

## Saab adopts solids to streamline body engineering

By augmenting surface modeling with NX, Saab's body engineering department tripled its productivity while helping decrease overall vehicle development time

Siemens PLM Software

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### ► Issues:

Speed underbody panel design; new method must support constant change

Validate through simulation; produce tooling from engineering data

Provide fully defined body panels to downstream applications

### ► Approach:

Augment surface modeling with NX software solids-based approach

Represent underbody with digital template; alter template to make large-scale changes quickly

Provide solid models for downstream prototyping, digital simulation and tooling

### ► Results:

Designer productivity increased by a factor of three; changes take one-third as long as previously

Analysis results and prototypes ready 50 percent sooner; tooling can be produced earlier

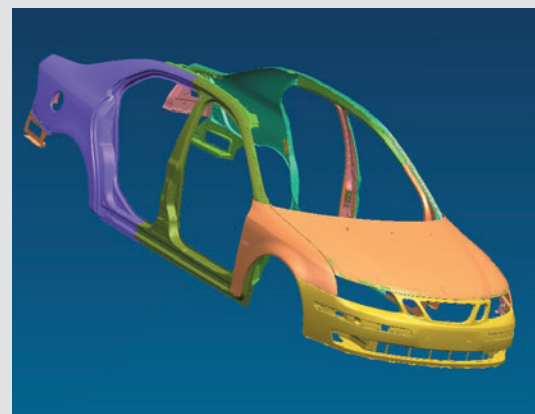
Derivative programs and styling updates now expected to go faster

### SAAB AUTOMOBILE AB

- To meet the corporate goal of speeding vehicle development, Saab's body engineering group needed to work more efficiently and provide higher quality data downstream.

#### Looking for a better way

Like all automakers, Saab wants to get new vehicles on the road sooner. When Saab's body engineers considered how they could help in that effort, they realized that surface modeling was causing delays. Designing underbody panels by trimming surfaces was time-consuming, but the bigger problem was changes to the design of body surfaces. Yet change is constant in body design; typically it goes on for years while the rest of the vehicle is being developed. Another drawback to surface modeling was that material thickness errors occurred when fitting together sheet metal parts. This delayed tooling as well as the availability of information for downstream applications such as noise, vibration and harshness (NVH), structural, crash analysis and prototyping.



#### Adopting solids

The department augmented surface modeling with an approach called "tool solids." Designers still import Class A surfaces from the styling department, as previously, as well as solids. But now they create 100 percent of the underbody by using NX® software and the tool solids method to build body structures and panels. Using the software's system-based modeling functionality, they create a template representing the entire underbody. To make a change, designers either update the components (swap Class A surface and update), or they alter the template. The latter method is ideal for large-scale changes such as going from a right-hand drive to a left-hand drive.

NX is integrated with Teamcenter® software to provide a formal structure for tracking the multitude of design variants that are created. Section drawings are no longer necessary. Solid geometry is sent directly to analysts, model makers and other downstream applications.

# SIEMENS

**Solutions/Services**

NX

Teamcenter

**Client's primary business**

Part of GM's Global Fleet, Saab Automobile AB is the maker of high-performance, Swedish-engineered vehicles. [www.saab.com](http://www.saab.com)

**Client location**

Trollhättan  
Sweden

***"NX and Teamcenter are enabling Saab Automobile to handle the aggressive development program that is the company's strategy for profitability."***

Johan Stabeck  
Manager  
Math Data-Based Technologies  
Saab Automobile AB

***"With NX, we spend time designing instead of thinking about how to use our software."***

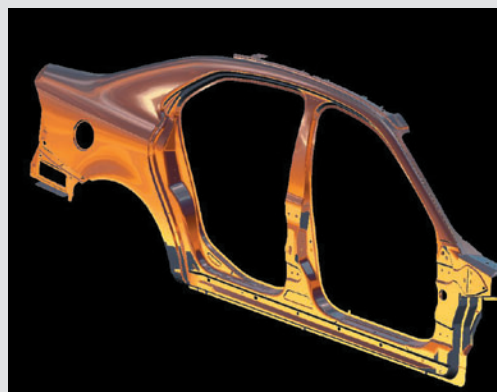
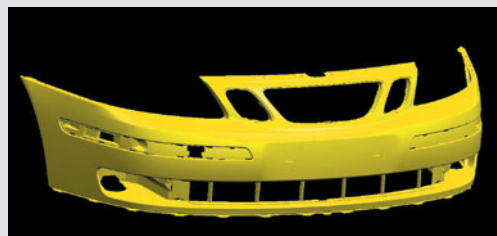
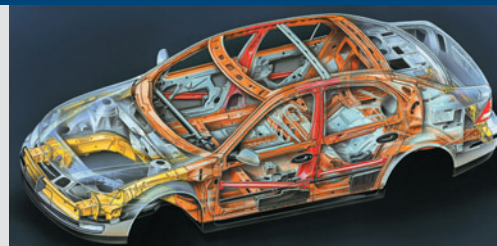
Morgan Borjesson  
Lead Designer  
Saab Automobile AB

**Early results are excellent**

Even though the Saab 9-3 was the first program to use the new approach and the focus was on ensuring quality data, productivity enhancements were impressive. Modeling went faster since designers were not performing difficult operations such as trimming surfaces to sheets. They spent much less time checking their work because the superior visualization of solids let them see immediately when connecting parts interfered.

Overall, designer productivity increased by a factor of three compared to surface modeling. Changes, even large ones, took about one-third as long as they did in the past. A redesign of the shock tower affecting 15 parts, for example, was done by one person in one week where three people would have been required in the past. Morgan Borjesson, lead designer, Saab Automobile AB, points out: "With NX, we spend time designing instead of thinking about how to use our software." There's more. Analysis results and prototypes were ready in half the time, enabling the designers to incorporate feedback sooner. Sending quality solid data downstream eliminated "side of metal" concerns. It also improved tool path efficiency, enhanced surface quality and permitted manufacturing/assembly automation such as welds, mastic and sealer creation.

With the Saab 9-3 now modeled in NX, creating bodies for derivative vehicles should go quickly. The 9-3's body template and bill of materials (contained in Teamcenter) will be the starting point. Changing the template will alter much of the body automatically, with only new parts modeled from scratch.

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