



Quicker in CAD

A CAD software suite allows A.K. Stamping Co. to create complex progressive dies quickly and accurately.

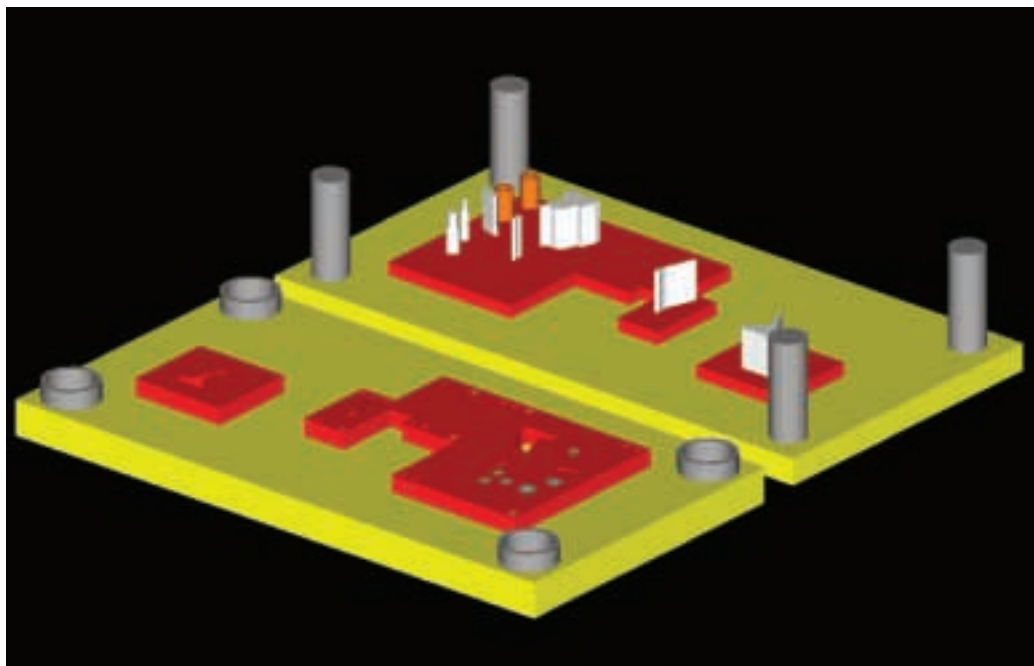
by Louis A. Kren,
Senior Editor

The journey from traditional drafting-board two-dimensional die design to solid modeling on a computer desktop continues. But die designers and builders on the leading edge say the technology can drastically reduce lead time.

"With the correct CAD software, I believe designers and builders can cut tool-development lead time by 60 percent," says Mark Andrews, vice president of engineering and tooling at A.K. Stamping Co., Inc., Mountainside, NJ. "We are just coming up to speed now, but we hope to accomplish this type of lead-time reduction."

For A.K. Stamping, the correct software is a suite from Striker Systems, Inc., White House, TN. The suite, Die Professional, works in AutoCAD to design dies and, following post-processing work on A.K. systems, files transfer to machining centers for manufacture. The parametric software closes the gap from 2D to 3D design, offering elements of both, according to Striker officials.

A.K. Stamping, formed in 1957 as an outgrowth of the A.K. Tool Co., designs and builds its own tooling including large 15- to 25-station progressive dies through the efforts of 14 engineers and 35 toolmakers and



During design, die-design software such as that provided by Striker Systems to A.K. Stamping can generate a solid model.

machinists. The company, with 280 employees, manufactures fabricated components primarily for telecommunications and computer/electronics customers.

In tapping Die Professional, A.K. uses specific suite components, combining that portion of design with its internally written post-processing software to produce tooling.

Tools for Tooling

Die Professional consists of five primary modules designed to take designers through the entire tooling-design process, according to Michael Boggs, director of sales and marketing for Striker.

"The suite is designed to carry a project through each module," Boggs explains. "SS-Design provides for part design and SS-Unfold shows what a part looks like in a flat state. But before construction of a progres-

sive die, SS-Strip Design provides a blueprint for the strip layout. Upon creation of a strip layout, engineers use SS-Die Design to create the die. With the die created, we offer SS-Wire, wire-EDM programming software that generates NC code to drive wire-EDM machines based on the die designed in SS-Die Design."

A.K. had specific requirements when company officials approached Striker for die-design software. The stamper looked to add much more automation in its tool-design process. At that time, automation at A.K. consisted largely of an aging 2D drafting program boosted by custom software. In this scenario, A.K., through its own customization efforts, could generate .dxf files and import those directly into manufacturing software to tackle wire-EDM and other machining work. A.K. tapped Striker to generate the inter-



face between the die-design process and A.K.'s existing manufacturing software, and provide other software customization. Such specific design needs in addition to specific plans for implementation set A.K. apart from many who buy software and figure it out as they go.

The A.K. Approach

"Before incorporating the new software, we used an outdated, computerized 2D drafting program," says Andrews, explaining the approach A.K. Stamping took in updating its tool-design efforts. "It offered virtually no automated macros except for those that we've written."

Macros provide the means for software such as this to automatically draw standard components and perform repeated functions. This saves valuable design time. A.K. needed new software that meshed with AutoCAD and would be compatible with files completed using the old system. Hiring a programmer to mesh each old drawing program with the new CAD system was not an option, says Andrews.

"Using the Striker software, we were able to turn newer drawing files into a format compatible with our old files, allowing all of them to be read by our custom postprocessors," he explains. "We had to be backward-compatible, finding something that allows us to transmit any tooling-data files from a desktop to the machinery. We have thousands of tools in use and we need to go in and make modifications and fixes."

The old drafting software was just too time-consuming, says Andrews. To create a side view or a section view of a tool, for example, engineers had to draw every single tool line as well as lines, just as they would if they worked on a drafting table.

"At the point where we were detailing, or placing dimensions on the computerized drawing," says Andrews, "60 percent of that time was spent doing basic time-consuming

drafting. With the Striker software, we wanted to remove that drafting time and enhance design time by using automated drafting techniques."

A.K. engineers don't use the entire new software suite, just portions that mesh with the stamper's designing goals and processes. Engineers use SS-Design to create a part, and then give it a flat shape through SS-Unfold. From there, a flat blank is created and engineers employ SS-Strip Design to create a strip layout.

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strip," explains Andrews. "The software offers a lot of automation for creating the strip layout and blanking tool. For example, if we want to maximize material efficiency, the software makes appropriate suggestions. By inserting a few parameters into the program, we can output desired shapes or geometry. Once that's done, we create the blanking tool."

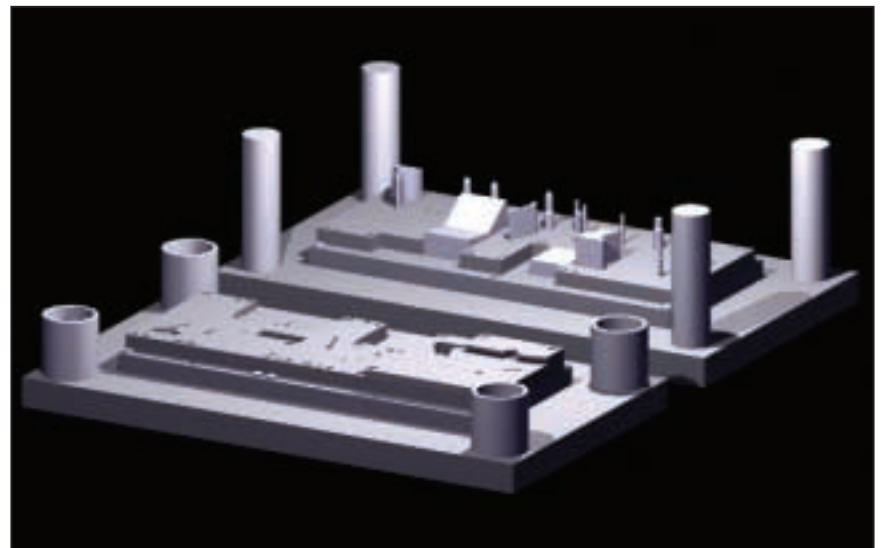
To further reduce design time, A.K. created libraries of standard die components, which the software adds where needed.

"We actually transferred much of our old data through .dxf files into the new libraries," says Andrews. "In this manner, from the strip layout we create our punches, and then create punchholders, strippers and die sections. We add the shoes and mount everything together. Once we do that, we are ready to create the forming portions of the tooling."

Software Compatibility

In SS-Die Design, A.K. engineers allocate spaces—the software refers to them as pockets—in the tool for

formed sections. At this point, the engineers exit the software to 3D model formed components in AutoCAD, based on pocket parameters created in the Striker software. Because Striker created its software to be compatible with AutoCAD, this hybrid technique poses no problems for A.K., as it translates readily into A.K. post-processors. The final step, after all blank and form components are in place, is the detailing. Here again, A.K. engineers rely on both AutoCAD and Striker.



Striker software in use at A.K. Stamping provides a rendering of the die model with materials assigned.

"At this point, SS-Die Design outputs a complete bill-of-material list, a wonderful feature," says Andrews.

Engineers at A.K. model a complete die and save it in a single file, then go back and place components from that master file into their own files, complete with detail numbers for each. They then generate a bill of material containing each detail number with a ballooned assembly view.

The software mix employed by A.K. Stamping allows automated line-by-line construction of the die, considered by Andrews to be the key to rapid die design. With line-by-line construction, a 2D process, the lines can be expanded easily on-screen to create a 3D solid model.

Ramping Up

Of course, seamless implementation of various software programs is not simple, though the result greatly pleases Andrews. Because the Striker software is so powerful and offers so many options, says Andrews, new users should take the time to examine its capabilities and have a specific plan in place for its use.

"The software has so many different automated techniques and tools, so we have to determine our method of procedure," Andrews says. "Users must determine exactly how they want to design their dies with this software. At first, it can be overwhelming, so concentrate on just the tools that you will need."

His recommendations?

"Experiment with it first and get used to all the modules—what they consist of and what the software can accomplish," he offers. "Once you identify your die-design recipe and determine your method of operation, then proceed to implement the software. You can't implement the software until you do that. Otherwise, you'll have a load of software and you'll have 10 engineers using it 10 different ways."

To avoid that scenario, A.K. Stamping first brushed up on AutoCAD, bringing in a representative to train design engineers in small groups. At that point, Andrews selected two young design engineers to begin training on the Striker suite.

"Younger engineers tend not to be rooted in an older software," he explains. "We thought they would be less resistant to change."

The two selected engineers have been working with the new software for a few months outside the main engineering department in a separate building. With Striker officials and the A.K. system administrator, the engineers meshed the software to the stamper's existing computer technology and then worked out a method to design dies with the new software, to company requirements.

With that phase completed, the engineers now work with the main

about a culture change.

"It is difficult to visualize designs in three dimensions until you start working with it," explains Andrews. "But when you incorporate solid modeling, you overcome a lot of the problems with clearances and interferences. Because the engineer sees everything as he is designing, he won't leave pockets out or forget to include a channel or a hole. The key is to trust the software."

"Engineers must learn to build the model of the tool rather than build drawings and then create the assembly model afterward," Andrews continues. "When drafting, you create



This dimensioned strip layout, a critical aspect of A.K. Stamping's die-design process, is created automatically in SS-Strip Design software.

engineering group to incorporate the software and design method. The two engineers each are teamed with a more experienced designer, and they provide software training to the rest of the engineering department—the younger engineers training staff on the software with the more experienced engineers focusing on design-method training.

"We just designed our first production die as well as two test dies with this new system and it worked out well," says Andrews. "We now are building that first production die."

Besides the change in design practices, incorporation of new software and solid modeling brought

drawings and at the end you have a complete tool. With solid modeling, you create a model of the tool and the drafting is secondary, it's done automatically afterward. To a tool designer, that is a great sense of accomplishment, to see the model and know that no drafting mistakes were made."

Andrews believes that 80 percent of mistakes made in die design result from drafting mistakes, from writing down a wrong number to omitting a cutout. By bringing Striker software into the die-design equation, Andrews and A.K. Stamping look to eliminate such mistakes and cut lead time significantly when designing and manufacturing dies. **MF**