



Easy-to-use Solution Gives 10x Feedrate for Performance Tool and Die

THE BUSINESS

Tooling provider

THE CLIENT

Performance Tool and Die
With two locations in
Detroit Lakes, Minn. and
Lakeville, Minn.
www.ptdmn.com

AN  OTTERTAIL COMPANY

CAM SYSTEM

GibbsCAM®

RESELLER

Midwest CAM Solutions
www.midwestcamsolutions.com

TOOLPATH

VoluMill™ from Celeritive Technologies
www.volumill.com

The Business Challenge

Performance Tool and Die (PTD), a leading tooling provider for the automotive, agriculture, and recreation industries, was looking for ways to decrease forces on the material during cutting, increase tool life, and reduce cycle time—seemingly contradictory objectives.

PTD's offerings include blank, form, and progressive stamping dies; press brake tooling; tube bend tooling; and weld and machine fixturing.

"Because we are in a toolroom setting, every block we do is different from the last," said Jake Kopveiler, CNC programmer at PTD. "We are not able to do block-specific fixturing, so most components are held in a vise. With a five-axis vertical mill, the block-holding problem becomes magnified since we are trying to mill more features on the block than would normally be done in a three-axis machine. Blocks are often left hanging out of the vise or fixture farther than normal, which is a less than optimal situation with respect to cutting pressure."

The need to reduce pressure and cycle times led PTD management to evaluate a software product suggested by their GibbsCAM® reseller, Midwest CAM Solutions of Brooklyn Center, Minn.

The Business Solution

VoluMill™ is a plug-in toolpath engine from Celeritive Technologies that is integrated in GibbsCAM. This new genre technology generates toolpaths with smooth motions and low force on the spindle and cutting tool. VoluMill toolpaths dramatically reduce cycle times and significantly extend the life of cutting tools.

"Our reseller told us other customers were seeing tremendous gains, so we decided to take advantage of VoluMill's free trial offer," Kopveiler said. "We were very skeptical of the advertised time reduction and extended tool life, but after using it for a short time we found it to be the real deal."

Almost immediately, PTD was running at feeds 10 times faster than before. In some cases, PTD experienced even greater savings. Running a large pedestal punch made out of A2 tool steel used to take 22:36 minutes to run with a three-inch inserted shell mill. With VoluMill, the same process took only 7:20 minutes with a half-inch solid-carbide ball end mill, delivering a 208 percent increase in efficiency. Once the trial period ended, PTD purchased three seats of VoluMill.

"The benefits exceeded our expectations," Kopveiler explained. "Our traditional method of rough milling a pocket in a plate or block would be to take passes of .100 to .150 depth of cut and 50 percent cutter diameter peripheral cut. By doing this, we used the bottom .100 to .150 of flute over and over again—causing them to wear while the rest of the cutter was virtually untouched.

"Now, we drop the cutter all the way into the block for full flute engagement and, depending on the cutter, take .020 to .080 peripheral cuts," Kopveiler continued. "Because the VoluMill software keeps a consistent peripheral cut amount, we can push our cutting tools to the maximum capacity without having to worry about heavier cuts in sharp corners in the toolpath. This has extended our cutting tool life significantly."

More importantly, PTD found that machining with VoluMill toolpaths produced less cutting pressure on the part than when cutting with traditional toolpaths, which eliminated the block holding issues they were experiencing. This benefit significantly affected their production of these parts, including the amount of scrap they were generating because of the block holding problems. Although PTD does not track scrap numbers, they estimate that scrap due to blocks tipping out of fixturing has been reduced by roughly 25 percent.

The smooth tool motions generated by a VoluMill toolpath allowed PTD to increase the feedrate 10 times, while taking 80 percent smaller peripheral cuts at four to eight times the depth of cut depending on the cutter being used.



OKK MCV1060 CAT50 13K spindle machine.

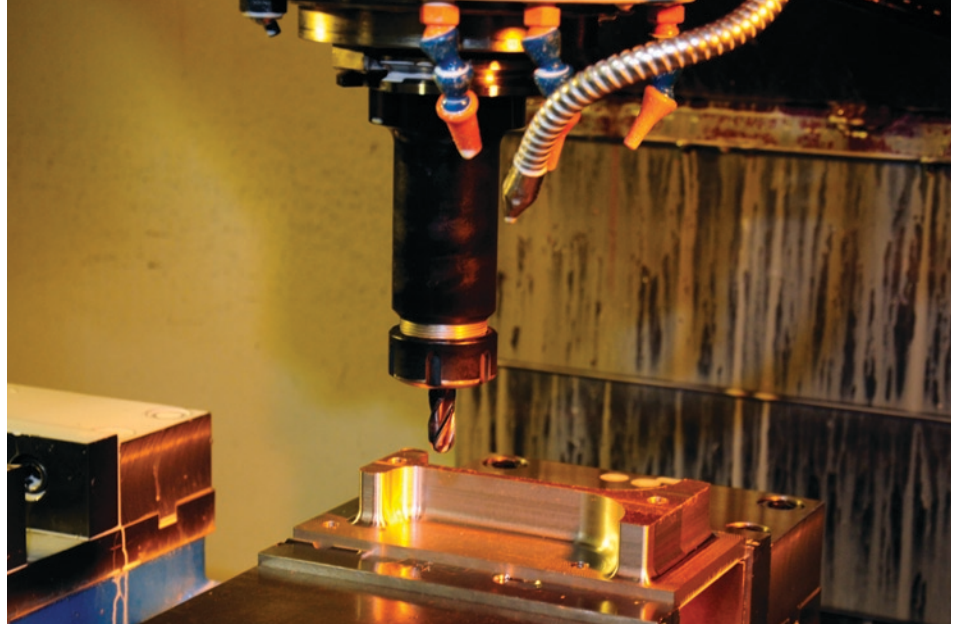
Application Parameters

	OLD PARAMETERS	NEW PARAMETERS
Material	A2 Steel	A2 Steel
Coolant	Dry with air blast	Dry with air blast
Toolpath	Standard Roughing / Contouring	Volumill™
Cutter	2" Iscar Helido Shellmill / 1/2" Garr Tool® VRX variable helix carbide coated 4-flute ball end mill	1/2" Garr Tool® VRX variable helix carbide coated 4-flute ball end mill
Cutter Dimensions	2" .062" corner radii / 1/2" x 1"	1/2" x 1"
Machine	OKK MCV1060 CAT50 13K spindle	OKK MCV1060 CAT50 13K spindle
Tool Holder	3 1/4" arbor holder / ER32 collet holder	ER32 collet holder
SFM	366 / 393 ft./min.	1,571 ft./min.
RPM	700 / 3,000	12,000
CLPT	.0125" / 0.0025"	0.0041"
IPM	35 / 30	200
ADOC	0.15" / 1"	1"
RDOC	1.25" / .02"	0.03"
Ramping	N/A	N/A

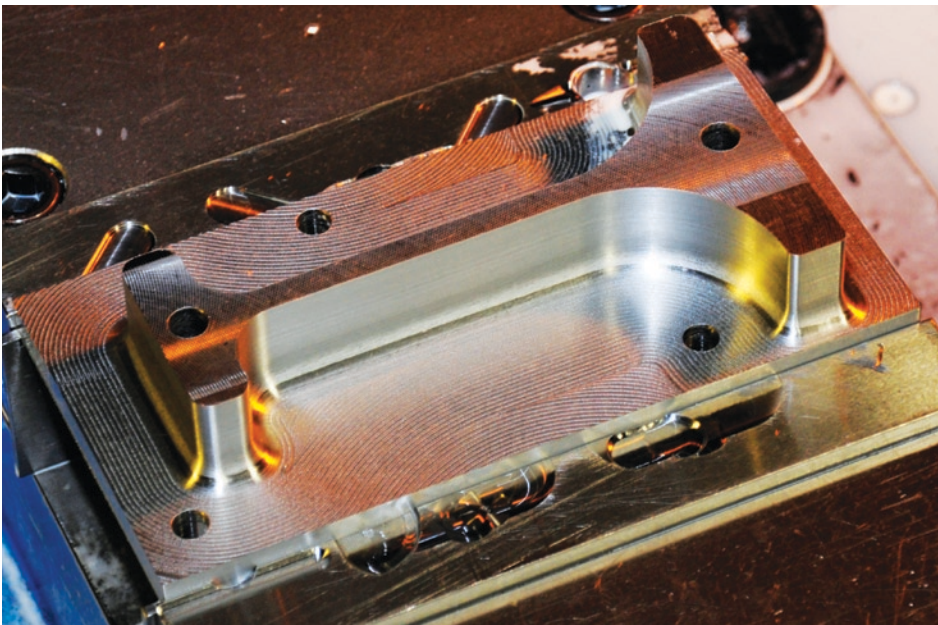
"Overall, this has equated to about a 40 percent time savings on milling operations. We realized a 208 percent increase in productivity using VoluMill toolpaths on a larger punch block," Kopveiler said.

The VoluMill™ Advantage

VoluMill was designed to eliminate the poor machining conditions that traditional toolpaths have produced since the advent of numerically controlled milling machines. CNC machines only execute commands given by a toolpath engine, which give poor instructions and require machine tools and cutting tools to operate under adverse conditions. VoluMill, which can work with



OKK MCV1060 CAT50 13K spindle machine milling an A2 steel component.



Component cut by a Garr Tool® VRX variable helix carbide coated 4-flute ball end mill and a VoluMill™ toolpath.

any CAM system, generates toolpaths with ideal machining conditions, enhancing machine utilization and shop productivity.

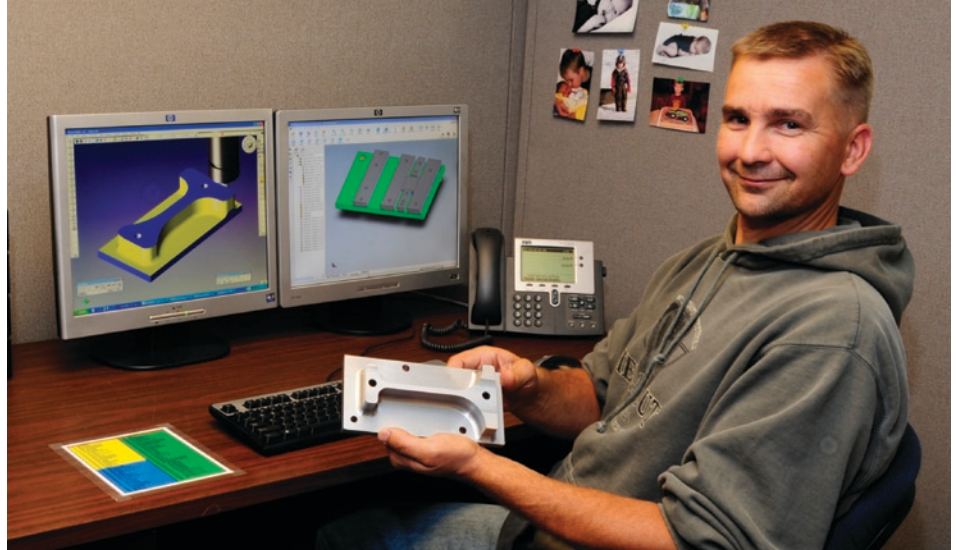
VoluMill toolpaths increase the return on the investment in machine tools, cutting tools, and fixturing components by increasing machine-utilization efficiency, shop productivity, and cutting tool life. These savings are particularly important in adverse economic environments. VoluMill offers the lowest-cost approach to increasing productivity for the manufacturing shop, and it usually pays for itself in a single job.

“Overall, VoluMill™ has been an easy tool to learn and use. It has been a great success thus far, and paid for itself in no time. We recommend it to anyone in a tooling or production setting, especially where efficient bulk material removal is desired.”

Jake Kopveiler, CNC programmer, Performance Tool and Die

“With the extreme speeds and feeds that are used, customers and others are very impressed with what we are doing,” Kopveiler concluded. “We’ve received numerous compliments on the process, and the initial promises given in the VoluMill materials have proven to be accurate.”

“Overall, VoluMill has been an easy tool to learn and use. It has been a great success thus far, and paid for itself in no time. We recommend it to anyone in a tooling or production setting, especially where efficient bulk material removal is desired.”



Jake Kopveiler, CNC programmer at Performance Tool and Die, holds a completed part cut by a Garr Tool® VRX variable helix carbide coated 4-flute ball end mill and a VoluMill™ toolpath.

For more information and to take advantage of the 15-day free trial offer, visit the VoluMill™ Web site at www.volumill.com

Celeritive Technologies, Inc. was founded to develop and market advanced productivity-improving CAD / CAM technologies. VoluMill™ offers a new genre in high-performance toolpath engines that significantly increases machining productivity and product quality. This innovative, powerful toolpath engine is easy to use, performs on any part geometry, and can be used with any CAM system. For more information and to take advantage of the 15-day free trial offer, visit the VoluMill Web site at www.volumill.com.

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