



SPEEDING STRUCTURAL ANALYSIS AT GM

GM MEXICO TECHNOLOGY CENTER ADOPTS ALTAIR'S GAME-CHANGING SIMULATION TOOL

About the Customer

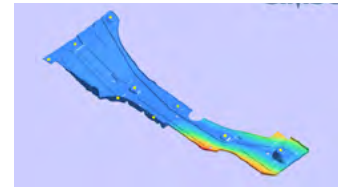
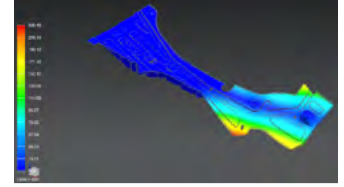
GM (General Motors) is one of the world's top four automotive manufacturers. With a portfolio of brands that includes household names such as Buick, Cadillac, and Chevrolet, the company produces millions of vehicles a year in plants across the Americas, Asia, and Europe.

Operating in a market characterized by unprecedented levels of competition and technological change, GM is committed to the fast and efficient development of innovative new vehicle designs. The GM Toluca Regional Engineering is very much part of this strategy. Hundreds of highly skilled engineers work at the center, designing components for GM vehicles worldwide.



With our previous tool we had to invest hours or even days to evaluate our components. Now it is a matter of minutes.

Mauricio Pacheco,
Design Manager, GM Mexico



Their Challenge

Time to market is a critical metric in the automotive sector, and pressure on the development cycle at the center is intense. In response, GM is keen to provide designers with the ability to perform structural analysis and evaluation of their own designs. By eliminating the need to use CAE specialists for these tasks, in theory the process could be made faster and more efficient. However, the simulation software initially utilized by designers proved problematic. Given the complexity of the components involved, designers often encountered time-consuming pre-processing issues when cleaning up geometry and creating a mesh of the CAD design.

Our Solution

Such problems are common with traditional finite element method (FEM) solvers. Simplifying geometry and meshing are notoriously labor-intensive tasks, prone to human error.

Understandably, GM was keen to investigate a new approach. The center is a long-established user of Altair simulation tools, and Altair's local team proposed another of its solutions, Altair SimSolid™, to meet the challenge of enabling faster and more efficient structural analysis earlier in the development process.

SimSolid is a genuine game-changer. Instead of demanding geometry simplification and meshing, users simply run simulations direct from CAD files. Time savings are dramatic, and the more complex the assembly, the greater the benefits. Moreover, SimSolid runs on standard PCs and workstations and is highly intuitive. As a result, there is no requirement for either high-end hardware or lengthy training; designers no longer need to rely on computer-aided engineering (CAE) specialists for their simulation.

Reflecting this, only minimal support from Altair's local team was required to get GM Toluca Regional Engineering up and running.

Results

Initially, the performance of SimSolid was assessed on thin solid components such as an air deflector, water deflector, and under-body tray. In terms of accuracy, for modal analysis at the component level, a correlation factor of 97% was found with SimSolid, compared to the center's existing solver. With SimSolid, this was combined with a 75% reduction in time taken to complete the analysis. Of that saving, 81% is accounted for by pre-processing, the rest for generating the solution. Furthermore, the simplicity SimSolid's workflow also enables GM to explore more design iterations even for complex components, and complete assemblies within program timing.

LEFT: CAD model of air deflector
TOP: Modal reference result obtained with current solver
BOTTOM: Modal result obtained with Altair SimSolid