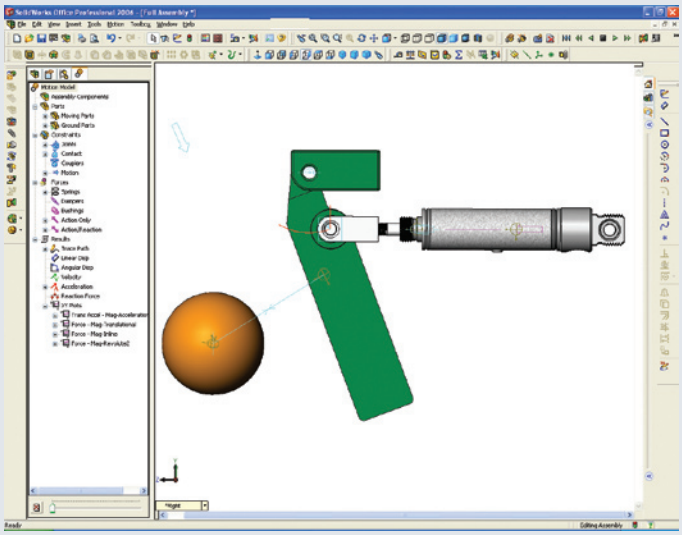
Bimba Manufacturing Company

IMPROVING PNEUMATIC CYLINDER PERFORMANCE WITH SOLIDWORKS ANALYSIS SOFTWARE



By implementing integrated SolidWorks Simulation analysis software, Bimba Manufacturing has compressed design cycles for its pneumatic cylinders while improving design performance.

- Shortened design cycles by 50 percent
- Reduced the number of prototypes by two-thirds
- Cut development costs substantially
- Improved confidence in design quality and performance

As the leading manufacturer of disposable pneumatic cylinders, Bimba Manufacturing Company has established a worldwide reputation for quality and reliability. Over the years, the company's business has expanded beyond its standard products to encompass a high volume of "specials," custom products specifically designed for unique customer applications. Today, nearly half of Bimba's business consists of custom-designed products. The company's engineers migrated from AutoCAD® 2D design tools to the SolidWorks® 3D CAD system several years ago to increase productivity and throughput to meet Bimba's growing product development needs.

Following its transition to 3D CAD, Bimba continued to rely on an extensive prototyping and testing program to engineer its products and validate design performance. However, after using 3D solid modeling for a year, Bimba's engineers realized they could compress design cycles even further—while improving design performance—by implementing integrated design analysis software, according to William Teach, project engineer.

"We were working on a project for over a year and suspected a potential problem based on hand calculations," Teach recalls. "We needed to apply static stress analysis to study force distributions to complete the project, so we obtained an evaluation copy of SolidWorks Simulation software, which confirmed our suppositions. With SolidWorks, we verified the problem quickly and easily and launched the product without an extended prototyping cycle."

That experience convinced Bimba's engineers to acquire SolidWorks Simulation software for conducting static stress analysis. "The software proved itself on that initial project," Teach explains. "We have since made the commitment to use SolidWorks Simulation on the development of all new products."

Bimba chose SolidWorks Simulation software because of its ease of use and direct integration inside SolidWorks Standard. The company also uses SolidWorks Motion for kinematics analysis and SolidWorks Flow Simulation for computational fluid dynamics (CFD) analysis. "The additional software is fully integrated," Teach says. "It's like using the same software package with just another toolbar."

SolidWorks

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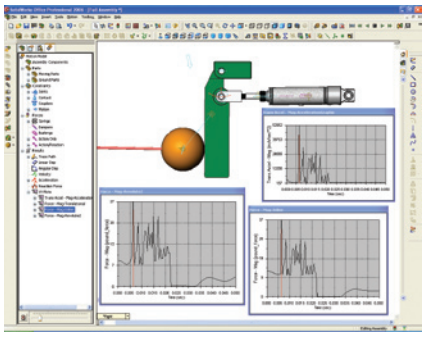
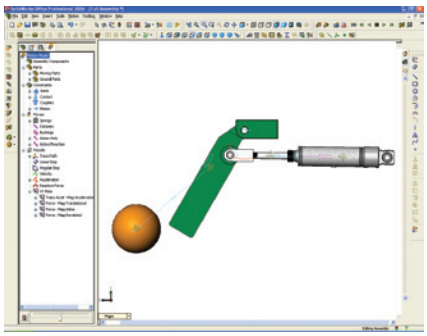
William Teach, Project Engineer





In addition to using SolidWorks Simulation for static stress analysis, Bimba uses SolidWorks Flow Simulation analysis software to study pressure differentials within cylinders as well as SolidWorks Motion for conducting kinematics analysis, such as the kinematics study shown here.

Shorter design cycles, fewer prototypes

Since implementing SolidWorks Simulation integrated analysis capabilities, Bimba has shortened its design cycles on average by 50 percent and reduced the number of prototypes required for physical testing by two-thirds.

"The benefits of using analysis have continued since that first project," Teach notes. "We worked on that project for over a year, and if we would have had SolidWorks software from the beginning, we would have finished it in about six months. Using integrated analysis has helped us to cut our development cycles in half.

"We still have to do physical testing, but with SolidWorks we only need to develop one or two prototypes as opposed to developing prototypes for testing six, seven, or eight times," he adds.

Resolving customer challenges

In addition to compressing design cycles and reducing prototypes, SolidWorks Simulation software enables Bimba to resolve customer problems quickly. For example, a customer that produces food-processing equipment was experiencing frequent cylinder failures on a fruit-sorting machine. Picked fruit is placed on a conveyor, which carries it to the sorting machine, where a rod attached to the end of an actuator sorts the fruit, kicking out damaged or poorly sized fruit.

"The bearing in the actuator was failing frequently, which necessitated shutting the machine down and switching out the actuator," Teach says. "With the customer's inputs, we used SolidWorks Motion to conduct a kinematics analysis to determine the impact load on the bearing. We discovered that the customer had increased the speed of the machine beyond the cylinder's use specifications. The customer reduced the speed of the machine as a short-term solution, and we are developing a new cylinder that will perform at the faster speed.

"In the past, we would have had to duplicate the behavior in our model shop, which would have been more costly and time-consuming," he adds. "With SolidWorks Motion, we were able to pinpoint the problem and resolve our customer's problem in a matter of weeks."

More and more of Bimba's customers are demanding a kinematics analysis to confirm their applications and have come to expect it, Teach notes.

Improved product quality

Bimba's engineers also use SolidWorks Simulation software to improve product quality and performance on a continual basis. For example, the company uses SolidWorks Flow Simulation to gain a greater understanding of the pressure differentials within its products. "Product quality is much better when a product is designed and analyzed properly," Teach says. "With solid modeling and integrated analysis, we are a lot more confident that our products will perform as designed."

SolidWorks

Dassault Systèmes SolidWorks Corp.
300 Baker Avenue
Concord, MA 01742 USA
Phone: 1 800 693 9000
Outside the US: +1 978 371 5011
Email: info@solidworks.com
www.solidworks.com

BIMBA STAINLESS

Bimba Manufacturing Company
Route 50 North
P.O. Box 68
Monee, IL 60449-0068
Phone: (708) 534-8544
www.bimba.com

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