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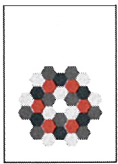
Midsize companies
embrace 3D model's
many uses

Jeff Richlin
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 Reed Business Information.

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- From S&OP to "total" planning
- SAP in the process industries
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Richlin Machinery taps 3D design, recasting itself as custom builder

By Roberto Michel, senior contributing editor

Manufacturers of all sizes constantly revitalize their operations to remain competitive. In product development, technologies such as digital prototyping and digital manufacturing help companies see how products will be manufactured well before they're built. For one midsize engineering-focused company, the idea of "digital prototyping" supported a transformational change in its business model.

Jeff Richlin is president of **Richlin Machinery**, a Farmingdale, N.Y.-based industrial equipment manufacturer. As the 21st century got under way, Richlin saw the market for its standard machine tools dry up after companies began sourcing small machined parts from suppliers in China and other low-cost countries.

"Customers that were making small round parts here in the states all of a sudden started offshoring everything," Richlin says. "So our sales plummeted." With the market gone overseas, Richlin had to take a hard look at his options, and saw a niche for more customized systems that needed to be serviced. Richlin also saw that 3D computer-aided design (CAD) technology could help the company win bids for and build such customized machinery.

It began using Inventor, a 3D CAD package from **Autodesk** that offers digital prototyping capabilities in its professional edition. This package—which includes functionality typically associated with the term *product life-cycle management* (PLM)—is central to Richlin's success in offering custom, turnkey machines with features such as automated material loading.

Inventor allows Richlin to quickly respond to requests for quotations.

"We're able to take a customer's requirements and turn them into a digital 3D model we can send to them," Richlin says. "Though there might be additional engineering discussions, usually they will look at the 3D model, confirm the process, and ask us to continue on to a more exact digital model."

Richlin uses Autodesk's lightweight DWF viewing format to share designs with customers, or can generate animated demonstrations in the Audio Video Interleave (AVI) format. These technologies not only help sell the customer on design efficacy, but they also help Richlin avoid potential production problems.

"Part of that process of going through the digital prototype is seeing if everything will fit, will everything work, will we have the right forces at the right spots—or will we have conflicts between components," says Richlin.



Seeing requirements

Autodesk, with revenues of \$1.84 billion in its most recent fiscal year, is the largest CAD vendor in the world. While the other large product-design vendors promulgate visions of PLM as enterprise innovation engines, Autodesk remains more concerned with its midsize customers' continuing transition from 2D to 3D design. Robert "Buzz" Kross, SVP, Autodesk Manufacturing Solutions, readily admits, "It's taken longer than we thought it would."

The quickening pace of that migration, however, pushed Autodesk's manufacturing division revenues in its latest quarter a full 30 percent higher than they were the same quarter of the previous year. Kross says the industry-leading growth stems primarily from Autodesk Inventor.

As previously noted, the ruling concept that Autodesk executives favor—i.e., "digital prototyping"—does bear striking resemblance to PLM, while eschewing complexities that might be appropriate for very large enterprises.

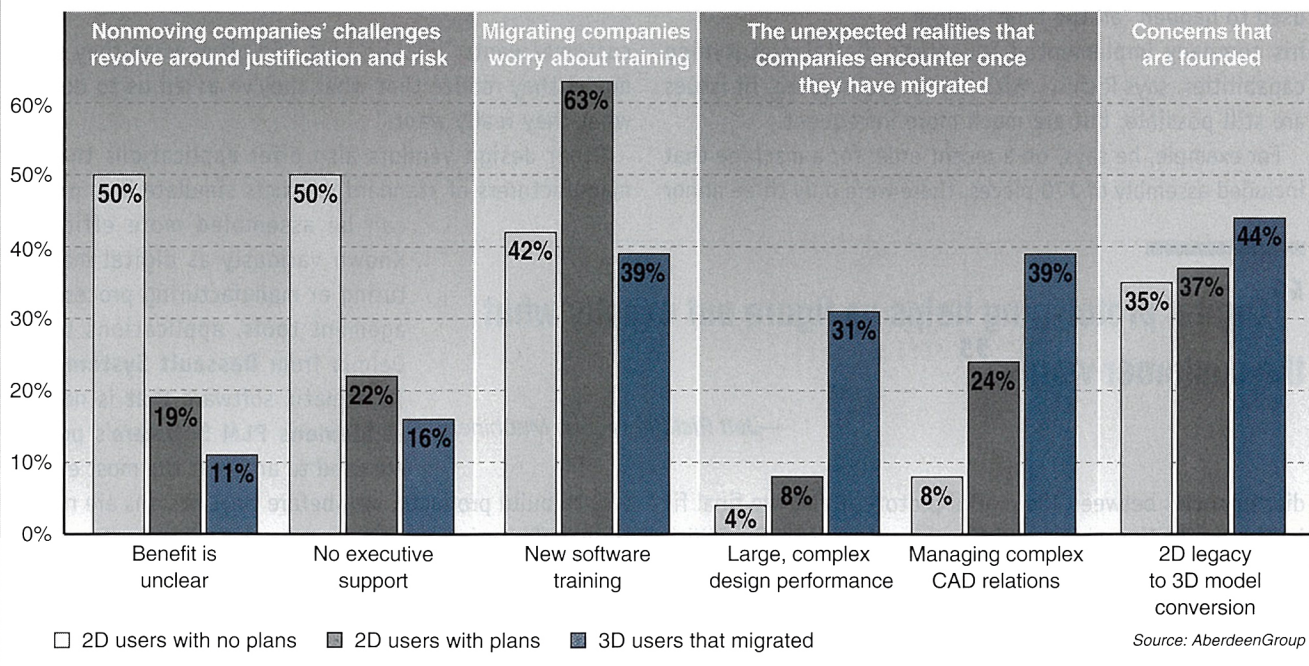
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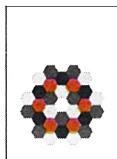
Realize, however, that when Autodesk speaks of digital prototyping it means more than the generation of a physical prototype based on digital information. The company instead defines it as "a single digital model that can be used in every stage of production, bridging the gaps between conceptual design, engineering, and manufacturing teams."

Autodesk is using the computing power gains and improved integration that have accrued over time to forge gains for users through bidirectional flow of concept and design information, by making analysis more integral to design,

Challenges to using 3D modeling



The slow application performance of large and complex designs, as well as the difficulties of managing complex CAD relationships, are issues recognized by those already using 3D modeling.



Cover Story

in supporting seamless translation of design information into manufacturing operations, and in other ways as well. Its ability to leverage available computing power was especially demonstrated recently in previewed capabilities for real-time ray tracing involving its creative design software, Autodesk AliasStudio.

Measures of success in digital prototyping found in best-in-class companies, says Dr. Andrew Anagnost, VP, CAD/CAE products, Autodesk, include halving the number of physical prototypes, getting to market on average 45 days sooner than otherwise possible, and seeing only about one-third as many engineering change orders, compared to companies deemed average.

Getting in the way

Mechanical interference problems used to happen "all the time" before his company implemented Inventor's digital prototyping capabilities, says Richlin. With digital prototyping, fit issues are still possible, but are much more infrequent.

For example, he says, on a recent order for a machine that included assembly of 170 pieces, there were only three minor

customer wants," Richlin says. "So often when they see the model they realize that what they've asked us to do is not what they really want."

Other design vendors also offer applications that help manufacturers of standard products simulate how products can be assembled more efficiently. Known variously as digital manufacturing or manufacturing process management tools, applications such as Delmia from **Dassault Systemes** and Tecnomatix software that is now part of **Siemens PLM Software's** portfolio are used to arrive at the most efficient

way to build products, well before final designs are released to manufacturing.

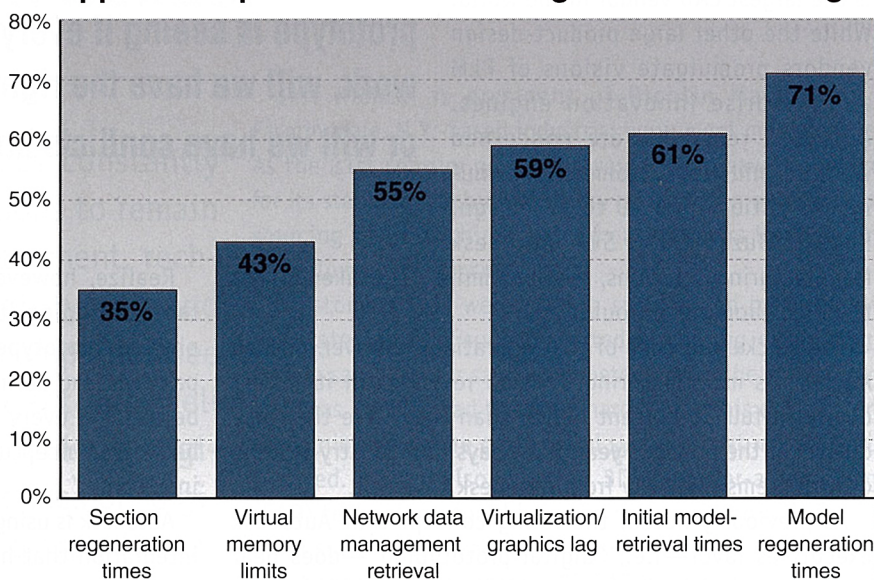
The combination of detailed design data with 3D helps users see nuances that might otherwise be overlooked. "By using digital prototyping, we are now able to make sure that all our tolerances will conform," says Richlin. "We know that we aren't going to miss by accumulating tolerances from one group of parts to another, and then have our holes off." ■

discrepancies between the digital prototype and the final fit in the production shop, and these were easy to fix. "With digital prototyping we know that whatever we send to the shop floor will fit," Richlin says.

But the biggest benefit of digital prototyping for a custom machine builder, says Richlin, is in the ability of the technology to bring customer requirements to life.

"Digital prototyping helps us figure out exactly what the

Application performance challenges of 3D modeling



Source: AberdeenGroup

Performance issues can be caused by inadequate processor speeds, lack of memory, or inadequate graphics cards. Memory limits are an inherent limitation of 32-bit systems that are addressed by 64-bit machines.

“Digital prototyping helps us figure out exactly what the customer wants.”

—Jeff Richlin, Richlin Machinery