SIEMENS

Solid Edge

MJC Engineering & Technology

Talk about a big project

Industry

Machinery and industrial products

Business challenges

Customer needed machine with large-scale, complex processes

Customer requirements too complex for old 2D system

New midrange CAD system not intuitive enough

Faster concept drawing needed for design review

Keys to success

Move to 3D CAD system

Switch to more intuitive system – Solid Edge

Boost customer confidence with impressive array of drawings

Get valuable design feedback early to cut design time

Results

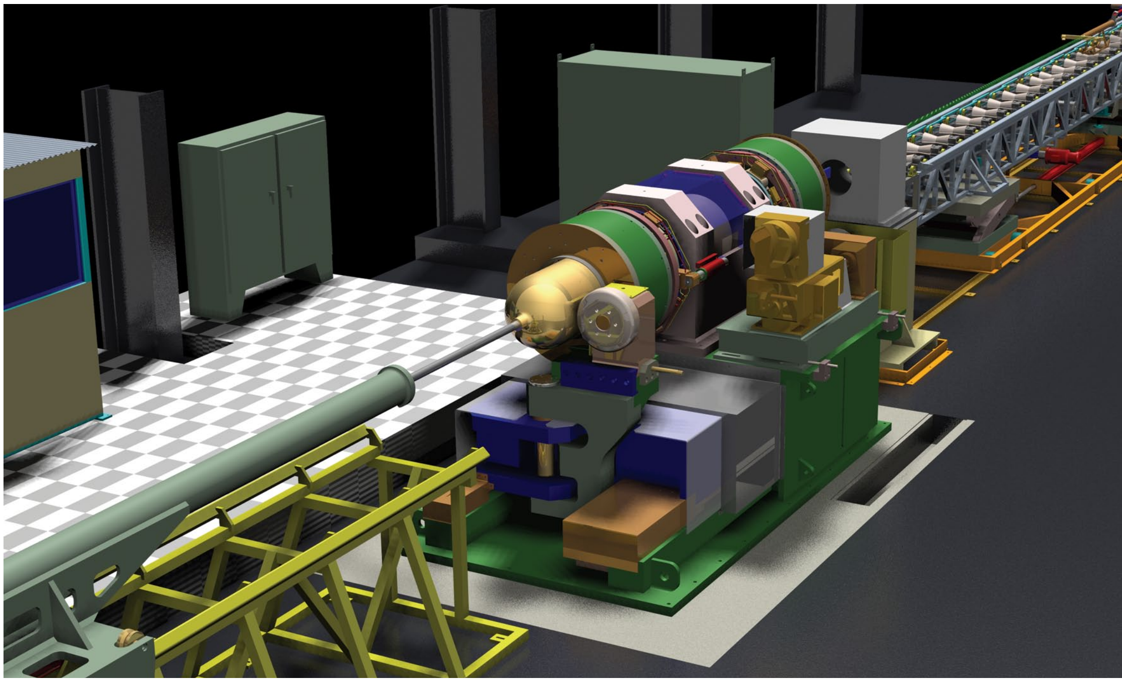
Concept drawing took 2 hours versus 2 days

Productive with new CAD system in 3 weeks

World's largest CNC metal spinning machine designed in Solid Edge

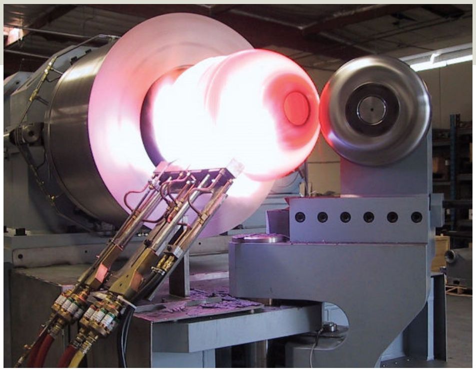
Complexity of customer machinery requirements handled with new 3D CAD system

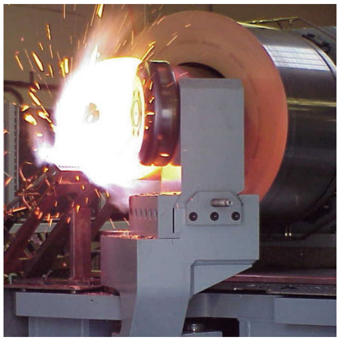
No other company would bid on the job. One competitor even said it couldn't be done. But engineers at MJC Engineering & Technology Inc. (Huntington Beach, California) forged ahead anyway and created the world's largest computer numerical control (CNC) metal spinning machine – a 55-ton, 80-foot long device that FIBA Technologies (Westboro, Massachusetts) now uses to spin steel tubes into seamless, integrally forged gas and chemical pressure vessels. Engineers at MJC modeled every piece of the machine, called the OSC 24300, as a digital assembly using Solid Edge® software. MJC's vice president and general manager, Per Carlson, says Solid Edge was crucial for the project. "Solid Edge was not only invaluable for the design of the machine," notes Carlson. "It was also helpful in convincing FIBA that our company, which is relatively small, could handle the challenge."

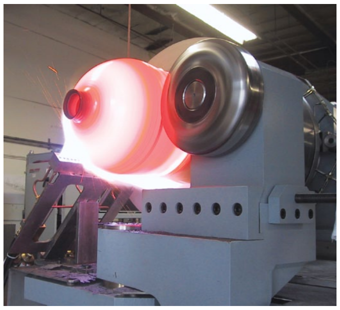


Results *continued*

Concept to manufacturing drawings in one-sixth the time of 2D system





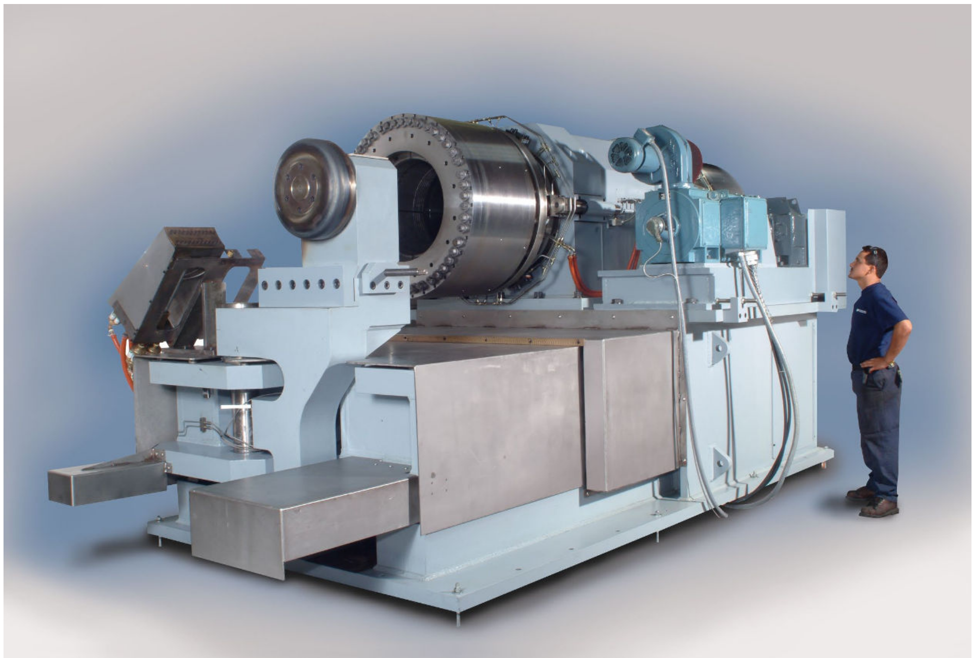


When FIBA was looking for a supplier for the metal spinning machine it had in mind, the requirements were daunting. Metal spinning is the process of forming a piece of flat sheet metal over a three-dimensional pattern while it spins on a machine tool similar to a lathe. The forming is accomplished by applying pressure to the metal as it spins. FIBA makes tube trailers that are used to transport chemicals and gases under pressure, such as oxygen and nitrogen. The company needed a metal spinning machine that could spin tubes up to 24 inches in diameter, with a 1 1/2-inch wall thickness. But the requirement that really made this job challenging was that the machine had to be able to handle tubes up to 40-feet long.

Self-taught CAD

Carlson, the lead designer on this project, had used AutoCAD® sofware in the past, but had upgraded to solid modeling several years earlier as the complexity of his company's designs increased. Carlson originally selected SolidWorks® software, but he sent it back after realizing how difficult it was to use. "SolidWorks had too many pop-up menus and you were always having to confirm and constrain everything you wanted to do," he explains. When he saw how much more intuitive Solid Edge was, he purchased it instead. "I believe, at that time, Solid Edge required 30 percent fewer keystrokes so you could work much faster," Carlson adds. "The software wasn't always interrupting your flow." Carlson taught himself to use Solid Edge by using the manuals and tutorials that came with it. Within three weeks, he was using Solid Edge to make production drawings. Even back then, the software paid for itself with the first design.

One of the main benefits Carslon experiences from Solid Edge is the ability to quickly create 3D images that illustrate design concepts. "Concept drawings for the customer and prospect reviews take two hours with Solid Edge, instead of two days with AutoCAD," Carlson says. In the case of the CNC spinning machine for FIBA, Carlson took advantage of the visualization capabilities of Solid Edge even prior to getting the job. "I modeled the concept in Solid Edge and then created about 20 3D images showing the machine from different angles and zooming in on areas of special interest. This gave FIBA an idea of



Solutions/Services

Solid Edge
www.siemens.com/solidedge

SINUMERIK 840D
www.siemens.com/sinumerik

Customer's primary business

MJC Engineering & Technology Inc. designs and manufactures custom-built CNC metal spinning equipment and specialty machinery.
www.mjcengineering.com

Customer location

Huntington Beach, California
United States

"Every time I get a new version of Solid Edge, I get excited because they add things I had wished for. It is phenomenal. I can't speak highly enough about this software."

Per Carlson
Vice President and General Manager
MJC Engineering & Technology Inc.

how we planned to do things," Carlson says. "We're not that big of a shop. We're in a 12,000-square-foot building. These images really boosted their confidence in us."

While Carlson designed FIBA's machine, he frequently generated images from his Solid Edge assemblies and showed them to others in the company. "This is where Solid Edge is so incredible. In very short time you can model something that looks like a machine, and then you can go out and show people the images and get their feedback," he explains. "I got very valuable feedback early-on, because people could understand what they were seeing in those images."

"You pulled it off"

Carlson modeled the entire OSC 24300 machine as a Solid Edge assembly. The assembly contains approximately 2,000 major parts. Including bolts, nuts, screws and so on, there are closer to 5,000 parts in the assembly. Carlson designed the section of the machine that does the forming and spinning in about two months. The more difficult challenge was the material handling portion of the system. "By putting my ideas into Solid Edge, I got feedback immediately about what might or might not work," Carlson says. "Between the visualization and the automatic determination of mass properties, I could tell very quickly whether something would work or not." Total design time for the OSC 24300 was six months.

Each time Carlson completed a section of the machine, an assistant took his models and produced manufacturing drawings from them. This process went very quickly, thanks to Solid Edge software's fast and

intuitive drafting environment. "In general, what we find is that we can go from concept to manufacturing drawings in one-sixth the time it took us previously in 2D," Carlson notes.

The OSC 24300 was built in about one year. Some other specifications were a 300-horsepower motor, a tube handling system and an automated induction-heating system. Also included were MJC's Spin CAD software – operator-interface software based on the Windows® operating system that lets the machine programmer generate spin passes on a computer using point-and-click technology – and a Siemens SINUMERIK® 840D controller with HMI software. When a FIBA representative came out to California to see the finished machine, MJC spun a sample part for him there on its small shop floor. "I wasn't sure you could do it when I came out here a year ago and saw this little 'garage,'" says the man from FIBA, noting, "but you guys pulled it off!"

For Carlson and his colleagues at MJC Engineering & Technology, that was high praise, which is similar to how Carlson feels about Solid Edge: "Every time I get a new version of Solid Edge, I get excited because they add things I had wished for. It is phenomenal. I can't speak highly enough about this software."

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