GRANBERG® INTERNATIONAL

AlibreCAM at Granberg International

Granberg International, located in Pittsburg, CA, is a second generation, family-owned company and a world leader in the design and manufacture of chainsaw accessories. They say that "Necessity is the mother of all invention." Well, Erik Granberg, President and CEO, tells the story of how his father, Elof Granberg, started the company in the 1950s after experiencing the difficulty of clearing timber on a ranch the family had just purchased in British Columbia.

That necessity led to the invention of the first portable chainsaw blade sharpener that is sold today worldwide! Hear Erik tell the story here! We recently sat down with Erik Granberg to learn more about the company and its use of AlibreCAM software from MecSoft Corporation.

The Alaskan® Sawmill

Following his early successes, Erik's father then purchased the patent rights of what is known today as the Alaskan ® Sawmill, a lightweight and innovative attachment that allows one person to perform accurate millwork onsite with only a chainsaw! Erik is continuing the Granberg family tradition of craftsmanship and innovation from their 12,000 sq/ft facility.


The Granberg Alaskan® Sawmill is a one-person sawmill that allows you to mill rough cut lumber to exact widths from end to end using a chainsaw attachment.

Want to see how **AlibreCAM** can help you? Click here to download a demo.

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[Alaskan® Sawmill Video / More Videos](#)

The AlibreCAM Difference!

Six years ago, Erik began implementing CNC technology into their manufacturing process and currently has seven (7) Haas CNC machining centers running production full time. Erik has also implemented the [Jergan Quick Exchange Die](#) system on each of his Haas machines. This system allows his team to rapidly change setups, minimizing change-over time, while increasing production volume and accuracy. Erik designs the many fixture plate configurations in-house using [Alibre Design](#) and uses the [AlibreCAM](#) plugin to generate the toolpaths and g-code programs needed to manufacture them. Let's have a look.
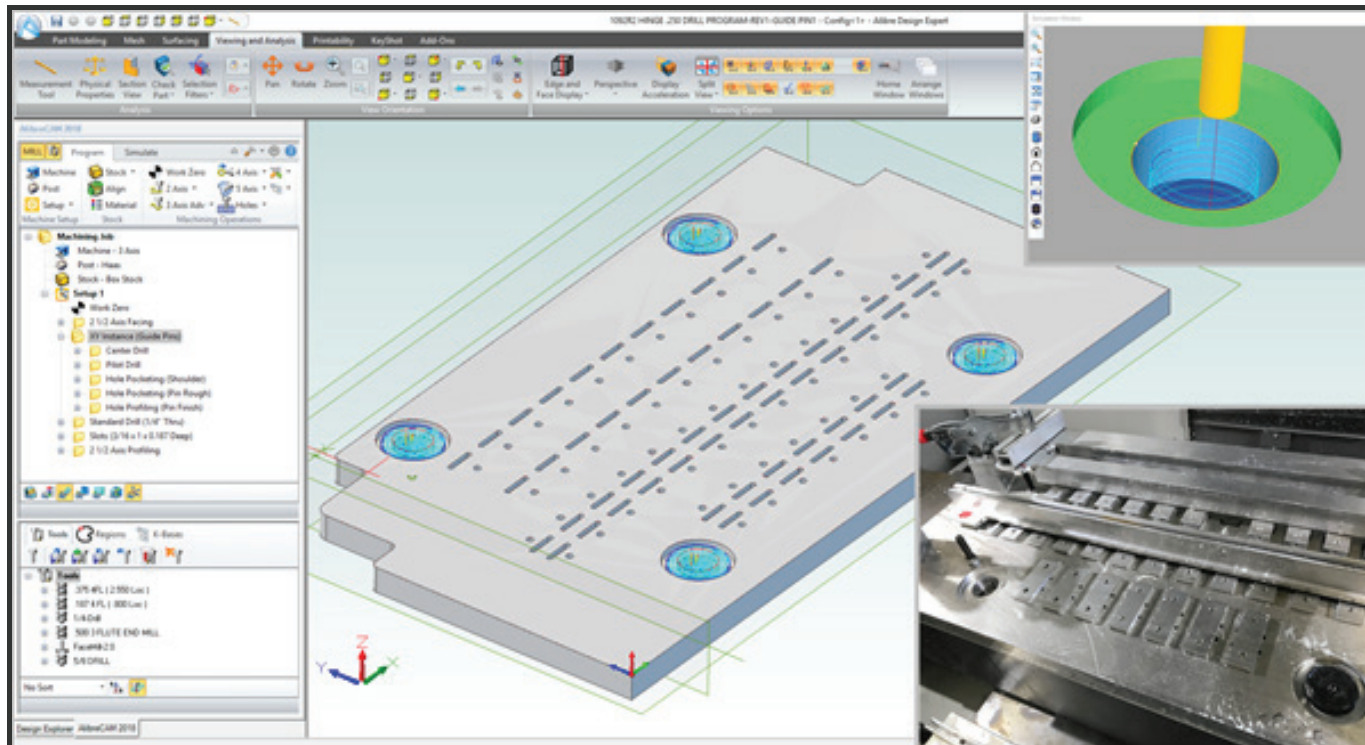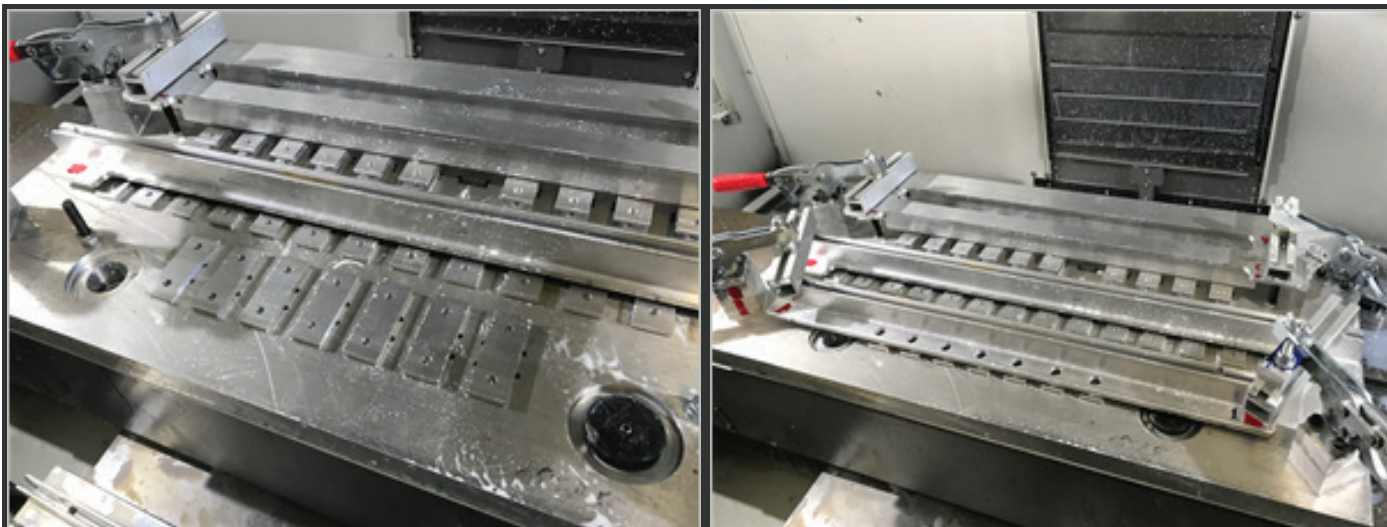
Here we see Alibre Design with the AlibreCAM plugin loaded. The AlibreCAM Machining Browser is displayed on the left with the current Machining Job tree above and the current cutting tools listed below. One of Erik's custom designed fixture plates for their Quick Exchange Die system is shown with toolpaths displayed for the four ball lock guide pin & bushing hole locations. (Top Right) The AlibreCAM toolpath simulation of the Hole Profiling finishing operation on the bushing hole diameter. (Bottom Right) The actual fixture plate mounted on the Quick Exchange Die in the Haas CNC machining center.

> *"Since implementing AlibreCAM and CNC six years ago, we have increased our production volume here at Granberg International by 300%! AlibreCAM's ability to quickly generate CNC programs from multiple Alibre Design configurations and iterations is one of the key factors of our recent success."*
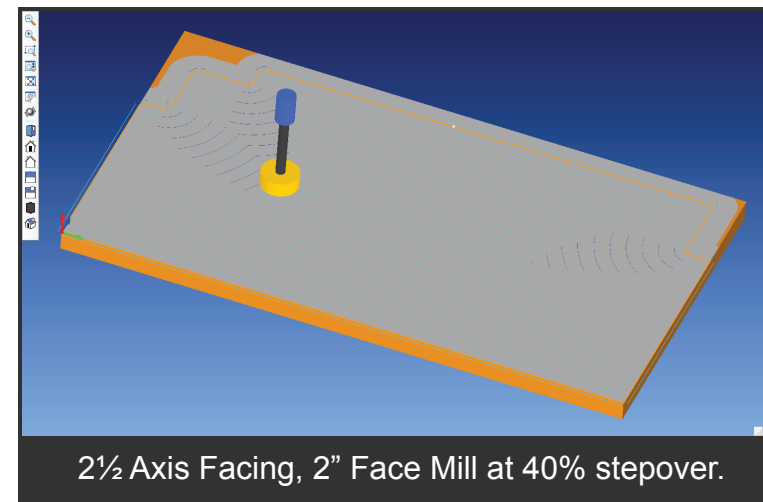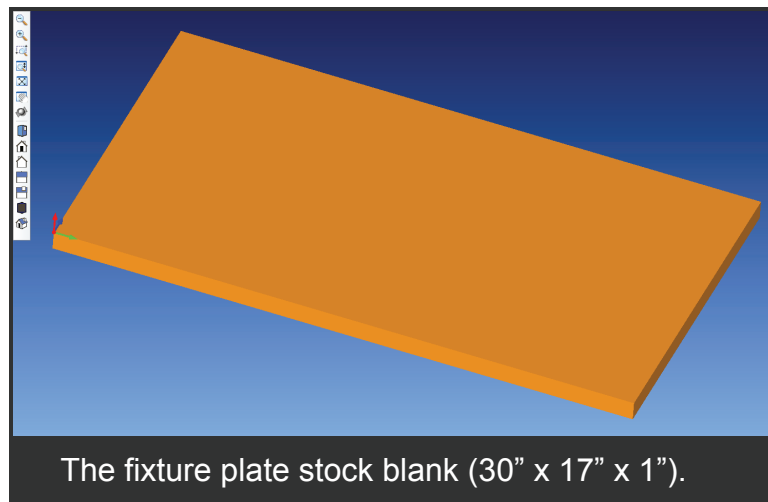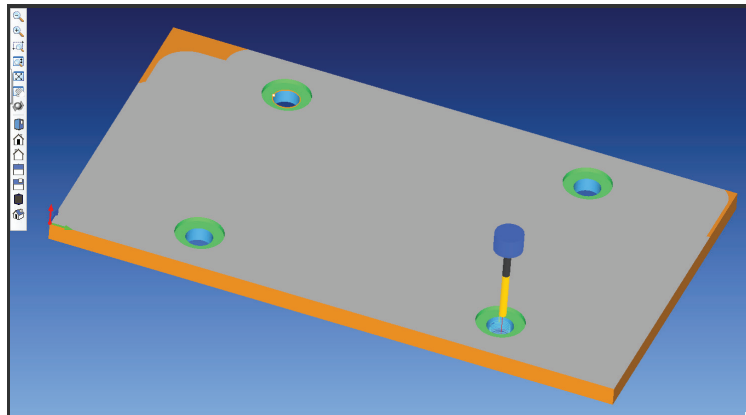>
> *Erik Granberg, President/CEO, Granberg International*

Here we see the fixture plate being set up on the Quick Exchange Die
in the Haas CNC machining center.

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The AlibreCAM Toolpaths

The following illustrates the AlibreCAM toolpaths and cut material simulations for the fixture plate design configuration shown above. The required machining consists of an initial Facing operation followed by four Hole Machining sets (for the outer ball lock guide pins & bushings), Drilling, Slotting and the final perimeter Profiling operation. The Hole Machining toolpaths for the ball lock guide pins are discussed in more detail below.
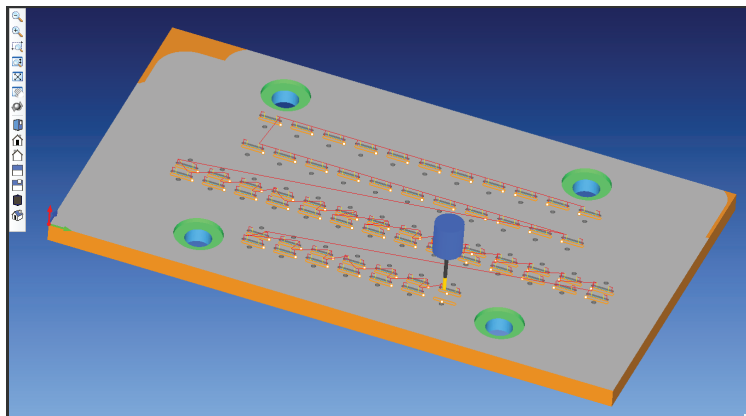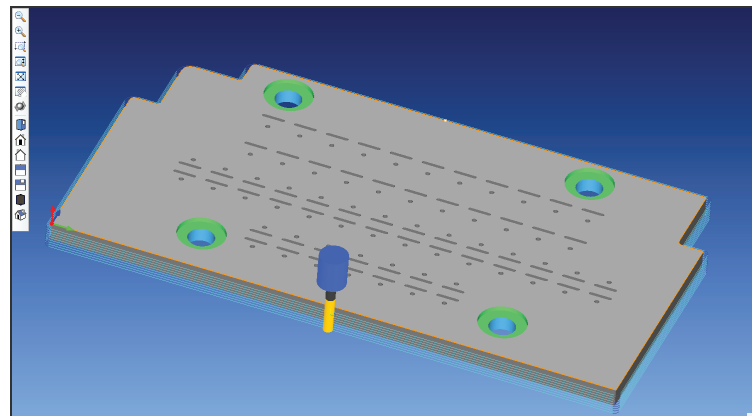

The fixture plate stock blank (30" x 17" x 1").

2½ Axis Facing, 2" Face Mill at 40% stepover.

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Ball lock guide pin holes (see below for the list of toolpaths used in this XY Instance operation).
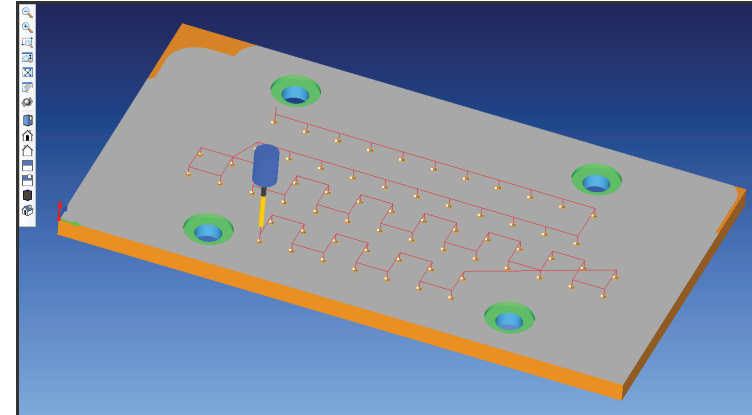
Hole Machining, ¼" Drill, ¾" deep at 0.25" step increments, Minimum Distance sort order.

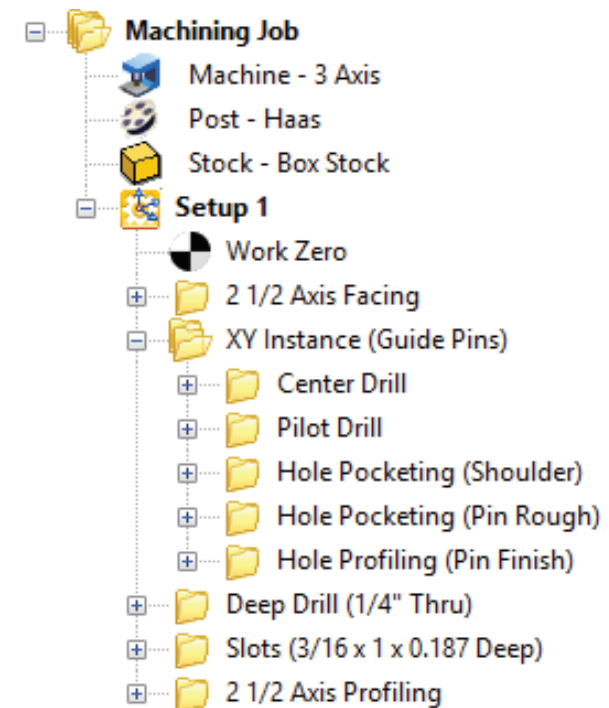2½ Axis Slotting, 3/16" End Mill, 0.187" deep, Minimum Distance sort order.

2½ Axis Profiling, ½" End Mill, 0.15" cut levels.

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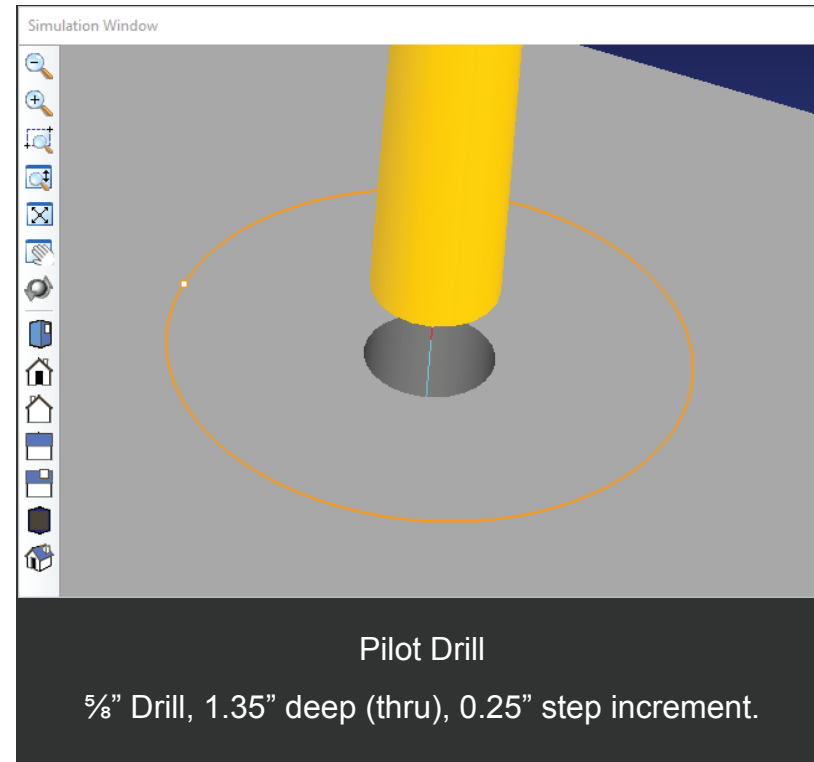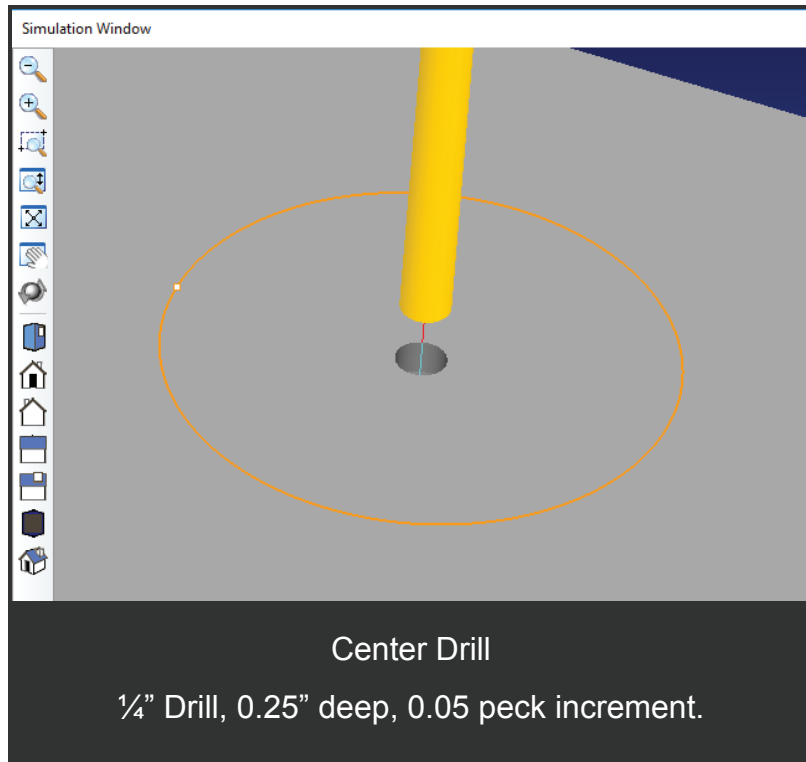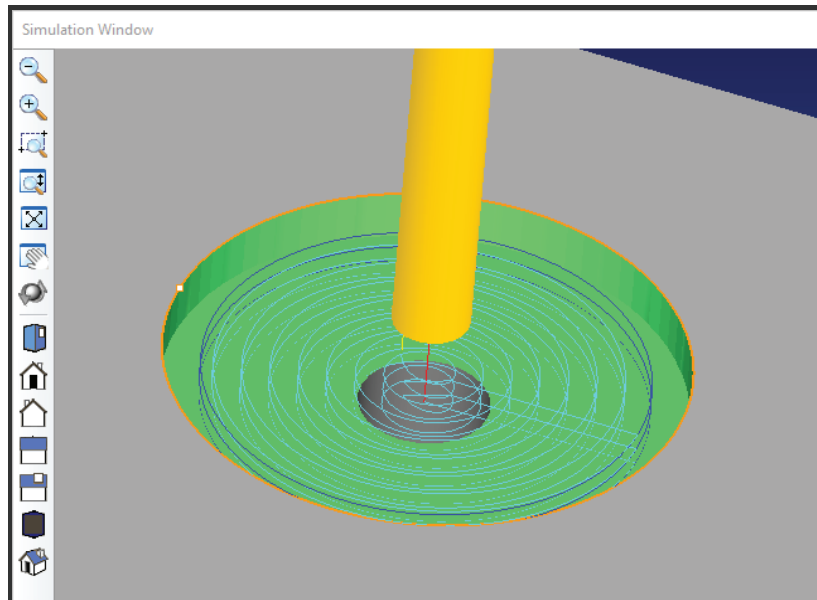
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The Ball Lock Guide Pin Hole Operation Set

One of the interesting things from a machining perspective are the four outer hole set locations (shown in blue/green) for the fixture plate ball lock guide pins and bushings. In AlibreCAM, only one hole set needs to be programmed. The g-code for the other three are generated automatically using an XY Instance operation. The Machining Job is shown here.

The critical dimension is the center thru hole diameter of 1.3765" for the press-fit bushing. The g-code for this hole is posted to 6 decimal places of accuracy using a Hole Profiling finishing operation. See **Adjusting Toolpath Accuracy** below for more information.

Each hole set consists of two Drill operations, two helical Hole Pocketing roughing operations and a final helical Hole Profiling finishing operation. The first smaller Drill operation provides centering stability for the second larger Drill, which in turn provides the access needed for the two helical Hole Pocketing roughing operations. The second Hole Pocketing roughing operation provides the needed access for the entry and exit of the final Hole Profiling finishing operation, which cuts the final hole to the finished diameter. More details for each operation in this set are provided below.

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Simulation Window

Center Drill

¼" Drill, 0.25" deep, 0.05 peck increment.

Simulation Window

Pilot Drill

⅝" Drill, 1.35" deep (thru), 0.25" step increment.

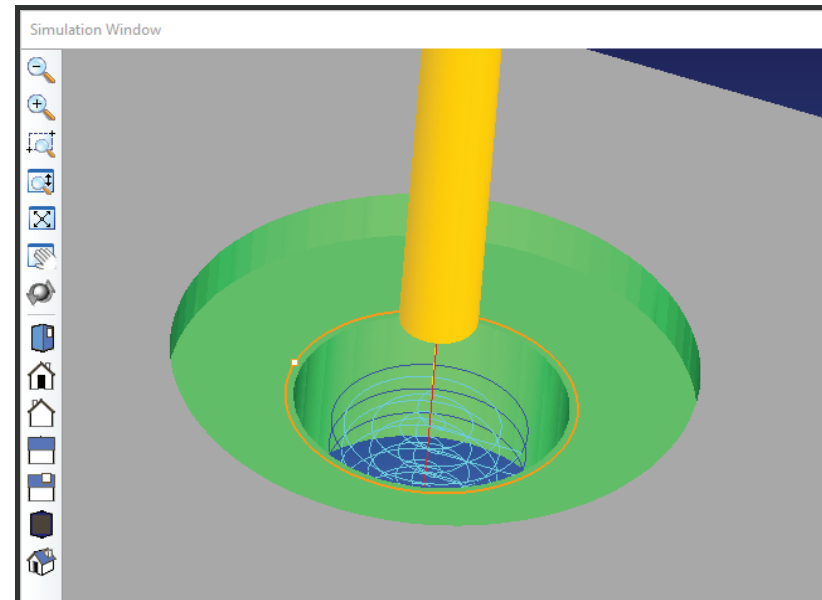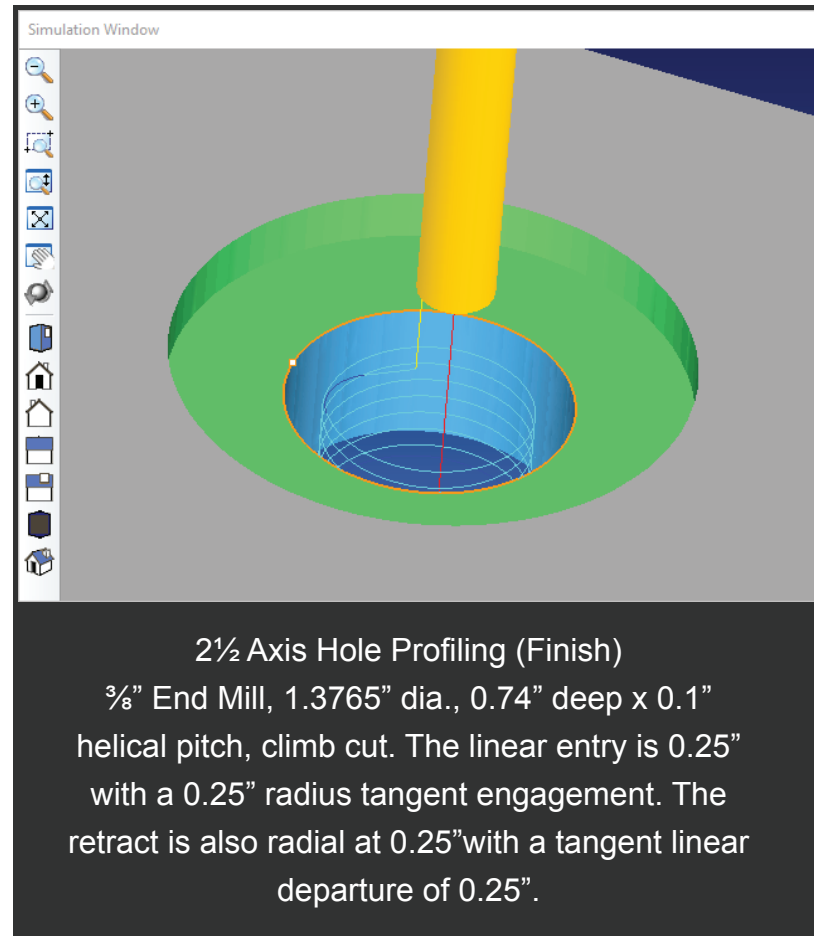Want to see how **AlibreCAM** can help you? Click here to download a demo.

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2½ Axis Hole Pocketing
⅜" End Mill, 2.5" dia., 0.26" deep, 40% stepover
climb cut, 0.1" stepdown with cleanup pass at each
cut level (dark blue). The helical entry is
0.25" dia. x 0.25" deep.

2½ Axis Hole Pocketing (Rough)
⅜" End Mill, 1.300" dia., 0.74" deep, 40% stepover
climb cut, 0.15" stepdown with clean up pass at
each cut level (dark blue). The helical entry is
0.125" dia x 0.25" deep.

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2½ Axis Hole Profiling (Finish)
⅜" End Mill, 1.3765" dia., 0.74" deep x 0.1" helical pitch, climb cut. The linear entry is 0.25" with a 0.25" radius tangent engagement. The retract is also radial at 0.25"with a tangent linear departure of 0.25".

Adjusting Toolpath Accuracy

Internally, AlibreCAM tool motions are calculated at double-precision accuracy up to 14 decimal places. The GOTO motion values displayed in the AlibreCAM Toolpath Viewer are shown at 6 decimal places. Here are the adjustments made in Alibre Design and AlibreCAM to tighten the accuracy required for the final finishing Hole Pocketing operation. It should be noted here that accuracy is relative. As you increase accuracy, you also increase processing and machining time.

1. Adjust the accuracy settings of the Alibre Design File Properties dialog. For example, set Length Precision and Angle Precision to 6 (Decimal Places).


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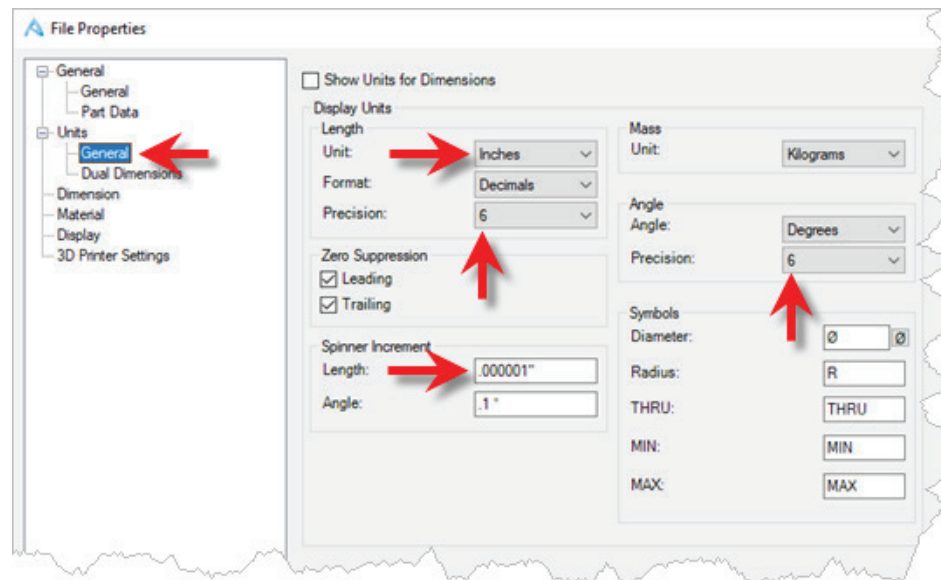
2. In the AlibreCAM toolpath operation that requires a high degree of accuracy, set the operation Global Tolerance to between 4 and 6 decimal places. The Cut Parameters tab of the Hole Profiling operation dialog is shown below.
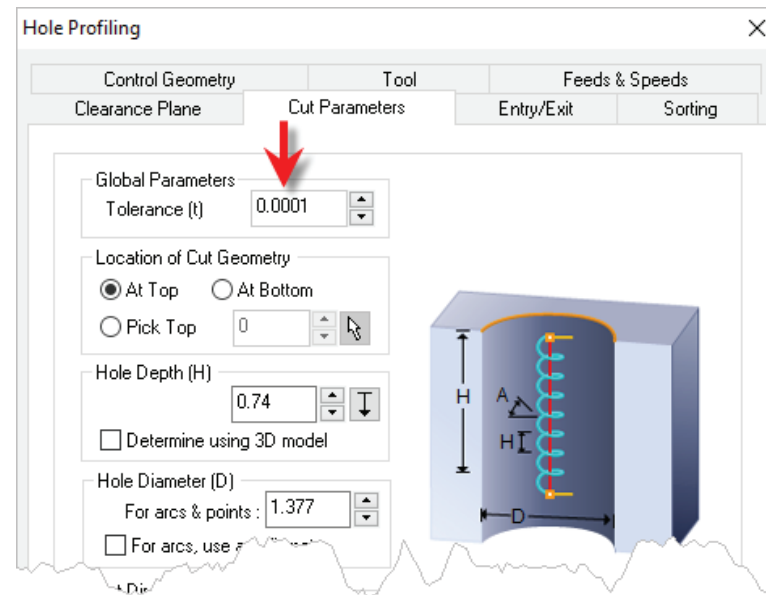
3. Before posting your g-code, edit your selected post using the built-in AlibreCAM Post Processor Generator. From your Set Post Processor Options dialog, select your post from the Current Post Processor list (we selected haas) and then select the Edit… button. This will display the Post Processor Generator for that post.

4. Select the Motion section on the left.

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5. For # of Decimal Places, set this to 6.

6. Then also check the box to Show Trailing Zeros. These selections are shown below.

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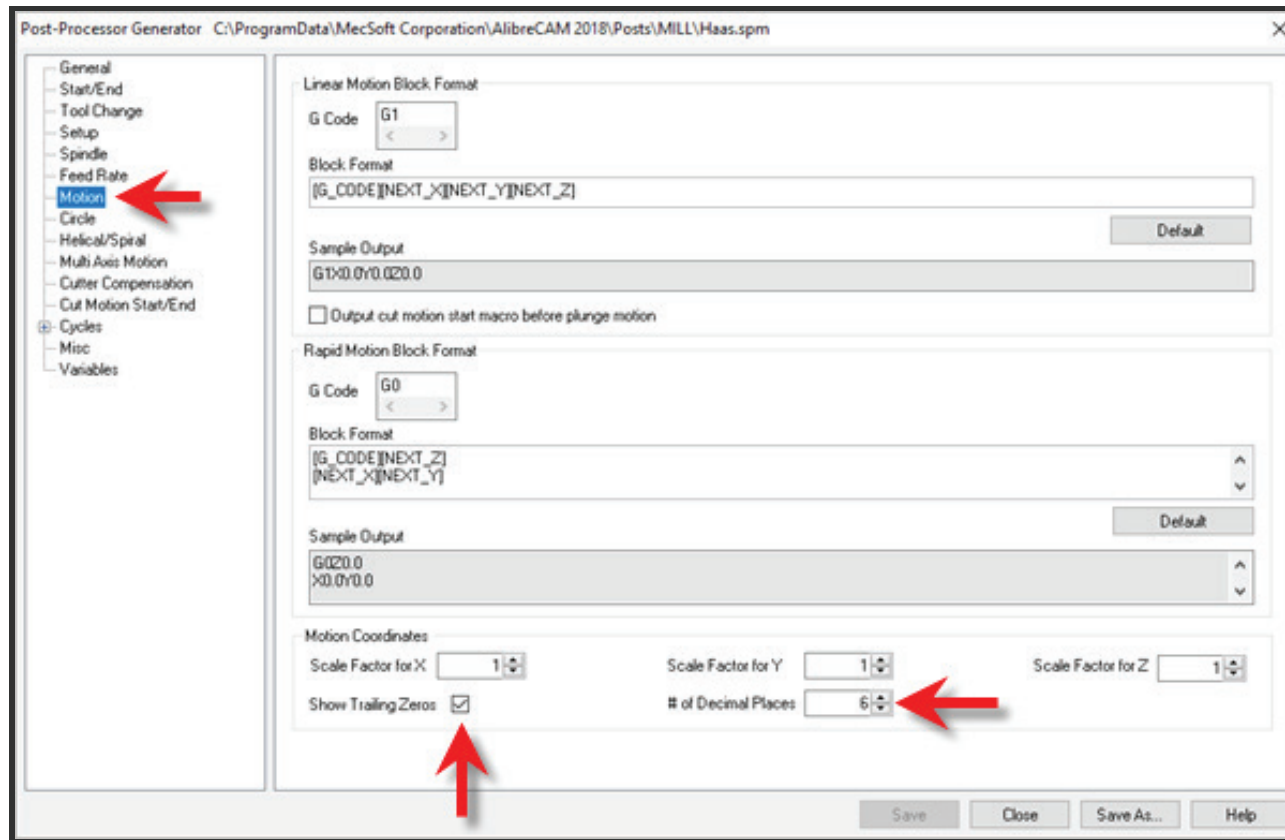
7. Now, go to the CAM Preferences dialog and from the Machining section, uncheck each of the Arc Output options shown below:
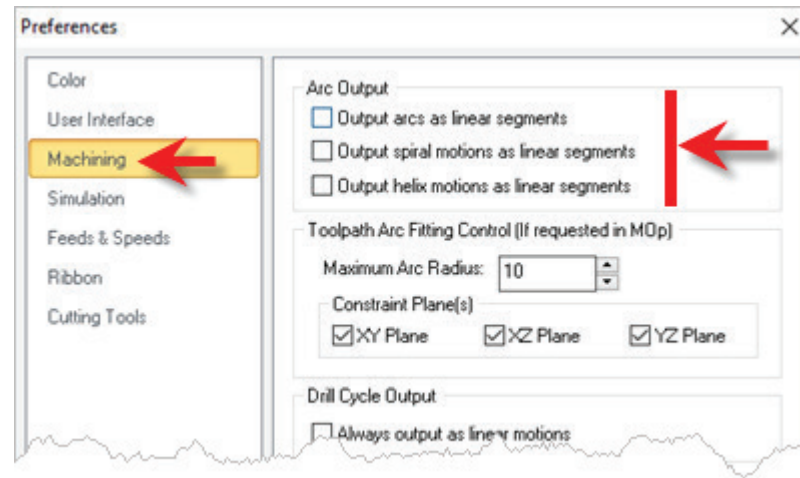
8. Now from the machining Job tree in AlibreCAM, right-click on the operation requiring a high degree of accuracy, and select Post.
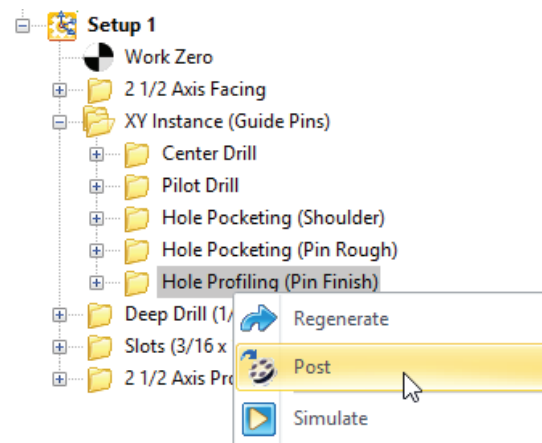
9. Here is the sample Haas g-code output for this toolpath in 6 decimal places of accuracy.

```
1092R2 HINGE .250 DRILL PROGRAM-REV1-GUIDE PIN1_Hole Prof...   —   □   ×

File  Edit  Format  View  Help
%
O0
N1G40G49G80
(Hole Profiling (Pin Finish))
N2(Tool Diameter = 0.375 Length = 4.23 )
N3G54
N4G20T0M6
N5 S4889M3
N6G90G0X6.852668Y14.701669
N7G43Z0.250000H0
N8 G1Z-0.260000 F29.
N9 X6.650218Y14.554992 F58.
N10 G17
N11 G03X6.594590Y14.205666I0.146677J-0.202450
N12 X7.501000Y14.500000Z-1.000000I0.405410J0.294334
N13 X6.499000I-0.501000J0.000000
N14 X7.501000I0.501000J0.000000
N15 X7.251000Y14.750000I-0.250000J0.000000
N16 G1X7.001000
N17 G0Z0.250000
N18M30
%
```

More about Granberg International

A special thanks to Erik Ganberg and Granberg International for allowing us to share their AlibreCAM success story! For more information about Granberg International and their available product line, we invite you to visit them on the web at https://granberg.com/, on Facebook, Twitter, YouTube and Instagram.

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More about AlibreCAM-MILL

AlibreCAM-MILL is available in 5 different configurations (Express, Standard, Expert, Professional and Premium). The parts shown here can be machined using the Standard configuration. The XY Instance operation requires the Professional configuration. Here are some additional details about each of the available configurations. For the complete features list, visit the AlibreCAM Product Page.

- **AlibreCAM 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.

- **AlibreCAM Standard:** This configuration includes everything that is in the Express configuration and additional 2-1/2 Axis, 3 Axis & Drilling machining methods.

- **AlibreCAM 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.

- **AlibreCAM Professional:** Ideal for complex 3D machining. Includes the Standard and Expert configuration, plus advanced 3 Axis & 4 Axis machining strategies, 5 Axis indexed machining, machine tool simulation, graphical toolpath editing and a host of other features.

- **AlibreCAM Premium:** Tailored for complex 3D machining with both 3 Axis & 4 Axis, as well as continuous 5 Axis machining methods. Includes the Standard, Expert and Professional configurations, plus 5 Axis simultaneous machining strategies.

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