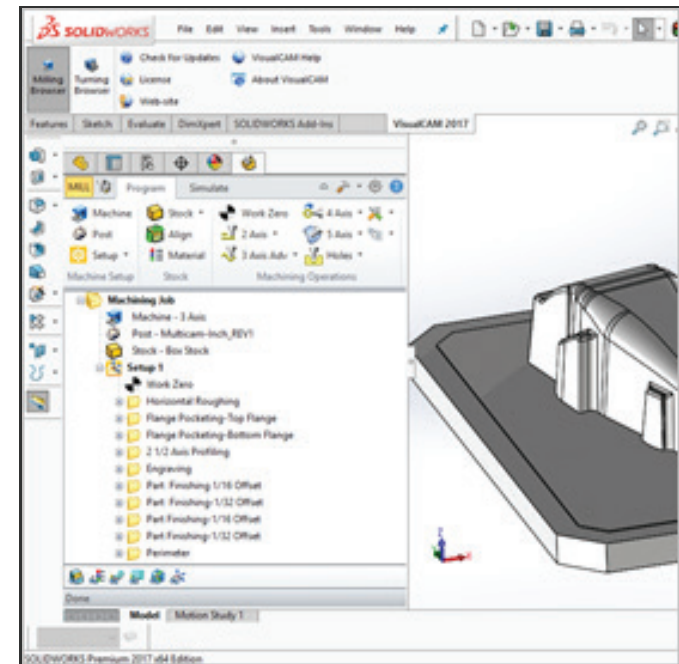




VisualCAM for SOLIDWORKS at The Warren Group

[The Warren Group](#), located in Santa Fe Springs, CA, designs and manufacturers prototype and production packaging solutions for the industrial, automotive and consumer products industries. For the past seven years, TWG has relied on [VisualCAM for SOLIDWORKS](#) to program the toolpaths they need to drive their two 5'x10' [Multicam](#) CNC machining centers.

Edgar Mota has been with TWG for the past seven years working in production as a CNC Operator and currently in engineering as a Lead Designer. We recently sat down with Edgar to learn more about the company and how it uses VisualCAM for SOLIDWORKS in their engineering and manufacturing process.



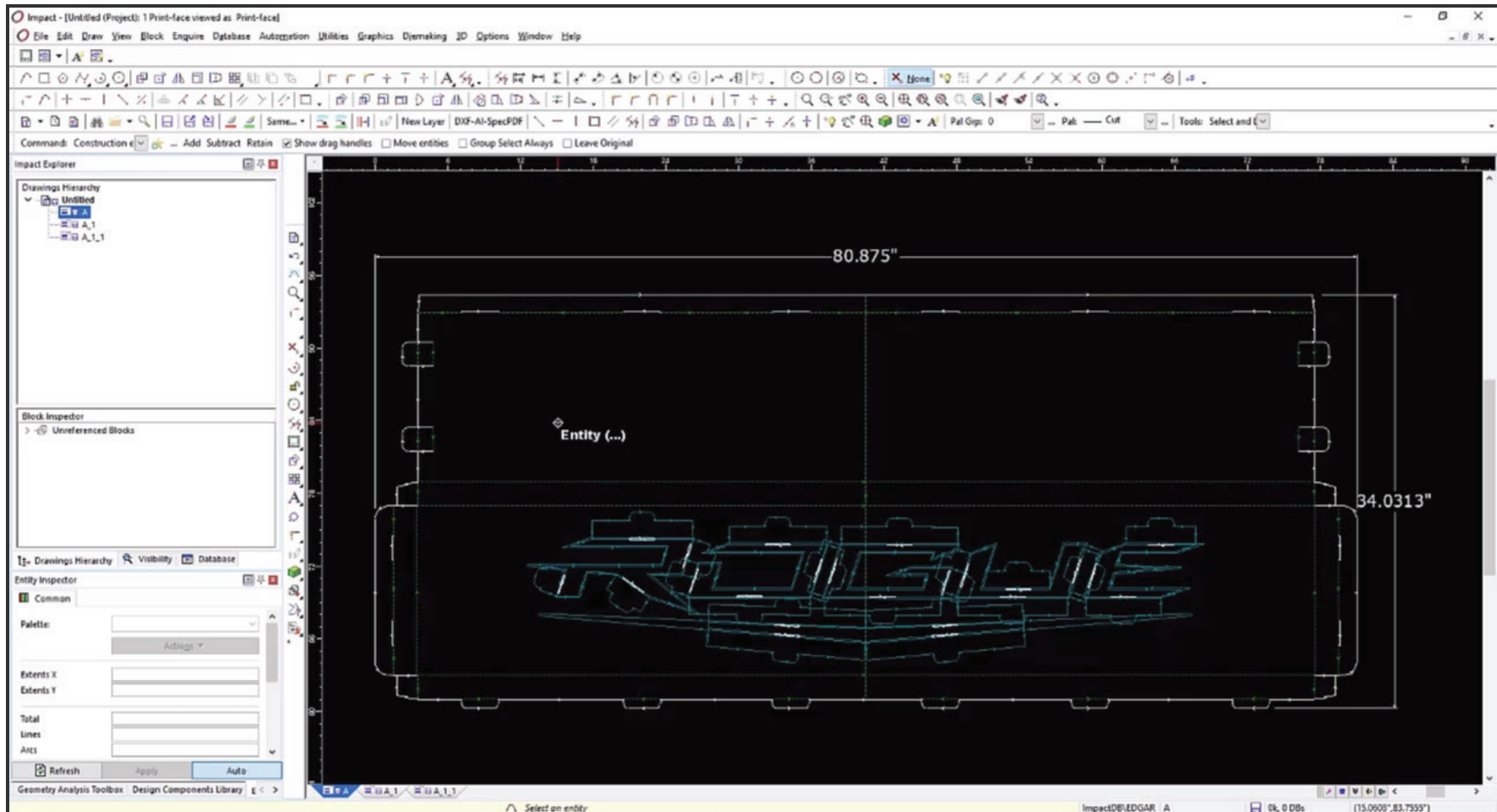
Packaging Design & Manufacturing

For packaging design & drafting the Warren Group uses [Impact from Arden Software](#), a database driven packaging design application. Once the design is complete, 2D flat patterns are opened in [VisualCAM for SOLIDWORKS](#), a fully integrated, Gold Certified SOLIDWORKS partner application. Edgar takes advantage of VisualCAM's ability to create custom knowledge bases that capture the CNC knowledge specific to their manufacturing processes. A typical packaging design is shown below.

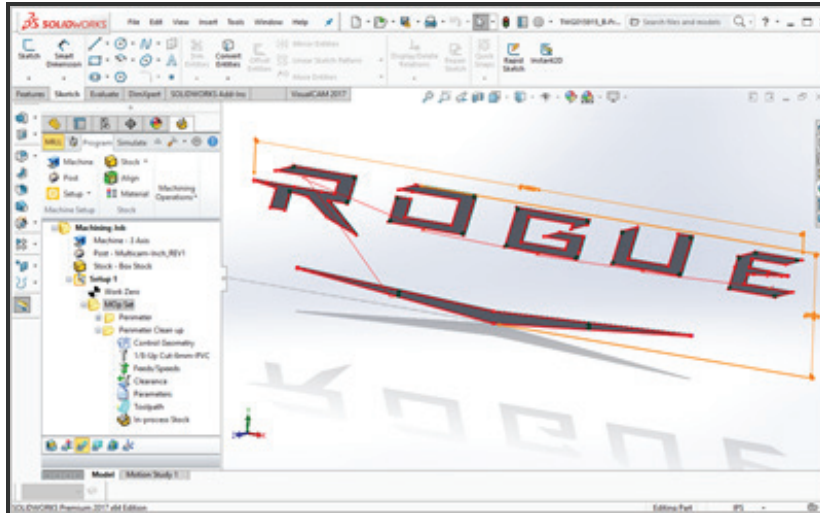
"I really like VisualCAM's ease of use for setting up parts for machining. It allows us to have our own custom knowledge bases and tool libraries. We use them extensively to organize and accelerate our design through manufacturing procedures."

"After reading your blog article [Understanding Climb vs. Conventional Milling](#), we have found that using Climb Cut produces a much cleaner cut on our acrylic & PVC materials!"

Edgar Mota, Lead Designer, The Warren Group, Santa Fe Springs, CA



Impact from Arden Software is used to design corrugated packaging.
Here we see the flat pattern of a corrugated display package.



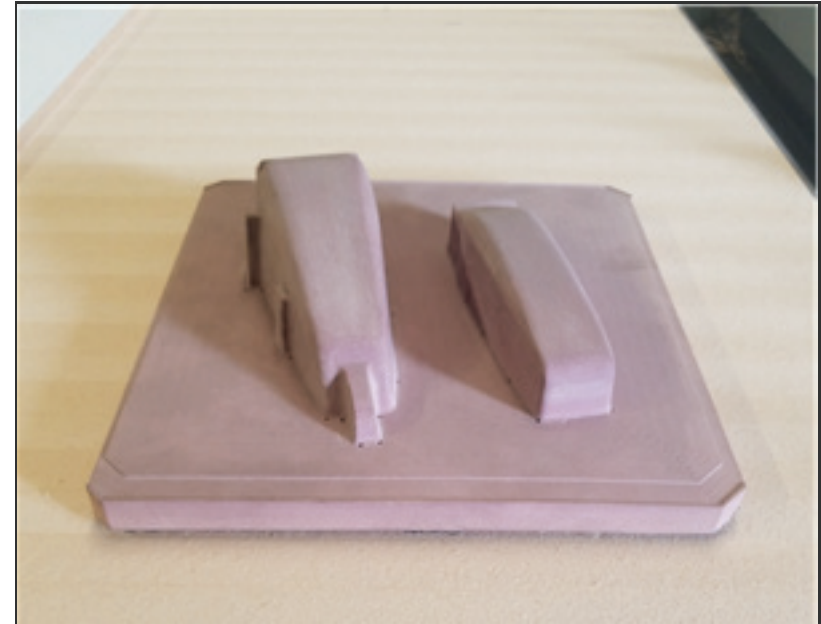
VisualCAM for SOLIDWORKS is used to produce toolpaths automatically from the company's CNC Knowledge Bases. The G-Code posted from VisualCAM drives both of the company's Multicam CNC Routers. This lettering is cut from PVC sheet stock to be mounted on the front face of the corrugated packaging design shown in Impact above.



Here we see a prototype of corrugated packaging and lettering cut with VisualCAM toolpaths..

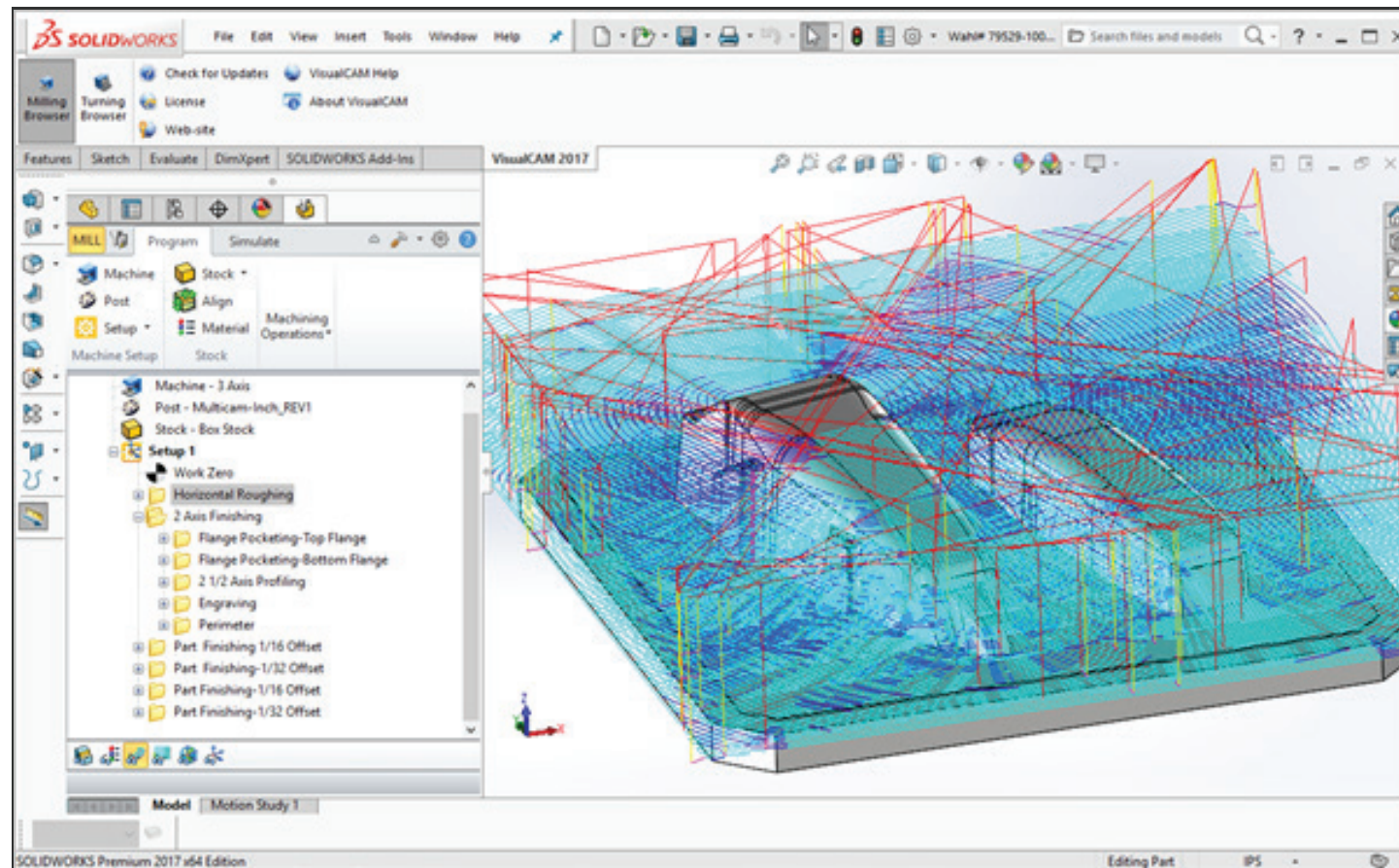
Thermoformed Packaging Molds

The Warren Group also designs and machines their own tooling used in the production of thermoformed packaging products. In the example shown here, VisualCAM for SOLIDWORKS is used to produce the toolpaths required to machine this mold block from RenShape® Tooling board on the company's 3 Axis MultiCAM CNC machining center. The completed mold is used to manufacture the thermoformed 0.020" clear PVC packaging for this product. Let's have a closer look.

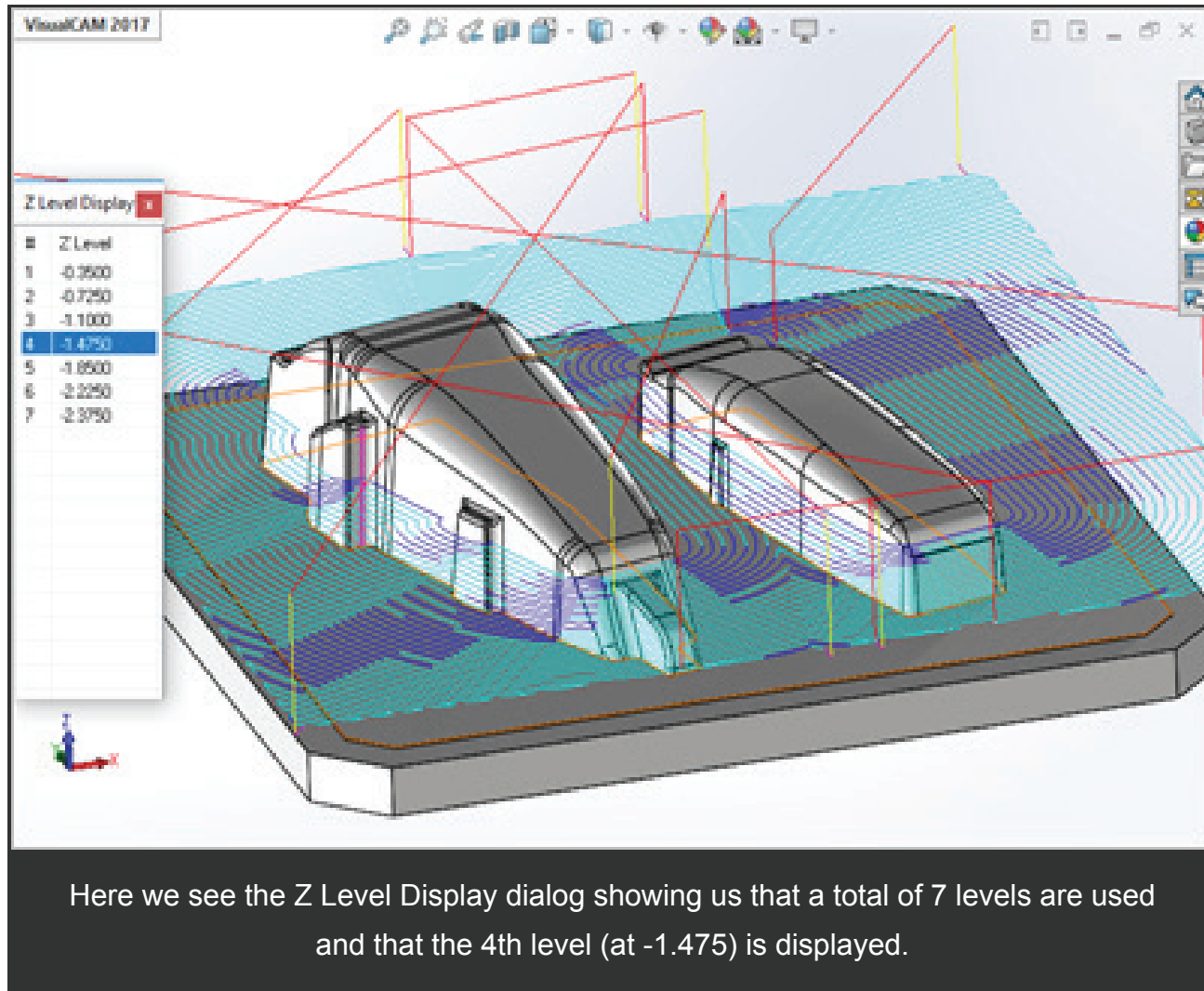


3 Axis Roughing

In the illustrations below, we see the 3 Axis Horizontal Roughing toolpath that VisualCAM calculated was needed to rough out the 3" thick piece of RenShape® Tooling board using a $\frac{3}{8}$ " diameter end mill. The Cut Parameters include a Stock allowance of 0.025", an Offset Cut Pattern, Mixed Cut Direction, and a 0.125" Stepover. Cut Level Parameters include a 0.375" Stepdown, Depth First cut level ordering and a Bottom Z limit of -2.375". For Engage/Retract, a Path motion is used with a linear extension of 0.275". Cut Arc Fitting is applied at each Z level. The estimated machining time is 38 mins.

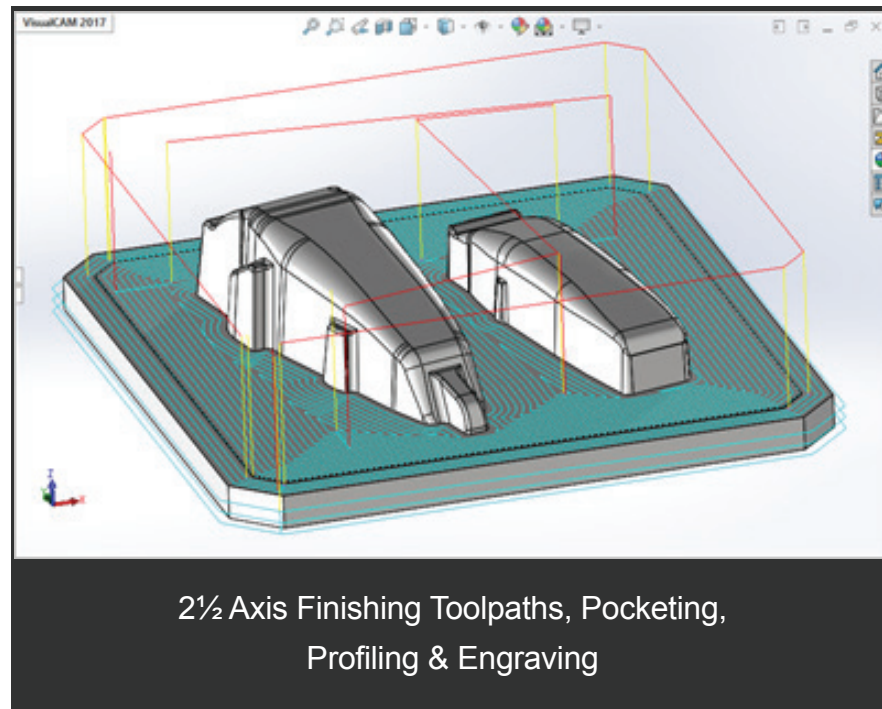


Here we see VisualCAM performing the cut material simulation for the actual 3 Axis Horizontal Roughing toolpath used to produce this mold. In the initial toolpath display you will see the arc motions displayed in dark blue.



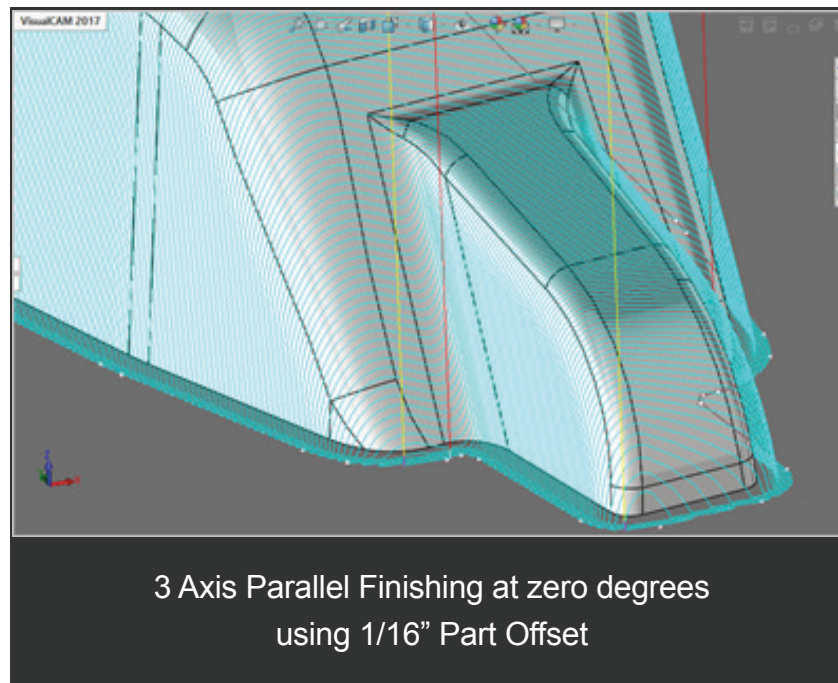
2½ Axis Finishing

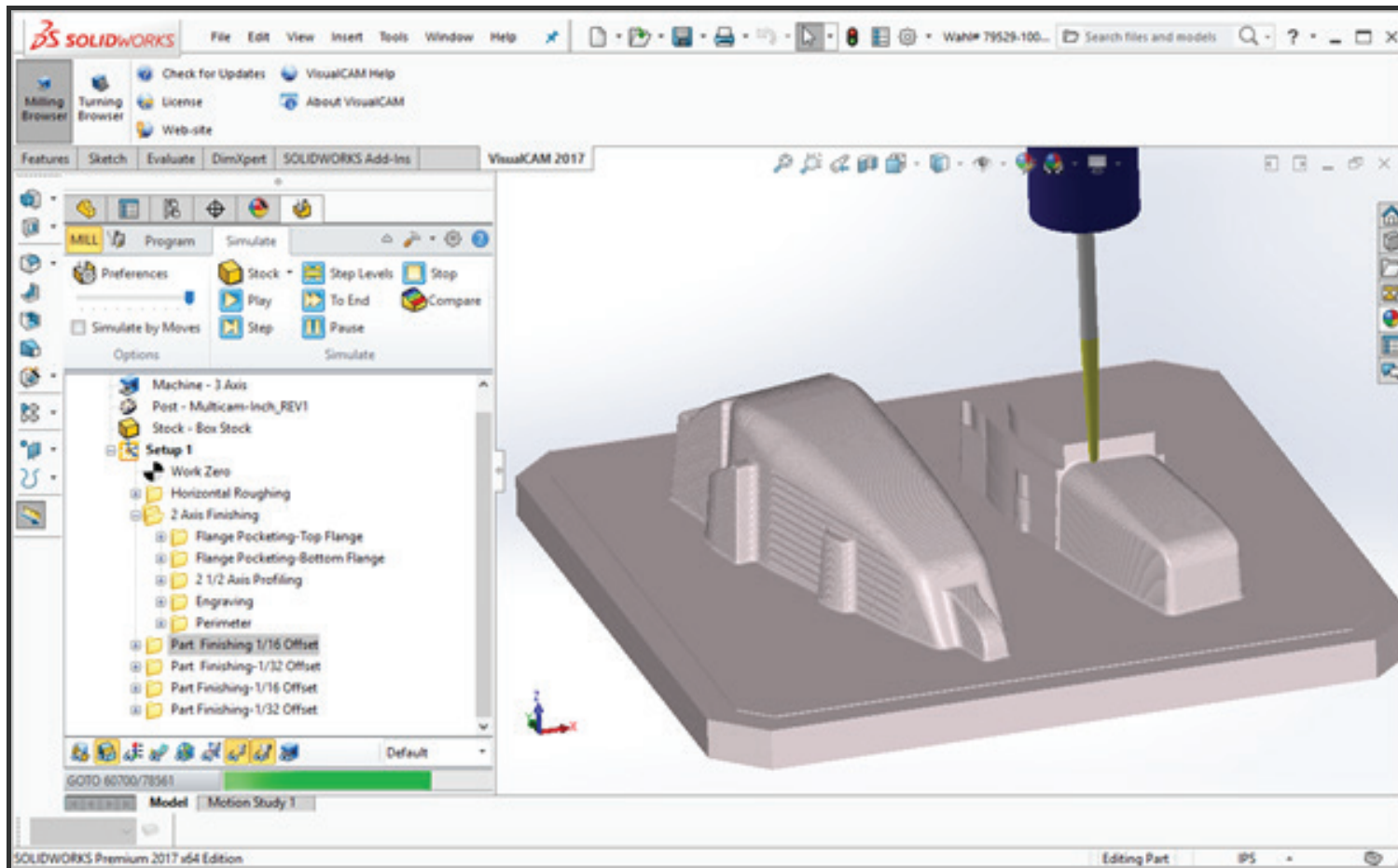
To begin the finishing process a series of 2½ Axis toolpath strategies (Pocketing, Profiling & Engraving) are used to machine the top and bottom base flanges using a ¼” end mill. Pocketing is used to machine the flange surfaces to a finished Z depth. Profiling and Engraving are used to clean up the edges between the top and bottom flanges. The toolpaths for these operations are shown together below.



3 Axis Finishing

For the final finishing four separate 3 Axis Parallel Finishing toolpath strategies are used. Each follows the part surfaces in the Z Axis. The first two cut along the X axis zero direction using part boundary offsets of 1/16" and 1/32" as containment. Cut Parameters include Tool: 0.0625" radius 2 degree carbide Taper Mill, Tolerance: 0.001", Stock: zero, Cut Direction: Mixed, Angle of Cuts: 0 (zero), Stepover: 10% (of the tool diameter), Z Containment Limit: -2.375, Linear Entry/Exit and Straight Cut Connections. The estimated machining time for the first two operations is just under 15 mins. The second two are identical except that they follow the Y Axis 90 degree direction and are completed in 12 mins.





Here we see VisualCAM performing the cut material simulation for the initial 3 Axis Parallel Finishing toolpath. A total of four finishing toolpaths are used, two running at zero degrees (X) and two at 90 degrees (Y).

Machining Operations Information

Mops Information

Name	Status	Tool	Tool #	Cut Feed	# of GOTOs	Machine Time
Setup 1						
Work Zero	Clean	No Tool	-	0.0		
Horizontal Roughing	Clean	3/8-UpCut-1" Wood MDF	8	200.00 in/min	13451	38.12 min
Flange Pocketing-Top R...	Clean	1/4-UpCut-1/2 Wood MDF	1	180.00 in/min	1967	3.41 min
Flange Pocketing-Bottom...	Clean	1/4-UpCut-1/2 Wood MDF	1	108.00 in/min	135	1.44 min
2 1/2 Axis Profiling	Clean	1/4-UpCut-1/2 Wood MDF	1	108.00 in/min	61	0.43 min
Engraving	Clean	1/4-UpCut-1/2 Wood MDF	1	180.00 in/min	20	0.28 min
Perimeter	Clean	3/8-UpCut-1" Wood MDF	8	180.00 in/min	203	0.80 min
Part Finishing-1/16 Offset	Clean	TaperMill- 1/8"	7	600.00 in/min	78561	8.71 min
Part Finishing-1/32 Offset	Clean	TaperMill- 1/8"	7	600.00 in/min	73628	6.98 min
Part Finishing-1/16 Offset	Clean	TaperMill- 1/8"	7	600.00 in/min	57187	6.11 min
Part Finishing-1/32 Offset	Clean	TaperMill- 1/8"	7	600.00 in/min	54556	5.39 min
Setup-total						1 hr 11 min

Print

OK Cancel Help

Machining Operations Information

"I like how each toolpath operation in VisualCAM has default parameters that can be adjusted to suit your needs. Our VisualCAM Knowledge Bases have all of the parameter values that we know work well for our materials and CNC machines."

Edgar Mota, Lead Designer, The Warren Group, Santa Fe Springs, CA

A special thanks to The Warren Group for allowing us to share their VisualCAM success story!

More about The Warren Group

The Warren Group specializes in custom packaging, displays and signage for the industrial, automotive and consumer products industries from their 15,000 square foot facility in Santa Fe Springs, CA. From concept & design to prototype & production The Warren Group uses only the best CAD/CAM tools and software on the market, including VisualCAM-MILL for SOLIDWORKS! For more information about The Warren Group we invite you to visit them online at www.studiotwg.com.



More about VisualCAM-MILL for SOLIDWORKS

VisualCAM-MILL for SOLIDWORKS is available in 5 different configurations (Express, Standard, Expert, Professional and Premium). The parts shown here were machined using the Standard configuration. Here are some additional details about each of the available configurations. For the complete features list, visit the [VisualCAM for SOLIDWORKS Product Page](#).

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