

## RhinoCAM at Lohmann Woodcarving Company

Jim Lohmann of [Lohmann Woodcarving Company](#) has been practicing woodcarving by hand for the past 45 years, getting his start in the Boston area, and then moving to Chicago. Today, Jim works from his workshop in Covington, Michigan, where he has been practicing his craft for the past 30 years. For centuries, the “tools of the trade” of a master woodcarver have been and still are pencil & paper, hand-forged chisels and unmatched artistic craftsmanship.

Jim still carves by hand & chisel but has also evolved his craft with the use of state-of-the-art digital technology. Today, you are just as likely to find Jim 3D sculpting in [ZBrush](#), 3D modeling in [Rhino](#) and cutting 3 and 4 axis toolpaths in [RhinoCAM](#)!



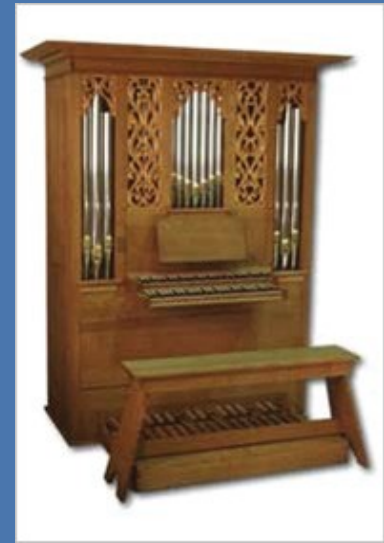
## The RhinoCAM Difference

Jim began embracing CNC technology as a way to help speed up the hand-finishing process of his woodcarving. Jim soon found that he needed a more robust CAM program that could machine in 2, 3 and 4 Axis! That's when Jim started using Rhino and RhinoCAM. For CNC machining, Jim currently uses a [NewCNC dual head CNC router with automatic tool changer and added 4th axis capability](#). We recently sat down with Jim to discuss his migration to digital woodcarving and his use of [RhinoCAM CNC software from MecSoft Corporation](#). Here is what Jim had to say about RhinoCAM:



*"I find RhinoCAM very user friendly. Setting up a part to machine is very easy and intuitive. RhinoCAM has done everything that I have ever asked it to do and it does it well - it just works!"*

*Jim Lohmann, Owner/Operator, Lohmann  
Woodcarving Company, Covington, MI*



Lohmann Woodcarving Company expertise from left to right, Architectural Details, Carvings/Furniture, Preservation & Recreation, Organs

This fireplace mantel project is a great example of how RhinoCAM CNC software has become one of Jim Lohmann's (of [Lohmann Woodcarving Company](#)) go-to software programs in his digital woodcarving workshop. Here, RhinoCAM is used to machine complex 3D mesh models that Jim has sculpted in [ZBrush](#). Jim designed the mantel from a photograph that his client wanted the completed project to look similar to.

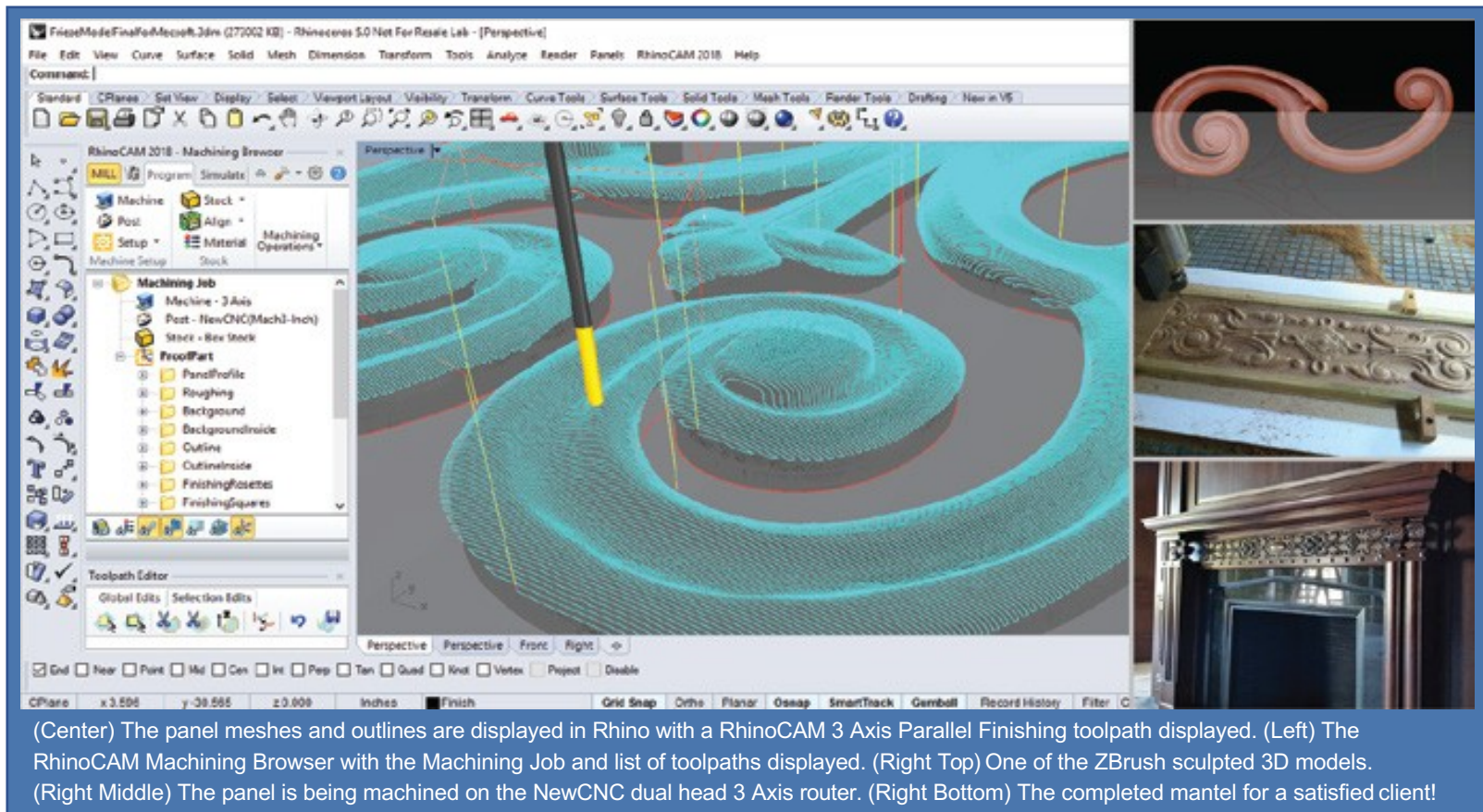
The mantle includes a 7" x 70" horizontal panel relief machined in Sapele, positioned across the top between four vertical columns, two on either end of the mantel. The upper decorative panel and the columns are both discussed in detail here. Be sure to check out the image of the completed fireplace mantel shown here.





## The 3 Axis Decorative Panel

The horizontal panel is comprised of multiple 3D carvings that Jim designed in ZBrush. The mesh models from ZBrush containing over eight million facet triangles were then loaded into Rhino and assembled onto the XY plane. The half panel design from ZBrush is shown below.





The half panel design as it appears in ZBrush

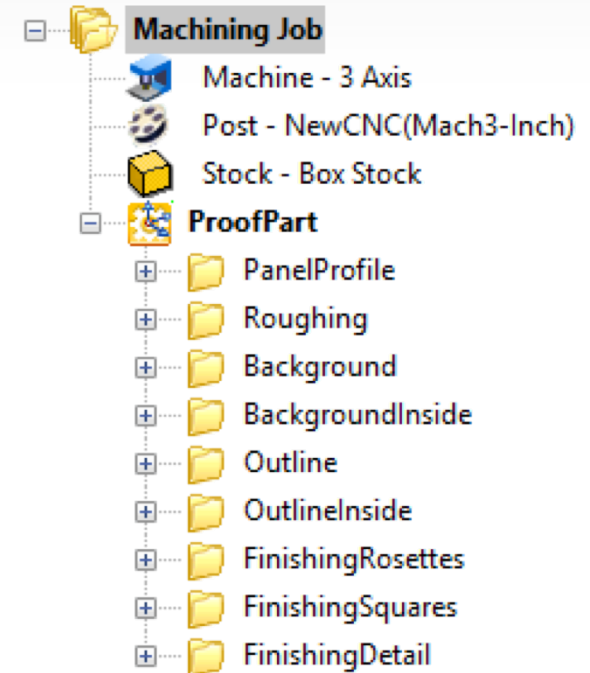


Actual Relief Machined with RhinoCAM toolpaths

Want to see how RhinoCAM can help you? [Click Here](#) to download a demo!

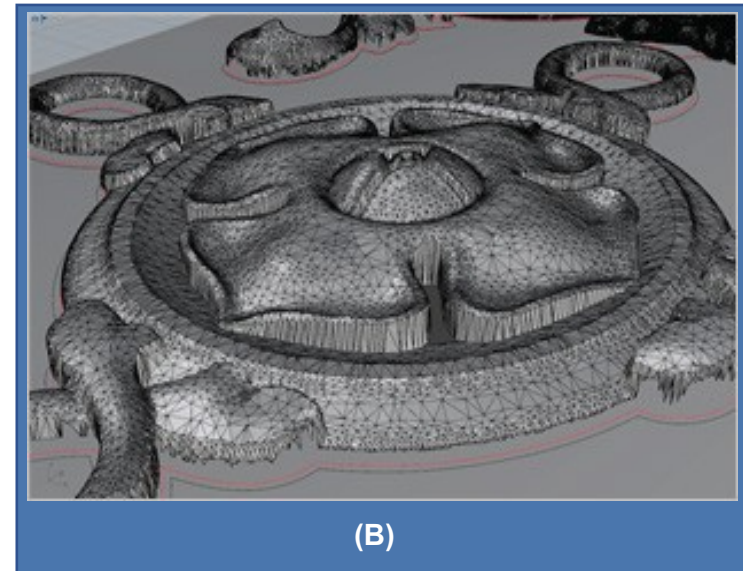
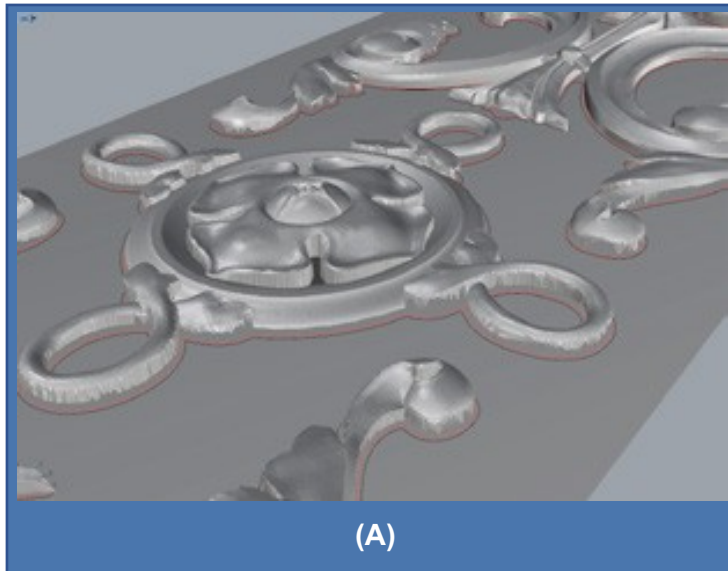
The toolpath strategies for the decorative panel are listed in the Machining Job on the right. The images of the RhinoCAM toolpaths are shown below.

- A. Mesh Models** - The mesh models are arranged on the panel and displayed in Rhino.
- B. Mesh Triangles** - A close-up of the faceted mesh triangles in one of the two center rosettes.
- C. Stock Model** - The 7" x 70" x 1" stock model is shown displayed over the part model.
- D. Stock Perimeter** - The Machining Job starts with a 2½ Axis Profiling strategy using a ⅛" flat end mill to cut the perimeter.
- E. 3 Axis Roughing** - For roughing, a 3 Axis Parallel Finishing strategy is used with a ¼" ball mill with a 25% stepover, leaving 0.04" of stock remaining on the part.
- F. Background Pocketing** - For the background of the panel, a 2½ Axis Pocketing strategy is used with a ⅛" flat end mill, leaving 0.005" of stock remaining, linear cut pattern, mixed cut direction, a 75% stepover and a single cut level with a cleanup perimeter pass.

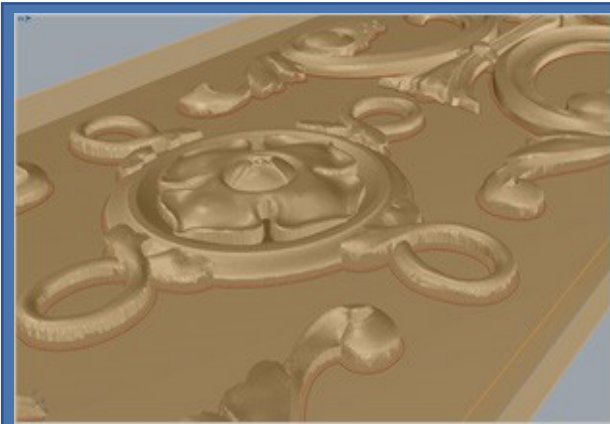




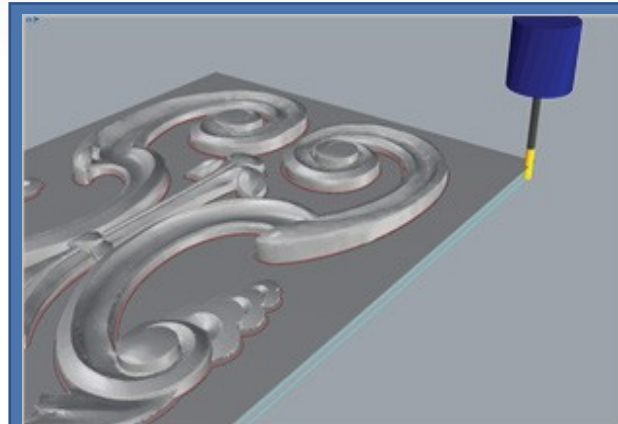
- G. Finishing Perimeters** - Next are 2½ Axis Profiling strategies around the inner and outer perimeter of each mesh, using a 1/16" ball mill and 3 cut levels of 0.063" each.
- H. Final Finishing** - For the final finishing strategy is a 3 Axis Parallel Finishing strategy using a 1/16" ball mill leaving 0.015" of stock remaining, a mixed cut direction and stepover of 0.015".



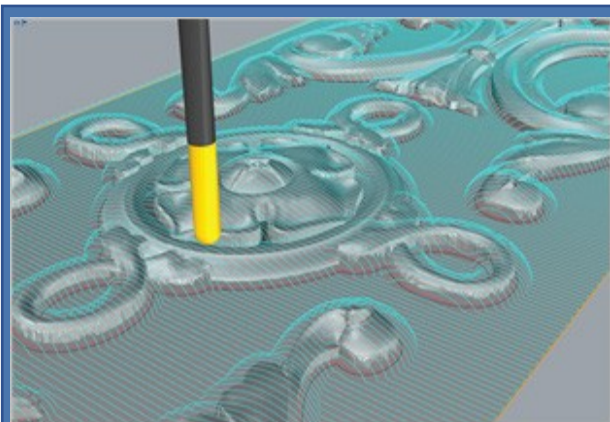




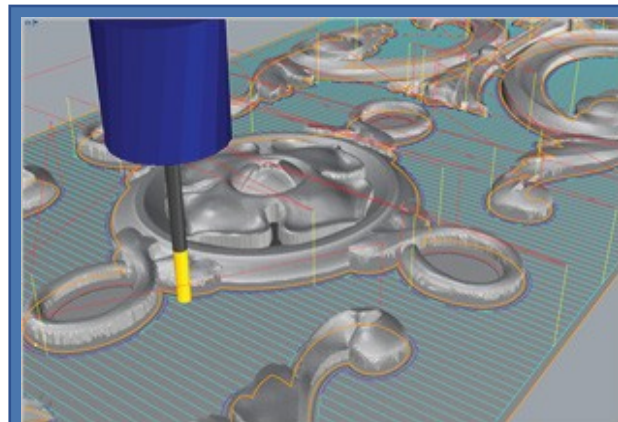
(C)



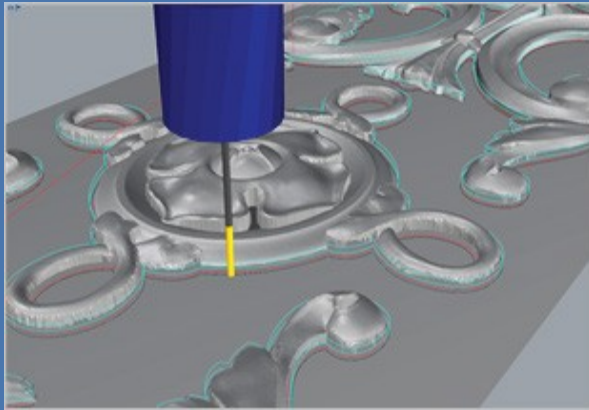
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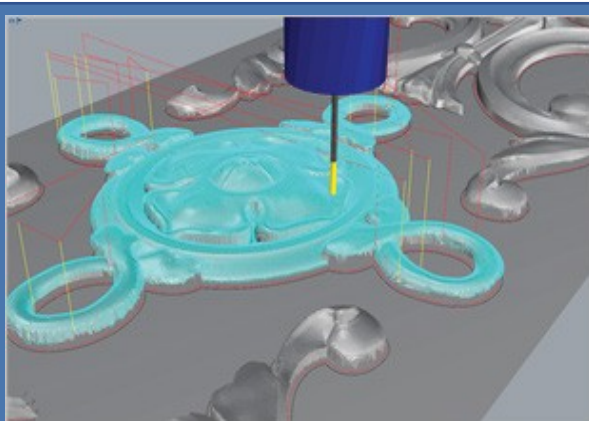
(E)



(F)



(G)



(H)



Actual panel relief being machined from RhinoCAM toolpaths on Jim's NewCNC3 Axis router.

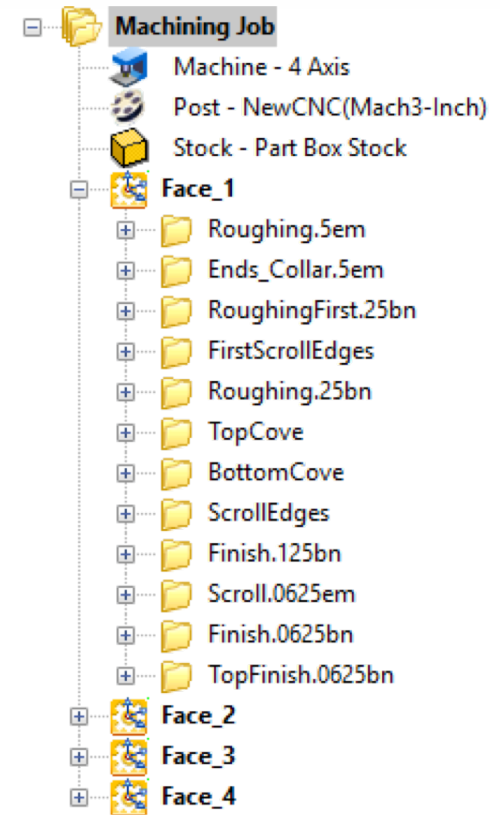
## The 4 Axis Mantel Columns

As we mentioned previously, the mantel design shown above includes four vertical column supports, two on each end. Each identical column is 4" square x 6" tall and are comprised of four identical sides to each column. Jim uses a positional (indexed) 4 Axis machining strategy to machine these columns, taking advantage of the 4 Axis attachment capability on his NewCNC router.

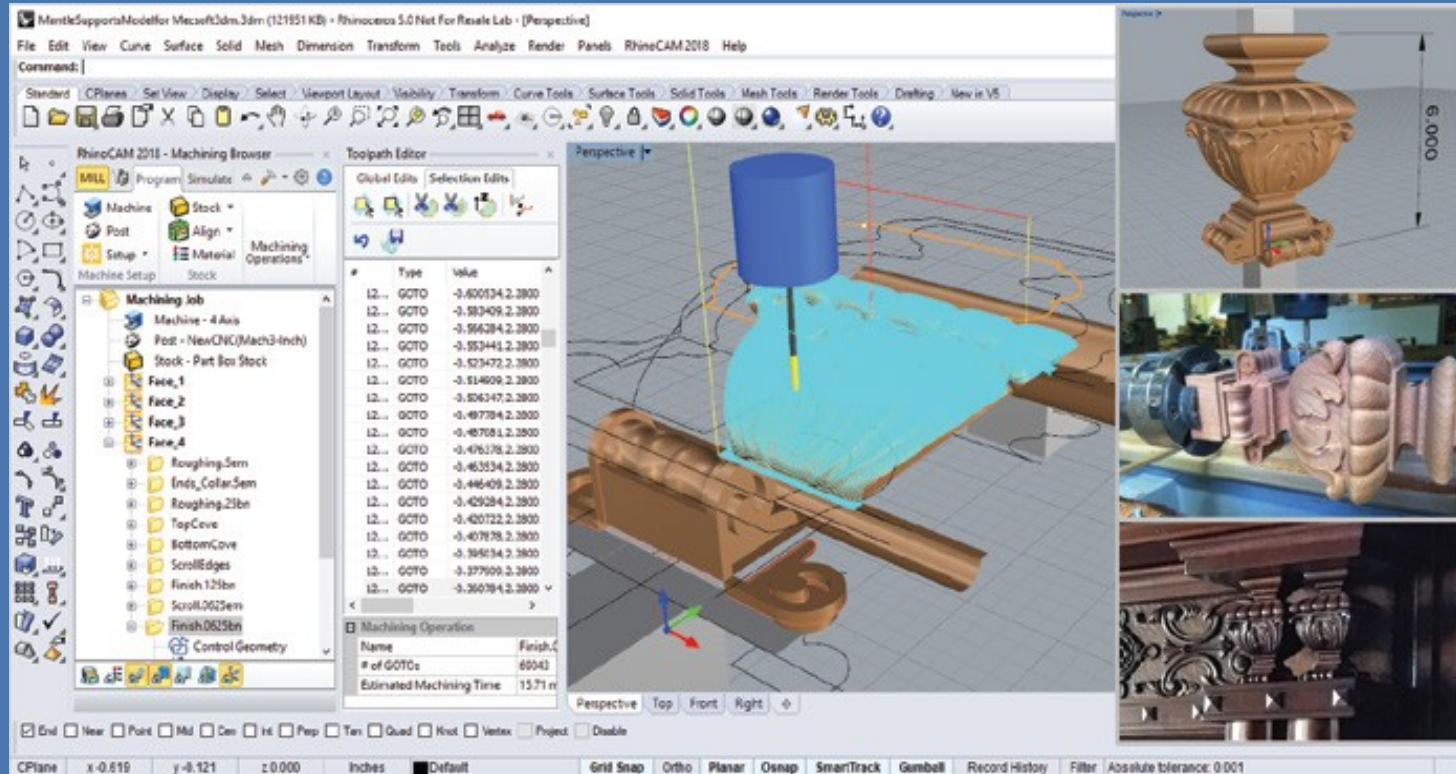
In the Machining Job tree shown on the right, you see four setups named Face 1, Face 2, Face 3 and Face 4. The rotation axis is set to the Y Axis. Each setup has its own degree of rotation about the Y axis defined. RhinoCAM will post the axis rotation codes necessary to machine all four faces of the part. Each degree of rotation is listed below:

1. Face 1: Y Rotation Axis set to 0 (zero)
2. Face 2: Y Rotational Axis set to 90
3. Face 3: Y Rotational Axis set to 180
4. Face 4: Y Rotational Axis set to 270

In the Machining Job for Setup 1, you see a host of 2½ and 3 Axis machining strategies to both rough and finish that side, while the rotation axis is fixed at zero degrees. Again, this is referred to as positional or indexed 4 Axis machining.







(Center) The 3D surfaces, 3D Meshes, and 2D curves used to machine one face orientation is displayed in Rhino. (Left) The RhinoCAM plug-in is loaded and the Machining Browser is displayed on the far left and the Toolpath Editor is displayed beside it.

(Right) In the top right, we see the complete 3D model of the column in Rhino. In the middle right, we see one of the columns being machined on the New CNC router with 4th Axis capability. In the lower right, we see a close-up of the completed columns installed.





The completed 4 Axis Mantel Columns



The completed mantel project showing the 3 Axis decorative panel (center) and the four 4 Axis mantel column supports (right & left).



More RhinoCAM projects from Lohmann Woodcarving (Left) Gothic window machining  
(Right) Gloucester Rosette dual head machining

## More About Lohmann Woodcarving

Jim Lohmann has been practicing woodcarving by hand for the past 45 years, getting his start in the Boston area, and then moving to Chicago. Today, Jim works from his shop in Covington, Michigan, where he has been practicing his craft for the past 30 years. For more information about Jim and Lohmann Woodcarving, we invite you to visit him online at <http://digitalwoodcarving.com/> and these additional links:

- [Lohmann Woodcarving on Facebook.](#)
- [Woodcarving Services.](#)
- [Image samples from Lohmann Woodcarving.](#)

## More about RhinoCAM

RhinoCAM - MILL is available in five different configurations (Express, Standard, Expert, Professional and Premium). The part shown here was programmed using the Professional configuration. Here are some additional details about each of the available configurations. For the complete features list, 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.
- **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.

## More about NewCNC

To learn more about the great team at NewCNC and their dual-head CNC routers, we invite you to visit them online at their [website](#), [Facebook](#), [Google+](#) pages and [YouTube](#) channel.