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About HyperWorks®

Performance Simulation Technology

HyperWorks is an enterprise simulation solution for rapid design exploration and decision-making. As one of the most comprehensive, open-architecture CAE solutions in the industry, HyperWorks includes best-in-class modeling, analysis, visualization and data management solutions for linear, nonlinear, structural optimization, fluid-structure interaction, and multi-body dynamics applications.

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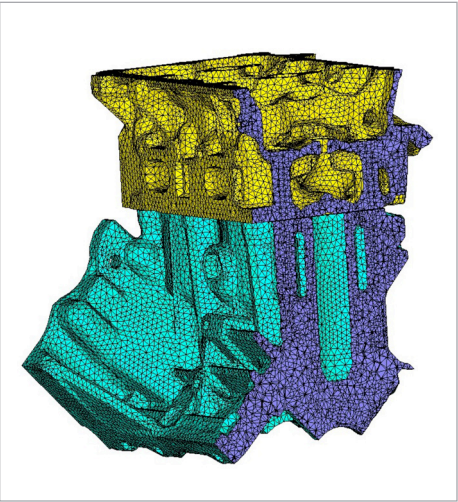
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Success Story



Dana Adopts Altair’s SimLab to Automate Meshing of Powertrain Models with Dramatic Time Savings



Key Highlights

Industry
Automotive, Powertrain

Challenge
Implement a First-Time-Right design methodology

Altair Solution
Meshing Automation with SimLab

- Benefits**
- Pre-processing time dramatically reduced
 - Much better analysis convergence for large models

Customer Profile

Dana Holding Corporation is a world leader in driveline, sealing, and thermal-management technologies that improve fuel efficiency, reduce emissions and lower the cost of ownership in passenger, commercial and off-highway vehicles. Dana's 25,000 employees operate in 27 countries within a network of some 90 engineering, manufacturing and distribution facilities.

Computer simulation of powertrain components—entailing the creation of very large models with 25,000 surfaces or more—has long been an important aspect of Dana’s product development process. For many years, the company’s engineers have employed a standard industry methodology of transforming CAD designs

into prototypes, analyzing the prototype to observe failure points, redesigning the prototype and retesting until the product met specifications.

The Challenge: A First-Time-Right Design

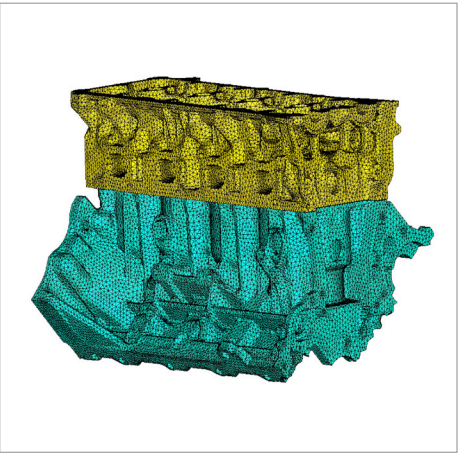
While the prototype/simulation/redesign method ultimately produces a quality component, elements of the process are very time-consuming, therefore increasing costs. For example, when the Dana Power Technologies Group in Lisle, Ill., carried out pre-processing for models of cylinder heads and engine blocks, the geometry needed to be imported from CAD and then cleaned up by engineers, a sometimes tedious task. As a result, completing the mesh for the model could take anywhere from one to four days.

Dana Success Story

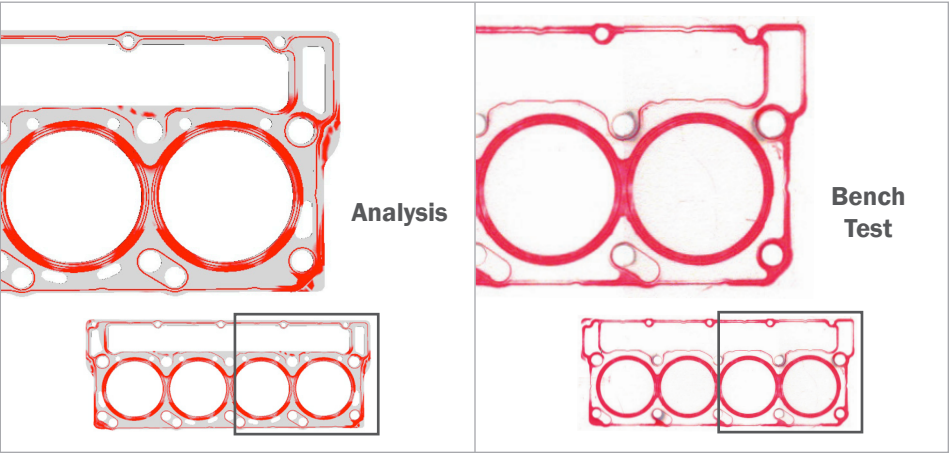


“With SimLab the time for pre-processing is dramatically reduced — from as much as four days down to just two to four hours for the same job.”

Rohit Ramkumar
Manager, CAE Group
Dana Corporation



SimLab uses native CAD geometries to create meshes



Automating the meshing with SimLab is a time saver and produces more accurate results

Several years ago, Dana’s product development team made a decision to implement a “first-time-right” design methodology in which analysis would be conducted before building a prototype, a change that would speed the entire design cycle. At its core, this process demanded a faster way to pre-process simulation models.

The Solution: Meshing Automation with SimLab

From one of Dana’s automotive manufacturing customers, CAE Group

Manager Rohit Ramkumar heard about SimLab and worked with Altair to view a demo and obtain a trial license. In addition, Ramkumar’s colleague, Dana Senior CAE Analyst Marsha Minkov, spent half a day with one of the creators of SimLab, and the two carried out an evaluation that compared the pros and cons of SimLab’s capabilities against other methods. The time savings with SimLab became so apparent that they rapidly integrated SimLab into their modeling process.

Conventional tools import the simulation model from CAD and then require

a frequently extensive clean-up operation. SimLab’s biggest advantage, Ramkumar notes, is that it uses native geometries.

“This is a very big step,” he says. “With SimLab, we are not working with translated CAD geometry but rather are importing the native geometry. SimLab automatically and quickly takes care of cleaning the geometry. As a result, the time for pre-processing in SimLab is dramatically reduced—from as much as four days down to just four hours for the same job. SimLab takes care of the meshing by itself.”

SimLab, in fact, has automated many of the pre-processing steps. The software carries out the importing of the native geometry from the CAD systems, meshing, creating surface and node sets, and creating contact pairs, all with little or no user intervention.

Altair has worked side-by-side with Dana to integrate SimLab into its processes. Initially, Altair demonstrated how SimLab could help cut Dana’s modeling time. Then, Altair provided training so Dana could try out SimLab’s features. Since SimLab’s introduction at Dana, Altair has constantly supported the product development team through phone call and emails, creating a procedure for DANA processes.

In addition, Altair has worked with Dana to create templates, a clearly defined group of settings that Dana engineers anywhere can use for all the engine models and other components. Every engineer who does the meshing with these templates will obtain a similar mesh with same attributes.

In addition to its pre-processing capability, Dana has found SimLab to be user-friendly and highly flexible; and it offers some valuable post-processing capabilities, such as bore distortion plotting and temperature interpolation (from dissimilar meshes).

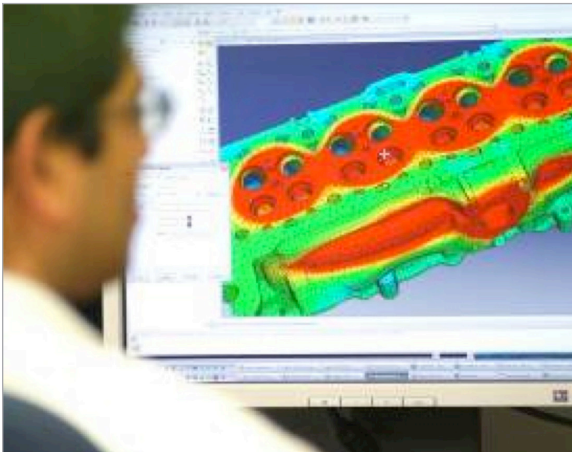
Results: Better Meshing Yields Better Product Quality

By cutting pre-processing time to just hours, instead of days, SimLab has enabled Dana to implement and make continuous improvements in Dana’s first-time-right process. Today, many Dana product lines use the CAD-to-analysis-to-prototype method on 100 percent of their products, and others employ it on 85 to 90 percent.

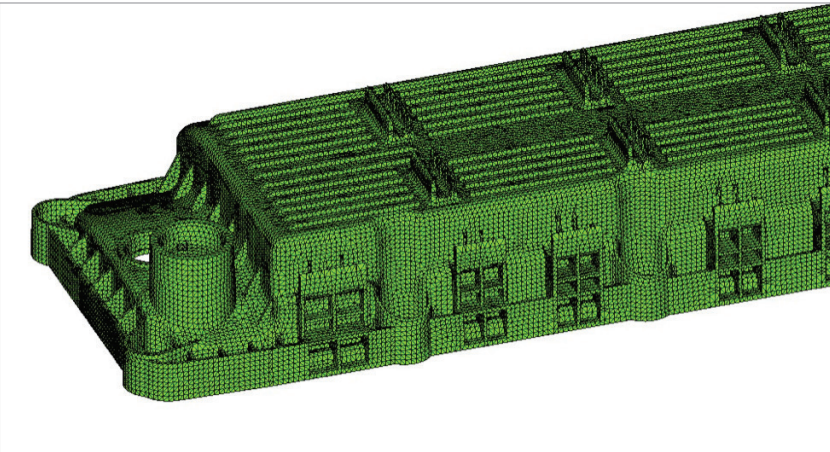
Prior to using SimLab, Dana relied on written documents to record settings and results for meshing. Now, the SimLab templates have enabled Dana to share its time-saving simulation steps with its other facilities across the globe. “We have been able to implement templates for mesh controls in

other Dana R&D centers, using the same template across all locations,” Ramkumar says. “Now we’re aiming to automate the whole meshing process to the point that it can be carried out with few mouse clicks.”

Ramkumar says SimLab has allowed Dana to obtain much better convergence for its large models because the process begins with higher-quality meshes. “We don’t have to cut corners or manipulate to get an analysis to run,” he says. “We therefore may have a better analysis overall and ultimately a better-performing product.



At Dana virtual analysis is always conducted before building a prototype



Complex components like the plastic valve cover shown here, can be meshed easily and quickly in SimLab