ENSER Corp. Cuts Sheet Metal Design Time & Prototyping Costs by 50% with SolidDesigner's Assembly Modeling Tools

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Matthew Martin
Lead Designer
ENSER

The Challenge

Founded in 1947, ENSER Corp. started out as a tool design company designing jigs, fixtures, gauges, dies, and special machines. Over time, the Cinnaminson, New Jersey based firm with offices in Charlotte, NC and Orlando, FL naturally progressed into product design, mold design, finite element analysis, motion simulation and custom precision machines. Staffed with industry-experienced professionals skilled in a variety of engineering disciplines, ENSER provides a full line of engineering services for the design, development, analysis and prototyping of various manufacturing equipment and tooling. Okuma America Corp., a manufacturer of CNC machining systems, asked ENSER to design a new sheet metal enclosure for an existing vertical machining center. The purpose of the new enclosure was to give the machine a more modern look consistent with the rest of Okuma's product line.

ENSER's challenge was to design a leak-proof sheet metal enclosure around the machine's internal components. The goal was to work out all interferences in the design phase to minimize the number of prototypes required and to reduce lead times.

The Solutions

Company wide, ENSER regularly uses 10 different CAD systems to support various clients. For this project, CoCreate's SolidDesigner was the software of choice for two reasons. First, it is the software the client, Okuma, uses, and ENSER prefers to deliver CAD data in native format whenever possible. More importantly, of the many CAD systems ENSER owns, SolidDesigner is the easiest to use. "The simplicity of SolidDesigner makes it the software of choice for a project like this where we basically have to design a lot of components quickly," says Matthew Martin, the ENSER lead designer on this project.
The Okuma machining center had been designed years ago in 2D AutoCAD. Okuma supplied ENSER with the AutoCAD files of the machine's internal components. Martin imported Okuma's existing AutoCad files of the unenclosed internal components into SolidDesigner. Then, working from the 2D profiles, he modeled the individual components as solids and combined them into a solid assembly representing the part of the machine to have a modern enclosure built around. Getting from the existing 2D files to a solid representation of the unenclosed mechanical portion of the machine took about one week. The assembly model included the range of motion of moving parts

such as the saddle and spindle, giving a clear picture of the envelope that the sheet metal would have to fit around.

Next, Martin designed the new enclosure in SolidDesigner. This process took approximately five months, including many iterations to create a design that met all the requirements of Okuma. Once he had a sheet metal design that matched the client's vision, was leak-proof, and fit perfectly around the machine's internal components, Martin created detailed drawings for Okuma and it's sheet metal vendor. Martin used SolidDesigner Annotation, the seamlessly integrated module that creates and updates fully annotated 2D standard compliant drawings from 3D SolidDesigner models. Although Okuma still requests drawings, the company also wanted the solid models that ENSER had created for this project. Because the drawings are associative to the solid models, when Okuma makes changes to the enclosure at a later date, they can change the solid geometry and use annotation to help update the drawings quickly.

The Benefits

Creating the solid model of the existing machine went so quickly because of the simple features of SolidDesigner which make positioning parts relative to each other quick and easy. "Other programs force you to type in keyboard instructions to tell the software how to position parts," Martin explains. "SolidDesigner lets you click on a feature, such as the cylinder of a bolt, and position it in relation to a feature on another part, such as a hole in a sheet metal panel. This makes a big difference when you're working with an assembly with hundreds of parts."

Having a solid model complete with the range of motion of moving parts allowed ENSER to minimize interferences between the enclosure and the internal parts. "This is where SolidDesigner really paid off," says Chip Wilson, engineering representative at ENSER. "This machine moved in three axes. If we had tried to design sheet metal around that range of motion in 2D, we could have had many interference's get overlooked. With solids, we could make sure the enclosure didn't hit anything before we built prototypes." Martin also used animation capabilities of SolidDesigner to work out the travel of the machine's automatic door. The ability to move parts through their range of motion on the screen spared them a lengthy trial-and-error session with physical parts.

The Results

The use of SolidDesigner on this project saved precious time and money for the client. "We cut lead time in half and reduced prototyping costs by at least 50 percent compared to what it would have taken with 2D CAD," Wilson says.

Certainly Okuma appreciated those savings. But the client may eventually reap even more benefits from ENSER's use of solid modeling. "The whole point is for Okuma to be able to customize these machines quickly," Wilson explains. "Their customers configure the machines with options like different pallet changers and tool holders. Now that Okuma has the solid model of the machine, modifying it for these kinds of changes should go very quickly."

For ENSER, there were other benefits of using SolidDesigner in addition to the time and cost savings they passed on to the customer. One aspect of SolidDesigner that they particularly appreciated was the small size of the assembly file it created. "Of all the CAD programs we use that offer assembly modeling, we've noticed a huge difference in the size of the files they create," says Wilson. "This assembly created with SolidDesigner resulted in a 30-megabyte file. The same assembly created using another Windows-based solid modeler could generate a 300-megabyte file."

"SolidDesigner creates some of the smallest assembly files we see," Wilson continues. "The reason is that although SolidDesigner offers parametric modeling, it doesn't force you to define parts this way." Parametric modeling of individual components adds a lot of data overhead that gets carried into an assembly file. At ENSER, when a project involves a fairly large assembly such as the Okuma machine with several hundred parts, designers try to use parametrics as little as possible when modeling the individual components. "This keeps assembly file sizes in the manageable range and allows us to work with them more efficiently," Wilson adds.

SolidDesigner's assembly modeling tools allowed ENSER to fulfill the client's request quickly, primarily by eliminating the numerous rounds of prototypes that would have been required in the past to make the new enclosure fit. "By taking advantage of SolidDesigner to prototype this machine," says Martin, "we cut down on mistakes on the production floor."

For further information, please contact one of CoCreate's offices or visit our World Wide Web site at:

http://www.cocreate.com

CoCreate Software Inc.
3801 Automation Way Suite 110
Fort Collins, CO 80525
Phone : (970) 206 8000
Fax : (970) 206 8001