

Competitive Technology *(continued)*

3-D and toolpaths are applied directly to the model.

The designers who would use the software researched several products and recommended Cimatron E CAD/CAM software from Cimatron Ltd., Novi, Mich. An important factor in the choice was Cimatron's knowledge base in mold-making, according to Wagner. "They understood injection molds, and their support people have designed injection molds and done the kind of work that we do," he said.

Cimatron software, the use of which was expanded throughout the shop in 2009, features full associativity through-

out the design and machining processes. Prior to the changeover, the facility employed six different software packages in the toolroom and design areas, creating the potential for translation errors and making engineering updates difficult. "Now, if one of my guys makes a change on an already-programmed part, I can go in, pull up the part and update it, and all I have to do is re-recognize things and then I'm flying again," Wagner said. "Prior to that, if there was a change I would have to bring in the model and do all the work again."

Wood said the main catalyst for consolidating software was a 2009 Kaizen

process improvement effort. "We did a full Kaizen, including team members from the toolroom, design group, production personnel and our COO and GM. We restructured how we build and design tools. We did it because the market is changing constantly, and if you don't change, you are going to go under. We had to change and make ourselves better."

In the Kaizen effort, Wood said: "We looked at everything. We built new processes for the way we need to build tools to be competitive in the future. We set our shop up in separate teams, and as much as possible created

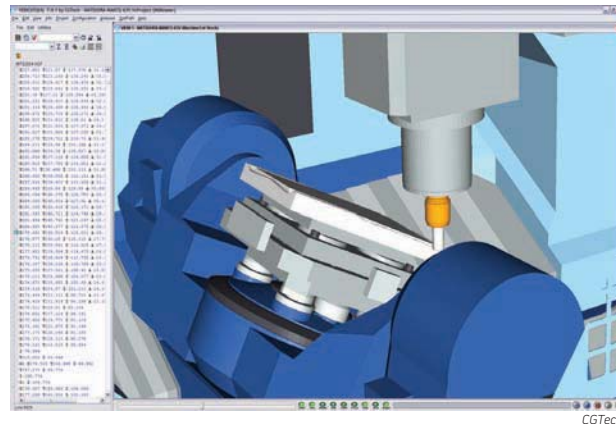
Virtual verification makes mold mistakes disappear

JUST AS THE "RESET" button erases mistakes in a video game program and starts the game anew, so does NC verification software by eliminating programming errors—and their much more costly results—in machining.

CGTech Inc., Irvine, Calif., maker of VERICUT CNC simulation and verification software, says simulation enables a user to virtually machine parts on a computer before cutting, and detect and eliminate errors that could ruin the part, damage the fixture, break the cutting tool or crash the machine. Such verification can be crucial in the short-lead time, single-digit-production environment of moldmaking. Starting over after a crash or gouge of a high-value mold is not only expensive, but missed deadlines and poor surface finishes will sour a shop's relationship with its customer.

Unlike the verification feature built into many CAM packages that check the internal CAM file before post-processing, VERICUT's external simulation verifies the post-processed NC code as sent to the machine tool, according to CGTech. Also, a program optimization module, OptiPath, creates toolpaths that maintain consistent chip load and cutting pressure, benefiting surface finish and reducing bench work finishing for moldmakers.

Development of the OptiPath module was largely driven by the mold and die industry. It reduces the long machining times common with large, complex dies and molds. OptiPath retains knowledge



Premachining simulation of CNC cutter paths, as illustrated by VERICUT software, enables a user to virtually machine parts on a computer screen before actual cutting occurs. Such verification can be of crucial importance in the short-lead time, single-digit-production environment of moldmaking.

of the amount of material removed and the amount remaining, and thereby can determine ideal feed rates, slowing feed during heavy material removal and increasing the rate when cuts are lighter.

In addition to facilitating mold machining, simulation software can assist in mold design before machining begins. Dennis Wood, tooling manager for Vaupell Inc., said his facility employs Moldflow injection molding simulation software from Autodesk Inc.'s Moldflow unit in Waltham, Mass., to analyze the part to be molded and predict the course of the molding process.

The software examines the part structure and highlights possible problems. For example, Wood said, molded plastics perform best when wall thickness is consistent; inconsistencies can lead to sink, warp and cooling problems with the molded part. A Moldflow analysis indicates

where part design changes enhance molding results.

"We can change things around before the mold design phase," Wood said. "We use it to help with part manufacturability. [The software] is a powerful tool and it has a lot of variables." He cautions that, for accurate predictions, "the variables have to be correct, or it's garbage in, garbage out."

Wood added that if a mold is not producing good parts, a Moldflow analysis can enable the shop to "go back and reverse engineer after the fact. You can put in variables and start playing with different things: open a runner up, open a gate, change the cooling and see what it will do. There are an infinite amount of things you can do with the software. We create a results file that we give to our process technicians. That's where they start, and it is very, very close."

—B. Kennedy