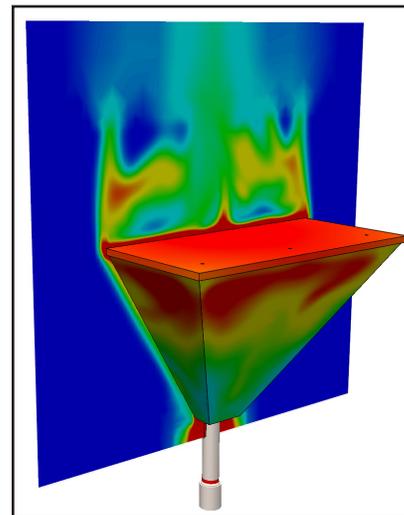
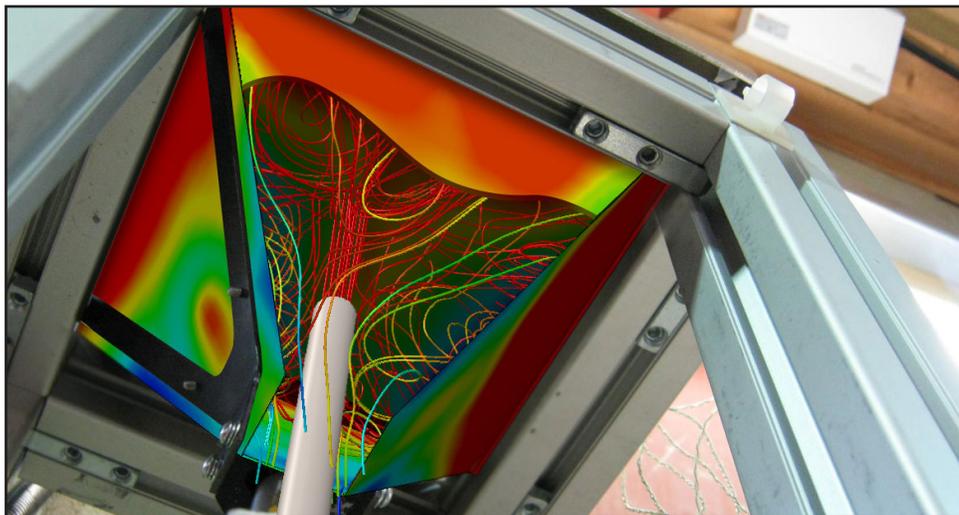


SURFACE GENERATION LTD

Thermal simulation studies with SOLIDWORKS



As a high-technology company, Surface Generation Ltd is a leader in the design and manufacturing of advanced plastics, carbon composites, glass and metals. Founded in 2002, it has over 90 percent exports into aerospace, automotive, consumer electronics and defence. Customers include Boeing, IHI Corporation and the Swiss Federal Institute of Technology (Zurich).

Its success is built around a unique patented design to production technology for the manufacture of composite parts. Advanced heating, cooling and process control helps save on the energy consumption, cycle time and pressures needed to process complex material combinations.

For design engineer Peter Etherington, having the right software is essential. The company is a long-standing user of SOLIDWORKS technology including SOLIDWORKS Electrical. But until recently it relied upon laboratory testing for thermal analysis work. Now, thanks to SOLIDWORKS Flow Simulation, it has a powerful desktop solution which saves time and money.

Lengthy testing in the laboratory

Surface Generation invests a lot of effort in testing the manufacture of parts for customers. There are extensive test rigs to help prove designs can be manufactured for use in demanding applications. Thermal testing is a key element of this important work.

"We create a prototype - not necessarily full-scale - and look at its key areas. This means thermal testing in the laboratory," says Etherington.

Prototypes are made, test rigs configured and the testing carried out but if the results aren't as expected, the whole time-consuming process begins again.

"In testing a physical object, you can't change the geometry. You have to make another piece. Because of the fast-moving markets we operate in, we don't have the time to keep making test pieces. We were potentially missing opportunities by spending a long time validating thermal analysis."

Finding a cheaper solution to complement and replace some laboratory testing became essential. A rapid turnaround using computational fluid dynamics (CFD) software would reinforce the company's reputation for innovation.

An idea of using parametric design to explore solutions and quickly test them computationally was also compelling. However, confidence in such techniques would only come from a close correlation to laboratory studies. Good integration with the SOLIDWORKS design software was desirable too.

Using SOLIDWORKS design and flow simulation software, Surface Generation Ltd works on cutting edge projects from aerospace to consumer electronics

Challenge:

Complement laboratory testing with thermal simulation studies to reduce project time and cost

Solution:

SOLIDWORKS Flow Simulation

Results:

- Close correlation between thermal simulation and laboratory work
- Faster results turnaround compared to physical testing
- Supports static and transient thermal simulations
- Useful reactive tool for engineering investigations

Careful evaluation against real-world results

Surface Generation asked several suppliers for thermal simulation demonstrations based on components for which laboratory results were known. The level of training and support being offered was also carefully evaluated. This close scrutiny found SOLIDWORKS Flow Simulation was the ideal choice.

"It was the integration with the familiar SOLIDWORKS interface that we liked," says Etherington. "We liked the support we had from our existing SOLIDWORKS reseller. The guys who deal with SOLIDWORKS Flow Simulation are engineers, so they understand it in full."

The implementation was straightforward, requiring only a new licence key to unlock the software. An onsite programme of bespoke training in SOLIDWORKS Flow Simulation was geared towards thermal simulation studies using designs already tested in the laboratory.

"The training was delivered really well. We had an overview and then focussed on the areas that were important to us."

This was followed by remote technical support to help develop repeatable strategies to allow close correlation with physical testing results. The gap between the simulation results and laboratory testing then rapidly narrowed. Rather than test whole components, key elements are tested individually and simulation runs optimised for faster results.

"Over the last six months, we have done lots of validation work so we have been running simulation alongside physical testing to prove its accuracy. We now are getting results within five percent."

Building its expertise in thermal simulation

This close correlation has allowed the company to move from steady-state thermal analyses into transient studies. Objects in the laboratory are heated for a number of seconds and then tested. Some early parallel simulations for just 30 seconds took a long time to compute and correlated poorly.

The reseller was sent some design examples and, helped by conference calls, Surface Generation received some "really good tips and solutions." Thanks to this expert technical support, the transient thermal simulations are equally close to real-world results. Even a 700-second transient study can be processed overnight.

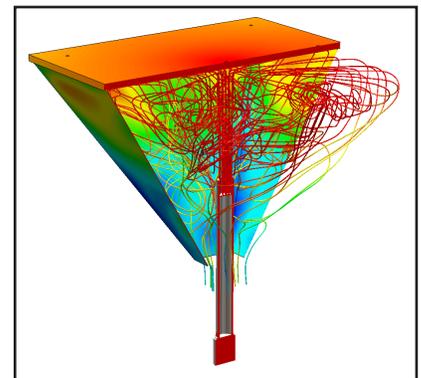
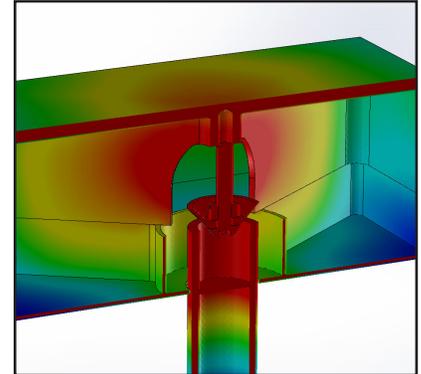
SOLIDWORKS Flow Simulation now quickly provides reliable information for sound engineering decisions. The correlation between simulation and physical testing is so good that it's proved a useful reactive tool. For example, an engineer doing an investigation on site may request an urgent simulation to answer what-if questions.

Simulation is now part of most projects and is even occasionally used in sales situations. It also helps with internal confidence building when deciding whether certain design proposals would satisfy customer requirements. The company's work in comparing simulation results with physical testing has proved time well spent.

"We are in a position where we have very good confidence in SOLIDWORKS Flow Simulation to make design decisions based on the results," says Etherington.

"IT'S VERY EASY TO FIND YOUR WAY AROUND SOLIDWORKS FLOW SIMULATION AND TO MANAGE THE RESULTS. WE'RE GETTING VERY GOOD RESULTS FOR STEADY STATE AND TRANSIENT THERMAL ANALYSES."

Peter Etherington
Design Engineer
Surface Generation Ltd



Surface Generation Ltd uses SolidWorks Flow Simulation technology to provide thermal design confidence for research, development and customer projects



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