

# SURFACE GENERATION LIMITED

ADVANCING COMPOSITE MACHINERY DEVELOPMENT  
WITH SOLIDWORKS ELECTRICAL 3D



Surface Generation added SOLIDWORKS Electrical design software to its set of SOLIDWORKS mechanical design, finite element analysis (FEA), and computational fluid dynamics analysis (CFD) tools to realize similar productivity gains in the development of electrical systems for its industry-leading composites manufacturing machines to those that it's enjoyed in mechanical design using SOLIDWORKS solutions.



**SURFACE  
GENERATION**

**Challenge:**

Integrate mechanical and electrical design to improve electrical design schematic accuracy, minimize production rework, and support greater complexity and miniaturization in composites processing machinery.

**Solution:**

Add SOLIDWORKS Electrical 3D electrical design software to its SOLIDWORKS mechanical design environment.

**Results:**

- Cut rework due to schematic errors by 75 percent
- Shortened project cycle times by 10 percent
- Reduced rework-related costs by 5 percent
- Supported dramatic year-over-year growth

As a world leader in the design and manufacture of fiber-reinforced composite processing solutions, Surface Generation Limited serves a customer base that includes blue chip original equipment manufacturers (OEMs) and Tier 1 automotive suppliers. The U.K.-based company's success derives from its intelligent molding process, which has created a paradigm shift in terms of cost, quality, and delivery at all stages of composites production.

Founded in 2002, Surface Generation has developed advanced composites production techniques that cut cycle times, reduce energy consumption, and require less factory floor space. The company's innovative solutions give customers the ability to guarantee Production to Functional Specifications (PtFS). Surface Generation's patented technology can combine, compact, process, and meld composite materials more efficiently and precisely than traditional autoclave or oven processes. The company's machines are used across a range of industries, including aerospace, automotive, defense, and leisure.

Surface Generation's composites production machines include both electrical and mechanical design elements. While the manufacturer has realized productivity gains in systems development on the mechanical side for several years—leveraging SOLIDWORKS® CAD, FEA (finite element analysis), and CFD (computational fluid dynamics) tools—it sought similar efficiency improvements in electrical design to support growth, according to Senior Software Engineer Pete Massey.

"We had been working with a range of products, including basic drawing packages and schematic preparation tools, as well as more advanced electrical modeling tools and work flows," Massey explains. "We reached the point where we could see a growing disconnect between the mechanical and electrical design sides of the business, so we felt it imperative to assess tools and work flows that could potentially straddle these two design activities."

After conducting an evaluation of available electrical design packages, Surface Generation chose SOLIDWORKS Electrical 3D design software because it's easy to use and includes the most comprehensive library of electrical components. "SOLIDWORKS Electrical integrates directly with the SOLIDWORKS mechanical platform," notes Chief Operating Officer Jim Henderson. "The software's part libraries are particularly useful for rapidly deploying comprehensive electrical design schematics for our products."

**BETTER SCHEMATICS EQUAL SHORTER CYCLE TIMES AND LESS REWORK**

Since implementing SOLIDWORKS Electrical 3D software, Surface Generation can more thoroughly evaluate, analyze, and document electrical designs, resulting in a 75 percent decrease in rework related to electrical schematics, a 10 percent reduction in project cycle times, and a 5 percent drop in rework-related costs. The company has achieved these productivity gains while responding to trends toward greater miniaturization and complexity in systems design.

"Our customers are demanding that our systems take up less floor space, so an electrical control system that used to take up 10 square feet of space must now be housed in a one-square-foot cabinet," Massey stresses. "By integrating electrical and mechanical design, we not only produce higher-quality, more accurate schematics—resulting in less rework during production—but we can also model real-world effects during the development of compact, more complex systems.

"For example, locating solid-state electrical devices in a confined space generates heat," Massey adds. "By having all design domains on one platform, we can simulate heat flow inside the cabinet by bringing in the thermal effects of electronic components and satisfy demands for miniaturization while maintaining the high levels of quality for which we are known."



**"With SOLIDWORKS Electrical 3D, we are better positioned to develop our next generation of optimized systems. It's helping us improve margins and reduce customer costs, which allows us to maintain and manage our dramatic business growth."**

— Jim Henderson, Chief Operating Officer

## IMPROVED COMMUNICATION MAXIMIZES RESOURCE UTILIZATION

In addition to improving the quality of schematics and reducing rework, SOLIDWORKS Electrical 3D software has improved communication between mechanical and electrical designers, and enabled Surface Generation to take advantage of the benefits of working with partners.

“Integrating mechanical and electrical design allows all our teams to better understand what other teams do,” Henderson points out. “This cross talk benefits the company because the teams think in terms of overall delivery rather than just from the perspective of their specific part in it.

“Because our schematics are more accurate, we have greater confidence in the quality of the data, can communicate more effectively with partners and subcontractors, and maximize utilization of internal and external resources,” Henderson adds.

## SUSTAINING DRAMATIC GROWTH

The SOLIDWORKS Electrical 3D implementation has enabled Surface Generation to deliver its composites manufacturing systems in a more unified and coherent manner, which is helping the company sustain a year-over-year doubling of its business.

“With SOLIDWORKS Electrical 3D, we are better positioned to develop our next generation of optimized systems,” Henderson explains. “It’s helping us improve margins and reduce customer costs, which allows us to maintain and manage our dramatic business growth.”



Using SOLIDWORKS Electrical design software to develop electrical systems for its paradigm-changing composites manufacturing machines, which customers use to manufacture products like these, Surface Generation has improved the quality and accuracy of its electrical schematics, resulting in reductions in design cycles, cost, and rework.

### Focus on Surface Generation Limited

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