

SEATS, INC.

DRIVING INNOVATION IN SEATING DESIGN WITH SOLIDWORKS AND SIMULIA SIMULATION SOLUTIONS

Case Study



Seats, Inc. moved to SOLIDWORKS design and simulation tools, and added **3DEXPERIENCE** Works SIMULIA advanced simulation, capabilities, to drive value in product design. The move helped them to reduce costs, improve quality, and increase innovation.

Challenge:

Leverage simulation technology to drive innovation in seat design in a more flexible, integrated, and cost-effective manner.

Solution:

Replace Solid Edge CAD and Ansys simulation tools with integrated SOLIDWORKS modeling, design, simulation, product data management (PDM), documentation, and inspection solutions; then add advanced 3DEXPERIENCE Works SIMULIA simulation solutions to take advantage of more affordable cloud computing.

Results:

- Replaced costly prototype iterations with less costly simulation iterations
- Reduced errors to less than 1 percent
- Optimized weld locations and reduced number of welds required
- Drove innovation in seat/part design with advanced simulation and topology optimization

Seats, Inc. is a leading manufacturer of seating and accessories for operators of vehicles with wheels or tracks. Founded by W.R. Sauvey in 1952, the company has grown to become one of the most diverse seating manufacturers in the United States, with products that are used in a wide variety of applications, including industrial trucks, over-the-highway semitractors, off-highway equipment, earthmoving equipment, military vehicles, and emergency vehicles. The seating manufacturer produces standard and custom seats for any vehicle other than automobiles and aircraft, and also manufactures low-speed electric vehicles for a related company, Columbia Vehicle Group, Inc.

With its headquarters in Reedsburg, Wisconsin, in a facility containing approximately 311,000 square feet of manufacturing and tooling space and 19,000 square feet of office space situated on 16 ½ acres of land, Seats also has 74,000 square feet of manufacturing space located in Richland Center, Wisconsin, along with a manufacturing location in Saltillo, Mexico. In 2018, the company added facilities in Laredo, Texas, and Spring Hill, Kansas, and more recently added another facility in Chariton, Iowa.



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simulation solutions has enabled us to drive value in product design. With powerful integrated tools, we are developing the durable, reliable, and innovative seat features that our customers want while shortening design and testing cycles, maintaining high levels of quality, and keeping costs low."

– Jesse Boyarski, Director of Engineering

Throughout its history, Seats has grown continually by focusing on quality, customer satisfaction, and the development of innovations in seating engineering and design. Until 2019, the company used the combination of Solid Edge® CAD and Ansys® simulation tools to develop and engineer its products. However, that approach was not fully integrated, was incompatible with many customer systems, and was becoming increasingly expensive, especially for higher-end nonlinear simulations, according to Director of Engineering Jesse Boyarski.

"We needed a more flexible, integrated design and simulation solution to increase efficiency and reduce costs," Boyarski recalls. "Our simulation needs run from basic linear static stress analysis to motion simulation to more complicated, nonlinear fatigue, contact, and plastic deformation analysis. Many of our customers use SOLIDWORKS® design and engineering tools, which are fully integrated, so we made the decision in 2019 to move to the SOLIDWORKS product development environment."

Seats chose to implement integrated SOLIDWORKS modeling, design, simulation, product data management (PDM), documentation, and inspection solutions to increase integration and boost simulation flexibility and efficiency during product development. More recently, the company added the SIMULIA® Durability and Mechanics Engineer role from the 3DEXPERIENCE® Works portfolio to take advantage of more affordable cloud computing using the Abaqus® explicit solver for complex nonlinear analyses. The product innovation portfolio leverages the cloud-based

3DEXPERIENCE platform to give customers access to the power of industry-leading tools for design, simulation, manufacturing, data management, and marketing from Dassault Systèmes.

"We now have a range of simulation tools from basic to complex to fit all of our needs," Boyarski explains. "Designers can use integrated SOLIDWORKS Simulation solutions to run basic simulations as they design, while our power users can utilize SIMULIA Simulation solutions for more complicated analyses. We are also very confident in our simulation results, as we've seen tight correlation with our physical testing results."

INTEGRATED SOLUTIONS STREAMLINE OPERATIONS, BOOST QUALITY

Using integrated SOLIDWORKS modeling, design, simulation, and PDM solutions, Seats has been able to accelerate development, reduce physical prototyping iterations, and drive innovation while simultaneously improving quality and reducing errors through PDM revision controls. "With everybody now using integrated SOLIDWORKS tools and our data managed by PDM, we're seeing both time and cost benefits, as well as meeting critical ISO compliance requirements," Boyarski stresses.

"The move to the SOLIDWORKS product development ecosystem and the addition of SIMULIA simulation solutions has enabled us to drive value in product design," Boyarski adds. "With powerful integrated tools, we are developing the durable, reliable, and innovative seat features that our customers want while shortening design and testing cycles, maintaining high levels of quality, and keeping costs low."

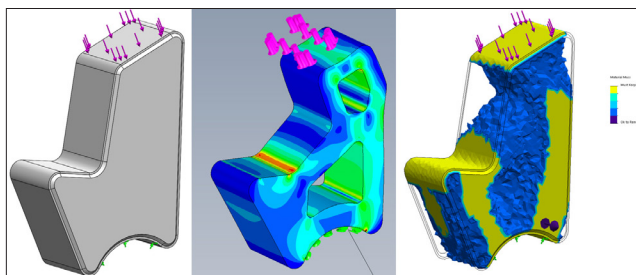
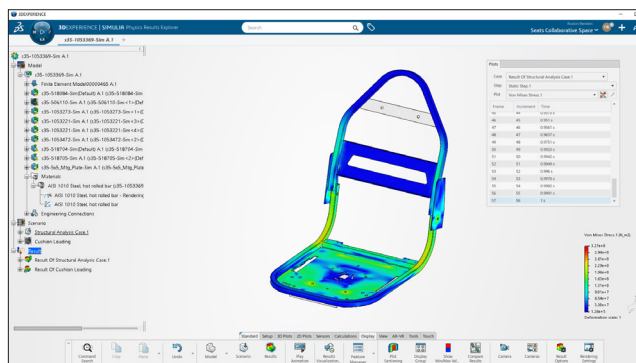
FLEXIBLE APPLICATION OF RIGHT-SIZED SIMULATION TOOLS

With four different available simulation packages — with capabilities ranging from more basic, rudimentary analysis to complex nonlinear simulations — Seats can deploy simulation tools that are right-sized for each function. Designers can use basic linear static stress and motion analysis while designing, and engineers can tap advanced analysis tools using the load results of



"Being able to run a quick analysis while designing a part is extremely useful because you can make a change and rerun the simulation to see if the change addressed the issue. I've personally used SOLIDWORKS topology optimization to reduce material in powdered metal components and SIMULIA simulation to optimize weld locations, reducing the number of welds and material usage in a seat frame while maintaining the overall strength and stiffness."

– Austin Rendon, Design Engineer II



Using SIMULIA Durability and Mechanics Engineer and SOLIDWORKS Simulation Premium tools, Seats engineers can run advanced nonlinear simulations on the cloud-based **3DEXPERIENCE** platform (top) as well as tap topology optimization tools to optimize seat geometry and reduce material usage (bottom), saving time and money in the process.

motion analysis to run more complex simulations to validate innovations and final designs.

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SIMULIA simulation to optimize weld locations, reducing the number of welds and material usage in a seat frame while maintaining the overall strength and stiffness.”

DRIVING INNOVATION TODAY, PREPARING FOR FUTURE GROWTH

While the addition of SOLIDWORKS and SIMULIA simulation solutions is helping Seats drive innovations in seat design today, access to the **3DEXPERIENCE** platform lays a scalable foundation for supporting future growth by tying in additional personnel and facilities for product development in the cloud. “Today, we handle all of the company’s design and engineering from our headquarters in Wisconsin,” Boyarski points out.

“However, as we continue to grow and add more facilities, we may need design, engineering, and CAD support at other locations, which means we would need to collaborate across locations and could leverage the cloud for more than just running SIMULIA simulations,” Boyarski continues. “With the **3DEXPERIENCE** platform, we can innovate today while we set the stage for our company’s future growth.”

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VAR: GSC, Germantown, WI, USA

Products:

- SOLIDWORKS Standard CAD
- SOLIDWORKS Simulation Standard
- SOLIDWORKS Simulation Professional
- SOLIDWORKS Simulation Premium
- SOLIDWORKS PDM Professional
- SOLIDWORKS Composer
- SOLIDWORKS Inspection
- **3DEXPERIENCE** Works SIMULIA Durability and Mechanics Engineer
- **3DEXPERIENCE** Works SIMULIA Simulation Collaborator
- Collaborative Designer for SOLIDWORKS
- Collaborative Industry Innovator
- **3DEXPERIENCE** Works Learner
- 3DSwymer

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