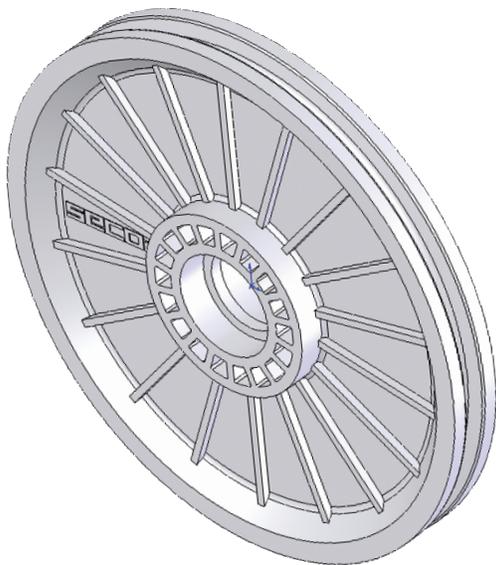


# SECOA, INC.

## Innovating stage and performing arts equipment design with SolidWorks software



*By using SolidWorks software, SECOA has improved the development of cast, extruded, and sheetmetal parts, as well as the development of product families using configurations capabilities.*

SECOA, Inc., is a leading US manufacturer of stage rigging and performing arts equipment and systems that support theatrical or orchestral performances in professional, educational, and community theaters, halls, and auditoriums. Historically, stage equipment design has paralleled architecture, including the use of 2D CAD tools to create stage layouts. As equipment development grew in complexity and sophistication, so did the need to utilize 3D technologies for supporting the design, validation, and manufacture of components more efficiently and cost-effectively, according to Edward Oliver, SECOA special projects engineer.

"We began to deal more heavily with specialized needs that required 3D-based technologies to drive casting design, extrusion-die development, finite element analysis, and automated CAM-based manufacturing," Oliver explains. "Initially, we upgraded our AutoCAD® 2D package to Autodesk Inventor® 3D CAD software because of steeply discounted pricing, but became dissatisfied with Inventor and Autodesk's support and upgrade approach."

In October 2004, SECOA decided to benchmark Inventor software against SolidWorks® 3D CAD software and its integrated SolidWorks Simulation analysis upgrade using actual SECOA parts. "We asked both vendors to change the model mesh, go back and modify the model, and run the analysis again," Oliver recalls. "The Autodesk® reseller wanted to revert back to their standard demo, while Symmetry Solutions did whatever we asked. There was a night-and-day difference between the integrated SolidWorks software solution and the Autodesk approach, as well as in the expertise of the resellers."

The company chose to migrate to SolidWorks software with the SolidWorks Simulation upgrade because of the solution's ease of use, fully integrated analysis approach, superior training and support, and mold development, sheet-metal, and configuration capabilities.

### **Integrated analysis saves time and money**

Using SolidWorks 3D CAD software and SolidWorks Simulation, SECOA has cut its equipment design cycle by 50 percent, while substantially reducing development costs and improving equipment performance. A particularly illustrative example of how this combination benefits SECOA was the development of a removable stage with infill traps for

### **Results:**

- Cut design cycles by 50 percent
- Substantially reduced development costs
- Improved product quality, innovation, and performance
- Enhanced design visualization and communication

the Guthrie on the River in Minneapolis, Minnesota, which allows the scenery and actors to pop up from below the stage. In addition to infill traps, SECOA engineers had to design the stage to support the use of a 14,000-pound forklift, which needed to be driven on and off the stage, using aluminum supports to minimize weight and support portability.

"We used SolidWorks 3D CAD software and SolidWorks Simulation to design the aluminum columns and support beams needed to support the forklift load," Oliver recounts. "Without this solution, we would have had to conduct repetitive prototype testing, which is expensive and time-consuming. We saved additional time with an integrated solution. Other CAD systems can work with an FEA (finite element analysis) package, but only SolidWorks software has a modeler and an FEA package that talk to each other."

"Integrating modeling and analysis improves system performance and conceptual design," he adds. "It makes it so much easier to tweak your design and make refinements. In the end, we get a better part, both structurally and aesthetically."

### Improved casting, sheet-metal, and configuration capabilities

By implementing SolidWorks software, SECOA has improved the development of cast, extruded, and sheetmetal parts, as well as the development of product families using configuration capabilities. "With 3D, it's easier to develop injection-molded plastic parts, aluminum extrusion dies, and sheetmetal components," Oliver says. "SolidWorks software models also streamline interaction with vendors. It's easier for our mold-maker and sheet-metal fabricator to interpret our designs in 3D, leaving less potential for misunderstandings."

Applying SolidWorks software configurations helps SECOA save additional time. "We can model one part; make a design with parameters, such as thickness and diameter; and create models for a range of sizes from that one model," Oliver notes. "If we need to change a detail, we can make one change that is applied to each configuration instead of making many changes."

### Enhanced design innovation, visualization, and communication

SECOA has improved its design presentation, visualization, and communication capabilities with SolidWorks software, enabling the company's engineers to innovate while increasing productivity. "SolidWorks software enables not only us to present design concepts to customers more effectively, but also to get our point across to vendors more quickly," Oliver says. "We can sit down with the mold-maker and fiberglass vendor and review the design in 3D, which allows us to accomplish in two or three days what would have taken a month in the past."

"We used capabilities of SolidWorks software to help highlight design challenges in a fiberglass architectural ceiling system at The Plaza Theater in El Paso, Texas," he adds. "We were able to quickly demonstrate what the adjustable acoustic ceiling system would look like from several vantage points within the theater, allowing for a quick and easy discussion of possible design enhancements for aesthetics and manufacturability. Once the design was finalized, the solid model was sent directly to our mold-maker to produce the tooling needed to produce the fiberglass panels."

Using SolidWorks software, the company has also innovated part designs—transforming box-like shapes into sweeping, curved parts; reducing weight; and optimizing material usage—while improving its marketing image. SECOA embosses its logo on parts and uses SolidWorks software images and models in its marketing literature.

*"OTHER CAD SYSTEMS CAN WORK WITH AN FEA (FINITE ELEMENT ANALYSIS) PACKAGE, BUT ONLY SOLIDWORKS SOFTWARE HAS A MODELER AND AN FEA PACKAGE THAT TALK TO EACH OTHER."*

Edward Oliver  
Special Projects Engineer



SECOA uses SolidWorks to support specialized design needs, including castings, extrusion development, finite element analysis, and automated CAM-based manufacturing.



SECOA, Inc.  
8650 109th Avenue North  
Champlin, MN 55316  
Phone: +1 763 506 8800  
www.secoa.com  
VAR: Symmetry Solutions, Inc.,  
Brooklyn Center, Minnesota



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

