##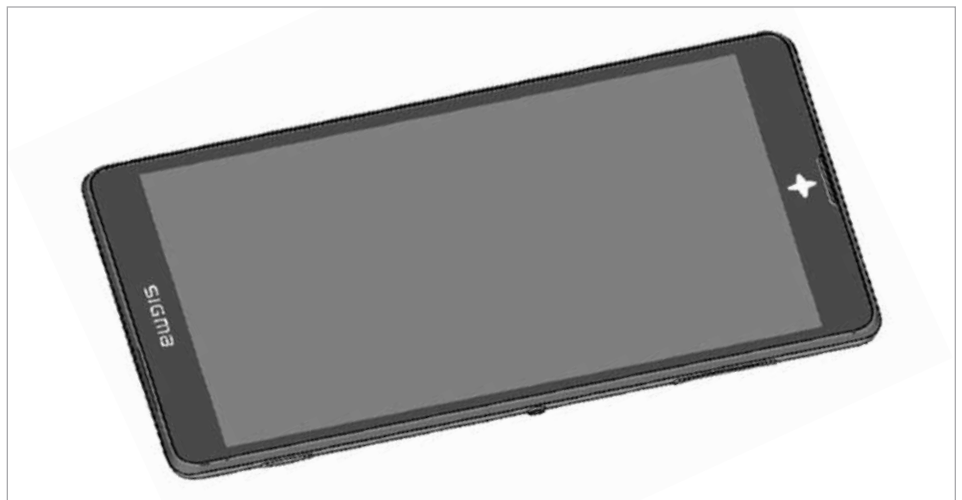 Getting it right the First Time; how FE-Simulation with RADIOSS supports Sigma Connectivity in Streamlining the Development Process

About Sigma Connectivity

Sigma Connectivity is a world leading development service organization in Lund, Sweden, offers connectivity solutions to a broad range of industries, including telecommunications, security, transportation, aviation, facility management, automotive, and healthcare. To reduce costs and to streamline development processes the company relies on CAE software and has recently switched from an external nonlinear simulation solver to RADIOSS, the nonlinear solver of Altair's HyperWorks CAE suite. As a result of this successful change and by using Altair's flexible unit based license system, the company was able to streamline and improve its development activities in terms of licensing costs and access to a broad set of simulation tools for various application disciplines.

From this new setup Sigma Connectivity as well as its customers will benefit with regards to a more competitive pricing and sophisticated virtual investigations early in the development process.

Sigma Connectivity was established in 2013, when Sigma acquired Sony Mobile's world leading development unit for mobile hardware in Lund, Sweden. Sigma Connectivity offers R&D, product development, quality assurance, production technology, and software development services related to connectivity solutions to a broad range of industries including telecommunications, security, transportation, aviation,facility management, automotive, and healthcare. The application fields range from antennas, RF, mechanics, optics, acoustics, industrialization, and production

Key Highlights

Industry
Connectivity solutions, Engineering services

Challenge
Handle simulation diciplines such as bending, torsion, connector stability impact and thermal heating

Altair Solutions
Altair HyperWorks

Benefits
- Reduced license costs
- Decreased number of software vendors and related support teams
- Broader simulation portfolio to offer

Sigma Connectivity Success Story

"With HyperWorks we can quickly give feedback to our engineers and optimize our design more target oriented. The HyperWorks units allow us to freely use any tool within the suite itself as well as any software from the broad offering of the Altair Partner Alliance, which helps us to serve our customers better, faster and at even more compatible prices."

Petter Olofsson
Senior Manager Mechanics
Sigma Connectivity

technology solutions. The in-house lab facilities provide unique opportunities to perform advanced testing to ensure product quality and compliance with relevant standards and requirements. Among the company's customers are small start-ups and multibillion corporations alike. Sigma Connectivity is working closely with its sister companies in the Sigma Group in order to provide end-to-end solutions – back-end systems, applications, devices and information management. More information on Sigma Connectivity can be found at: sigmaconnectivity.se.

Challenge - handle all simulation types with one virtual prototype

The development of connectivity solutions involves a diverse set of application areas, which all have to be investigated. Products such as mobile phones have to pass certain tests regarding bending, torsion, connector stability, impact, thermal heating, pressure on sensitive areas, and failure of the device. Instead of building expensive prototypes for physical testing, time and costs can be saved by creating a virtual prototype and by using simulation early in the product

development process. Making and finding mistakes in a simulation set up is simply a lot more cost efficient compared to finding them after the first physical prototype is built.

Some of the simulation processes Sigma Connectivity employs are impact and drop test simulations to ensure that critical components are not damaged when hit by an object or falling down. With these types of simulation the development engineers can assure avoiding a loss of functionality after an impact or fall. Additionally, they look for cracks and permanent deformations that might affect the products' structural integrity.
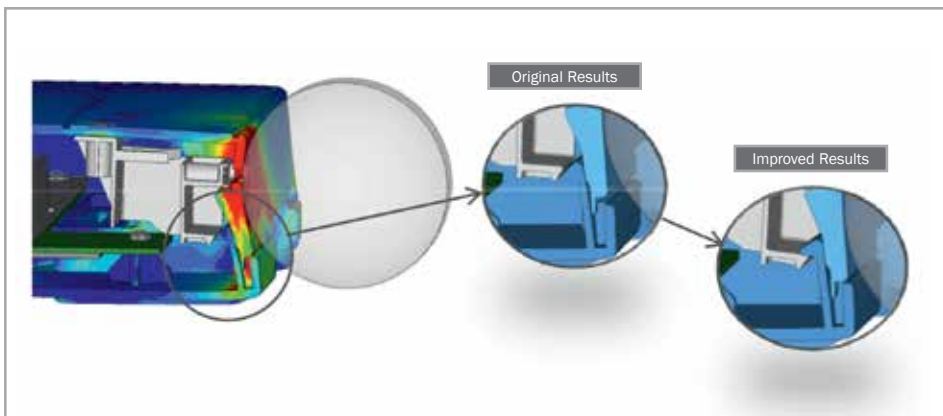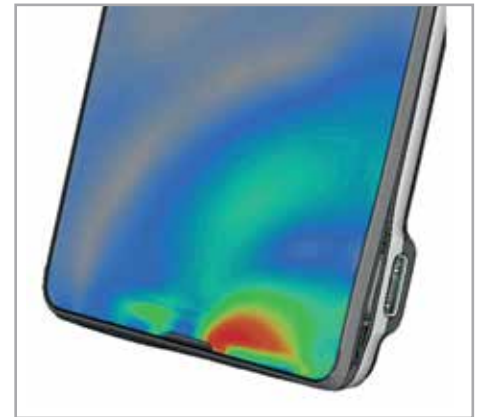

Simulation results show a falling object hitting a network door controller. Cause of failure was identified, design optimized and model was ready for final prototype build.

Area of interest in an impact simulation, all simulation types are handled using the same virtual prototype.
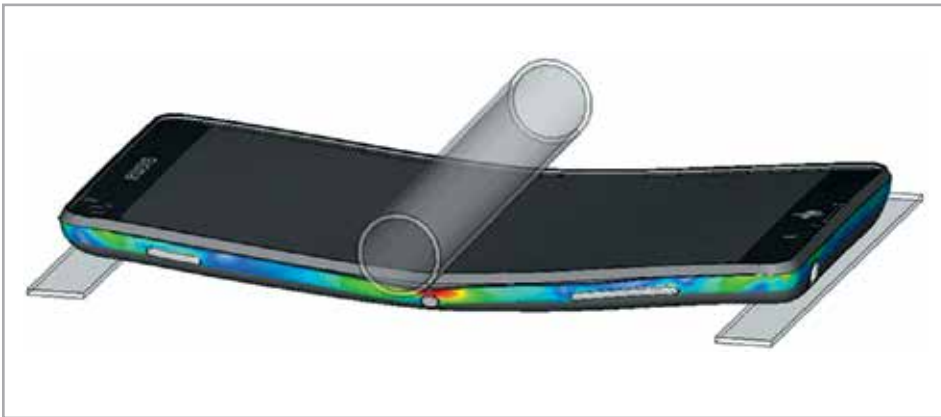
Bending simulation showing stresses.

Impact simulation on glass panel.

By means of another type of simulation, thermal simulations, the engineers investigate how thermal hot spots and critical component temperatures within i.e. a phone can be avoided.

Simulation is extensively used in the early development phases at the Sigma Group, where about 10-15 engineers are working with different types of simulations. For mobile phones, to name but one development example, Sigma performs 10-20 simulations within 2 weeks, iterating this process 3-4 times during the development phase.

To address all needed simulation disciplines Sigma Connectivity has to invest in software solutions, which often come from different software vendors. To reduce the company's software licensing efforts Sigma Connectivity sought to decrease the number of software vendors while at least keeping or ideally increasing their ability to address the needed simulation disciplines. Among the first Altair tools the engineers at Sigma had implemented in its development processes are HyperMesh, the pre-processor of Altair's HyperWorks CAE suite and HyperView, which is employed for post processing. By increasing the usage of Altair tools and also employing solvers such as RADIOSS the company strived to cut down the numbers of software providers and license costs.

Solution - access to most CAE applications needed via one vendor

Being a HyperWorks user since 2004 (still Sony Ericsson at that time) Sigma Connectivity recently started a benchmark to switch from their external nonlinear FE-Solver to RADIOSS, which is included in the HyperWorks suite. The development process of Sigma Connectivity starts in the concept phase where HyperMesh is employed to mesh the virtual prototype coming from a CAD system. In the past, the meshed geometry was subsequently simulated with an external nonlinear solver and the results were transferred to HyperView for post processing. Since Sigma Connectivity draws on HyperWorks units for the licensing of all the software included in the HyperWorks suite, they are free to also use any other tool within the suite. In addition to the HyperWorks tools, Altair's flexible units based licensing system also offers access to any other software from the broad offering of the Altair Partner Alliance. This alliance offers a software application platform where customers can invoke third-party applications at no incremental cost using their existing HyperWorks units. By accessing RADIOSS with their existing units the company could consolidate its software costs because they reduce the need to employ an external solver with additional license fees.

For the benchmark, which aimed to prove that RADIOSS would be similarly well suited for the needed non linear FE-solving tasks, Sigma Connectivity made use of a former project which has the development complexity of a mobile phone. The Benchmark itself was performed by Altair in Lund. The Altair HyperWorks support engineers involved in the benchmark worked with the given input from Sigma to define the correct element types, connectors and other elements in RADIOSS, to basically receive the same properties and results as with the external solver. A couple of load cases and some different scenarios had been set up and the results were compared with those coming from the formerly used solver. After the good results of the benchmark Sigma Connectivity, being supported by Altair ProductDesign engineers, decided to use RADIOSS in a real life project which was also successful.

Now, with the RADIOSS solver in place, Sigma Connectivity still uses HyperMesh for meshing and HyperView for post-processing tasks. Additionally, RADIOSS is employed for most of the dynamic and quasi-static simulations and PBS Professional as well as e-compute is used for their queuing system on the cluster. Also, PBS Professional, Altair's HPC workload management solution, is licensed via the same HyperWorks units.

In addition to the above listed tools the company also recently started to use AcuSolve for thermal simulation and Evolve to create realistic renderings of products that don´t yet exist. Furthermore they are planning to use OptiStruct for thermal analyses in the near future. So far, Sigma Connectivity uses the material database Total Materia from the Altair Partner Alliance, and the APA offers additional tools that might be interesting for future projects as well. All of these tools, including the HyperWorks suite, PBS, and the APA tools can be directly accessed by the Sigma engineers using their existing HyperWorks license units.

Benefits of an integrated simulation approach

By applying different types of mechanical and thermal simulations a product can be developed with higher quality in shorter time. It is also important to better understand the root cause of a failure in field or in internal testing. With the successful switch from the external solver to RADIOSS, the nonlinear solver of the HyperWorks suite, Sigma Connectivity can handle close to all needed simulation disciplines for their development processes more cost effectively.

HyperWorks, including its solvers, and Altair's flexible licensing system enables Sigma Connectivity to:

- reduce license costs by using the same license unit pool successfully for many different types of software tools.
- decrease the number of software vendors and related support teams.
- offer a broader simulation portfolio to the customers.
- offer its engineering services at more compatible prices, since the software costs significantly decreased with the HyperWorks licensing system.

"Since we already had HyperMesh and HyperView in place, looking back at the effort involved in switching from our former solver to RADIOSS, the transition was relatively easy and we were up to speed, using RADIOSS in a real life project much earlier than expected. This was due to satisfying results from the solver due to being able to do the same type of analysis without spending too much extra time on the new solver. We are looking forward to the next RADIOSS release, which will surely improve our processes further."

Henrik Persson
Senior CAE Analyst, Sigma Connectivity

About Altair

Altair is focused on the development and broad application of simulation technology to synthesize and optimize designs, processes and decisions for improved business performance. Privately held with more than 2,600 employees, Altair is headquartered in Troy, Michigan, USA and operates more than 45 offices throughout 24 countries. Today, Altair serves more than 5,000 corporate clients across broad industry segments.

www.altair.com

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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