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Renault Nissan Mitsubishi Alliance Uses Altair SimSolid™ to Bring Vehicles Chassis Faster onto the Road

Renault Nissan Mitsubishi Alliance is a French-Japanese strategic partnership between the automobile manufacturers Renault (based in France), Nissan (based in Japan) and Mitsubishi Motors (based in Japan). Today, the automotive group has 122 manufacturing plants worldwide with nearly 450,000 employees controlling ten major brands: Renault, Nissan, Mitsubishi, Infiniti, Renault Samsung, Dacia, Alpine, Datsun, Venucia, and Lada. The ambition of the alliance is to offer autonomous drive, connectivity features, and services on a wide range of affordable vehicles. As part of the Renault Chassis Le Mans plant, which is building car-to-ground connecting components for the Renault Group and for the Alliance, the CTC Chassis Technical Center is a CAD engineering center where 350 engineers and technicians are working with a focus on testing and validation.

Their challenge

In today's hypercompetitive market the automotive industry is facing a multitude of challenges, including reducing the vehicles' weight. To face this challenge and make their cars lighter, Renault decreases mass on chassis components by combining new, lighter material Alu with topology optimization. Knowing that time-to-market is a key factor to stay ahead of the competition, and aligning to the corporate initiative "FAST" (Future-Ready At-Scale Transformation), the CTC had to find measures to reduce the lead time on the development of its products.

While traditional simulation methods such as finite element analysis are helpful to develop and deliver lighter and affordable cars, their usage could take a lot of time to achieve these goals. The idea at CTC was to find a new, easy-to-use simulation tool that would enable non-experts, part time analyst, and designers to gain insights and accurate results in early design phases of Renault vehicles chassis projects and projects for production line tooling/conveyors.

GROUPE RENAULT

Industry
Automotive

Challenge
Reduce time to market by enabling designers to gain early insights and achieve accurate results for lightweight vehicles.

Altair Solution
Using Altair SimSolid, designers without expert simulation knowledge were able to perform simulations to develop lighter chassis faster.

Benefits
• Accurate results (only 5-10% error rate)
• Lead time reduction (25 to 100 times faster)
• Easy-to-use solution

Our Solution

The Renault Chassis department has been working with Altair's solutions since 2010, using Altair HyperWorks™ units to access Altair OptiStruct™, Altair HyperMesh™, Altair SimLab™, and Altair Inspire™. When Anthony Reullier, digital simulation specialist and CAE leader in the Renault chassis team and welding referent for Renault, heard about the new solution Altair SimSolid at the ATC 2018 in Paris, he was interested from the start.

Using SimSolid does not require any expertise in analysis, so users can simply work with the raw CAD data and perform structural analyses on fully featured CAD assemblies within minutes. It eliminates geometry preparation and meshing, which are the two most time-consuming, expertise-extensive and error-prone tasks performed in a conventional structural simulation. These features convinced the CTC team around Reullier to start an evaluation project for the Chassis activities to find out how the simulation tool for structural analysis could be implemented in the Renault design process. Supported by Jules Tamdjo from Ecole Polytech Lille, the CTC evaluated SimSolid's accuracy and ability to be integrated in Renault Chassis design process to reduce time to market and give more flexibility to designers to evaluate their solutions faster. Their goal was to provide their designers with a software tool which enables them to design quickly in total autonomy based on their calculations results.
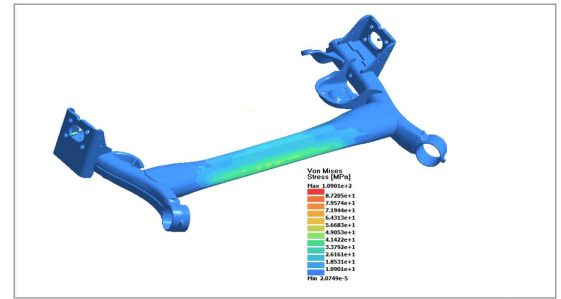
Results

Overall, the CTC team was very satisfied with the results of their evaluation. In particular, Altair SimSolid has underlined the value of the software by its accuracy level and the lead time reduction compared to the finite element method. They were able to achieve a reduction in lead time from weeks to hours (25 to 100 times faster than actual Renault process design loop) compared to the actual solution and an error rate as low as 5 percent to 10 percent on a defined perimeter of parts/systems. They also found that SimSolid is an easy-to-use solution providing autonomous design loop for part-time analysts and designers which means less paperwork and meetings.
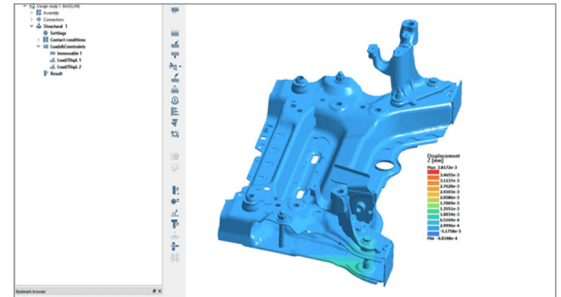
"To us, Altair SimSolid means efficiency. While the software quickly provides accurate simulation and optimization in one step it does not require any expert knowledge. No expertise in analysis is necessary and especially no meshing is required," said Anthony Reullier. "Also, SimSolid helps our designers to develop with confidence as we can rely on the results."

Using SimSolid, there is no need to compile a report.

Calculating stiffness in SimSolid

SimSolid enables development teams to significantly reduce lead time

> "To us, Altair SimSolid means efficiency. While the software quickly provides accurate simulation and optimization in one step it does not require any expert knowledge. No expertise in analysis is necessary and especially no meshing is required. Also, SimSolid helps our designer to shape chassis components with confidence based on the SimSolid simulation."

Anthony Reullier
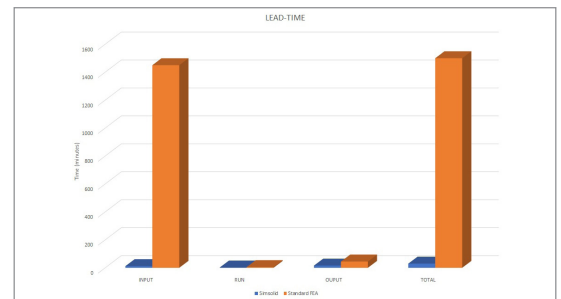Digital simulation specialist and CAE leader at Renault

The Chassis development department in Le Mans was happy to have found a tool providing them with accurate results, while offering also non-simulation experts access to simulation and optimization. One of the main benefits is the time saving the new solution offers to them. The overall lead time reduction amounts up to several weeks, which also translates to cost savings for the overall development process. The Chassis team was very satisfied with customer partnership and specific customization Altair was offering.

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