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Machine Simulation Tutorials



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Creating a Sample Machine Model

The following material presents a detailed tutorial for creating a sample machine model with simulation bodies, using the Test Machine functions to validate the model at various points along the way.

Summary of Steps

Step 1: Start Machine Manager and initialize a new MDD "Step 2: Add and configure the three linear axes" on page 4 "Step 2: Add and configure the three linear axes" on page 4 "Step 4. Add the first two simulation bodies and test the machine " on page 9 "Step 5 Set the machine's ISO view to reversed " on page 14 "Steps 6 Add another axis and Sim body, and test the machine " on page 15 "Step 7 Add remaining axis and sim body, and test the machine " on page 17 "Step 8 Create operations " on page 20

Step 1: Start Machine Manager and initialize a new MDD



 Manager Go to Plug-Ins > Machine Manager. (If you see no such menu item, use Plug-In Manager to activate it.)

Machine Manager opens, showing the most recent MDD.

2. Change the machine type to 3-Axis Vertical Mill.

This is the simplest machine to start with.

3. Click New to create a new MDD.

We now have a 3-axis mill MDD that we can customize.

4. Type in Filename: New Machine 5000.

- 5. Choose bullet option New From Template.
- 6. Choose bullet option Other and from the dropdown that appears, select Empty.

-		New MD	D		-		×
Filename: New	Machine	5000					
◯ Clone From ● New From T		Unique Key	Ang	ieO.02e20	ad4-c	1791 Reger	ierate
○ 3-Axis ○ 4-Axis ○ 5-Axis	Mill	 2-Axis Lat Mill-Turn Other 	the				
Empty (Ad		© outo	¥			Creat Cance	

7. Click Create. A new Machine Manager dialog opens for the New Machine 5000.

The Kinematic tree contains the minimum it could possibly contain: one Toolgroup (T) and one Part Station (P), nothing else.

Machine Manager					
emed New Machine 5000	New Mac	chine 50	00		
□□ P1 (P)	General	Machir	ning Prefs	Interop Events	Simulation
	Menu Na	me	New Ma	chine 5000	
	VMM Na	me			
	Machine	Sim	<none></none>		
	Post Pro	cessor			
	Part File				
	Orientat	tion	Views		
	Ver	tical	Work	space Vertical	Mill 🗸 🗸
	⊖ Hor	rizontal	S	eparate Machine	Sim Viewset

Step 2: Add and configure the three linear axes

Z Axis

First we will add the Z axis. It is not necessary to add items in any particular order, we will begin with the Z axis because it is on the tool branch and it addresses the part.

1. Right-click the Root Node > Add child > Linear Axis.

Machine Manager				
New Machine	5000 Add child	Nov	Machine 5000 Linear Axis	
⊡ P1 (P)	Rename Delete		Rotary Axis Toolgroup	vents Simu
		VM Ma	Part Station	
		Pos Par	Utility Station Simulation Body	

2. Enter details as shown. Label: Z1. User Name: Spindle. (The convention for Tool axes is to start with 1 and go up.)

🖳 Add	Linear Axis 🛛 🗖 🗙
Label 2	21
User Name	Spindle
	OK Cancel

Please Note: The User name of an axis entered here will appear throughout Machine Manager (including Test Machine and MTG) and also in Render Tracking.

3. Click OK and see the result:

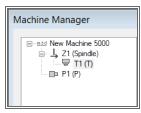
Machine Manager			
New Machine 5000	New Machine 5000		
<u>1</u> , Z1 (Spindle) ₩ T1 (T) □= P1 (P)	Linear Axis Rapid Max Velocity 0 Rapid Acceleration 0 Max Feed 0 Axis Limited Minimum Limit 0	mm/min mm/min²	Direction Vector Standard Z V X 0 Y 0 Z 1
	Maximum Limit 0		Nominal Z v From Current CS

- Tree has Z1 directly below root (sibling with T1 and P1) and is selected.
- The Linear Axis tab opens and shows what options you have for a linear axis.

Now we will configure the Z axis.

4. In the Direction Vector area, a pulldown menu provides options for X,Y,Z, Standard and Reversed vectors, plus a Custom option. Retain the default (Standard Z).

5. In the tree, click and drag T1 onto Z1.



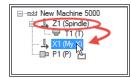
X Axis

Next, we will add the X axis.

Right-click Root > Add child > Linear Axis. Lable it X1, user Name: My X.

We will now configure the X axis:

- 6. In the Direction Vector area, again retain the default (Standard X) from the pulldown menu.
- 7. In the tree, drag Z1 onto X1.



Notice how the subtree (T1) comes along.

Y Axis

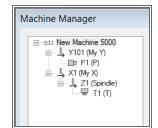
Finally we will add the Y axis.

8. Right-click Root Add child> Linear Axis. Label: Y101, (The convention for Part axes is to start with 101 and go up.) user Name is My Y.

We will now configure the Y axis.

9. In the Direction Vector area, pulldown menu, retain the default (Standard Y).

10. In the tree, drag P1 onto Y101.



11. Save the MDD.

We have created a very basic 3-axis machine but it needs much more detail. The next item we will configure for this example machine, is an ATC toolgroup.

Step 3: Configure the toolgroup

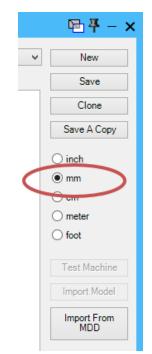
1. In the Kinematic tree, click T1.

The dialog presents three toolgroup-specific tabs.

Machine Manager	
□ <u>mdd</u> New Machine 5000 □J, Y101 (My Y) □J, X1 (My X) □J, X1 (My X) □J, Z1 (Spindle) T1 (T)	New Machine 5000 Toolgroup Orientation ATC V Flow 1

 Select the second tab (Orientation) and enter the following: (double check that the dimension selector is set to mm as shown right.)

Toolgro	up Orientation	Tool Station
Relati	ive To Machine H	lome
Hom	e Position	From Current CS
X	380	To New CS
Y	480	
Z	660	
-H Ve	ector	V Vector
X	+ +	Y+ v
x	1	X 0
Y	0	Y 1
Z	0	Ζ 0



Retain the H Vector and V Vector defaults.

Select the first tab (Toolgroup) and:

In the pulldown menu, change the type to ATC (Automatic Tool Changing head).
 Notice that many other controls on the tab just go away, as they are not needed.

4. Change the other options as shown below:

Show Tool ID#s on Tiles					
✓ Tip Center Programming					
Mill Backend Type		~			
Shank Size 64					

We checked the box for Lock Mill Backend since only one backend will ever be encountered (as is the usual case). The value entered into the Shank Size box represents a maximum shank size. ie. in this case no greater than 64mm.

- 5. Select the Tool Station tab and enter the following:
- Retain values for "Home Position".
- Select the checkbox for Single Tool Orientation.

This means that when users see the tool dialog, they will not have to choose from the stations on the tool cross.

- Retain the selected status for the Live Tool checkbox.
- Retain default choices for vectors.

Note: If your machine had right-angle heads, these would have to be configured. In this case it is not necessary.

Toolgroup Orientation Tool Station Relative To T1 (T) From Current CS X 0 Tool New CS Y 0 Tool New CS	Automatic Tool Changer Tool ID Tool Change Time	secs
Z 0	✓ Single Tool Orientation ✓ Live Tool Additive	
H Vector	Subpositions	
X 1 X 0 Y 0 Y 1	Allow Mill Subpositions Manual	v n Defined) v
Z 0 Z 0	Name	Angle
Tool Dialog Orientation	Add Edit Delete	
Flip Depth		

6. Save the MDD.

We still have the rotary axes to add, but before that we will create some Simulation bodies so that we can start using Test Machine.

First we will add a base plate and color it black, and then add a cylinder to represent the spindle, which will be red.

Move the Machine Manager dialog to the top of the workspace and Click the roll-up

icon ***** on the title bar to hide the dialog.

Step 4. Add the first two simulation bodies and test the machine

First we will make a black Base Plate which will be used only for simulation purposes.

- 1. File > New. Call the file Base Plate and save it in your preferred tutorial directory.
- 2. In the DCD enter the following mm values:

General Comments Machining Preferences Machine New Open Material New Family STAINLESS STEEL Save Alloy Group ASTM A296 Save As Hardness 275 to 325 Close Alloys Default Alloy Close Inches Inches Mill Class # X 1000 +X 1000 +Z 0 +Y 1000 -Z 600 Tool Change Part Offset Z 0 X	Base Plate.vnc				9 - • ×
Material New Family STAINLESS STEEL Alloy Group ASTM A296 Hardness 275 to 325 Alloys Default Alloy Close Inches Inches Inches Mill Class HSK 80A Vorkspace Intermediate Tooling Stock Size and Part Origin Mill Class +X 1000 -X -1000 -Y -1000 -Y -1000 -Y -000	General Comment	s Machining Preferences			
Material Save Family STAINLESS STEEL Alloy Group ASTM A296 Hardness 275 to 325 Alloys Default Alloy Close Inches Image: Stock Size and Part Origin Mill Class HSK 80A Clearance Stock Size and Part Origin Mill Class +X 1000 -X -1000 -Y -1000 Part Offset Z	Machine New	Machine 5000		~	Open
Partinity STAINLESS STEEL Alloy Group ASTM A296 Hardness 275 to 325 Alloys Default Alloy Close Inches Image: Comparison of the strength of the strengen of the strength of the strengt of the strength of	Material				New
Alloy Group AS IM A295 Hardness 275 to 325 Alloys Default Alloy Close Inches Millimeters Workspace Intermediate Tooling Stock Size and Part Origin +X 1000 -X -1000 Part Offset Part Part Part Part Part Part Part Part	Family	STAINLESS STEEL		\checkmark	Save
Alloys Default Alloy Close Inches Inches Millimeters Workspace Intermediate Tooling Stock Size and Part Origin Mill Class +X 1000 +X 1000 -X -1000 Part Offset 7	Alloy Group	ASTM A296		~	Save As
Alloys Derait Alloy Inches Millimeters Workspace Intermediate Tooling Stock Size and Part Origin +X 1000 -X -1000 -Y 1000 Part Offset -Y 1000 -Y 1000 	Hardness	275 to 325		¥	Save Copy
Workspace Intermediate Tooling Stock Size and Part Origin +X 1000 +X 1000 +Y 1000 -Y -1000 Part Offset Clearance Z 0	Alloys	Default Alloy			Close
Workspace Intermediate Tooling Stock Size and Part Origin Mill Class +X 1000 +Y 1000 -Y -1000 Part Offset 7					◯ Inches
Stock Size and Part Origin Mill Class HSK 80A +X 1000 +Z 0 -X -1000 -Z -600 Part Offset -Z 0					Millimeters
Stock Size and Part Origin Mill Class HSK 80A +X 1000 +Z 0 -X -1000 -Z -600 Part Offset -Z 0					
+X 1000 +X 1000 +Y 1000 -Y -1000 Part Offset -Z -600 -Z -600 -Z -600 -Z -600	Workspace Interm	nediate Tooling			
+X 1000 +X 1000 +Y 1000 -Y -1000 Part Offset -Z -600 -Z -600 -Z -600 -Z -600					
-X -1000 +Y 1000 -Y -1000 Part Offset		-			80A ~
+Y 1000 -Y -1000 Part Offset			Clearance	500	
-Y -1000 -Z -600	-X -1000				Tool Change
-Y -1000	+Y 1000	-7 -600			
	-Y				
	Part Offset	~ 7 0			
	X 0				
	T U				

3. Close the DCD dialog.

In the part file, make sure you are in isometric view. We will now create a large cuboid.

4. Open the Create Solid dialog and choose Cuboid. (Solid Modeling > Create

Solid	> Cuboid	—).

5. In the Cuboid dialog, click the "Stock Dim" button. This will supply most of the dimensions you need. Now change Max Z = -600 and Min Z = -650.

Cubo	bid						9 🗖 🗙
Max	x	1000	Y	1000	z	-600	Do It Stock Dim.
Min	х	-1000	Y	-1000	z	-650	

- 6. Click Do It.
- 7. Right-click on the unselected body and choose > User Color from the menu.
- 8. Change the color of #0 (Body) to Color #25 (black), then close the attribute dialog.

Set Color for Solids/Geometry						
Assigned Colors						
25 20 6 37 10 Preset Colors						
1 2 3 4 5 6 7 3						
9 10 11 12 13 14 15 16						
17 18 19 20 21 22 23 24						
25 26 27 28 29 30 31 32						
33 34 35 36 37 38 39 40						

- 9. Open the CS list dialog. You will be watching it in the next step.
- 10. Save the part file.

We will now add the base plate body as a Sim body in Machine Manager.

- 11. Unroll Machine Manager by hovering over the visible title bar.
- 12. Right-click the Root and choose Add child > Simulation Body.
- 13. Label the shape Base Plate and click OK.

🖳 Add	Simulation Body	-	×
Label	Base Plate		
	ОК	(Cancel
			.:

The Simulation Body tab opens, prompting you to configure the body.

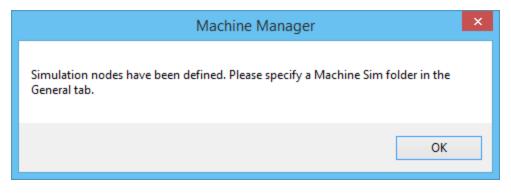
14. Ensure the body in the workspace is selected, then click Apply Selected. The image appears in the first column.

Machine Manager		g 🗆 🗵
	New Machine 5000 Simulation Body Apply Selected Select Body Visible On Load	New Save Clone
Base Plate	Name of Body Cube ID T Collision Groups Visibility Groups Visibility Groups	Save A Copy inch mm cm cm foot Test Machine import Model
		Key Prefix AngieO

15. Click toolgroup node T1, and in the Tool Station tab click To New CS. Notice a new CS named T1_N1 CS is created.

Machine Manager		CS	
	New Machine 5000 Toolgroup Orientation Relative To T1 (T) Home Position X 0 Y 0 Z 0	1 2	Comm WFD

16. Click Save in the Machine Manager dialog. You may be presented with an error message:



17. Click OK and use the dropdown menu in Machine Manager to choose the Machine Sim subfolder

...\<*version*>\MachineSim\NewMachine5000. All Simulation parts will now be saved to this location.

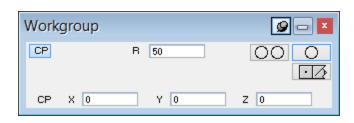
Machine Manager		9 - ×
	New Machine 5000 v General Machining Prefs Interop Events Simulation Menu Name New Machine 5000 v VMM Name Machine Sim New Machine 5000 v Post Processor Post Processor Chone > 1000 v Post Processor	New Save Clone Save A Copy O inch mm
	Part File Cleve Folder? Orientation Verso Workspace Vertical Horizontal Separate Machine Sim Viewset Set Views Filename New Machine 5000 mdd Revision # 3 Location C:\ProgramData\2D Systema\GibbsCAM\11.0.2\MDD Unique Key AngleO.82c74c73.3706	 mail meter foot Test Machine Import Model
	Comments	Key Prefix AngieO

18. Roll up Machine Manager by moving your cursor out of the dialog.

We will now make a second Sim body in the Base Plate file, a basic spindle:

19. Change CS to the newly created, T1_N1 CS.

20. Create a circle as shown below Geometry > Circle > (center and radius).



This circle will be used to create an extruded body to represent the spindle.

- 21. Create Solid > Create Solid > Extrude:
- 22. Select the circle. Enter the following values and click Do it.

		R		
	Extrude		🥥 🗖 🗙	
_	Z+ 0 Z150	Taper	Do It	

- Right-click the unselected body and choose User Color. Set the color of #0 (Body) to Color #10 (red).
- 24. Select the new solid body.
- 25. Save the part file.

Now we will add the cylinder as a Sim body in Machine Manager.

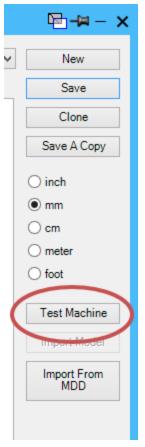
- 26. Hover over the rolled up Machine Manager to open it.
- 27. Right-click Z1 Add child > Simulation Body. Call it Tool Spindle and ensure Apply Selected is checked, then click OK.
- 28. Verify that the image is as you expected.
- 29. Save the MDD.

We are now able to use the Test Machine function for a very basic test.

Click Test Machine. (If prompted to do so, save the current MDD.)

Move the cursor out of the Machine manager dialog to repin it. The Test Machine dialog and Machine Sim Rendering palette will be visible.

- On the Test Machine dialog, slide the X1 slider and the Z1 slider and see how the "spindle" moves and the base plate does not.
- Slide the Y101 slider and see how nothing moves.
- Close the Test Machine dialog.



You may have noticed that the machine's ISO view is different from GibbsCAMs .

We will be fixing this in the next step.

Step 5 Set the machine's ISO view to reversed

- 1. In Machine Manager, click the Root node (and then, if necessary, the General tab).
- 2. Click the Workspace pull-down in the Views section and select Custom.
- 3. Click the Edit Custom button, enter the following, then click OK.

	Set	View
ISO	v]
- Up V	Vector	Right Vector
X	0	X 1
Y	0	Y O
z	1	Z 0
		OK Cancel

- 4. Save the MDD.
- 5. Click Test Machine and press CTRL+I to change to the new machine-ISO view.
- Slide the X1 slider and note the corrected behaviour. Close the Test Machine dialog.

Steps 6 Add another axis and Sim body, and test the machine

Now we will add the first rotary axis.

 In Machine Manager, right-click Y101 and Add child > Rotary Axis. Enter details as follows then click OK.

🖳 Add	Rotary Axis 🛛 🗖 🗖	x
Label	B101	
User Name	My B	
	OK Cance	۱ :

2. In the Rotary Axis tab, change the Direction Vector to Reversed B.

(Remember that this machine's ISO is reversed.)

3. Select the "Axis Limited" checkbox and set the values as shown.

Rotary Axis			
Rapid Max Velocity	0	°/min	Direction Vector
Rapid Acceleration	0	°/min²	Reversed B 🗸 🗸
Max Feed	0]	X 0
Axis Limited			Y -1
Minimum Limit	-30		Ζ 0
Maximum Limit	120]	Nominal B \lor
			From Current CS
		l	Pivot Point
			X 0
			Υ 0
			Z 20

4. Save the MDD and roll up Machine Manager.

We will now create the third Sim body, the brown Table in the part file.

- 5. Select CS: XY plane.
- Select the base plate, and move it down out of the way: using Modify > Translate as shown below. Do it.

Translate	🥥 🗆 🗵
Offset Am	ount
×	0
Y	0
z	-400
🗌 Visible V	wGs Dolt

Now we will create a cuboid to represent the table:

7. (Create Solid >) Cuboid as shown. Do It.

Cubo	bid						🥥 🗖 🗙
Max	x	500	Y	500	7	-500	Do It Stock Dim.
Min	x	-500	Y	-500		-550]

- Right-click (unselected body) you just created> User Color and change the #0 (Body) to Color #20 (brown).
- 9. Save the part file.

Return to Machine Manager and add the new brown cuboid as a Sim body.

- 10. Select the brown body, and then unroll Machine Manager.
- 11. Right-click B101: Add child > Simulation Body. Call it Table and ensure Apply Selected is checked, then click OK.
- 12. Verify that the image is as you expected.
- 13. Save the MDD.

Click Test Machine again and notice the new B101 slider. Experiment with the B rotations and Y slides, and then close Test Machine.

Step 7 Add remaining axis and sim body, and test the machine

In the part file we will create two cuboids whose intersection will represent the fourth Sim body, a trunion:

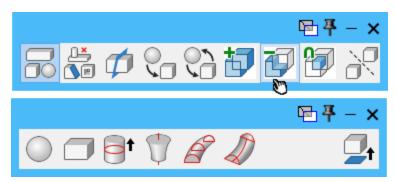
1. In the CS: XY plane, Create Solid > Cuboid as shown: Do it.

Cuboid				🥥 🗖 🗙
Max X	500	Y 800	Z 0	Do It
Min X		Y -800	Z -750	Stock Dim.

2. Now create a second cuboid as shown below: Do it.

Cubo	bid							🥥 🗖 🗙
							_	Do It
Max	Х	550	Y	700	Z	0		Stock Dim.
Min	×	-550	Y	-700	z	-700		

3. Select big cube, then Ctrl-select the smaller, (in that order) and Subtract.



- 4. Right-click the unselected body you just created and change the color to Color #6 (green).
- 5. Save the part file.

In Machine Manager, we will add the green trunion as a Sim body:

- 6. Select the green body, and then unroll Machine Manager.
- Right-click Y101: Add child > Simulation Body. Call it Trunion and ensure Apply Selected is checked, then click OK.
- 8. Verify that the image is as you expected.
- 9. Save the MDD.

And next we will add the second rotary axis:

10. In Machine Manager, right-click B101 and Add child > Rotary Axis. Label it C101, user name My C, then click OK.

Make sure the Direction Vector is set to Standard C.. The Pivot point can remain as 0,0,0.

11. Drag P1 under C101.

In the part file, we will create the fifth and final Sim body, a purple heptagon:

12. Geometry > Shape > Polygon:

Polygon	g - 🗵
$\langle \mathbb{Y} \rangle$	Sides 7 Distance To Flat Distance To Corner 150
Center Position	
X 0 Y	0 Z -400
Fillet Radius	Dolt

Use this heptagon to create an extruded body representing the spindle:

- 13. (Create Solid >) Extrude:
- 14. Double-click the heptagon.

Extrude	🥥 🗔 🗙
Z+ <u>50</u> Taper Z- 0	Do It

- 15. Right-click the body and change the color to Color #37 (violet).
- 16. Save the part file.

In Machine Manager, we will add the violet rotary table as a Sim body:

- 17. Select the violet rotary table and then unroll Machine Manager.
- 18. Right-click C101: Add child > Simulation Body and call it Rotary Table.
- 19. Verify that the image is as expected.
- 20. Save the MDD.

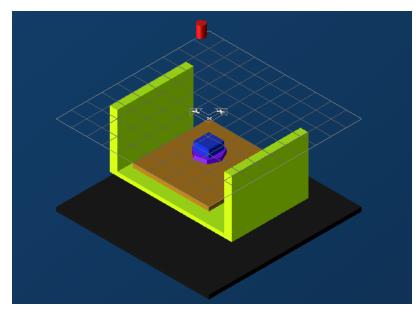
In the part file, make a stock body, a cube:

Cuboid				9 🗆 🗙
Max X	100	Y 100	Z -250	Do It
Min X		Y -100	Z -350	Stock Dim.

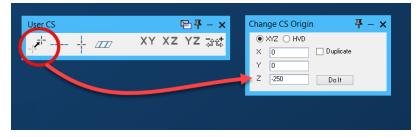
- 21. Right-click the new cuboid and designate it as stock > Body type > Stock.
- 22. Save the part file.

Step 8 Create operations

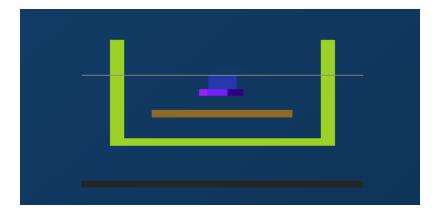
Now we will create a simple machining process that consists of pecking four holes in the stock, to demonstrate that the machine we just created works correctly.



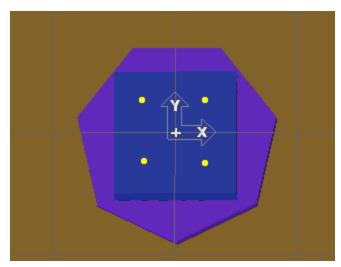
- 1. Create a new CS off the XY plane, to hold the geometry for the operation.
- 2. Move the origin to Z -250:



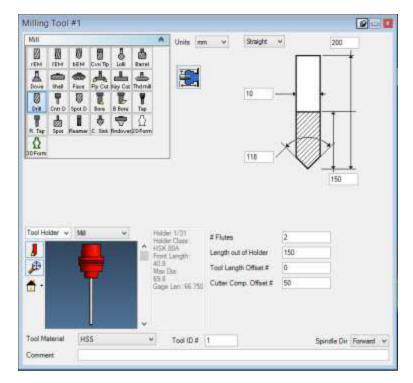
The CS is now on the stock surface



3. With the new CS selected, create four points.



4. Create the tool, using values as shown:



 Now, set the Home position of the tool. In Machine Manager, T1 (Spindle) Tool Station tab, set the Home Position to Z -190. This should place the tool and tool holder right below the spindle.

mdd New Machine 5000	New Machine 5000 (AngieO)		✓ New			
- L Y101 (My Y) - C B101 (My B)	Toolgroup Orientation Tool Station					
	I (P) Relative To T1 (T) otary Tole Home Position From Current CS X Y 0 To New CS	Automatic Tool Changer Tool ID Tool Change Time	Clon Save A			
		Single Tool Orientation Live Tool Subcositions	◯ inch ● mm ◯ cm ◯ meter			
		Allow Mill Subpositions Manual Axis (Tool Station Defined) Name Angle	foot Test Mai Import N			
	Tool Dialog Otertation	Add Edit Delete	MD			
			Key Prefix			

		03 E + /		
en Varager - Hen Robbe 200 - Lynn Rob - Hen Robert - H	Sear Income SMI prop.D. Locasa (Vertilator) = Ext.c. Nadare a 110		BIP-X	
	None function None function # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # # <td>Initialize that foregoes Tool Short Conservation Initialize that Initialize that</td> <td>South Constants</td> <td></td>	Initialize that foregoes Tool Short Conservation Initialize that Initialize that	South Constants	
			September 2015	

Next, we will set up a Holes process using the **Drill** tab, the **Hole Feature** tab, and the **Rotate** tab.

6. Specify settings and values in the Drill tab as follows:

Process #1 Holes		🥥 🗔 🗙
Drill Hole Feature	Bore Pre-Mill Mill Feature Rotate	
Entry/Exit Cycle: Feed In - Rapid Out Feed In - Feed Out Tap Rigid Tap Peck, Full Out Peck, Chip Breaker Rough Mill Bore Finish Mill Bore	 Dimension from Hole Dimension from Tool Tuite 1 <	10 11.996 .11.996
Mate RPM 3000 Feed 250 Dwell 0 Clearance 1.25 Peck 5 Retract 1 Direction		750 20 0

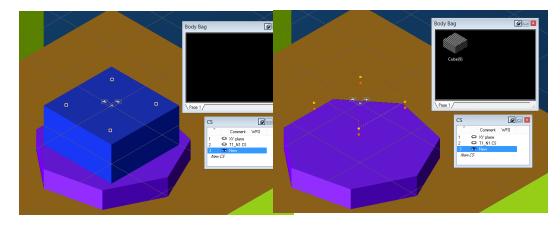
7. Specify settings and values in the Hole Feature tab as follows:

Process #1 Holes	
Drill Hole Feature Bore Pre-Mill	Mill Feature Rotate
R Level:	Dimension from Hole Dimension from Tool
At Op End: Same As R Level 👽	
Top Surface Z Absolute	
Feature Depth Z Absolute	Transition Between Holes R Level Part Clearance 750 Absolute Z 20
Mach. CS: Absolute 🗸	Hole Feature 0 Mach. CS: 6: T1_N1 CS Segment
Reset All to Absolute	 Match Segment by Index Match Segment by Properties Length Taper Diameter Machining Method

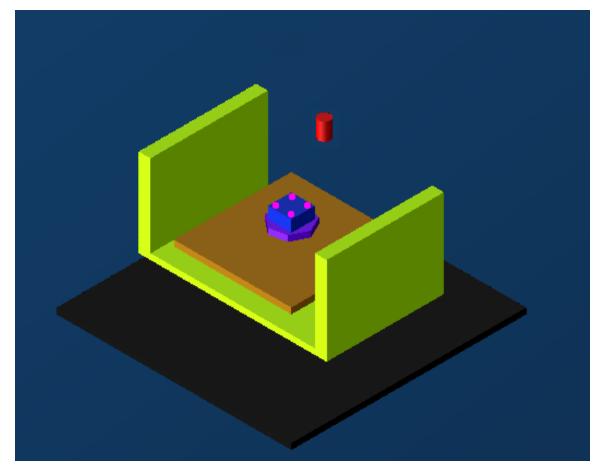
8. Specify settings and values in the Rotate tab as follows:

Process #1 Holes [🥥 📼 🗙
Drill Hole Feature Bore Pre-Mill Mill Feature Rotate	
Mach. CS: 6: T1_N1 CS	
Position Angle C	
O Polar & Cylindrical Milling	
Duplicate C Du	

9. In the workspace, select all four of the points on the stock and click Do it. In the screenshot on the right, the stock has been placed in the body bag to show the toolpath.



10. Now render your operations with your new machine.



To use this machine for rendering operations, load your own Mill part file, select Machine Sim Rendering, then click the load machine icon on the Machine Sim palette. Now choose New Machine 5000 from the list and click Load Machine.