RhinoCAM at Quail Pens

Carl and Gina Hill operate their cottage business Quail Pens from their home in Wallace Idaho. Referred to as the Silver Capital of the World, Wallace is a historic city in the Panhandle Region of northern Idaho. Wallace is the county seat of Shoshone County and has three active silver mines plus one semi-active gold mine!

Carl has 39 years of experience in engineering under his belt, at Cessna Aircraft, Texas Instruments, Hewlett Packard, Raytheon Missile Systems, and then at General Electric as a Mechanical Engineer and also Manufacturing Engineering manager. Carl understands machine design and is familiar with both Mastercam and NX software. When it came time to choose a CAM package for his own business, Quail Pens, Carl chose RhinoCAM Expert!

Why RhinoCAM?

Well, when we recently sat down with Carl to talk about RhinoCAM at Quail Pens, he had more than one answer to this question! Here is just a sample of what Carl had to say about why he uses RhinoCAM.

"When we find a design problem during the machining process, we don't have to open two different programs - we just fix the design in Rhino, and then RhinoCAM immediately lets us know that we need to regenerate our toolpaths!"

RhinoCAM is extremely fast and very efficient! Also, when I design something in Rhino, I know that RhinoCAM is reading my Rhino file directly, not a translated version of the file. I know from experience that in any file translation, you lose detail - Not so with RhinoCAM!"

Carl & Gina Hill, Owner/Operators, Quail Pens

About the Antler Pen

In the examples shown below, Carl is cutting the Cap and Base of their Antler Pen product line. That's right, the stock material is elk and some deer antler! All of the antlers that Carl uses are shed which means they are picked up off the ground after the buck sheds them in the spring. Rest assured my friends, that no animals are harmed in the production of Carl's products!

Because of the porous nature of the material, brass sleeves are glued into a drilled hole through the antler's center.

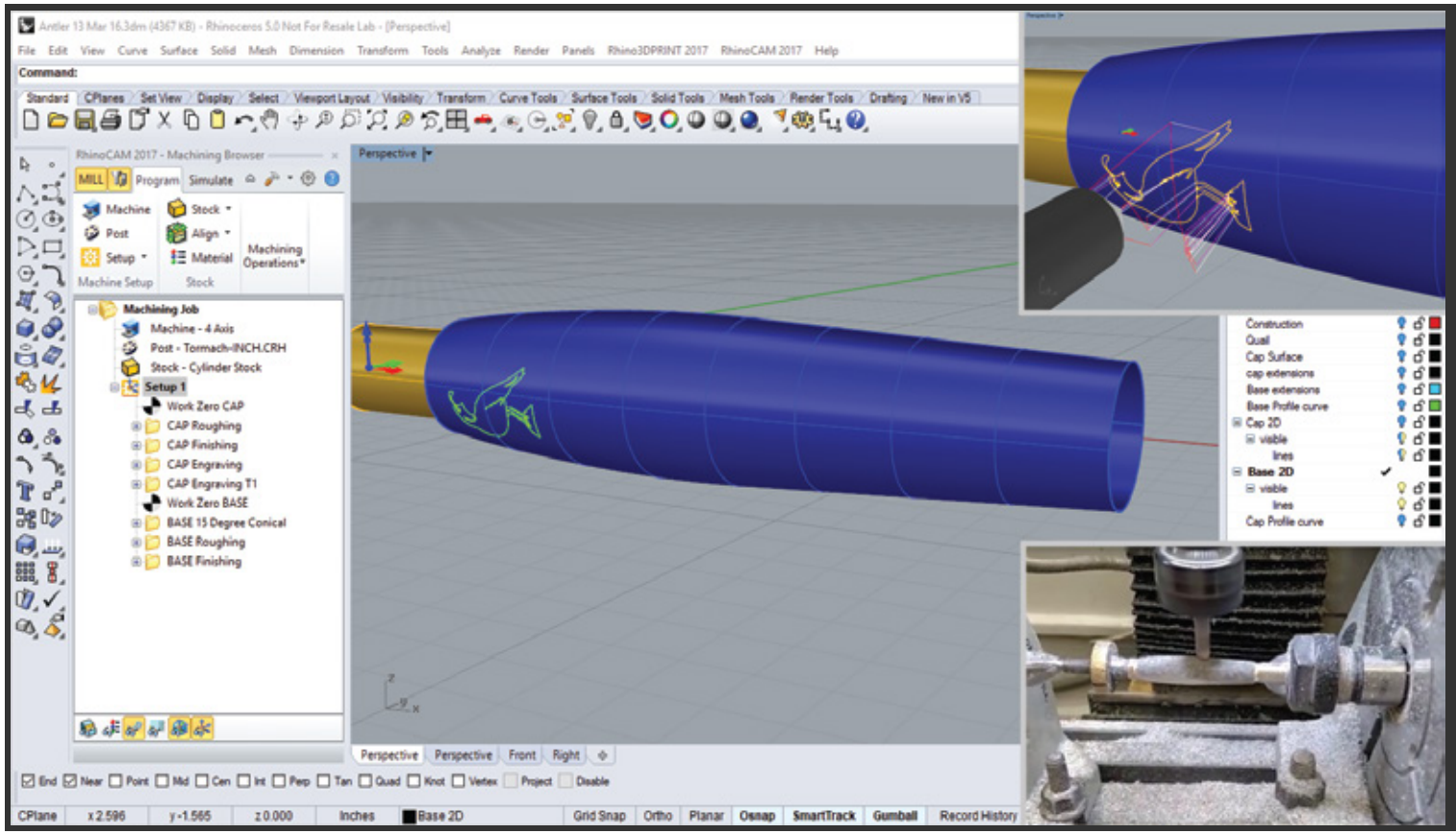
It is also soaked with a stabilizing agent that allows it to be machined to size. Each pen is unique to the specific animal that shed the antler the previous spring! How cool is that!

Here is just a few samples of the fascinating Antler Pen from Quail Pens.

The Antler Pen is unique, literally! No two pens are the same, and each bears the rustic look of the great outdoors!

The Antler Pen Cap

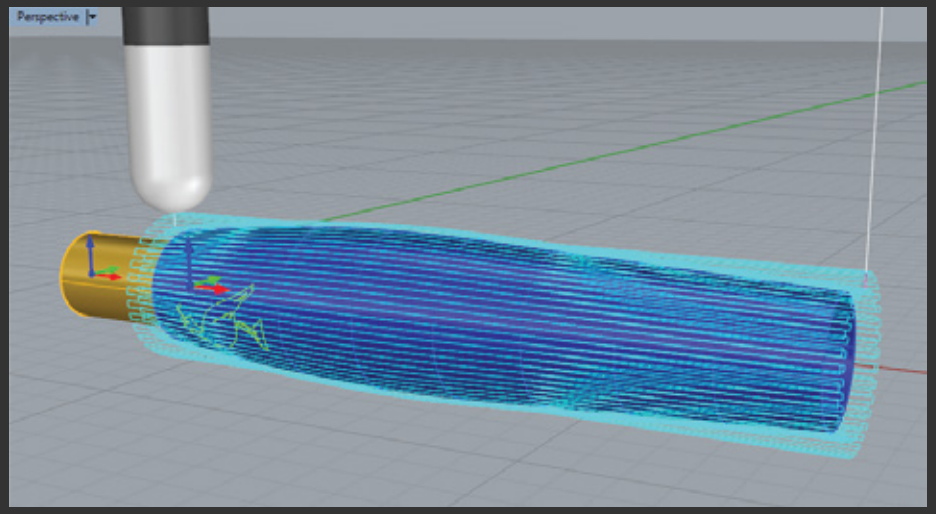
In the image below we see the surface model of the Antler Pen Cap in Rhino 5.0 with RhinoCAM loaded. The 4 Axis Engraving toolpath (inset top right) is used to cut Carl's signature Quail logo. In the Machining Job tree on the left, we see two Work Zeros, one for the Cap and one for the Base. Under Work Zero Cap (on the left), we see four operations. The first is Parallel Finishing, leaving stock. The second is another Parallel Finishing followed by two Engraving operations. The Stock is a cylinder 2" long by 1/2:" diameter. These are all 4 Axis toolpaths with additional details mentioned below.



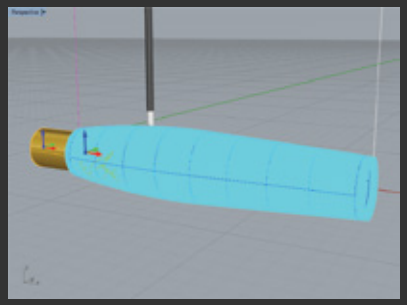
Here we see the Antler Pen Cap with brass sleeve insert modeled in Rhino 5.0. On the left we see the RhinoCAM Machining Browser showing the 4 Axis Setup with Work Zeros for the Cap and the Base. (Inset Top Right) The 4 Axis Engraving toolpath is shown for Carl's Quail logo. (Inset Bottom Right) The actual Antler Pen cap being machined on Carl's Tormach 4 Axis CNC machining center.

[Watch the Video Here!]

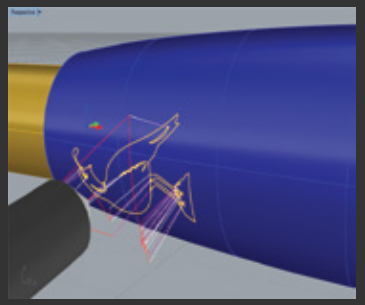
Here are more details on the Antler Pen Cap and the 4 Axis toolpaths used to cut it.



The first 4 Axis Parallel Finishing toolpath uses a ¼" Ball Mill and leaves 0.015" of stock after two Z-level step down.



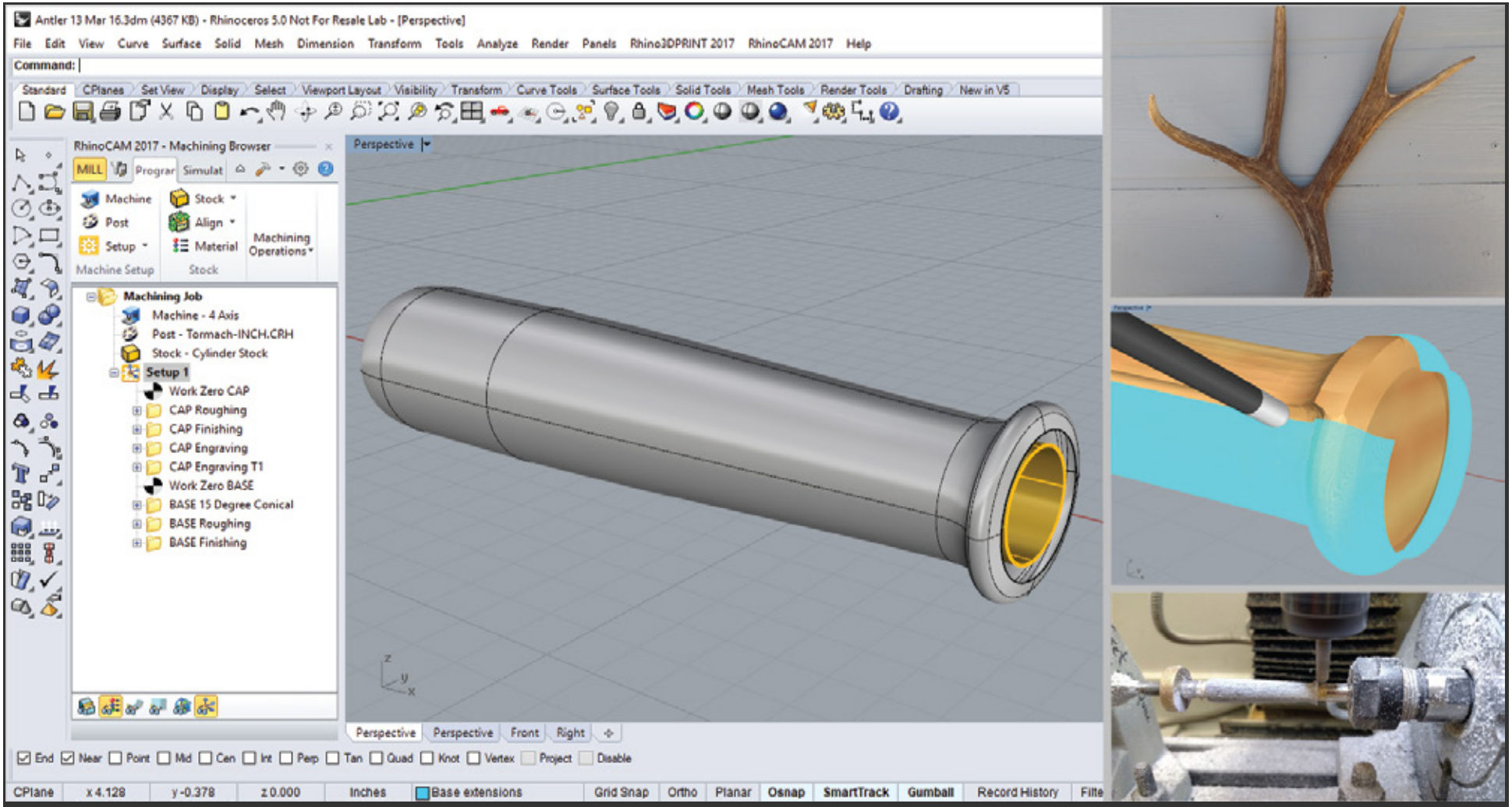
The second 4 Axis Parallel Finishing toolpath using a 0.047" Ball Mill at a stepover of 3% (0.0014") and a stock of zero (right on the Rhino surface)



The first of two 4 Axis Engraving toolpaths for theQuail logo is shown using a 40-degree V-Mill, 2 roughing and one finishing pass at 0.004" deep.

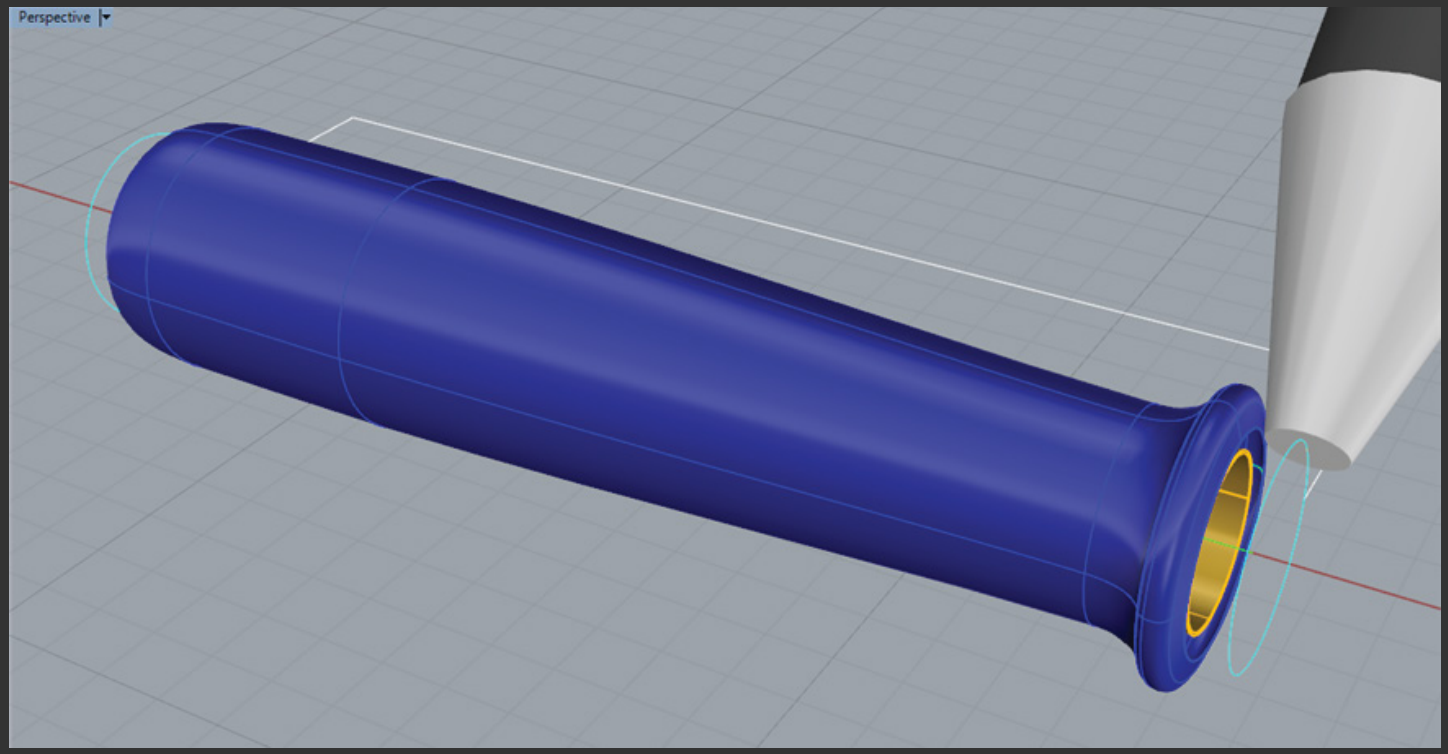
The Antler Pen Base

Now let's talk about the Antler Pen Base. The Rhino 3D surface model of the base is shown below, and we can clearly see the brass sleeve located at its center. In the Machining Job tree on the left, we see the second Work Zero for the base. Again, these are all 4 Axis toolpaths. The actual antler material and Carl's Tormach 4 Axis CNC machining center are shown on the right side of the image.

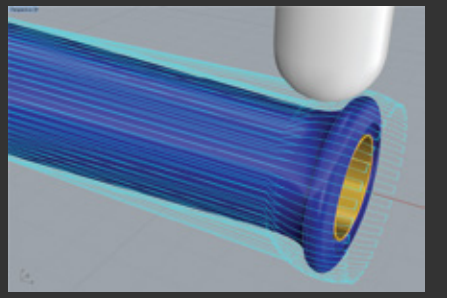


Here we see the Antler Pen Base with brass sleeve insert modeled in Rhino 5.0. On the left we see the RhinoCAM Machining Browser showing the 4 Axis Setup. (Inset Top Right) The actual Elk antler stock is shown. (Inset Middle Right) The 4 Axis Parallel Finishing operation is being simulated in RhinoCAM. (Inset Bottom Right) The 4 Axis Parallel Finishing toolpath is shown being cut on the Tormach 4 Axis machining center.

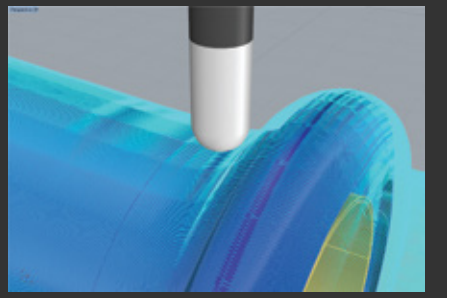
Here are more details on the Antler Pen Base and the 4 Axis Parallel Finishing and Engraving toolpaths Carl uses to cut it.



Here we see the 4 Axis Engraving toolpath using a 15-degree Chamfer Mill cuts the conical face on the flair end of the base. Notice here that the actual toolpath is not located on the part! It is positioned outside of the part so that the side of the Chamfer Mill is used to cut the conical face on the end of the base.

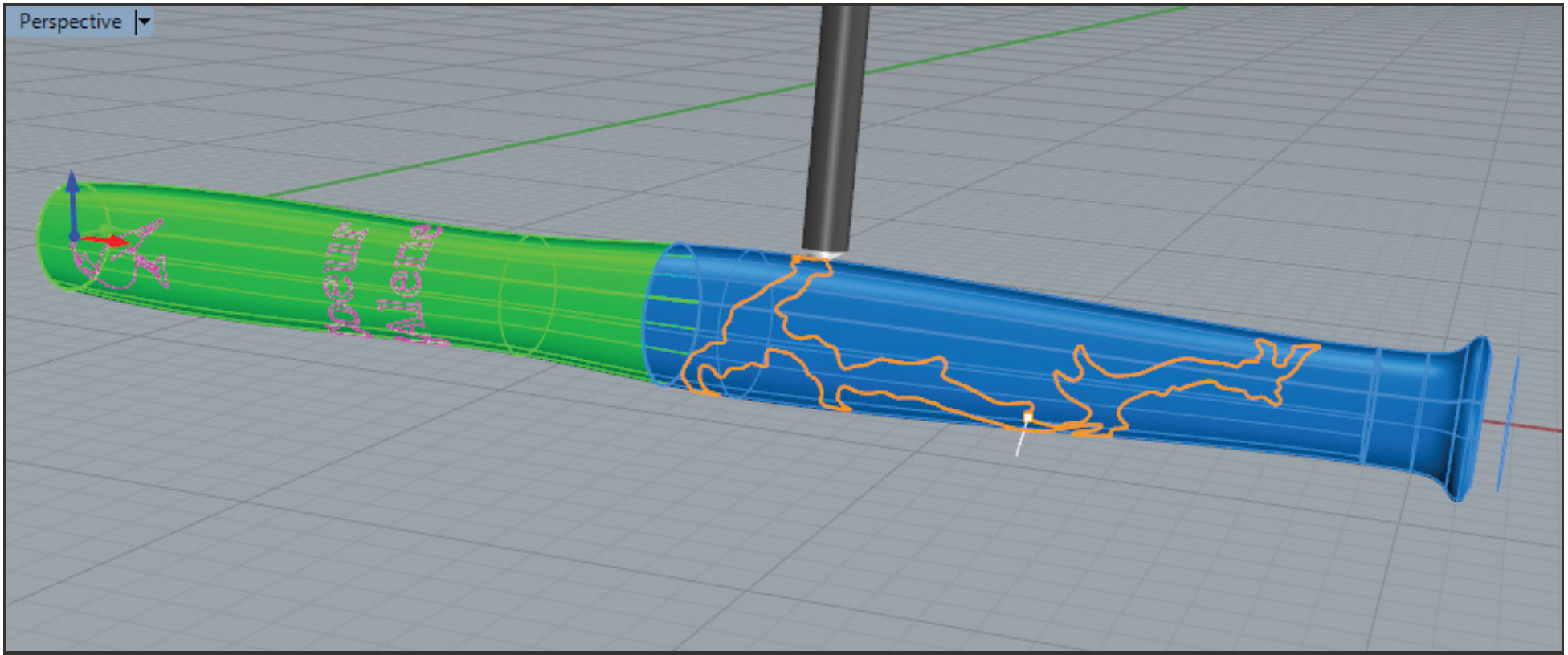


Here we see a 4 Axis Parallel Finishing toolpath (for roughing) using a ¼" Ball Mill with a step over of 8% (0.020") and a step down of 35% (0.0875").



Here we see the fine finishing detail of the second 4 Axis Parallel Finishing toolpath using a 0.047" Dia x 0.023" Corner Radius Mill at a 2.5% step over (0.0011").

Carl also produces this same pen in brass with the outline of Lake Coeur d'Alene (located just west of Wallace, Idaho) 4 Axis engraved on the base and additional nomenclature engraving on the cap.



In this image, we see the brass version of the Antler Pen with the 4 Axis Engraving of Lake Coeur d'Alene being simulated.

"I don't have to know all of the intricacies of the cam programming process because RhinoCAM does all of the math calculations for me! I don't think my requirements will ever exceed RhinoCAM's capabilities."

Carl Hill, Owner/Operator, Quail Pens

More about Quail Pens

For more information about Carl & Gina Hill at Quail Pens, we invite you to visit them on the web at http://www.quail-pens.com/.

More about RhinoCAM

RhinoCAM is available in 5 different configurations (Express, Standard, Expert, Professional, and Premium). The parts shown here were programmed using the Expert configuration. Here are some additional details about each of the available configurations. For the complete features list, visit the RhinoCAM Product Page.

- **RhinoCAM 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
- **RhinoCAM Expert**: Includes the Standard configuration plus 4 Axis machining strategies, advanced cut material simulation, and tool holder collision detection.
- **RhinoCAM Premium:** Includes the Standard, Expert and Professional configurations plus 5 Axis simultaneous machining strategies.
- **RhinoCAM Standard:** This is a general-purpose machining program targeted at the general machinist. This product is ideal for the rapid-prototyping, hobby and educational markets where ease of use is a paramount requirement. Includes 2-1/2 Axis, 3 Axis, and Drilling machining methods.
- **RhinoCAM Professional:** 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. Setup 4: Pocketing & Deep Drill 7