Automating the Simulation Process at AMCOR

Key Highlights

Industry
Packaging

Challenge
Automate pre-processing to create input decks for different load cases in one process template

Altair Solution
Application of Altair's Impact simulation Director

Benefits
- Reduction in preprocessing time
- User errors declined
- More time for research & development

In today's remarkably competitive markets, the packaging industry needs to be highly responsive to the rapidly changing industry they operate in. New products are being produced all the time, and packaging professionals must maintain a fine balance between packaging performance, environmental impact and shelf appeal while keeping costs to a minimum.

Headquartered in Ann Arbor, Michigan with over 59 manufacturing plants in 13 counties and over 6,000 employees, Amcor Rigid Plastics is a leading product supplier for food, beverage, healthcare, personal and homecare packaging segments. Working within the rigid plastics industry the demand for sustainable practices are high. The industry is under pressure to create more environmentally friendly products.

Packaging is often maligned, even considered environmentally un-kind. It typically makes up a small cost of the overall product and is considered a throw away item However, if the package does not meet its requirements then spoilage can occur or even food safety can be compromised, with much higher costs.

Amcor is continually looking for innovative and lightweight container designs which would be aesthetically pleasant and have an ease in handling for the consumer without compromising the quality, performance or safety. Simulation plays a major role in ensuring Amcor's lightweight packages meet the functionality requirements.

Keywords: process automation

AMCOR Success Story

“Thanks to the Altair ProductDesign team, we have been able to reduce our virtual testing time significantly. The Impact Simulation Director is fully integrated into our design process and has allowed our engineers to concentrate on research and development, not consumed with model building and set up tasks. We have potentially identified the areas on automating the tool further which should help in reducing the pre- processing time even more.”

Omkar Dole
FEA Scientist II
AMCOR Rigid Plastics

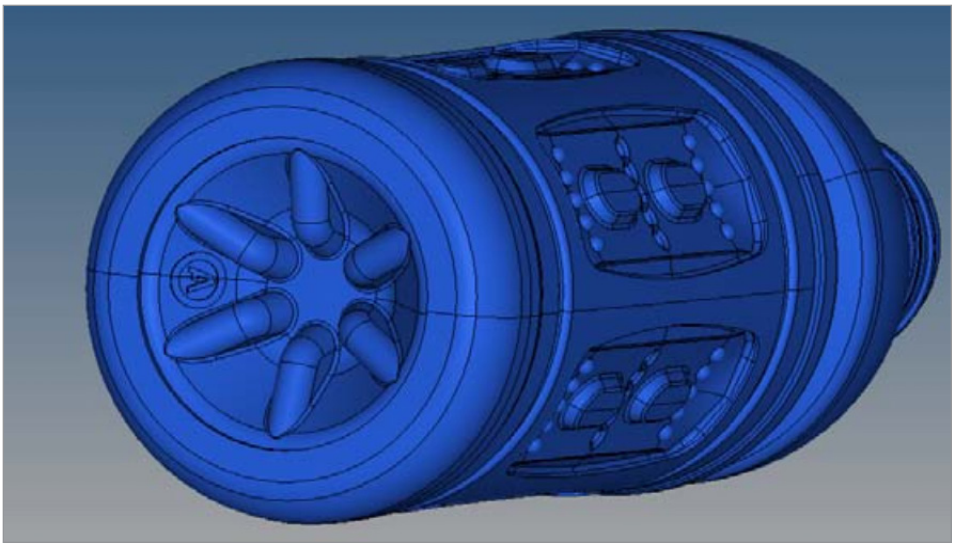
Long time users of Altair’s HyperWorks suite, the Amcor team was using the software to create accurate finite element models of the concept designs from the CAD teams in order to assess their performance in the virtual world. Amcor wanted to explore ways that it could accelerate the engineering and analysis tasks associated with the development of new packaging products.

The Amcor team met with Altair ProductDesign’s Enterprise Solution Group (ESG), a team that specializes in assessing and improving product development processes and workflows. The ESG team worked with Amcor’s simulation specialists to identify where time and eventually costs could be saved within the design process. The team discovered that the virtual test process used to investigate the performance of new packaging designs under various loading and impact scenarios, tied up a large amount of the simulation team’s time. To accelerate this process, Altair ProductDesign suggested that Amcor could take advantage of the Impact Simulation Director.

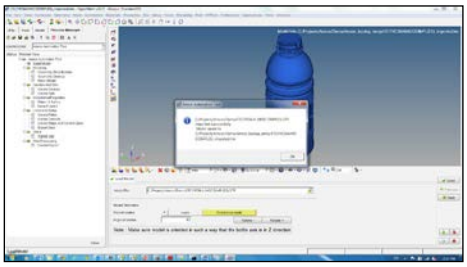
Applying the Impact Simulation Director

The Impact Simulation Director, or ISD, automates the laborious, manual tasks

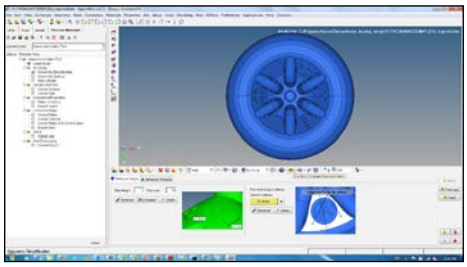
Capturing results of a filled cap top load analysis through HyperView



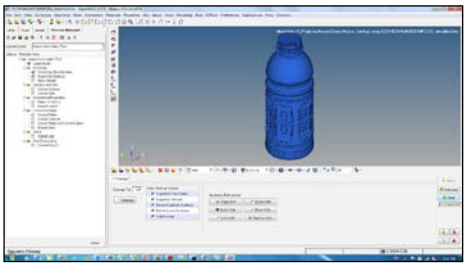
Raw CAD of an Amcor bottle imported into HyperMesh



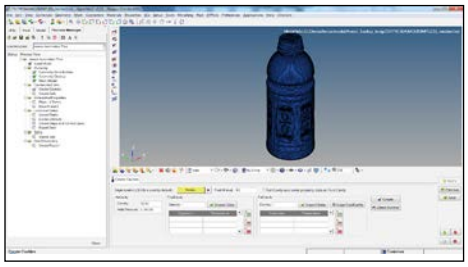
1. Import geometry



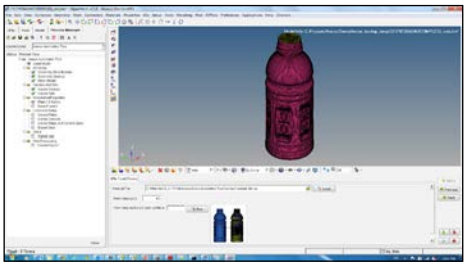
2. Simplify complex geometry



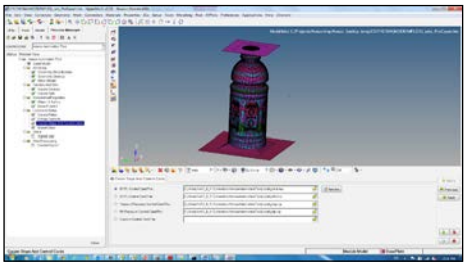
3. Clean up model



4. Mesh the model



5. Create sets



6. Export model for analysis

associated with model setup, analysis, post-processing and reporting. When tailored to an organization's specific procedures and best practices, the ISD is designed to reduce development time and costs while enhancing product robustness and performance.

Altair ProductDesign worked closely with Amcor's team to understand the existing impact simulation process in order to identify how the ISD could be best implemented to avoid disruption to the ongoing product development cycle. On-site training sessions were organized to help achieve a quick and effective adoption of the solution.

Once implemented, the ISD was able to accelerate the modeling process by allowing the user to define mesh criteria for each part, automatically mesh the model and then quickly check mesh quality and status. Amcor's users can assign materials and properties to all the parts according to the solver specific material file as well as checking and fixing penetrations and interference for all the parts and sub-assemblies.

The solution guides the analyst through the impact simulation process, creating solver decks from CAD geometry for a wide variety of analyses. For Amcor, this included 'Empty Vented Top Load' – where the empty bottle is analyzed for a buckling load, 'Filled Capped Top Load', where the fluid will be filled in the bottle, capped and analyzed for buckling load, and 'Vacuum Response', tests the container to see if the container is able to absorb vacuum, and 'Fill Pressure', checks to see if the container is able to withstand the filling pressure.

Reducing Manual Effort from Hours Down to Minutes

What used to be a long tedious labor intensive practice that would previously have taken Amcor's team as long as a few hours, has been simplified to a matter of minutes using the ISD solution. The team has been able to save a considerable amount time during the virtual test stage. For example, the company estimates that its team is now 60% more efficient in the pre-processing stage since implementing the solution for the simplest cases..

By accelerating the crucial performance analysis stage, Amcor is now able to allow its engineers and designers to focus more on research and development for future projects. In an industry where innovation is key, this is a big bonus for Amcor whose engineers no longer need to spend a large amount of their time modeling products and setting up analysis studies.

Amcor and Altair ProductDesign are currently in the process of creating more refinements to increase the range of containers that the tool can handle and we are looking forward to complete automation of the pre-processing in the future.

For more information please visit:
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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 2,200 employees, Altair has offices throughout North America, South America, Europe and Asia/Pacific. With a 30-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 5,000 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 ProductDesign

Altair ProductDesign is a global, multi-disciplinary product development consultancy of more than 800 designers, engineers, scientists, and creative thinkers. As a wholly owned subsidiary of Altair Engineering Inc., this organization is best known for its market leadership in combining its engineering expertise with computer aided engineering (CAE) technology to deliver innovation and automate processes. Altair ProductDesign utilizes proprietary simulation and optimization technologies (such as Altair HyperWorks) to help clients bring innovative, profitable products to market on a tighter, more efficient time-scale.

www.altairproductdesign.com

About HyperWorks

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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