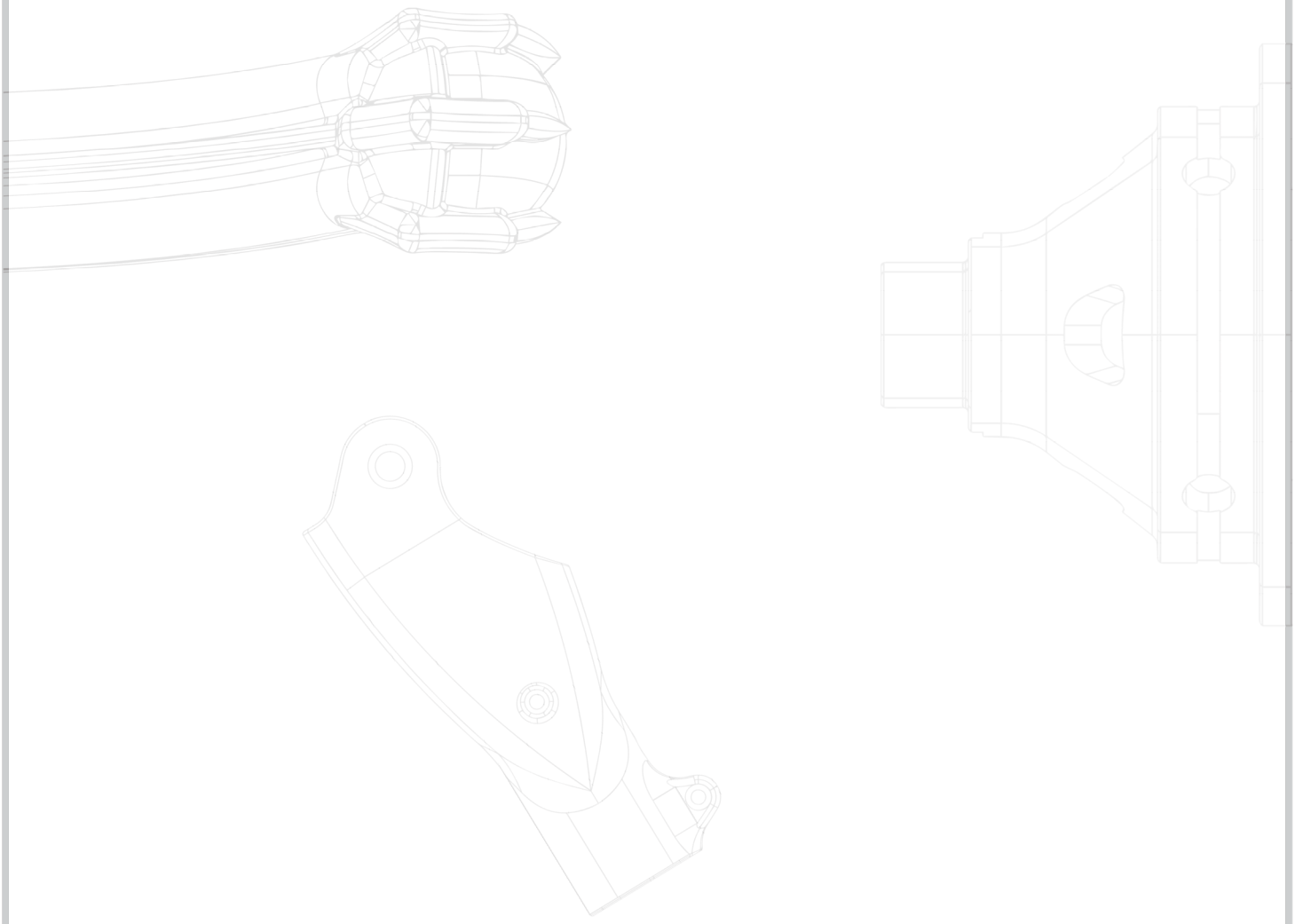
MASTERCAM TOOL DESIGNER TUTORIAL

August 2018



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Mastercam

MASTERCAM TOOL DESIGNER TUTORIAL

August 2018
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Software: Mastercam 2019

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Be sure you have the latest information!

Information might have changed or been added since this document was published. The latest version of the document is installed with Mastercam or can be obtained from your local Reseller. A ReadMe file (ReadMe.PDF) – installed with each release – includes the latest information about Mastercam features and enhancements.

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INTRODUCTION

Welcome to the *Tool Designer Tutorial*. These lessons explore Tool Designer's interface and teach the basic concepts of the software, including the following topics:

- A broad look at the Tool Designer interface.
- An introduction to Tool Designer's workflow.
- An overview of each page in the Tool Designer function panel.
- The techniques needed to create a valid 3D tool.

Tutorial Goals

- Gain an understanding of basic Tool Designer functions.
- Explore the parameters required to develop a 3D tool.
- Create sample 3D tools from the included STEP files.

WARNING: Screen colors in the tutorial pictures were modified to enhance image quality; they may not match your Mastercam settings or the tutorial results. These color differences do not affect the lesson or your results.

Estimated time to complete this tutorial: 4 hours

General Tutorial Requirements

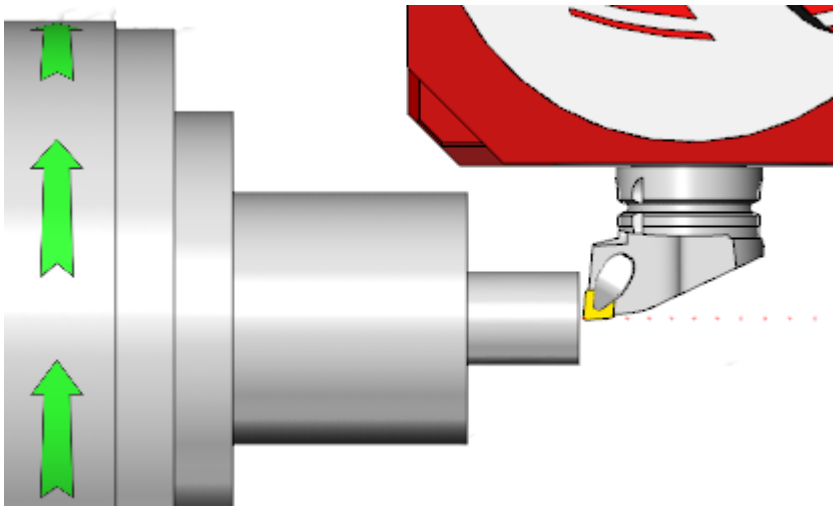
All Mastercam 2019 tutorials have the following general requirements:

- You must be comfortable using the Windows® operating system.
- The tutorials cannot be used with Mastercam Demo/Home Learning Edition. The Demo/HLE file format (`emcam`) is different from Mastercam (`mcam`), and basic Mastercam functions, such as file conversions and posting, are unavailable.
- Each lesson in the tutorial builds on the mastery of the preceding lesson's skills. We recommend that you complete them in order.
- Additional files may accompany a tutorial. Unless the tutorial provides specific instructions on where to place these files, store them in a folder that can be accessed from the Mastercam 2019 workstation, either with the tutorial or in any location that you prefer.
- You will need an internet connection to view videos that are referenced in the tutorials. All videos can be found on our YouTube channel: www.youtube.com/user/MastercamTechDocs
- All Mastercam tutorials require you to configure Mastercam to work in a default Metric or Inch configuration. The tutorial provides instructions for loading the appropriate configuration file.

CHAPTER 1

TOOL DESIGNER OVERVIEW

Mastercam's Tool Designer lets you create 3D tools to use when simulating your toolpaths. 3D tools give you a more accurate simulation result, showing collisions that might not display when using a 2D tool. The following picture shows a 3D tool performing a facing operation in Machine Simulation.



Currently, Tool Designer supports turning tools comprised of a single insert with one or more holder entities, and although you can use 3D tools in both Mastercam and Mastercam for SOLIDWORKS, you can only create or edit them in standalone Mastercam.

Goals

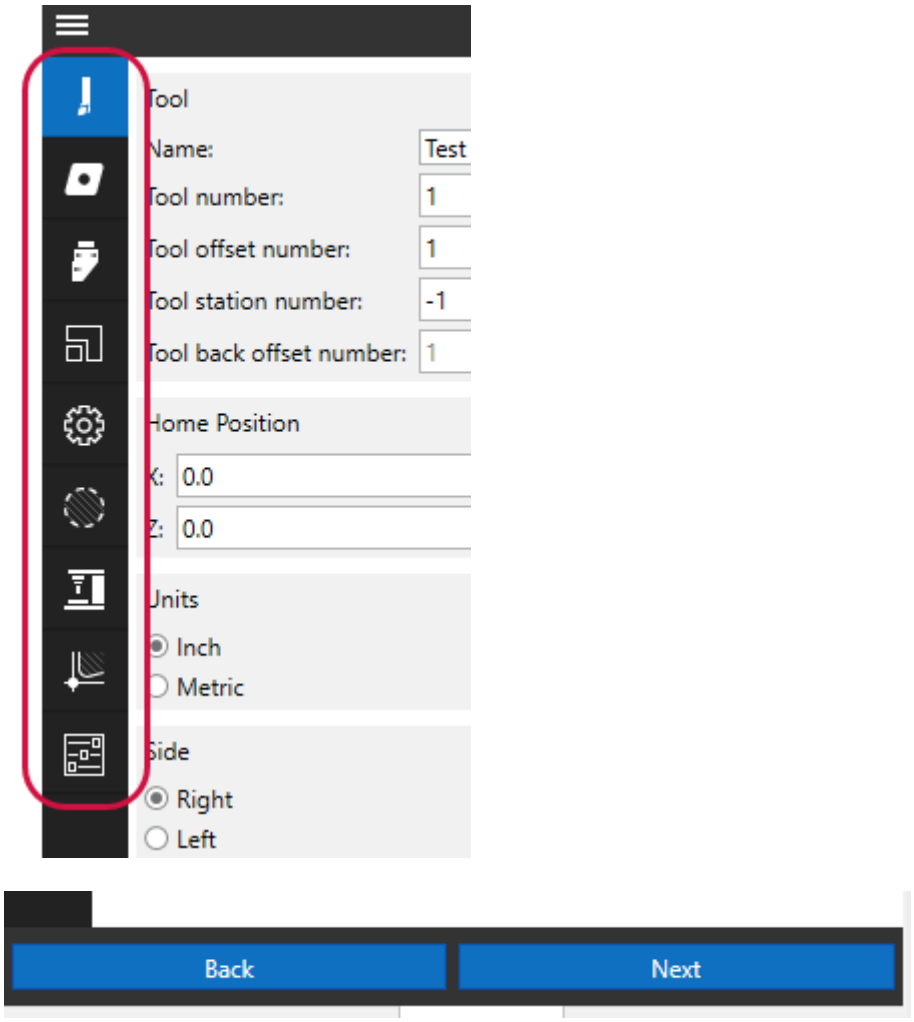
- Start Tool Designer
- Understand the Tool Designer workflow.
- Explore Tool Designer's nine pages of settings.

The Tool Designer Workflow

Tool Designer comprises nine pages of settings that you complete in top-down fashion. That is, you must fill out the pages in order, with subsequent pages being disabled until the required information in previous pages is completed. Most of the values in each page auto-fill with default values. You can edit these fields as needed, but if you leave one blank, it automatically restores to its default value. Required fields, on the other hand, must be filled out by you and are outlined in red until you complete them.

Note: The standalone version of Tool Manager, which you run from the Windows **Start** menu, does not support lathe tooling. You must access Tool Designer through the **Lathe Tool Manager** dialog box, as you discover in the following exercise.

To select a Tool Designer page, click its icon on the left of the Tool Designer panel, as shown in the first picture following. You can also navigate between the pages using the **Back** and **Next** buttons at the bottom of the panel, as shown in the second picture following.

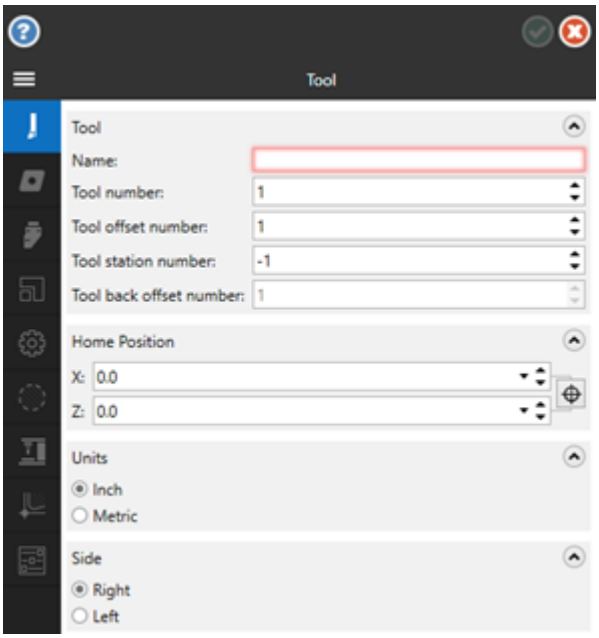


Tool Designer's settings pages

As mentioned previously, Tool Designer comprises nine pages of settings that must be completed in top-down fashion. The following sections describe these pages.

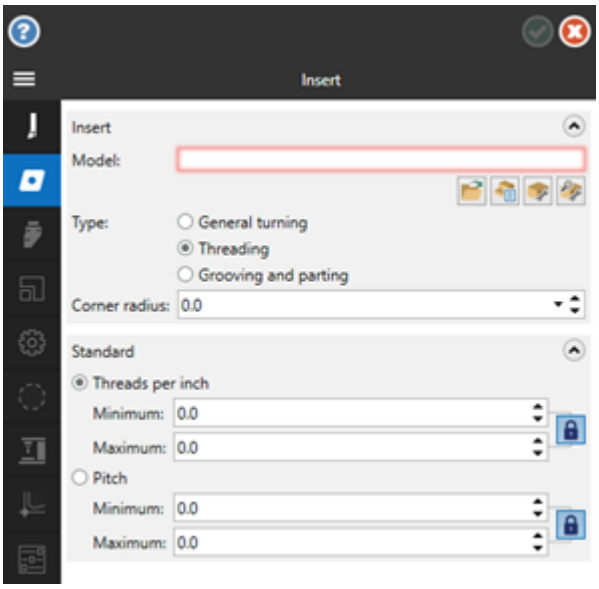
The Tool Page

This is the first page you must complete. Most of the fields have default values that you can leave as is or change as needed. You must, however, fill in the **Name** field before you can move on to the next page. As you can see in the following image, the **Tool** page settings define the tool's general characteristics. When you complete this page, the **Insert** page becomes enabled.



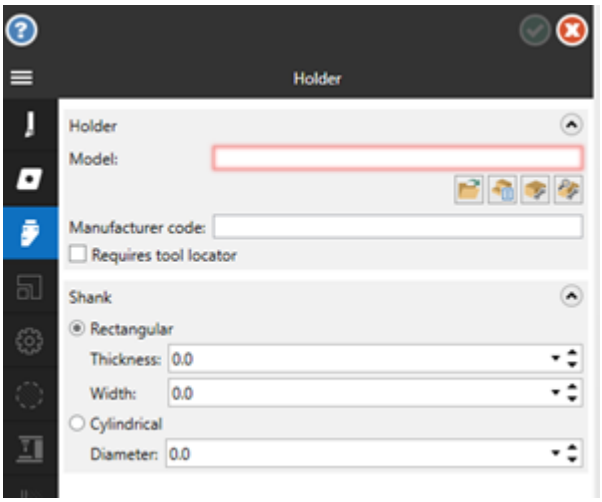
The Insert Page

This page contains general settings for the tool's insert. The one required field—the field without a default value—is **Model**, for which you can select a STEP file or a solid model from the graphics window or Solids Manager. The fields available in the **Insert** page depend on the insert **Type** you select. Once you have specified the insert model, the **Holder** page becomes enabled.



The Holder Page

As on the **Insert** page, the holder's **Model** field must be filled in before you can proceed. Also like the **Insert** page, for the model you can select either a STEP file or solids from Mastercam's graphics window or the Solids Manager. When you complete this page, the **Mating** and **Setup** pages become enabled.

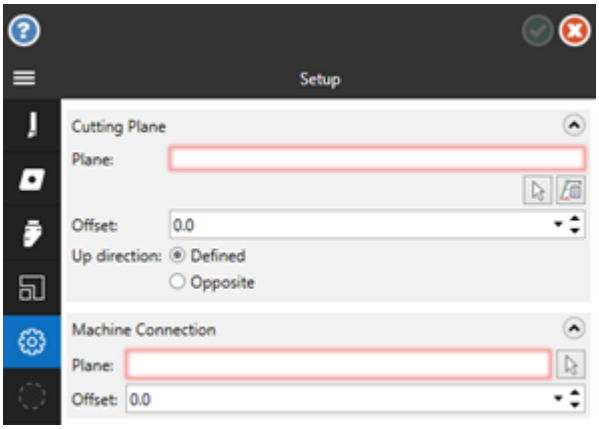


The Mating Page

On the **Mating** page, you specify how the tool's components fit together. Specifically, you must tell Tool Designer how to position the insert into the holder. This page contains no required fields.

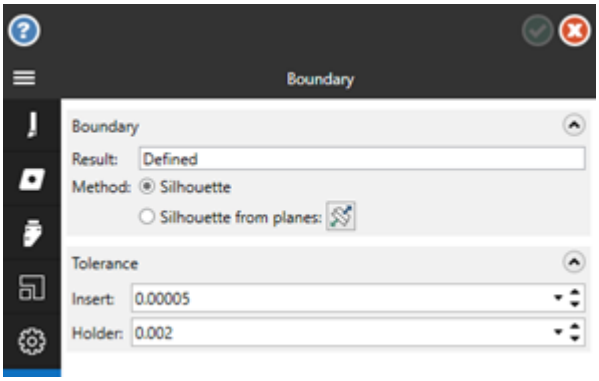
The Setup Page

On the **Setup** page, you specify how the tool is oriented with respect to the machine. You must define the **Cutting Plane** and **Machine Connection** to move on to the next page of settings. For the cutting plane, you can select a flat plane (face) from Mastercam's graphics window or use the **Plane Selection** dialog box. When you have defined the required fields, the **Boundary**, **Machine Orientation**, and **Compensation** pages become enabled.



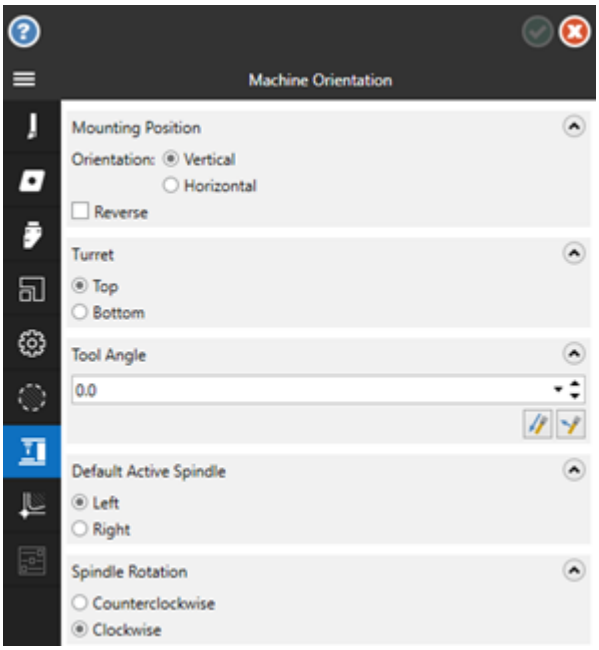
The Boundary Page

Use the **Boundary** page to define a tool boundary that Mastercam can use during toolpath calculation to determine the position of all of the tool's components. All fields on this page have default values.



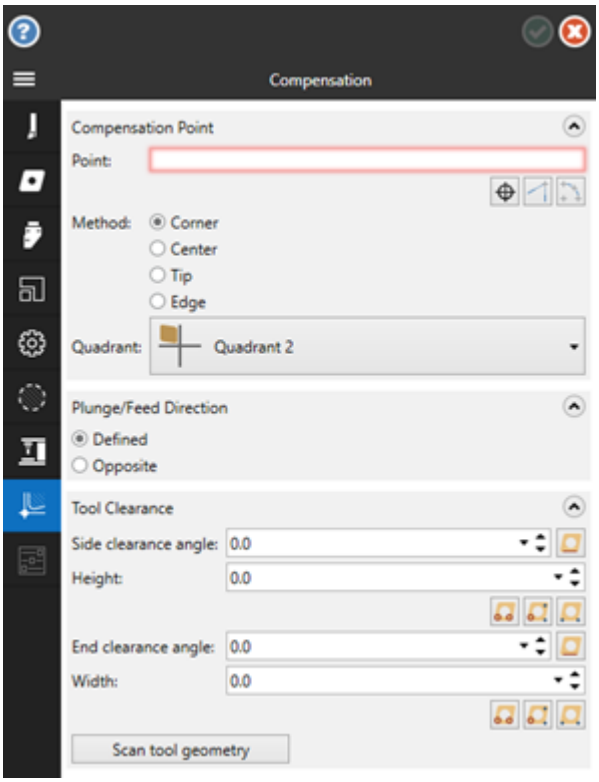
The Machine Orientation Page

This page determines how the tool is positioned on the machine, as well as the direction of spindle rotation. You can define the tool's mounting position, turret, tool angle, and default active spindle.



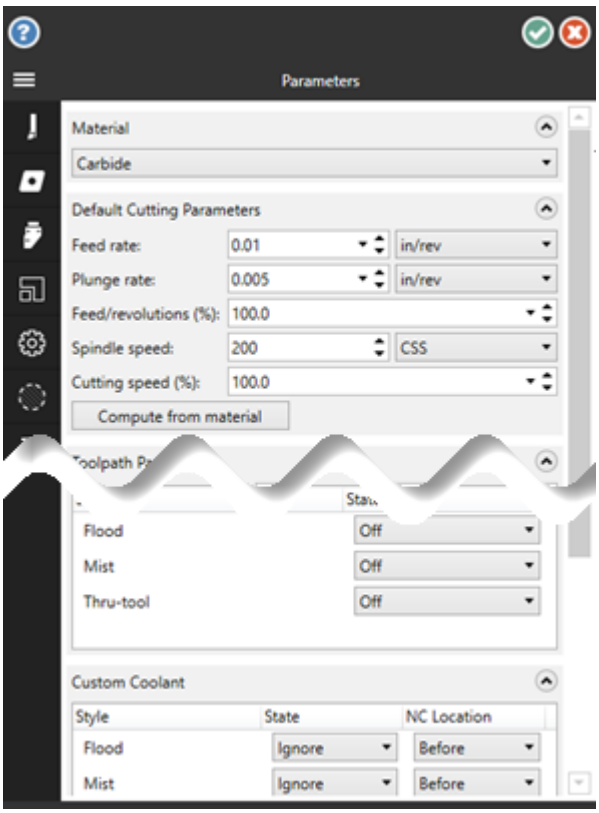
The Compensation Page

On this page, you specify compensation values, such as the compensation point, the compensation method, plunge and feed direction, and tool clearance. You must define the compensation point center to activate the last page, **Parameters**.



The Parameters Page

This page contains basic tool parameters, cutting parameters, toolpath parameters, and coolant settings. The settings here are like those in the **Parameters** tab of the **Define Tool** dialog box you see when designing a 2D tool. The settings on this page change based on the insert type setting on the **Insert** page.



Exercise 1: Opening Tool Designer

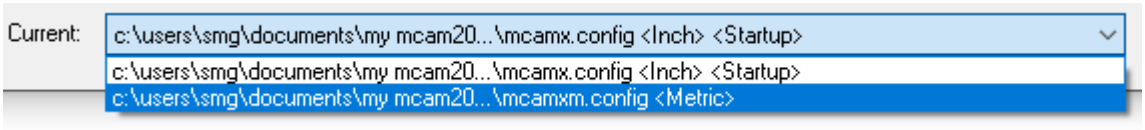
To access Tool Designer, you must first start Mastercam and then load a Lathe machine. Complete the following exercise to see how this is done.

1. Start Mastercam using your preferred method:
   a. Double-click Mastercam's desktop icon.

   OR

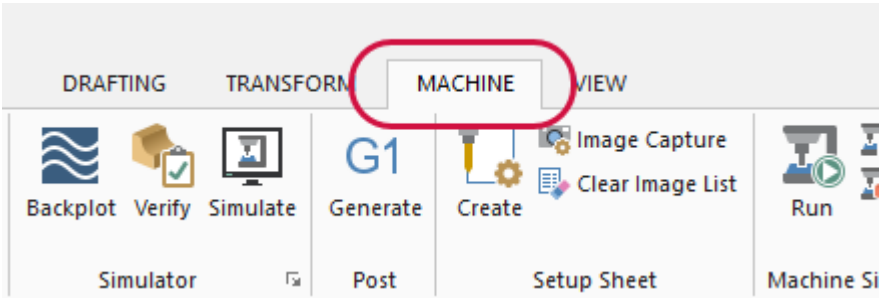
   b. Launch Mastercam from the Windows **Start** menu.
2. Select the default metric configuration file:
   a. Click the **File** tab.
   b. Choose **Configuration** from Mastercam's Backstage View to open the **System Configuration** dialog box.

   c. Choose `...\mcamxm.config <Metric>` from the **Current** drop-down list.

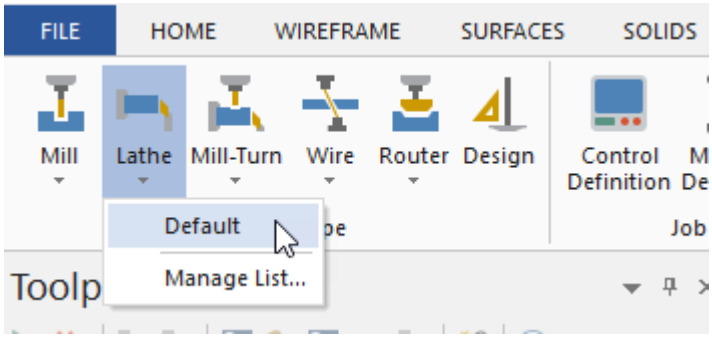
   d. Click **OK**.
3. Click the **Machine** tab.

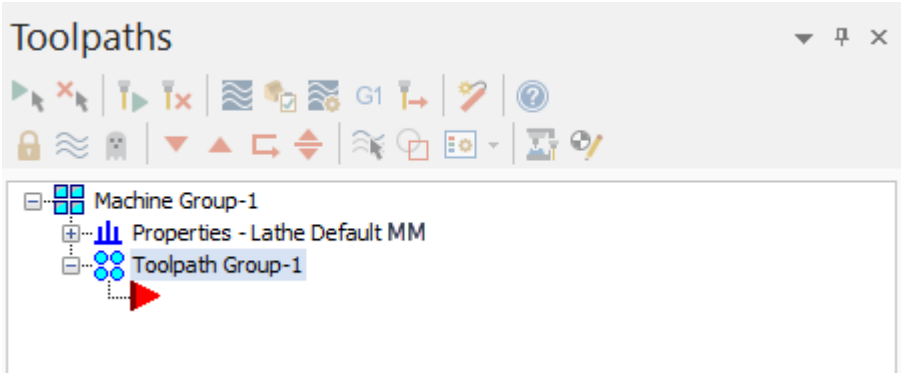
   The **Machine** tab—from which you can load a machine, access machine and control definitions, as well as start Backplot, Verify, and Simulation—displays.

4. Select **Lathe, Default** from the Machine Type group, as shown in the following picture.

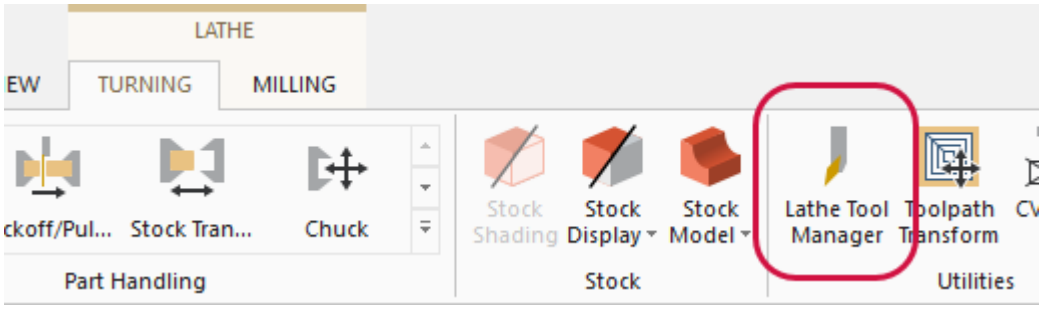
Mastercam creates a Lathe machine group in Toolpaths Manager, as shown in the second following picture.





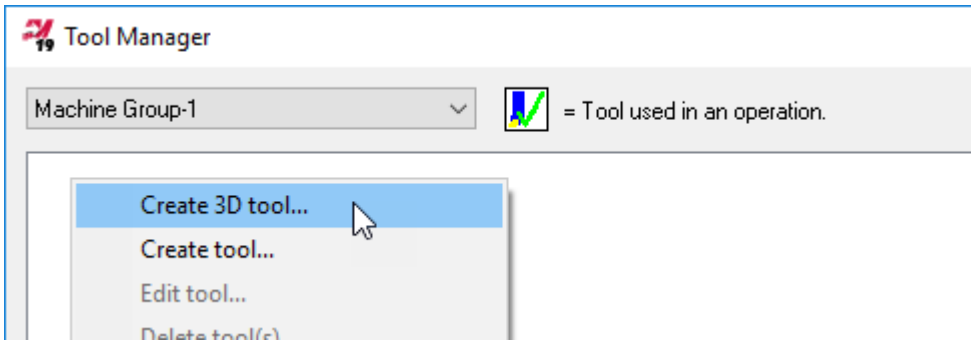
5. On the **Lathe Turning** contextual tab, choose **Lathe Tool Manager**.

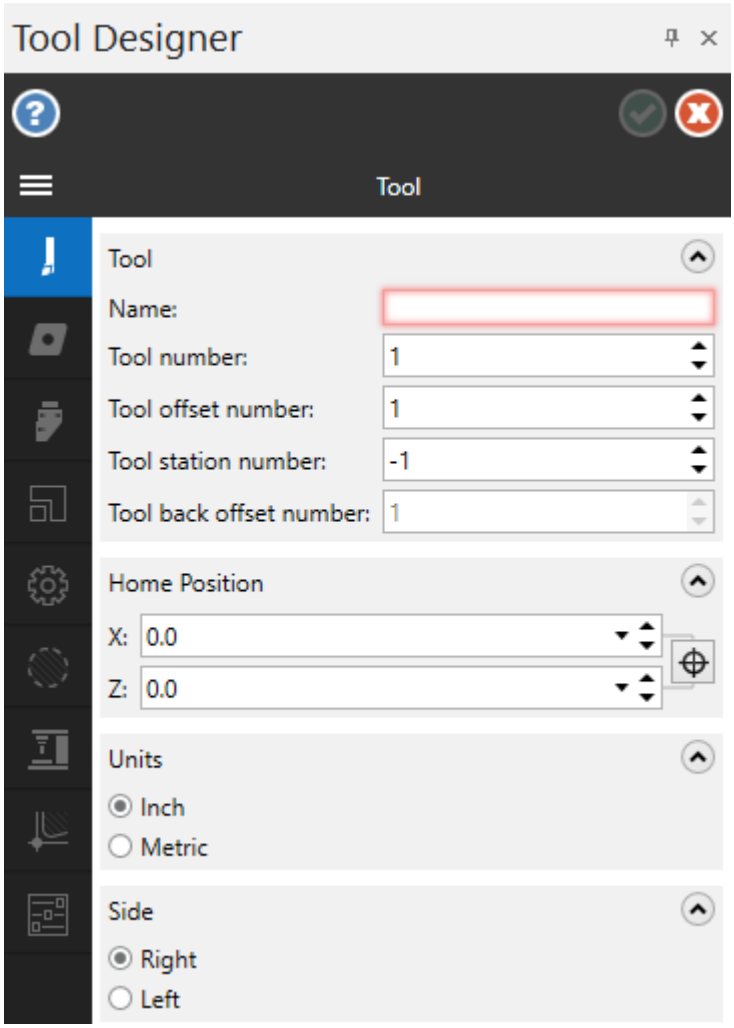
   The **Tool Manager** dialog box displays. In this dialog box, you can choose tools for your toolpaths, as well as create 2D and 3D tools.



6. In the upper pane of the **Tool Manager** dialog box, right-click, and choose **Create 3D tool** from the pop-up menu.

   The Tool Designer function panel displays, as shown in the second picture following.





You are now ready to design your first custom 3D tool, which you do in the next chapter.

CHAPTER 2

CREATING A SIMPLE RECTANGULAR 3D TOOL

In this chapter, you create a rectangular 3D tool using mostly default values and easily handled insert and holder models. After completing this chapter, you will have a general understanding of Tool Designer's workflow.

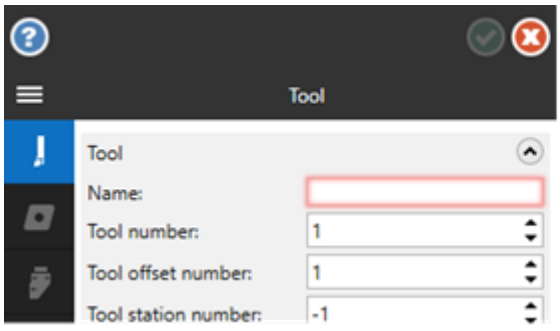
Goals

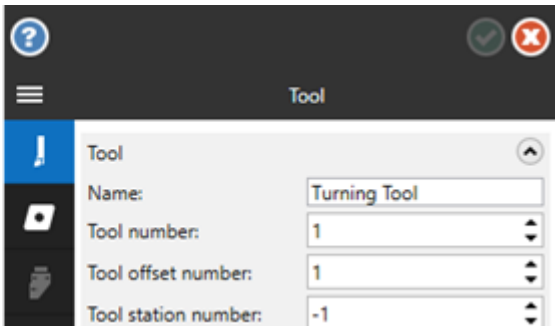
- Load a STEP file for a rectangular tool's insert and holder.
- Mate the insert to the rectangular holder.
- Define the cutting plane and machine-connection plane.
- Generate the tool from the data you entered and the default values.

Exercise 1: Defining the Insert

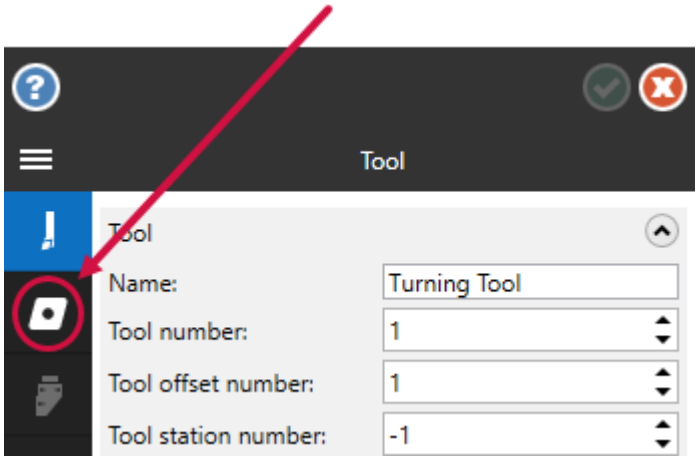
1. In the **Name** field, type **Turning Tool**.

   As shown in the before-and-after pictures that follow, the red outline disappears from the text box, indicating that this required field is complete.



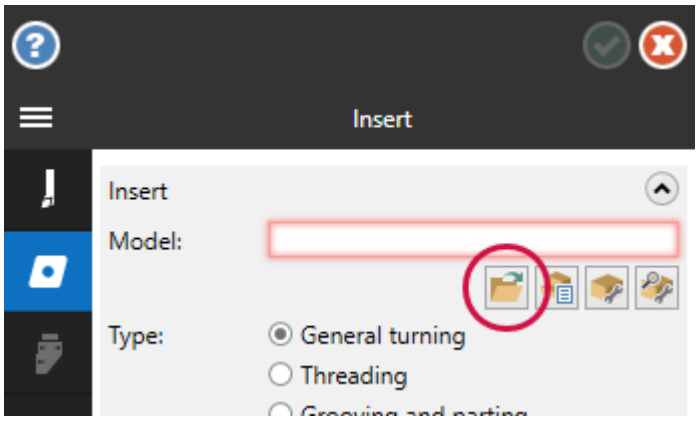


2. Click the **Insert** icon to move to that page.



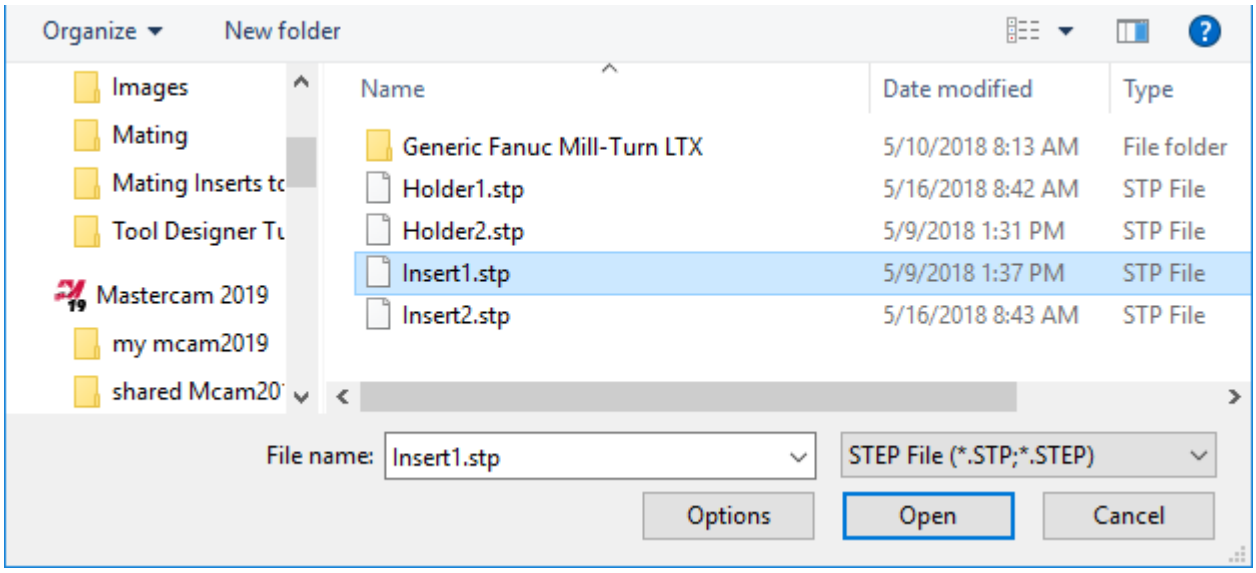
3. Click **Open insert model**, located below the **Model** field.

   The **Select file to import from** dialog box appears.

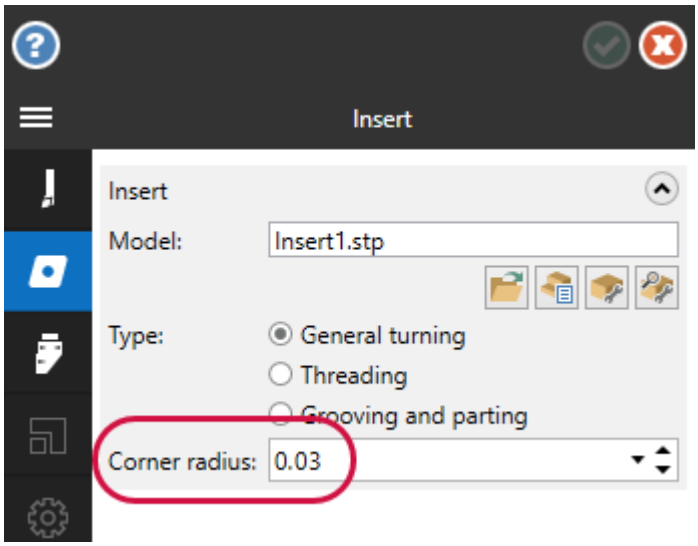


4. Navigate to and open the file `Insert1.stp`, which is included with this tutorial.

   The selected file name appears in the **Model** field, and the insert model displays in Mastercam's graphics window, as shown in the second picture following.

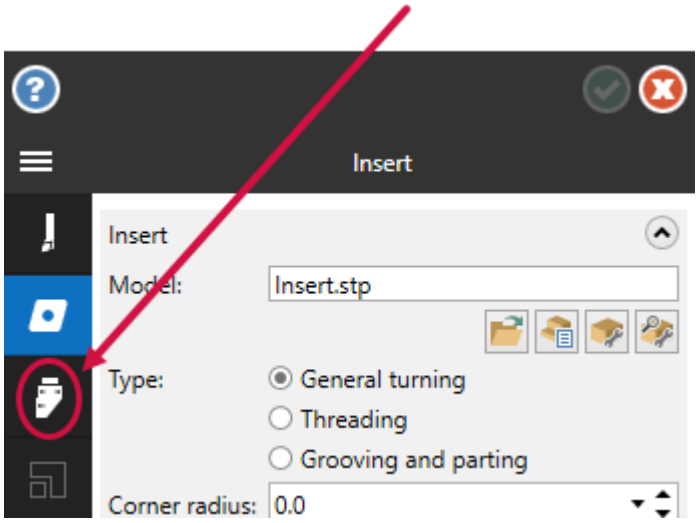


5. In the **Corner radius** field, enter **0.03**.

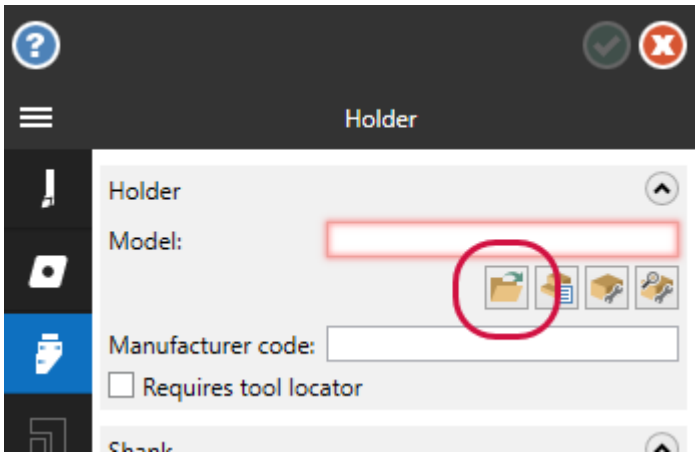


Exercise 2: Defining the holder

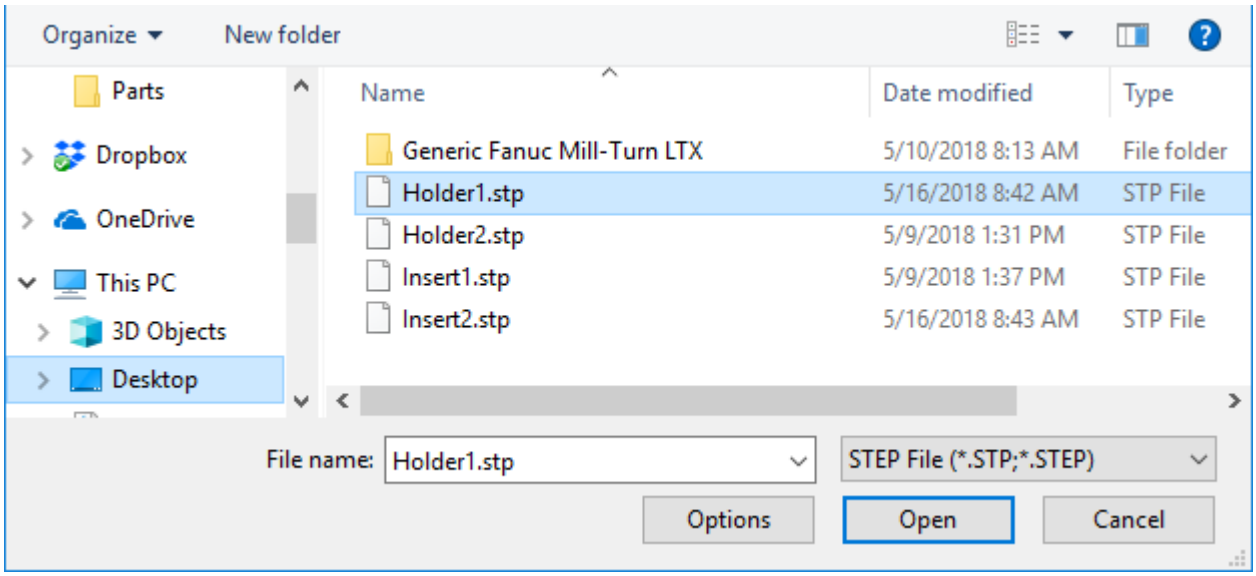
1. Click the **Holder** icon to move to that page.



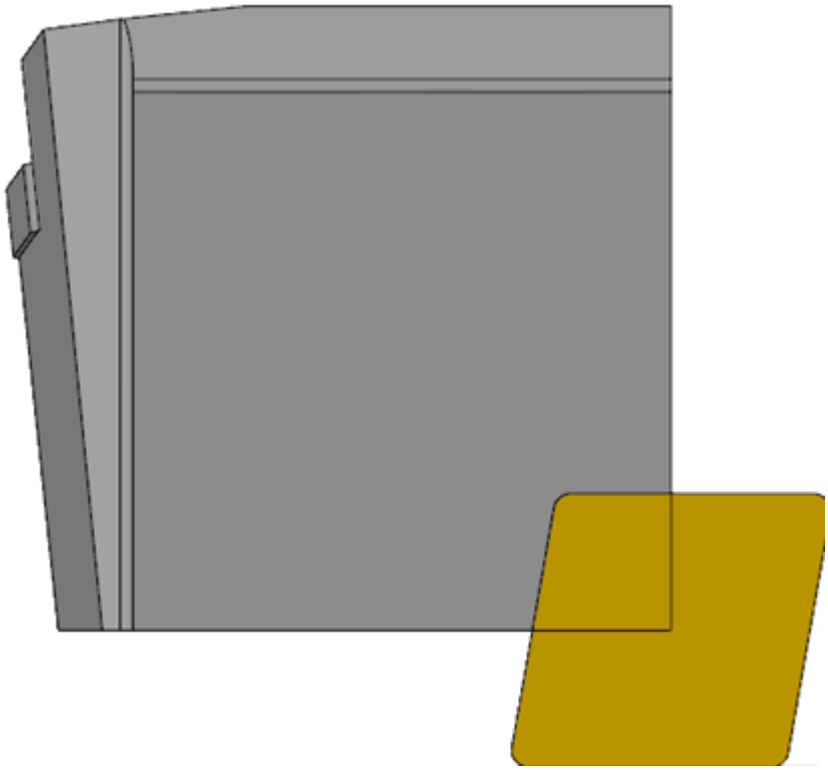
2. Click **Open holder model**, located below the **Model** field.



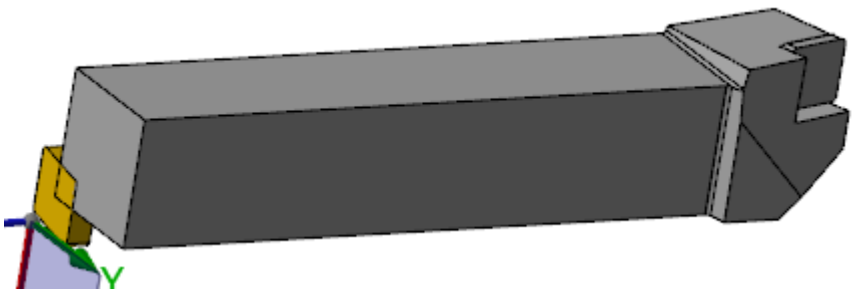
3. In the **Select file to import from** dialog box, navigate to and select the file `Holder1.stp`, which is included with this tutorial.



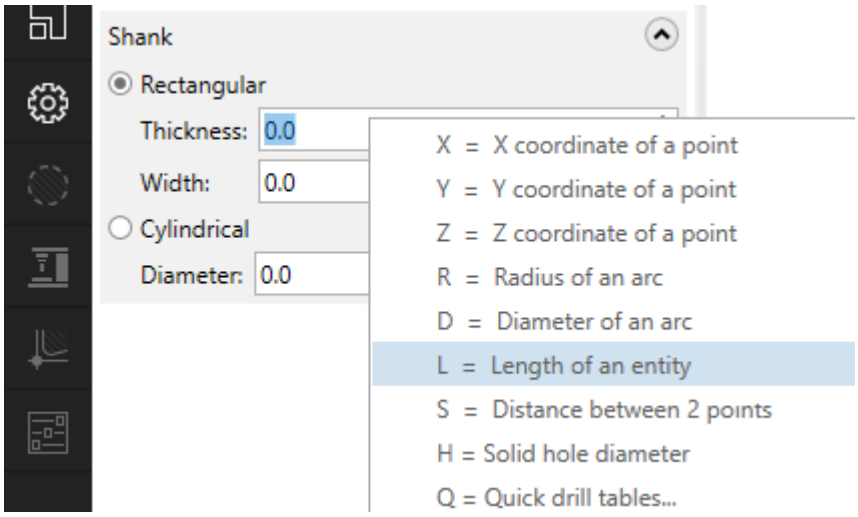
The selected file name appears in the **Model** field, and the holder model displays in Mastercam's graphics area.



4. Rotate the holder so that it looks similar to the following picture.

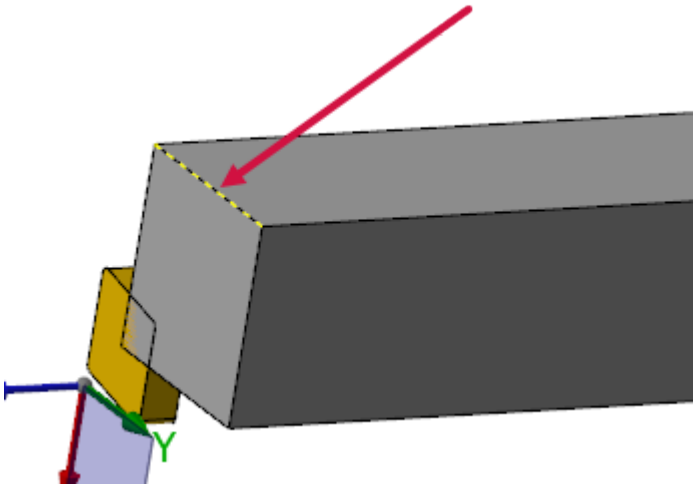


5. Right-click in the **Thickness** field, and choose **L = Length of an entity** from the pop-up menu.



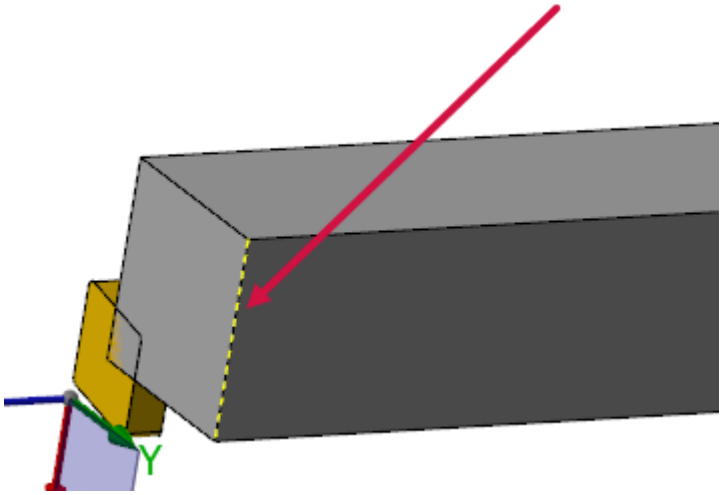
6. Click the solid edge indicated in the following picture.

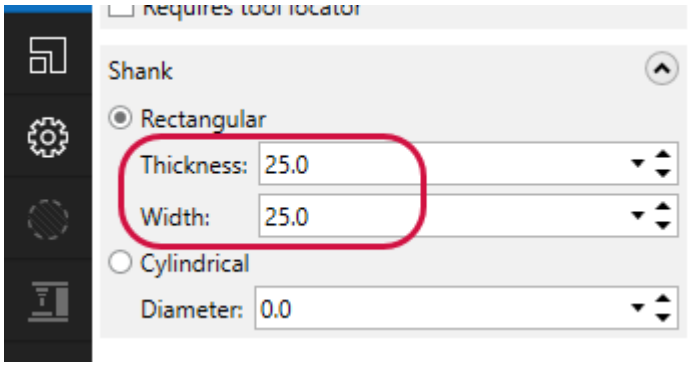
   Mastercam sets the rectangular tool's **Thickness** to **25.0**.



7. Right-click in the **Width** field, and choose **L = Length of an entity** from the pop-up menu.
8. Click the second edge, as shown in the following picture.

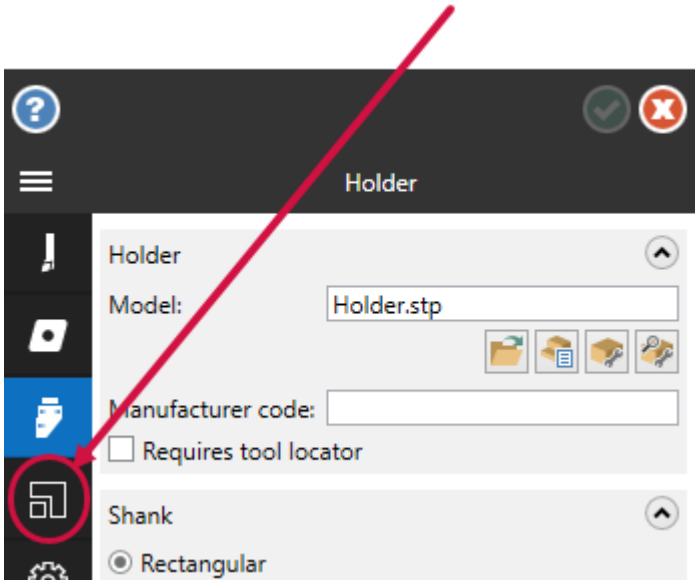
   Mastercam sets the rectangular tool's **Width** to 25.0.





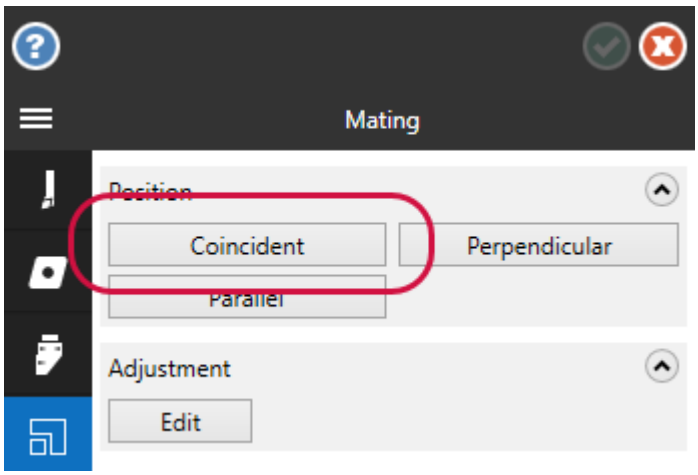
Exercise 3: Mating the insert to the holder

1. Click the **Mating** icon to move to that page.

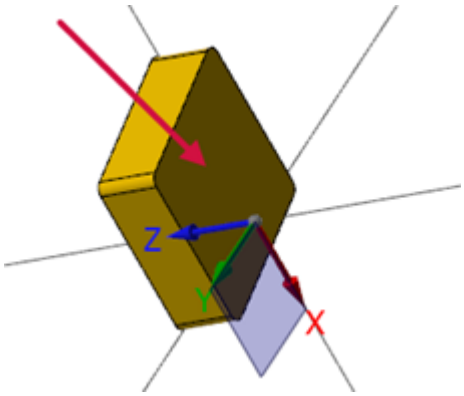


2. In the **Mating** panel, click **Coincident**.

   Mastercam hides the holder, leaving just the insert on the screen.



3. If necessary, press [**F9**] to turn on the axes, and then rotate the insert so that you can see the face opposite the one initially displayed.



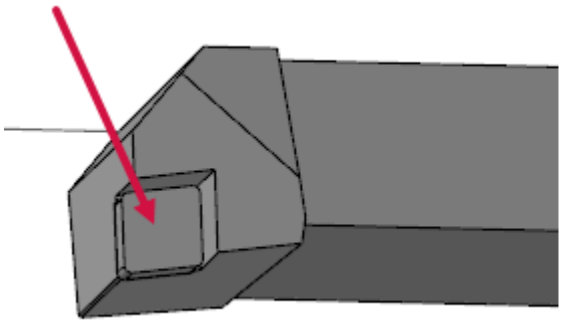
4. Select the insert face you rotated to, as indicated in the previous picture.

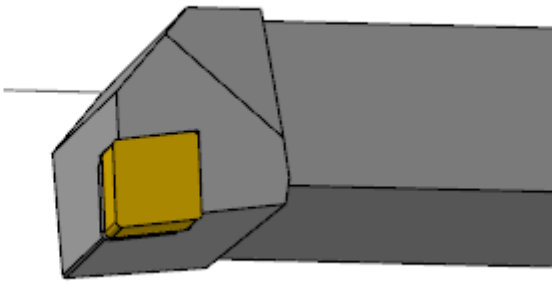
   The graphics window changes to display the tool holder.

5. On the holder, select the face shown in the first picture following. (To see the face, you might need to rotate the holder.)

   Mastercam places the insert's selected face on top of the holder's selected face, as shown in the second following picture.

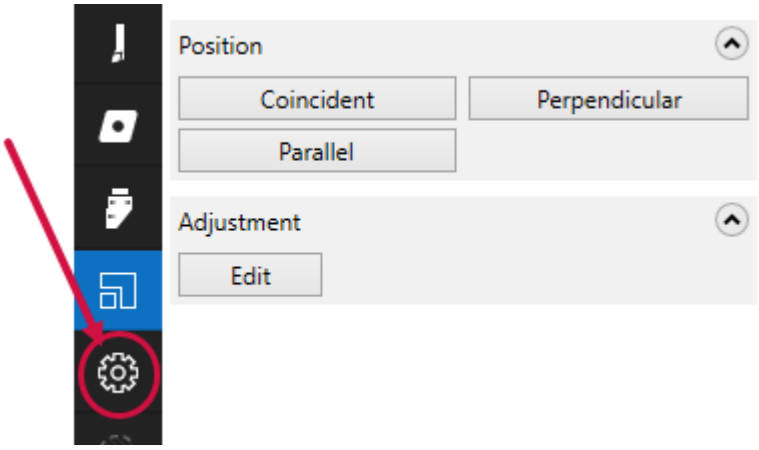
   Note: This is an over-simplified example of the mating process. More complicated, real-world scenarios are covered later in this tutorial.





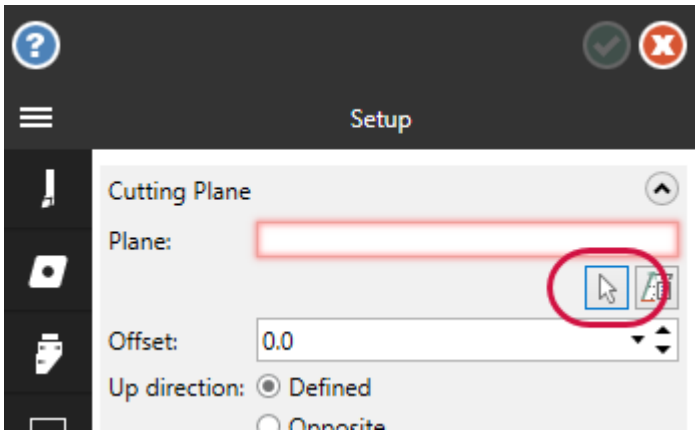
Exercise 4: Defining the cutting and machine-connection planes

1. Click the **Setup** icon to move to that page.

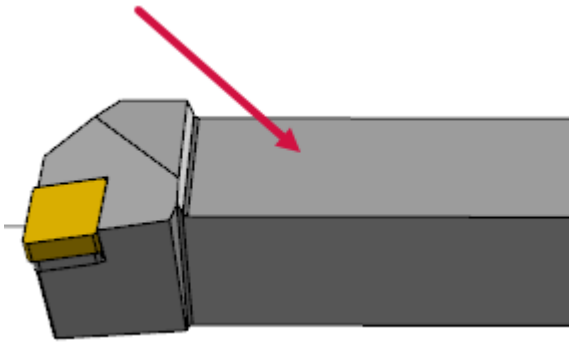


2. In the **Cutting Plane** section, click **Select plane**, located below the **Plane** field.

   Mastercam prompts you to select a flat solid face.



3. Rotate the part, and select the plane indicated in the following picture.

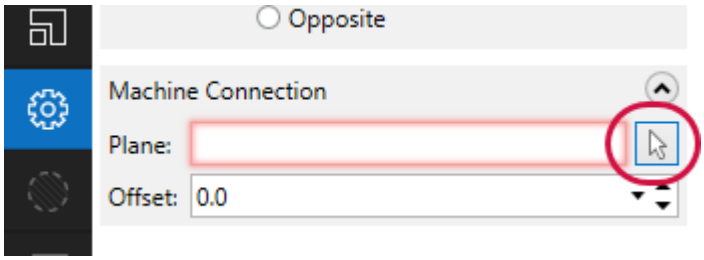


   Mastercam marks the **Plane** field as **Defined** and transforms the tool.

   The cutting plane is used to define the center height of the tool. It is the plane on the tool that lines up with the centerline of the part.

4. In the **Machine Connection** section, click **Select plane**, located below the **Plane** field.

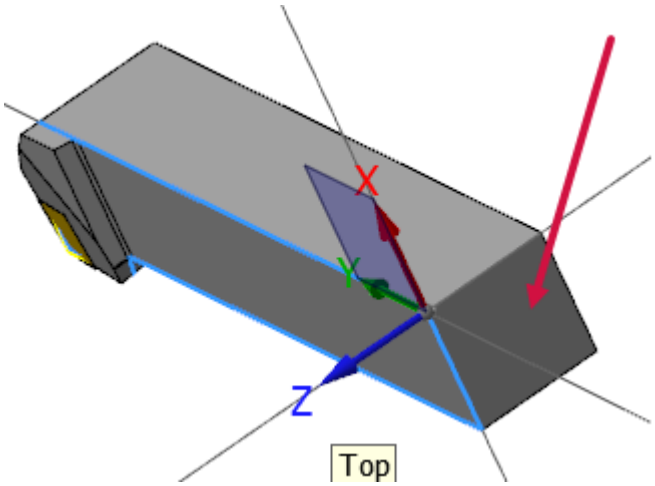
   Mastercam prompts you to select a flat solid face.



5. Rotate the part, and select the plane indicated in the following picture.

   Mastercam marks **Machine Connection** as defined and transforms the tool.

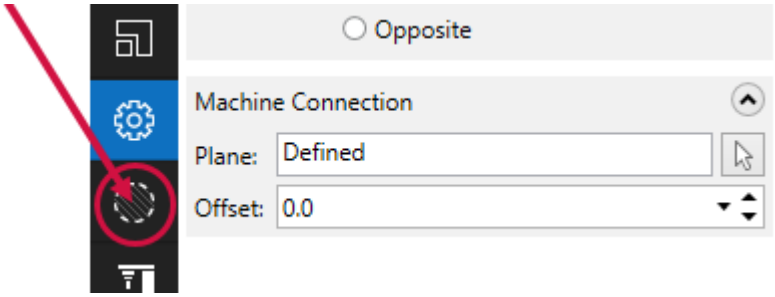
   The **Machine Connection** plane is perpendicular to the projection adjustment vector of the tool. Simply, it is where the tool mounts into the machine or the tool locator.

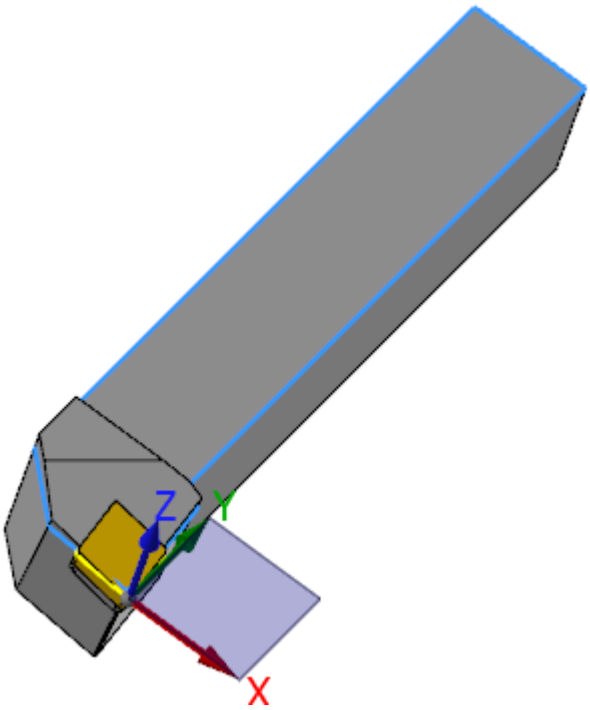


Exercise 5: Finishing the tool

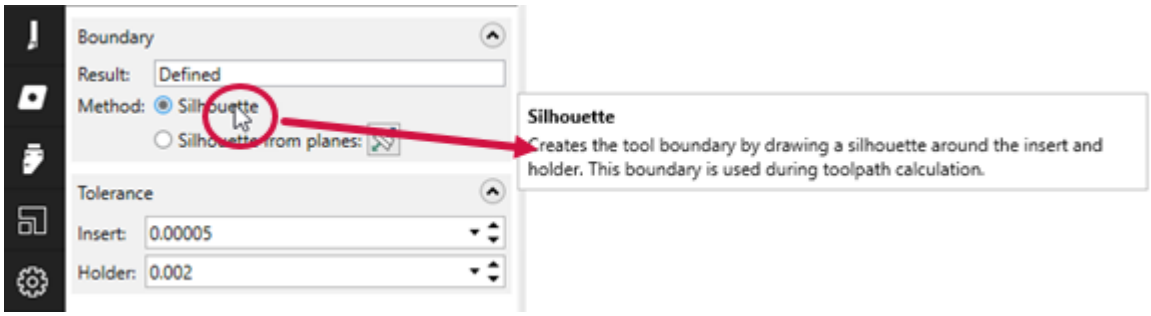
1. Click the **Boundary** icon to move to that page.

   Tool Designer generates a 2D silhouette boundary at the cutting plane, as shown (the blue and yellow lines) in the second picture following. Mastercam uses this 2D boundary to calculate the toolpath.

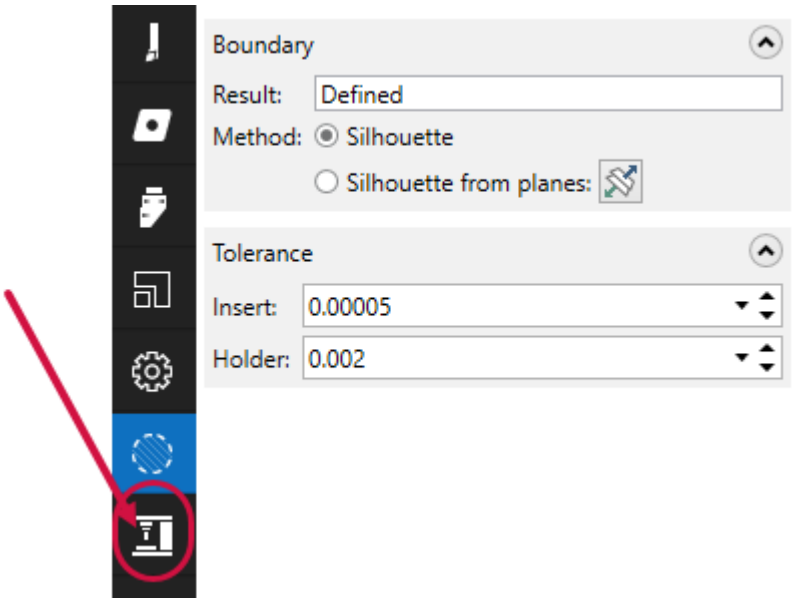




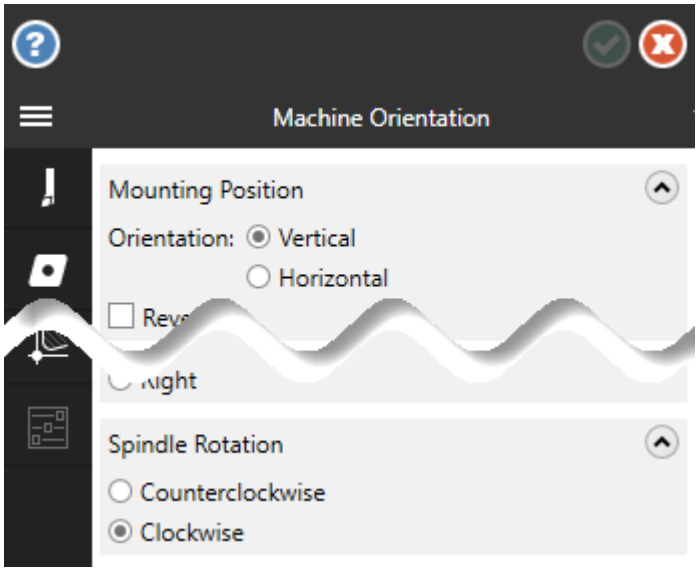
2. Hover your mouse pointer over each field in the page to get an explanatory tooltip.



3. Click the **Machine Orientation** icon to move to that page.

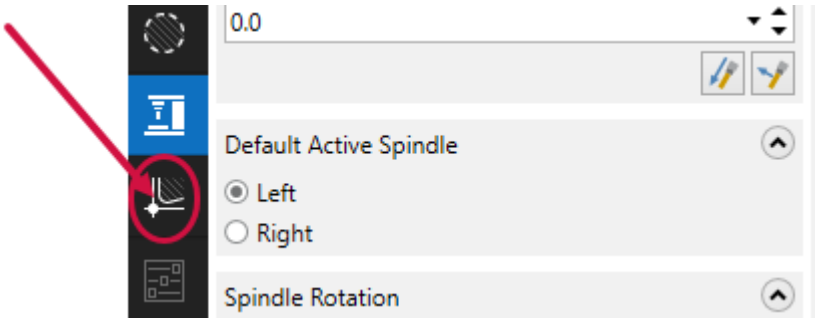


4. Look over the fields in the **Machine Orientation** page, reading each of the tooltips. As with the **Boundary** page, the default values in the **Machine Orientation** page work fine for this simplified run-through of the Tool Designer workflow.



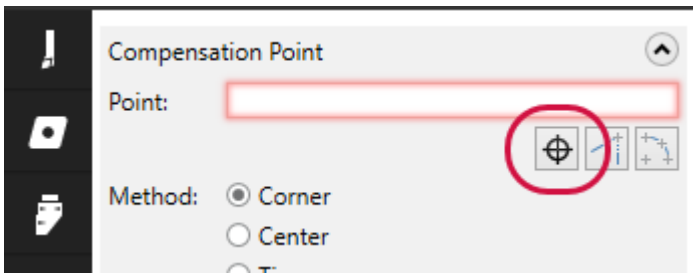
5. Click the **Compensation** icon to move to that page.

   The **Compensation** page has one required field, **Point**, that you must define.



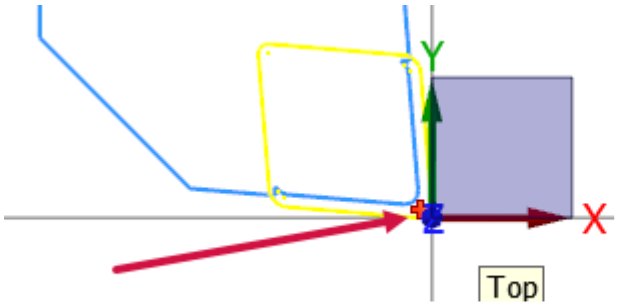
6. Click **Select compensation point**.

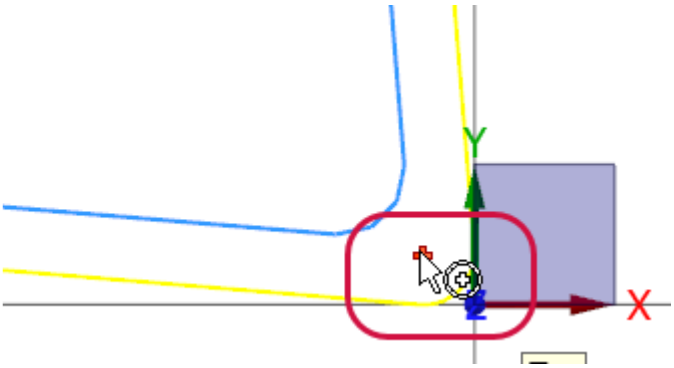
   Mastercam returns you to the graphics window to select the compensation point from a 2D representation of the tool.

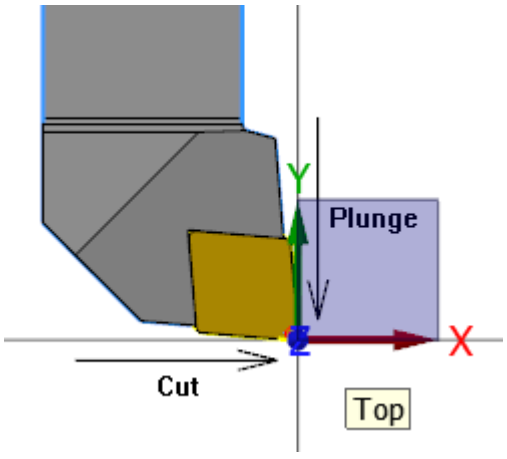


7. Click the point shown in the following pictures. The first picture shows the point in reference to the tool, and the second picture shows a closeup shot, detailing the exact place to click. The third picture shows the tool after setting the compensation point.

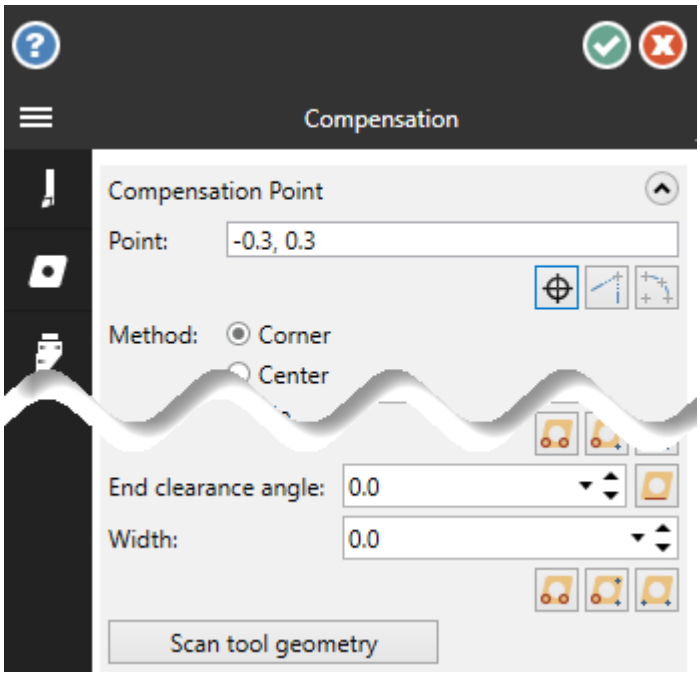
   Mastercam returns you to Tool Designer with the required **Point** field defined.





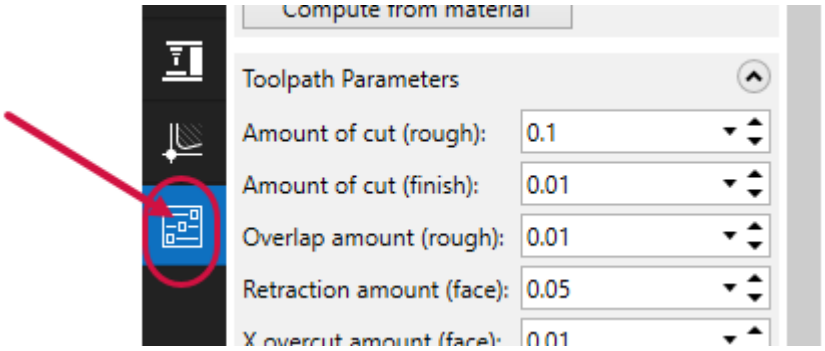


8. Review the other settings in the **Compensation** page.



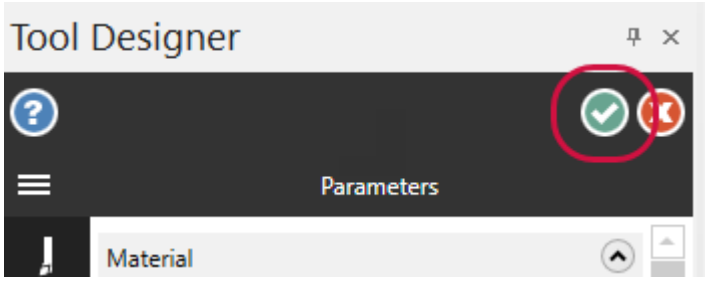
9. Click the **Parameters** icon to go to that page.

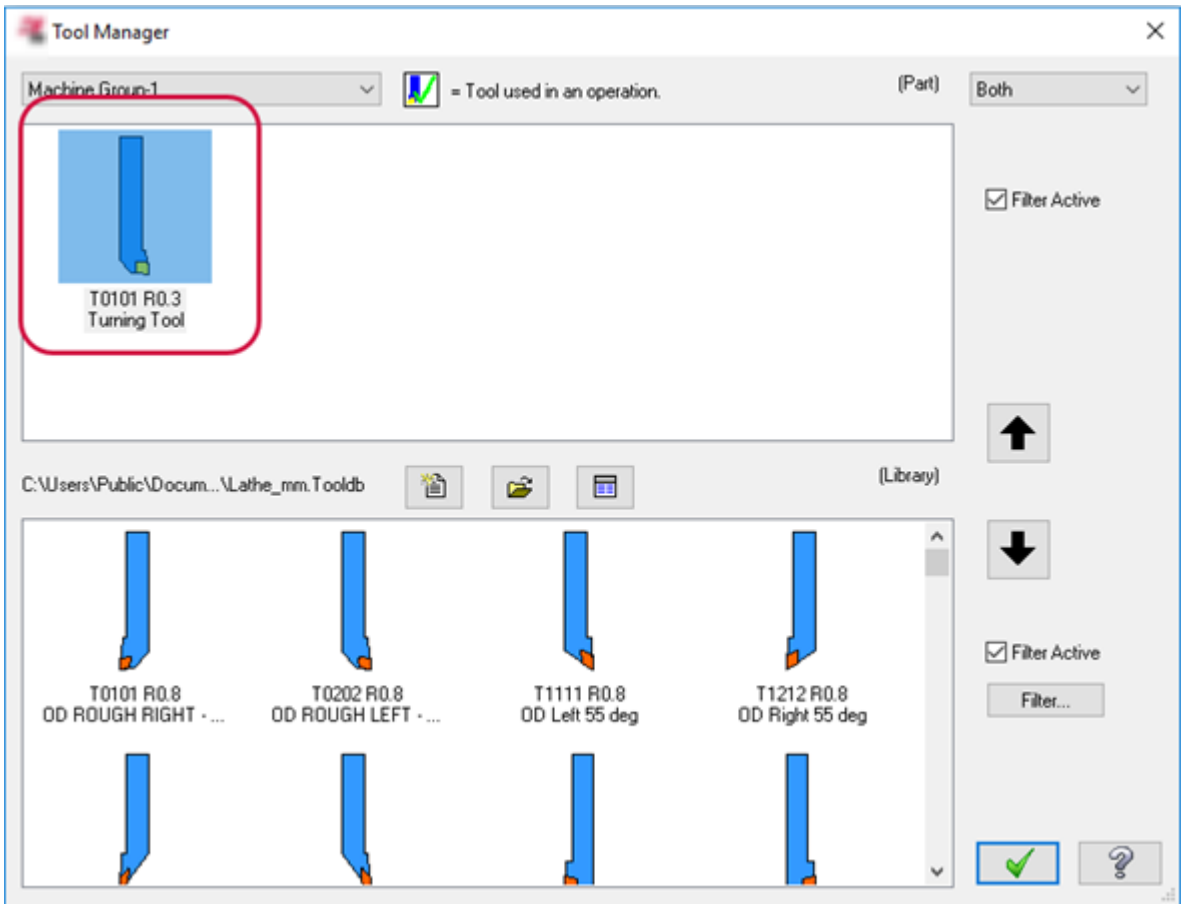
   As a Mastercam user, you should be familiar with the settings on this page, all of which have default values. You have seen them before in the **Parameters** tab of the **Define Tool** dialog box that displays when designing a 2D tool.



10. Click **OK** to close Tool Designer and to save the tool.

    Tool Manager displays with your new tool added to the upper pane, as shown in the second picture following.





You have now completed the rectangular 3D tool. In the next chapter, you create your first cylindrical tool.

CHAPTER 3

CREATING A SIMPLE 3D CYLINDRICAL TOOL

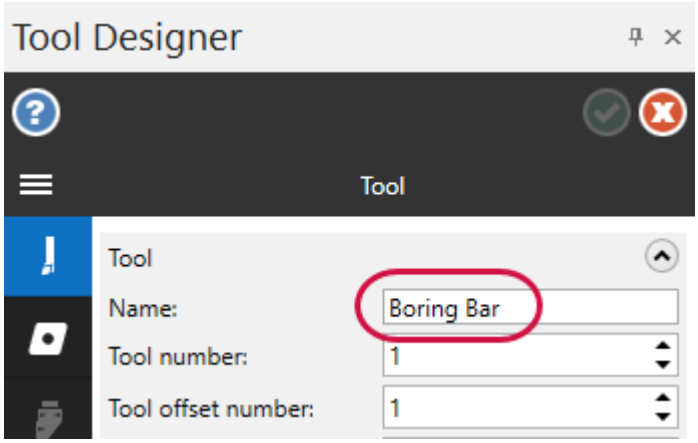
In this chapter, you create a cylindrical 3D tool, again using mostly default values and easily managed insert and holder models. After completing this chapter, you will have additional practice with Tool Designer and will understand the differences between designing rectangular and cylindrical 3D tools, such as boring bars and Capto-style tools.

Goals

- Load a STEP file for a cylindrical tool's insert and holder.
- Mate the insert to the cylindrical holder.
- Define the cutting plane and machine-connection plane.
- Generate the tool from the data you entered and the default values.

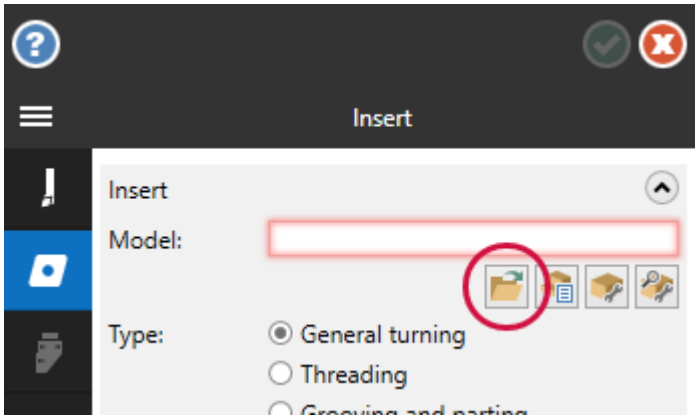
Exercise 1: Defining the Insert

1. Open Tool Designer.
2. In the **Name** field, type **Boring Bar**.



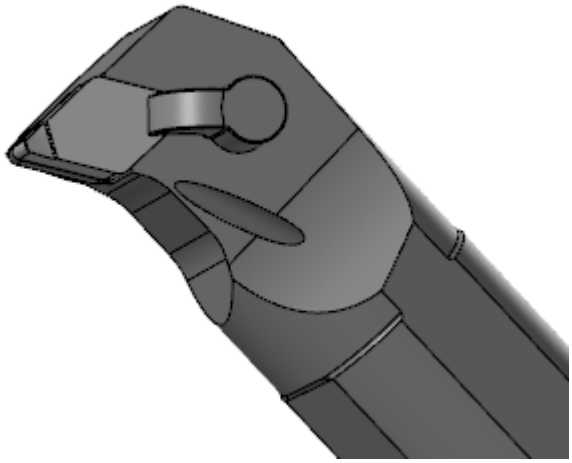
3. Click the **Insert** icon to move to that page.
4. Click **Open insert model**, located below the **Model** field.

   The **Select file to import from** dialog box appears.



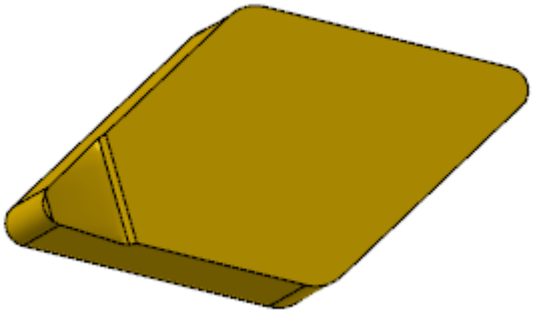
5. Navigate to and open the file `Tool2.stp`, which is included with this tutorial.

   The selected model displays in Mastercam's graphics window. Notice that this file includes both the insert and the holder. (Rotate the tool to see the end with the insert.)



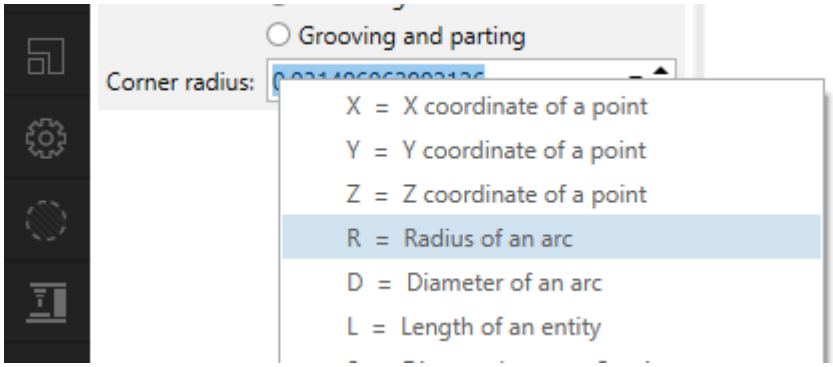
6. Click the insert.

   Mastercam displays the insert in the graphics window.



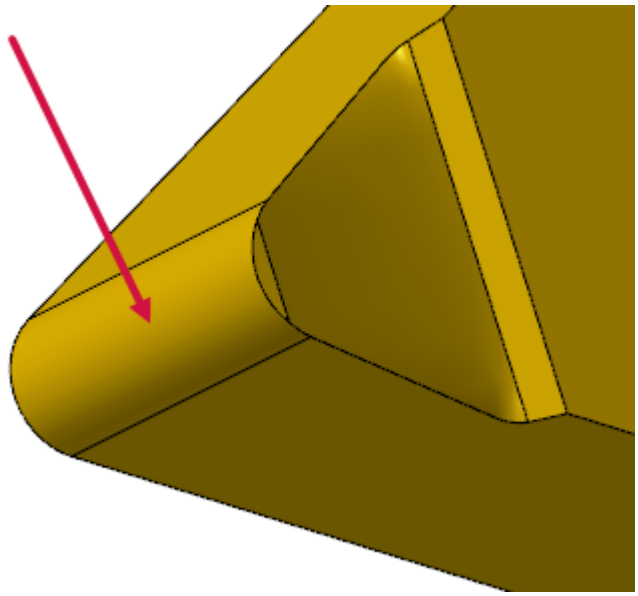
7. Right-click the **Corner radius** field, and select **Radius of an arc** from the pop-up menu.

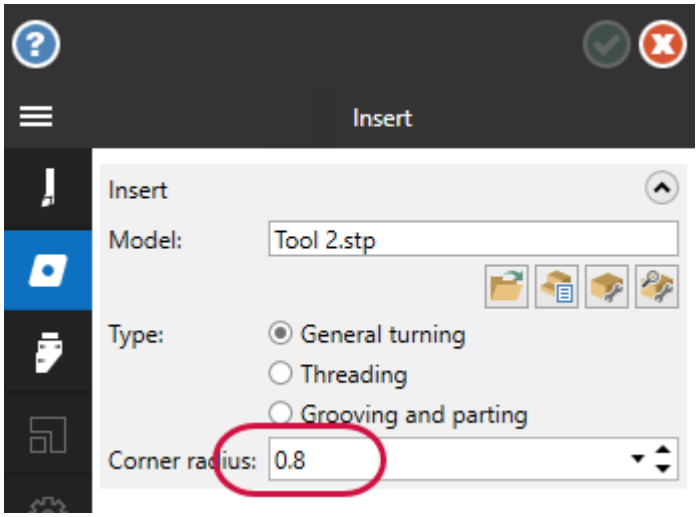
   This is another way to enter the **Corner radius**, rather than typing it as you did in the previous chapter.



8. Rotate the insert model as shown in the following picture, and select the corner radius indicated by the arrow.

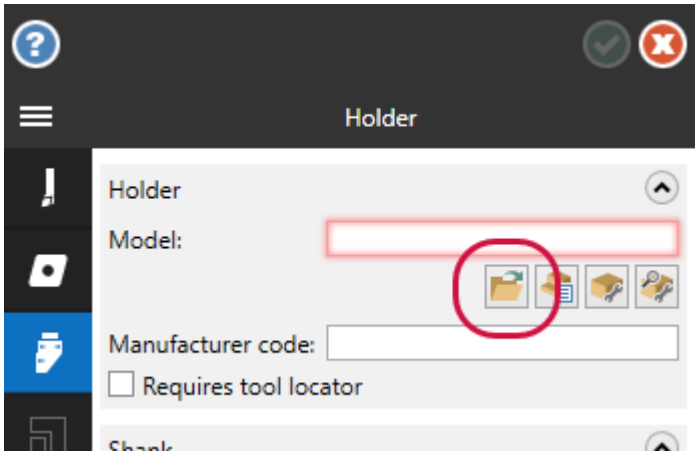
   A corner radius of **0.8** appears in the **Corner radius** field, as shown in the second picture following.





Exercise 2: Defining the holder

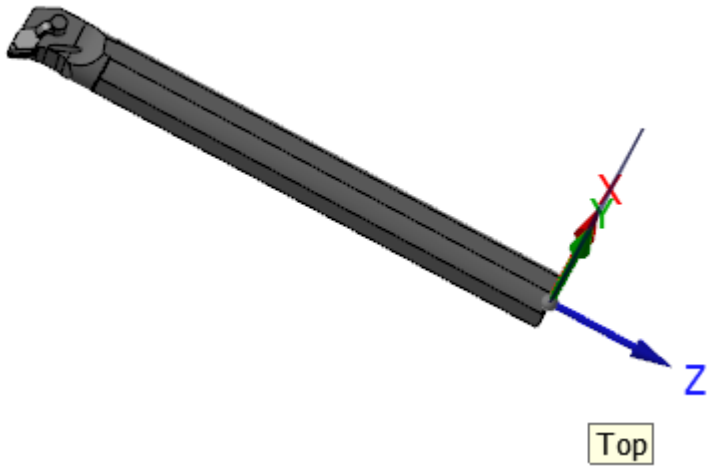
1. Click the **Holder** icon to move to that page.
2. Click **Open holder model**.



3. In the **Select file to import from** dialog box, navigate to and select the file `Tool2.stp`, which is included

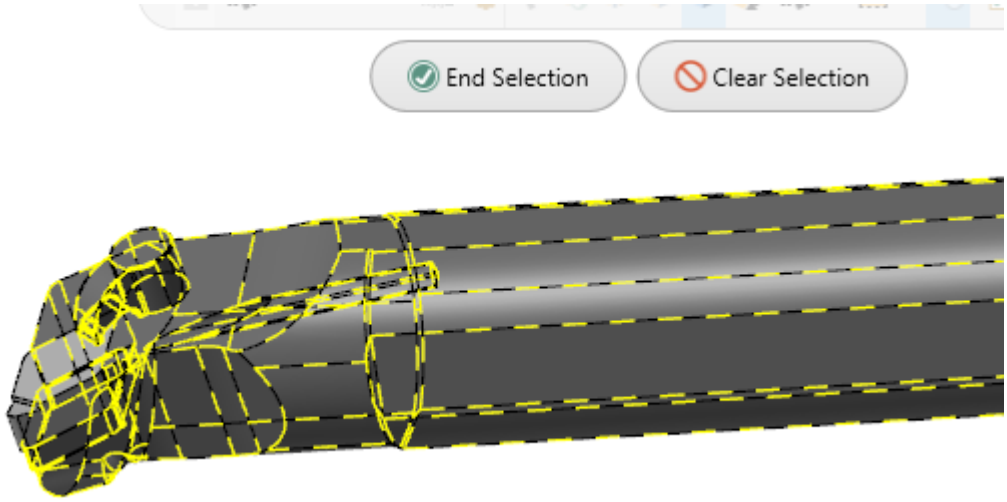
with this tutorial.

The tool appears in the graphics window.

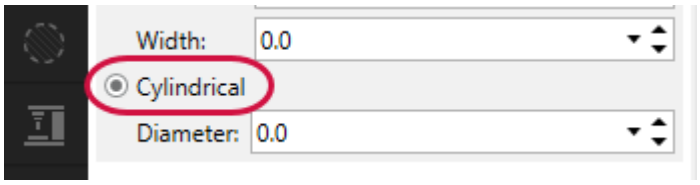


4. Click the holder, and then click **End Selection** or press [**Enter**].

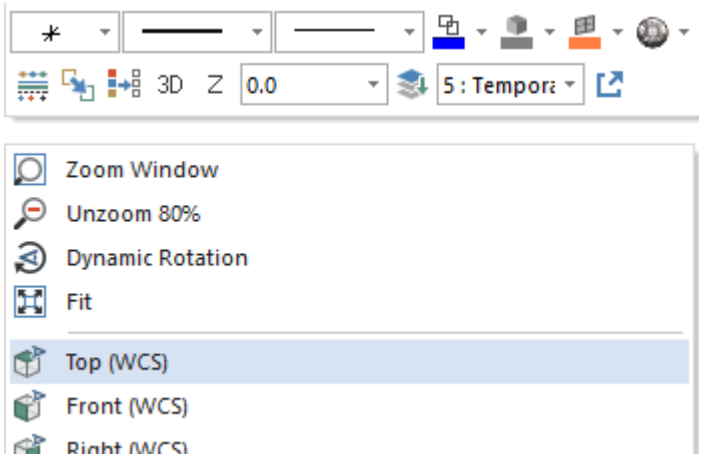
   The file name of the selected holder appears in the **Model** field.



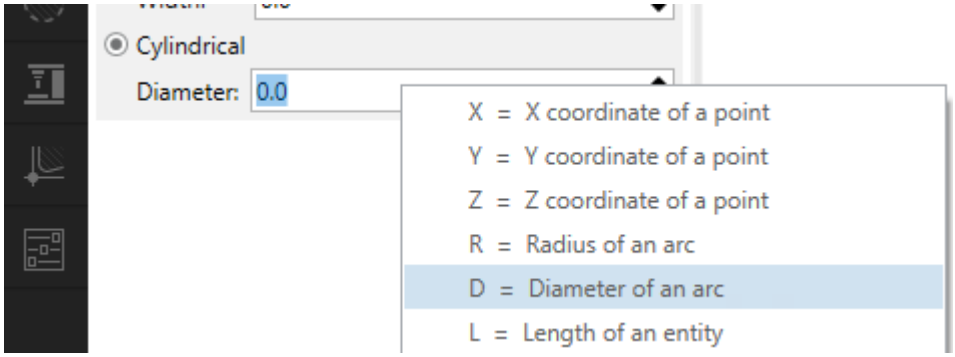
5. In the **Shank** section of the **Holder** page, click **Cylindrical**.



6. Right-click in the graphics window, and choose **Top (WCS)** from the pop-up menu.

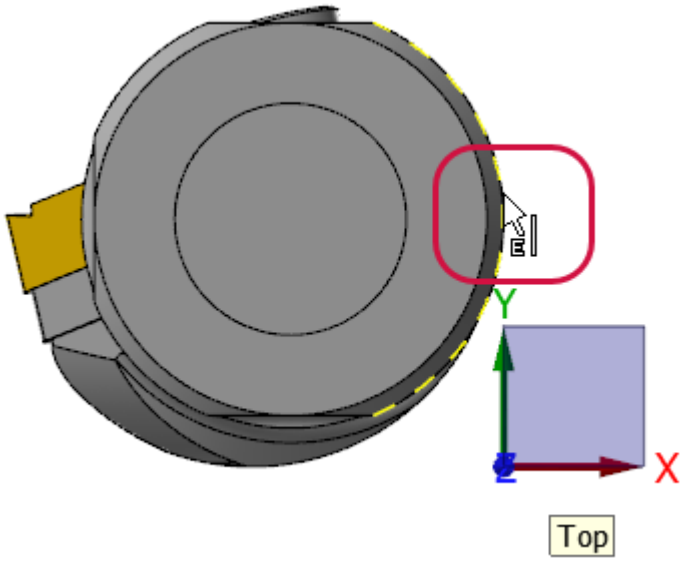


7. Right-click in **Diameter**, and choose **Diameter of an arc** from the pop-up menu.



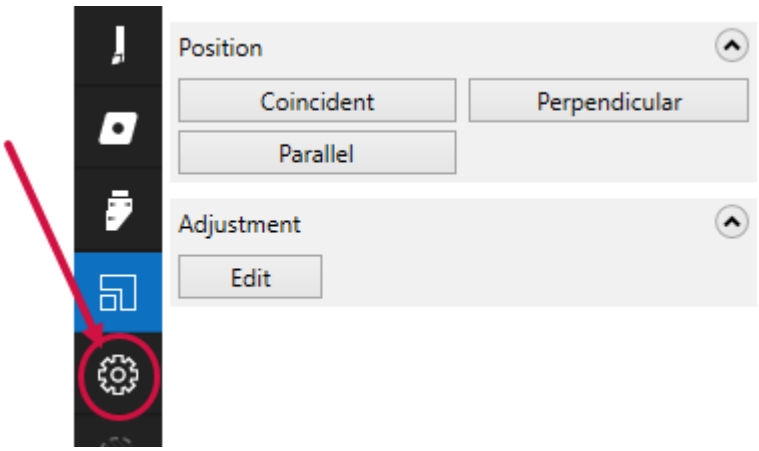
8. Select the circular edge shown in the following image.

   Mastercam sets the **Diameter** field to **25.4**.



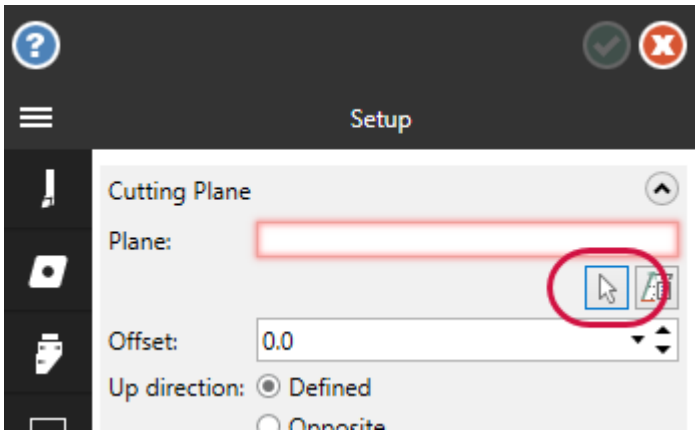
Exercise 3: Defining the cutting and machine-connection planes

1. Click the **Setup** icon to move to that page.



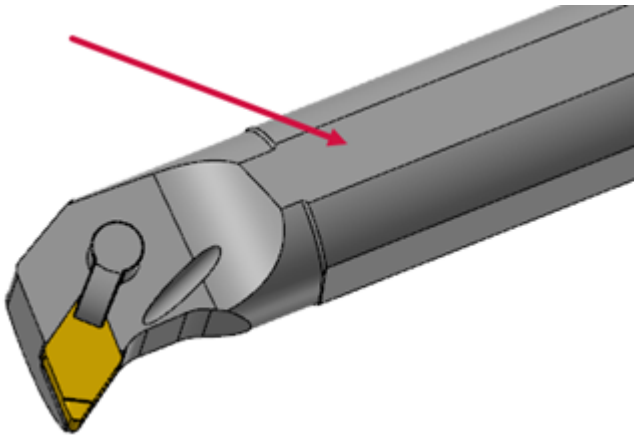
2. In the **Cutting Plane** section, click **Select plane**, located below the **Plane** field.

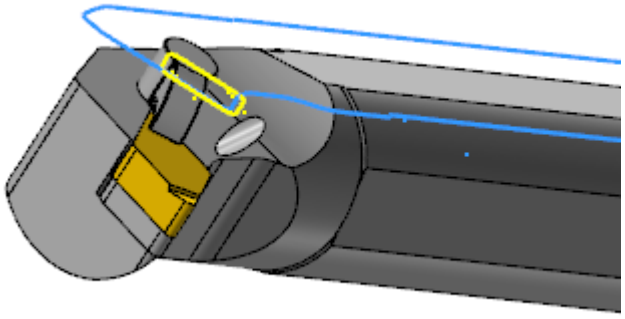
   Mastercam prompts you to select a flat solid face.



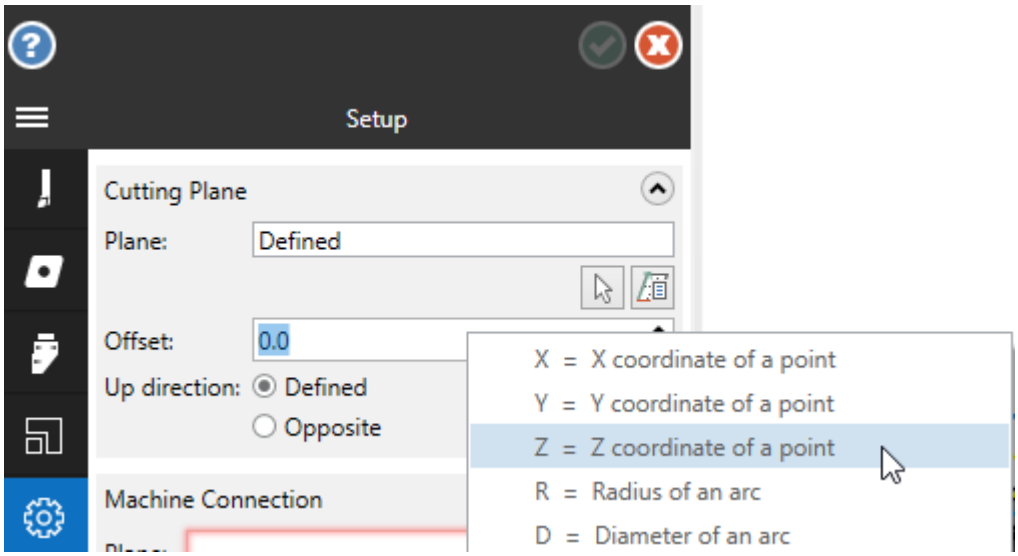
3. Rotate the part, and select the plane indicated in the following picture.

   Mastercam marks the **Plane** field as **Defined**. The cutting plane is used to define the center height of the tool. It is the plane on the tool that lines up with the centerline of the part. However, at this point, the cutting plane is not quite in the right location, as shown in the second picture following.



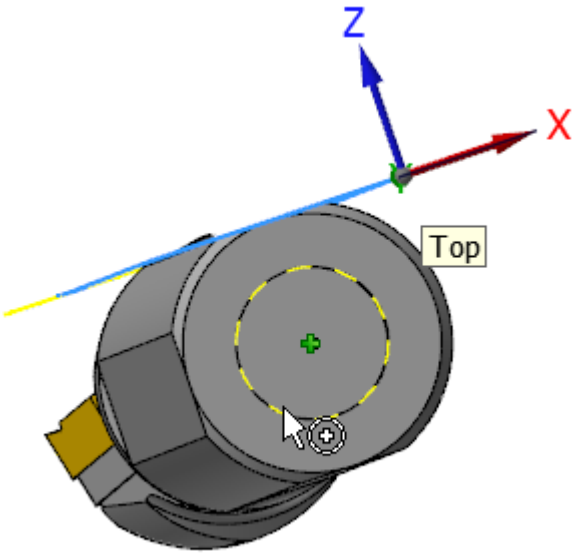


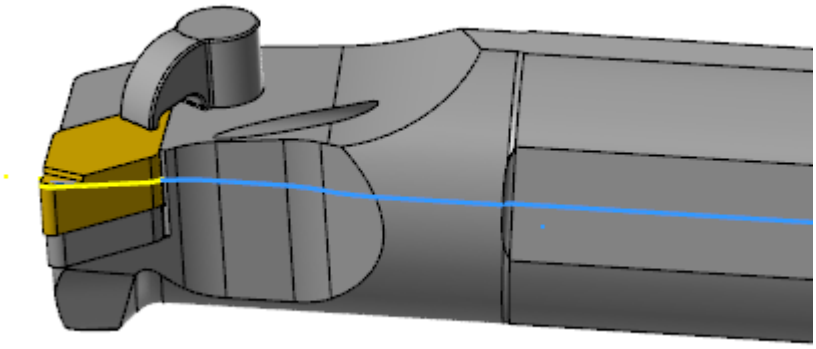
4. Right-click in the **Offset** field, and select **Z coordinate of a point** from the pop-up menu.



5. Select the arc shown in the following picture.

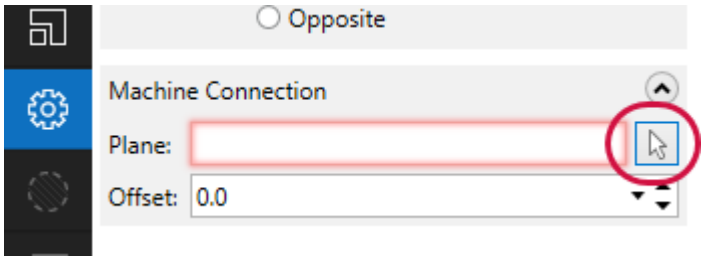
   Mastercam uses the arc's centerpoint as the offset point, and moves the cutting plane to the correct position, as shown in the second picture following.





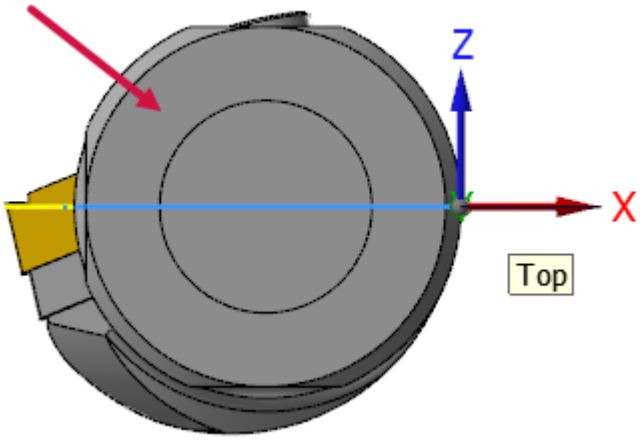
6. In the **Machine Connection** section, click **Select plane**, located next to the **Plane** field.

   Mastercam prompts you to select a flat solid face.



7. Rotate the part, and select the plane indicated in the following picture.

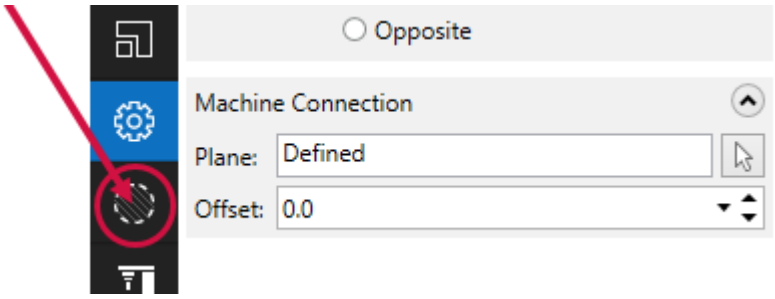
   Mastercam marks **Machine Connection** as defined. The **Machine Connection** plane is perpendicular to the projection adjustment vector of the tool. Simply, it is where the tool mounts into the machine or the tool locator.

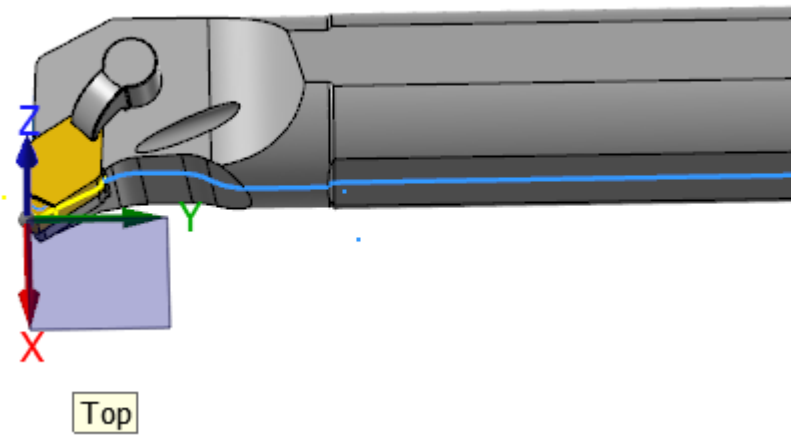


Exercise 4: Finishing the tool

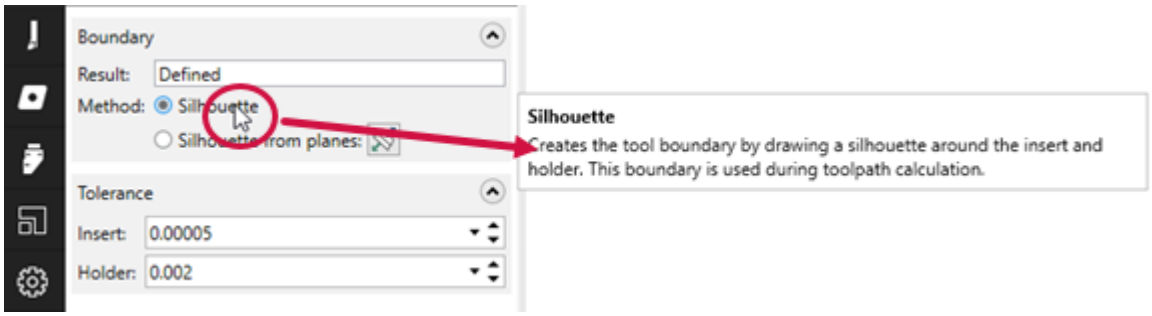
1. Click the **Boundary** icon to move to that page.

   Tool Designer generates a 2D silhouette boundary at the cutting plane, as shown (the blue and yellow lines) in the second picture following. Mastercam uses this 2D boundary to calculate the toolpath.

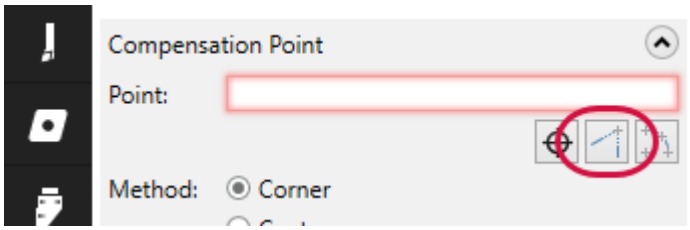




2. Hover your mouse pointer over each field in the page to get an explanatory tooltip.

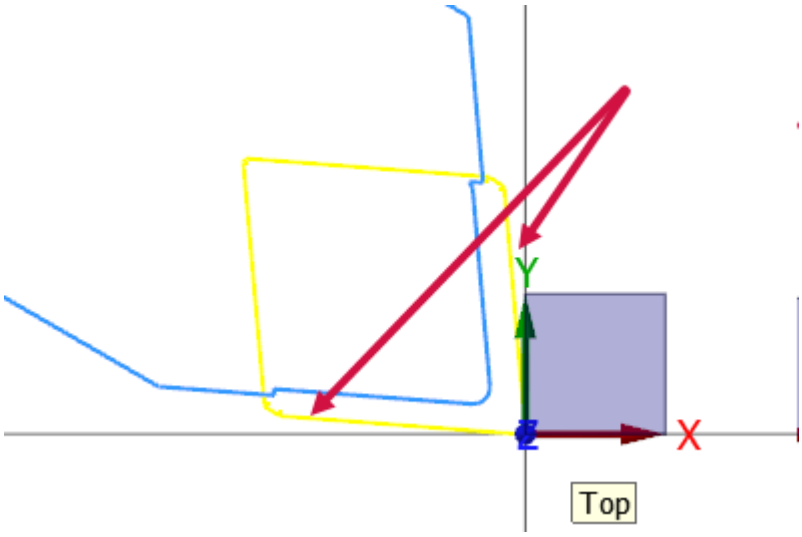


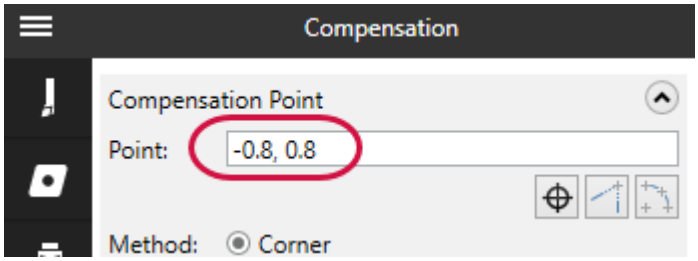
3. Click the **Machine Orientation** icon to move to that page, and read the tooltips so you become familiar with each of the fields.
4. Click the **Compensation** icon to move to that page.
5. Click **Select compensation point with arc from tangent entities**, located below the **Point** field.



6. Zoom in on the insert, and select the yellow lines indicated in the following picture.

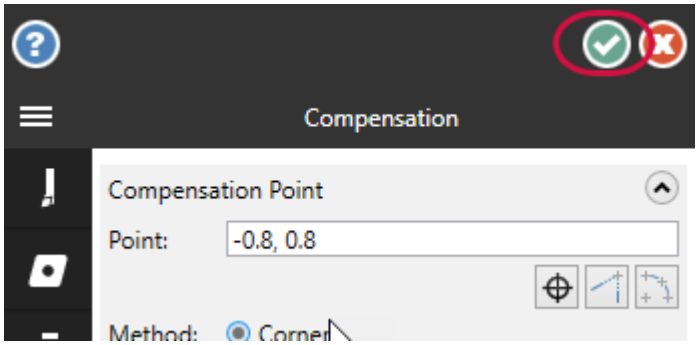
   Mastercam finds the finds the compensation point based ion the selected lines and sets the **Point** field to **-0.8, 0.8**, as shown in the second picture following.

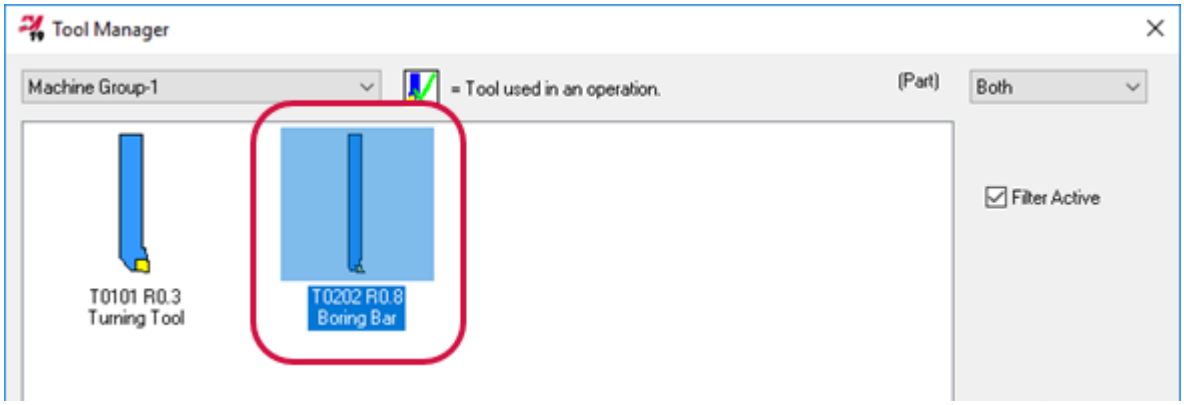




7. Click Tool Designer's **OK** button to exit the panel and to save the tool.

   Mastercam displays the Tool Manager dialog box and adds the tool to the tool window, as shown in the second picture following.





You have now completed the cylindrical tool. In the next chapter, you learn to handle more complicated mating scenarios.

CHAPTER 4

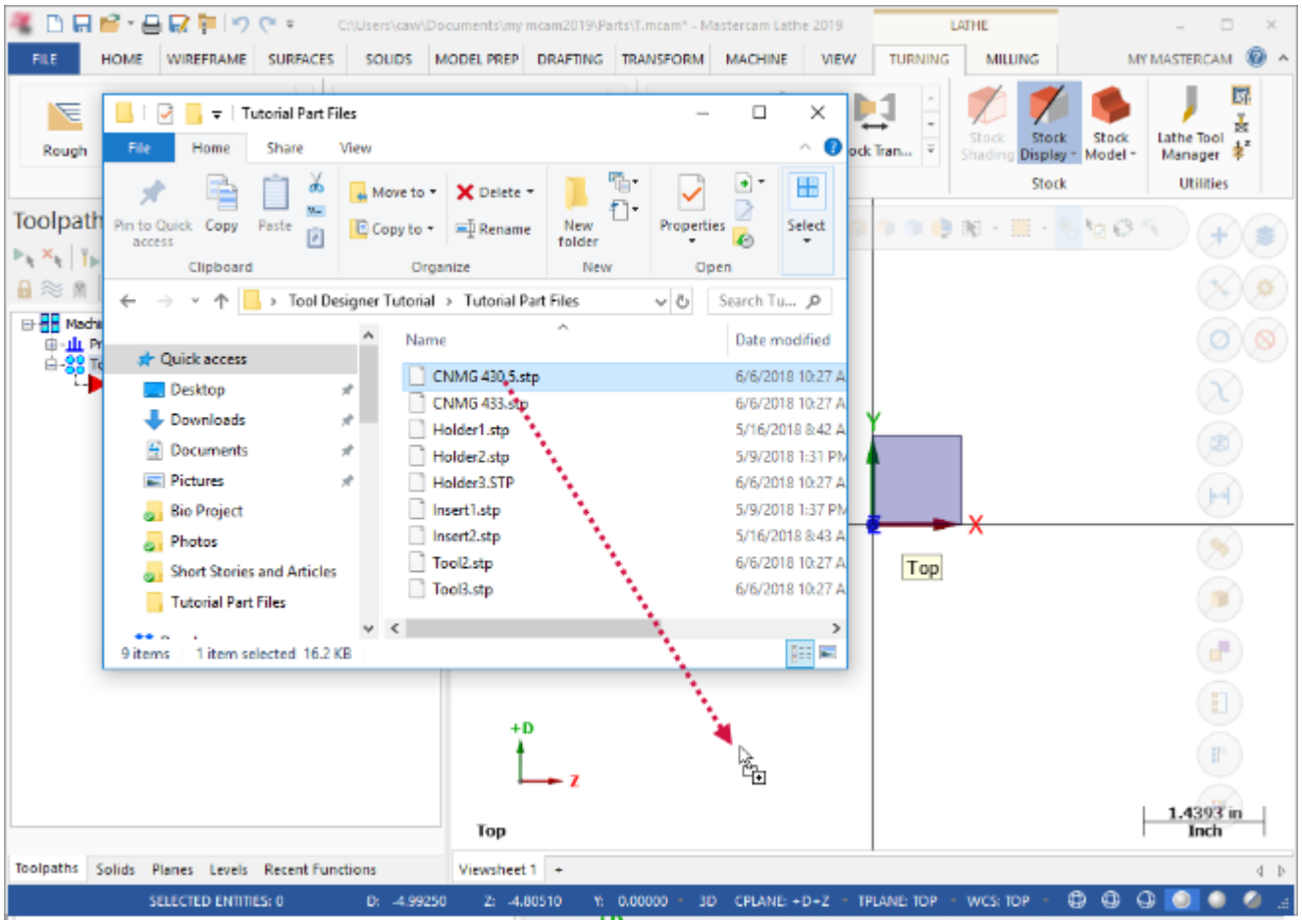
MATING INSERTS TO HOLDERS

Probably one of the trickiest tasks in creating a 3D tool is getting the insert to mate properly to the holder. The insert and holder models might be anywhere in 3D space, so Tool Designer features transformation tools that allow you to move the insert into its correct position. Often, as you have seen in previous chapters, this is just a matter of choosing a face on the insert and a face on the holder. In other cases, you might need to do more detailed editing. This chapter introduces you to the tools that make this editing possible.

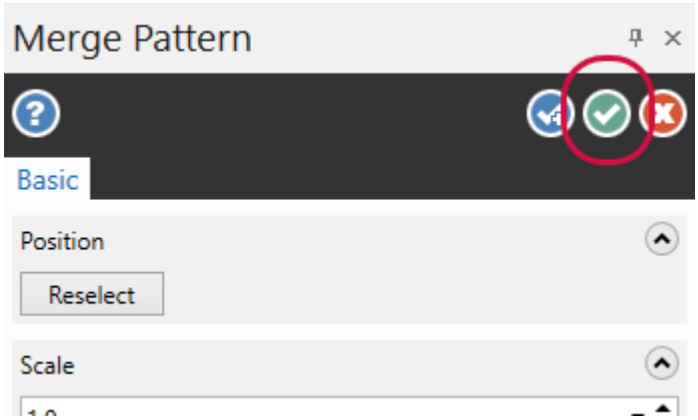
Exercise 1: Defining the Insert

1. Load the default Lathe machine.
2. Click the file `CNMG 430.5.stp`, included with this tutorial, and holding down [**Ctrl**], drag the file into Mastercam's graphics window.

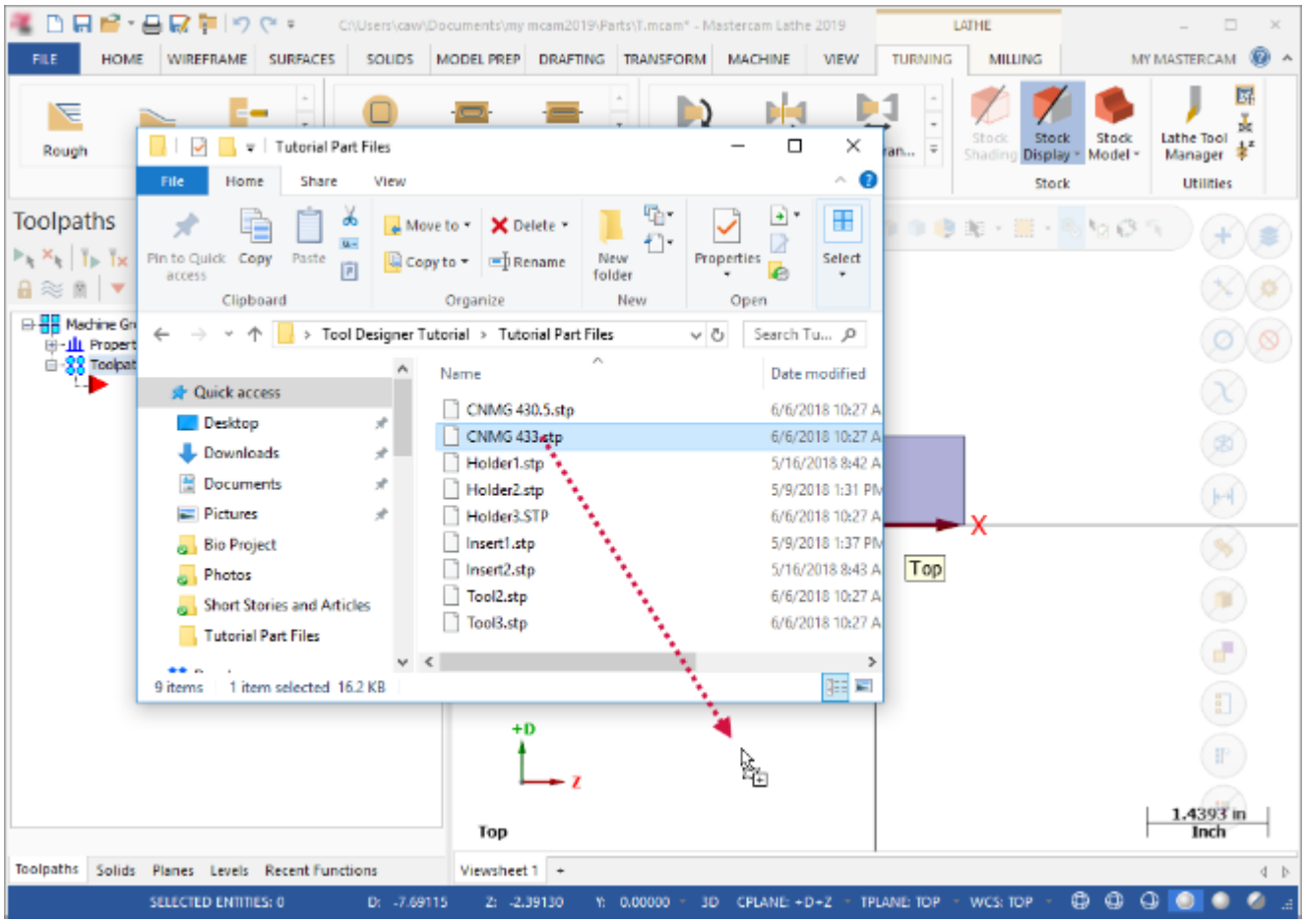
   The **Merge Pattern** function panel displays.



3. In the **Merge Pattern** function panel, click **OK**.

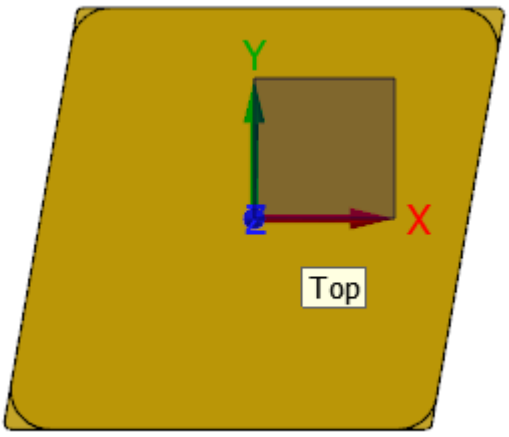


4. Holding down [**Ctrl**], drag the second insert file (`CNMG 433.stp`) into Mastercam's graphics window.

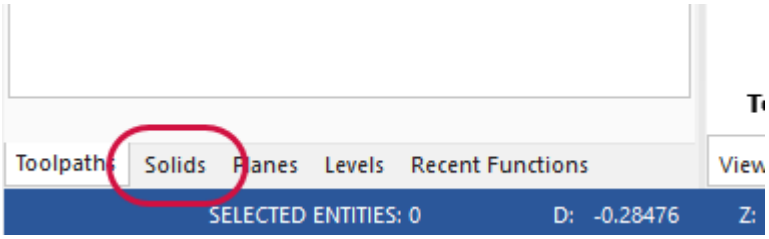


5. In the **Merge Pattern** function panel, click **OK**.

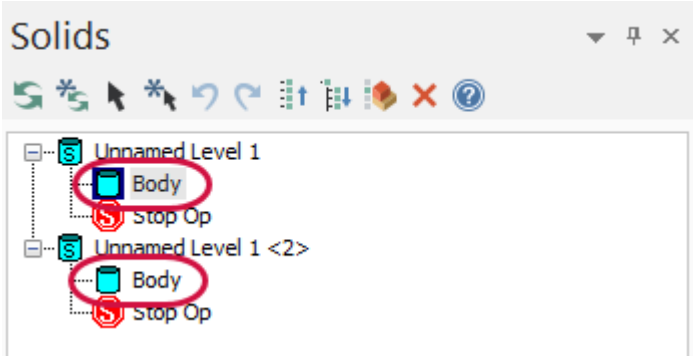
   You now have two insert solid models in the graphics area, one on top of the other.



6. Click the **Solids** tab to display the Solids Manager.

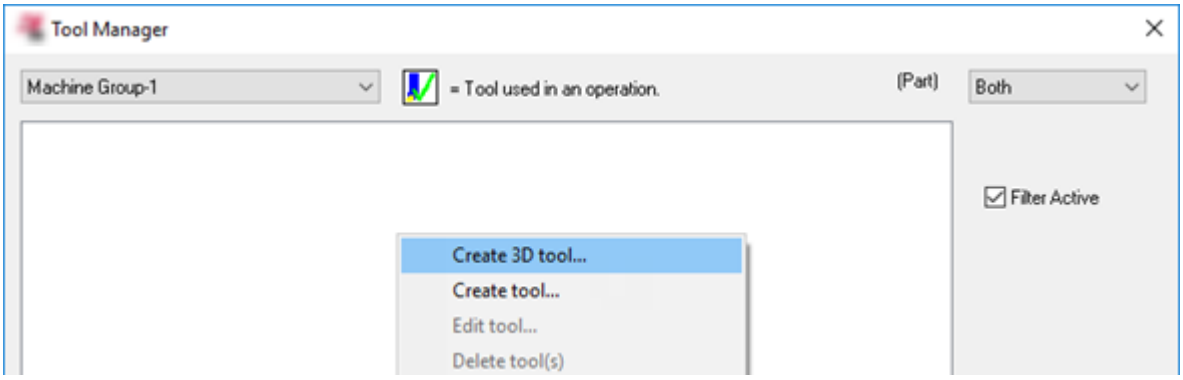


7. Open the two unnamed levels to see that there are two solid bodies in the file. These are the inserts you just brought into Mastercam.

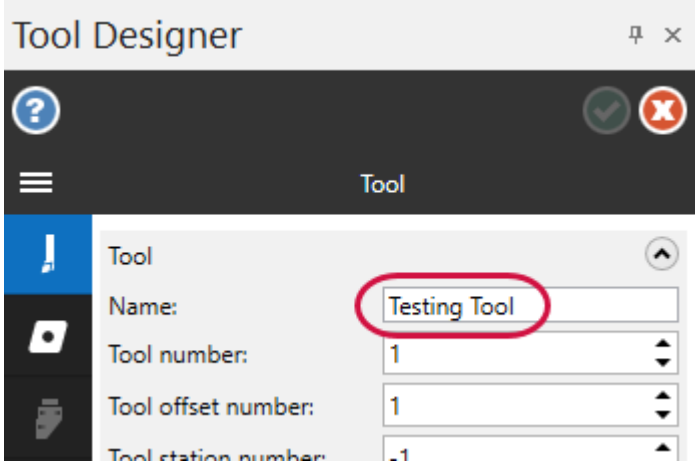


8. Open the Lathe Tool Manager, and create a new 3D tool.

   The **Tool Designer** panel displays.

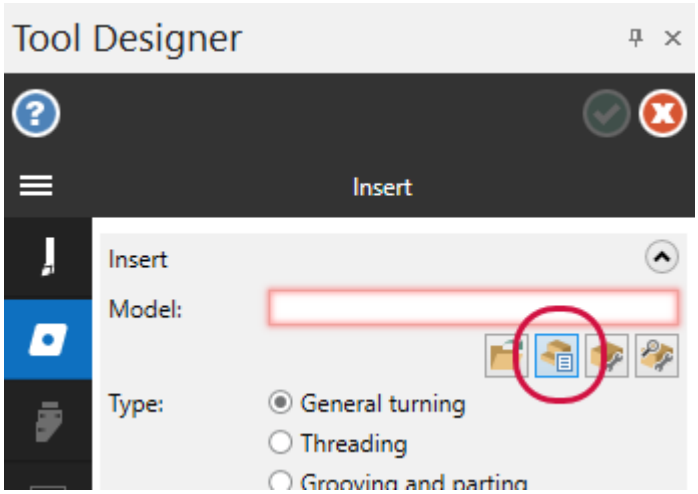


9. In the **Name** field, type **Testing Tool**.



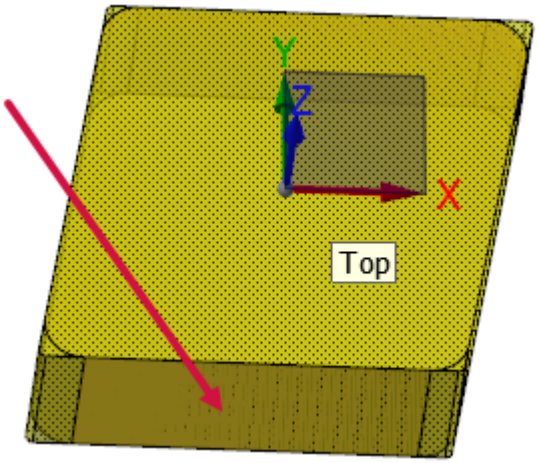
10. Click the **Insert** icon to move to that page.
11. Click **Select from Solids Manager**, located below the **Model** field.

    Mastercam returns you to the graphics window to select a solid model. In previous exercises, you selected **Open insert model** to load an insert from a file. **Select from Solids Manager** lets you choose the solid model from the Solids Manager or from the graphics window.

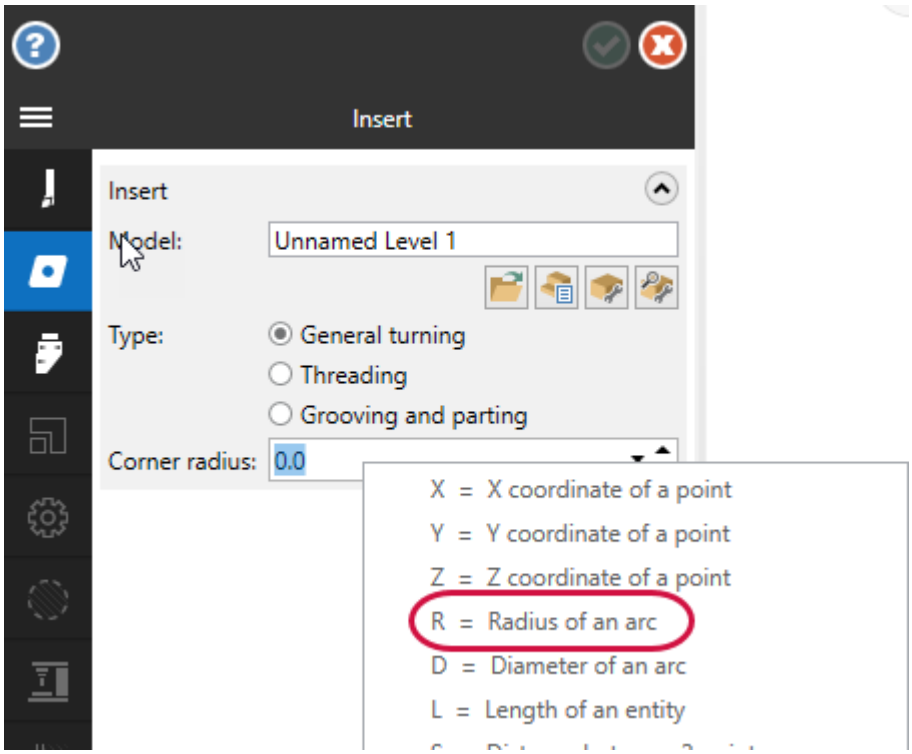


12. Select the insert face shown in the following picture.

    Remember that you can also choose the insert from Solids Manager.

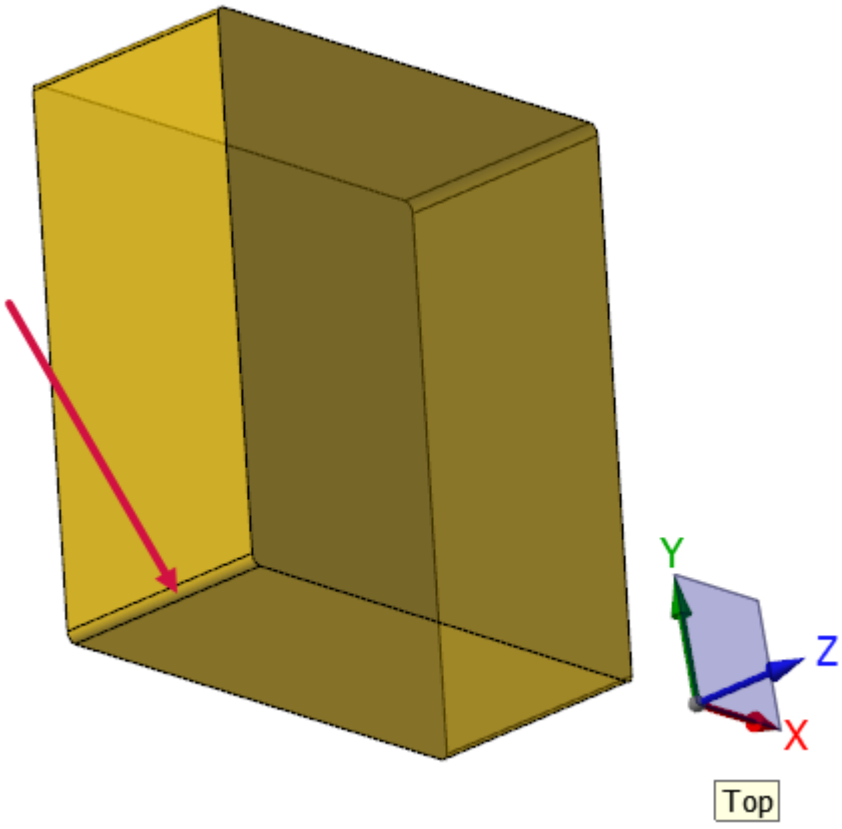


13. Right-click the **Corner radius** field, and select **Radius of an arc** from the pop-up menu.



14. Rotate the insert model as shown in the following picture, and select the corner radius indicated by the arrow.

    A corner radius of **0.2032** appears in the **Corner radius** field.



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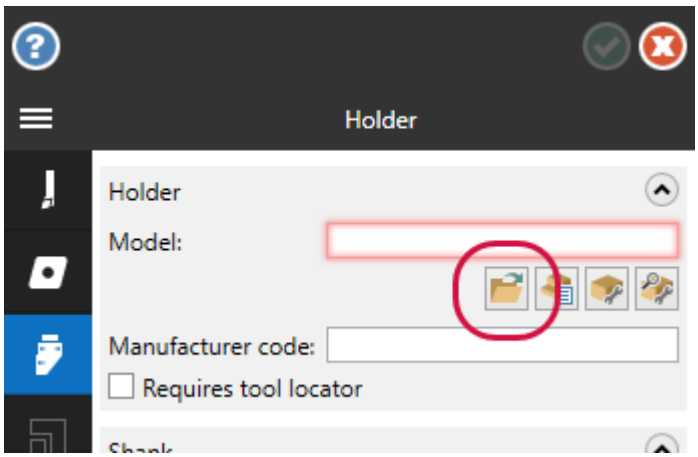
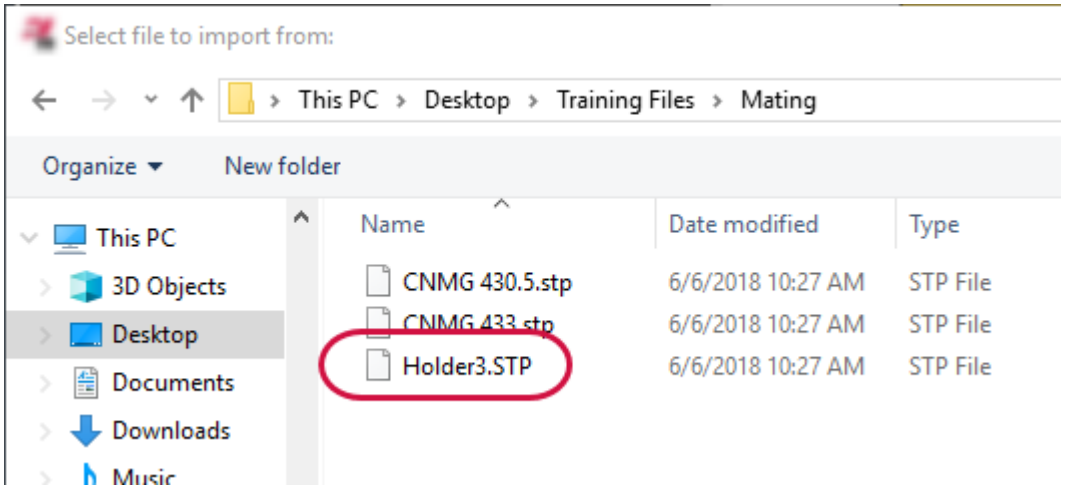
Exercise 2: Defining the holder

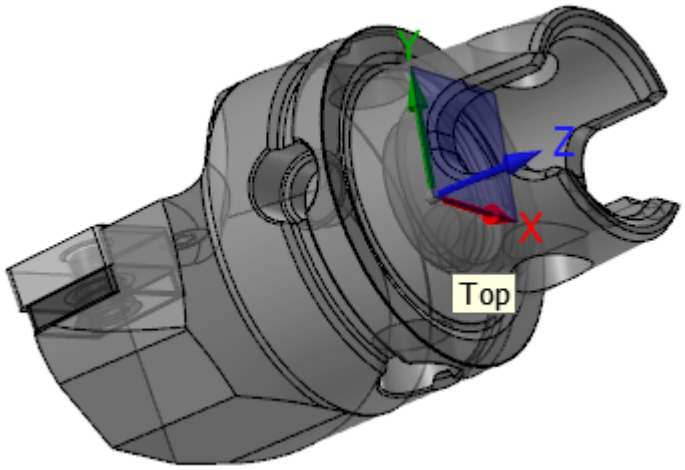
1. Move to the **Holder** page, and click **Open holder model**.



2. In the **Select file to import from** dialog box, navigate to and select the file `Holder3.stp`, which is included with this tutorial.

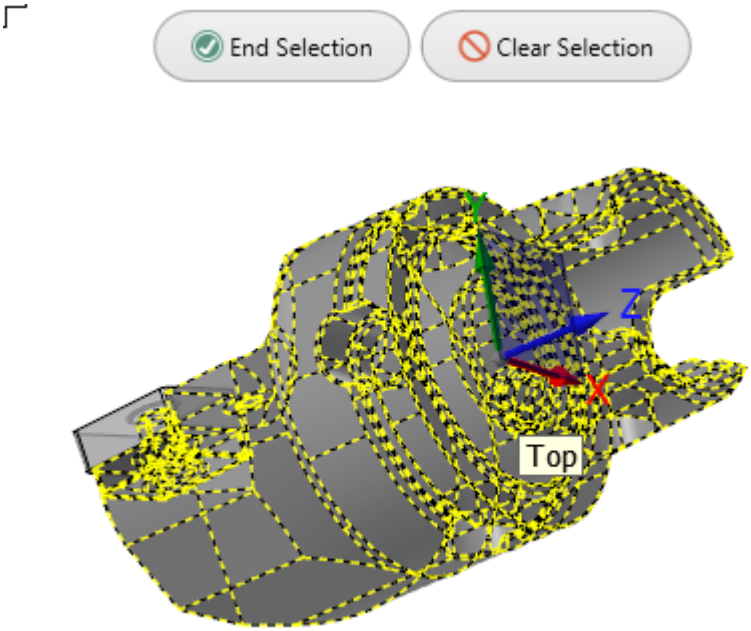
   The holder model appears in the graphics area, as shown in the second picture below.





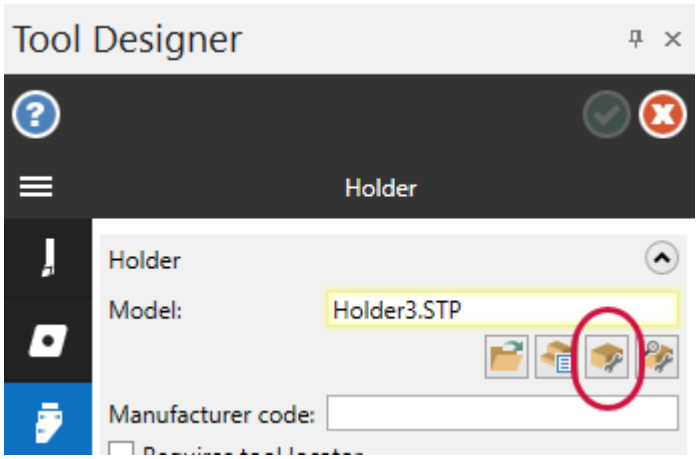
3. Click the model to select it, and then click **End Selection**.

The selected file name appears in the **Model** field. Notice that the **Model** field is outlined in yellow, which means the model might need to be optimized or repaired.



4. To try to repair the model, click **Optimize**. When the **Optimize solid** dialog box appears, click **OK**.

   Mastercam makes repairs and displays the **Optimize solid** dialog box, which shows the number of optimizations made.

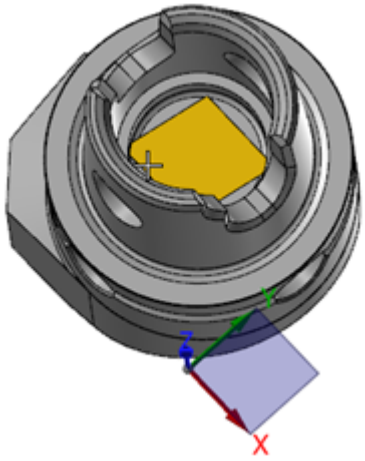


5. In the dialog box, click **OK**.

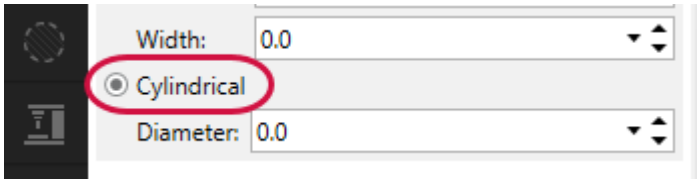
   In spite of Mastercam's optimizations, the **Model** field remains outlined in yellow. In this case, you can ignore this warning, as the tool will work fine in this tutorial. If Mastercam had been able to make all the necessary changes, the yellow outline would not have reappeared.

6. Rotate the holder model as shown in the following picture.

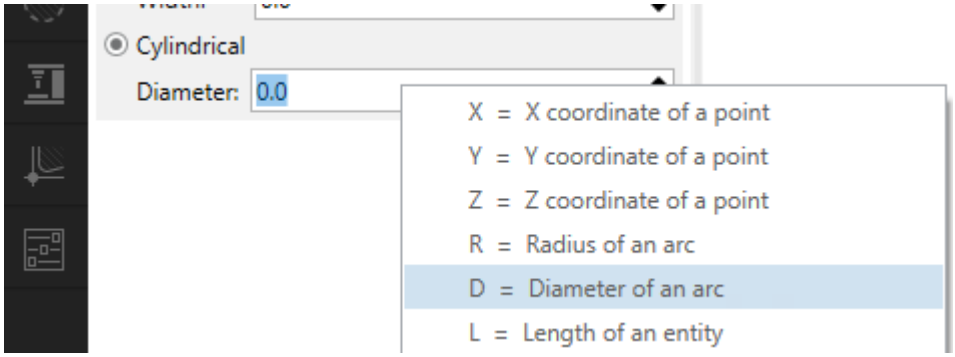
   Now you can see that the insert you picked for this tool is buried inside the holder.



7. In the **Shank** section of the **Holder** page, click **Cylindrical**.

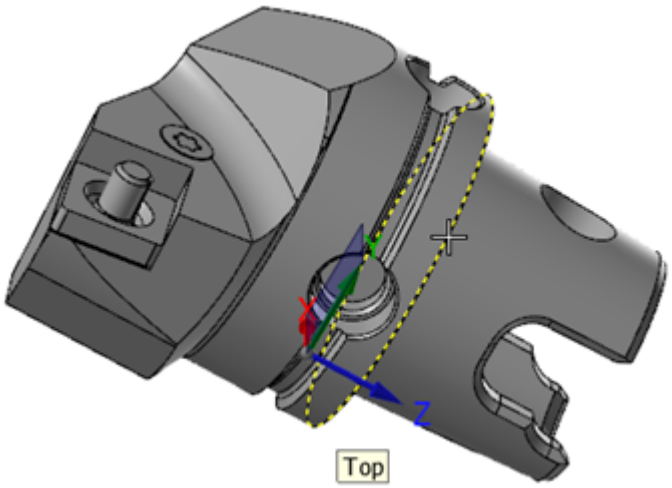


8. Right-click in **Diameter**, and choose **Diameter of an arc** from the pop-up menu.



9. Select the circular edge shown in the following image.

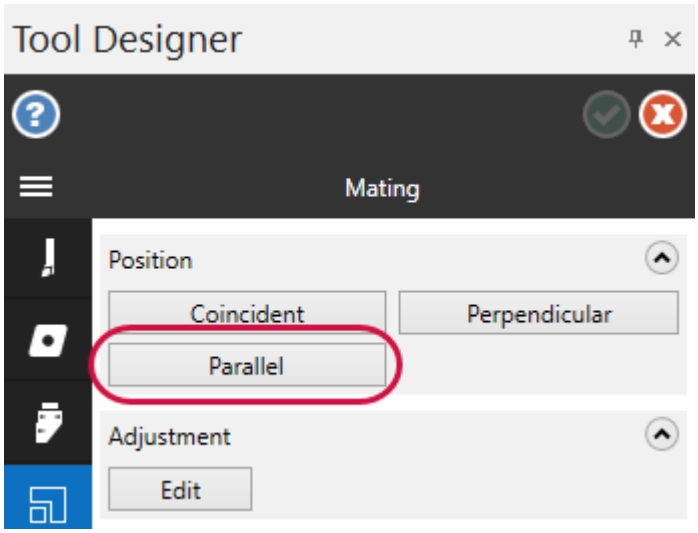
   Mastercam sets the **Diameter** field to **39.95**.



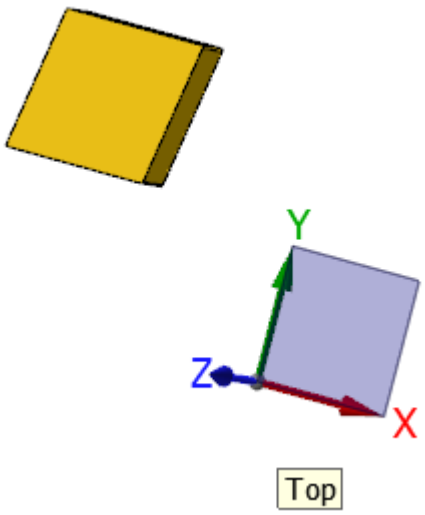
Exercise 3: Mating the insert to the holder

1. Click the **Mating** icon to move to that page.
2. In the **Mating** panel, click **Parallel**.

   Mastercam hides the holder, leaving just the insert on the screen.

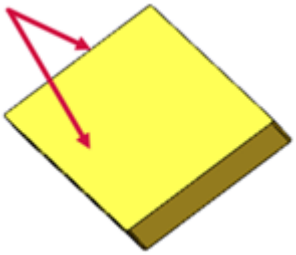


3. Rotate the insert so that you can see the face shown below. (The gnomon in the picture will help you position the insert.)



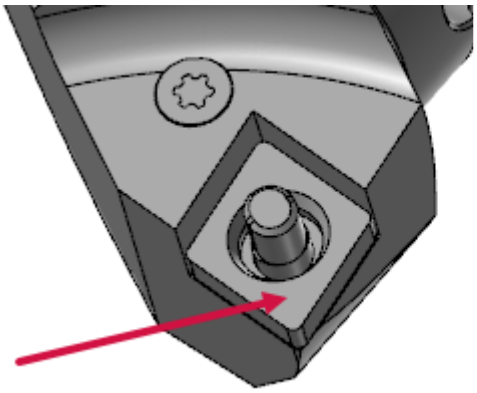
4. Select the insert face you rotated to, as indicated in the following picture, and then pick the edge indicated.

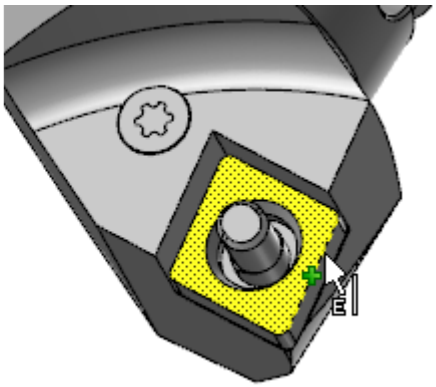
   The graphics window changes to display the tool holder.

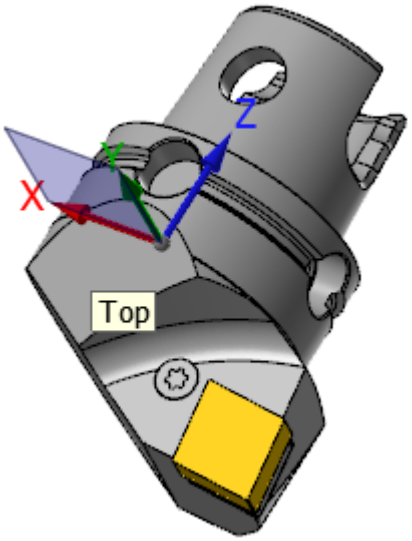


5. On the holder, select the face shown in the first picture following, and then select the edge shown. (To see the face and edge, you need to rotate the holder.)

   Mastercam aligns the insert with the holder, as shown in the third picture following.



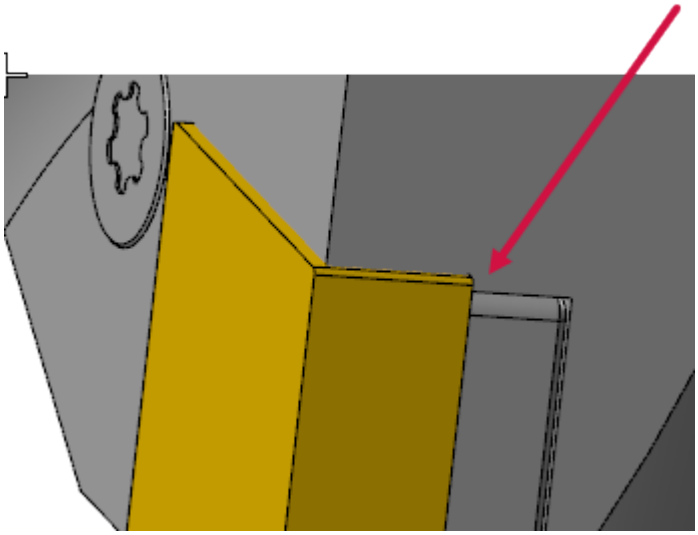




Exercise 4: Moving the insert

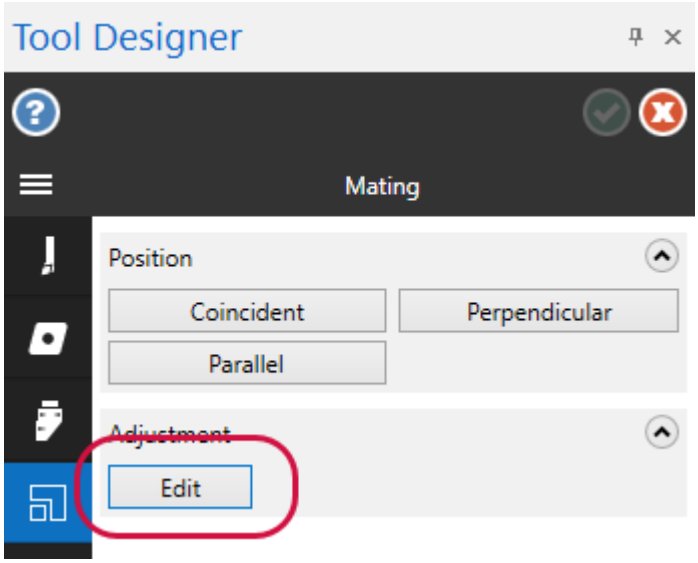
1. Zoom in on the insert, and notice that the insert is cutting into the holder.

   The insert's position requires further editing.



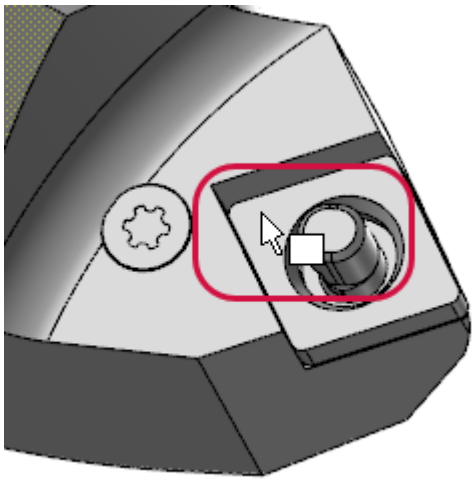
2. Click **Edit**.

   Mastercam returns you to the graphics area and activates the dynamic gnomon. You are prompted to select a face with which to position the gnomon.



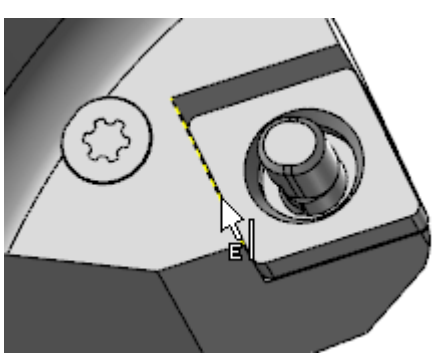
3. Select the face shown in the following picture.

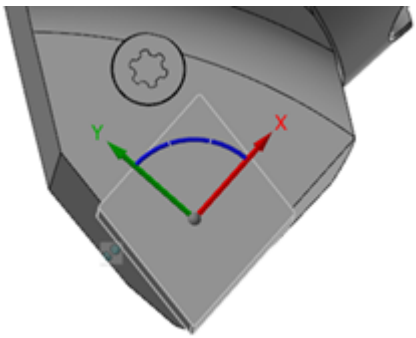
   Mastercam now asks you to select a line, two points, or a solid edge.



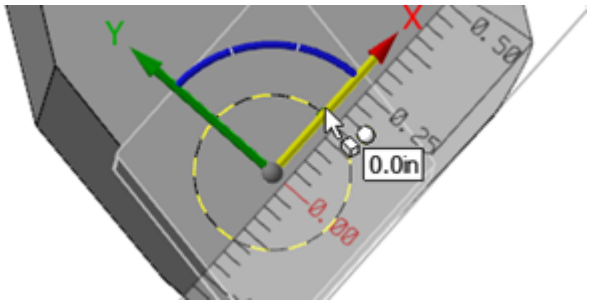
4. Select the solid edge where shown in the following picture.

   Mastercam places the insert and displays a 2D adjustment gnomon.

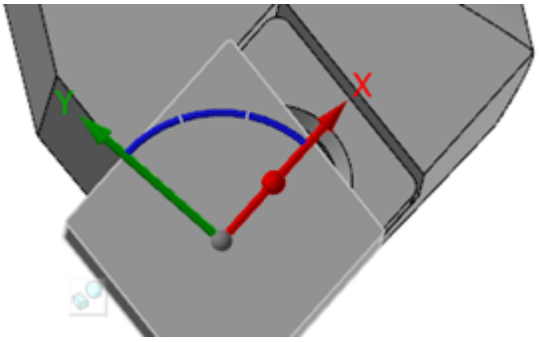




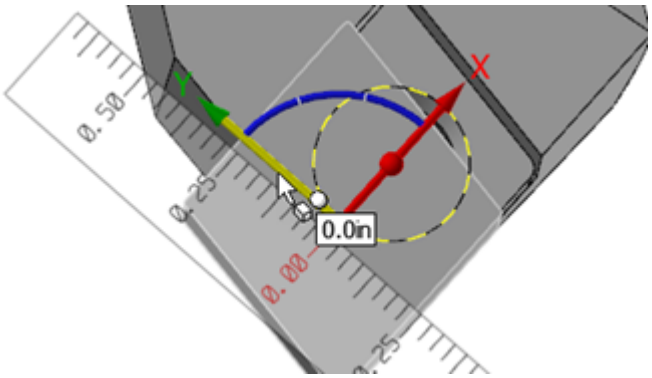
5. Click the gnomon's red arrow to activate movement in the X direction.



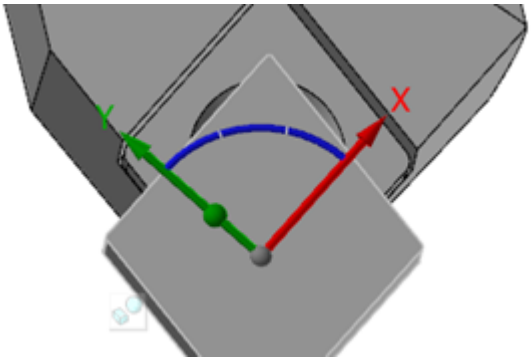
6. Move your mouse along the X axis to move the insert as shown in the following picture.



7. Click the gnomon's green arrow to activate movement in the Y direction.



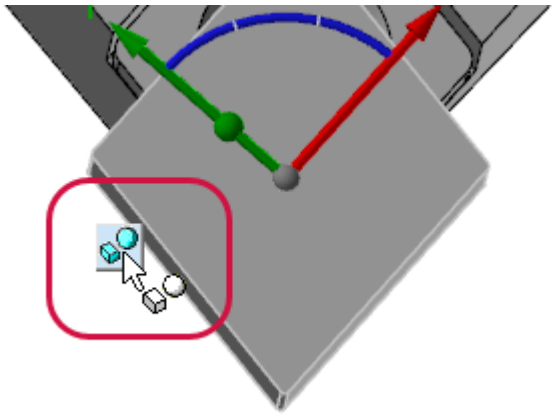
8. Move your mouse along the Y axis to move the insert as shown in the following picture.



Exercise 5: Repositioning the insert

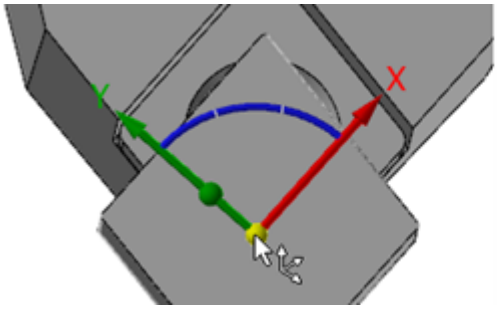
1. Click the gnomon's mode button to switch to gnomon mode.

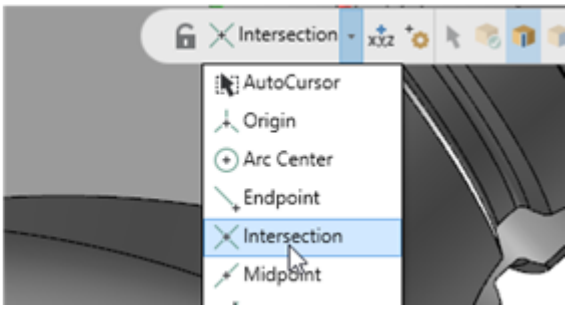
   In this mode, you can position the gnomon as needed.



2. Click the gnomon's origin, and then, from the **AutoCursor** drop-down, select **Intersection**.

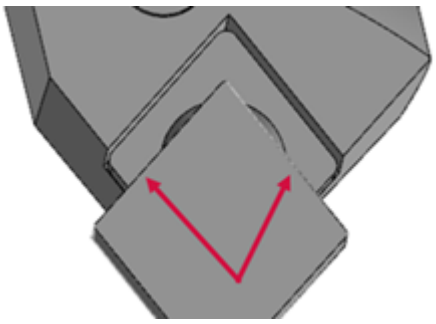
   You can now define a point from the intersection of two entities.

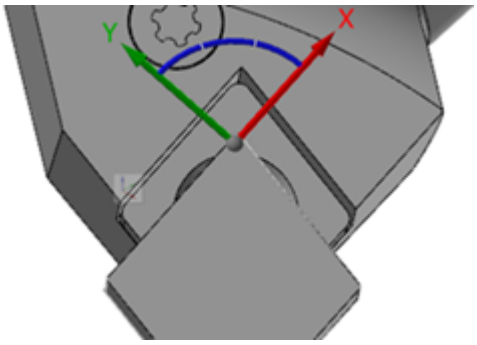




3. Select the two edges indicated in the following picture.

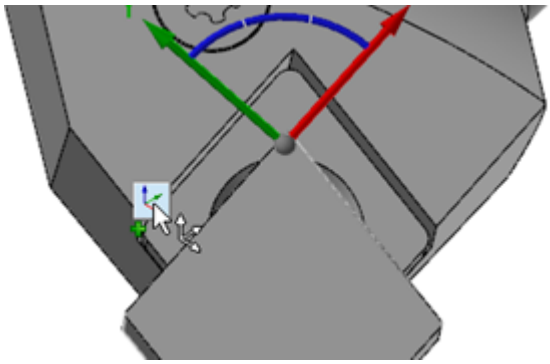
   Mastercam positions the gnomon at the intersection of the two lines, as shown in the second picture following.





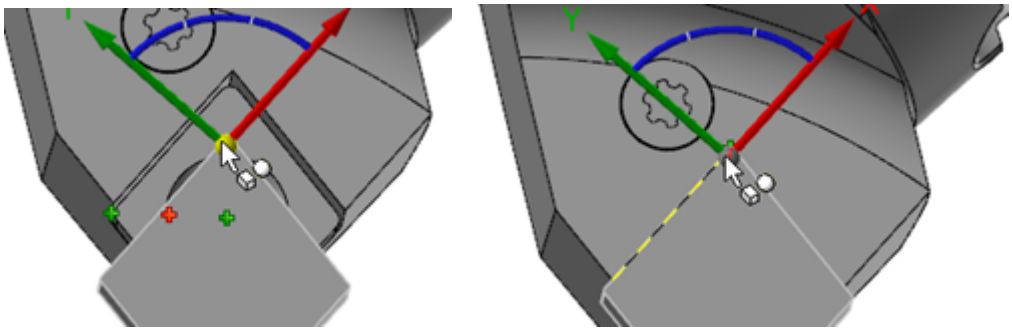
4. Click the gnomon button to return to translation mode.

   Changes you make now affect the geometry and not the gnomon.

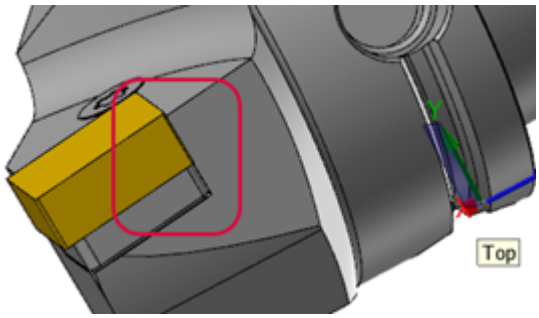


5. Click the gnonom's origin and then the corner indicated in the second picture following. Press [**Enter**] to finalize the new position.

   Mastercam aligns the corner of the insert with the corner on the holder, completing the mating process.



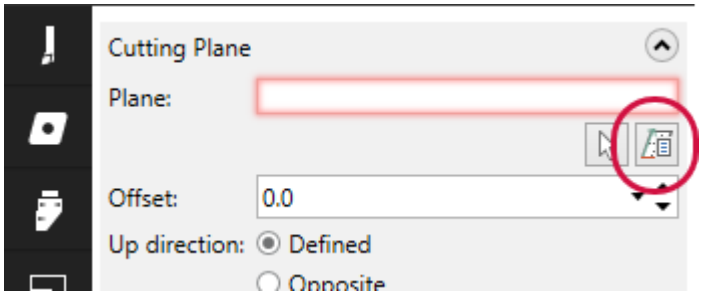
6. Rotate the tool so that you can see that the insert is now no longer cutting into the holder.



Exercise 6: Finishing the tool

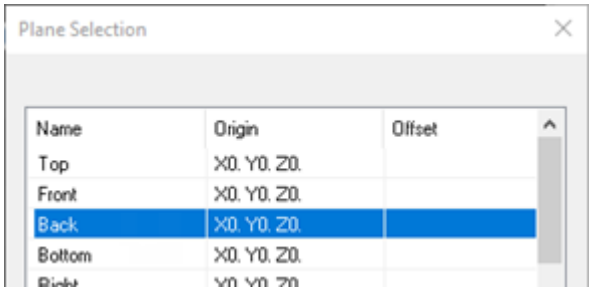
1. Click the **Setup** icon to move to that page, where you will set the cutting and machine connection planes.
2. In the **Cutting Plane** section, click **Select named plane**, located below the **Plane** field.

   The **Plane Selection** dialog box displays.



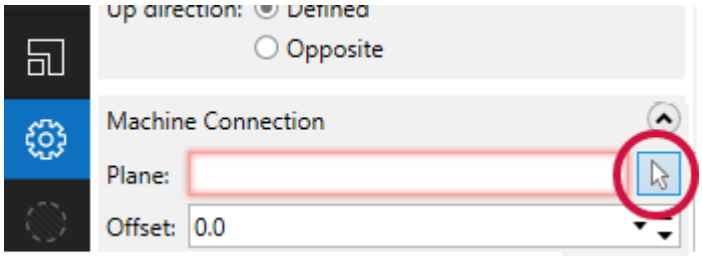
3. Select the **Back** plane, and click **OK**.

   Mastercam sets the **Plane** field to **Back**.

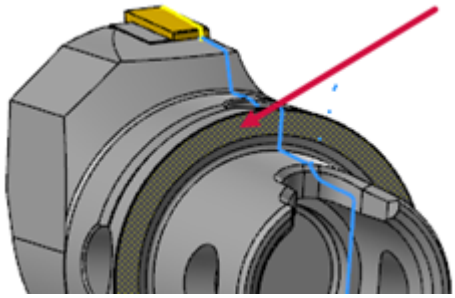


4. Click the **Select plane** button for the **Machine Connection** field.

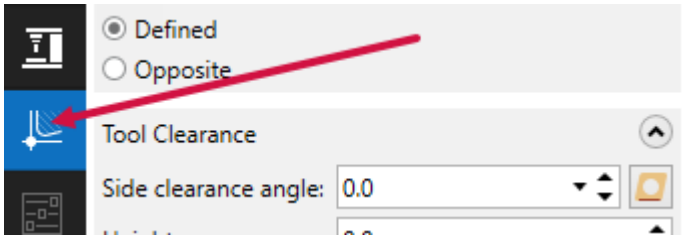
Mastercam returns you to the graphics area to select the **Machine Connection** plane.



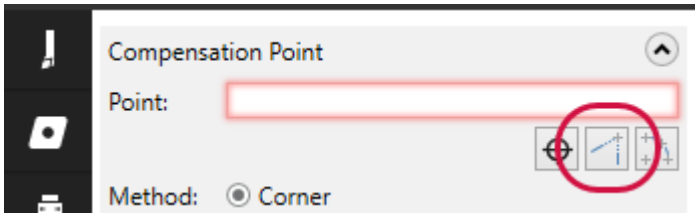
5. Select the face indicated in the following picture.



6. Move to the **Compensation** page.

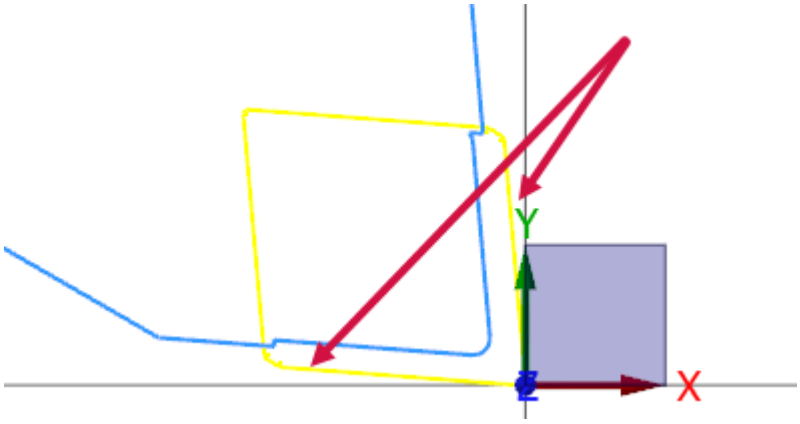


7. Select **Select compensation point with arc from tangent entities**.



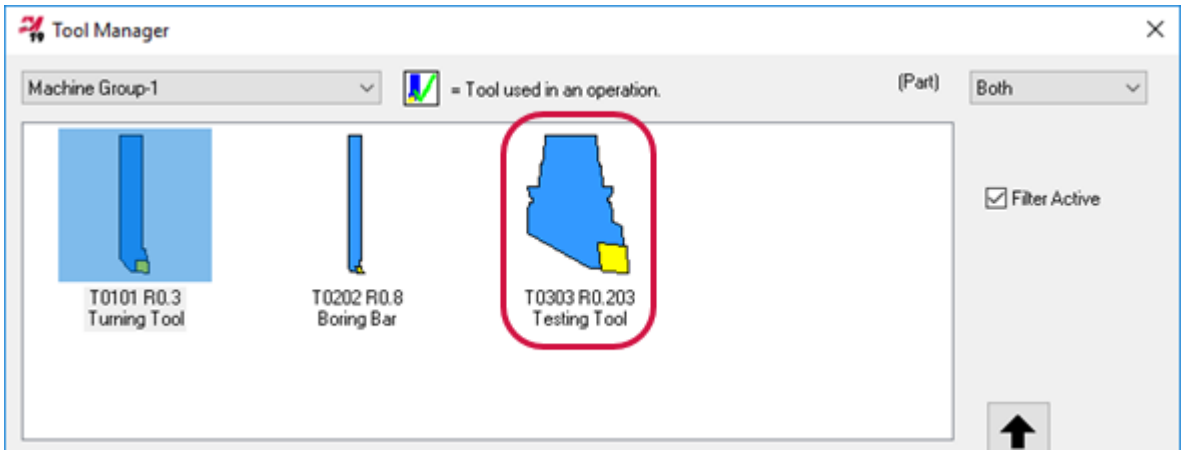
8. Select the two edges indicated in the following picture.

   Mastercam sets the compensation point to **-0.2032, 0.2032**.



9. Click **OK** to close Tool Designer and save the tool.

   The new tool appears in Tool Manager's tool list.

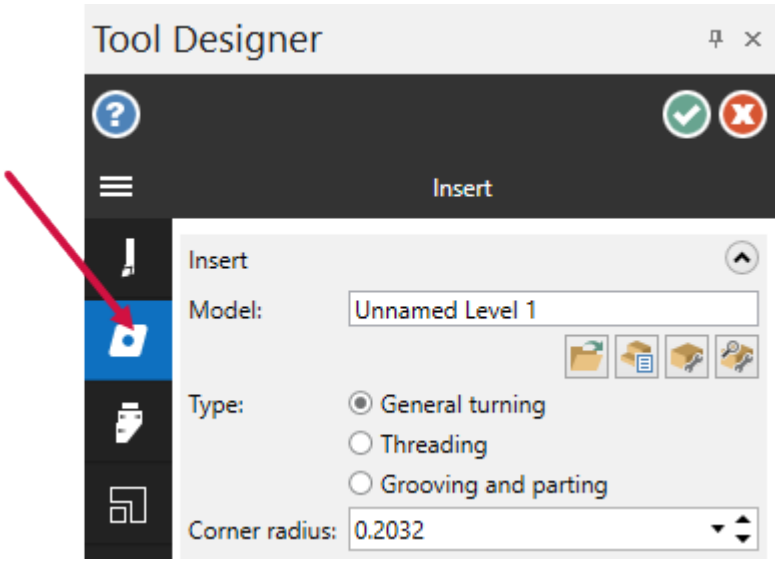


Exercise 7: Replacing the insert

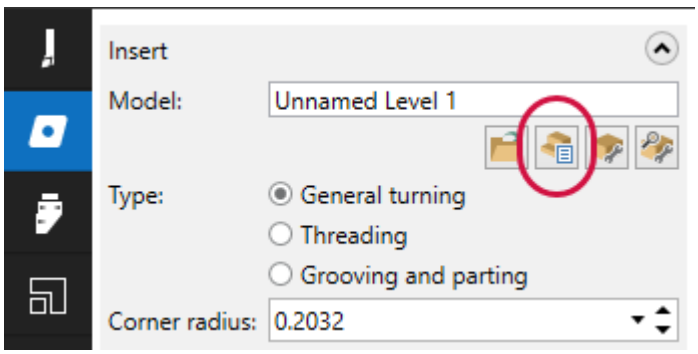
1. In Tool Manager, double-click **Testing Tool**.

   Mastercam reopens the tool in Tool Designer.

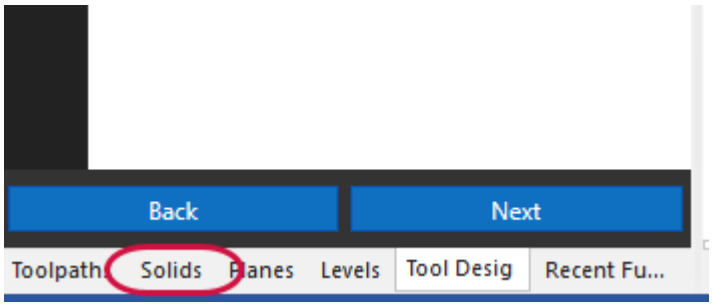
2. Go to the **Insert** page.



3. Click **Select from Solids Manager**.



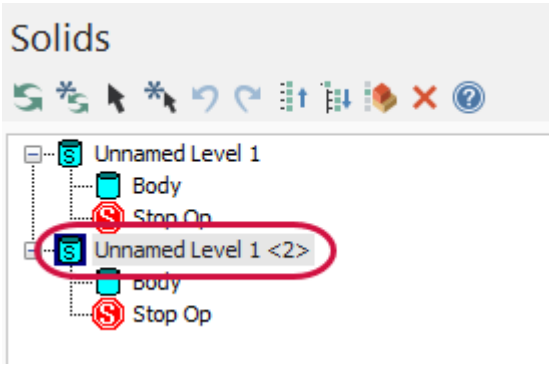
4. Click Mastercam's **Solids** tab to open the Solids Manager.



5. Select **Body** under **Unnamed Level 1 <2>**, and then double-click **Unnamed Level 1 <2>**.

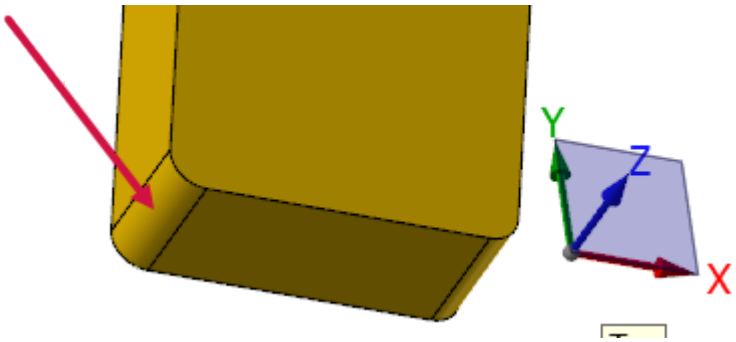
   Mastercam replaces the current insert with the second insert in the file, positioning it exactly where the original insert was located.

   Because most insert models are positioned as specified in an ISO standard, this is an easy way to replace inserts in your 3D tools. Once you have manually mated one insert to the holder, others whose models are defined in the same position automatically pop into place when selected on Tool Designer's **Insert** page.

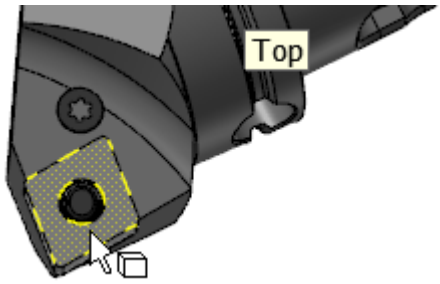


Exercise 8: Replacing a gauge insert

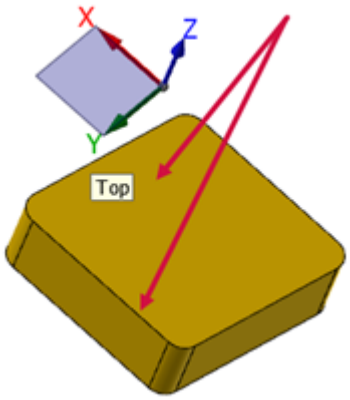
1. Start Tool Designer.
2. Name the tool **GaugeInsertTool**.
3. On the **Insert** page, click **Open insert model**.
4. Select the `CNMG 433.stp` file.
5. Right-click in the **Corner radius** field, choose **R = Radius of an arc**, and select a corner arc on the insert.



6. On the **Holder** page, click **Open holder** model, and choose the `Holder3.stp` file.
7. Rather than choose the holder geometry, choose the insert as the holder.

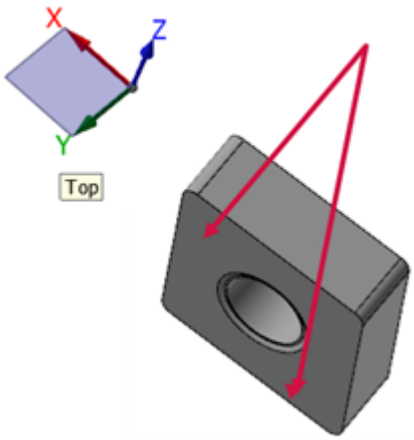


8. Go to the **Mating** tab, and click **Parallel**.
9. Choose the face and edge shown in the following picture.



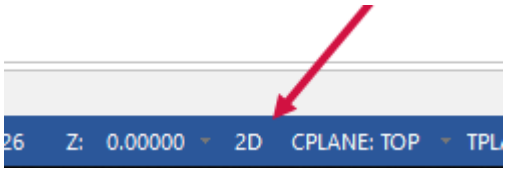
10. Choose the indicated face and edge on the holder/insert.

    Mastercam places the insert on top of the geometry you selected as the holder. What you want, though, is for the insert to be in the exact place as the gauge insert. This task requires the **Edit** function.



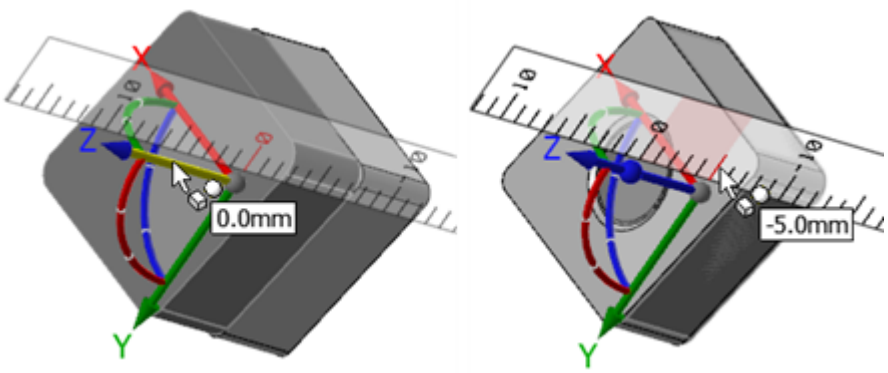
11. Click **Edit**, and set the gnomon to 3D by clicking the **2D** icon in Mastercam's **Status Bar**.

    You now have a control for manipulating the Z axis.



12. Click the blue Z axis arrow, slide the insert **-5.0 mm**. Click and then press [**Enter**] to finalize the change.

The inserts now share the same space.



13. Go back to the **Holder** page, and reload the holder file.
14. Select the holder geometry this time, and press [**Enter**].

    Mastercam displays the tool with the insert that has replaced the gauge insert.
15. Click Tool Designer's **OK** button to save the tool.

You have now completed the chapter on mating inserts to holders. In the next chapter, you learn to create tools from multiple-component holders.

CHAPTER 5

CREATING A CAPTO-STYLE MULTI-COMPONENT HOLDER

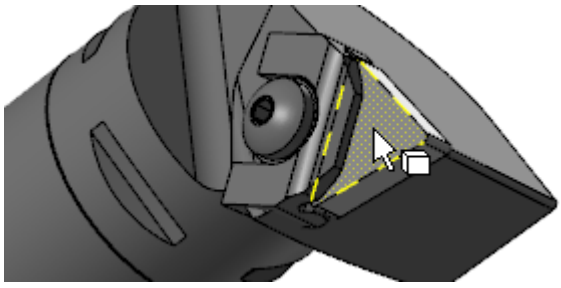
Although 3D tools created with Tool Designer can have only a single insert, holders can comprise many components. In this chapter, you learn to create such a tool.

Goals

- Define a holder made up of several components.
- Practice using Tool Designer.

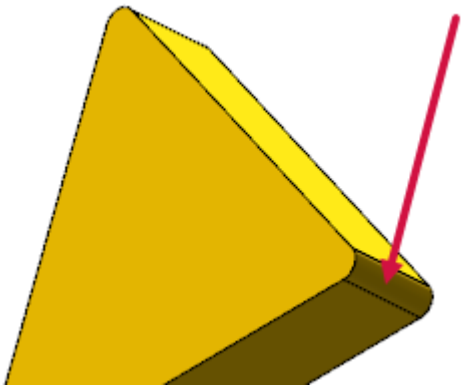
Exercise 1: Defining the insert

1. Open Tool Designer.
2. In the **Name** field, type **Capto Tool**.
3. Click the **Insert** icon to move to that page.
4. Click **Open insert model**, located below the **Model** field.
5. Navigate to and open the file `Tool3.stp`, which is included with this tutorial.
6. Rotate the tool, and select the insert, as shown in the following picture.



7. Right-click in the **Corner radius** field, and select **R = Radius of an arc**.
8. Select the arc shown in the following picture.

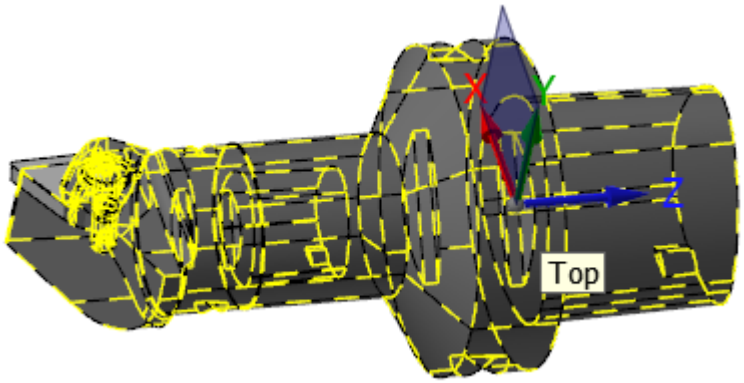
   Mastercam sets the **Corner radius** value to **0.79375**.



Exercise 2: Defining the holder

1. Go to the **Holder** page.
2. Click **Open holder model**.
3. Open the `Tool3.stp` file.
4. Select all entities except for the insert. Make sure you get the shim and the screw, as well.

   This is an example of a multi-component holder. Notice that the Model field is outlined in yellow, which means it may need to be optimized or repaired.

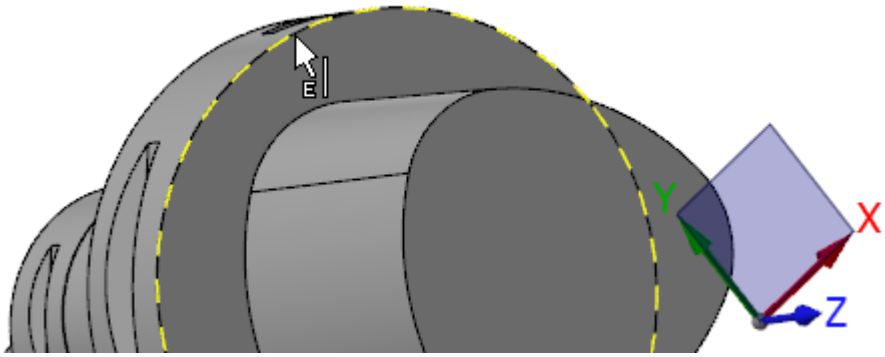


5. Click **End Selection** or press [**Enter**] to finalize your selections.

   Note: If you miss any parts of the holder, you can reload the file to start over.
6. Click the **Optimize** button, and dismiss the **Optimize solid** dialog box when it appears.

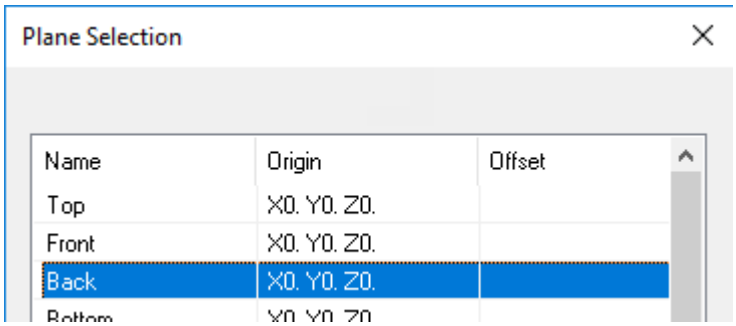
   Mastercam fixes the model and removes the yellow outline from the **Model** field.
7. In the **Shank** area, click **Cylindrical**.
8. Right-click the **Diameter** field, and select **Diameter of an arc** from the pop-up menu.
9. Choose the edge shown in the following picture.

   Mastercam sets **Diameter** to **80.0**.

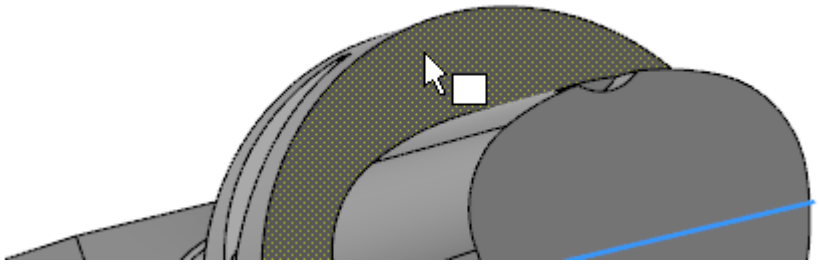


Exercise 3: Finishing the tool

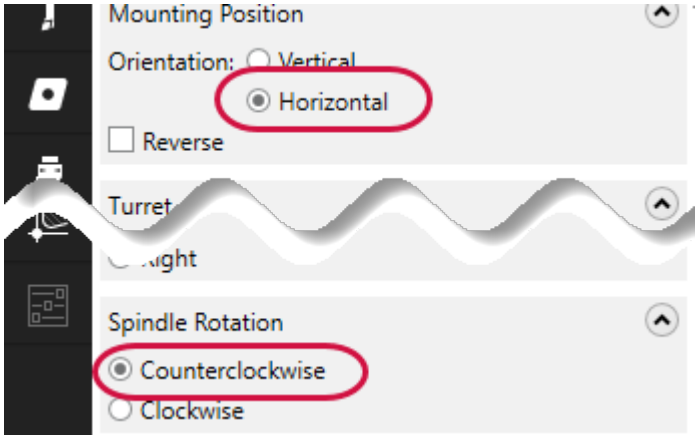
1. Go to the **Setup** page, and click **Select named plane**.
2. In the **Plane Selection** dialog box, select the **Back** plane, and click **OK**.



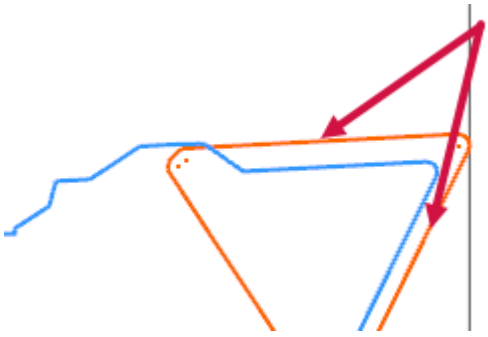
3. In the **Machine Connection** area, click **Select plane**, and then select the face shown in the following picture.



4. Go to the **Machine Orientation** page, and set **Orientation** to **Horizontal** and **Spindle Rotation** to **Counterclockwise**.



5. Go to the **Compensation** page, and click **Select compensation point with arc from tangent entities**.
6. Select the edges shown in the following picture.



7. In Tool Designer, click **OK** to close the panel and to save your tool.

CONCLUSION

Congratulations! You have completed the *Mastercam Tool Designer Tutorial*! Now that you have mastered the skills in this tutorial, explore Mastercam's other features and functions.

You may be interested in other tutorials that we offer. Mastercam tutorials are being constantly developed, and we will add more as we complete them. Visit our website, or select **Help**, **Tutorials** from the **File** tab.

Mastercam Resources

Enhance your Mastercam experience by using the following resources:

- *Mastercam Documentation*—Mastercam installs a number of helpful documents for your version of software in the Documentation folder of your Mastercam 2019 installation.
- *Mastercam Help*—Access Mastercam Help by selecting **Help**, **Contents** from Mastercam's **File** tab or by pressing **[Alt+H]** on your keyboard.
- *Mastercam Reseller*—Your local Mastercam Reseller can help with most questions about Mastercam.
- *Technical Support*—Our Technical Support department (+1 860-875-5006 or support@mastercam.com) is open Monday through Friday from 8:00 a.m. to 5:30 p.m. USA Eastern Standard Time.
- *Mastercam Tutorials*—We offer a series of tutorials to help registered users become familiar with basic Mastercam features and functions. Visit our website, or select **Help**, **Tutorials** from Mastercam's **File** tab to see the latest publications.
- *Mastercam University*—Mastercam University, an affordable online learning platform, gives you 24/7 access to Mastercam training materials. Take advantage of more than 180 videos to master skills at your own pace and help prepare for Mastercam Certification. For more information on Mastercam University, please contact your Authorized Mastercam Reseller, visit www.mastercamu.com, or email training@mastercam.com.
- *Online Communities*—You can find a wealth of information at www.mastercam.com. For tech tips and the latest Mastercam news, follow us on Facebook (www.facebook.com/mastercam), Twitter (www.twitter.com/mastercam), or Google+ (plus.google.com/+mastercam). Visit our YouTube channel to see Mastercam in action (www.youtube.com/user/MastercamCadCam)! Registered users can search for information or ask questions on the Mastercam Web forum, forum.mastercam.com, or use the knowledgebase at kb.mastercam.com.

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