

RhinoART© 2017 Quick Start Guide

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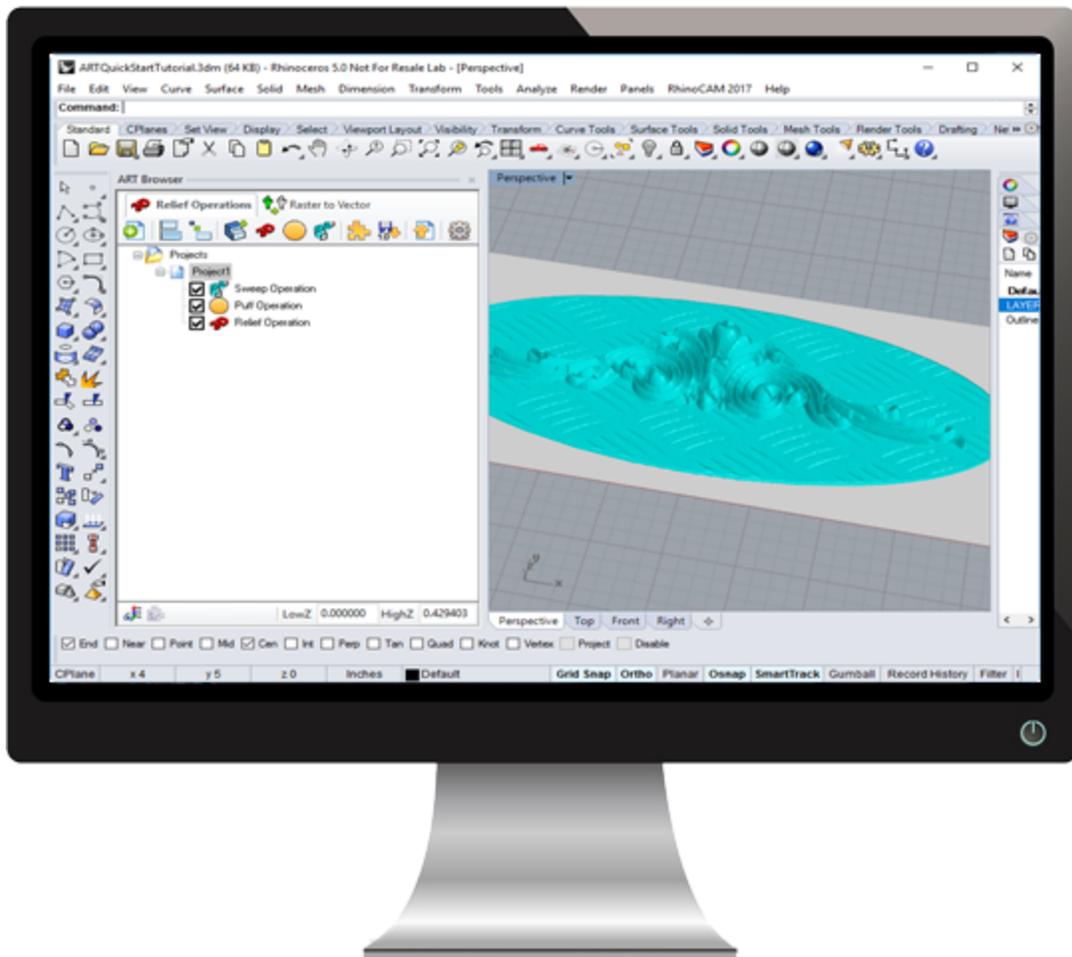


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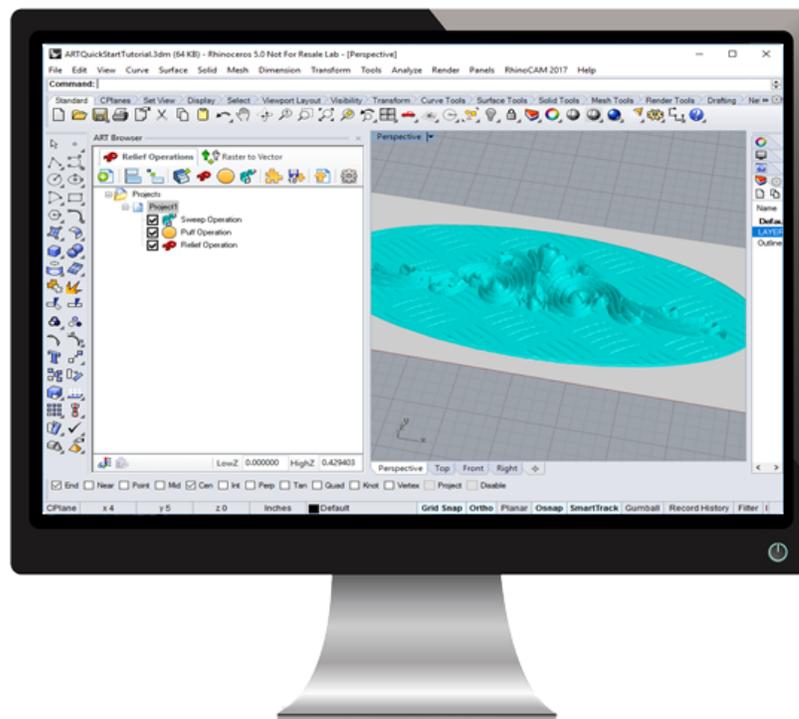
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About this Guide

1.1 About the ART Module

RhinoCAM's ART module (RhinoART) is used to convert artwork into geometry suitable for machining or 3D printing. To accomplish this, the user utilizes modeling techniques unique to the ART module that are found within the “Relief Operations” tabbed browser window or the “Raster to Vector” tabbed browser window. These modeling operations augment the traditional modeling methods available in Rhino. A simple and well thought out user interface makes this system one of the most intuitive and easy to use ART packages in the market.

ART’s capabilities enable you to create 3D reliefs as well as wireframe geometry from picture files. You can work with bitmap images such as .bmp, .jpg, and .gif files as well as native CAD geometry. Then you can use RhinoART with its selection of tools, variety of bitmaps and operations to create different shapes.



The ART Module Quick Started Guide

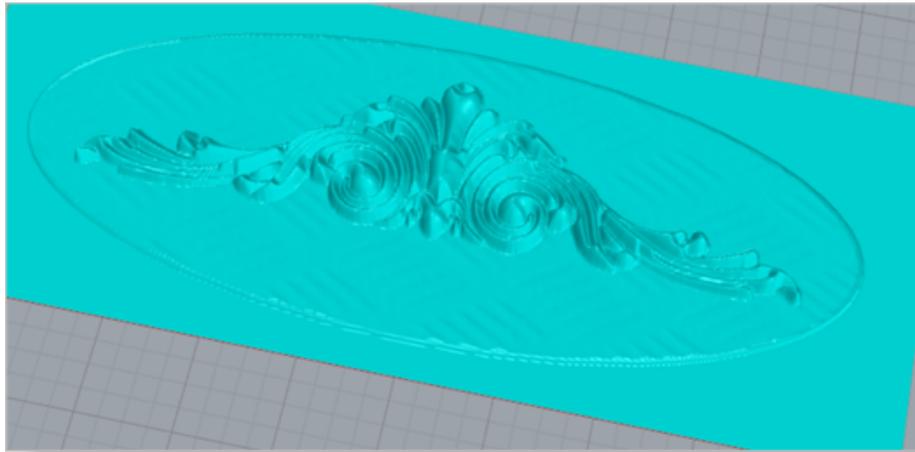
1.2 Using this Guide

If you already installed RhinoCAM successfully on your computer and are now looking at the blank screen of Rhino and wondering what to do next, this is the guide for you. This guide will explain how to get started in using RhinoCAM ART to program a simple part through an example.

This guide will illustrate creating relief operations using 2D curves using the various functions available in the ART module. We will start with 2D curves and end up with a 3D mesh geometry shown in the preceding page that is suitable for being manufactured. The focus of this tutorial is to create 3D shapes that would be difficult to model using traditional CAD

modeling methods.

This guide has two associated [Rhino](#) files that you can find located in the [QuickStart](#) folder under the installation folder of this guide. The first file is a completed file that contains all of the completed relief operations and represents the file that you should end up with after working through the tutorial. The other file is a starter file that contains only the geometry. Use the completed file as a reference. Copy the starter file and use this file to begin each tutorial.



ARTQuickStartTutorial_Completed.3dm

1.3 Useful Tips

Here are some useful tips that will help you use this guide effectively.

1. Copy the tutorial part files in a location other than the installation folder to make sure you have read/write privileges to the files.
2. Once you start working with the tutorial file, save your work periodically!
3. Don't stress out too much if you are having trouble with the tutorial. Call us or send us an email and we can help you out.
4. Most of all have fun!

Getting Ready

2.1 Running RhinoCAM

Locate the [RhinoCeros 5](#) shortcut on your desktop and double click to launch the application.

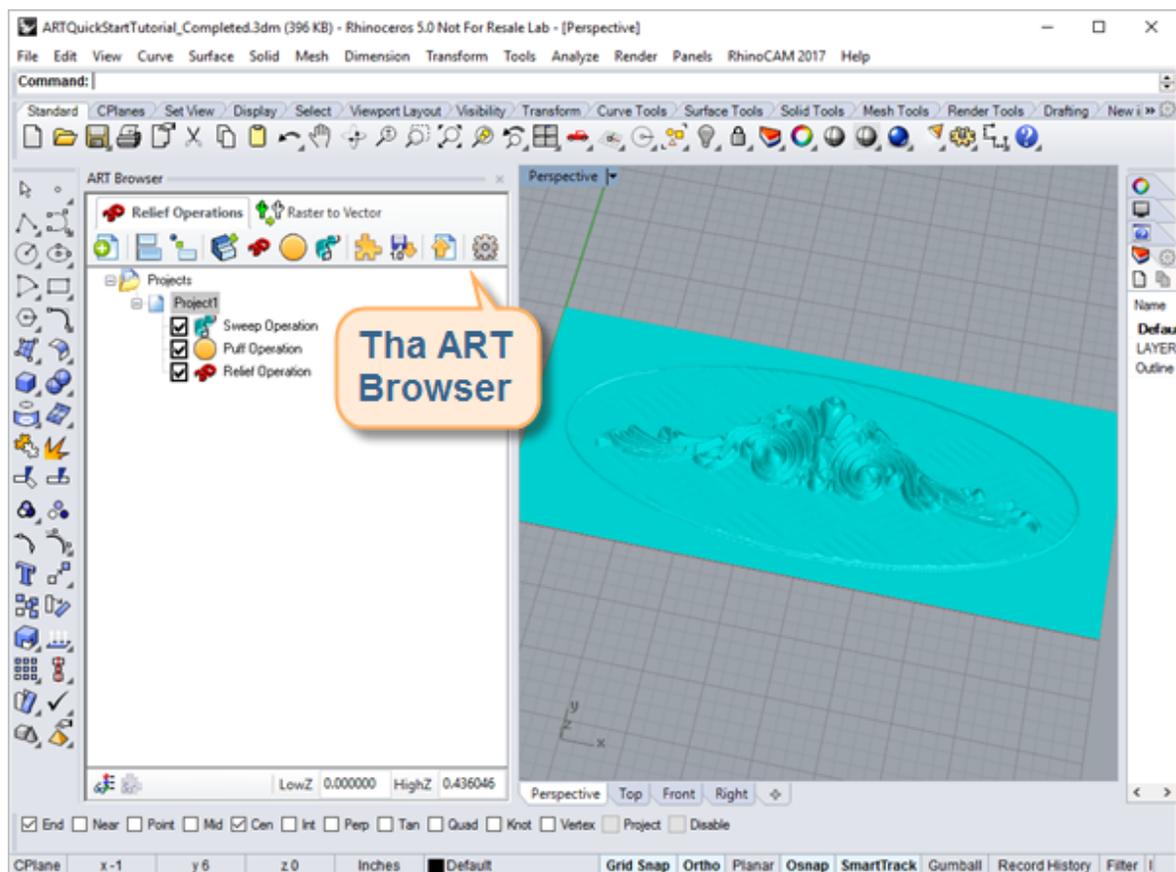
Alternatively you can also click on the Windows [Start](#) button and select [All Programs](#). Go to the program group containing [RhinoCeros 5](#). (The name of this program group will usually be called [RhinoCeros 5](#), unless you specified otherwise during setup.)

Once you locate the program group, select it and then select [RhinoCeros 5](#) to launch the application.

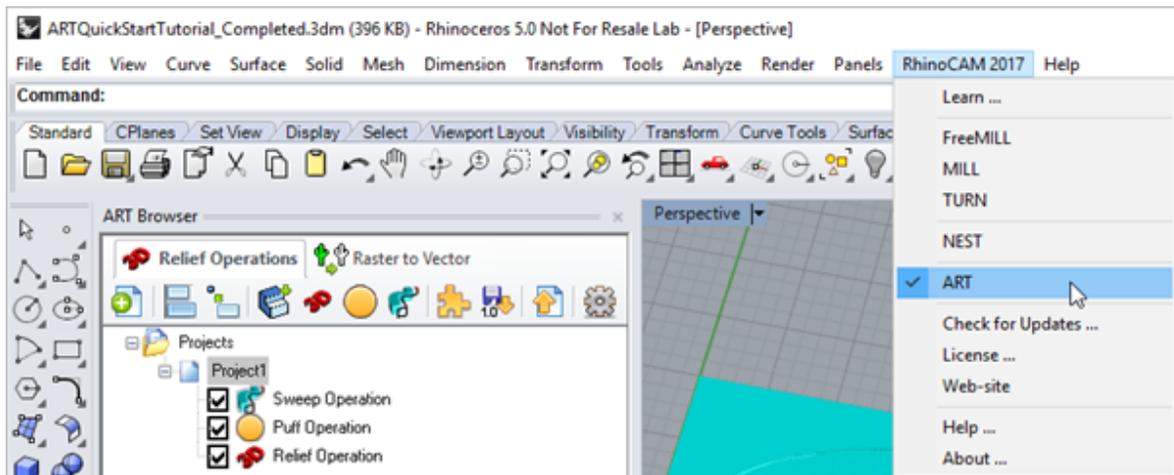
If the installation was successful, upon launching of [RhinoCeros 5](#) you should observe a menu entry called [RhinoCAM](#) in the main menu bar of [Rhino](#).

2.2 Launching the ART Module

When [RhinoCAM](#)'s [ART](#) module is selected from the [RhinoCAM](#) drop down menu, you will see one docking dialog called the [RhinoCAM – ART Browser](#), with two tabs, one tab called [3D Relief Operations](#) and the other called [Raster to Vector](#), docked on the left hand side of the [Rhino](#) screen as shown below.



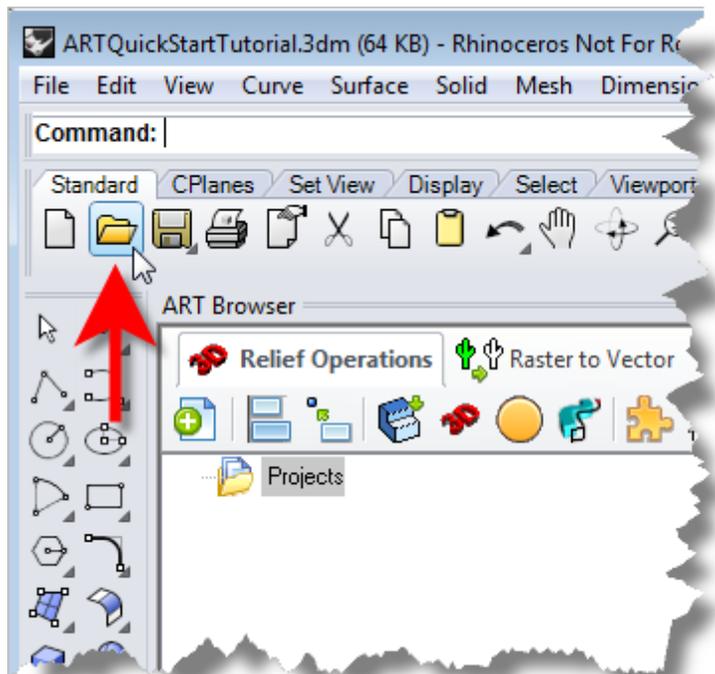
If the ART Browser does not appear as shown, select the RhinoCAM 2017 menu item from the the main menu bar of RhinoCAM and select the ART menu entry.



2.3 Loading the Part Model

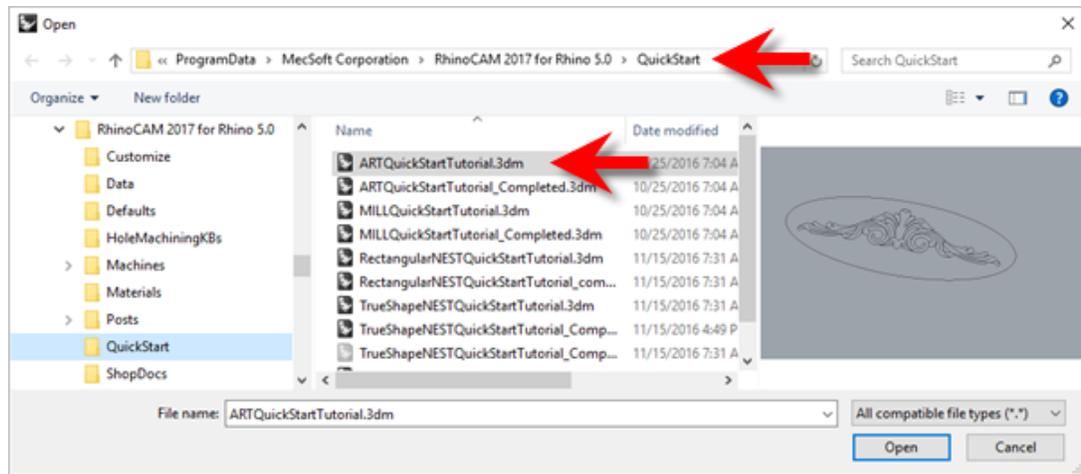
“Part” refers to the geometry that represents the final manufactured product. You can create parts within [RhinoCeros](#) or import geometry created in another [CAD](#) system. Bitmaps such as [.bmp](#), [.jpg](#), and [.gif](#) files can be loaded when using [3D Relief](#) or [Raster to Vector](#) operations.

1. Select [File / Open](#) from the [Menu](#), or click the [Open](#) icon from the [Standard](#) bar.



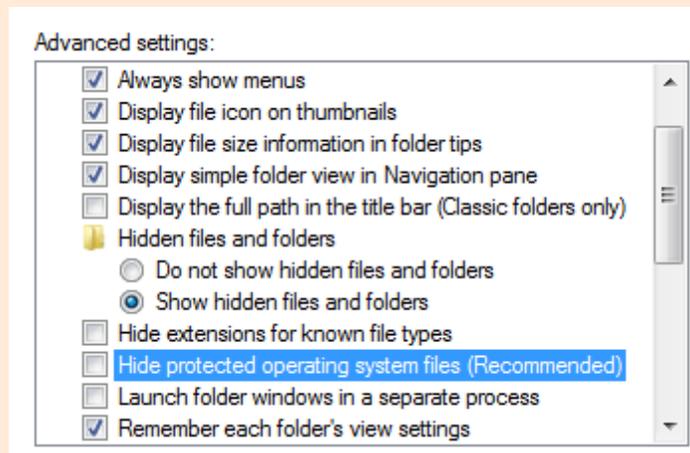
2. From the [Open](#) dialog box, select the [ARTQuickStartTutorial.3dm](#) file from the [C:](#)

\\ProgramData\MecSoft Corporation\RhinoCAM 2017 for Rhino 5.0\QuickStart\ folder. As mentioned before, it is advisable to make a copy of this part at a suitable alternative folder so that you have write privileges to modify the part.



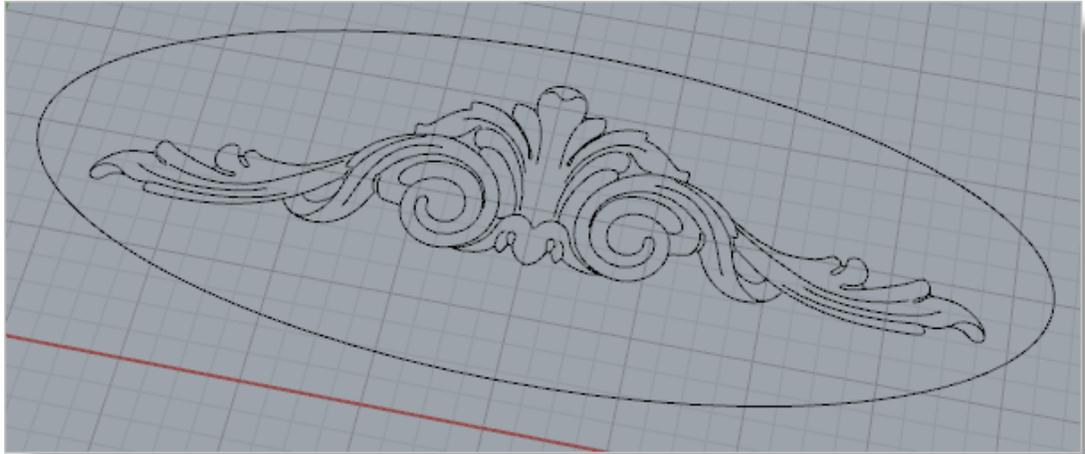
! By default, the `ProgramData` folder is "hidden" from view. Here are the steps to Show hidden files and folders:

1. For Windows 7/8 users: Go to `Control Panel > Appearance and Personalization > Folder Options`.
2. Select `View` tab and under advanced settings select `Show Hidden files and folders`, clear the check boxes for:
 - `Hide extensions for known file types`
 - `Hide protected operating system files (Recommended)`



3. Click `Apply` and `OK`.

The part appears as shown below.



ARTQuickStartTutorial.3dm

2.4 Strategy

We will restrict the project extents to be 10 inches x 4 inches. This example will include three operations; [Sweep](#), [Puff](#) and [3D Relief](#). We will go through each of these three relief operations to create 3D shapes so that the user has a better understanding of how the [ART](#) module works.

2.5 Basic Steps

The following steps will be followed in creating relief shapes. Some of these steps will have to be performed just once and others may have to be repeated to create the reliefs.

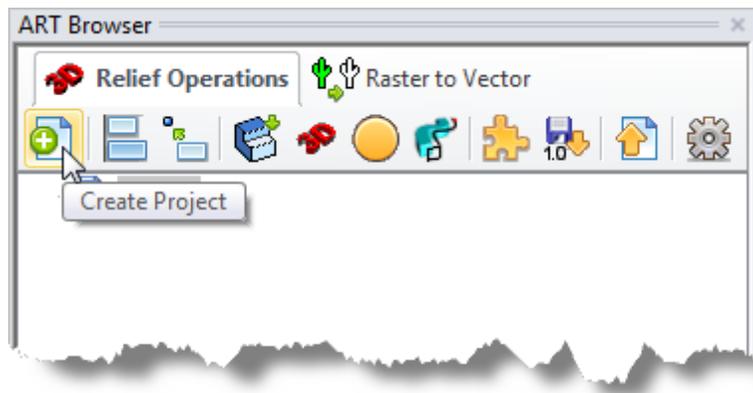
1. First we will create the [Project Workspace](#).
2. Then we will use the [Create Sweep](#) operation.
3. And after that we will use the [Create Puffed](#) operation.
4. Then the [Create 3D Relief](#) operation.
5. Finally we will [Export](#) the part as [Meshes](#) to use as CAD geometry.

Creating ART Operations

3.1 Create Project Workspace

The first step in creating reliefs is to define the project workspace to be used. The project workspace specifies the extents of the finally created model. This can be thought of as a canvas in which we will be creating our 3D model.

1. Click the **3D Relief Operations** tab under **ART browser** and select the **Create Project** button in the toolbar.

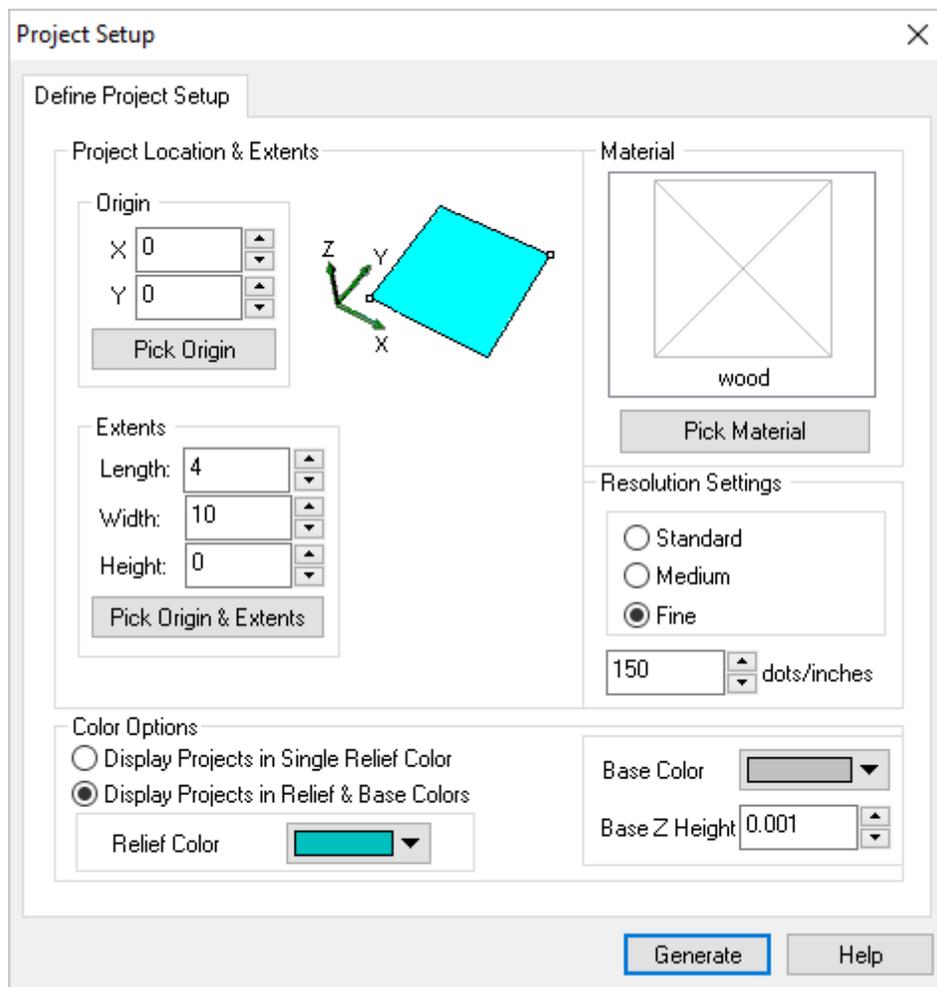


2. After selecting the **Create Project** icon, the **Project Setup** dialog will pop up.

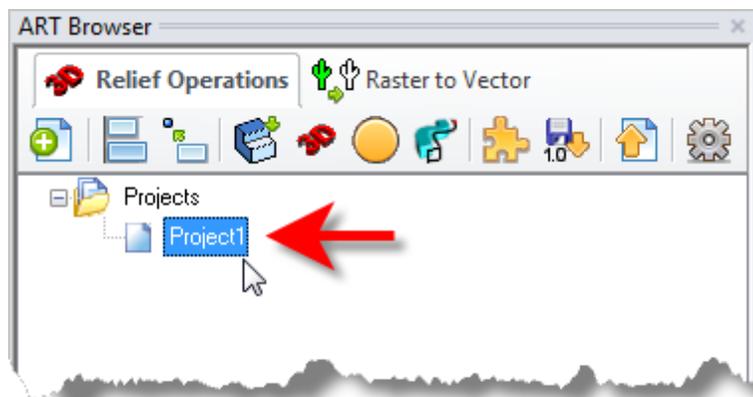
Under **Extents**, set the **Length** to **4** and the **Width** to **10**.

And under **Resolution Settings**, set the dots/inches to **150** or select the radio button for **Fine**.

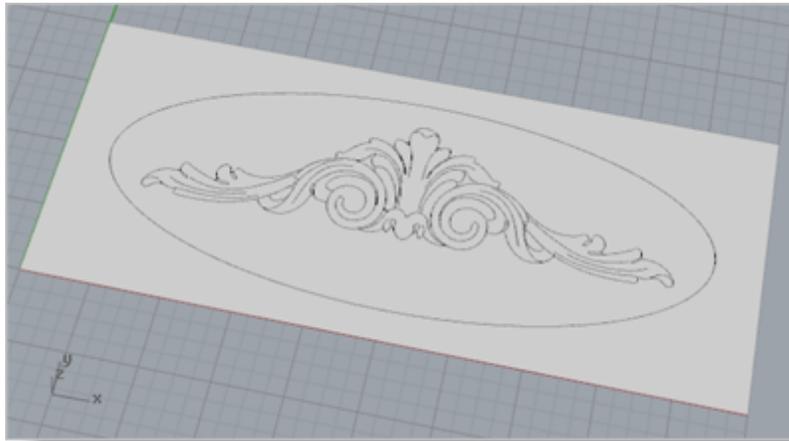
Selecting the radio button for **Fine** automatically defaults the dots/inches to **150**.



3. Click **Generate**. The project workspace icon now appears under the **Projects** folder in the browser area. The project workspace name defaults to "Project1" but can be renamed by right clicking on "Project1" and selecting **Rename** from the list.



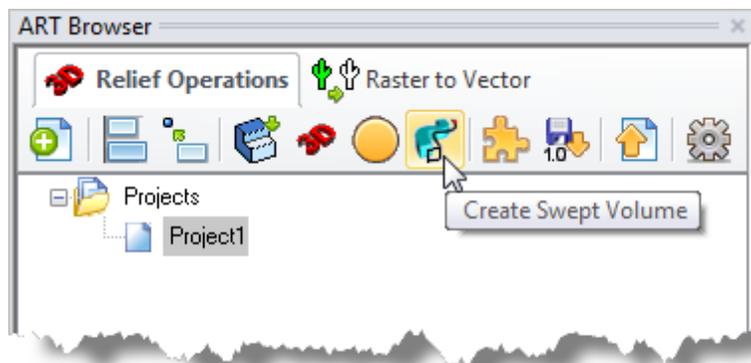
The project workspace will also be displayed in the graphics screen as shown below.



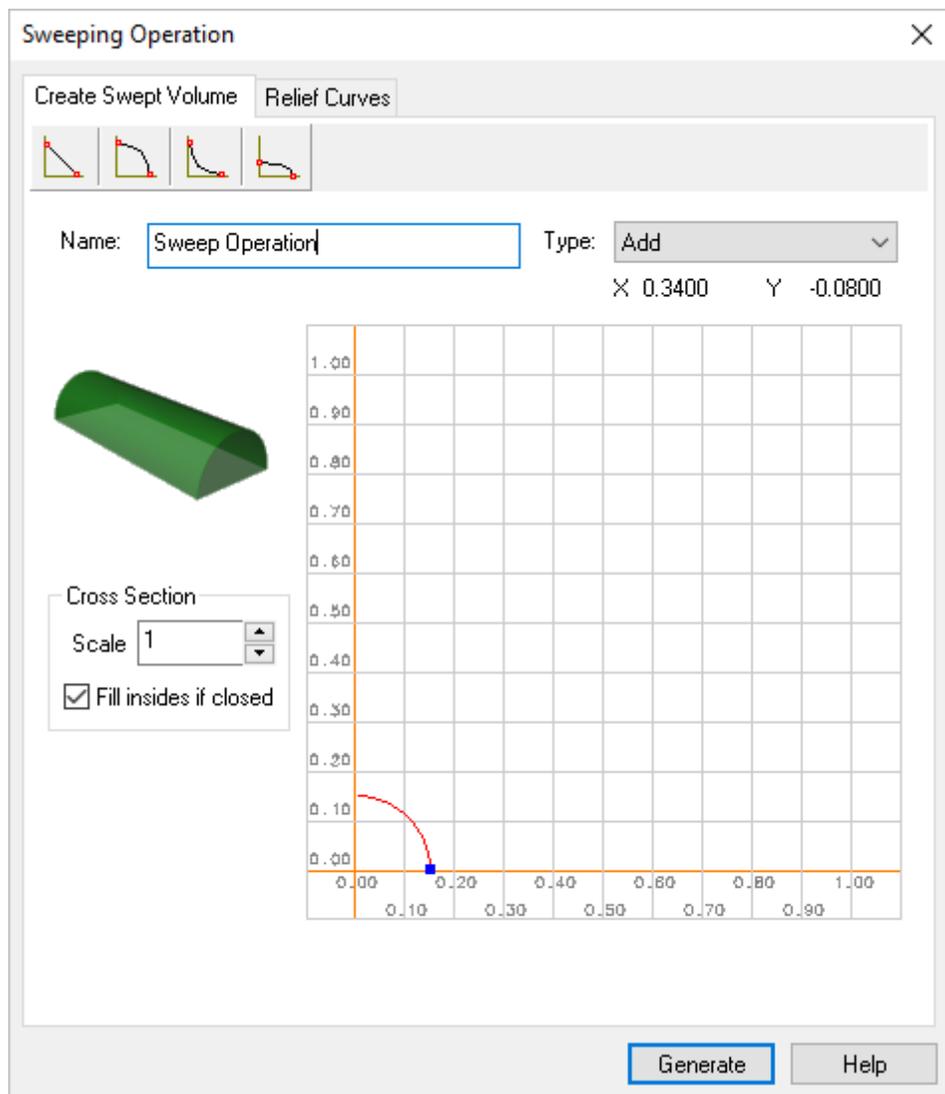
3.2 Create Sweep Operation

The [Create Sweep Operation](#) allows you to sweep a cross-section shape along the selected rail curve to generate a swept volume. The cross section shapes are selected from a predefined set. The rail curves can be any 2D curve, such as straight lines, arcs, ellipses and [NURBS](#) curves modeled in [CAD](#). This is a very useful function typically used to create borders, highlights and even 3D text shapes.

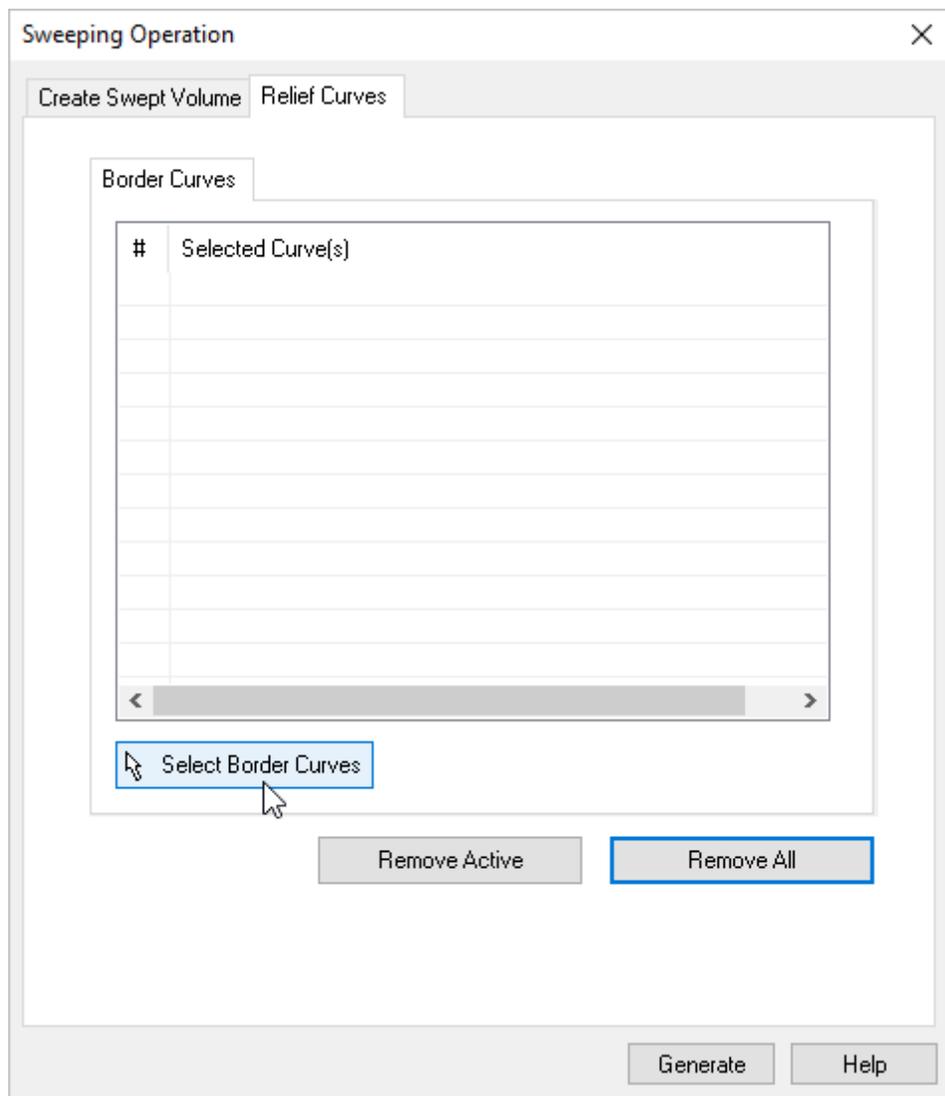
1. Select the [Create Swept Volume](#) icon from the [3D Relief Operations](#) toolbar to display the dialog.



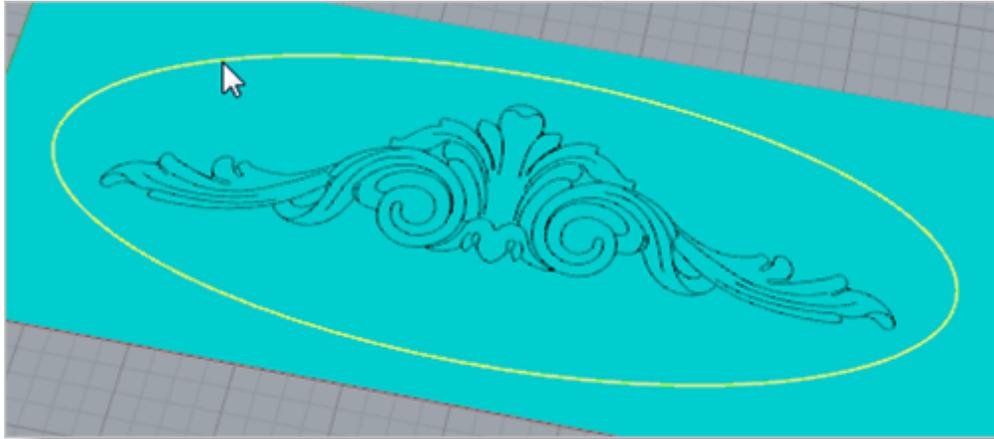
2. Under the [Create Swept Volume](#) tab select the cross section shape to be [Convex Arc](#) from the toolbar at the top. Refer to the dialog shown below.
3. Set the [Type](#) to [Add](#) and under [Cross Section](#) set the [Scale](#) to 1.
4. Then we'll set the X coordinate for arc radius by dragging the point on the arc in the [Sweep](#) operation dialog to approximately 0.15 as shown.
5. Also, check the box for [Fill insides if closed](#).



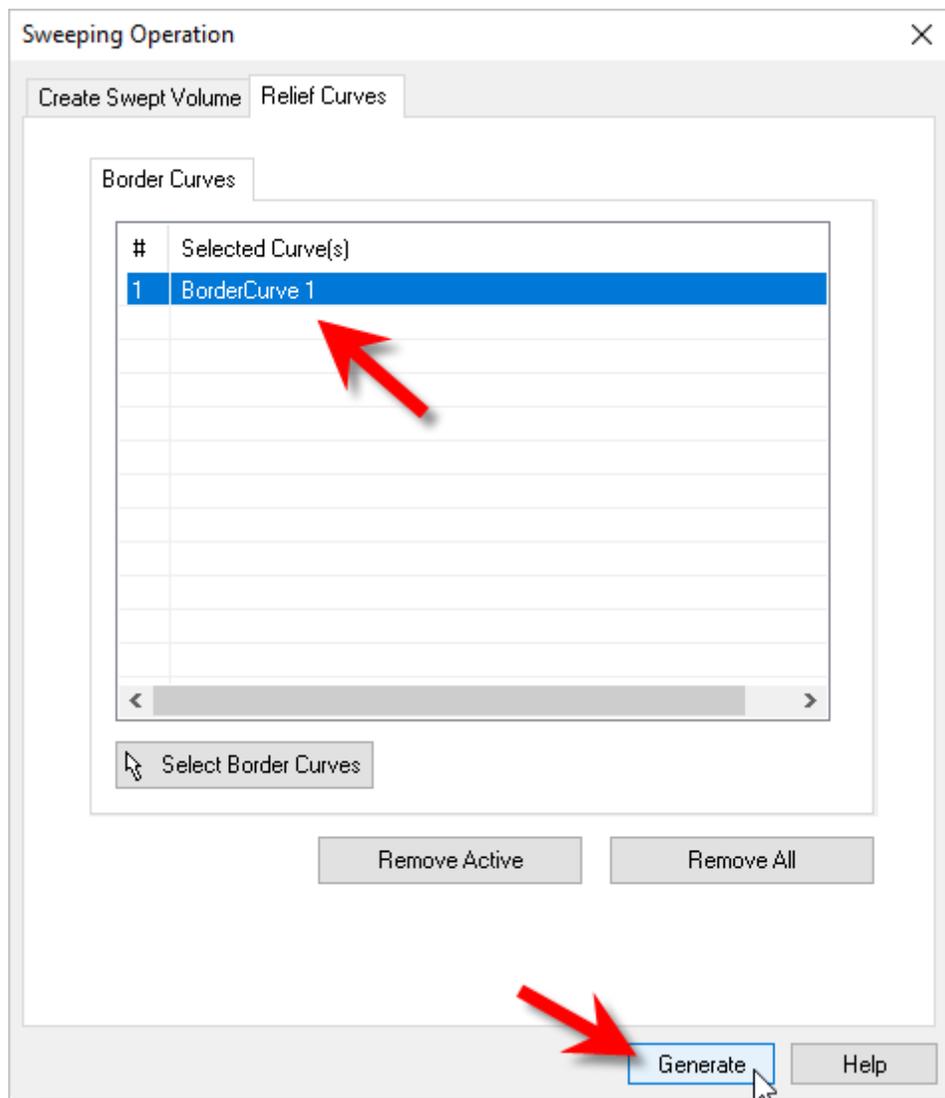
6. Now select the [Relief Curves](#) tab and then pick the [Select Border Curves](#) button. The dialog will minimize to allow you to select geometry.



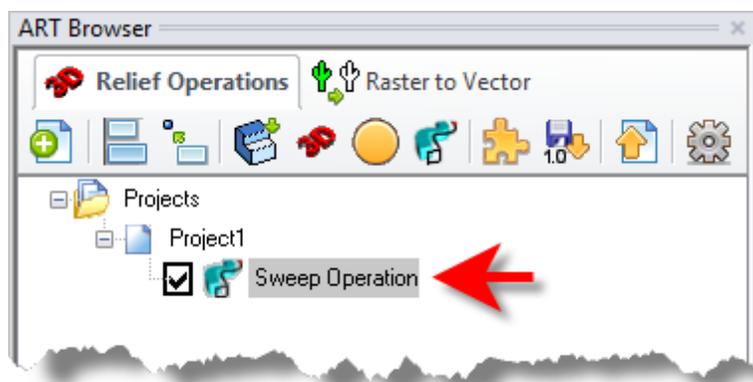
7. Select the outer ellipse and then **right-click** or press **Enter**. The dialog will reappear and display the name of the curve we just selected in the list box.



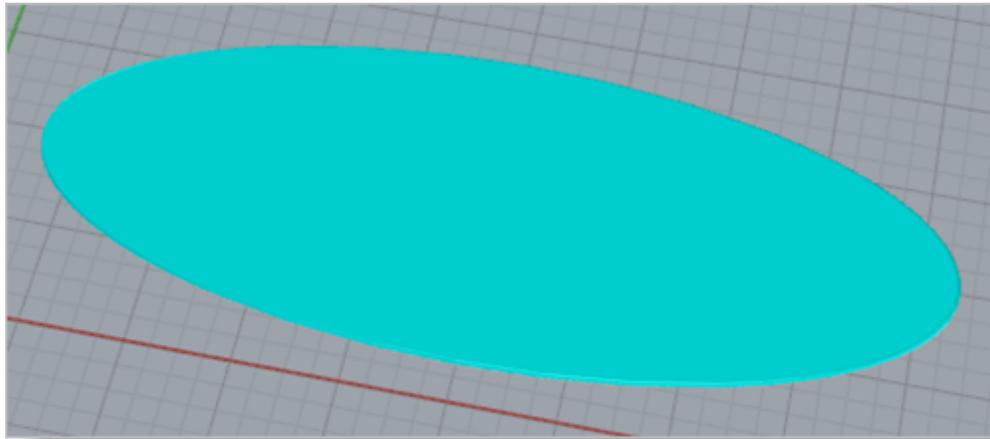
8. Now we pick [Generate](#).



9. A Sweep Operation icon is added to the ART Browser project tree as shown.



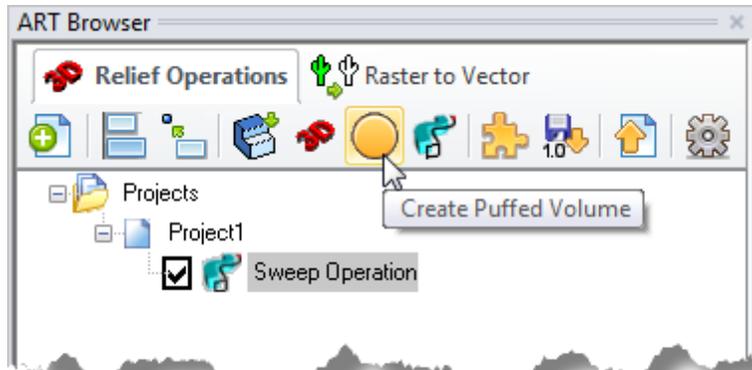
10. The result of the Sweep Operation will also be displayed in the graphics window.



3.3 Create Puff Operation

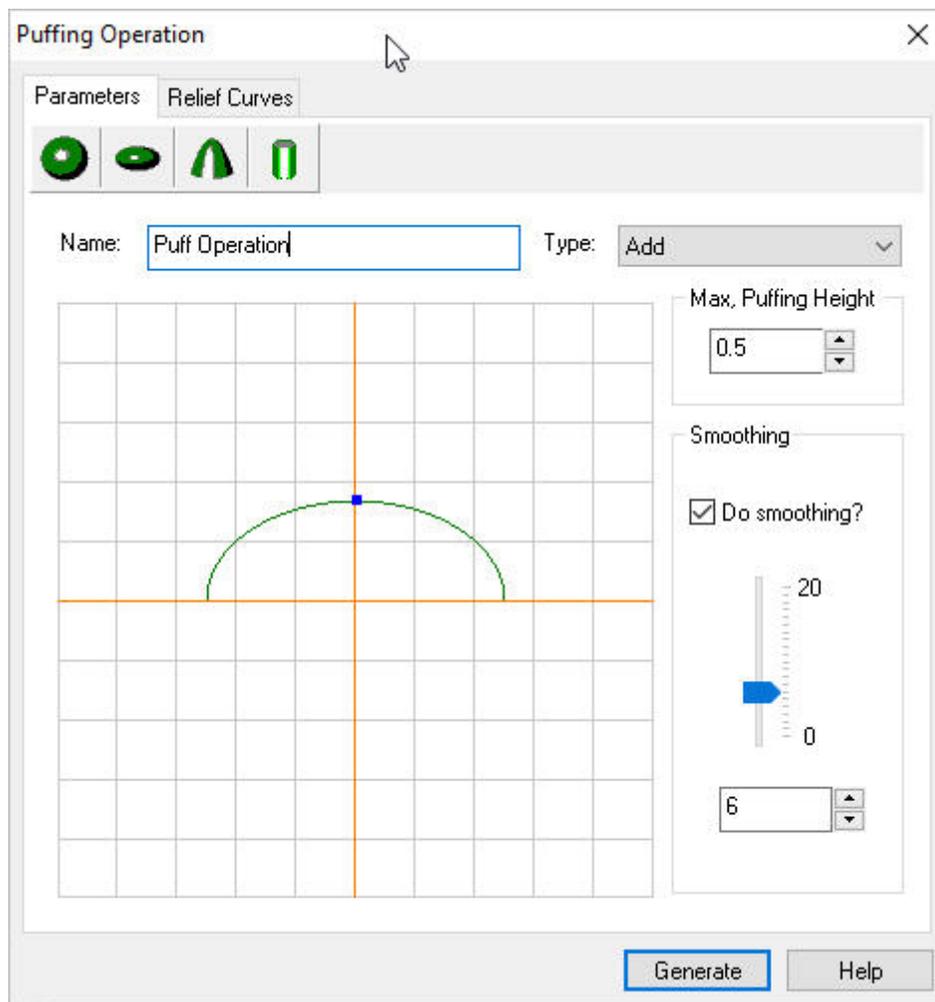
The **Create Puff Operation** allows you to select one or more border curves and puff up the insides using a shape function that can be selected from a predefined list. The shape of the puff can further be affected by selecting detail curves inside the border curves. This will be illustrated below.

1. Select the **Sweep** operation we just created. Then, select the **Create Puffed Volume** icon from the 3D **Relief Operations** toolbar to display the dialog.

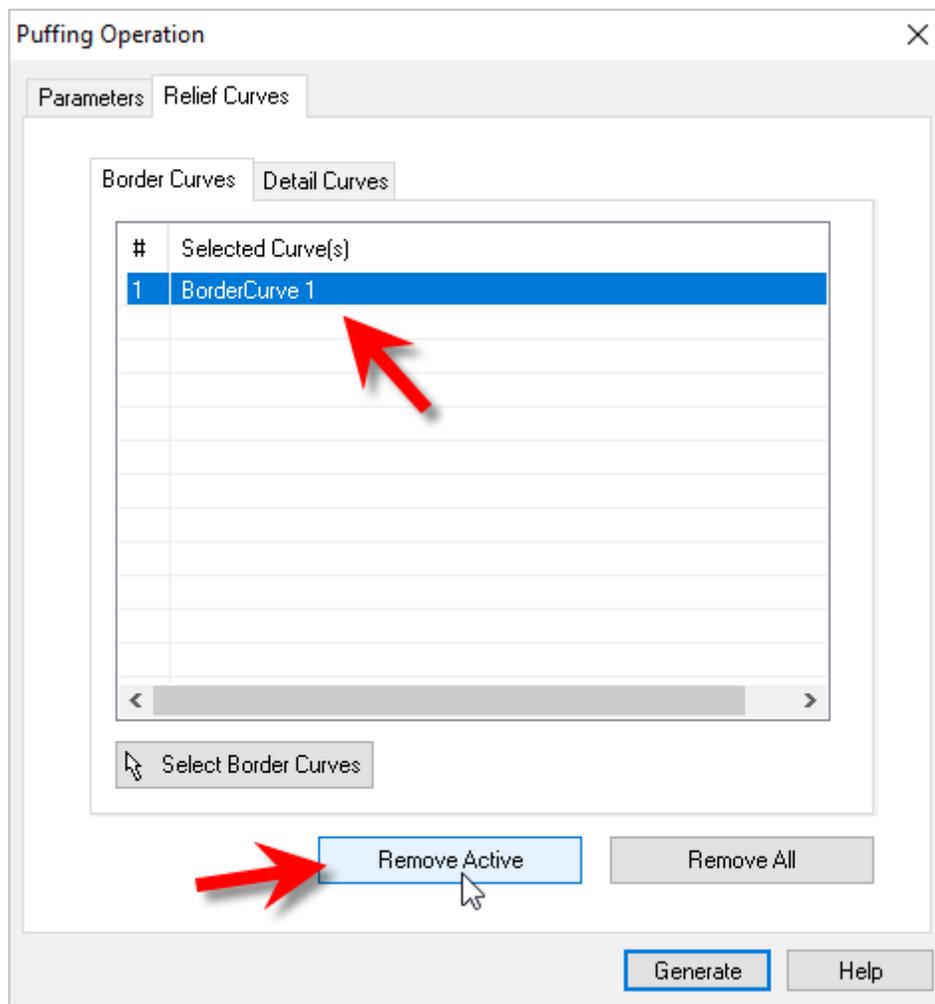


2. The **Puffing Operation** dialog will pop up. Then, select the **Sphere** icon from the toolbar.
3. Now set the **Type** to **Add** and the **Max. Puffing Height** to **0.5**.
4. Select the point on the arc to modify the puff cross-section
5. Under **Smoothing**, make sure the box is checked and then set the smoothing scale to **6**. You can use the slider, the up/down arrows or simply enter the value.

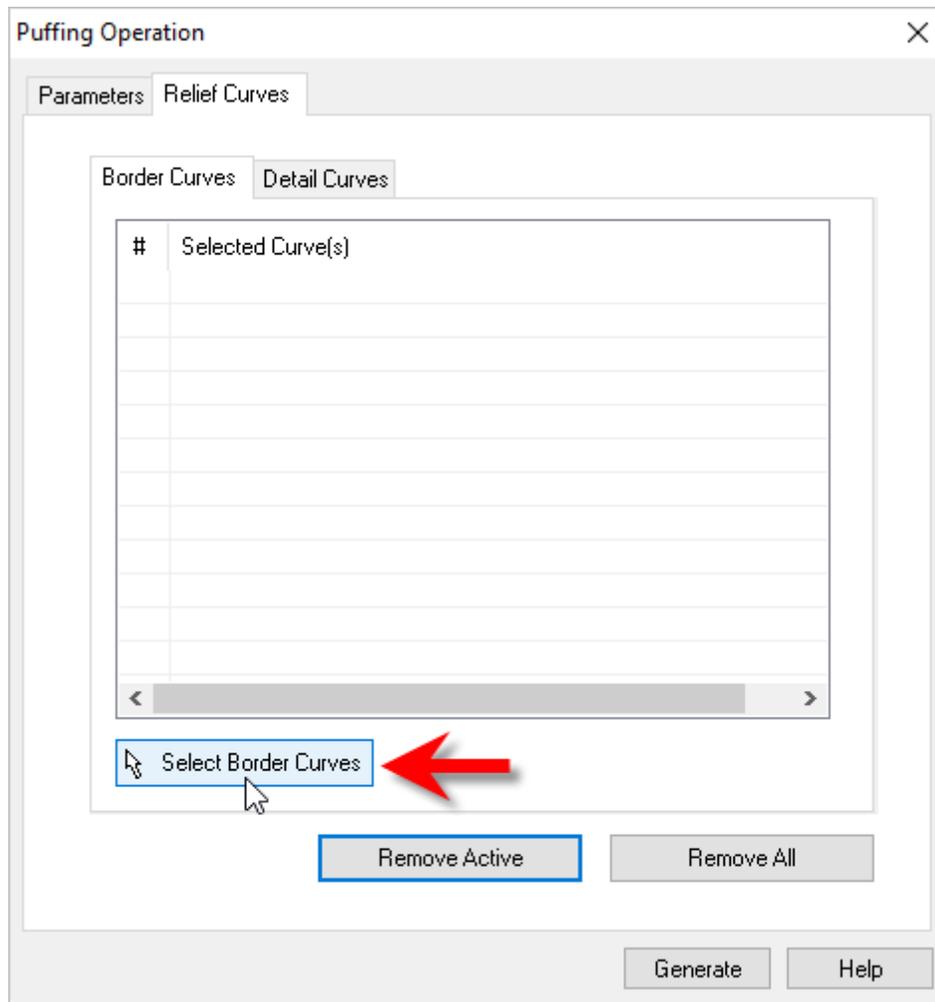
The dialog should now look as shown below:



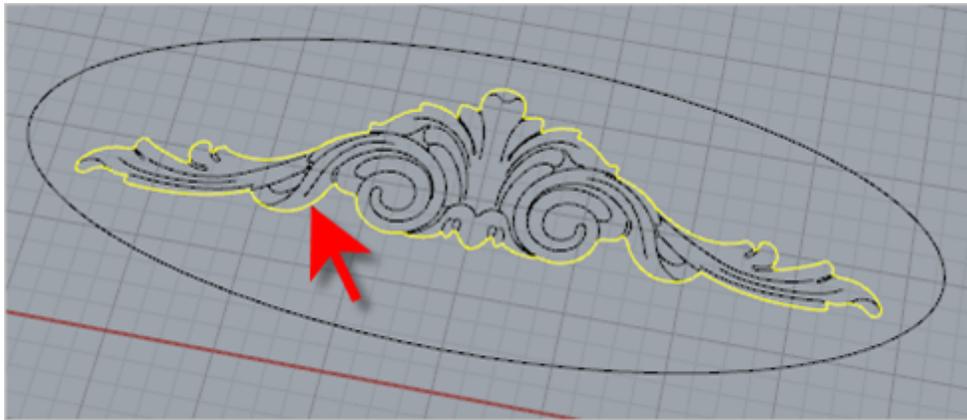
6. Next, select the [Relief Curves](#) tab. This tab contains two sub-tabs named [Border Curves](#) and [Detail Curves](#).
7. Select the default border curve [BorderCurve1](#) from the previous operation and then pick the [Remove Active](#) button to remove it from the [Selected Curve\(s\)](#) list.



8. Now, pick the [Select Border Curves](#) button. The dialog will minimize to allow you to select geometry.

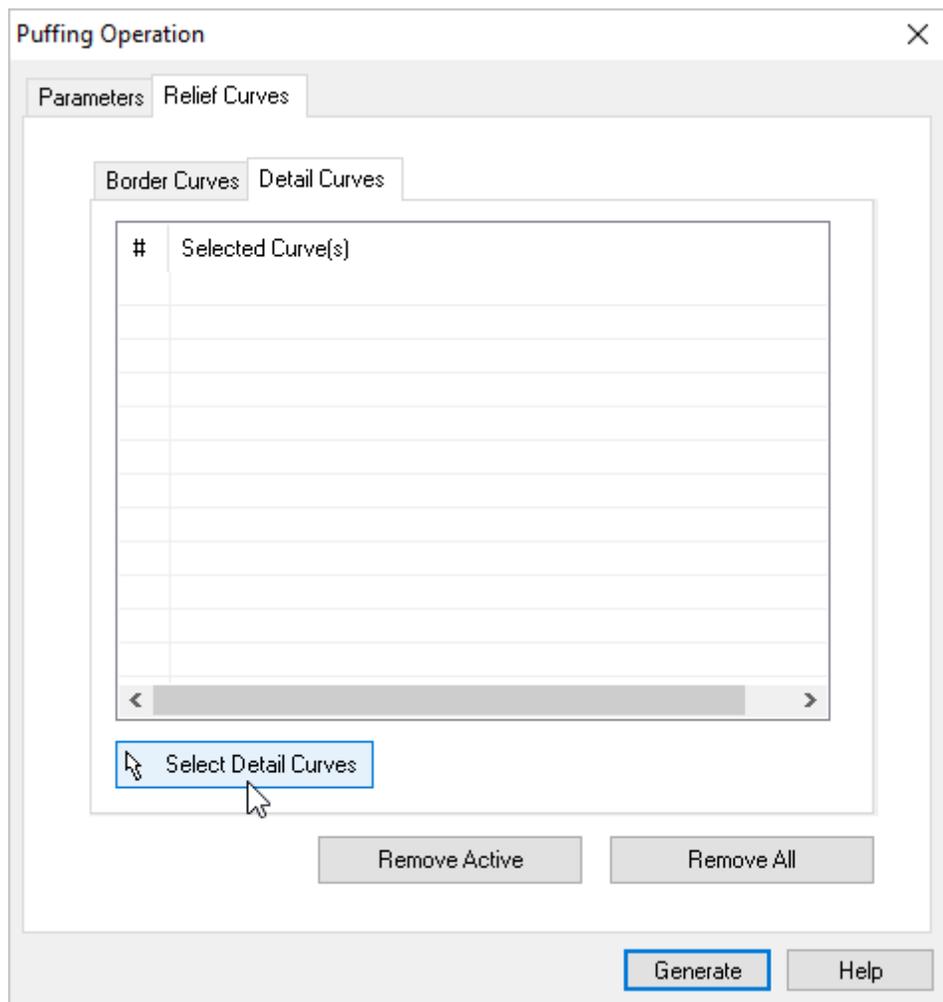


9. Now, we'll select the border profile of our relief geometry as shown below. Right-click or press **Enter** and the **Create Puff Operation** dialog will reappear.

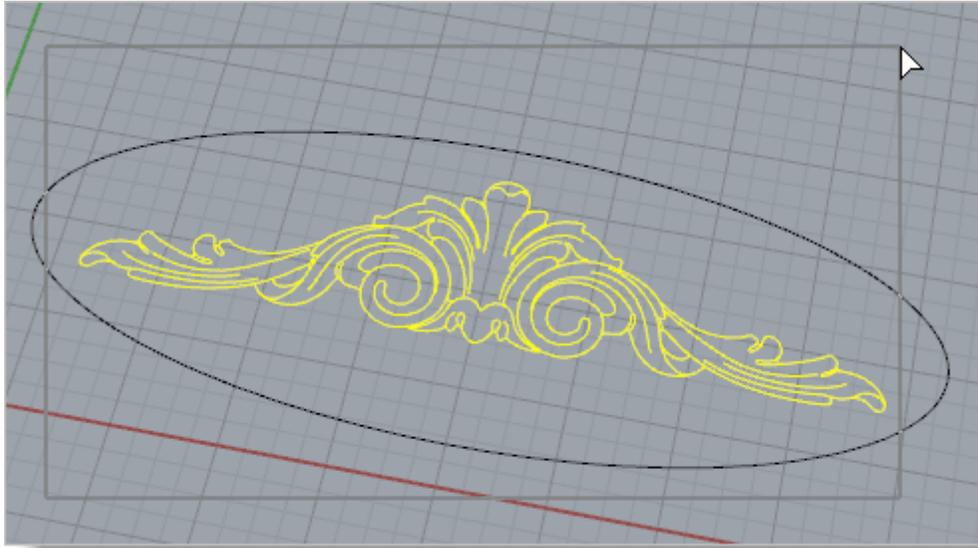


10. Next, select the **Detail Curves** tab and pick the **Select Detail Curves** button. Again, the

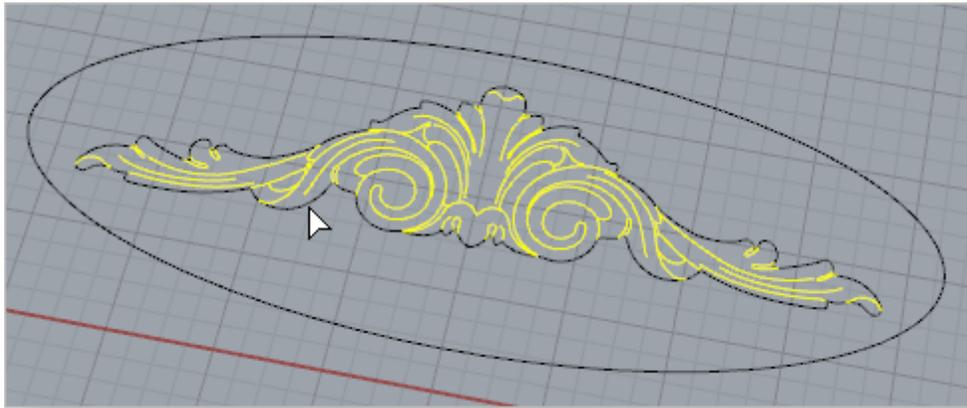
dialog will minimize to allow you to select geometry.



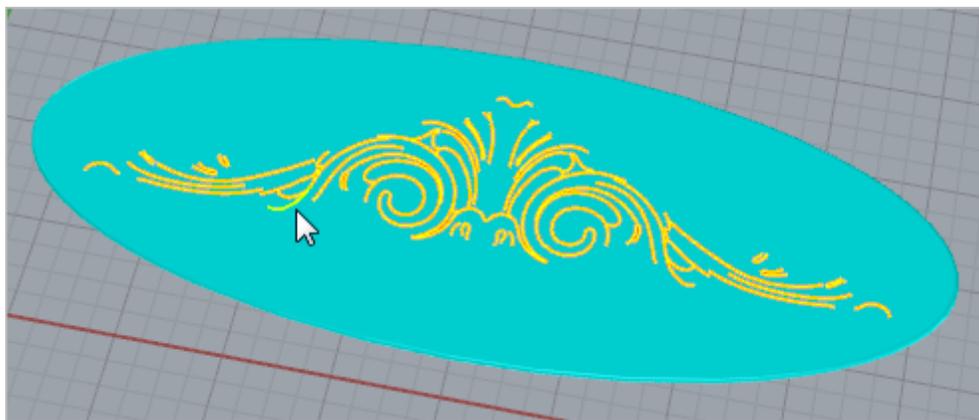
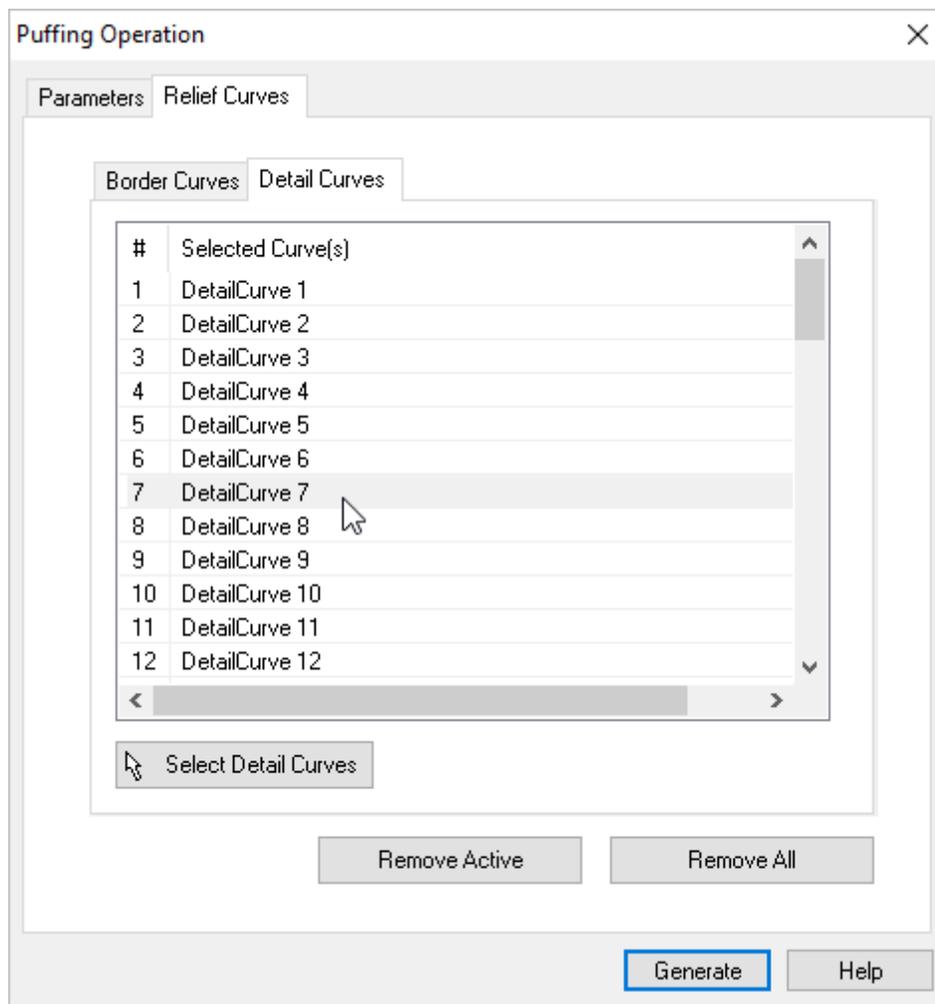
11. Now, while pressing the left-mouse button, drag a selection window around the detail curves.



12. If the selection window captures unwanted curves as we have done here, you can exclude them by pressing the **CTRL** key and then selecting the curves you want to exclude. When the details curves are selected, **right-click** or press **Enter** to complete the selection.



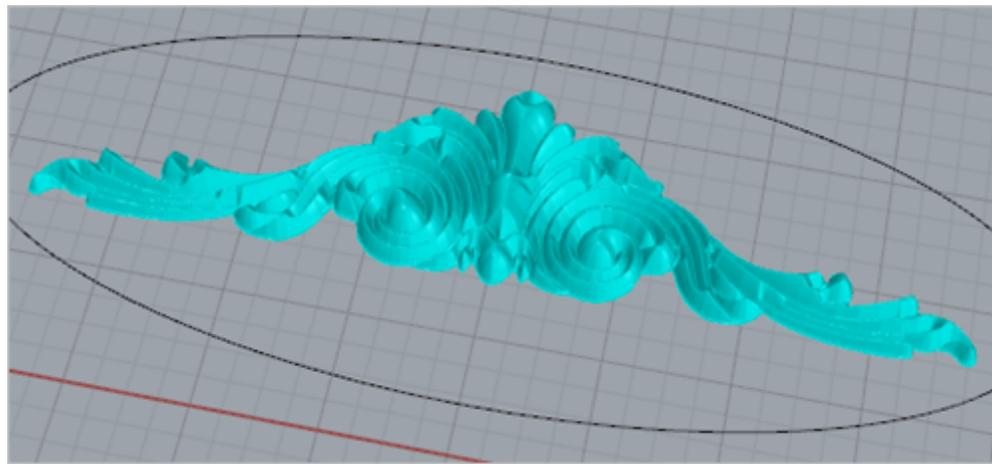
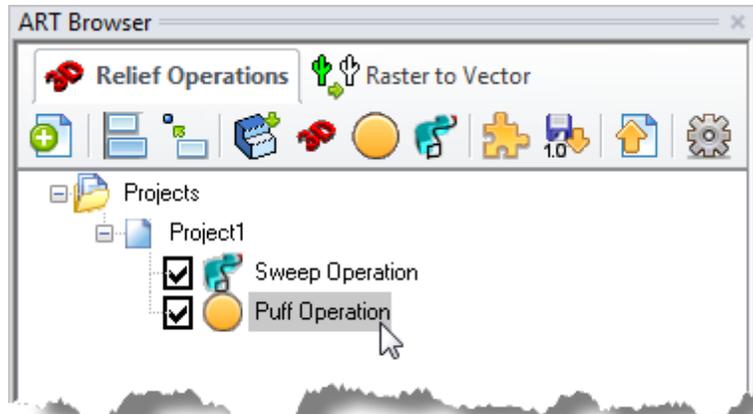
Note that selecting a **Curve** from the list also highlights it in the graphics window.



Alternatively, you can select one or more curves listed in the dialog and then pick the [Remove Active](#) button to remove them from the list.

13. Now with our [Detail Curves](#) selected, we can pick the [Generate](#) button.

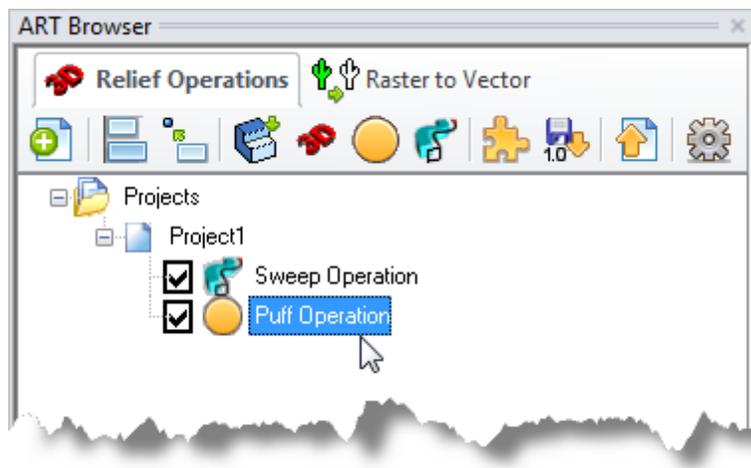
This will create a [Puff Operation](#) icon and append it to the end of the project tree in the [ART browser](#) as shown above. If this icon is not highlighted as shown above, select it and the geometry created by the [Puff Operation](#) will be displayed in the graphics screen as shown below.



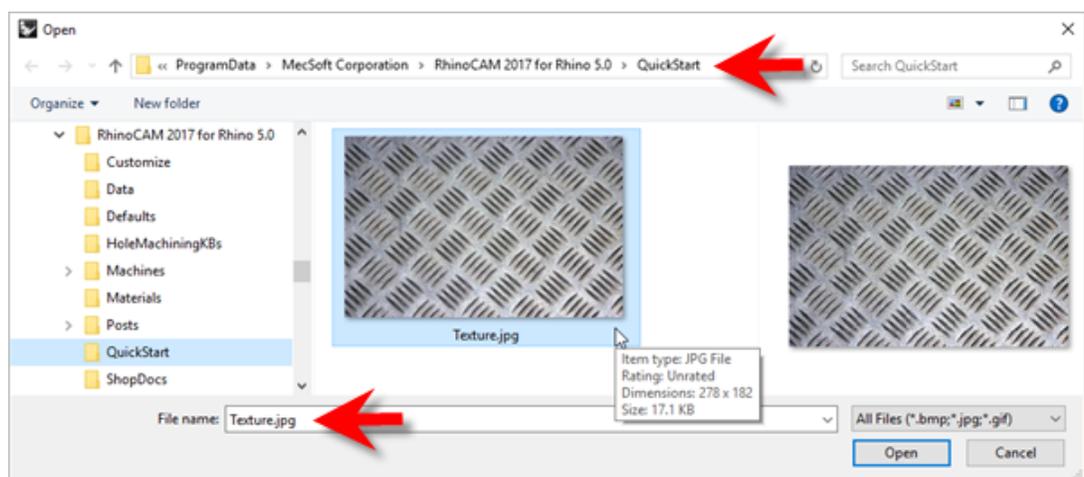
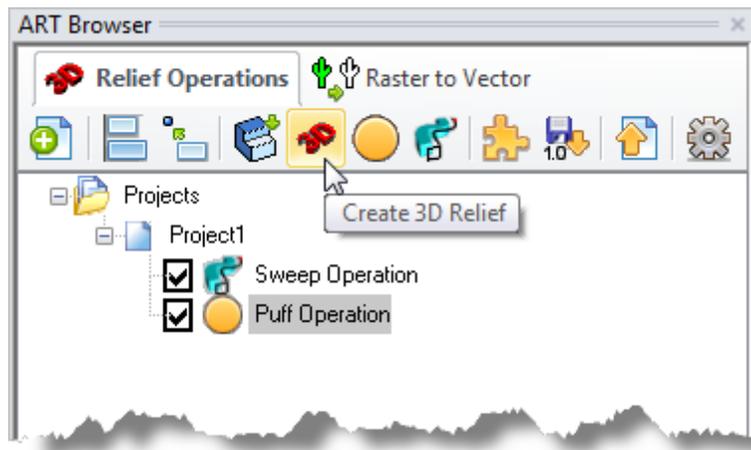
3.4 Create 3D Relief Operation

The [Create 3D Relief Operation](#) allows you to convert a color bitmap image to gray scale image, which in turn will be converted into a 3D model by assigning a height value to each of the pixel gray scale values in the gray scale raster image. Thus the darker the gray value, the lower it will be in height. This process can be quite useful in creating 3D geometry out of hard to model images such as a texture map.

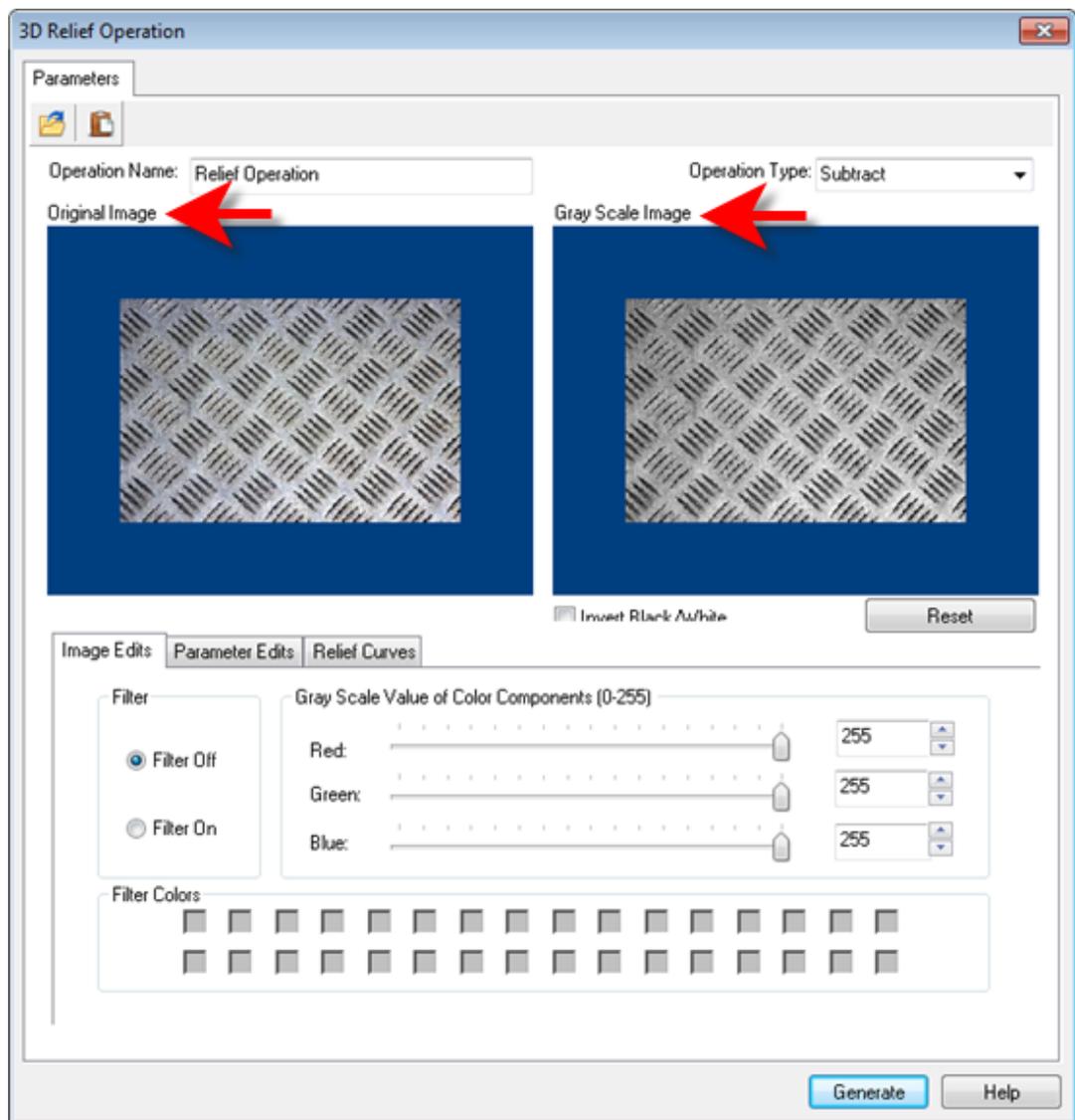
1. From the [ART Browser](#), select the [Puff Operation](#) that we just created.



2. From the 3D Relief Operations toolbar, select the Create 3D Relief icon and the file browser will display.



3. Now, select the *Texture.jpg* bitmap image file located in the *QuickStart* folder and then pick *Open* and the 3D Relief Operation dialog will display.



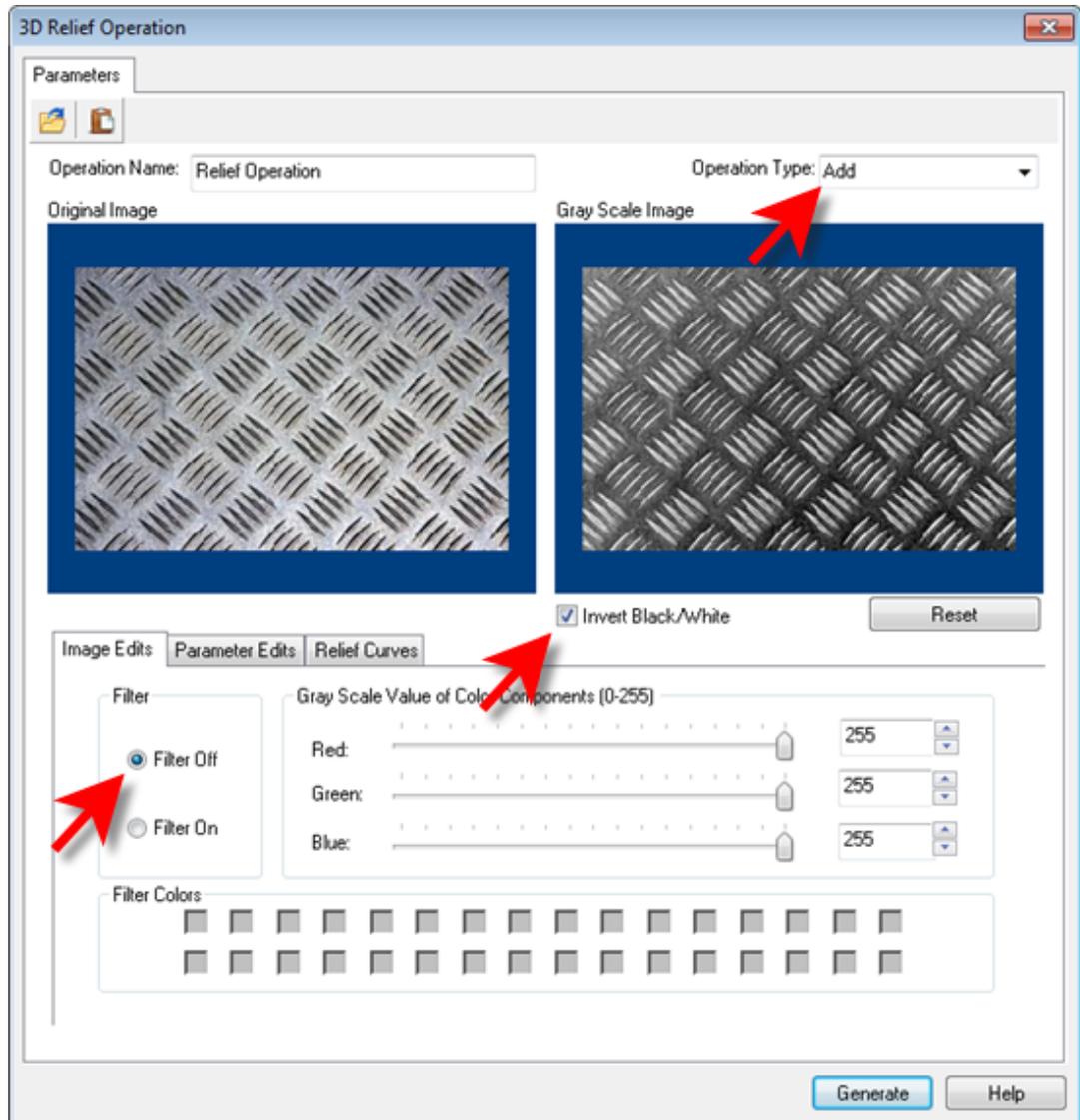
Note that the **Original Image** is displayed on the left and the resulting **Gray Scale Image** preview is on the right.

4. First we'll change the **Operation Type** to **Add** and then check the box to **Invert Black/White**.
5. Then on the **Image Edits** tab, make sure **Filter Off** is selected. This will update the **Gray Scale Image** preview on the right.

! If you turn on the **Filter On** button you can selectively remove colors from the bitmap image from consideration in the color to gray scale conversion process. You can also control how the gray scale values ought to be mapped to the color values under this scenario using the corresponding slider controls. The dialog will dynamically update the resulting gray scale bitmap on

the dialog as you modify these controls.

Your dialog should look like this:

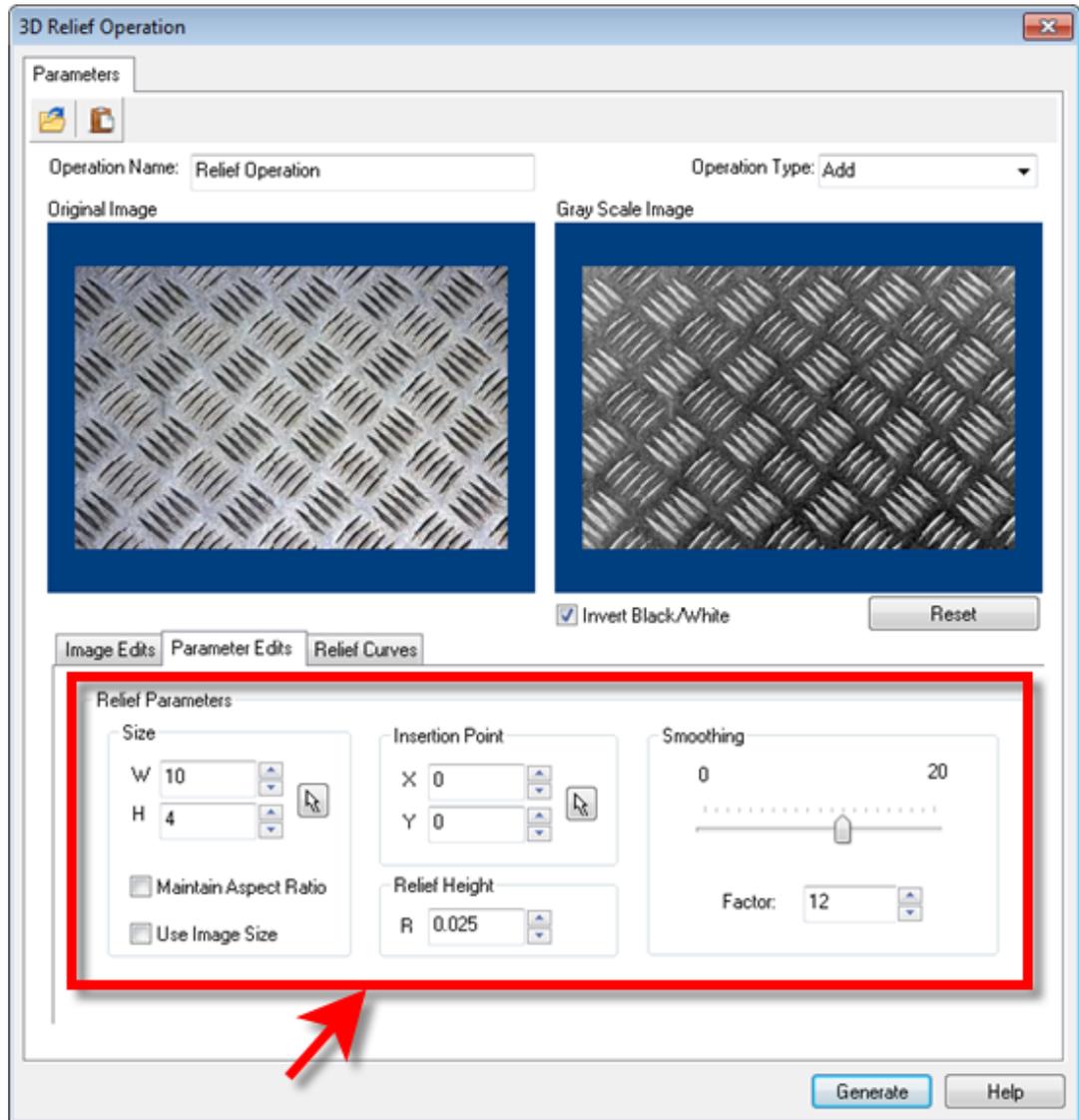


6. Now, select the **Parameter Edits** tab and uncheck **Use Image Size** and then also uncheck **Maintain Aspect Ratio**.
7. We'll also change the **Width (W)** to 10 and the **Height (H)** to 4 to scale the image to our project size.
8. In the future, you can also select the **Pick** button. This allows you to select two diagonal points to define the relief width and height.
9. Next we'll change the **Relief Height (R)** to 0.025. This means that white pixels on the gray scale image will be assigned a height value of 0.025 and black pixels will be assigned a height value of 0.0. All other gray scale

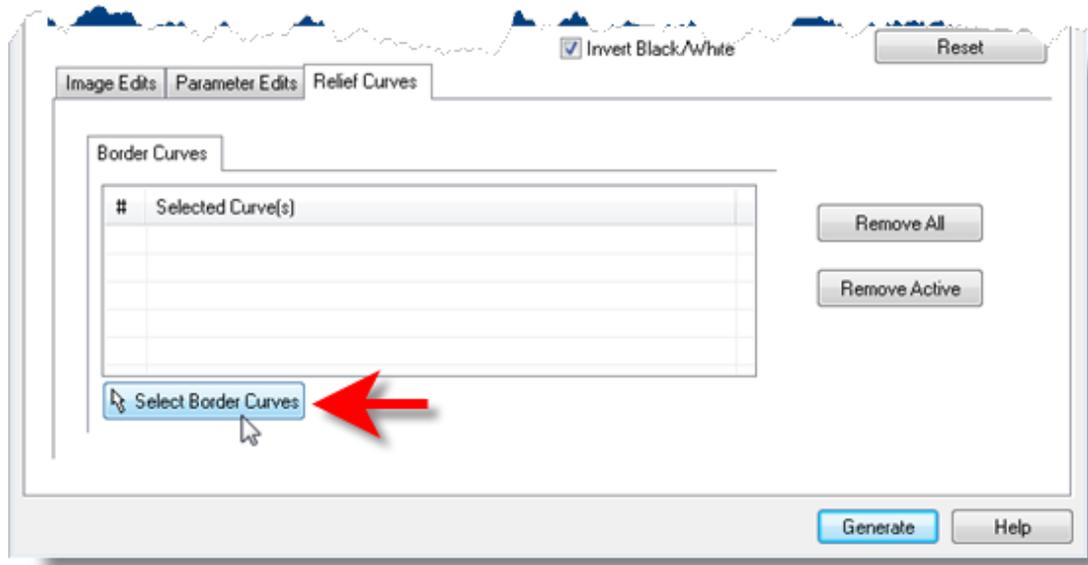
values will be assigned a height between these two values.

- Now, under **Smoothing** we'll type in a value of 12. You can also use the slider or up/down arrows to set this value. **Smoothing** is performed to remove any abrupt changes in height from pixilation in the graphics file.

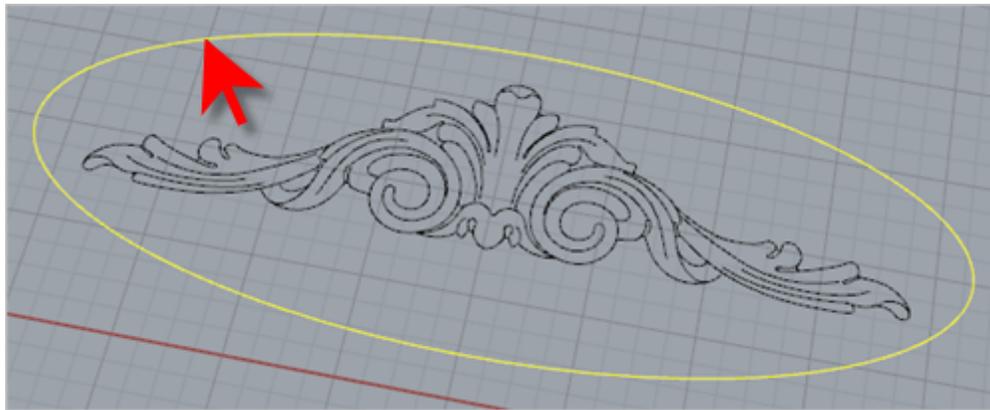
Your dialog should now look like this:



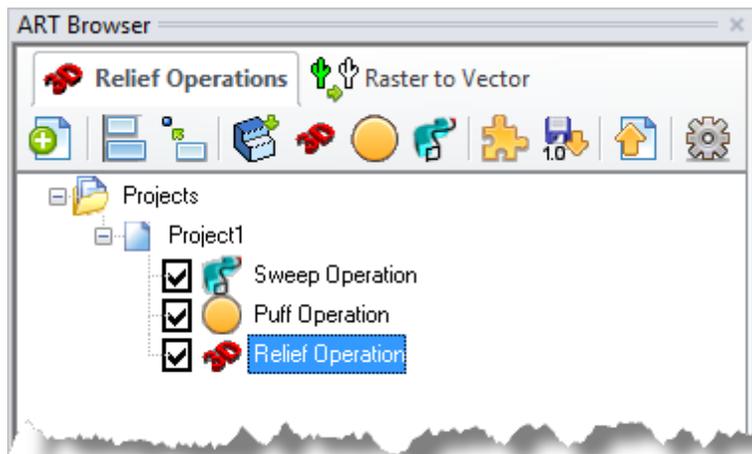
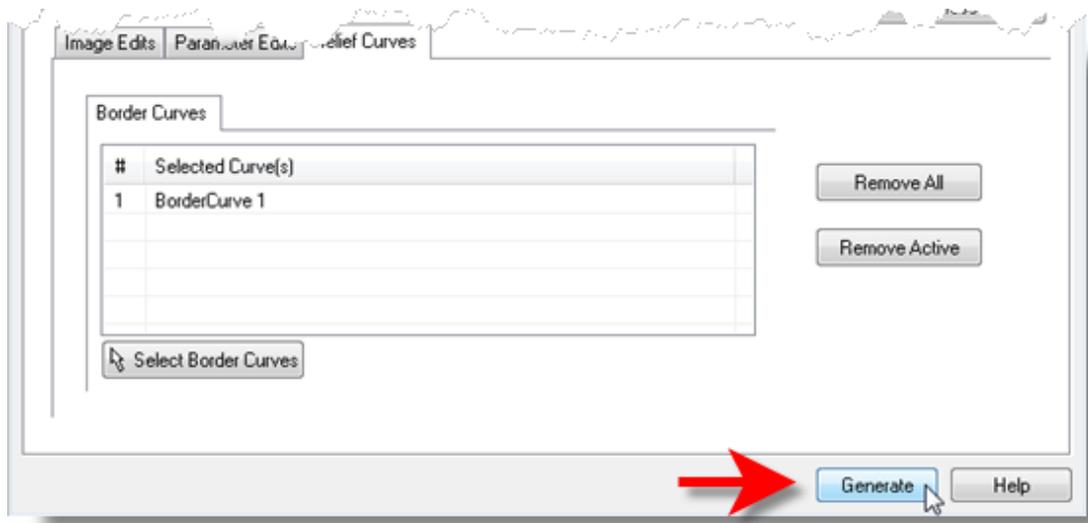
- Now, select the **Relief Curves** tab and notice the **Border Curves** tab within. **Border Curves** are used to restrict relief geometry within the extents of the selected curves. Select the default **BorderCurve 1** from the previous operation and then pick the **Remove Active** button to remove it from the Selected Curve(s) list.
- Now pick the **Select Border Curves** button. The dialog will minimize to allow us to select border curves.



13. For the border, select the outer elliptical curve and then right-click or press **Enter** and the dialog displays once again.

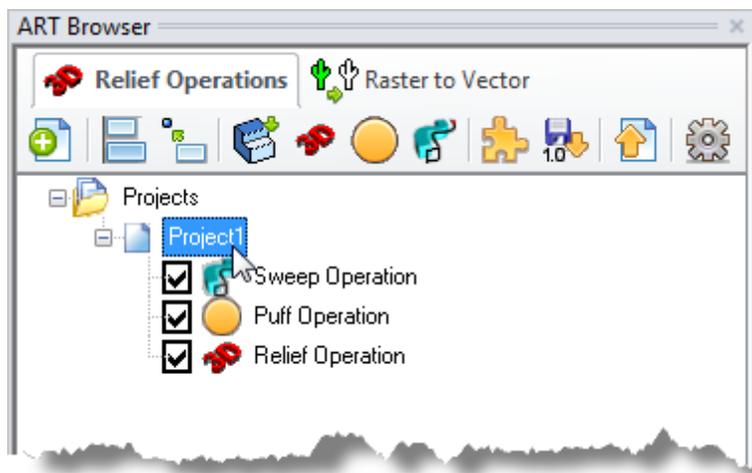


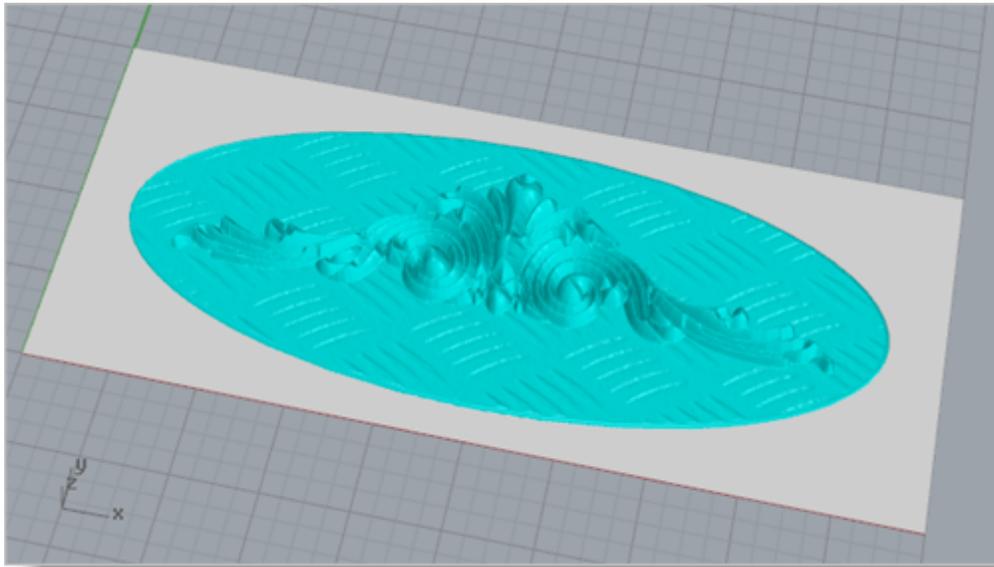
14. Finally, we pick **Generate** to create the **Relief Operation** and append it to the **Project Tree** in the **Art Browser**.



15. Selecting an operation from the [Project Tree](#) will display it in the [Graphics Window](#).

16. To see all three operations we created together, select [Project1](#) from the [Project Tree](#).

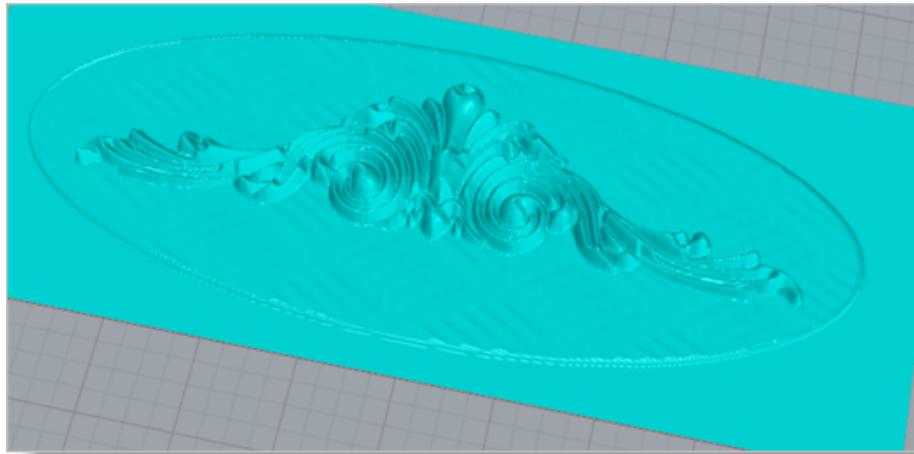




Export as Meshes to CAD

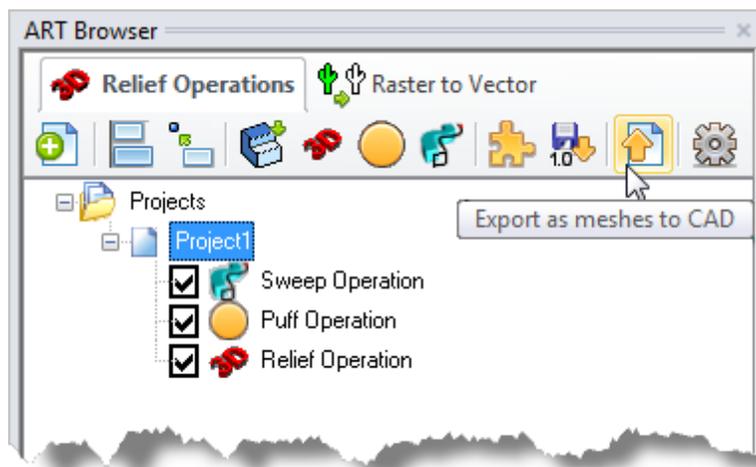
The resultant geometry obtained by the combination of all three operations that we have created thus far can be visualized by selecting the **Project1** icon under the project tree in the **ART browser**. It should be noted that by selecting each individual operation in the project tree, the **ART** module will only display the geometry corresponding to the selected operation.

We can now export the project as a 3D mesh to be used within the CAD design system.



Completed Project Geometry

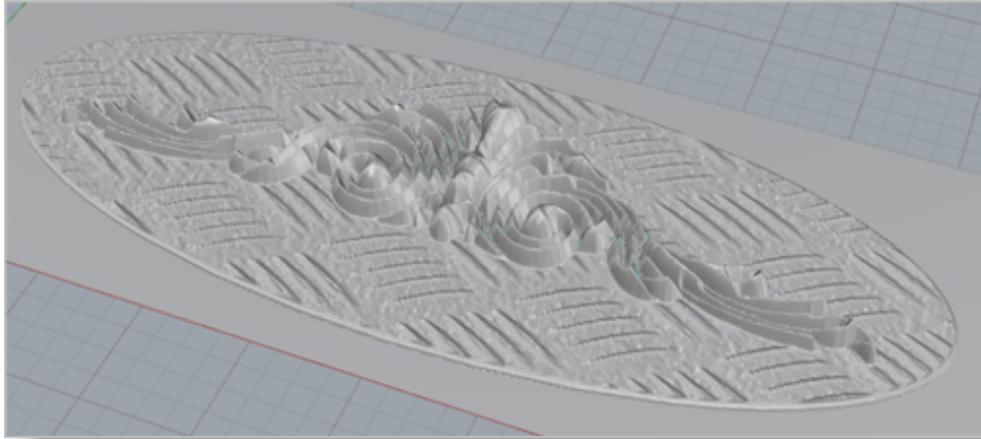
1. Select **Project1** and then from the **3D Relief Operations** tab, select **Export as meshes to CAD**. Note that you must export the **3D Relief Operations** before the geometry can be used within the CAD system.



2. Once the export is completed, select the **Projects** folder at the top of the **Projects Tree** to see **ONLY** the CAD mesh geometry in the graphics window.

! Unless the **Export as meshes to CAD** function is used, the geometry will not be available to the CAD system. The display of the geometry in the

graphics screen, before the export is performed, is done by the [ART](#) system and the [CAD](#) system has no knowledge of the existence of this geometry.



Resulting 3D Mesh

This completes the [Quick Start](#) tutorial for the [RhinoCAM 2017 ART](#) module.

Where to go for more help

We have come to the end of the [Quick Start Guide](#) of the [ART](#) module. This tutorial is just the tip of the proverbial iceberg of the various functions and controls available in the [ART](#) module. Please explore the product in more depth to get a feel for how these functions and controls operate.

If you need additional help please use the following resources:

- The on-line help distributed with the product is a great resource to find reference information on the various functions available.
- Apart from the on-line help system you can download other tutorials and projects from [MecSoft Corporation's](#) web site at www.mecsoft.com.
- If you need additional help, or if you have any questions regarding [RhinoART](#), you may contact us via e-mail at support@mecsoft.com
- MecSoft offers Online training as well as personalized full day training sessions. Please look up our website or email us at sales@mecsoft.com for further details
- Please do continue to visit our home page to learn about the latest updates to [RhinoART](#) and any other help material.

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