

# RESEMIN

## ADVANCING UNDERGROUND MINING EQUIPMENT DEVELOPMENT WITH SOLIDWORKS SIMULATION PREMIUM



With SOLIDWORKS design, simulation, PDM, inspection, and technical communication solutions, Resemin has realized substantial productivity gains during design, manufacture, and assembly of its underground drilling machinery and related equipment.

### **Challenge:**

Accelerate development cycles to meet market demand for fast delivery times while leveraging simulation technology to improve quality and increase innovation.

### **Solution:**

Implement SOLIDWORKS Premium design, SOLIDWORKS Simulation Premium analysis, SOLIDWORKS PDM Professional product data management, SOLIDWORKS Composer technical communication, and SOLIDWORKS Inspection quality assurance software solutions.

### **Benefits:**

- Cut machine delivery times in half
- Increased throughput from two to 60 machines annually
- Shortened analysis run times from two days to two hours
- Reduced prototyping by 70 percent

Resemin is a top international manufacturer of underground drilling machinery and related equipment that provide a better and more cost-effective alternative to the use of traditional drilling rigs for mining and tunneling applications. Headquartered in Lima, Peru, Resemin manufactures some of the leading mining equipment brands in the world, such as its RAPTOR long-hole and BOLTER 88 rock-drilling machine rigs.

Founded in 1989, the company has grown into an international leader by focusing on quality, safety, and reliability, and strict adherence to international standards under its ISO 9001:2000 certification. Because Resemin products must operate safely and reliably within extreme underground mining environments, the company is committed to leveraging advanced design, engineering, and analysis technologies to ensure quality and dependability.

According to Engineering Manager Fernando Díaz, producing 3D design geometry more quickly and easily to drive finite element analysis (FEA) studies, which help reduce development time and prototyping requirements while enabling the company to meet ISO 3449:2005 falling-object protective structures (FOPS) performance criteria, became critically important for the manufacturer's competitiveness.

"We decided to move from AutoCAD® 2D design tools to a 3D development platform to support a high level of design customization and accelerate the creation of 3D geometry to support simulations," Díaz recalls. "Resemin implemented SOLIDWORKS® Premium software in 2008 because it was too difficult and time-consuming to translate AutoCAD 2D drawings into 3D geometry to support FEA, and faster and easier to just create our designs in 3D in SOLIDWORKS."

Although Resemin engineers initially used ANSYS® software to conduct FEA studies on SOLIDWORKS models, they saw the potential for realizing greater productivity gains by leveraging integrated SOLIDWORKS Simulation Premium software, which Resemin migrated to in 2011, to conduct the complex nonlinear analyses that are required to comply with the FOPS standard. That experience prompted the company to implement additional SOLIDWORKS solutions, including SOLIDWORKS Simulation Professional analysis, SOLIDWORKS PDM™ Professional product data management, SOLIDWORKS Composer technical communication, SOLIDWORKS Inspection quality assurance, SOLIDWORKS Electrical Schematic design, SOLIDWORKS Electrical 3D design, SOLIDWORKS Visualize rendering, and DraftSight® 2D design software.

### **QUICKER SIMULATIONS, FEWER PROTOTYPES**

Using SOLIDWORKS Simulation Premium software, Resemin not only can conduct the complex nonlinear contact with plasticity analyses required to validate that its designs will protect operators from falling rocks, it also can perform these studies more quickly, resulting in a 70 percent reduction in prototyping. For example, the company can simulate the effects of a 227 kg rock falling a distance of five meters onto the canopy that protects the operator and use those insights to optimize designs to meet the FOPS safety standard.

"SOLIDWORKS Simulation Premium software provides accurate results and produces solutions much faster than the ANSYS FEA software that we used in the past," Díaz explains. "A nonlinear contact with plasticity analysis used to take two days to solve with ANSYS. With SOLIDWORKS Simulation Premium software, we're solving the same type of problem in a couple hours. This saves a lot of time in validating our designs prior to prototyping."



**"In 2008, before we standardized on SOLIDWORKS, we designed and manufactured an average of two machines each year. Right now, with SOLIDWORKS, we're producing 60 machines annually. The impact of transitioning to the integrated SOLIDWORKS 3D platform on our business and product development processes has been huge."**

— Fernando Díaz, Engineering Manager

## FAST, ACCURATE DESIGN AND PDM BOOSTS THROUGHOUT

In addition to facilitating FEA studies, the move to SOLIDWORKS 3D design has resulted in substantial improvements in accuracy and efficiency throughout Resemin's product development processes, enabling the mining equipment manufacturer to cut delivery times for its custom machines in half and dramatically boost throughput. With the implementation of SOLIDWORKS PDM Professional software in 2012, Resemin is getting better input from the field and further integrating experts with experience in underground mining into the design and product development process.

"In 2008, before we standardized on SOLIDWORKS, we designed and manufactured an average of two machines each year," Díaz says. "Right now, with SOLIDWORKS, we're producing 60 machines annually. The impact of transitioning to an integrated SOLIDWORKS 3D solution on our business has been huge."

## DOCUMENTATION AND INSPECTION ON AN INTEGRATED PLATFORM

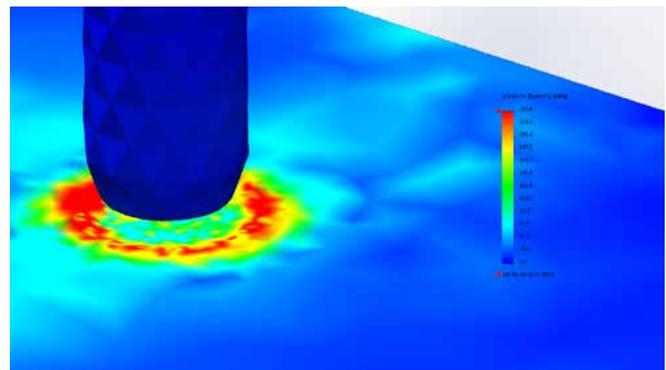
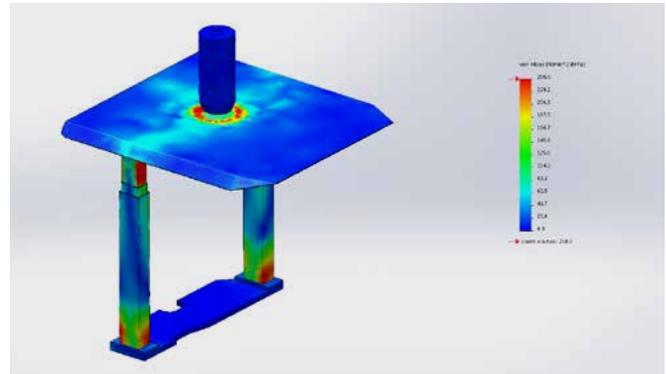
Building upon the success it realized with SOLIDWORKS 3D design, simulation, and PDM solutions, Resemin added SOLIDWORKS Composer technical communication software in 2012 and SOLIDWORKS Inspection quality assurance software in 2014. "We implemented SOLIDWORKS Composer to produce visuals for our spare parts manuals and animations to demonstrate how our machines operate," Díaz notes.

"We added SOLIDWORKS Inspection software last year to allow us to inspect components in digital formats and then connect those inspection reports to the physical parts in our SOLIDWORKS PDM system," Díaz continues. "Because we've experienced important benefits with every SOLIDWORKS solution that we've implemented, we make sure to keep our subscription up-to-date so we can take advantage of the new capabilities included with every new version."

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Using SOLIDWORKS Simulation Premium analysis software, Resemin can not only conduct the complex nonlinear contact with plasticity analyses required to validate that its designs will protect operators from falling rocks, it also can perform these studies more quickly, resulting in a 70 percent reduction in prototyping.

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