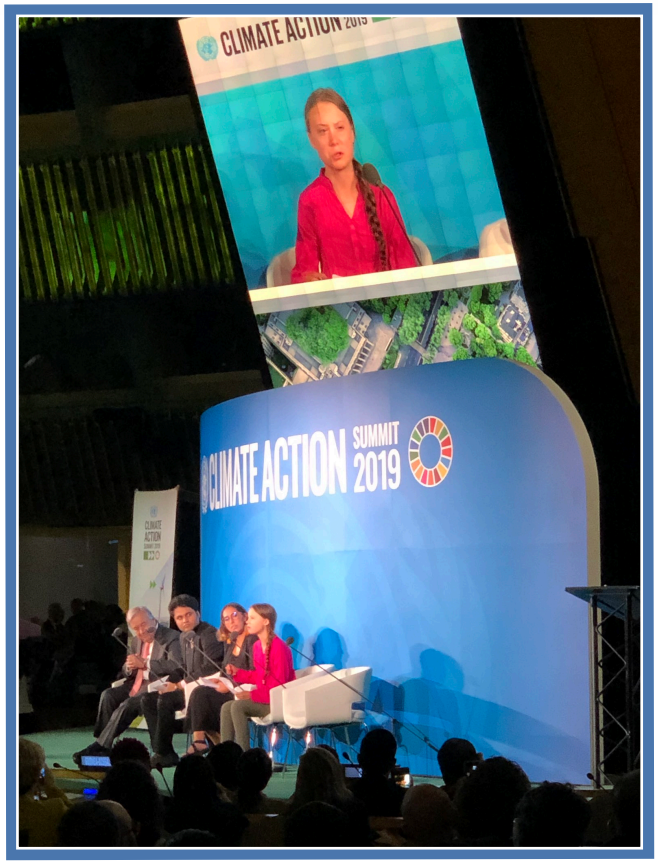
RhinoCAM and the 2019 United Nations Climate Action Summit!

We recently caught up with Max Allstadt, entrepreneur and independent CNC contractor out of Brooklyn, New York. Max is an avid Rhinoceros modeler and has been using RhinoCAM Professional with his ShopSaber CNC router since 2017. Prior to starting his own shop Max was a carpenter and an administrative assistant to Israeli-Canadian architect, urban designer, educator, theorist, and author Moshe Safdie. In just a short amount of time, Max has produced some very cool RhinoCAM projects like the stage for the United Nations 2019 Climate Action Summit in New York.



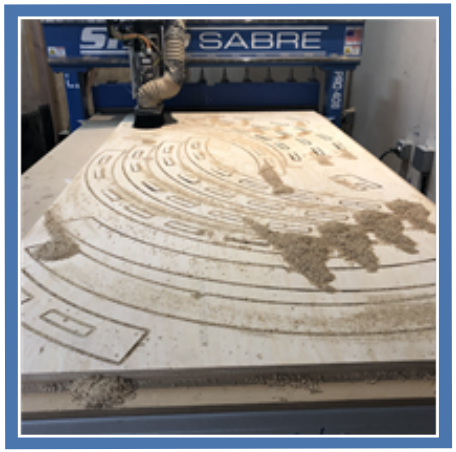
The RhinoCAM Difference

"I have found that your Annual Maintenance Subscription (AMS) is by far the best tech support in the industry! You guys answer the call 5 days a week and give me good advice unlike other CAM companies I have dealt with. If I can't get something working you guys help me quickly. You have never failed me!"

Max Allstadt,
CNC Contractor, Brooklyn, NY

The RhinoCAM Project

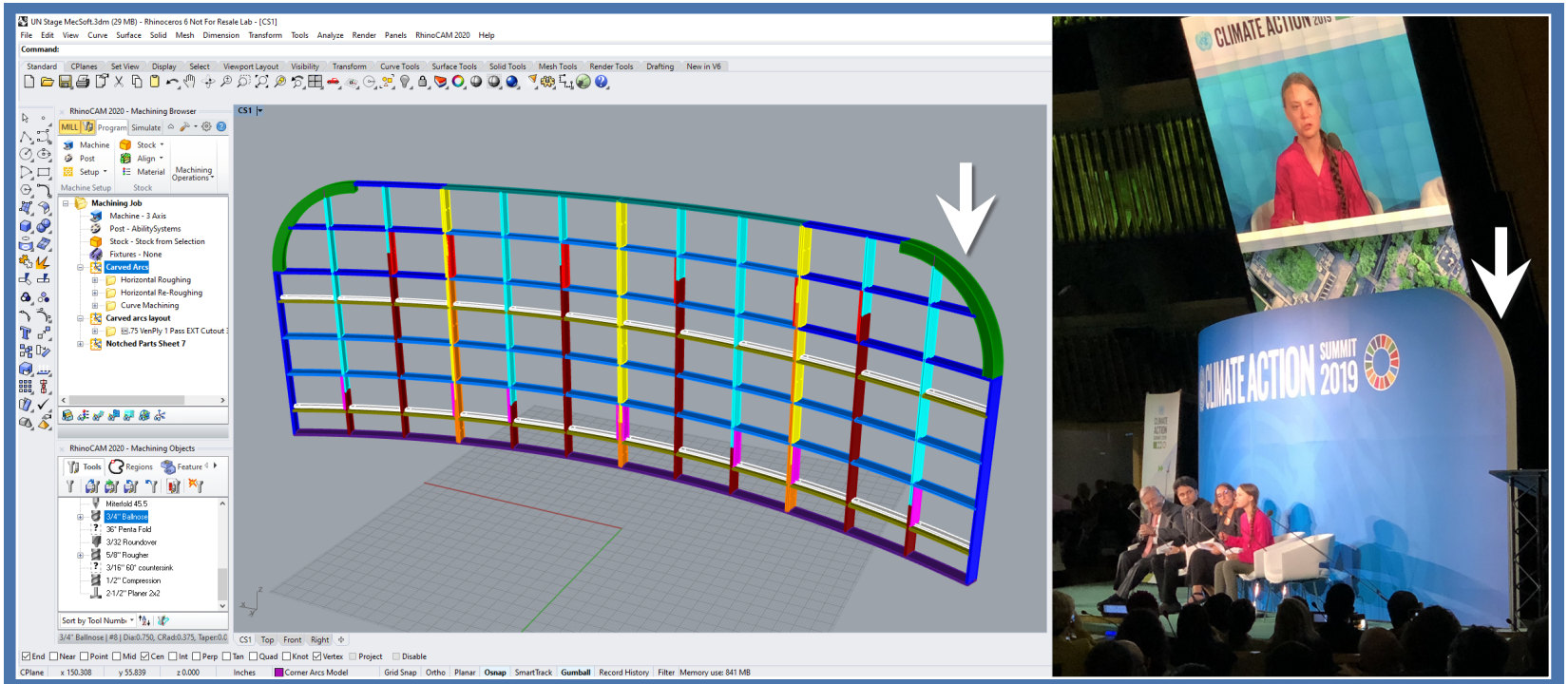
Max's portion of the United Nations 2019 Climate Action Summit in New York included the stage backdrop and banner. Below you can see the curved "waffle board" frame assembly loaded into Rhino 6.0. The components that we will be studying today are the curved radii sub framework at each of the two upper corners indicated in the images below.



Max Allstadt

RhinoCAM®

What is interesting about these two sub frames is that they are 3-dimensionally curved in each X, Y and Z axes simultaneously. To achieve this cut Max used RhinoCAM's Advanced 3 Axis Curve Machining strategy. The toolpath follows offset to the outer perimeter edge radius while being projected downward in Z onto the curved part surface! Max also utilized RhinoCAM's stock from selection feature that allowed him to model his own unique in-process stock model to minimize machining time!



On the left we see the "waffle frame" assembly displayed in Rhino 6.0 with the RhinoCAM milling plugin loaded. The RhinoCAM Machining Browser is displayed on the far left. On the far right we see the actual United Nations 2019 Climate Action Summit in process with the stage backdrop clearly shown.Very Cool!

Want to see how RhinoCAM can help you? Click Here to download a demo!

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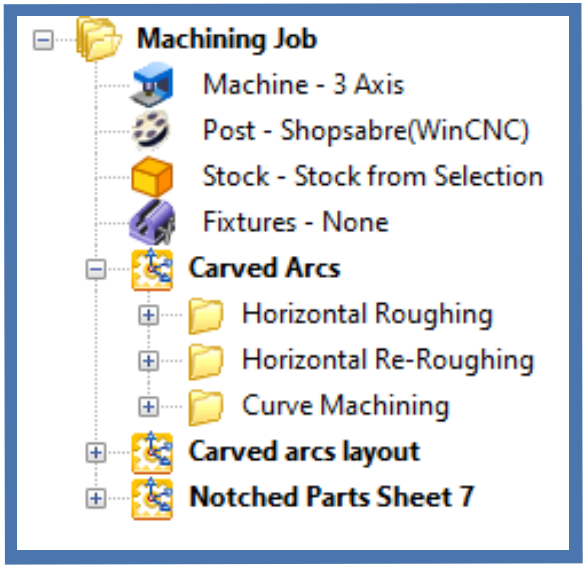
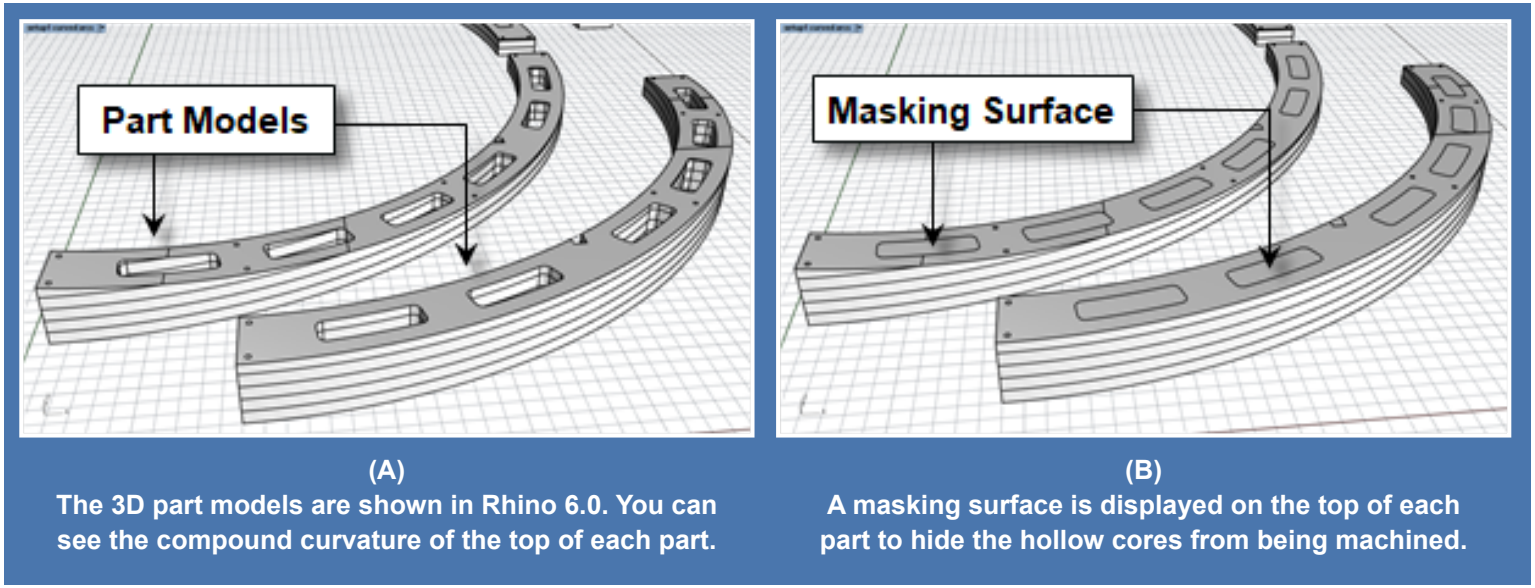
The Machining Setup

The machining setup for this project includes just 3 operations. Two are 3-axis roughing and re-roughing toolpaths while the third is a 3-axes curve machining strategy. On the right you see the Machining Job tree. The setup "Carved Arcs" contains the 3 toolpath operations in question. You will also see that the stock is defined as "Stock from Selection". See more information about the stock below.



The Part Geometry

The geometry for this setup includes the part models, masking surfaces, stock models and stock definition. Image (A) below shows part models. You will notice the compound curvature by looking at the top outer edge of each part. Each part consists of multiple layers of ¾" stock. Notice that the parts contain hollow cores to reduce weight. In image (B) you will see that a masking surface is displayed on the top of the part. This surface masks the hollow cores providing an even surface for the toolpath to follow.



(A)
The 3D part models are shown in Rhino 6.0. You can see the compound curvature of the top of each part.

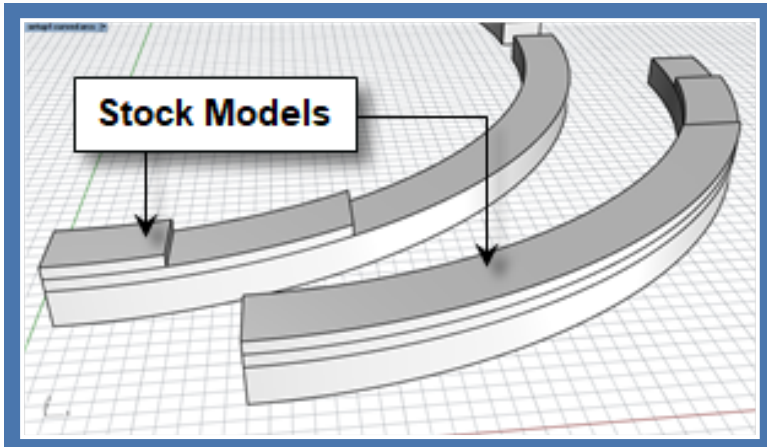
(B)
A masking surface is displayed on the top of each part to hide the hollow cores from being machined.

Stock from Selection

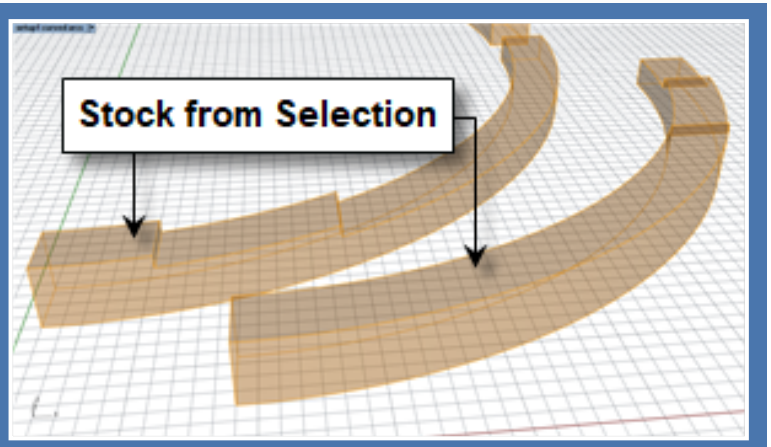
To save machining time Max has modeled his stock to match the actual stock that the parts will be cut from. In image (C) below you see the 3D stock models displayed. With the stock models selected in Rhino, you simply select “Stock from Selection” from the RhinoCAM Stock menu. This assigns the selected geometry as the current stock definition. After this is done, you then hide the actual stock geometry by turning off that layer in Rhino. In the image (D) you see that the stock definition matches the shape of the stock geometry.

***Stock from Selection** is a feature that is available starting with the Professional configuration of RhinoCAM. It is used anytime you have an irregular stock definition. For example, it can be used when the stock needs to match a casted blank. It can also be used anytime you want to minimize machining to a specific shape.*

***IMPORTANT**: Make sure you hide the actual stock geometry after defining the Stock from Selection!*



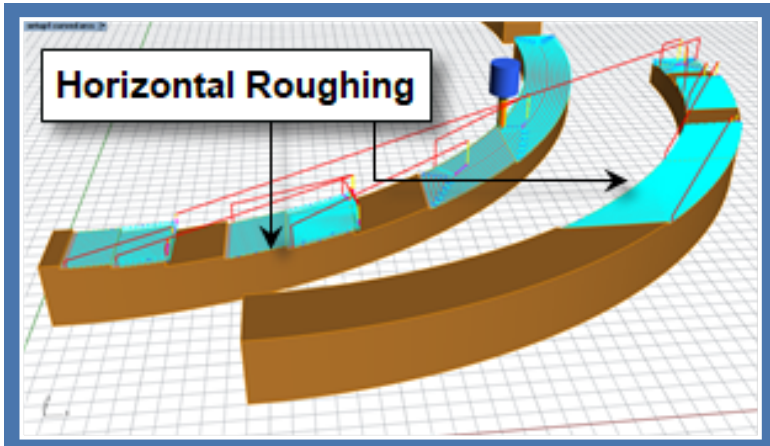
(C)
The 3D stock geometry is displayed in Rhino.
It matches the actual stock placed on the CNC machine



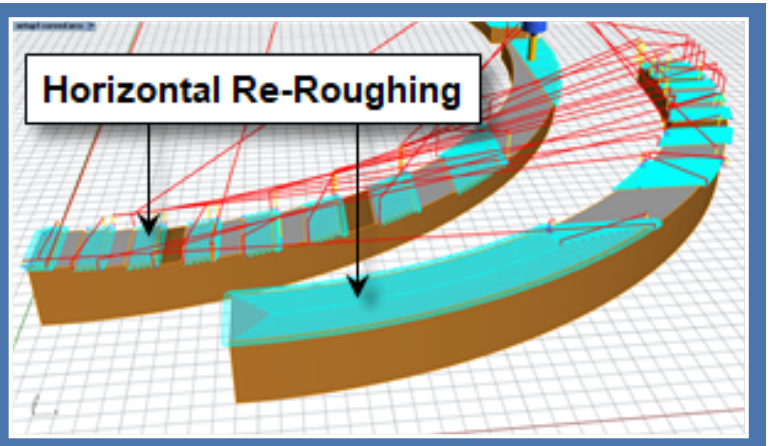
(D)
The “Stock from Selection” is displayed. Make sure you hide the actual stock geometry!

3 Axis Roughing & Re-Roughing

To remove excess stock material two 3 Axis roughing operations are used. The first shown in image (E) below is a 3 Axis Horizontal Roughing operation. It uses a ⅝" diameter flat end mill, an offset cut pattern, a ¼" stepover and a ¼" step down. Cut level ordering is set to Depth First. Engage/Retract is set to a 10-degree ramp path. In image (F) we see the second roughing operation, a 3 Axis Horizontal Re-Roughing strategy that only cuts material left from the previous operation. 3 Axis Re-Roughing is another feature available in the RhinoCAM Professional configuration.



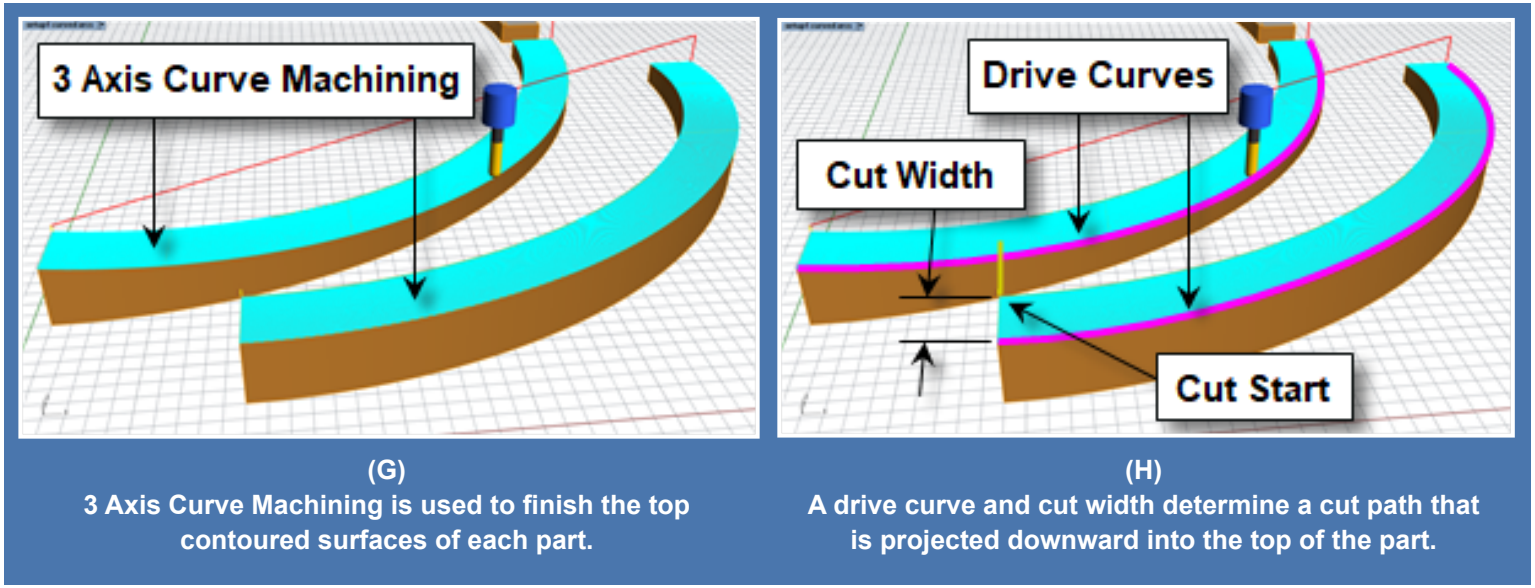
(E)
3 Axis Horizontal Roughing using a ⅝" flat end mill is performed first to remove the bulk of excess material from the predefined stock.



(F)
3 Axis Horizontal Re-Roughing removes previously uncut stock left over from the previous operation. Be sure to simulate your previous operation first.

3 Axis Curve Machining

The finishing operation in this setup is a 3 Axis Curve Machining strategy using a ¾" ball mill cutter. Curve Machining is another advanced 3 Axis strategy available in the RhinoCAM Professional configuration. In this operation the toolpath is offset from a drive curve and projected downward onto the underlying part surface. A cutting band width of 3.5" and a stepover distance of 0.112" (15%) matches the part width. The operation also uses straight cut connections between stepovers. The images below illustrate the operation. Note that the selected drive curves are at the top outer edges of the part.

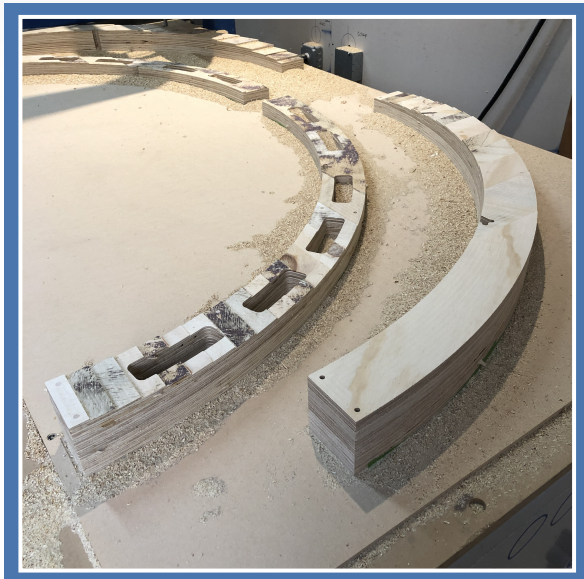


(G)
3 Axis Curve Machining is used to finish the top contoured surfaces of each part.

(H)
A drive curve and cut width determine a cut path that is projected downward into the top of the part.

More Shop Pics from Max Allstadt

Here are some additional shop pics from this project. Max's ShopSaber 3 Axis CNC router is shown top left.
This is followed by in-process stock material and the final curved frames installed. See more of Max's projects here.



Here you can see the in-process production picks for this project from Max Allstadt.

Cool project indeed Max!

Thank you for allowing us to showcase your work!

About the United Nations 2019 Climate Action Summit

The United Nations 2019 Climate Action Summit, and the Climate Youth Summit, succeeded in focusing the attention of world leaders, from government, the private sector and civil society, on the urgency for action to address the climate emergency, and on increasing climate action.

More about Max Allstadt

Max Allstadt operates his CNC shop from within the Studio Guereux Fabrication for the Arts complex in Brooklyn, New York. Max specializes in exceptional quality and the on-time delivery of each and every project with the use of CAD/CAM and numerically controlled tools including Rhinoceros CAD modeling and RhinoCAM CNC software. You can find more picks from Max here on Instagram.

Max Allstadt

Just a few projects from the shop of Max Allstadt!

More about RhinoCAM

RhinoCAM - MILL is available in five configurations (Express, Standard, Expert, Professional and Premium). The parts shown here were programmed using the Professional configuration. Here are some additional details about each of the available configurations. For the complete features list, we invite you to visit the RhinoCAM Product Page.

- **RhinoCAM MILL Express**: This is a general-purpose program tailored for hobbyists, makers and students. Ideal for getting started with CAM programming. Includes 2 & 3 axis machining methods. Includes ART & NEST modules as well!

- **RhinoCAM MILL Standard**: This configuration includes everything that is in the Express configuration and additional 2-1/2 Axis, 3 Axis & Drilling machining methods. Also now includes 2½ Axis Turning!

- **RhinoCAM MILL Expert**: Suitable for 4 Axis rotary machining. Includes the Standard configuration, plus 4 Axis machining strategies, advanced cut material simulation and tool holder collision detection.

- **RhinoCAM MILL Professional**: Ideal for complex 3D machining. Includes the Standard and Expert configuration, plus advanced 3 Axis machining strategies, 5 Axis indexed machining, machine tool simulation, graphical toolpath editing and a host of other features.

- **RhinoCAM MILL Premium**: Tailored for complex 3D machining with both 3 Axis and full 5 Axis methods. Includes the Standard, Expert and Professional configurations, plus 5 Axis simultaneous machining strategies.

For the complete features list, we invite you to visit the
RhinoCAM Product Page: mecsoft.com/rhinocam

Try RhinoCAM Today!

Powerful production CAM for Rhino users!

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