



LIGHTER, STRONGER, QUIETER VEHICLES

NEW DESIGN SPACE WORKFLOW FOR STRUCTURAL INSERTS AT SIKA

About the Customer

Sika is a specialty chemicals company and a leader in developing and producing systems and products for bonding, sealing, damping, reinforcing, and protecting in the building sector and motor vehicle industry. Offering a wide range of body-in-white (BIW) noise reduction and vibration damping solutions and addressing problems encountered in automotive development, Sika is a key development partner for both automotive OEMs and suppliers. Sika's structural systems team focuses on solutions reinforcing the customer's BIW and noise, vibration and harshness (NVH) issues, supporting and consulting customers in adhesive topics, providing material cards, contributing towards research projects, and analyzing and testing structural materials. With its ultra-lightweight constrained layer material composite for structure-borne noise reduction, Sika is a winner of the 2018 Altair Enlighten Award. It's the company's philosophy to make today's vehicles lighter, stronger, safer, quieter, and greener.

Their Challenge

To meet today's weight and performance targets, many OEMs are looking for lightweight material solutions like reinforcement parts to achieve a low body mass while maintaining high stiffness. When it comes to NVH behavior, predicting the performance of these parts has been a major challenge within the automotive industry. Based on their broad experience with reinforcement parts for NVH topics, Sika has developed a standard process including an analysis of the BIW with full volumes to detect sensitivities and to get an overview of the potential performances and the locations in the BiW. Based on those results, the company usually develops a first design and then optimizes the weight and design. This step usually takes many iterations until the best trade-off concept with maximum performance at lowest weight is developed.

70% ▼
REDUCED MODELING
TIME

CAPABLE OF DESIGNING
UP TO
5 ▲
MORE ITERATIONS

100% ▲
DESIGN CONFIDENCE



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To gain a deeper understanding about where it is best to put material in the BIW, the team uses Altair® OptiStruct® for structural and NVH analyses in their workflow. Sika was very happy with the results, but its engineers were striving for even more improvements. To further optimize its workflow, especially regarding simulation time, Sika asked Altair to review its current approach to NVH studies.

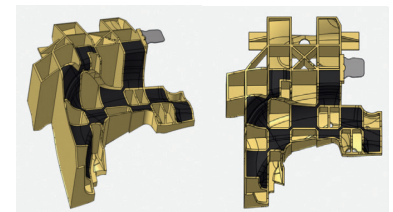
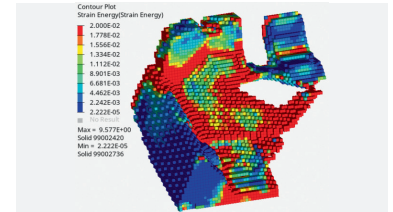
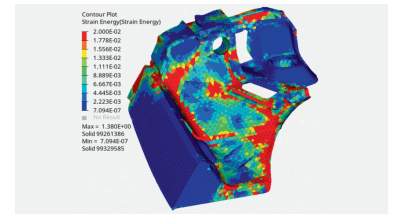
Our Solution

Following a thorough review of the Sika workflow, Altair identified several areas with room for improvement. To quicken the development process, the simulation experts suggested Altair's design space workflow, a new, powerful, and easy-to-use solution for design space creation for topology optimization and results interpretation which is integrated in Altair® HyperWorks®. In this specific case, Sika wanted to study a D-pillar upper part. Adhering to their traditional workflow, it takes up to 3 hours to create surfaces and edit them to create closed volumes (tetra mesh) until the simulation can be run. Conversely, using Altair's design space workflow, the engineers defined the design space, then created a voxel mesh and modified the intersection. The time they saved using this new workflow is considerable: It takes the engineering team less than 40 minutes until the cavity is ready for simulation. Based on the new process, the engineers gained important insights that helped them decide where to place the first ribbed concept. In addition to the accelerated decision making of the new workflow, the engineers also benefit from the solution's ease of use, which allows them to achieve results faster and easier than before.

Results

Using the Altair design space workflow, the Sika engineers eliminated time-consuming steps in their workflow and generated results more efficiently, which let them make faster go/no-go decisions regarding potential reinforcer locations in the BIW. Instead of hours in the prior standard workflow, Sika achieved the required results within minutes. Since modeling time was reduced by 70%, the team can spend more time gaining a deeper knowledge of the part and on engineering to run more iterations to improve it further. Thanks to the saved time, Sika could efficiently develop BIW parts and integrate these into the various working environments with the customer. Not only did Sika benefit from the Altair team's simulation expertise, it also benefitted from the constructive collaboration, which optimized the application of Altair's software solutions.

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TOP: Adhering to the traditional workflow, the model preparation took Sika engineers up to three hours. **MIDDLE:** Using the Altair design space workflow the engineers realized significant time savings. **BOTTOM:** Example of a D-upper NVH reinforcer