preview.

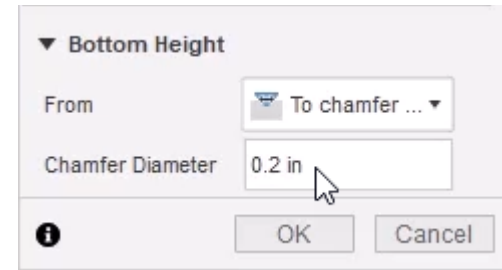


Figure 20. Change the diameter

21. Inspect the toolpath preview and notice the holes are spotted in preparation for the hole drilling operation. In the image on the right, notice the operation spots the closest hole first and the farthest hole last. This order will be referenced again in Step 26.

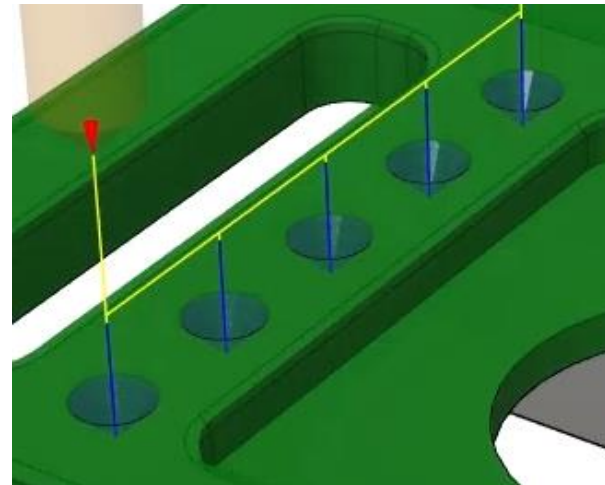


Figure 21. Inspect the toolpath preview

22. Click Drilling> Drill to create the operation that will drill the holes through the part. Click the Drill dialog's Select to choose the operation's tool. Navigate to the Learn CAM 90 – INCH tool library and choose Tool 2. Click the Select Tool dialog's Select.



Figure 22. Create a Drill operation and choose its tool

23. Select the hole faces shown in the image on the right.

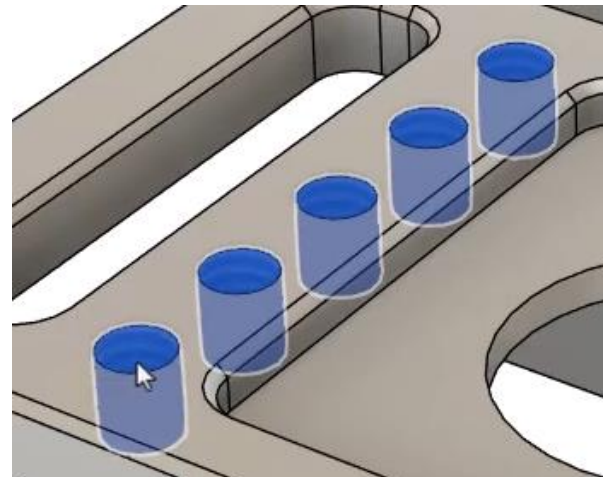


Figure 23. Select the hole faces

24. Navigate to the Heights tab and activate the Bottom Height section's Drill Tip through Bottom option. This option ensures that the tool's Tip passes all the way through the part. Enter **0.05 inches** into the Break-Through Depth box to make sure the tool plunges slightly past the part's bottom face.

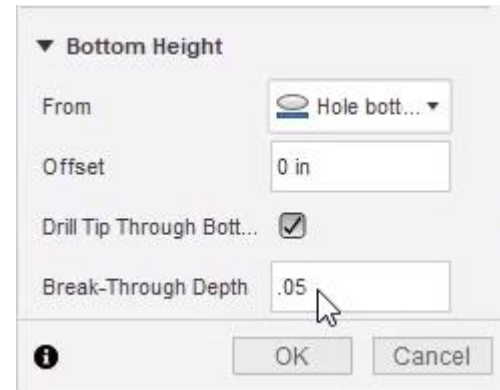


Figure 24. Configure the Bottom Height

25. Continue to the Passes tab and choose the Chip breaking – partial retract option from the Cycle Type menu.

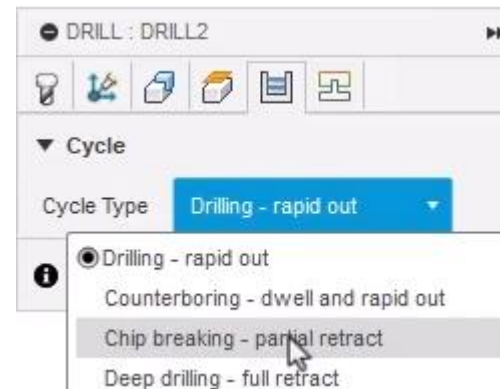


Figure 25. Change the cycle type

26. Navigate to the Geometry tab and activate the Reverse Order option. OK the dialog to generate the toolpath preview.

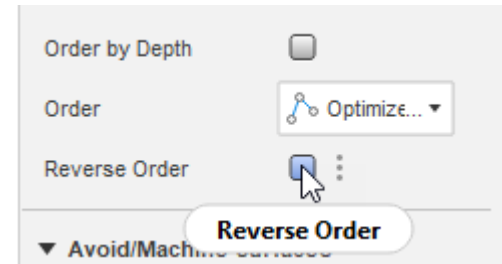


Figure 26. Activate the Reverse Order option

27. Inspect the toolpath preview and notice that the last hole that was spotted in Step 21 is the first hole drilled by the current operation. This slightly increases the setup's efficiency because the machine's table is already in the correct position to drill the hole.

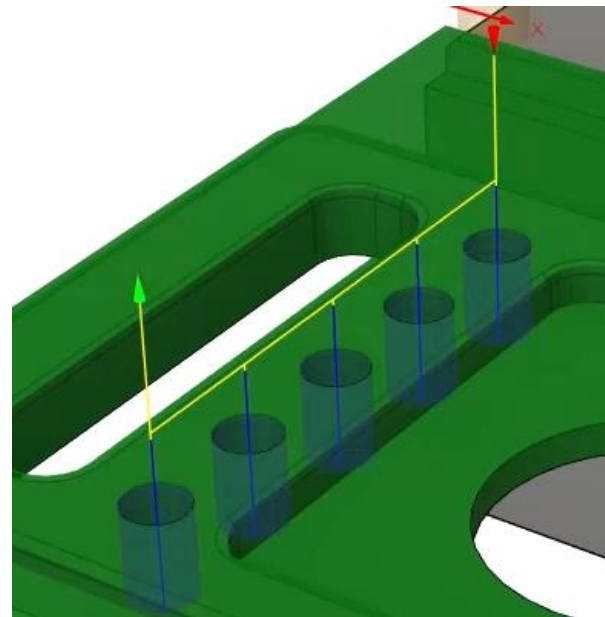


Figure 27. Inspect the toolpath preview

28. Create another new Drill operation by clicking Drilling> Drill. Click the Drill dialog's Select to choose an appropriate tool for the operation. Navigate to the Learn CAM 90 – INCH tool library and choose Tool 3. Click the Select Tool dialog's Select.

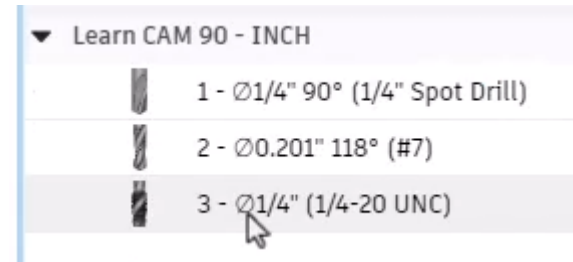


Figure 28. Create a Drill operation to tap the holes

29. Navigate to the Drill dialog's Geometry tab and select the hole faces shown in the image on the right. Make sure the first hole you selected is the last hole drilled by the previous operation.

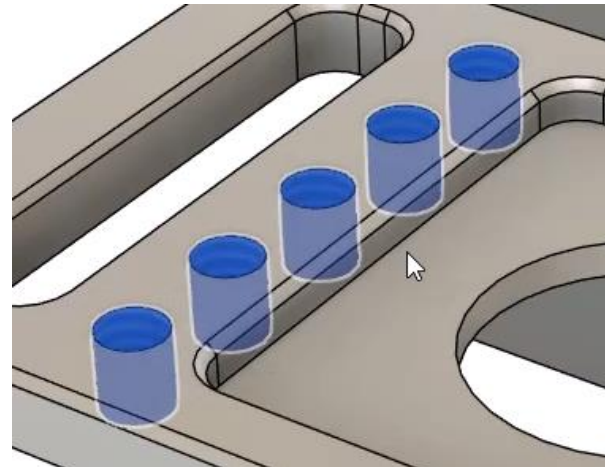


Figure 29. Select the hole faces

30. Choose the Order selected option from the Order menu. This will ensure that the first hole to be tapped is the last hole the previous operation drilled.

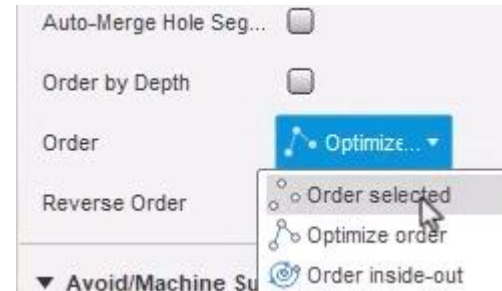


Figure 30. Change the order type

31. Continue to the Heights tab and activate the Bottom Height section's Drill Tip through Bottom option. Enter **0.1 inches** into the Break-Through Depth box. This will ensure the tap plunges past the part's bottom face.

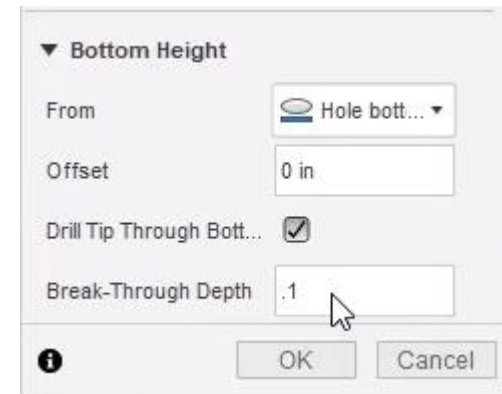


Figure 31. Adjust the height

32. Continue to the Cycle tab and verify that the Tapping option is selected from the Cycle Type menu. OK the dialog to generate the toolpath preview.

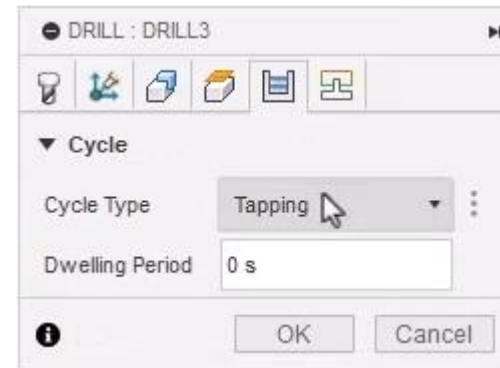


Figure 32. Verify the cycle type

- 33.** Inspect the toolpath preview and notice that the holes are drilled and tapped.

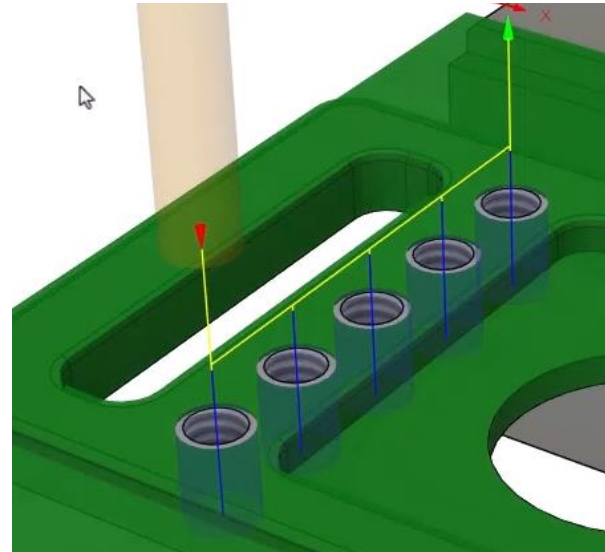


Figure 33. Inspect the toolpath preview

- 34.** The next operation will cut the part's perimeter while leaving tabs to temporarily connect it to the stock. Click 2D > 2D Contour.

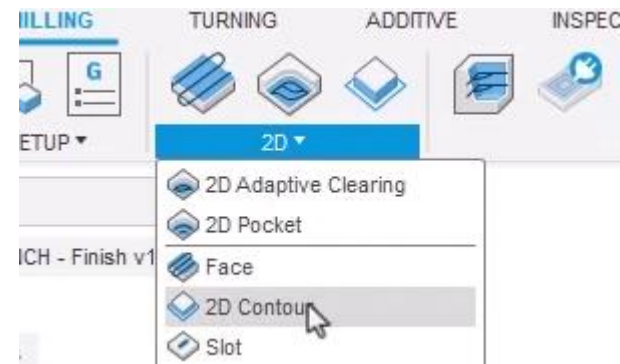


Figure 34. Create a new 2D Contour operation

35. Click the 2D Contour dialog's Select to choose an appropriate tool for the operation. Choose Tool 6, then click the Select Tool dialog's Select.



Figure 35. Choose the operation's tool

36. Navigate to the Geometry tab and select the edge shown in the image on the right as the Contour Selection.

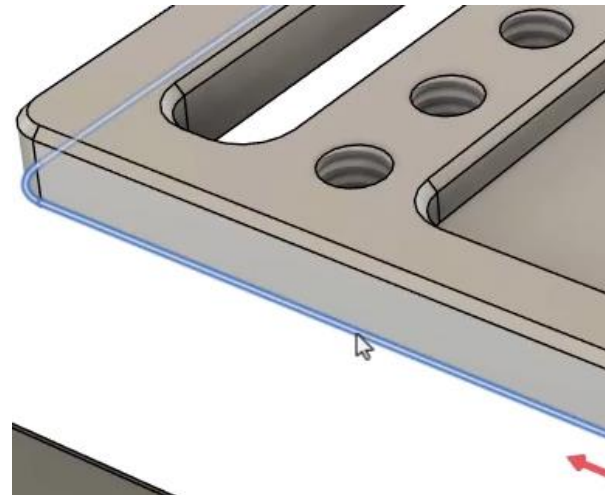


Figure 36. Select the edge

37. Activate the dialog's Tabs option.

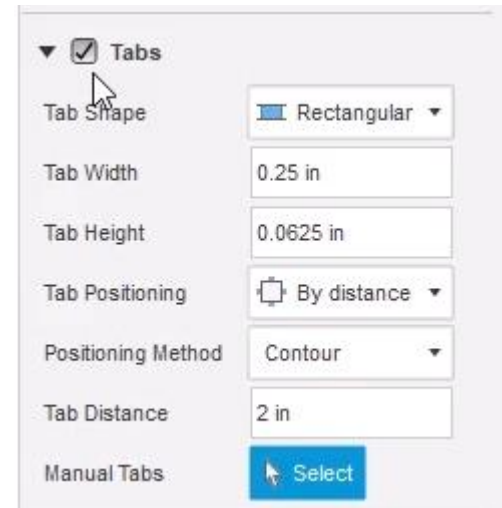


Figure 37. Activate the Tabs option

38. Use the View Cube to navigate to the Top view and notice the locations that Fusion chooses to place the six tabs.

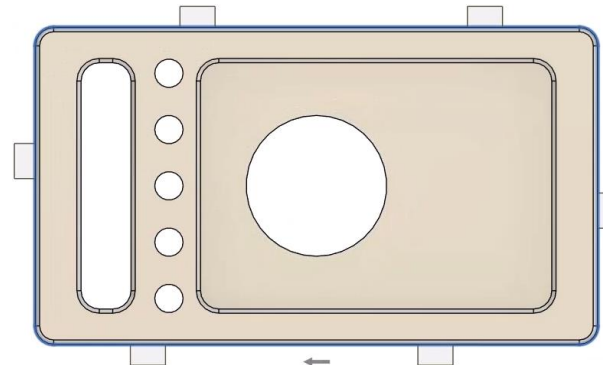


Figure 38. Note the tab locations

39. Enter **5 inches** into the Tab Distance box, then click Select to manually add additional tabs.



Figure 39. Modify the number of tabs

40. Click the model's perimeter to place two more tabs.

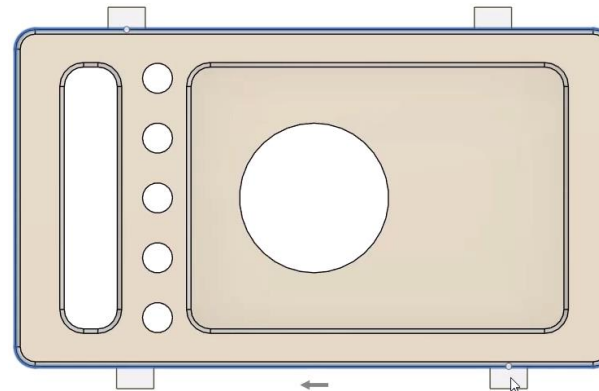


Figure 40. Place two additional tabs

41. You can control the tabs' width and height. Enter **0.5 inches** into the Tab Width box, then enter **0.1 inches** into the Tab Height box.

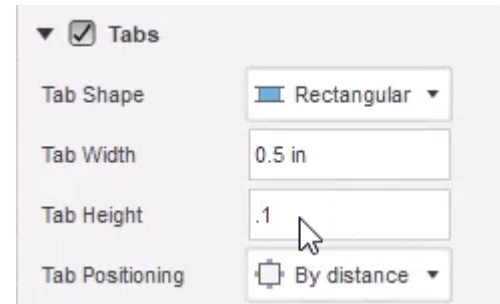


Figure 41. Adjust the tabs' geometry

42. Continue to the Passes tab and activate the Roughing Passes option. Enter **0.1 inches** into the Maximum Stepover box, then OK dialog.



Figure 42. Customize the Roughing Passes option

- 43.** Inspect the toolpath preview and notice that the part's perimeter is cut but tabs stay temporarily connected to the stock.

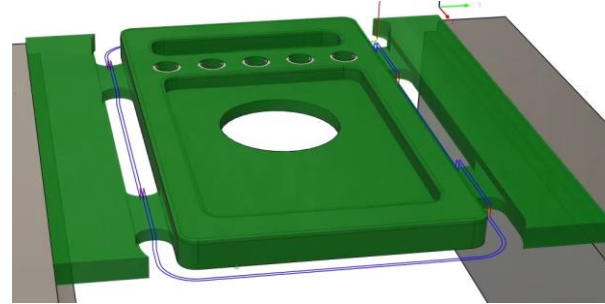


Figure 43. Inspect the toolpath preview