

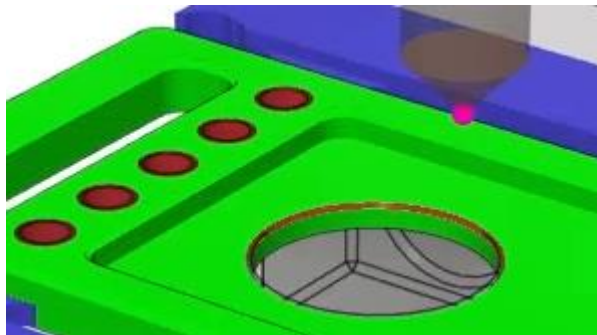
Step-by-step guide

Use simulation to validate stock removal

Validate an entire setup or individual operations using Fusion's simulation tool.

Learning objectives:

- Simulate toolpaths.
- Modify toolpath parameters.



The completed exercise

1. Continue with one of your fully programmed parts or open the supplied *Cell Phone INCH – Simulate.f3z* file. The f3z archive file contains the vise, the original assembly, and all the links.

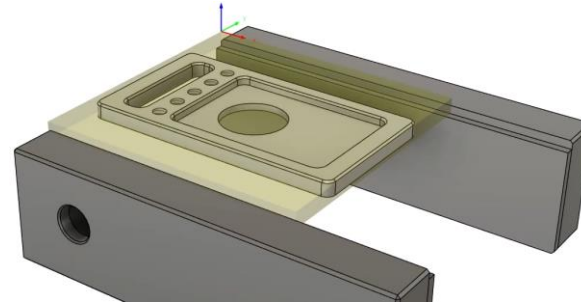


Figure 1. Open the file

2. Fusion can verify that operations correctly cut the modeled geometry by simulating either entire setups or individual operations. Select Setup1.



Figure 2. Select Setup1

3. Open the simulation by clicking Actions> Simulate.

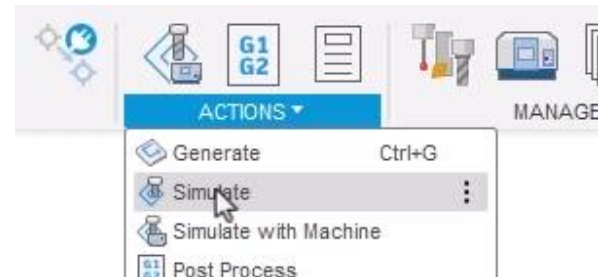


Figure 3. Simulate the setup

4. The stock body is displayed in blue, and the tool, holder, and fixtures have reduced opacity.

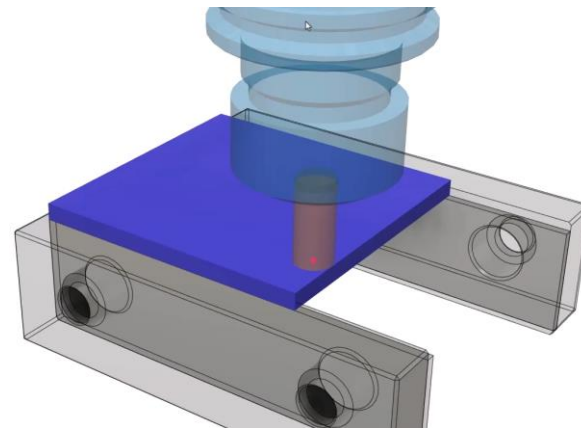


Figure 4. Inspect the visible bodies

5. The Simulate dialog's options can be used to customize the simulation. Make sure the Comparison option is selected from the Colorization menu so that you can easily tell if each operation removes the proper amount of material.

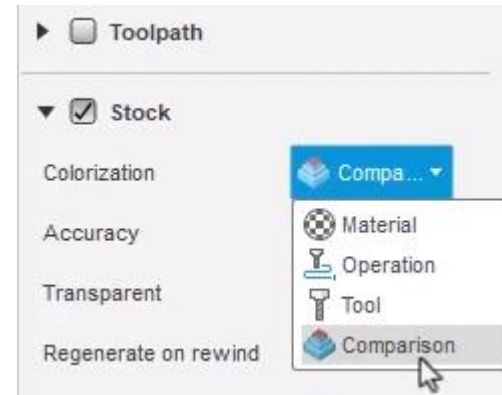


Figure 5. Change the colorization type

6. Click in an open area of the canvas and drag your cursor to the right. Notice the simulation plays as you drag the cursor.

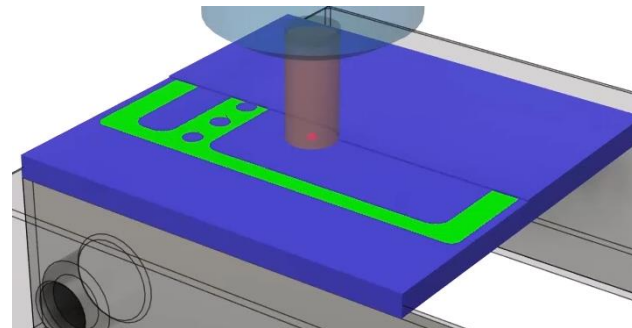


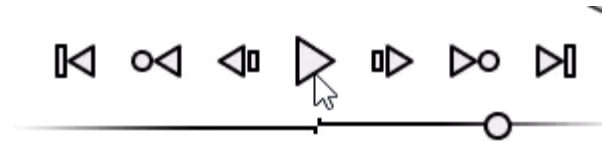
Figure 6. Click and drag your cursor

7. You can also click the timeline at the bottom of the screen to jump to specific points. This timeline is broken into segments representing each of the setup's operations.



Figure 7. Click the timeline

8. A third way to play the animation is to press Play near the Bottom of the Screen. The slider below the Play button allows you to adjust the animation's forward or reverse speed.



8. Press Play

9. Because you selected the Comparison option in Step 5, Fusion applies a color to each face. Blue faces indicate areas that need more material removed. Green faces indicate that the proper amount of material has been removed, and red faces indicate that too much material has been removed. This model did not have a chamfer feature on the large center hole and the tapped holes' threads were not modeled. Fusion assumes too much material has been removed in these areas because the machined part does not match the modeled geometry. In this instance, these red faces can be ignored.

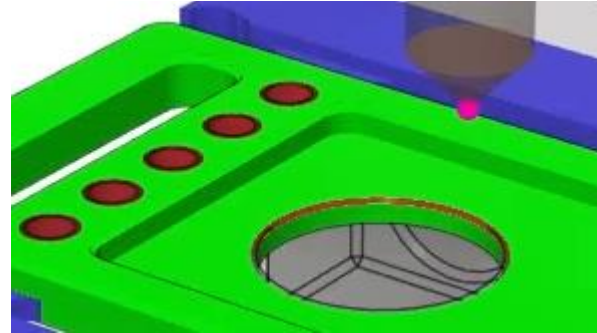


Figure 9. Inspect the result

10. After you finish exploring the simulation, click Exit Simulation > Exit Simulation. Alternately, you could click the Simulate dialog's Exit Simulation.

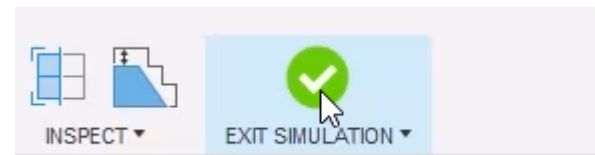


Figure 10. Exit the simulation

11. After verifying the simulation, you could edit one of your operations. For instance, Setup1's final operation is the 2D Chamfer that cuts the large hole's chamfer. You could edit this operation and reduce the Chamfer Width value to **0.4 inches**.

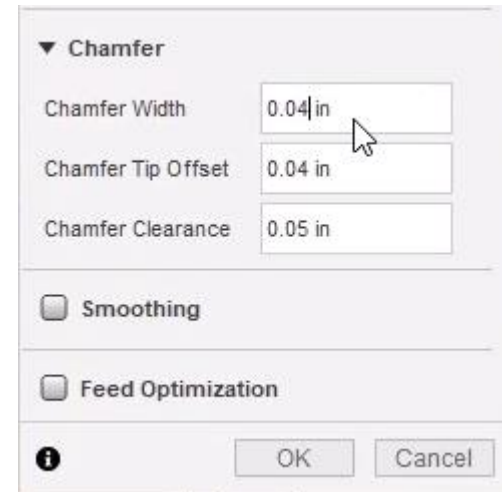


Figure 11. Edit an operation

12. After you OK the dialog, select the operation.

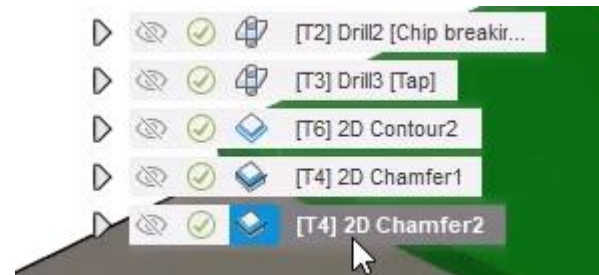


Figure 12. Select the operation

13. You can simulate the individual operation by clicking Actions> Simulate.

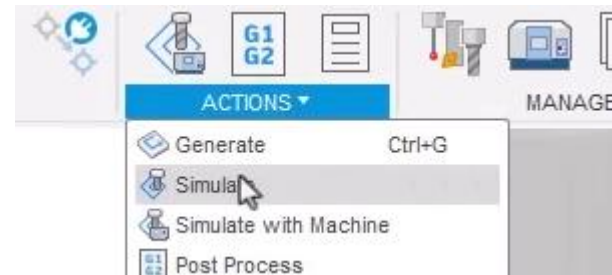


Figure 13. Simulate the selected operation

14. Play the simulation and note your modification's effects. In this instance, the chamfered edge is substantially bigger. Exit the simulation after you finish analyzing the part, then save the file.

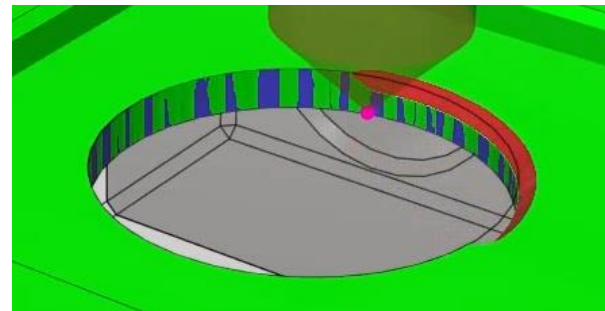


Figure 14. Analyze the simulation

15. The Simulate dialog's Info tab has information about the tool's current position, the current operation, and more.

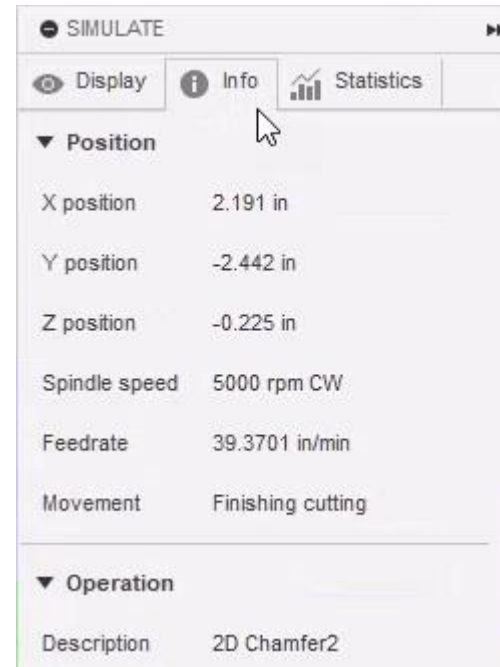


Figure 15. Inspect the operation's information

16. The dialog's Statistics tab gives you information about the setup or operation's estimated machining time and distance. Click Exit Simulation after you finish exploring the operation's parameters.

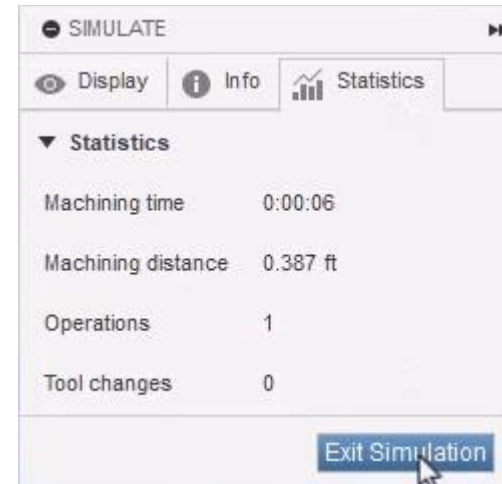


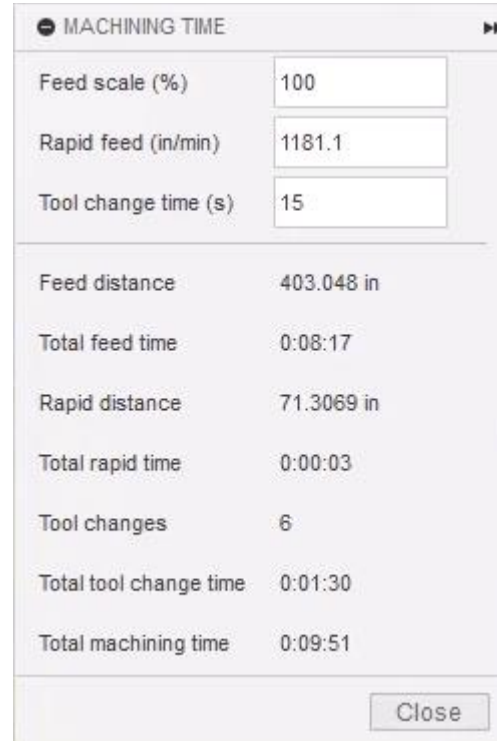
Figure 16. Inspect the operation's statistics

17. Some of the information you noted in Steps 15 and 16 can be found in a different place. Right-click Setup1 and choose Machining Time from the menu.



Figure 17. View a setup's Machining Time dialog

18. Inspect the Machining Time dialog's information and note the similarities to the information you saw inside the Simulate dialog.



The Machining Time dialog box displays the following information:

MACHINING TIME	
Feed scale (%)	100
Rapid feed (in/min)	1181.1
Tool change time (s)	15
<hr/>	
Feed distance	403.048 in
Total feed time	0:08:17
Rapid distance	71.3069 in
Total rapid time	0:00:03
Tool changes	6
Total tool change time	0:01:30
Total machining time	0:09:51
<div>Close</div>	

Figure 18. View a setup's Machining Time dialog