

Using the HS Pocketing Operation

This Tutorial is designed to demonstrate the use of the HS Pocketing operation powered by VoluMill™. For detailed explanations of the fields in the HS Pocketing dialog, please see The HS Pocketing Dialog.

1. For this tutorial we will use the following example file which is located in the C:\Program Files\BobCAD-CAM\BobCAD-CAM V23\Examples folder named HSPocket_Example.bbcd. Once you have located this file, open it inside of the **BobCAD-CAM V23** software (figure 1.1).

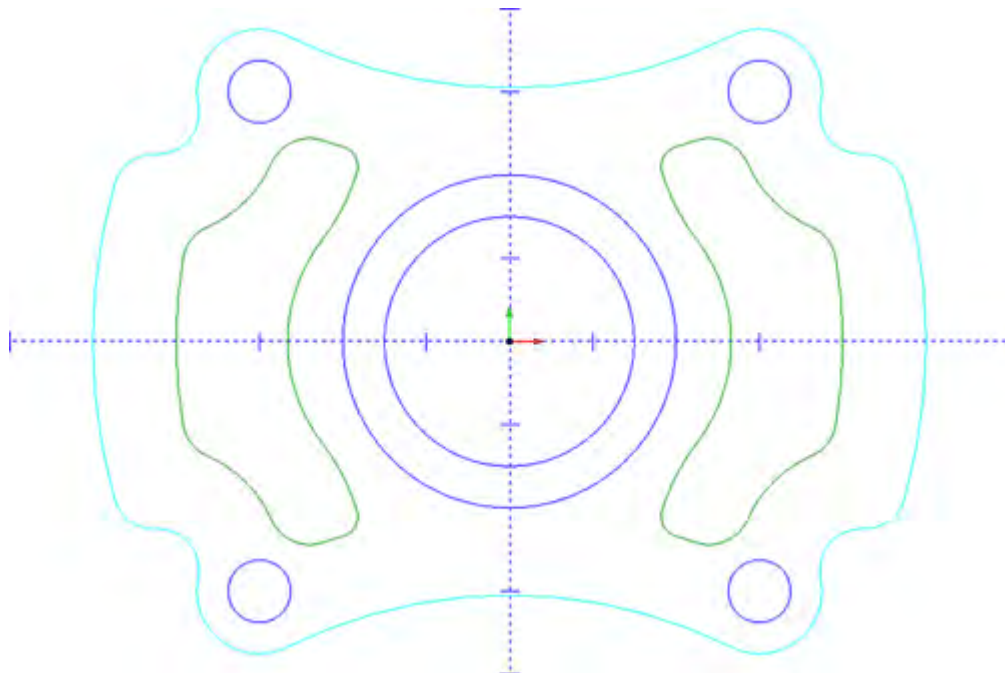


figure 1. 1

2. Once the file is opened, click on the **CAM** tab in the **Data-CAM tree manager** to access the milling operations.

- Next right click on **Milling Stock** and select **Mill 2 Axis** then click on **HS Pocketing** (figure 3.1). Notice that a **HS Pocket** operation has been added to the **CAM tree** (figure 3.2).

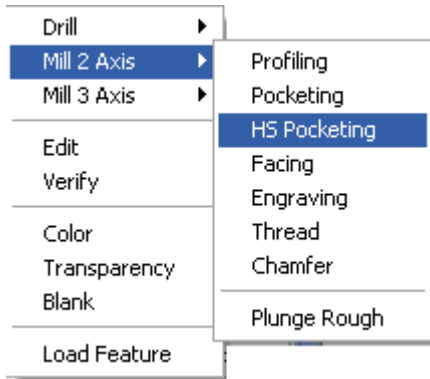


figure 3.1

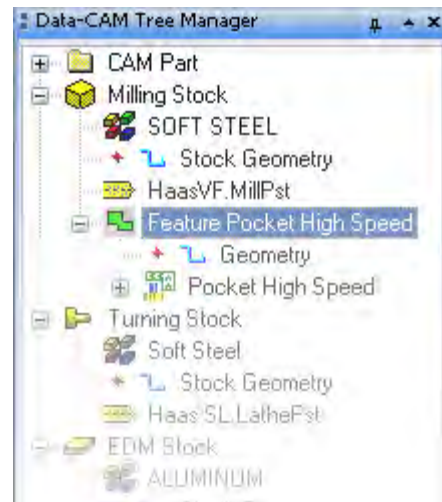


figure 3.2

- Right click on **Geometry** underneath where it says **Feature Pocket High Speed** and click **Re/Select** (figure 4.1). This will activate selection mode and allow you to associate the pocket geometry to the **HS Pocket** feature.



figure 4.1

5. Now holding down the Shift key on your keyboard click on the two green pockets inside of the part. Each of these loops should highlight showing that they have been selected (figure 5.1). Once these are selected, right click anywhere in the workspace and click **OK**. The geometry has now been associated with this feature.

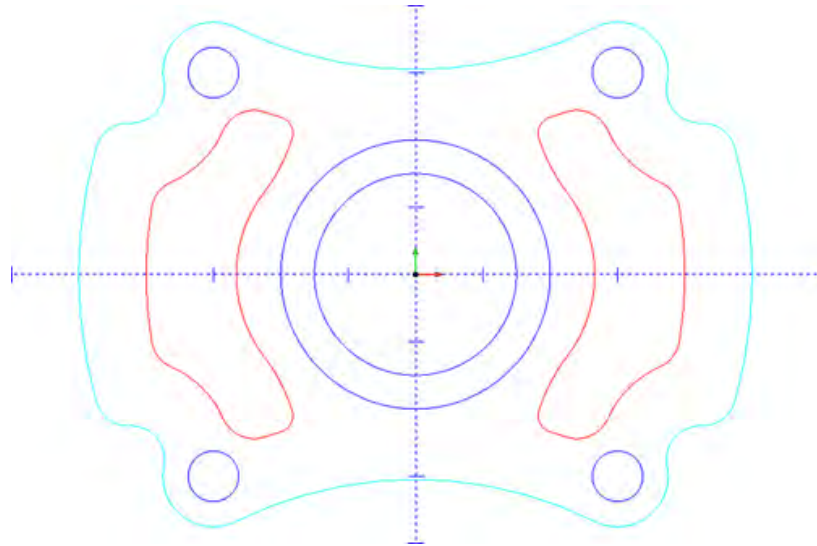


figure 5.1

6. Before we begin explaining the settings, right click on **Pocket High Speed** and click **Compute** tool path just using the default settings. The tool path will be displayed in the workspace (figure 6.1).

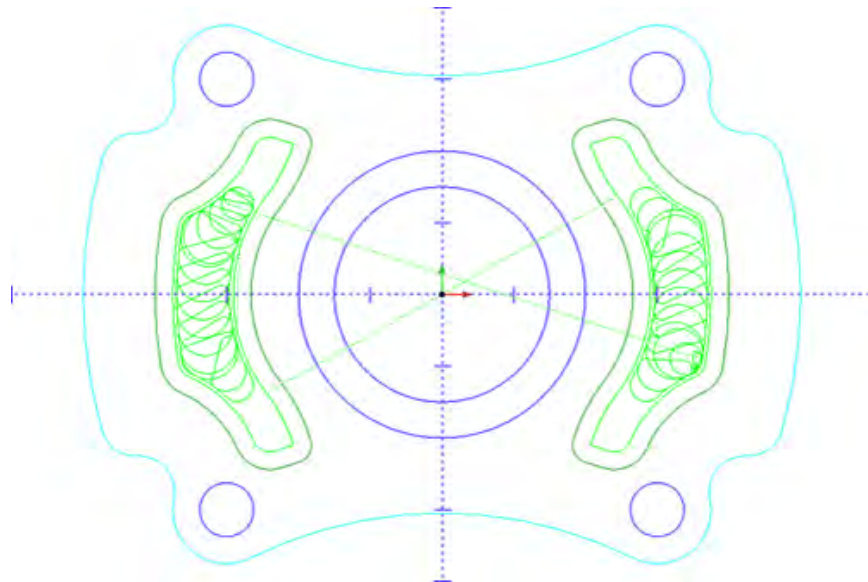


figure 6.1

- Next click the plus sign next to **Pocket High Speed** to reveal the tools that are being applied. By default a **Rough** and a **Finish** tool will be displayed (figure 7.1).

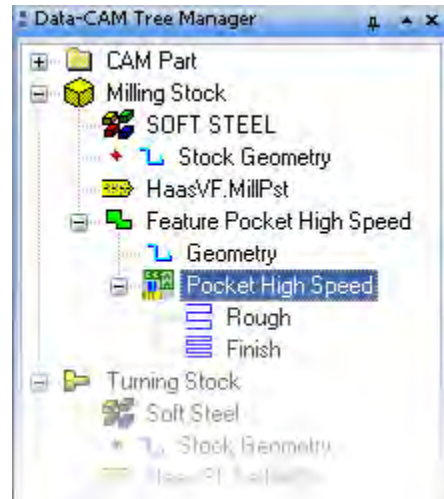


figure 7.1

- Click on **Rough** to highlight the roughing tool path in the CAD window (figure 8.1). Initially you may look at this tool path and realize that it is not roughing out the entire pocket. This is the nature of the tool path and the current .5 tool size will only go this far into the pocket.

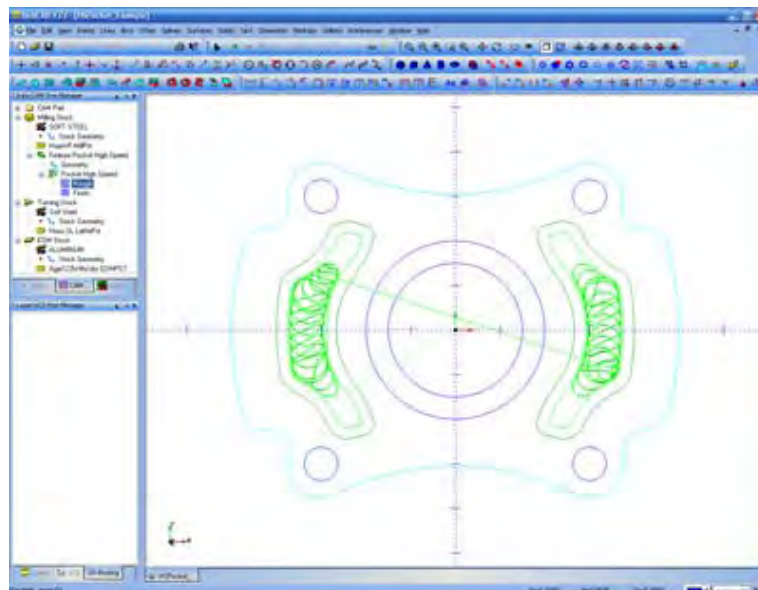


figure 8.1

9. Now right click on **Pocket High Speed** in the CAM tree and click **Edit** so we can change some of the cutting parameters. After you click **Edit** the **HS Pocket** dialog will appear.
10. The first page displayed in the **HS Pocket** dialog is the **Approach and Entry** page. On this page fields are available to edit the **Rapid Plane**, **Top of Part**, and **Floor Clearance** parameters. The **Floor Clearance** field is special to this tool path and is utilized for the high speed repositioning of the tool when it is no longer engaged in the material. The tool will move above the floor of part the value specified and move, at the maximum feed rate entered on the tool page, to the next cut. We suggest using floor clearance values from 0.01 to 0.05. Setting this value to 0.00 will cause the tool to drag across all ready cut areas, so it is not suggested that this value be used.
11. Next click on **Patterns** in the left hand column to bring up the pattern options for this feature. As we talked about after the initial calculation of the toolpath, the **Rough** toolpath did not clear all of the material out of the pocket. If you wish to use only one roughing tool to clear the pocket and you are sure that the tool will fit, click on the **Cleanup Corners** button on this page in the dialog. The **Cleanup Corners** option allows the tool path to enter into corners that are equal to or greater than the tool radius. For this example, click the **Cleanup Corners** option and click OK to close the dialog.
12. Recompute the tool path by right clicking **Pocket High Speed** and clicking **Compute**. After the calculation has finished, click on **Rough** again to highlight the roughing tool path. Notice that now the toolpath enters the corners and machines the entire pocket (figure 12.1).

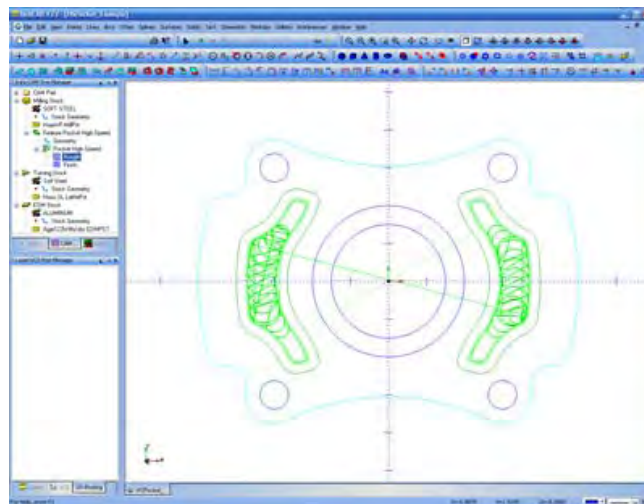


figure 12.1

13. Right click **Pocket High Speed** again and click **Edit** to reopen the **HS Pocket** dialog.
14. On the **Patterns** page, click on the **Cleanup Corners** button to de-select the option.
15. Click on **Options** in the left hand column, and the **Cleanup Tool** options are shown. The options on this page give the ability to utilize a smaller or secondary tool to go into areas that were not machined by the larger roughing tool. The tool path knows where the larger tool has cut and will create an efficient tool path to remove left over material.
16. On the **Options** page, click **Perform Cleanup**. On the left hand side, notice that another tool, labeled **Cleanup**, has been added to the operation. Also notice that on the **Options** page all of the same options that were available for the initial roughing tool are exposed for you to input information.
17. Click **OK** on the dialog and the system will automatically compute the new tool path due to the **Cleanup** tool being added to the operation.
18. Now right click on **Cleanup** in the CAM tree right below **Rough** and select **Color**. Pick a different color, so that the **Cleanup** tool path color is different than the other tool paths and click **OK** to apply the chosen color (figure 18.1).

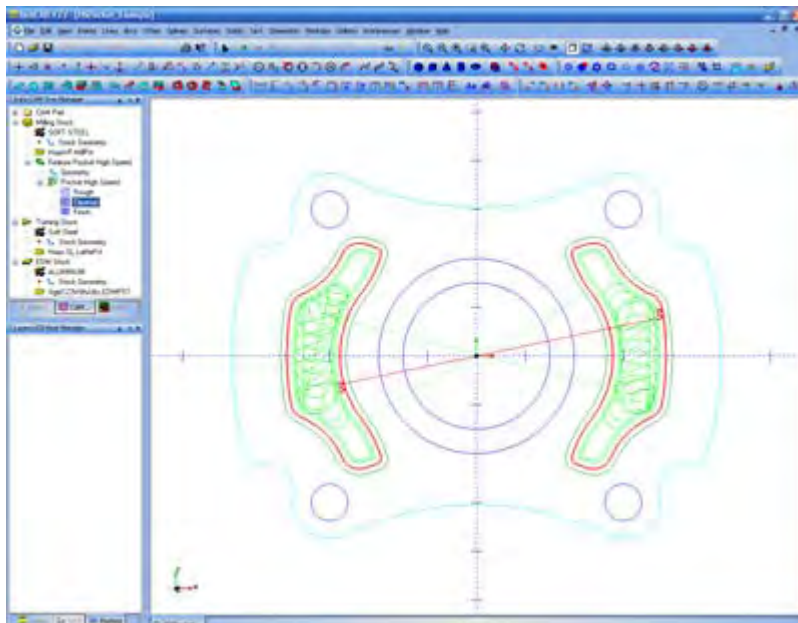


figure 18.1

19. Right click **Pocket High Speed** in the **CAM tree** again and click **Edit**. The **HS Pocket** dialog will open.
20. Click on **Rough** underneath **Tool** on the left hand side. Here the **Tool Diameter** and **Corner Radius** values can be entered (figure 20.1). On the right click **Manual** under **Feeds and Speeds** so we can manually input the values that will be applied to the toolpath. Notice that there are 3 feed rate fields. The **Cutting Feed** field is where to enter the maximum feed rate to be used while tool is engaged in the material. The **Ramp Feedrate** field will be the feed rate utilized for the helical entries into the material. The **Maximum Feedrate** field is the feed rate used for the high speed repositioning of the tool from one cut to the next. It is suggested that the highest cutting feed rate of the machine be entered into this field.

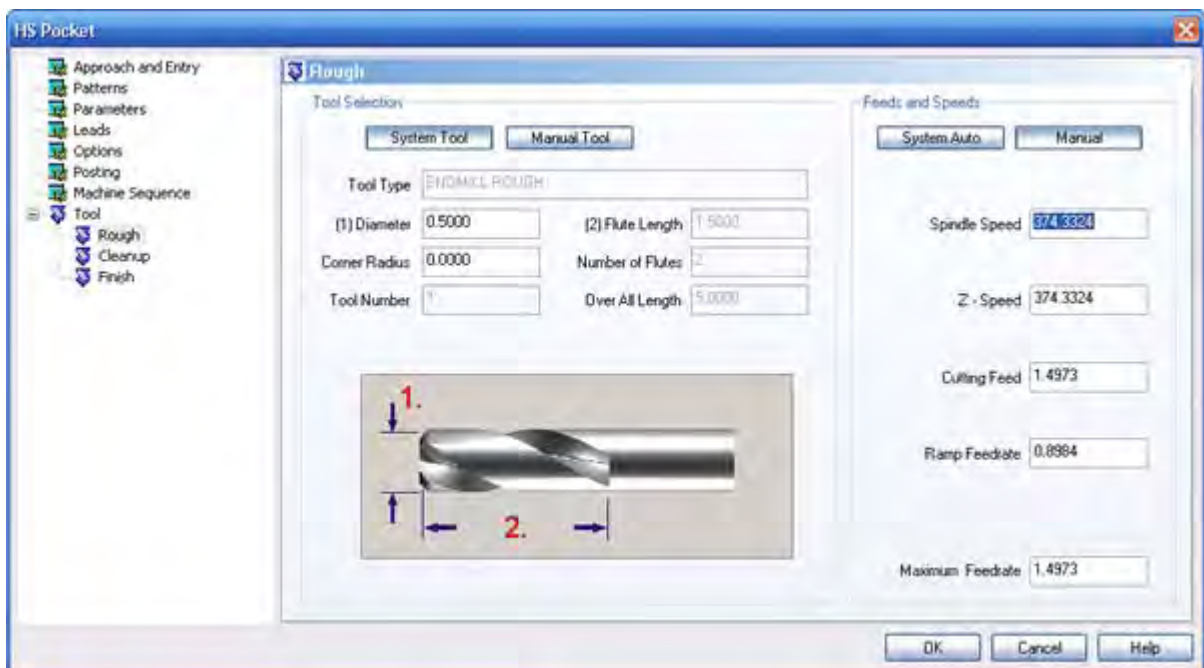


figure 20.1

21. In order to show the adaptiveness of this tool path, change the diameter of the rough tool to 0.75. Then click on the **Options** page and turn off the **Cleanup** tool option by de-selecting the **Perform Cleanup** button. On the **Patterns** page, select **Cleanup Corners** again. So now we will be using a single roughing tool, which we have allowed to enter sharp corners, and a finish tool.

22. Click **OK** in the dialog and recompute the tool path. Notice now how the pocket is being generated as a helical profile (figure 22.1). Because the size of the tool will cut the pocket leaving no stand-ups a helical profile is generated. This is important to know, because pockets may be encountered where you know that the tool will fit, but the system gives a "**Tool may be too large**" error. The solution to this is making sure the **Cleanup Corners** option is selected inside the feature.

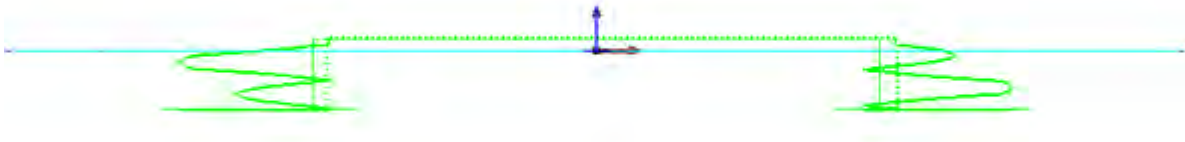


figure 22.1

*Another important feature of this tool path, is the ability to machine "**open pockets**". The system will now allow users to define sides of a pocket to be "open", meaning the pocketing tool path will extend outside of the boundary to minimize plunging into the material and allowing the tool to enter in from outside of the part. Any edge or edges can be changed to a dashed (non-solid) line-style to tell the system that these edges may be passed over.*

23. For our example part, click on the **Other** menu and select **Rectangle**. Enter 11 for the **Width** and 8 for the **Height**. Make sure **Sharp Corner** is selected, and under **Origin** select **Enter** and **Center**. We will place the center of this rectangle at X0, Y0, Z0. Click **OK** and the part should now look like figure 23.1.

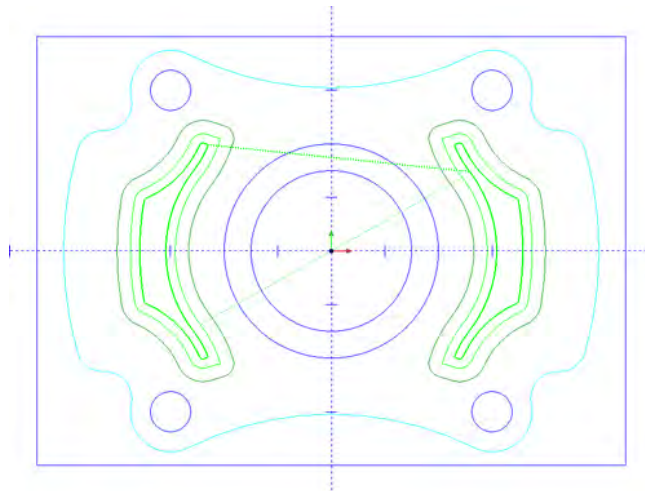


figure 23.1

24. For this example, we are going to make the entire rectangle dashed lines, to signify that this is the stock we are starting with. So next, click **Cancel** if you have not all ready done so on the rectangle function. Right click in the workspace and click **Select** to activate selection mode. While holding the Shift key on your keyboard, click on one of the edges of the rectangle and the entire rectangle should highlight. After the rectangle is selected, right click any where in the workspace and hover over **Modify Attributes** and click **Line Style**. The line style dialog will display. Click on any of the dashed lines (any but the first option) and click **OK**. Now the rectangle should change in appearance to all dashed lines (figure 24.1).

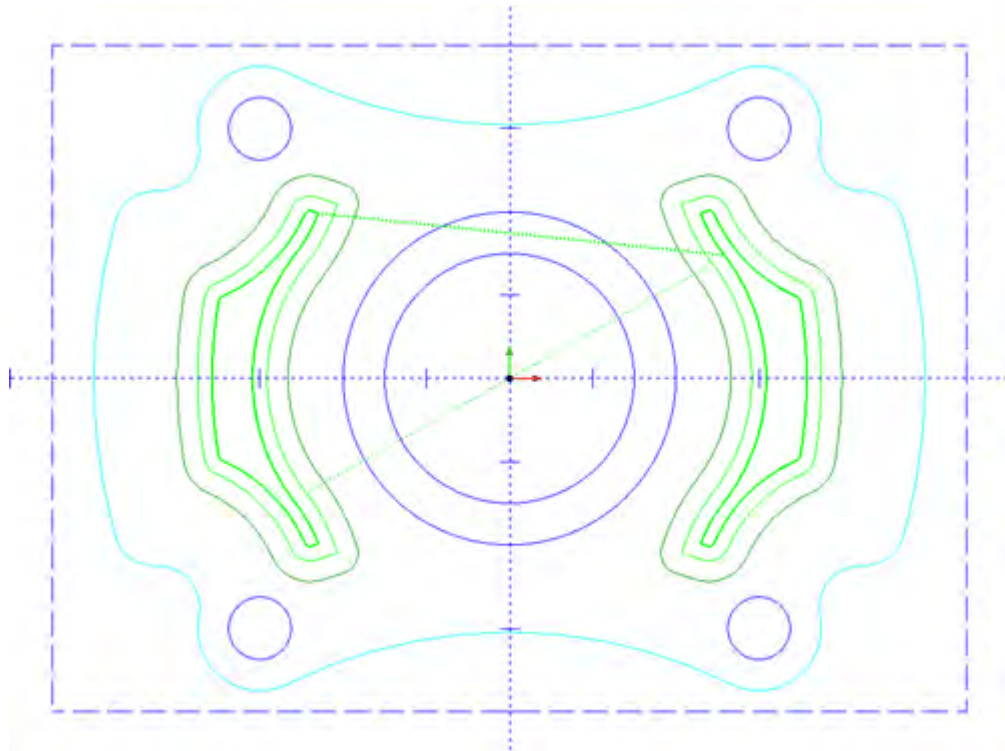


figure 24.1

26. Create a new **HS Pocket** operation by right clicking **Milling Stock** and selecting **Mill 2 Axis** then click on **HS Pocketing**. Right click **Geometry** on the new feature that was created and choose **Re/Select**. While holding the Shift key on the keyboard click on a side of the outside rectangle and the outside profile of the part (figure 26.1). Once these two loops are fully highlighted right click in the work space and click **OK**.

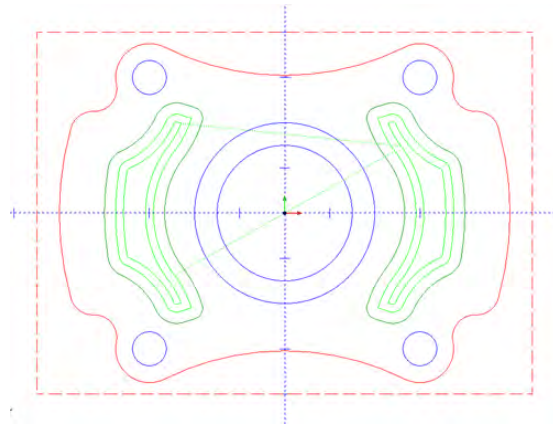


figure 26.1

27. Compute the tool path just using the default settings by right clicking **Pocket High Speed** on the second feature and clicking compute. Notice now how the tool path starts outside of the boundary allowing the tool to enter from off the material (figure 27.1).

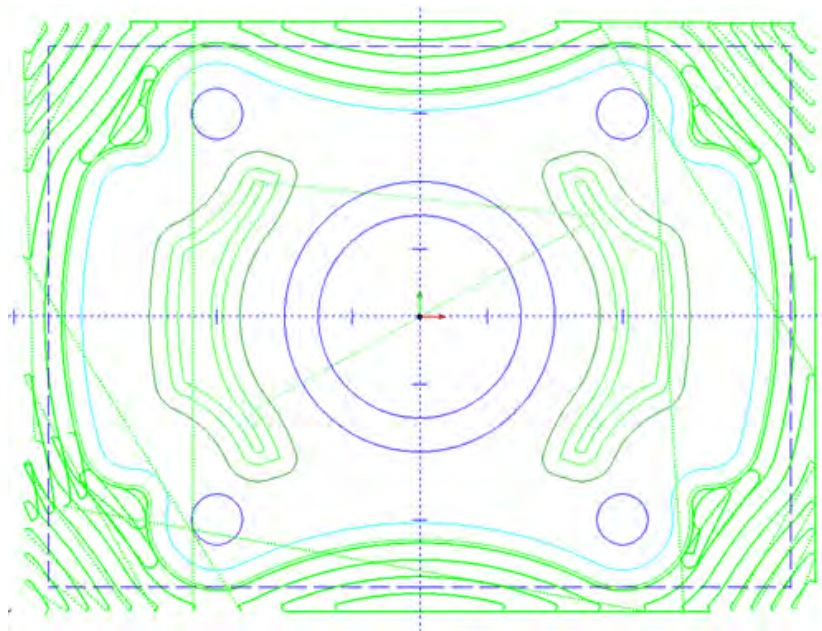


figure 27.1