



20%
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Fender has reduced
manufacturing
time by at least
20% across
the board.

Since we began using SolidWorks, we have been able to complete the most difficult step — developing the neck back shape — 30% faster. That's just one example of how SolidWorks is helping us cut time and manual steps from the process.

Glenn Dominick
Senior Manufacturing Engineer
Fender Musical Instruments

"We have standardized on SolidWorks across the operation, from research and development through manufacturing," Dominick notes. "Working on the same 3D platform makes it easier to share ideas and furthers our goal to produce consistently high-quality guitars with less effort and fewer manual operations."

For more information:
www.fender.com
www.solidworks.com

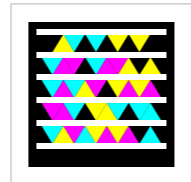
Fender Musical Instruments
Fender Musical Instruments Corp. is a leading manufacturer of stringed instruments, including electric, acoustic, and bass guitars, as well as guitar amplifiers. Since the founding of its predecessor company in 1946 by "Leo" Fender, Fender has built a reputation for producing some of the world's best-sounding and best-playing electric guitars. Fender's Stratocaster and Telecaster guitar models have become rock-and-roll icons as the instruments of choice for legendary guitarists including Jimi Hendrix, Eric Clapton, and David Gilmour.

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By *Tim Trainer*

Fender rocks guitar design with SolidWorks

Fender Musical Instruments Corp. wanted to take the design and manufacture of its guitars from a handcrafted art to automated production while maintaining quality. It implemented SolidWorks 3D design software to automate design and production, enabling Fender to save time, increase throughput, and achieve more consistent quality.



Use your smartphone to learn more about Fender Guitars

For much of its history, Fender produced guitars by hand, and the company continues to operate a custom shop where artisans still handcraft custom-ordered guitars. As the company has grown, however, it has integrated design and manufacturing technologies into its traditional processes and methods to achieve greater consistency and efficiency, and to keep pace with a continuously expanding market. While the company used 2D design tools for many years, the 2002 acquisition of the Jackson guitar brand — created with the debut of the Jackson Rhoads guitar for former Ozzy Osbourne guitarist Randy Rhoads — brought more complex geometry challenges, according to Glenn Dominick, senior manufacturing engineer.

"Jackson guitars are a completely different type of guitar," Dominick explains. "The geometry is complex. We can better address Jackson design challenges with 3D, particularly the neck shape, because its 15-degree angle makes tooling much more difficult to produce. Since there is no efficient way to develop fixtures on those

kinds of angles using 2D, we have to use a 3D tool for Jackson guitars."

Fender chose SolidWorks 3D design software from Dassault Systèmes SolidWorks Corp. — first deployed on the Jackson and Fender Stratocaster lines and now used companywide — because it is easy to use, includes advanced surfacing capabilities, and integrates well with computer-aided manufacturing (CAM) applications.

REDESIGNING MANUFACTURING PROCESSES

On the Jackson line, Fender redesigned its manufacturing processes to accommodate the guitars' more intricate and complex shapes, as well as to take advantage of automation. "SolidWorks has enabled us to improve our secondary manufacturing processes with computer-control (CNC) machining," Dominick stresses. "Because we have an accurate, precise 3D model of the guitar body, we can take advantage of the efficiencies associated with programming tooling paths and procedures using automated equipment.

"Since we began using SolidWorks, we have been able to complete the most difficult step — developing the neck back shape — 30% faster," he adds. "That's just one example of how SolidWorks is helping us cut time and manual steps from the process. By using SolidWorks, we have reduced manufacturing

time by at least 20% across the board and have boosted production throughput by creating better tooling and taking advantage of better CAM programming."

MEETING DEMANDS FOR GREATER CONSISTENCY

In addition to saving time and increasing throughput, SolidWorks is helping Fender achieve more consistent quality and an equally high level of performance from instrument to instrument. "With a hand-built guitar, you want every guitar to be different and have its own sound," Dominick points out. "But with a production model you want to standardize shape, quality, and performance. A Fender Master Builder can use a lot of tricks and extra sanding to finesse the handcrafted instrument to achieve what he wants. On production models, we want to produce the same level of quality performance over and over again. Using SolidWorks, we know that the notes are going to intonate correctly and that we will produce more consistent-playing instruments," he adds. "SolidWorks helps us achieve consistency through a higher degree of accuracy and greater levels of automation."

STANDARDIZING ACROSS ALL PRODUCTION FACILITIES

Fender first used SolidWorks to design a recent Stratocaster guitar model at its facility in Baja California, Mexico, and to drive manufacturing of the Jackson line. Since then, Fender has standardized on SolidWorks across all products and facilities, and now operates more than 20 seats of the software throughout the company.