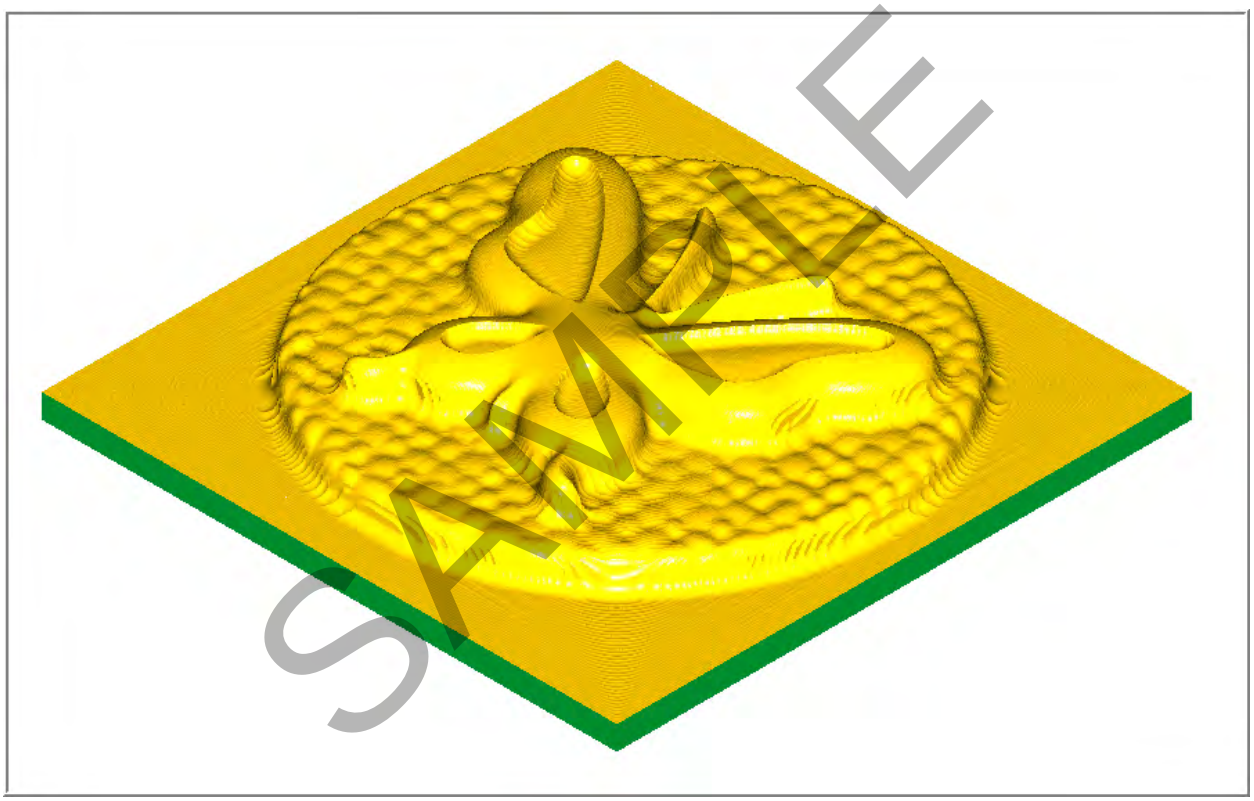
Mastercam X4

TRAINING GUIDE

INTRO TO CAD/CAM



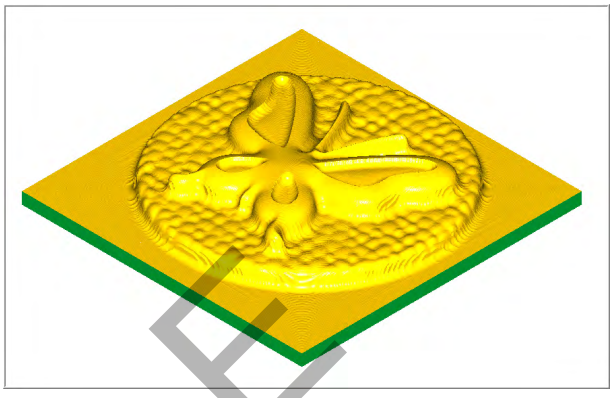
LESSON-6 ART ORGANIC

camInstructor

Objectives

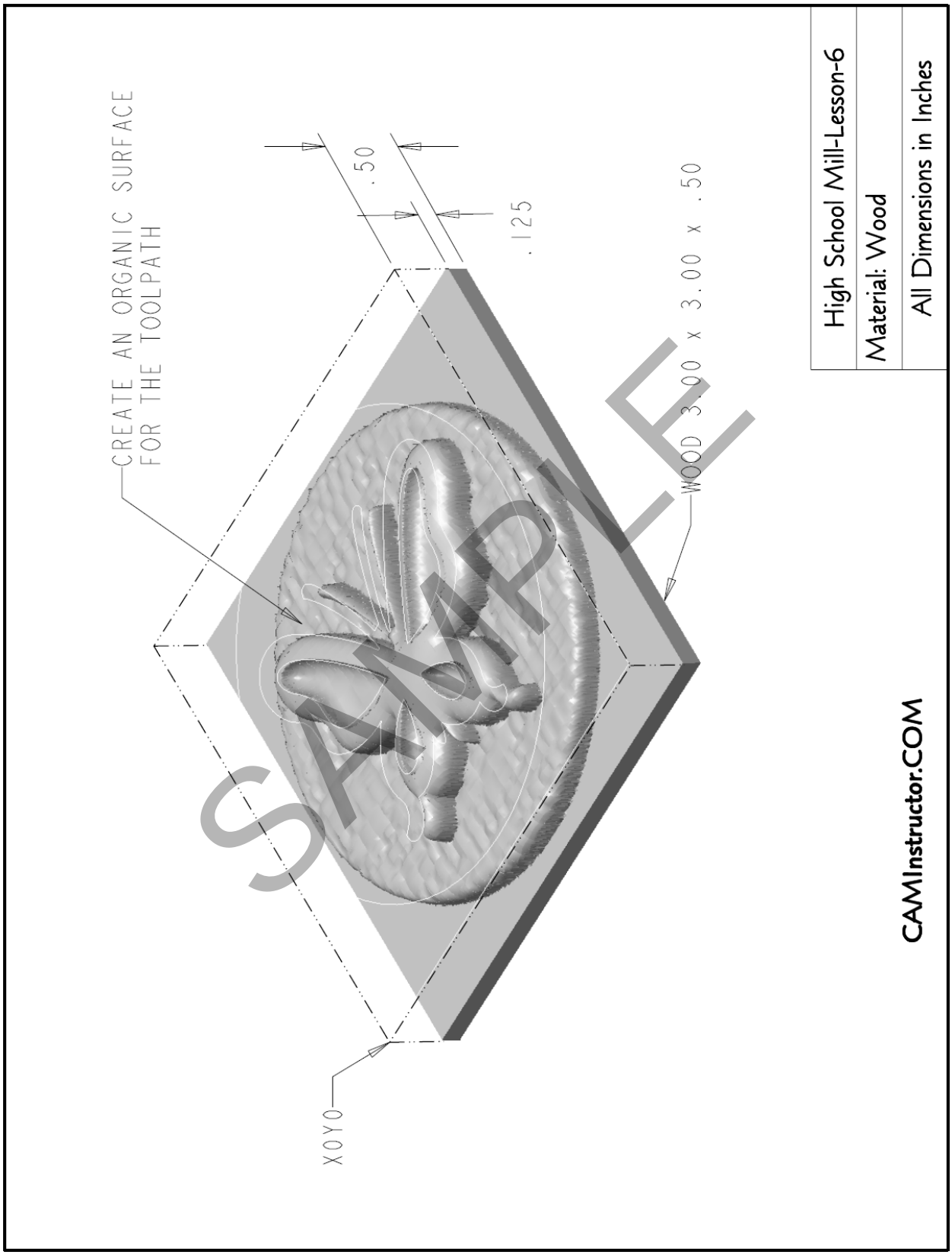
You will import a Mastercam Art Library file and use it to create a surface. You will generate a toolpath to machine the part on a CNC router or mill. This lesson covers the following topics:

➲ **Import a Mastercam Library File:**
Setting the size and depth attributes
Creating an Organic Surface
Creating a Texture
Modifying Surfaces
Defining the top of the workpiece



➲ **Creating the Toolpath:**
Selecting the proper cutting tool
Setting feeds and speeds
Selecting the proper toolpath
Posting the G-code

LESSON-6 ART ORGANIC



TOOL LIST

- One cutter will be used to create this part.
- The .125" diameter ball endmill will be used to machine the picture.
-

Item	Description
Saved Mastercam File	Lesson-6-yourname.mcx
Cutter(s) type	0.125 Ball Endmill 1/8" Ball Endmill
Material size	6" x 3" x 0.5"
Material Type	Wood or Plastic
Feed rate	14 inches per minute
Spindle speed	5000 RPM
Stepover	10%
Saved NC File	Lesson-6-yourname.nc

LESSON-6 THE PROCESS

Geometry Creation (CAD)

TASK 1: Set the environment
TASK 2: Create a 3" x 3" rectangle
TASK 3: Create a circle inside the rectangle
TASK 4: Import the File into Mastercam Art
TASK 5: Create the canvas
TASK 6: Introduce the Art Manager
TASK 7: Create an organic surface
TASK 8: Add texture
TASK 9: Add an organic surface
TASK 10: Make the top of the image Z- zero

Toolpath Creation (CAM)

TASK 11: Define the rough stock using stock setup
TASK 12: Machine the part
TASK 13: Backplot the toolpath
TASK 14: Verify the toolpath
TASK 15: Save updated MCX file
TASK 16: Post and create the CNC code file

Geometry Creation (CAD)

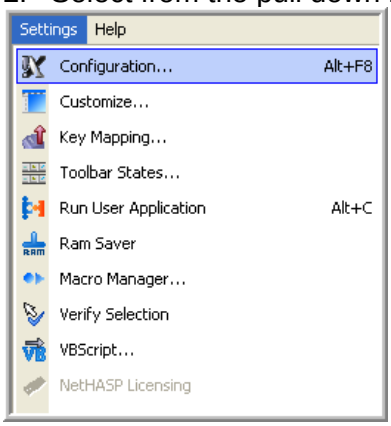
TASK 1:
SET THE ENVIRONMENT

Before starting the geometry creation and generating the toolpaths you should:

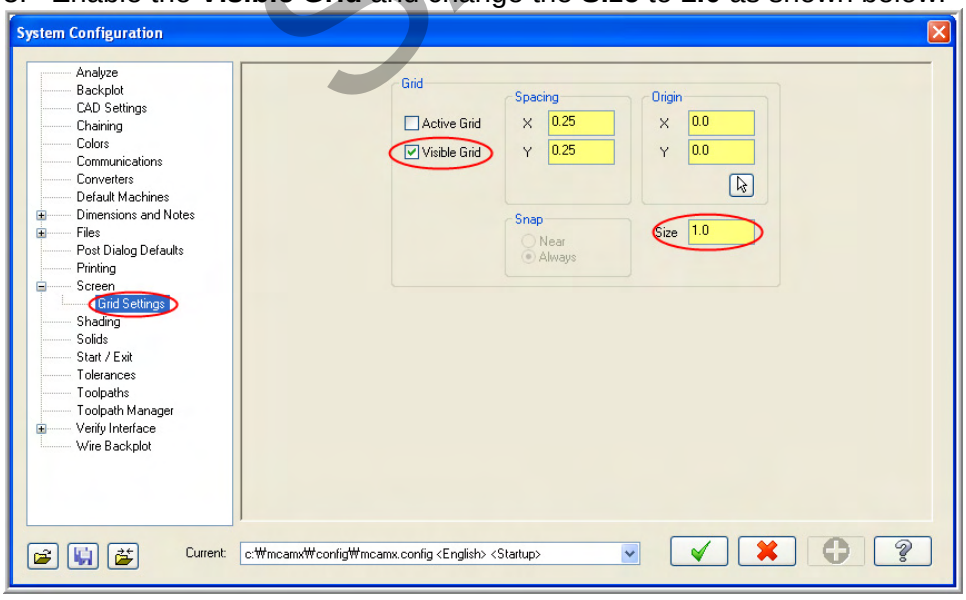
- Set up the grid.
- Customize the toolbars to machine a 2D part.
- Set the machine type.

TASK 1A:
SET THE DISPLAY OF THE GRID

1. Launch Mastercam.
2. Select from the pull down menu **Settings>Configuration…**



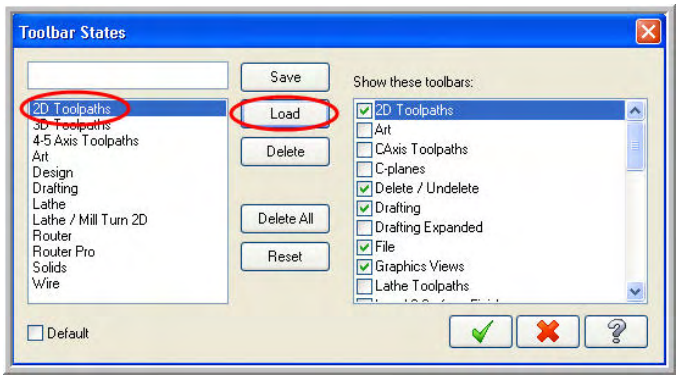
3. From the Topics pane on the left side of this dialog box expand the **Screen** topic by selecting the **+** sign as shown below.
4. Click on **Grid Settings** as shown below.
5. Enable the **Visible Grid** and change the **Size** to **1.0** as shown below.



6. Select the **OK**  button to complete this function.

TASK 1B:
SET THE TOOLBARS REQUIRED TO CREATE THE GEOMETRY AND MACHINE A 2D AND/OR A 3D PART

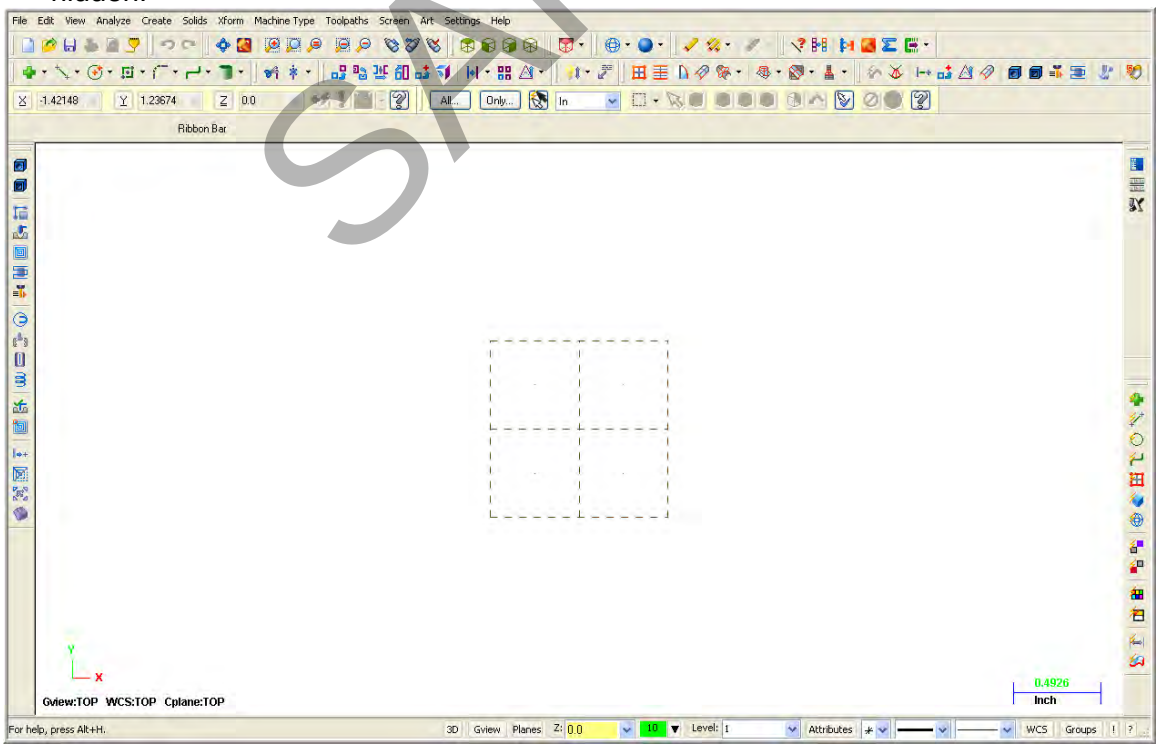
1. Select from the pull down menu **Settings>Toolbar States…**
2. Select **2D-Toolpaths**.
3. Then select the **Load** button 



4. Select the **OK** button  to accept the settings.

➲ To Show or Hide the **Operations Manager** pane on the left of the screen press **Alt + O.** Pressing **Alt + O** acts like a toggle switch between Show and Hide. For more information on the **Operations Manager,** see the **Tips and Techniques** section on the multimedia CD supplied with this course.

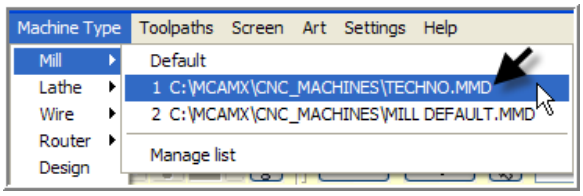
5. The Mastercam interface will be displayed as shown below when the Operations Manager is hidden.



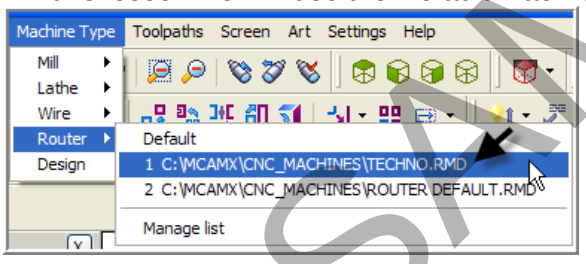
TASK 1C:
SELECT THE TYPE OF MACHINE

- You may have to check with your Instructor to determine the CNC Machine you will use to machine the part in this lesson.
- If you do not have the appropriate post processor for the CNC Machine in your class use the Default Machine to complete this lesson.
- To set the machine type do the following:

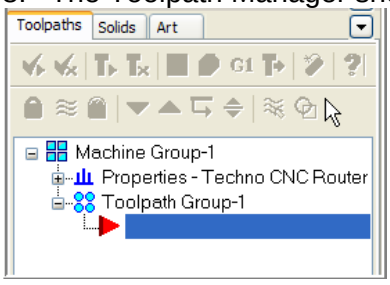
1. If you are using a **CNC Mill** continue to **step 2.** If you are using a **CNC Router** continue to **step 5.**
2. Select from the pull down menu **Machine Type>Mill.**
3. Click on (**your cnc machine).mmd** machine type. In the example below a **techno.mmd** is selected, which is the **Machine Definition** for a **Techno CNC Mill**. For the purpose of this lesson we will use the Default Machine or (Mill Default.mmd).



4. Continue to **step 7**.
5. If you are using a **CNC Router**: select from the pull down menu **Machine Type>Router.**
6. Click on (**your cnc machine).rmd** machine type. In the example below a **techno.rmd** is selected, which is the **Machine Definition** for a **Techno CNC Router**. For the purpose of this lesson we will use the Default Machine or (Router Default.rmd).



7. To display the **Toolpath Manager** press **Alt + O.**
8. The Toolpath Manager should look as shown below.



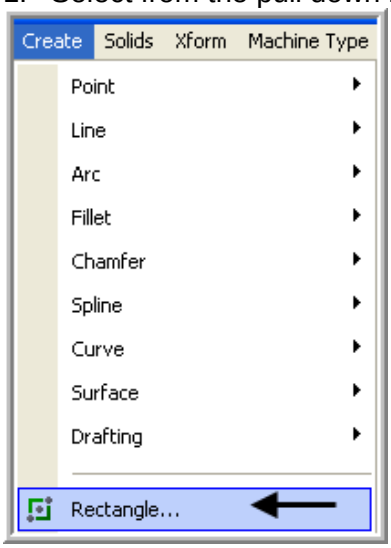
9. You are now ready to proceed with your lesson.

TASK 2:

CREATE A RECTANGLE 3” X 3”

➲ This task explains how to create the 3” x 3” rectangle. These four lines could be created in many different ways, this is just one option.

1. Select from the pull down menu **Create>Rectangle…**

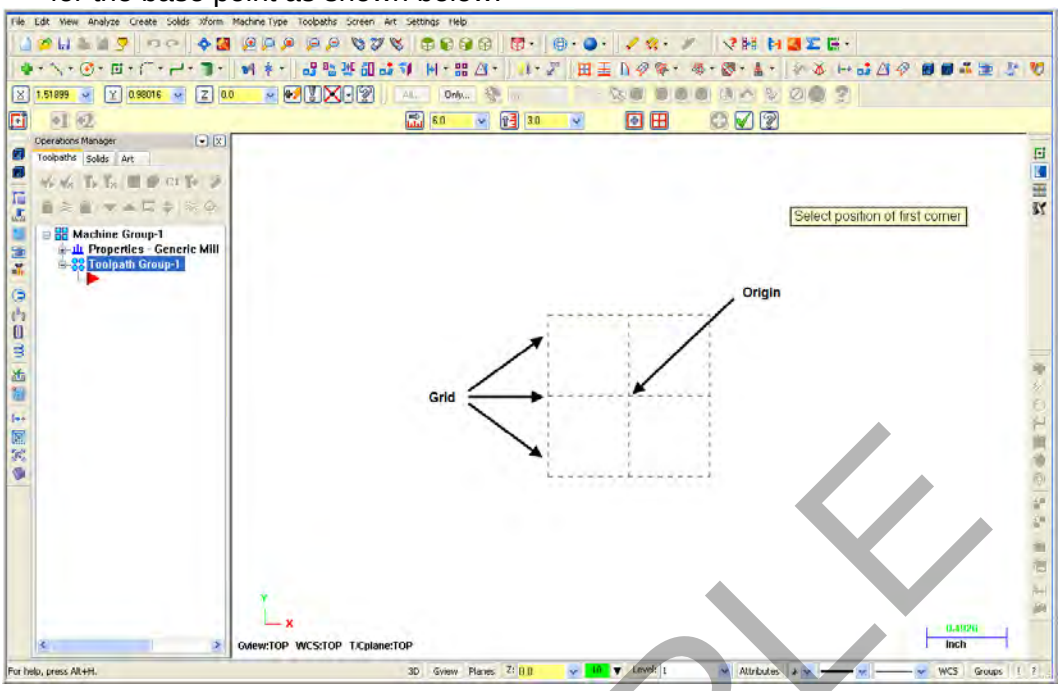


2. The Create Rectangle ribbon bar appears and you are prompted to **Select position of first corner.**

3. On the ribbon bar click in the **Width** field and enter a value of **3.0**. Press the **Tab key** and you will be moved over to the **Height** field.

4. In the **Height** field enter a value of **3.0** and then press **Enter**.

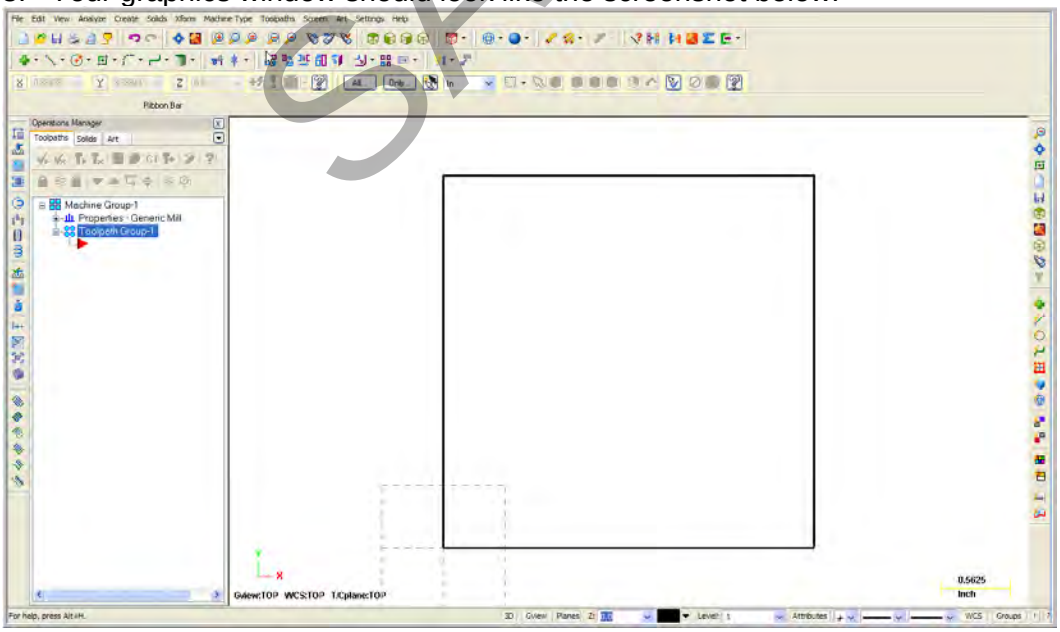
5. Move the **cursor** to the center of the **Grid** and click the **mouse** button (snap) on the **Origin** for the base point as shown below.



6. Click on the **OK** icon  to complete this feature.

7. Select the **Fit to screen** icon found at the top of the screen to fit the part to the screen  .

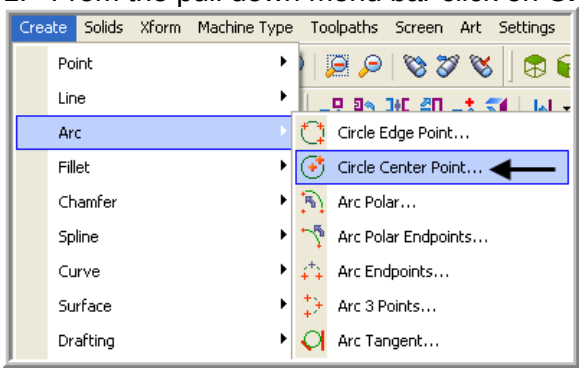
8. Your graphics window should look like the screenshot below.



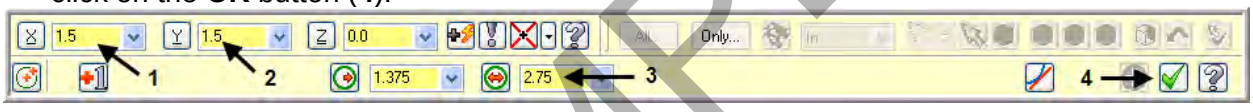
TASK 3:
CREATE A CIRCLE INSIDE THE RECTANGLE

➲ We will add a circle to provide more features to our project.

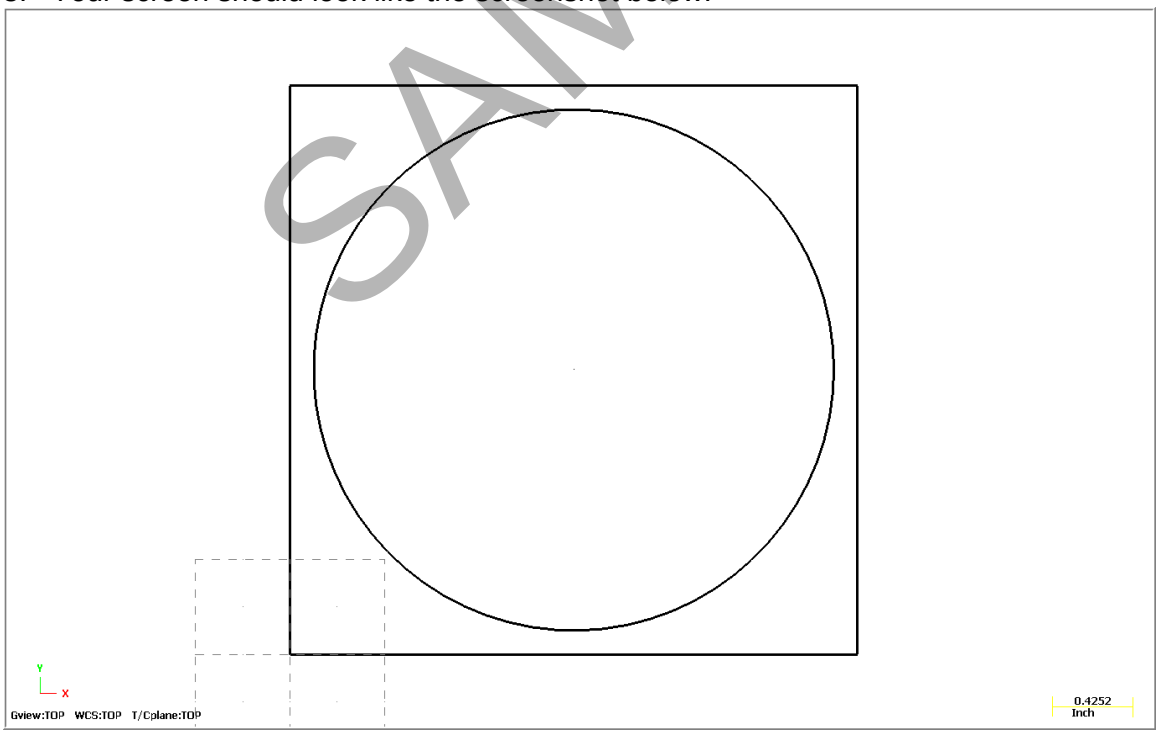
1. From the pull down menu bar click on **Create>Arc>Circle Center Point…**



2. The **Create Arc** ribbon bar appears and you are prompted to **Enter the center point**. On the ribbon bar enter **1.5** in the **X** field (**1**) and press the **Tab key**. Enter **1.5** in the **Y** field (**2**) and press the **Tab key**. Press **Enter** and then enter **2.75** in the **Diameter** field (**3**). Then click on the **OK** button (**4**).



3. Your screen should look like the screenshot below.

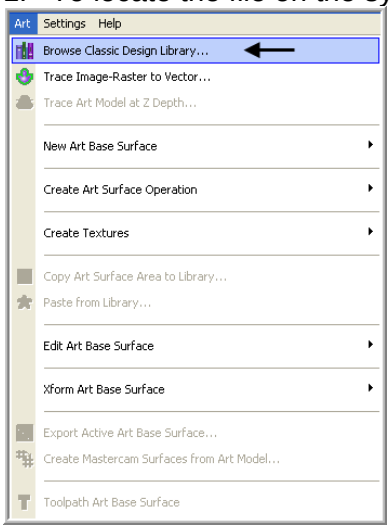


TASK 4:
IMPORT THE FILE INTO MASTERCAM ART

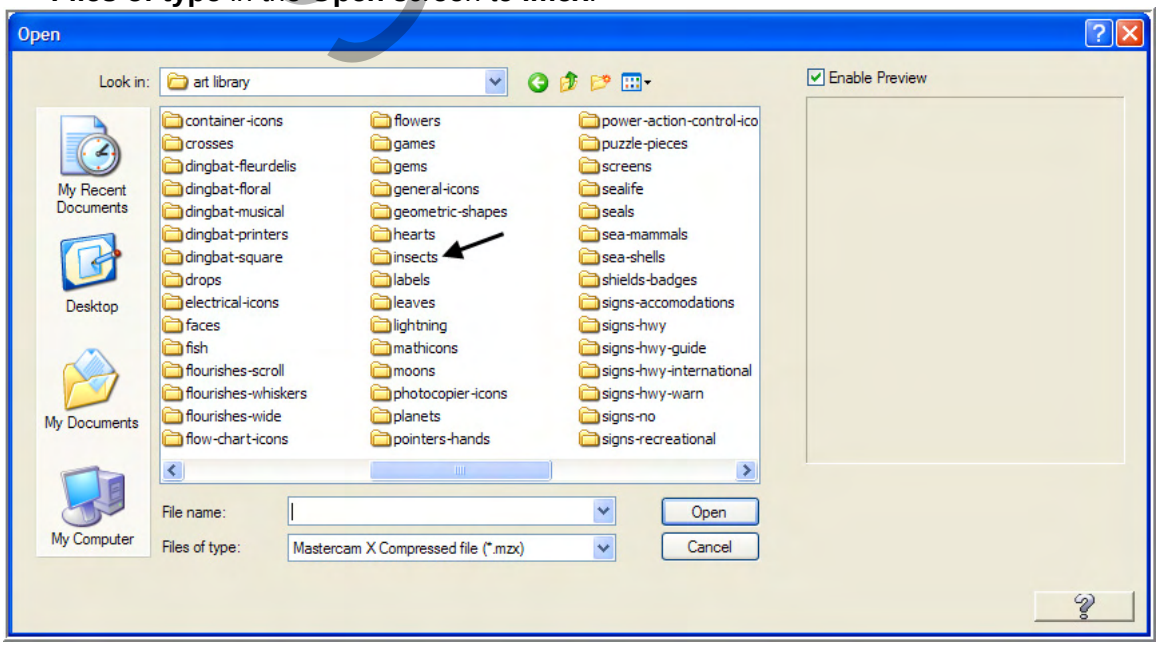
➲ In this lesson we will use a file that comes with Mastercam. This file is located on the CD that accompanies this course, or it may be in a folder on the computer or on the computer network.

Mastercam Art allows you to import all types of raster graphics (BMP, GIF, JPG or JPEG, PCD, PCX, TIF or TIFF), including images that have been digitized with a scanner or digital camera. Raster graphics, also referred to as bitmap images, are drawn as an array of squares (pixels). Vector graphics are drawn as lines, polygons and text,

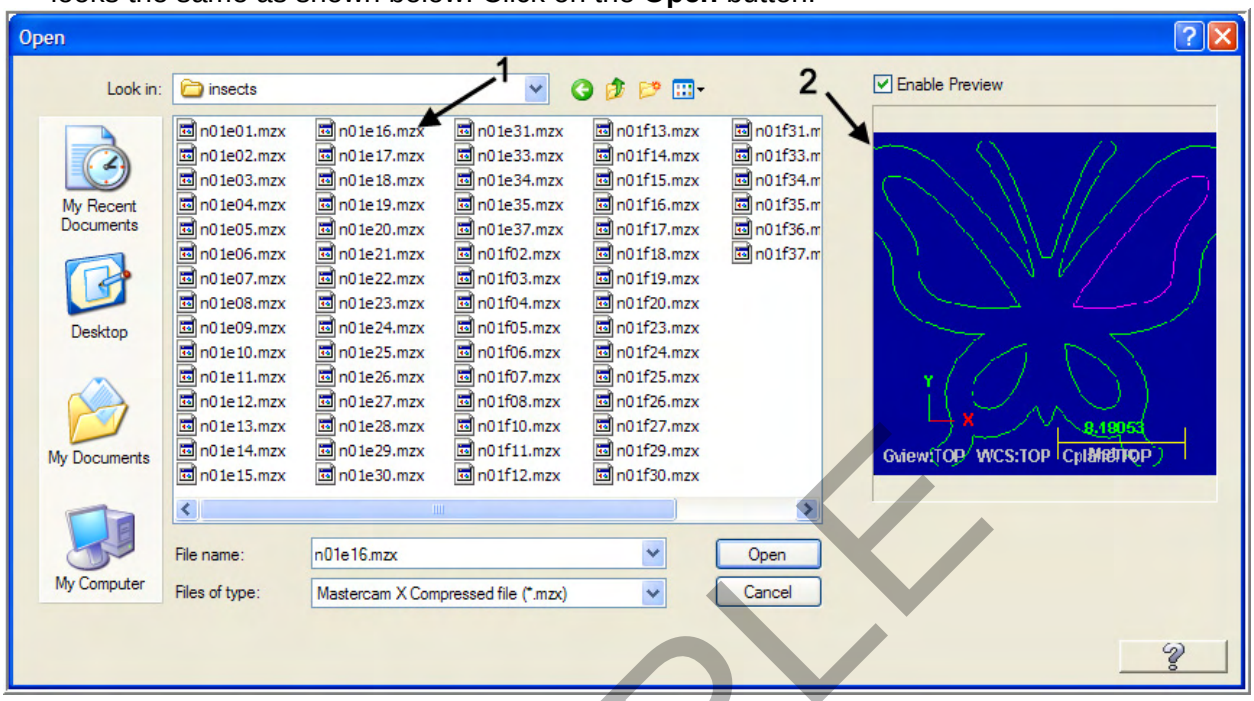
1. To locate the file on the system, select **Art>Browse Classic Design Library…**



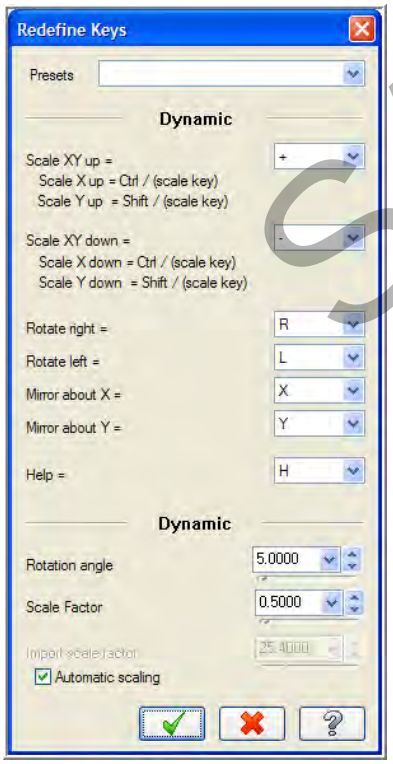
2. Double click on the **insects Folder** as shown below. Note: If the file is not located on the computer or computer network, then locate the CD that accompanies this book and use the same instructions in Steps 2 through 4 except look on the CD for the file **n01e16.mcx** in the **Mastercam Files** folder on the CD. If you are opening the file from the CD then change the **Files of type** in the **Open** screen to **.mcx**.



3. Click on **n01e16.mzx** (**1**) and make sure that the **image** (**2**) displayed in the preview screen looks the same as shown below. Click on the **Open** button.

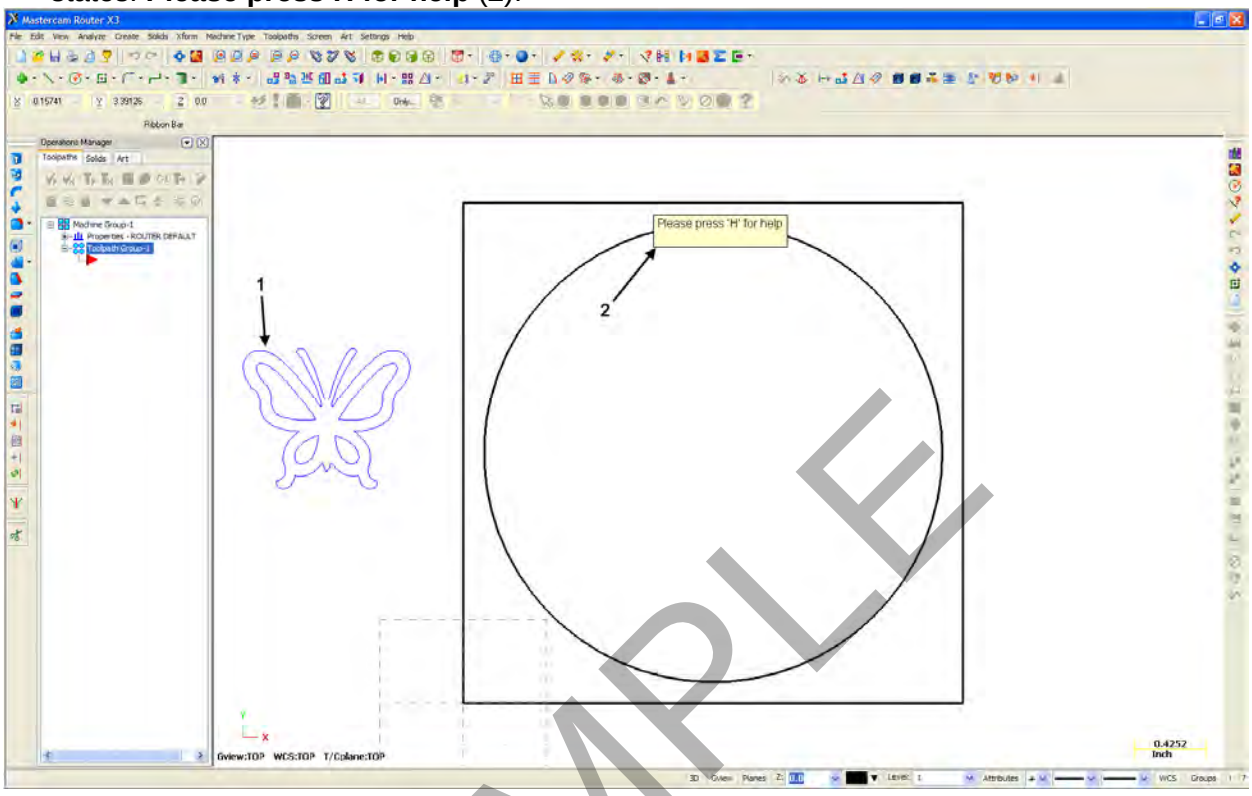


4. The **Redefine Keys** dialog box displays next, as shown below. Take note of the various commands that are available for when the image is brought into the Mastercam graphics window.

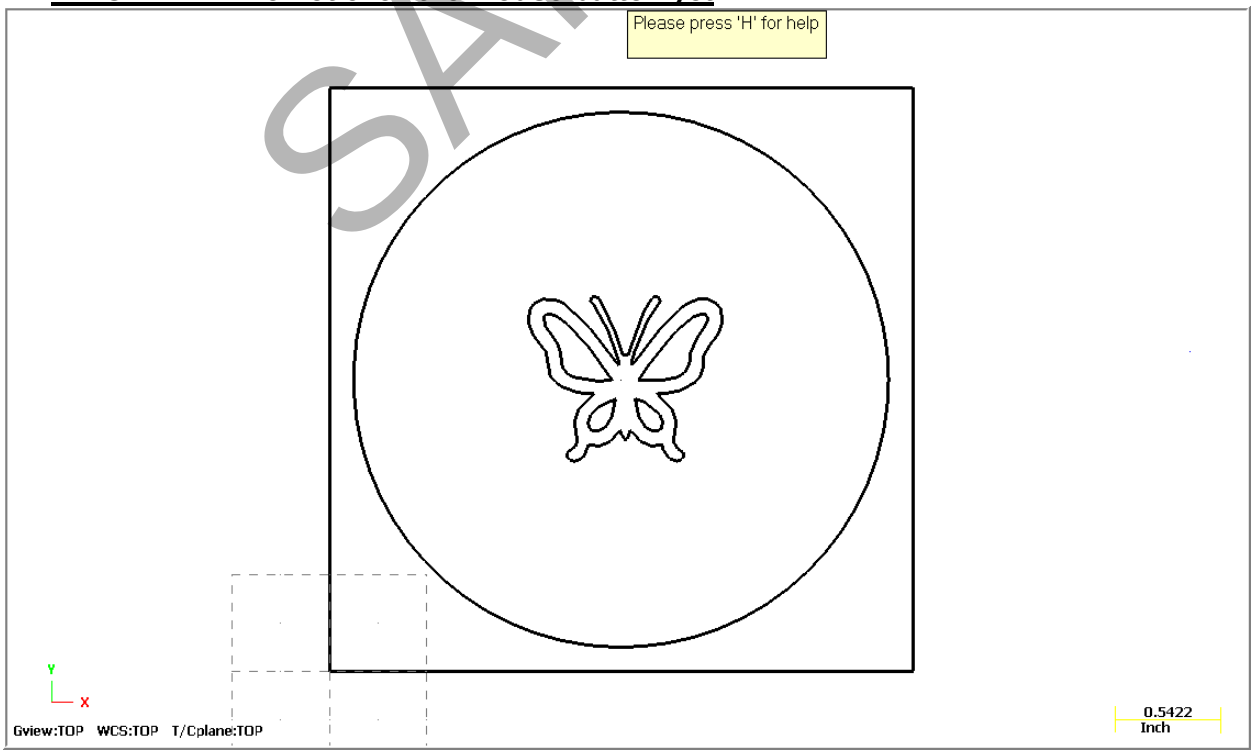


5. Click on the **OK**  button.

6. The image of the butterfly is now visible and attached to your cursor (**1**). As you move the cursor, the image of the Butterfly will move as if it is attached to it. Note that the prompt states: **Please press H for help** (**2**).



7. **Move** the mouse so the **butterfly** is in the middle of the rectangle as shown below. **IMPORTANT: Do not click the mouse button yet**.



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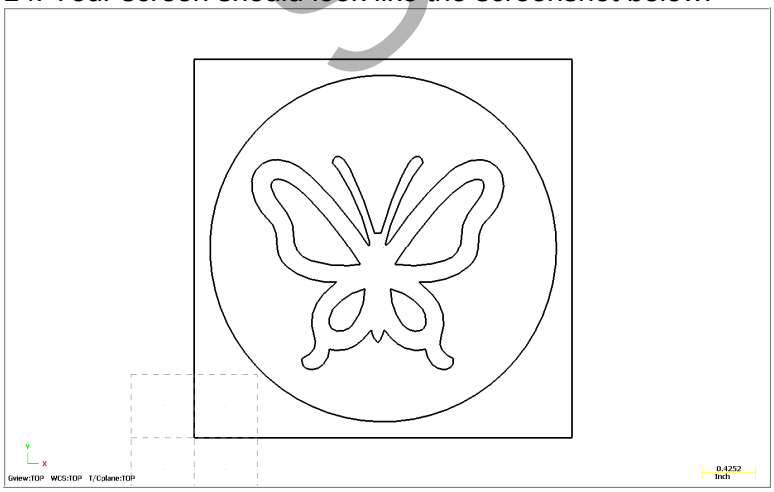
8. Press the **H key** on your keyboard. The **Redefine Keys** dialog box appears again, as shown on the right. This dialog box displays any time you press the H key and shows the keys needed to manipulate the butterfly Image.
9. Make sure the **Scale Factor** is set to **2.000** as shown to the right.
10. Click on the **OK** button  .

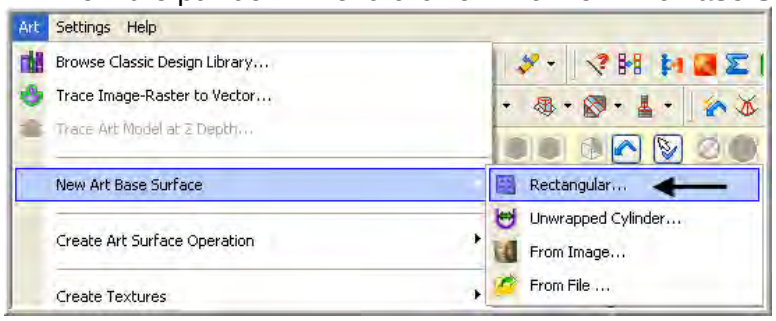
11. Press the **+ (plus) key** on your keyboard once. The image should increase in size.
12. Make sure the **butterfly** is in the center of the Rectangle and **Click the Left Mouse Button** to position the butterfly.
13. Press the **Esc key** on your keyboard.
14. Your screen should look like the screenshot below.



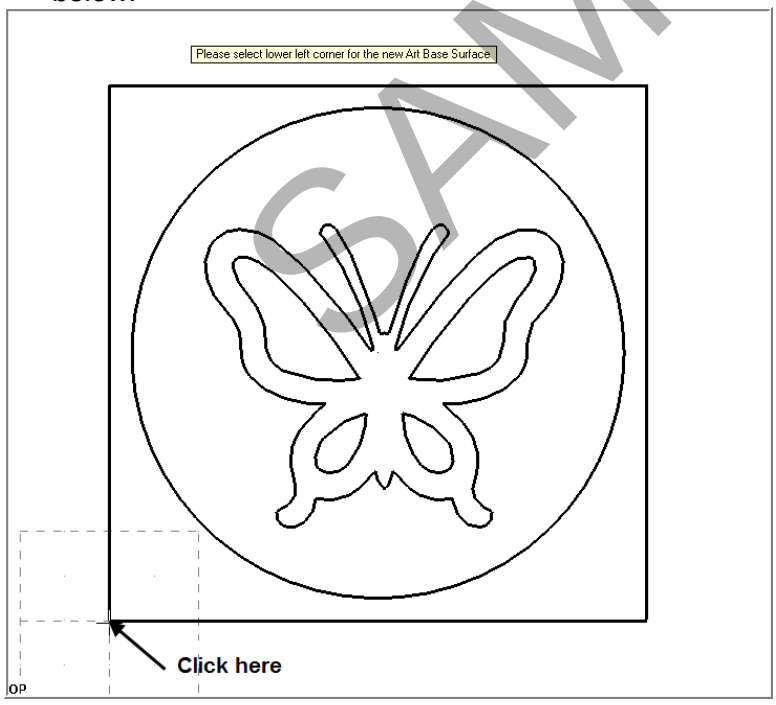
TASK 5:
CREATE THE CANVAS

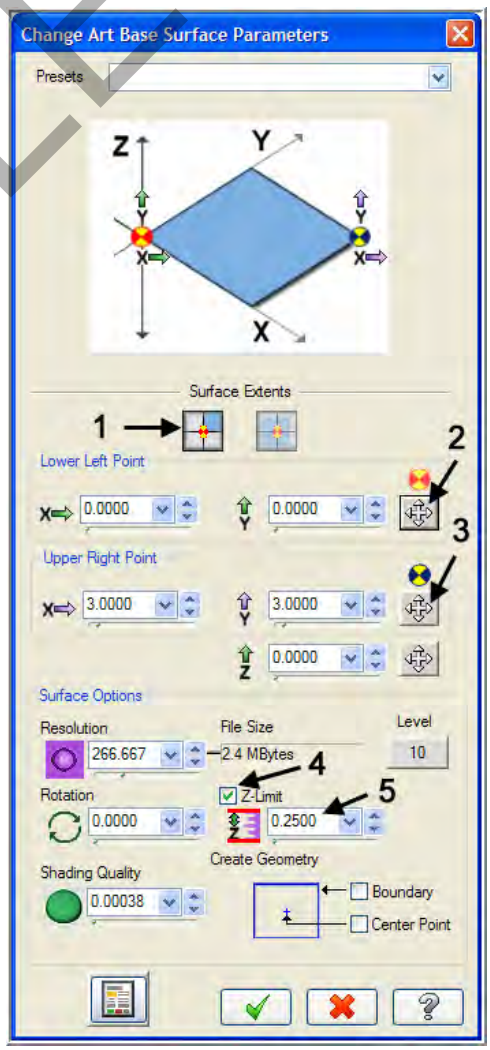
➲ In this task we will create a 3” x 3” Art Base Surface on the existing rectangle.

1. From the pull down menu click on **Art>New Art Base Surface>Rectangular…**

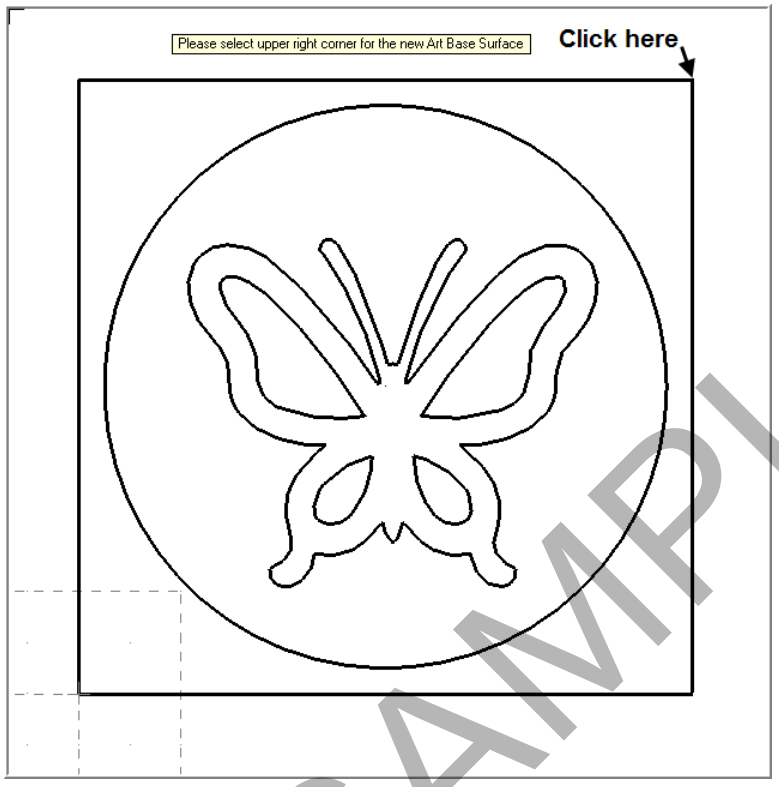


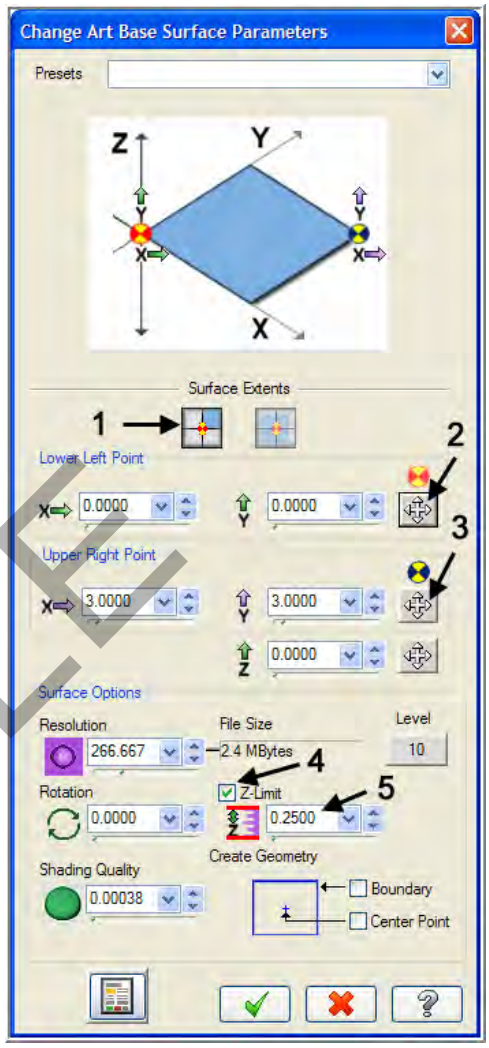
2. The **Rectangular** dialog box appears. Make sure that the **Surface Extents** (**1**) is set to **Create Art Base Surface by specifying 2 points** as shown to the right.
3. Click on the **Lower Left Point** selector button (**2**) as shown to the right.
4. You are prompted to **Please select lower left corner for the new Art Base Surface**. Click on the **Lower Left** corner of the rectangle on your screen as shown below.



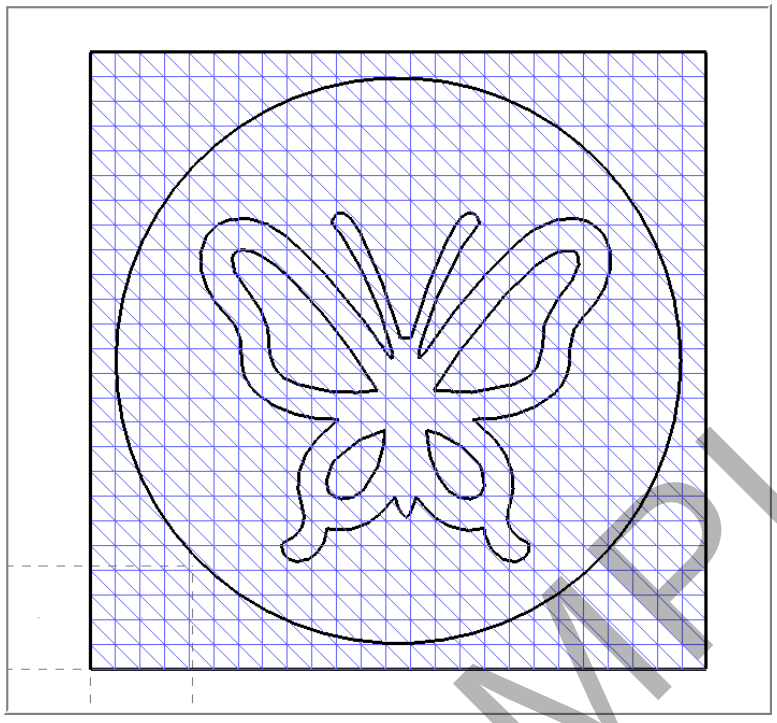


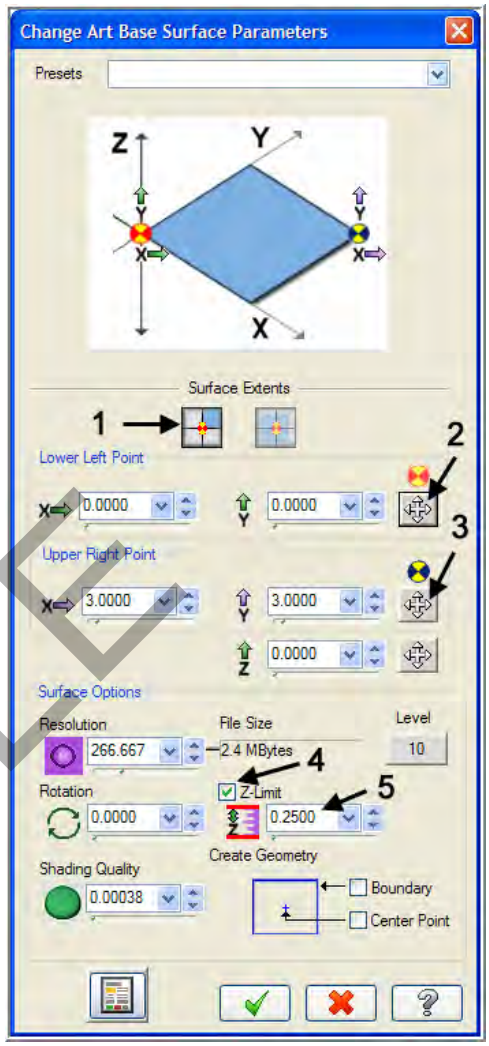
5. The **Rectangular** dialog box appears again. Click on the **Upper Right Point** selector button **(3)** as shown to the right.
6. You are prompted to **Please select upper right corner for the new Art Base Surface**. Click on the **Upper Right** corner of the rectangle on your screen as shown below.





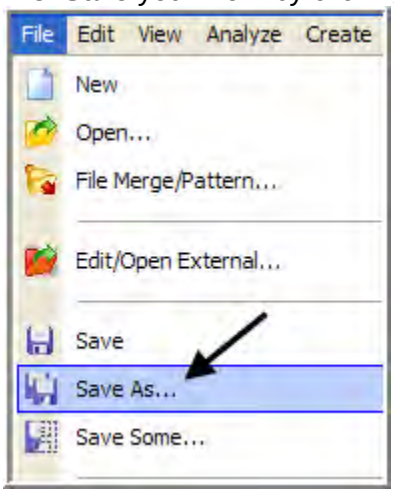
7. The **Rectangular** dialog box appears again.
8. Click on **Z-Limit** to turn it on **(4)** the change the **Z-Limit dimension to 0.2500 (5**) as shown in the image on the right.
9. Click on **OK** .
10. Your screen should look like the screenshot below.



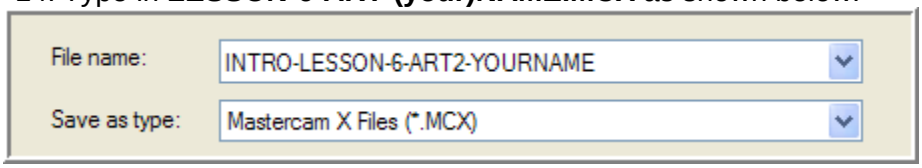


11. Select the **Alt key** and hold it down while selecting the **S key** on your keyboard (**Alt + S**). The image will turn to a solid color.
12. Select **Alt + S** again to toggle the image back. You will use this key sequence later in the lesson to view the newly created features in the image.

13. Save your work by clicking on the pull down menu **File>Save As…**



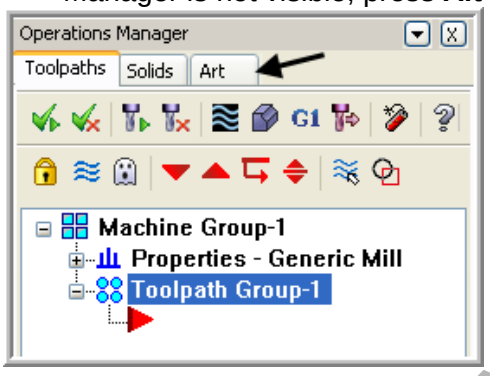
14. Type in **LESSON-6-ART-(your)NAME.MCX** as shown below.



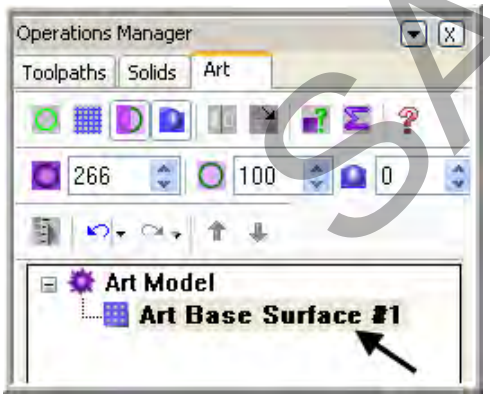
TASK 6:
INTRODUCE THE ART MANAGER

➲ The Art Manager is used to make changes to the Art features in your part and provides various ways to view your part.

1. Click on the **Art Tab** in the **Operations Manager** as shown below. Note: If the Operations Manager is not visible, press **Alt + O** to make it visible.



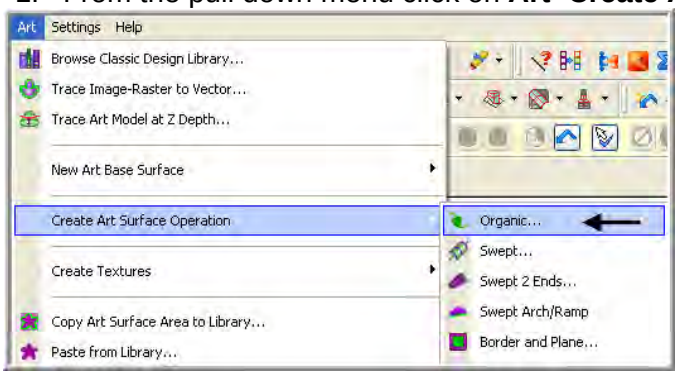
2. The **Operations Manager** should now look like the screenshot below. **Art Base Surface #1** is the default name of the new Art Base Surface you created in **Task 5**.



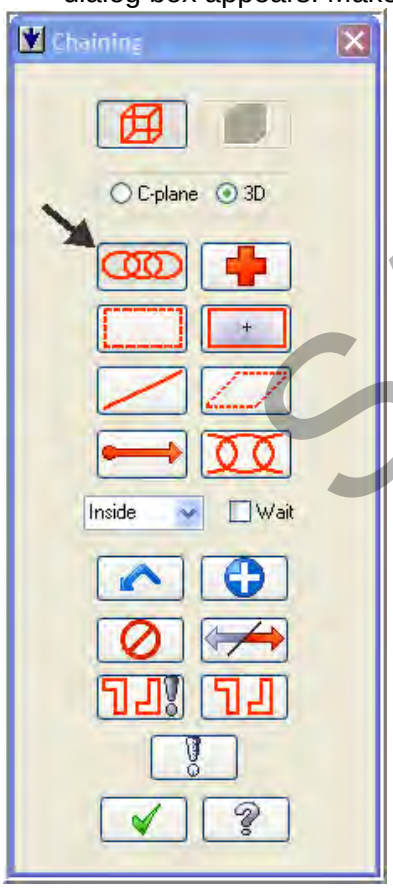
TASK 7:
CREATE AN ORGANIC SURFACE

➲ We will use the **Organic Surface** feature in Art to add 3-dimensional features to the butterfly.

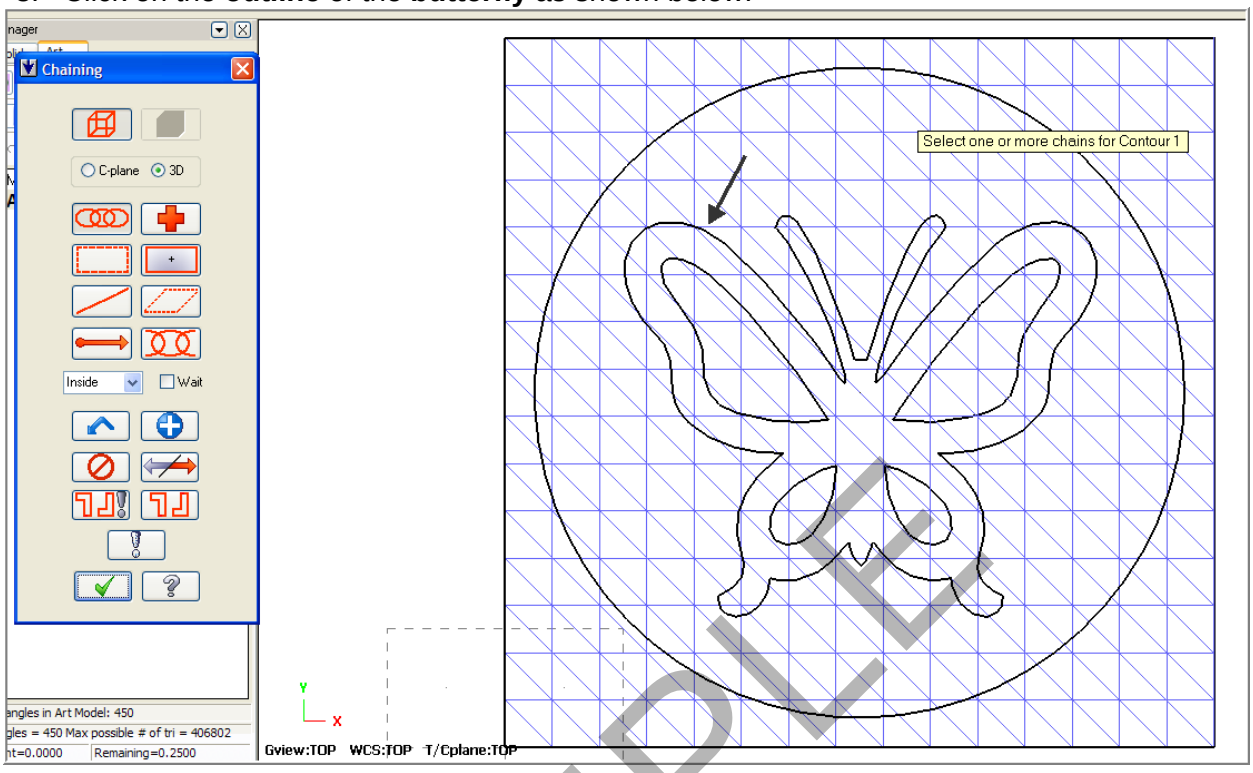
1. From the pull down menu click on **Art>Create Art Surface Operation>Organic…**



2. You will be prompted to **Select one or more chains for Contour 1** and the **Chaining** dialog box appears. Make sure the **Chain button** is selected as shown below.

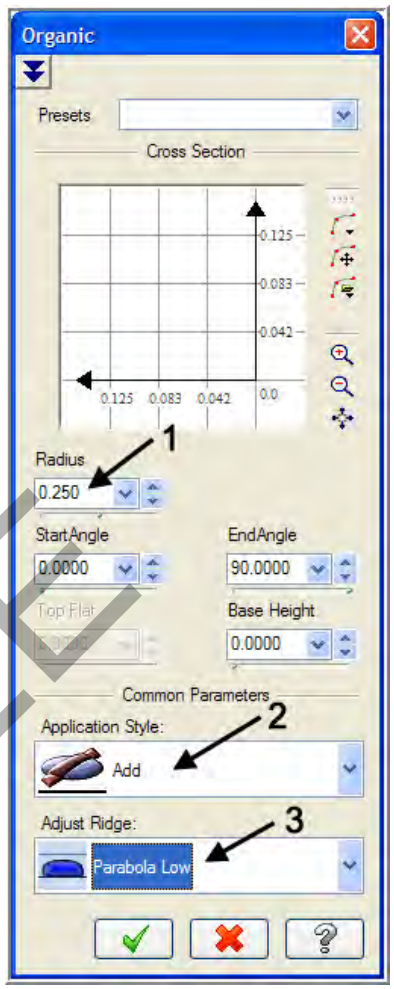


3. Click on the **outline** of the **butterfly** as shown below.

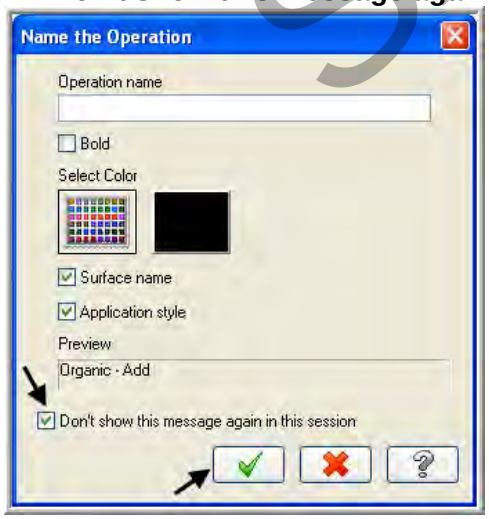


4. Click on the **OK**  button in the **Chaining dialog box**.

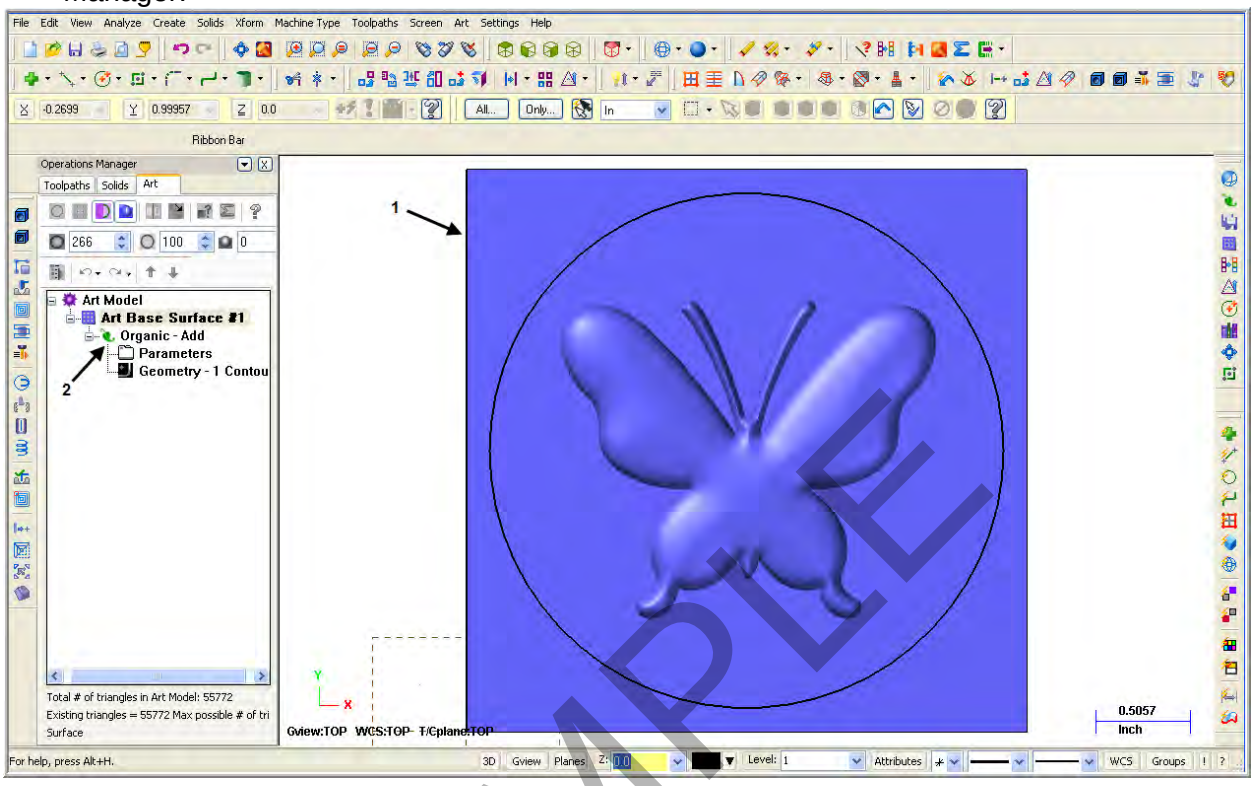
5. The **Organic dialog box** appears next as shown to the right.
6. Change the **Radius** (**1**) to **0.250**.
7. Make sure the **Application Style** (**2**) is set to **Add**.
8. Change the **Adjust Ridge** (**3**) to **Parabola Low** by clicking in the **Adjust Ridge** field.
9. Click on the **OK** button  .



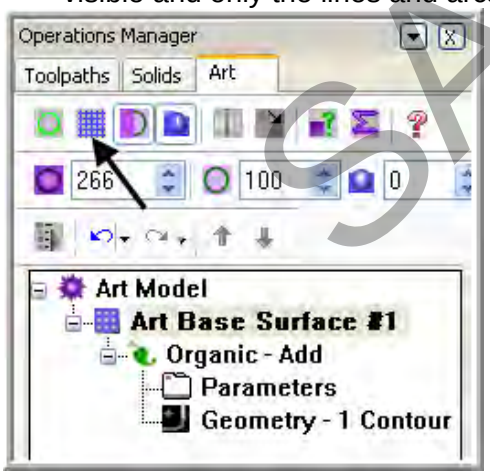
10. When the **Name the Operation** dialog box appears, click on the **OK** button  to accept the default name. To dismiss the naming dialog box, put a check mark in front of **Don't show this message again in this session**.



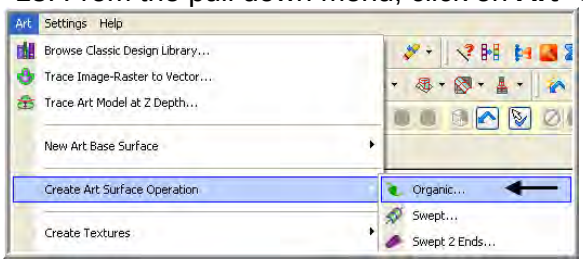
11. Your screen should look like the screenshot below. Note that the **butterfly** (**1**) has a 3-dimensional shape, and the addition of the **Organic – Add** Operation (**2**) in the Art Manager.



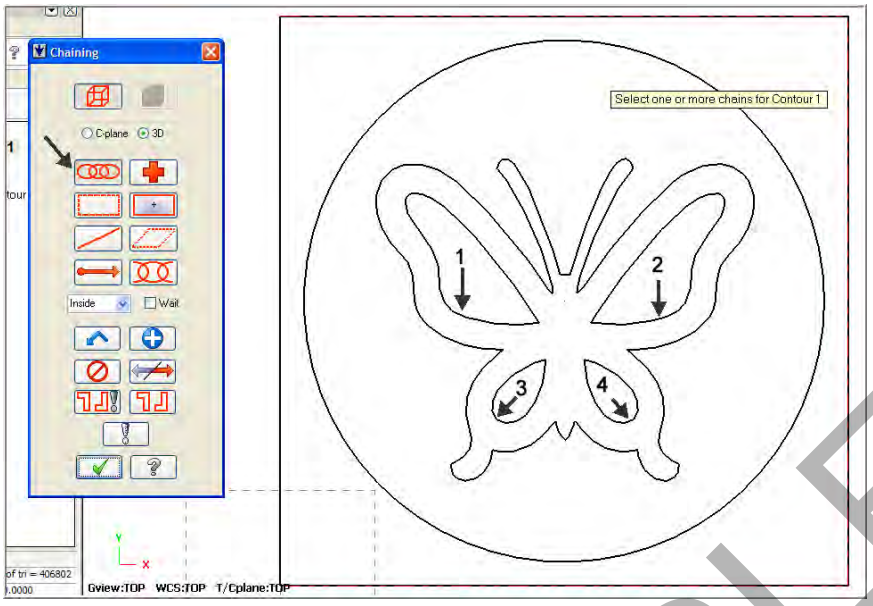
12. Click on the **Hide Art Model** button as shown below. Notice the surface model is no longer visible and only the lines and arcs are visible.



13. From the pull down menu, click on **Art>Create Art Surface Operation>Organic…**

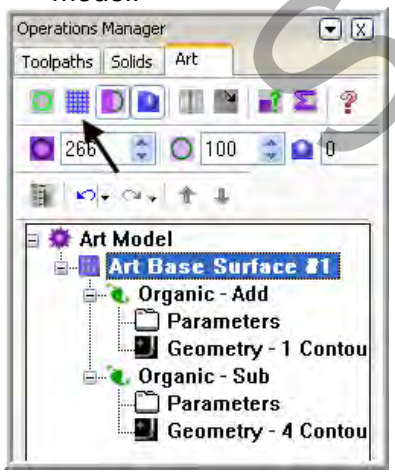


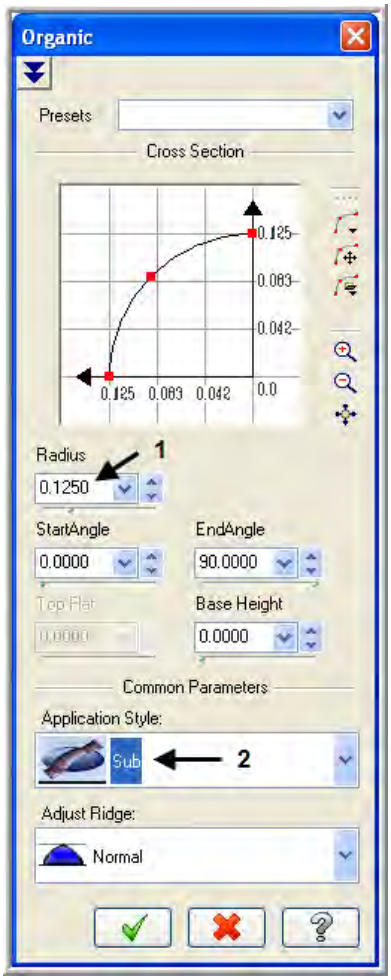
14. You are prompted to **Select one or more chains for Contour 1** and the **Chaining** dialog box appears. Make sure the **Chain Button** is selected and click on the **four inside contours** as shown below.



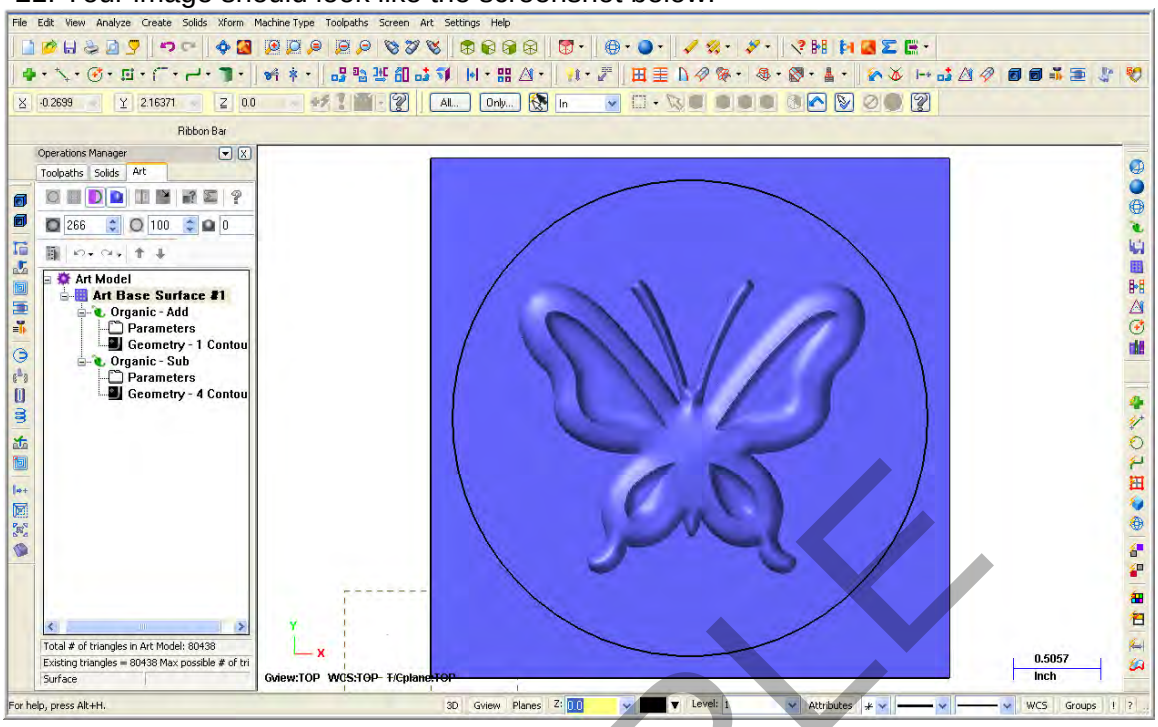
15. Click on the **OK** button  in the Chaining dialog box.

16. The **Organic dialog box** appears next as shown to the right.
17. Change the **Radius** (**1**) to **0.1250**.
18. Make sure the **Application Style** (**2**) is set to **Sub**.
19. Click on **OK**  .
20. Click on the **Hide Art Model** button to unhide the art model.



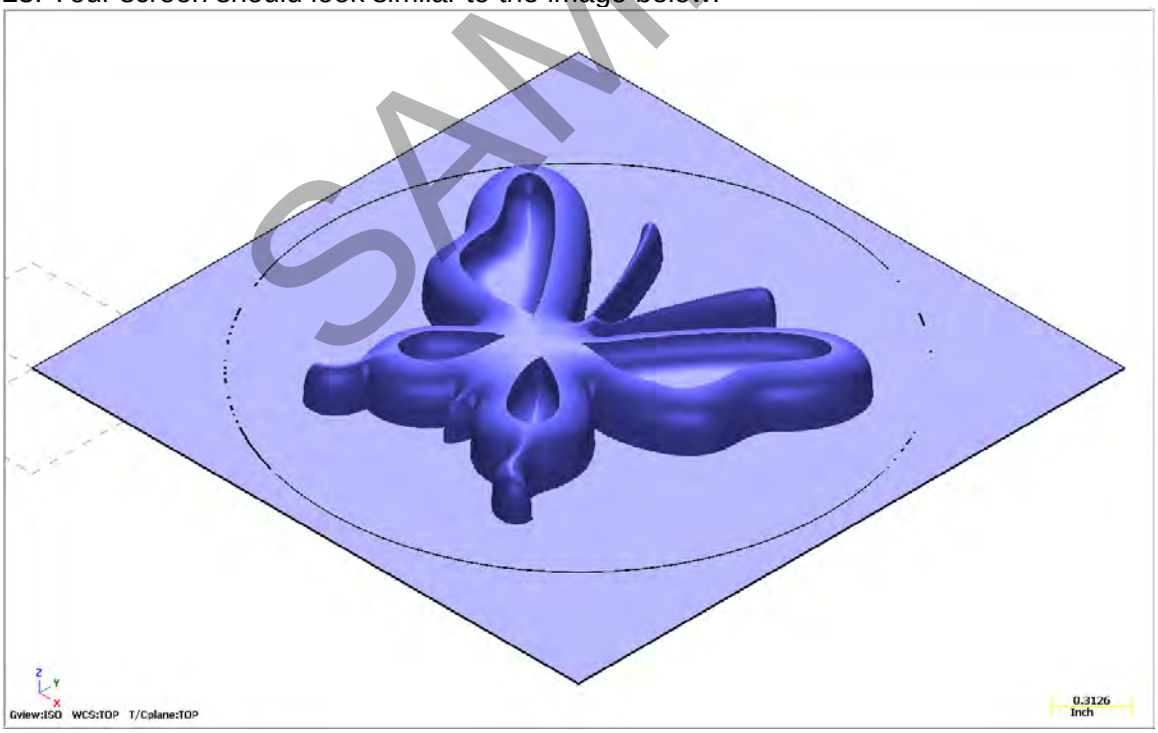


21. Your image should look like the screenshot below.



22. Click on **Isometric Gview**  . Notice the butterfly is no 3 Dimensional (3D).

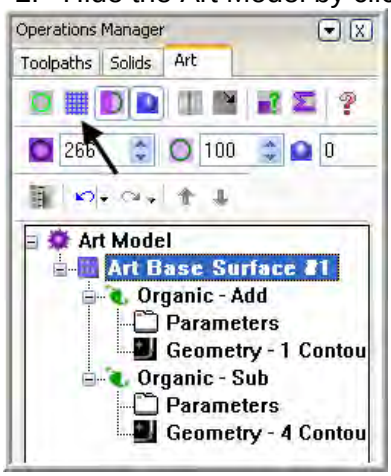
23. Your screen should look similar to the image below.



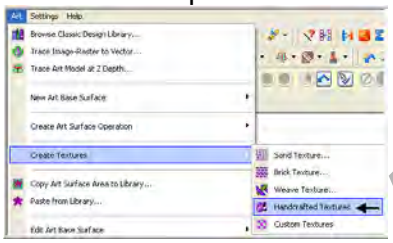
24. Click on **Top Gview**  .

TASK 8:
ADD TEXTURE

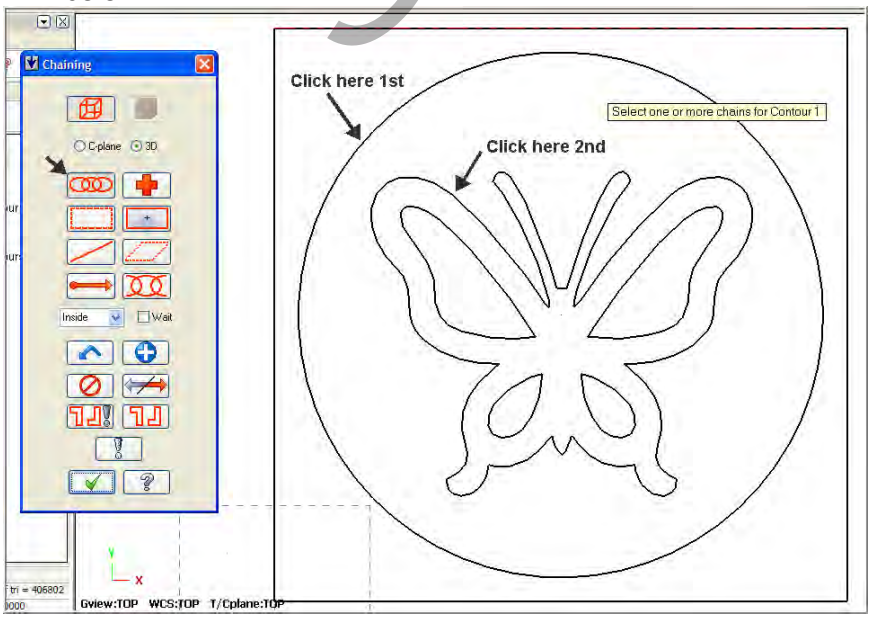
1. Unshade the image by pressing the **Alt + S** keys on your keyboard, or by clicking on the **wireframe** icon  .
2. Hide the Art Model by clicking on the **Hide Art Model** icon as shown below.



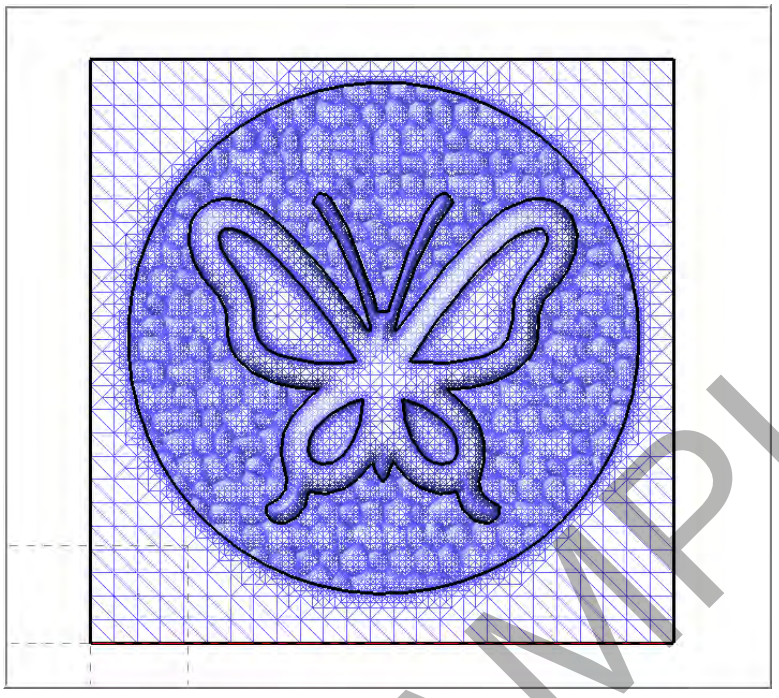
3. From the pull down menu, click on **Art>Create Textures>Handcrafted Textures…**

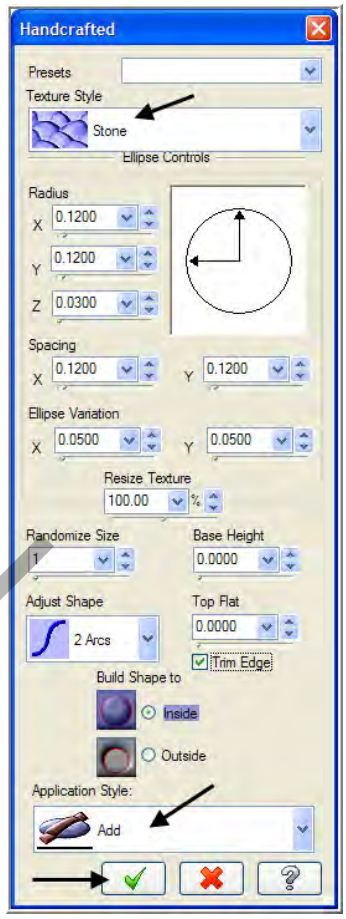


4. The **Chaining** dialog box appears and you are prompted to **Select one or more chains for Contour 1.** Click on the **circle** first then on the **butterfly** outline second, as shown below.

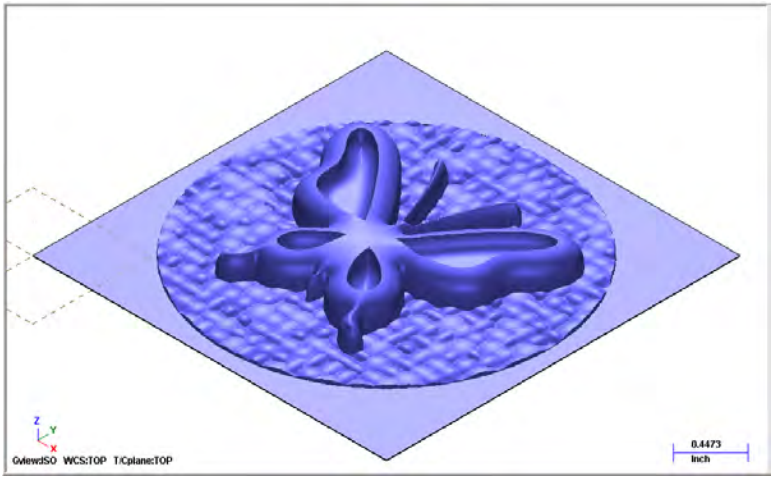


5. Select **OK** in the Chaining dialog box.
6. The **Handcrafted** dialog box appears next. Keep the default settings as shown to the right.
7. Click **OK**.
8. Click on the **Hide Art Model** Icon to **unhide** the Art Model.
9. Your screen should look like the screenshot below.



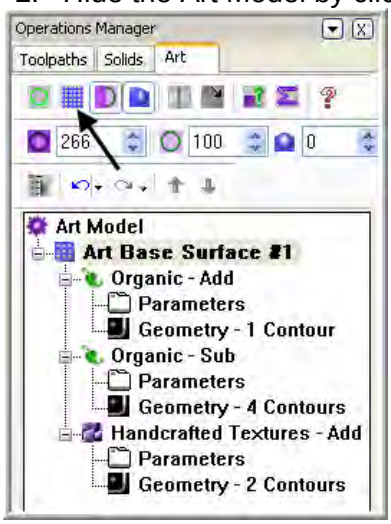


10. Turn on the shading by selecting the **Alt + S** keys on your keyboard or by selecting the **Shade** Icon.
11. Change the graphics view of the image by clicking on the **Isometric** icon.
12. Click on the **Fit to screen** icon.
13. Your screen should look like the screenshot below.

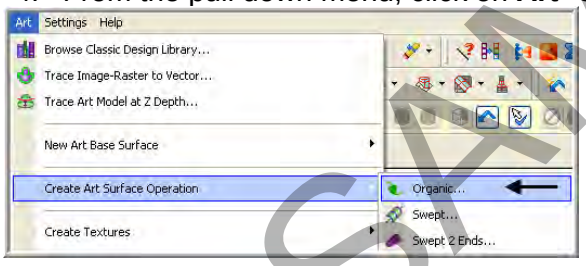


TASK 9:
ADD AN ORGANIC SURFACE

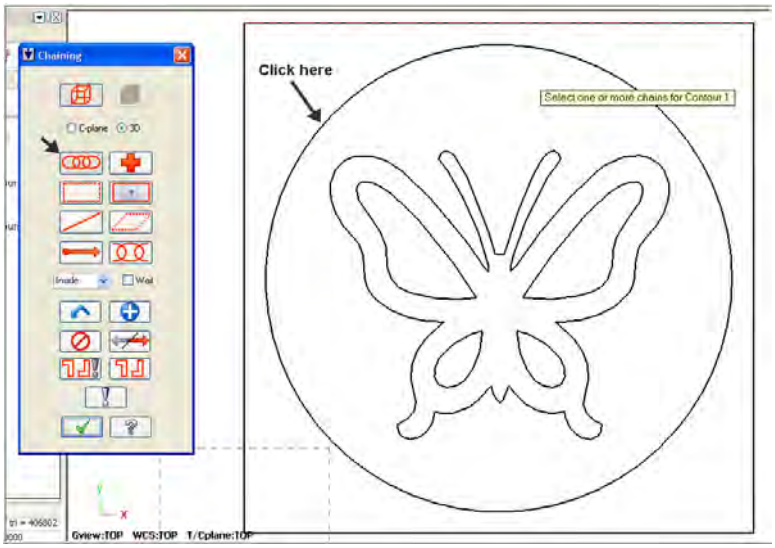
1. Unshade the image by selecting the **Alt and S** key on your keyboard or by clicking on the **wireframe** icon  .
2. Hide the Art Model by clicking on the **Hide Art Model** icon as shown below.



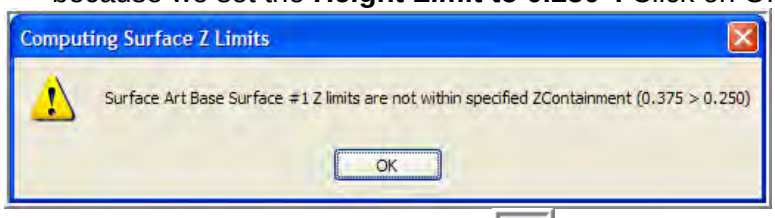
3. Change the graphics view to **Top** by clicking on the **Top Icon**  .
4. From the pull down menu, click on **Art>Create Art Surface Operation>Organic…**



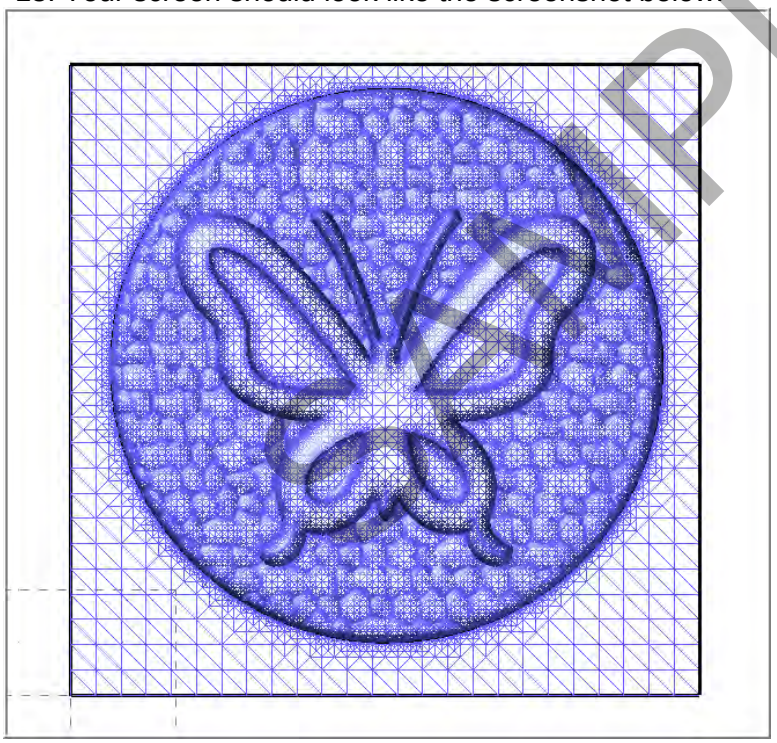
5. The **Chaining** dialog box appears and you are prompted to **Select one or more chains for Contour 1.** Click on the **circle** as shown below.

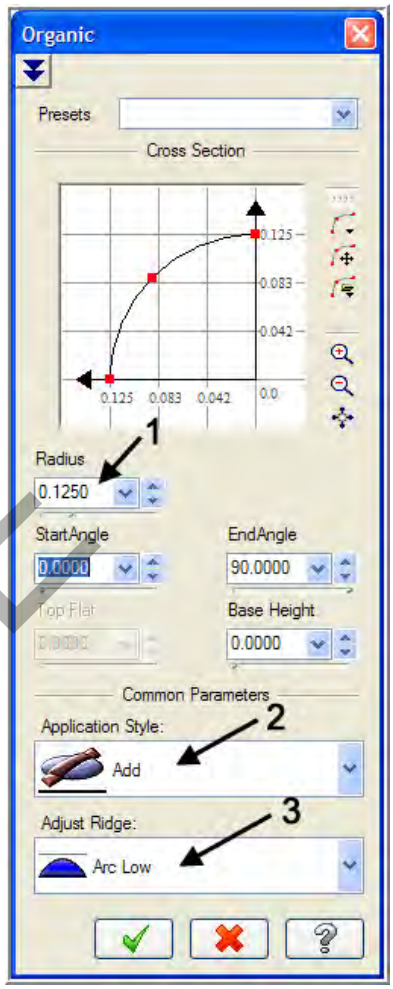


6. Select **OK**  in the Chaining dialog box.
7. The **Organic** parameter screen appears. Make sure the **Radius** is **0.125** as shown to the right (**1**).
8. The **Application Style** should be set to **Add** (**2**).
9. The **Adjust Ridge** setting should be **Arc Low** (**3**).
10. Click **OK**  .
11. The following window may appear. It is telling you that the height of the image will be created at **0.250"** instead of **0.375"** because we set the **Height Limit to 0.250".** Click on OK.



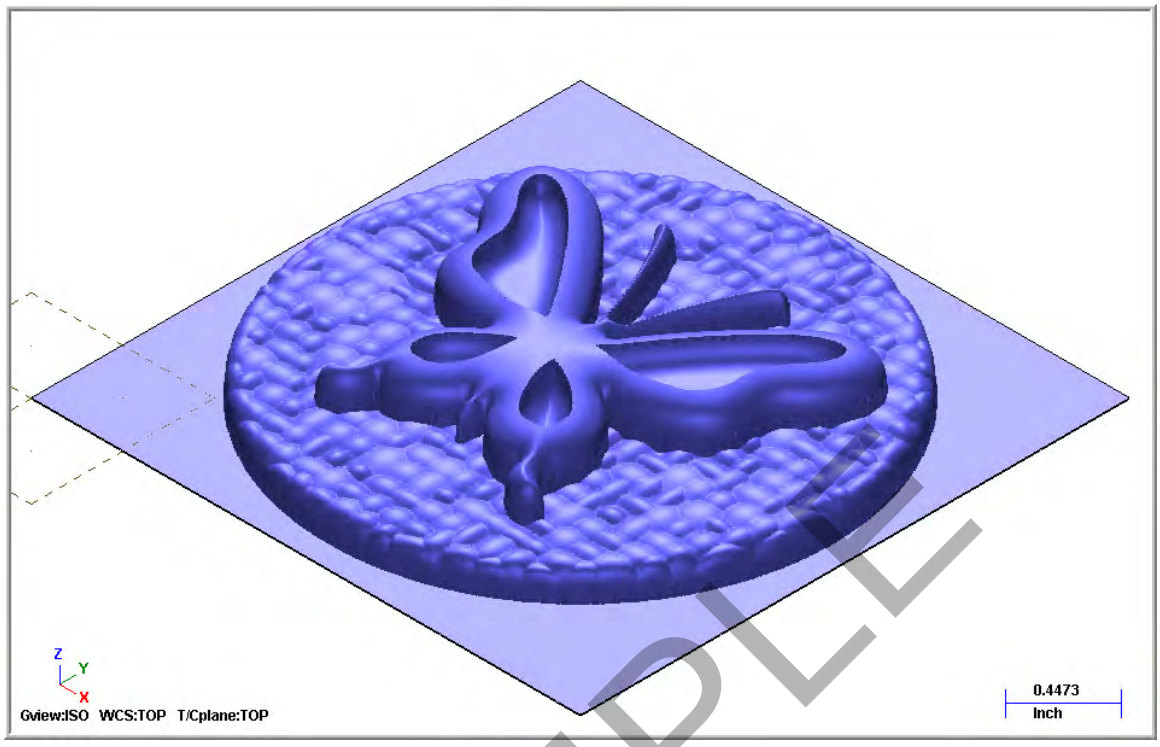
12. Click on the **Hide Art Model** Icon  to **unhide** the Art Model.
13. Your screen should look like the screenshot below.





14. Turn on the shading by selecting the **Alt + S** keys on your keyboard or by selecting the **Shade** Icon  .
15. Change the graphics view of the image by clicking on the **Isometric** icon  .

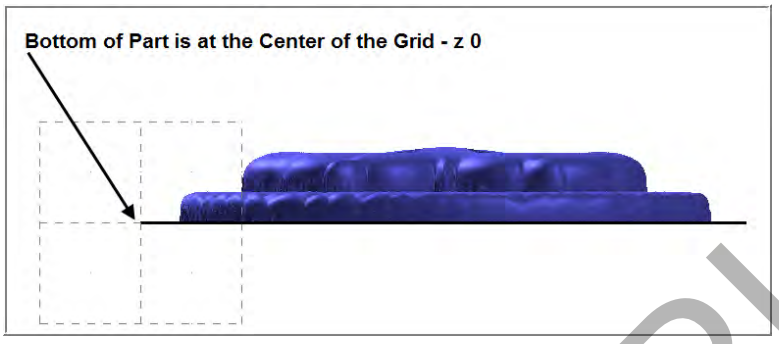
16. Click on the **Fit to screen** icon  . Your screen should look like the screenshot below.



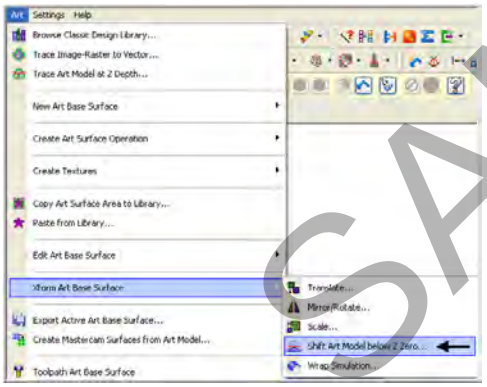
TASK 10:
MAKE THE TOP OF THE IMAGE Z ZERO

➲ In this task we will move the image so the top is at **Z Zero**.

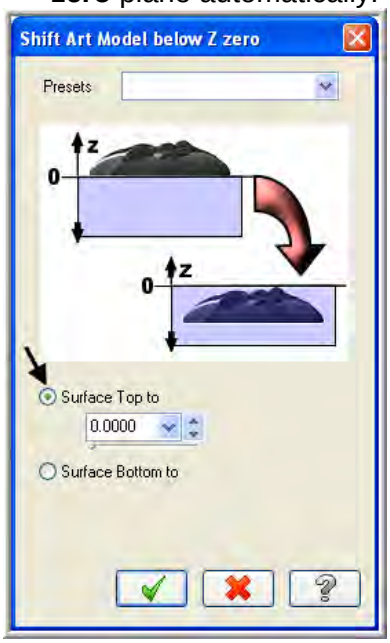
1. Change the graphics view to **Front**  .
2. Select the **Fit to screen** button  to fit the geometry to the screen.
3. The image should look like the example below. Notice that the **bottom** of the part is at the center of the Grid which is **Z zero**.



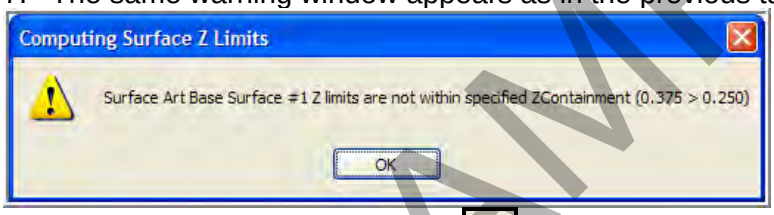
4. From the pull down menu click on **Art>Xform Art Base Surface> Shift Art Model below Z Zero…**



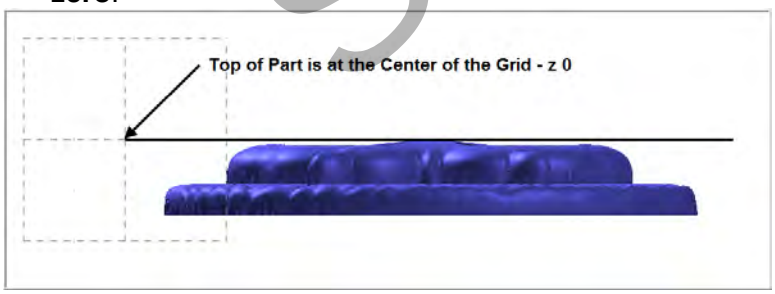
5. Select the option **Surface Top to**. This will move the top of the **Art base surface** to the **Z zero** plane automatically.



6. Select the **OK** button  to accept.
7. The same warning window appears as in the previous task. Click OK to accept.



8. Select the **Fit to screen** button  to fit the geometry to the screen.
9. The image should look like the example below. Note that the **Top** of the part is now at **Z - zero**.



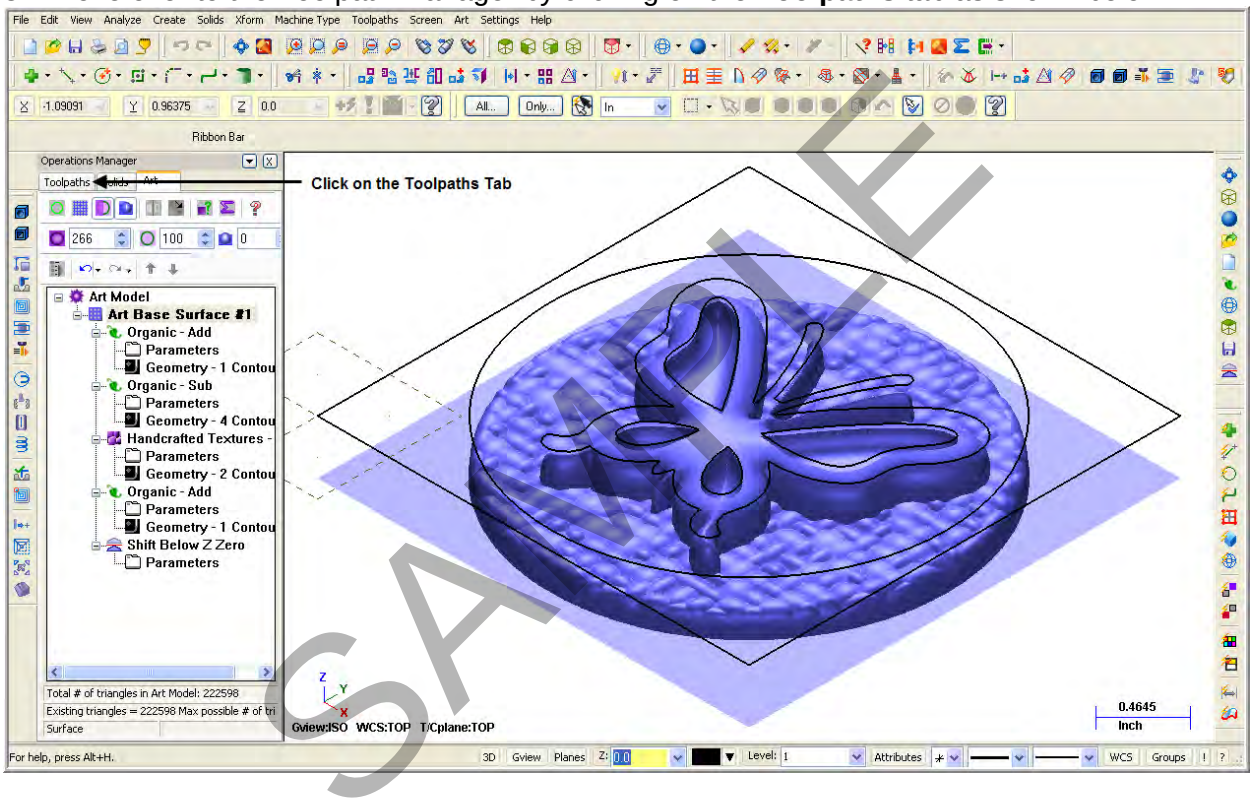
10. Change the graphics view of the image by clicking on the **Isometric** icon  .
11. Click on the **Fit to screen** icon  .
12. Save the geometry by clicking on **File>Save…** or by clicking on the **Save** icon  .

Toolpath Creation (CAM)

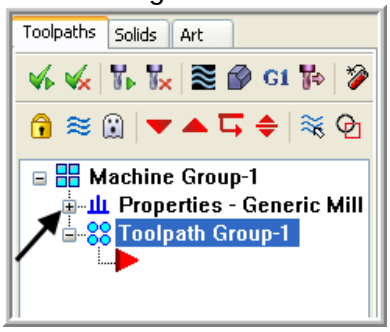
TASK 11:
DEFINE THE ROUGH STOCK USING STOCK SETUP

1. For a better view of the part use the toolbar at the top of the screen to change the graphics view to **Isometric**.

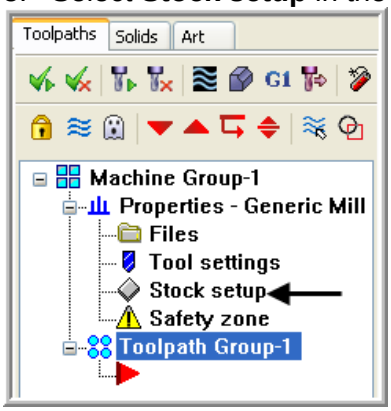
2. Select the **Fit to screen** icon  .
3. Move over to the Toolpath Manager by clicking on the **Toolpaths** tab as shown below.



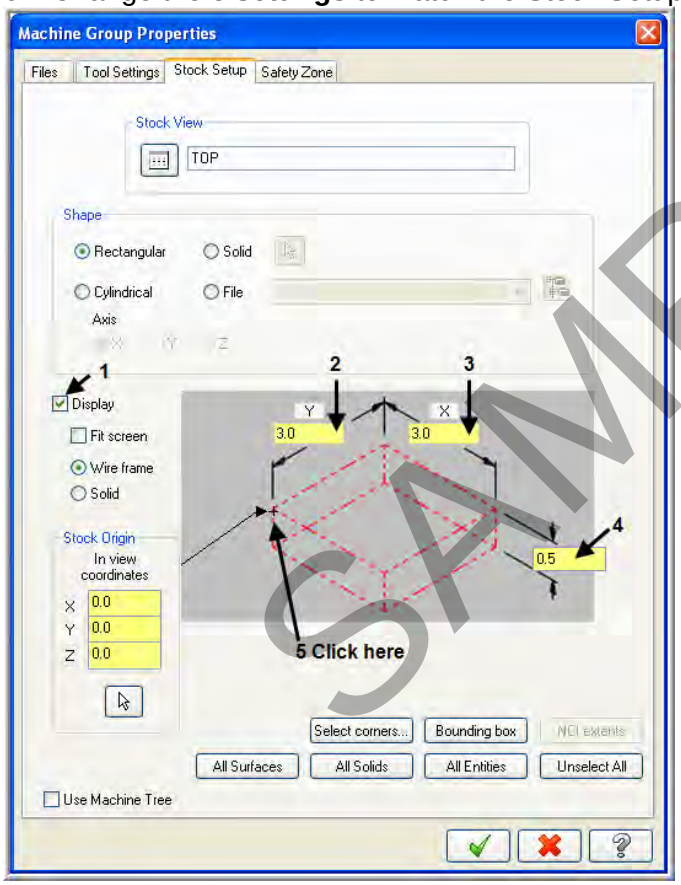
4. Select the **plus** (**+**) in front of **Properties** to expand the Toolpaths Group Properties. Pressing **Alt + O** will Show/hide Operations Manager pane.



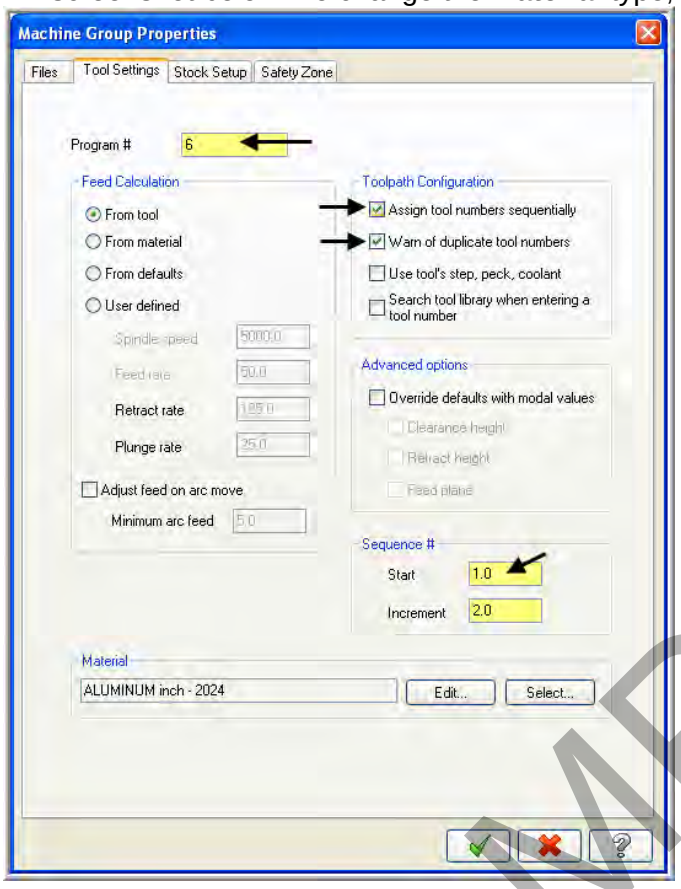
5. Select **Stock setup** in the Toolpath Manager.



6. Change the **5 settings** to match the Stock Setup screenshot below.

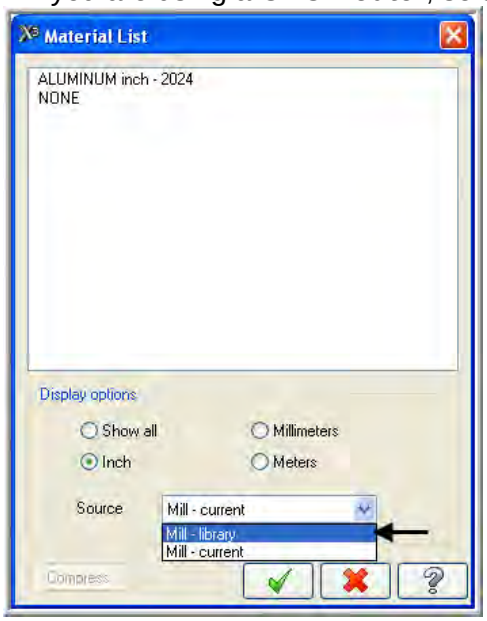


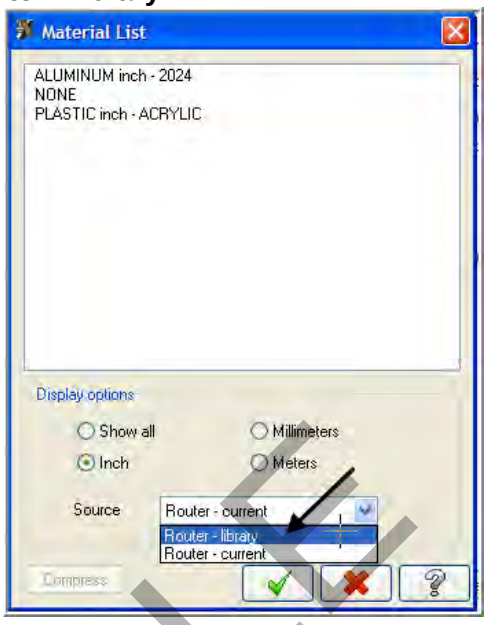
7. Select the **Tool Settings** tab and change the parameters to match the **Tool Settings** screenshot below. To change the **Material** type, follow the next set of instructions.



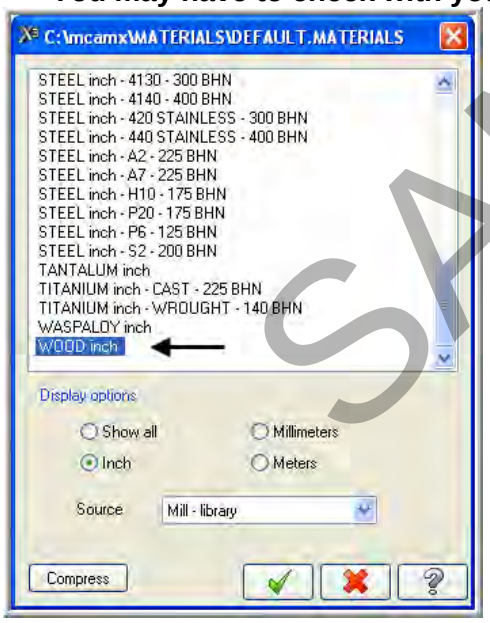
8. To change the **Material** type to **Wood** click the **Select** button at the bottom of the Tool Settings tab.

9. In the **Material List** dialog box open the **Source** drop down list and select **Mill - library**. If you are using a **CNC Router**, select **Router - library**.





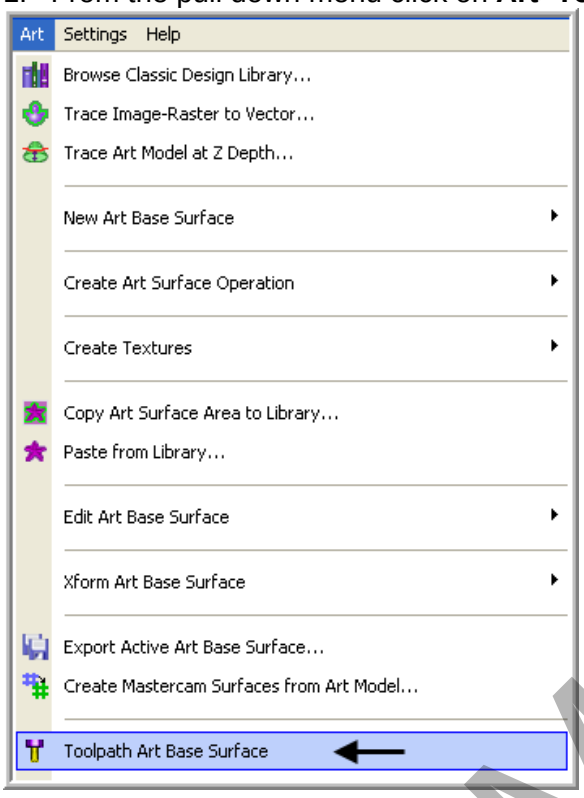
10. From the **Default Materials** list select **WOOD inch** and then select the **OK** button  .
You may have to check with your Instructor to determine the material to use.



11. Select the **OK** button  again to complete this **Stock Setup**.

TASK 12:
MACHINE THE PART

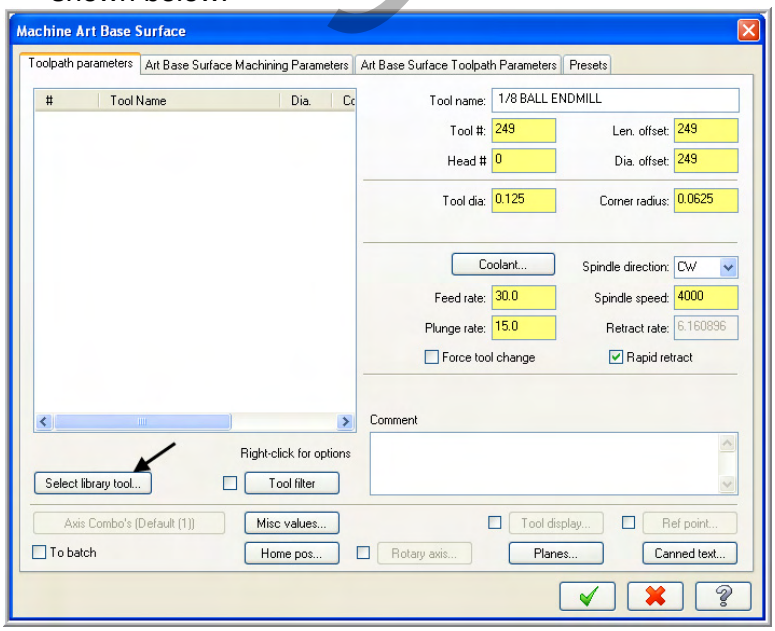
1. From the pull down menu click on **Art>Toolpath Art Base Surface…**



2. If you are prompted to **Enter new NC name** ensure that **Lesson-6-Art-Organic-Name** is displayed, and then select the **OK** button  . If this dialog box does not appear proceed to the next step.

➲ Note that it will take couple of minutes to open the **Machine Art Base Surface**.

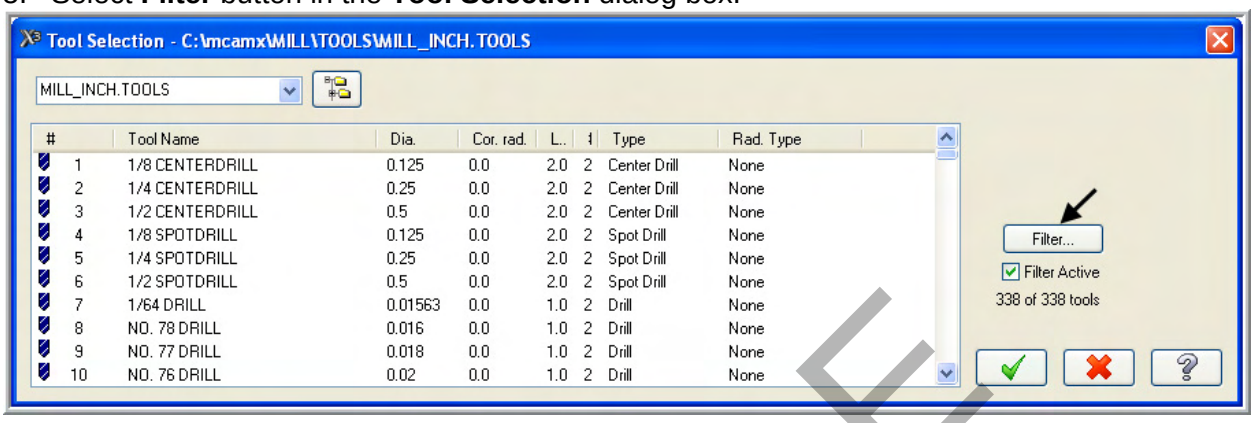
3. In the **Machine Art Base Surface** dialog box, click on the **Select library tool…** button as shown below.



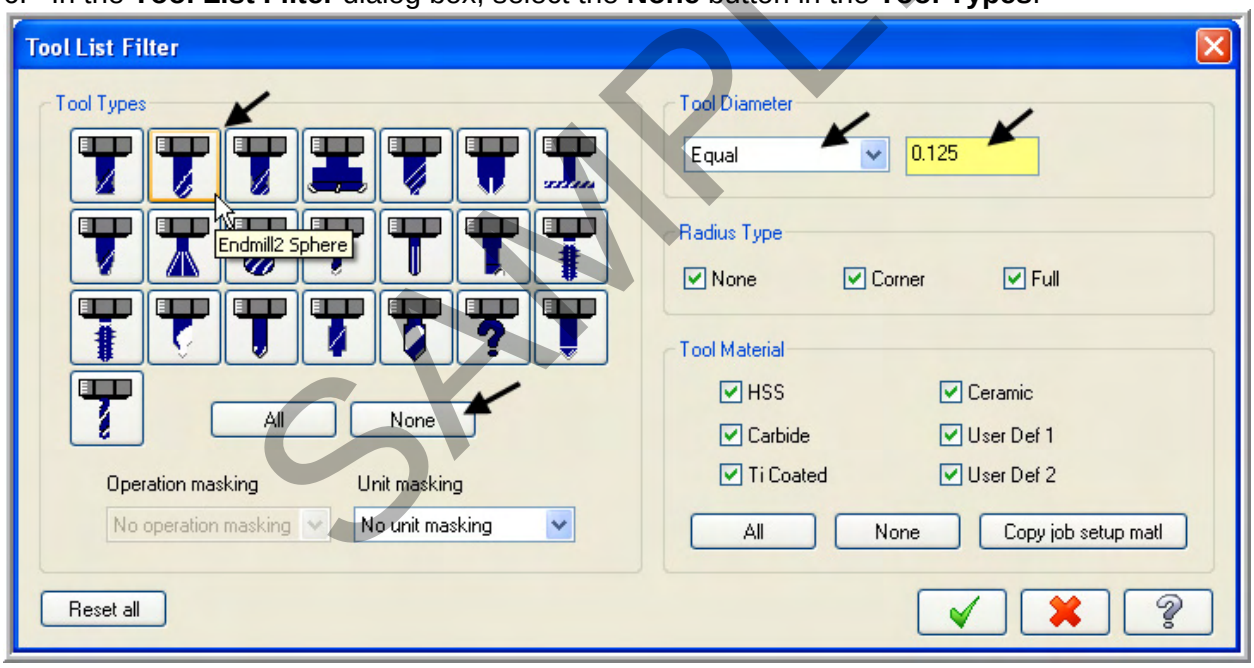
4. Select the **1/8 Ball Cutter**.

➲ If the 1/8 Ball Cutterl is not in the **Tool Selection** list, follow the next steps. Otherwise proceed to **Step 12**.

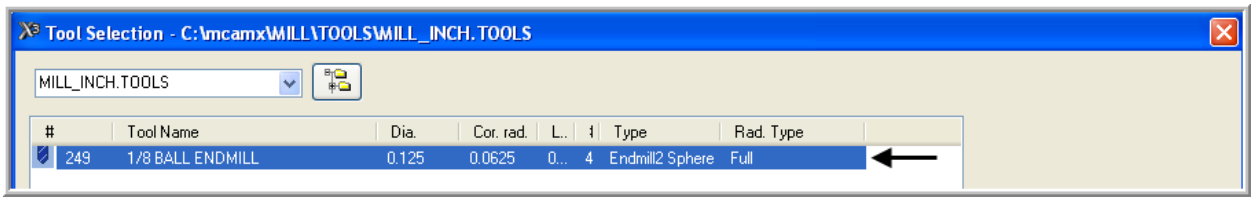
5. Select **Filter** button in the **Tool Selection** dialog box.



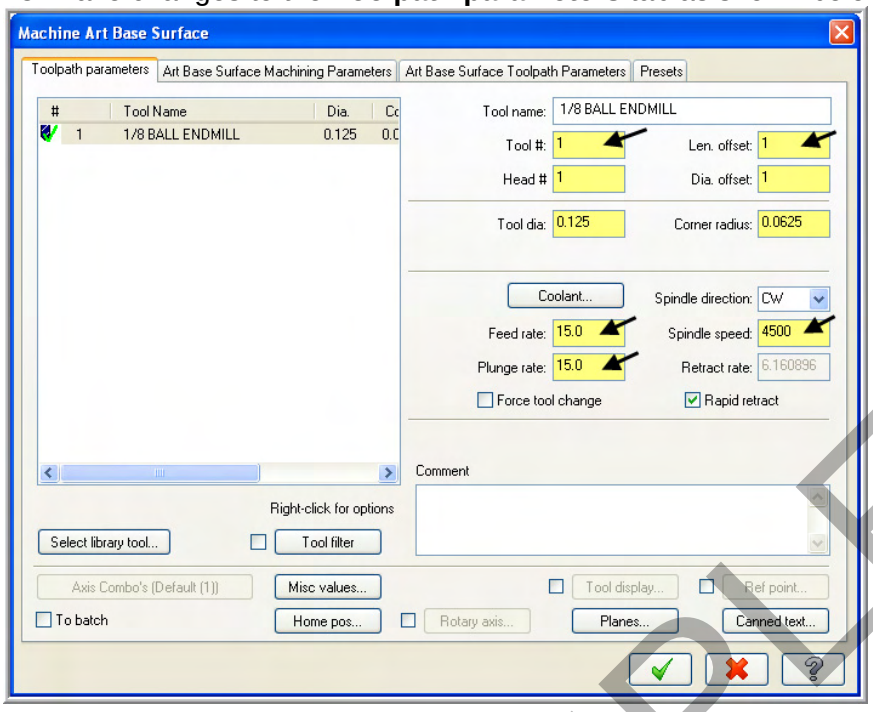
6. In the **Tool List Filter** dialog box, select the **None** button in the **Tool Types**.



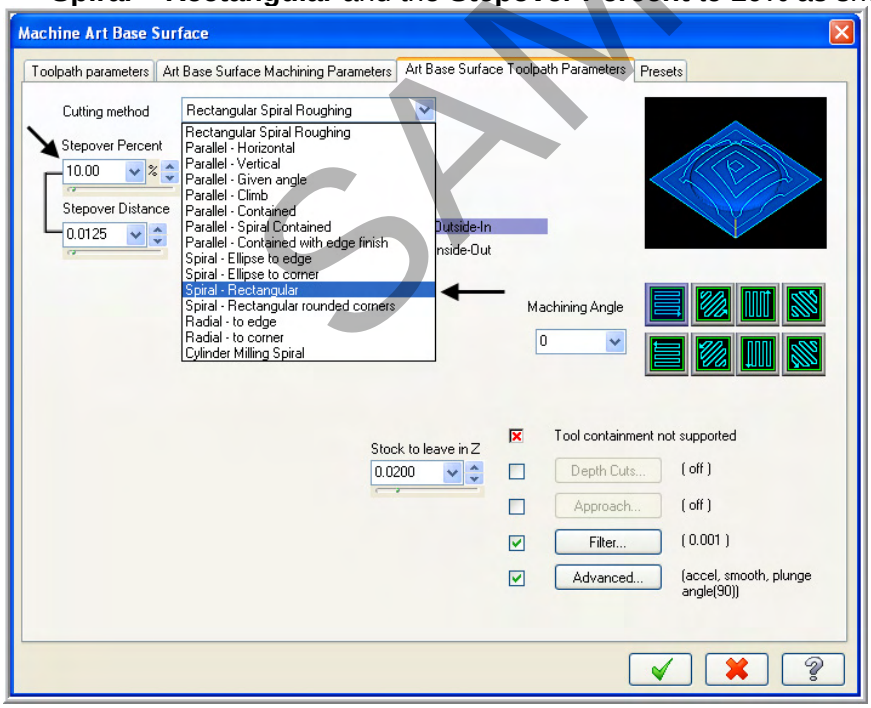
7. Select the **Endmill Sphere** as the Tool Type as shown above.
8. In the **Tool Diameter** section, select the drop-down arrow and choose **Equal**.
9. Enter **1/8** as the diameter and press the **Tab** key or **Enter** to display the numeric value (0.125),
10. Select the **OK** button  to exit **Tool List Filter**.
11. Select the **1/8 Ball Endmill** from the list.



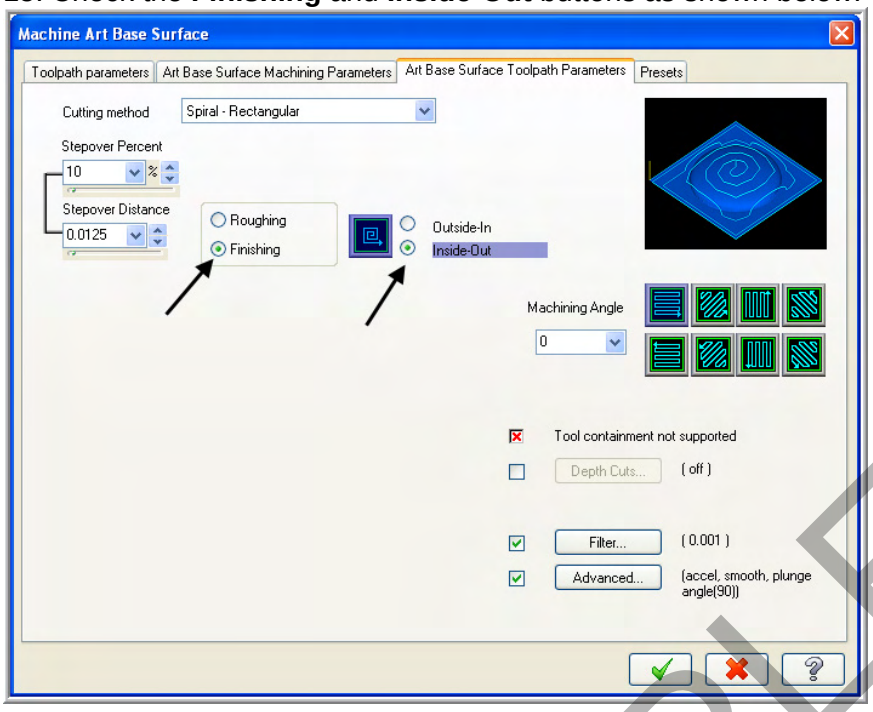
12. Select the **OK** button  to exit the **Tool Selection** screen.
13. Make changes to the **Toolpath parameters** tab as shown below.



14. Select the **Art Base Surface Toolpath Parameters** tab and change the **Cutting method** to **Spiral – Rectangular** and the **Stepover Percent** to **10%** as shown.



15. Check the **Finishing** and **Inside-Out** buttons as shown below.



16. Select the **OK** button  to exit **Machine Art Base Surface** parameters.

➲ Note it may take a few minutes to generate the toolpath.

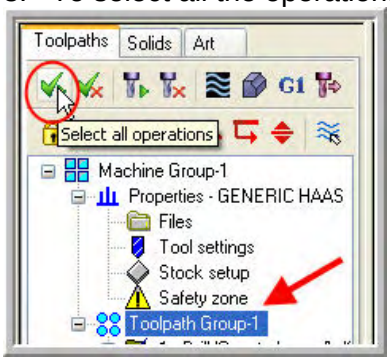
TASK 13:
BACKPLOT THE TOOLPATH

- In this task you will use Mastercam's **Backplot** function to view the path the tools take to cut this part.
- Backplot will enable you to review the cutting motions and identify any problem areas when cutting the part.
- When the toolpath is being backplotted Mastercam displays the current X, Y, and Z coordinates in the left side of the status bar at the lower left corner of the screen.

1. Select the **Isometric** view from the view toolbar.

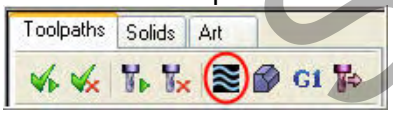
2. Select the **Fit to screen** icon to fit the part to the screen  .

3. To select all the operations to backplot, click the **Select All** icon  circled below.

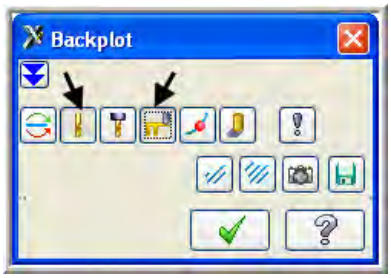


- Another method to **Select all** the operations is to click on the **Toolpath Group-1** in the Tool Manager as shown by the arrow above.

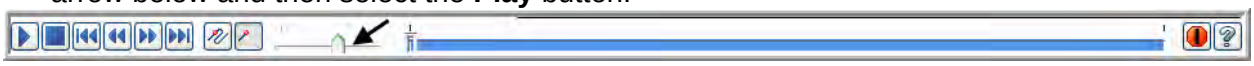
4. The next step is to select the **Backplot selected operations** icon shown below.

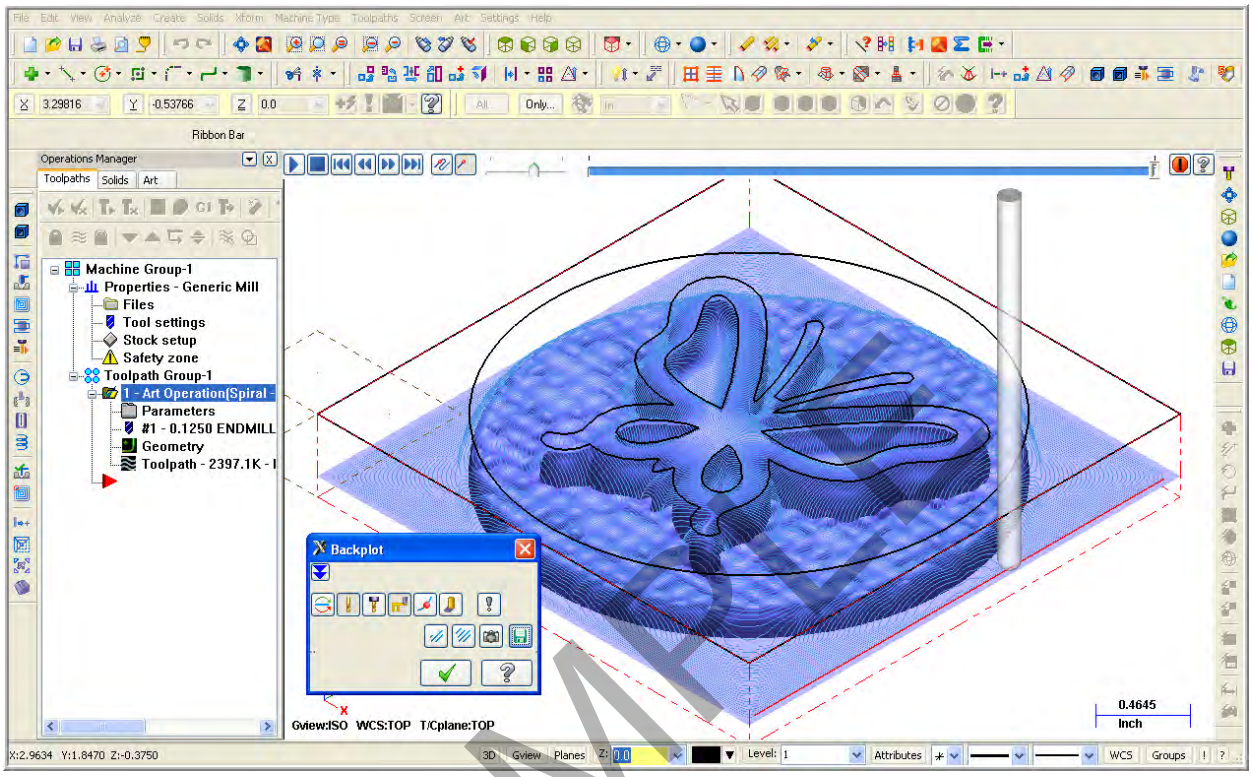


5. Before you backplot the toolpath, ensure that the two buttons shown below are activated. The option on the left will **Display Tool** and the option on the right will **Display rapid moves**. These buttons act like a toggle switch, pressed in activates the function.



6. Set the play speed on the **Backplot** controls midway along the speed bar as shown by the arrow below and then select the **Play** button.



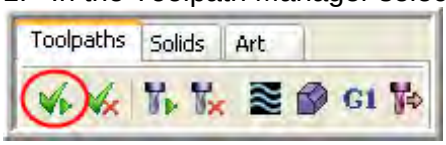


7. After reviewing the backplot of the toolpath using a .125" ball endmill select the **OK** button  to exit **Backplot**.

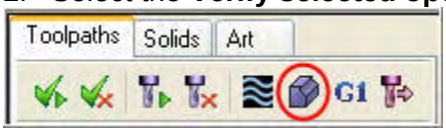
TASK14:
VERIFY THE TOOLPATH

- Mastercam's **Verify** utility allows you to use solid models to simulate the machining of a part and shows collisions, if any exist.
- This allows you to identify and correct program errors ***before*** they reach the shop floor.

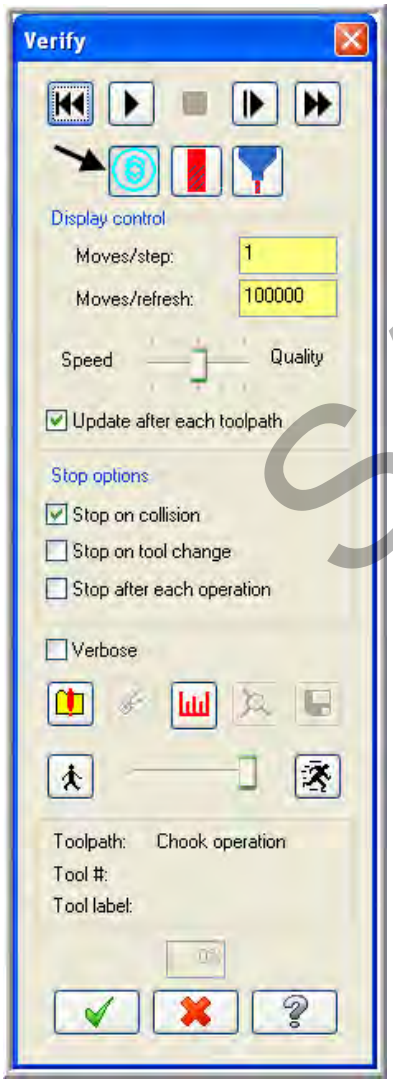
1. In the Toolpath Manager select all the operations to verify by clicking the **Select All** icon.



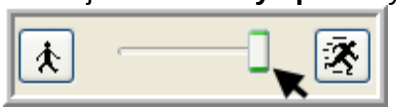
2. Select the **Verify selected operations** button circled below.



3. Enable the **Turbo** button as shown below.

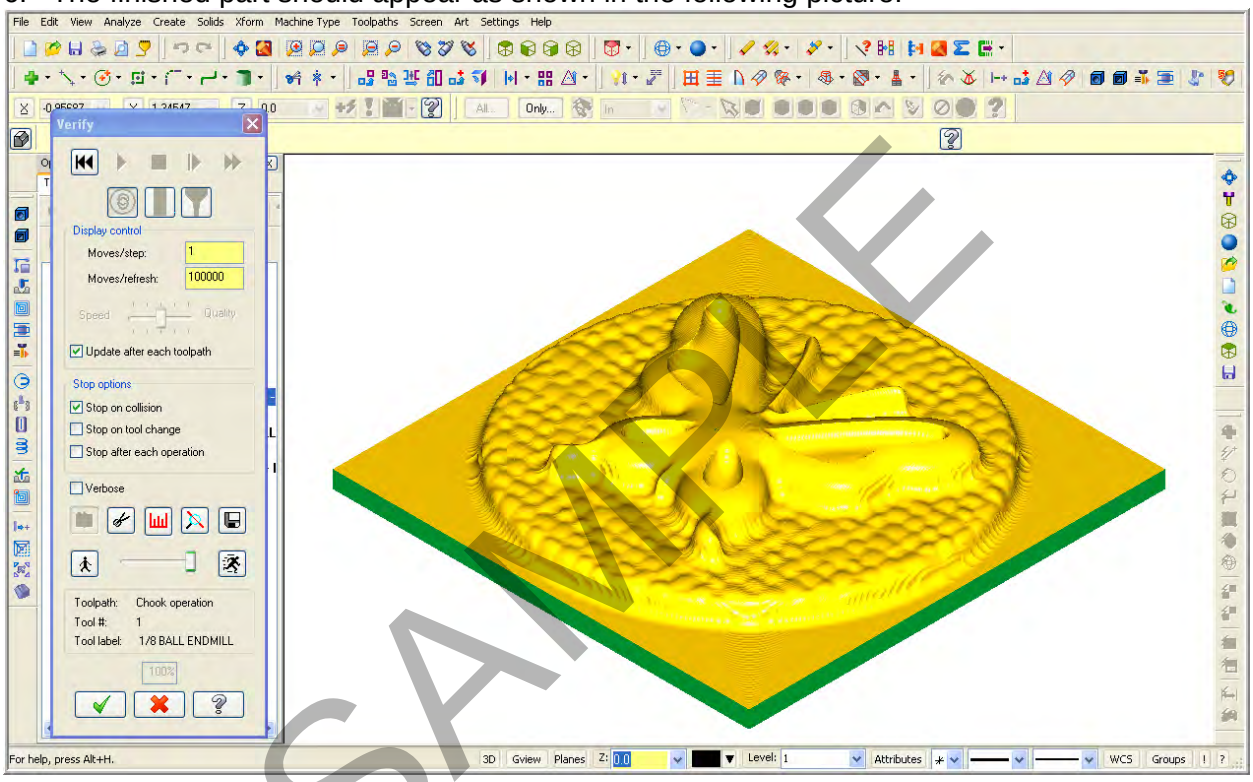


4. Adjust the **Verify speed** by moving the slider bar in the speed control bar.



5. Select the **Play** button to verify the two toolpaths.

6. The finished part should appear as shown in the following picture.



7. Select the **OK** button  to exit **Verify**.

TASK 15:
SAVE THE UPDATED MCX FILE

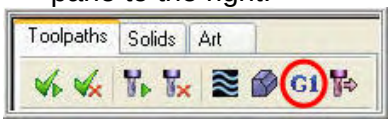
1. Select the **Save** icon from the toolbar.

TASK 16:
POST AND CREATE THE CNC CODE FILE

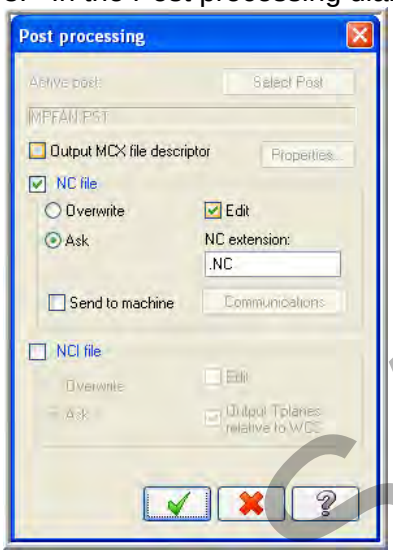
1. Ensure all the operations are selected by clicking the **Select All** icon  from the Toolpath Manager.

2. Select the **Post selected operations** button from the Toolpath Manager.

➲ Note: If you cannot see **G1,** click on the right pane of the Toolpath Manager and expand the pane to the right.



3. In the Post processing dialog box, make the necessary changes as shown below.



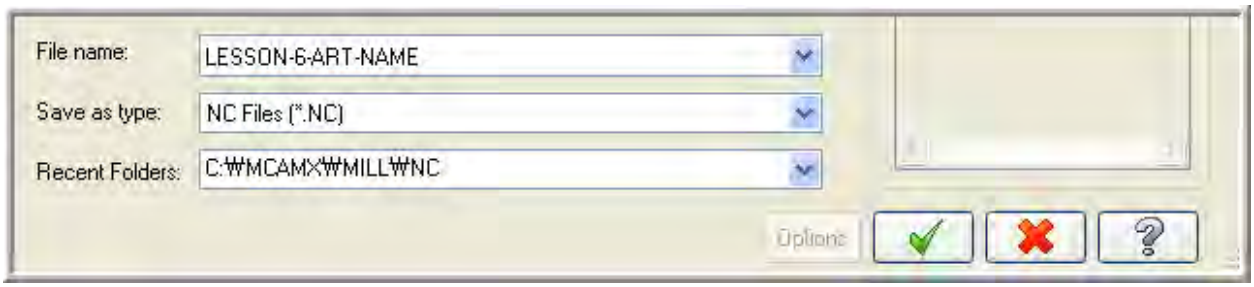
About Post Processing

NC file:
Select this option to save the NC file. The file name and extension are stored in the machine group properties for the selected operation. If you are posting operations from different machine groups or Mastercam files, or batch processing, Mastercam will create several files according to the settings for each machine group.

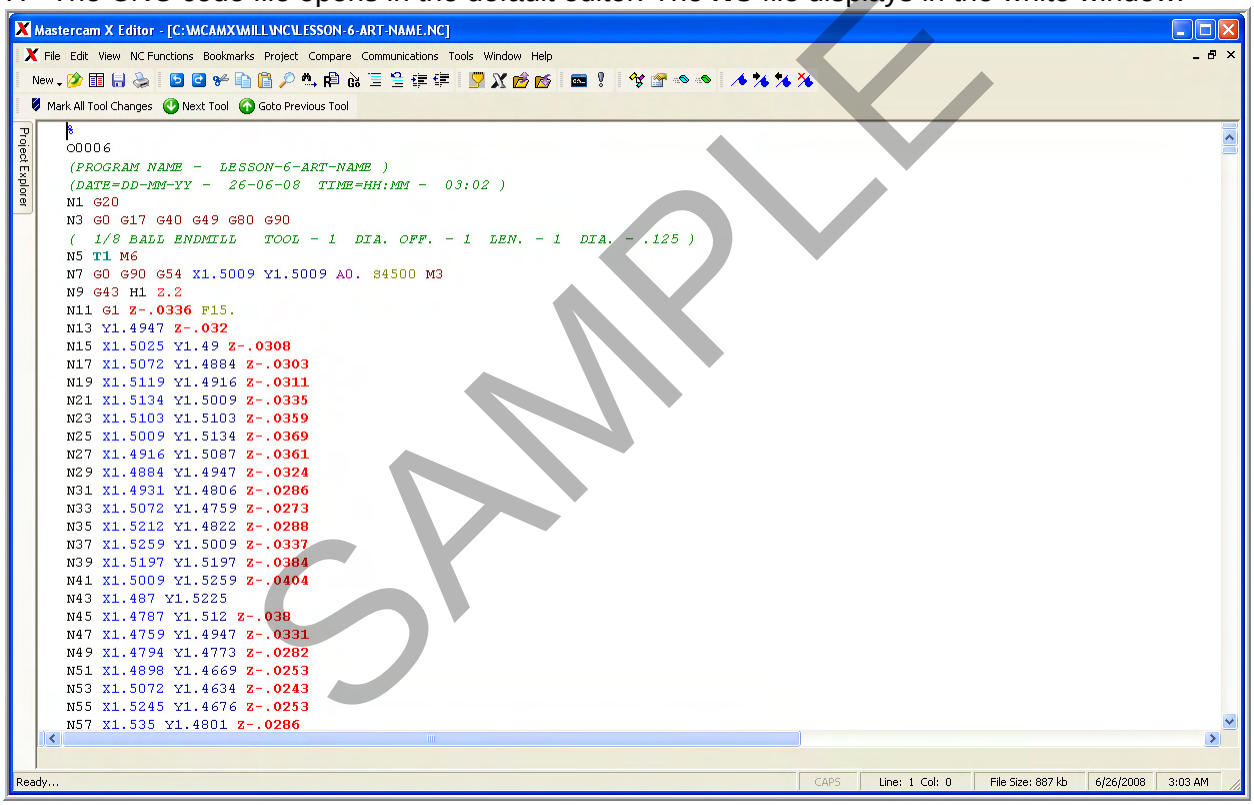
Edit:
When checked, automatically launches the default text editor with the file displayed so that you can review or modify it.

4. Select the **OK** button  to continue.

5. Ensure the same name as your Mastercam part file name is displayed in the **NC File name** field as shown below.



6. Select the **OK** button  .
7. The CNC code file opens in the default editor. The **NC** file displays in the white window.



8. For instructions on how to **Set Up and Run** the CNC Machine refer to the **Machine Instruction Lesson** and follow the appropriate instructions for your **CNC Machine**.
9. Select the  in the top right corner to exit the CNC editor.

This completes **Lesson-6 Art Organic**.

TASK 17:
REVIEW EXERCISE

1. Use Mastercam to create the geometry and toolpaths for the Lesson-6-Exercise and follow the Exercise guidelines below:

LESSON-6-EXERCISE GUIDELINES

Steps	Task	Description
Material Size	2	Create a rectangle 3” x 3” with X0, Y0 at the lower left corner of the rectangle.
Import Image	3	Import an image from the Classic Design Library that is different from the image used in this Lesson.
Image Settings	3	Scale the image so it fits inside the rectangle leaving approximately 0.5” of space between the image and the rectangle.
Create an Organic Surface	7	Using the image create a number of organic surfaces.
Add Texture	8	Add texture to an area of the image
Stock Setup	11	
Cutters	12	1/8” Ball End Mill
Feed rate	12	15 Inches per minute
Spindle speed	12	4500
Stepover Percent	12	10.00 precent
Saved Mastercam File	15	Lesson-6-exerciseyourname.mcx
Saved NC File	16	Lesson-6-exerciseyourname.nc