Altair | Partner Alliance

Altair's Products and Partners Offering Assist Commercial Vehicles Seat Manufacturer to Enhance its Development Process

ISRI ISRINGHAUSEN

Key Highlights

Industry
Automotive

Challenge
Create customized seats while optimizing weight, durability, and meeting safety standards.

Altair Solution
Utilize APA Software DesignLife, Moldex3D, KEY to METALS along with RADIOSS, MotionSolve, OptiStruct and more.

Benefits
- Accurately study part feasibility
- Optimize the forming cycle
- Reduce physical tool try-outs

Customer Profile

As a global player, the AUNDE Group, with the AUNDE and ISRINGHAUSEN brands, offers the entire process chain from yarn to seat in the van, truck and bus divisions. A development team comprising more than 250 designers and engineers with 27 regional design and development sites in 14 countries has to respond to the market and development trends from around the globe, realizing customer wishes in a region-specific manner. The latest ISRI® trend studies reveal innovations in the fields of functionality, comfort and sustainability.

ISRINGHAUSEN is the global market leader in the development and manufacture of innovative seating systems for commercial vehicles as well as technical springs. The company's products are used in trucks, buses, vans and construction equipment. 49 plants across 20 countries form the backbone of the company's manufacturing infrastructure.

Made-to-measure products for the leading names in commercial vehicles are manufactured by a global workforce of 5,000.

The Challenge: Develop high quality truck seats quickly and cost efficiently

In the automotive industry, the pressure to develop new and better products faster and less expensive is very high - in particular for suppliers. To be ahead of the competition and to maintain a market leadership position in a certain branch, simulation engineers are expected to shorten development cycles by delivering virtual models that fulfill all customer specific requirements even before a first prototype is built. To meet these expectations, they need simulation tools that enable them to develop virtual models that behave almost exactly like a physical prototype and that can be manufactured as designed. The effort of prototype testing should ideally be reduced to the validation of the simulation results.

Keywords: Altair Partner Alliance, DesignLife, Moldex3D, OptiStruct, HyperMesh, RADIOSS, MotionSolve, Durability, Injection Molding

ISRINGHAUSEN Success Story

“We are very happy with Altair and the Altair Partner Alliance. The APA provides access to a very broad range of tools and at the same time helps us to control our CAE expenses... The APA gives us the possibility to cover a wide range of simulation areas, enhances our development process and helps us to save costs as well as to develop even better seats in a shorter time frame.”

Tore Holene,
Manager of the simulation department at Isringhausen

In addition, each customer of a supplier such as Isringhausen has different requirements and expects these to be met without raising the price of a product. In case of Isringhausen, i. e. some seats need to fulfill certain stiffness requirements while being at the same time lighter and at least not more expensive than a former seat model. To reach this goal, the engineers have to be able to compare different design variations without having to build many physical prototypes.

The Solution: A CAE platform that provides flexible access to many different simulation tools at reasonable cost

Without simulation, it would simply not be possible to develop truck seats in the expected time frame and at the targeted costs. Within the development process of a truck seat, many aspects have to be considered.

The seat has to fulfill certain safety standards, has to be stiff, light, durable, and it has to be producible. To assure that all of those specifications are met, a wide range of disciplines has to be covered in the development process of a truck seat. Next to structural analysis, the engineers have to cover the areas optimization, multi-body simulation, NVH analysis, durability, and safety. Additionally, they have to consider manufacturing aspects of the different components depending on the material they are made of.

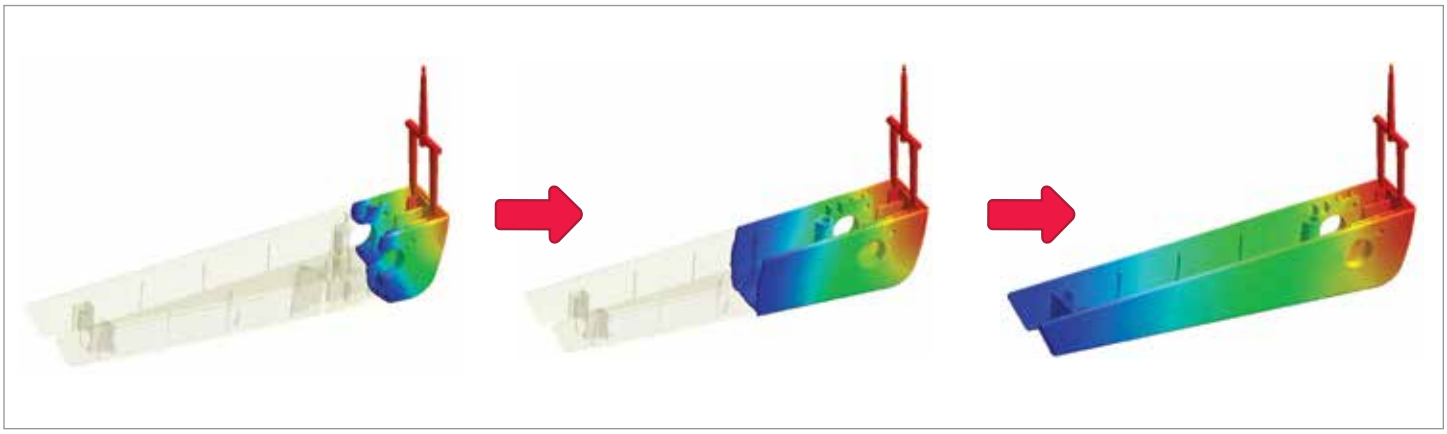
To cover all of those aspects in their development process, Isringhausen accesses the tools of the Altair Partner Alliance (APA) via Altair’s unique unit and subscription based licensing model. Customers use floating licenses to access a suite of third-party applications from Altair and HyperWorks partners, that can be employed with the same units used to invoke HyperWorks software.

The flexibility of these HyperWorks Units allows users to access the largest and most complete suite of CAE applications available in the market at no incremental cost and with no long-term commitment. The APA is constantly expanding its list of included software tools. The more tools are offered within the APA, the better the customer’s ROI in his software tools gets. Isringhausen today accesses more than ten different APA products and covers a major part of the CAE process with those tools. The employment and test of additional APA products is planned for the near future.

“Thanks to the APA, we have access to many different CAE tools, and we have the possibility to try out new ones without increasing our software-budget. The APA gives us the possibility to cover a wide range of different simulation areas and, moreover, allows us to test other products of the APA at no risk, no additional costs, and with no long term commitment,” says Tore Holene.

Multi body simulation of passenger seat on shaker table.

Model setup of bus seats with dummies for crash simulation.



Injection molding analysis performed by Moldex3D on a seat adjustment.

The Use Case – Development of a truck seat platform

Isringhausen developed a new truck seat platform as a basis for future truck seat projects. Within the development process of this new platform, the engineers applied many different simulation tools. The most important part of the project was simulating the structural strength of the seat platform to fulfill all legal and customer requirements applying to the seat structure. Since the needs vary from customer to customer, the requirements, in particular for crash test specifications, are wide spread, too. Within the project, the engineers also looked at several smaller load cases such as the strength of components or single parts within the structure. Furthermore, the simulation tools were used to investigate the manufacturability of components, such as stamping or plastic parts, to assure a flawless production. Finally, the engineers also investigated the durability of the structures with DesignLife.

In a project like this, the simulation engineers usually receive the geometry from the design department. The design department creates a CAD model which they then send to the simulation department for further analysis and simulations. Based on the simulation results, the CAD model is further developed and more details are added. The engineers then mesh the model again in HyperMesh to prepare it for the simulation.

“Since the Altair BatchMesher works very well for our needs and produces a good meshing quality, it is our meshing tool of choice. We are very happy with this tool, especially since the BatchMesher reduces the number of manual improvements, while improving the overall meshing quality” said Tore Holene.

After the model is prepared and has been meshed, everything is set for the simulation with different solvers. Isringhausen uses OptiStruct, RADIOSS, MotionSolve, plus one third party solver. To view the results and to generate .h3d-files, pictures and curves, HyperView is used at the end of the simulation cycle.

Moldex3D, also available via the APA, is used to simulate the injection molding plastic parts such as handles for seat adjustments, or coverings. The simulation with Moldex3D is applied to ensure that the parts are designed in a way that will not cause problems in the manufacturing process. Unequal cooling of the parts causes unequal shrinkage, distortion and dimensional inaccuracies. Other problems like sink-marks, air-traps and weld-lines are also detected and removed before injection molding tools are built.

To predict and avoid manufacturing problems of deep drawn sheet parts, another product included in the HyperWorks suite, HyperForm, is applied to perform forming simulation in an early stage of the development process. HyperForm offers a simple and easy tool for a quick but yet fairly reliable assessment in the initial stages of development, as well as a powerful tool for in-depth investigations where the tool specifications are taken into account.

Typically, a truck is expected to last 3 to 6 times longer than a passenger car, and failures causes much higher cost. Therefore, fatigue strength is a subject of great importance. DesignLife is applied for fatigue analysis, to study durability issues of components and complete seat structures under specified loads and for product life cycle requirements.

Results: Cost and time savings in the development process with maximum software flexibility

The major advantage the APA provides to Isringhausen is that the engineers are able to develop products faster, with less physical prototypes and lab tests, and hence - at lower costs. “If we have good simulation results, we usually do not need many prototypes and lab tests to finish the project. Before we started with simulation, many tests were necessary to find a design which fulfills all technical requirements. All in all, the tools of the APA and our simulation process save us a lot of time and costs in this area,” explains Tore Holene.

In addition, the engineers have more possibilities for weight optimization where among other tools OptiStruct and HyperStudy are utilized. Compared to a physical prototype and test based development process, a virtual development process is faster, less cost intensive, and it reveals where the product might have too much material and therefore still can be weight optimized.

“With the tools we use we can assure the required stiffness with as little material as possible. A lab test on a prototype surely can show us where a part has weak points and needs reinforcement. What it cannot do however is to show where a part has more material than needed, and where it has optimization potential. This is only possible in a simulation model. Hence, with the simulation we have much more possibilities for weight optimization and of course for cost reduction,” Tore Holene concludes.

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About Altair

Altair empowers client innovation and decision-making through technology that optimizes the analysis, management and visualization of business and engineering information. Privately held with more than 2,000 employees, Altair has offices throughout North America, South America, Europe and Asia/Pacific. With a 28-year-plus track record for high-end software and consulting services for engineering, computing and enterprise analytics, Altair consistently delivers a competitive advantage to customers in a broad range of industries. Altair has more than 3,000 corporate clients representing the automotive, aerospace, government and defense, and consumer products verticals. Altair also has a growing client presence in the electronics, architecture engineering and construction, and energy markets.

About Altair Partner Alliance

One Platform. One License. One Source. **All Access**.

Altair's HyperWorks platform for enterprise analytics has been opened to third-party applications, all of which are available to customers under one license using the revolutionary on-demand software licensing system. Altair extends the HyperWorks Platform from 28 internally developed solutions to over 70 applications with the addition of new partner applications. Customers can invoke these third party applications with little or no incremental cost utilizing their existing HyperWorks licenses.

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