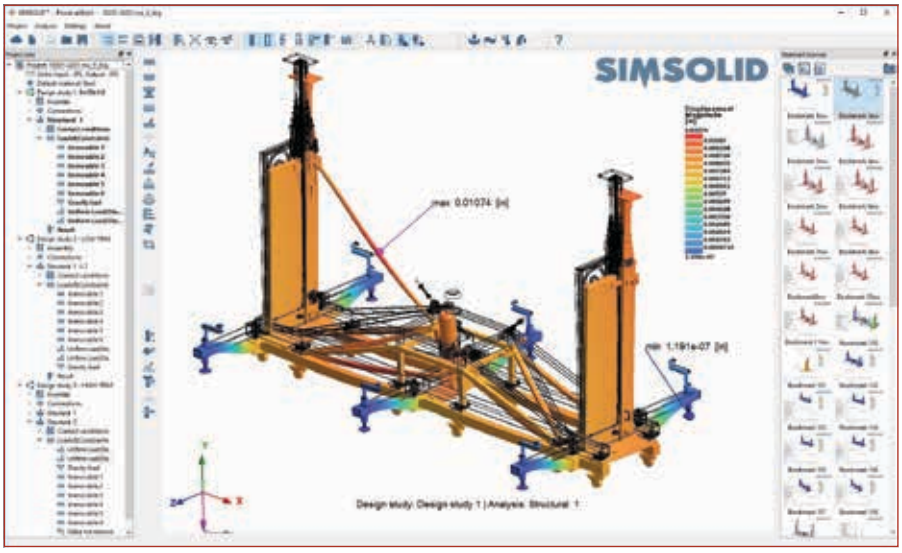
Revolutionising FEA with solid simulation

Altair SimSolid offers a paradigm shift in engineering design by providing fast, accurate, and easy to generate FEA simulation results to enable confident decision making. Ernst Burger, senior business development manager at Altair South Africa explains.



SimSolid can solve multiple physics problems such as those required for complex structures, while eliminating the need for geometry simplification, meshing and solver setup associated with traditional FEA.

A SimSolid analysis result for a grapple hook.

Computer Aided Design (CAD) and Computer Aided Engineering (CAE) are intrinsic parts of product development. CAE simulation tools are extremely important because they allow for performance validation and optimisation of a product design before the product is physically created. Up to now, structural analysis of parts and assemblies was typically done at the latter stages of the product development process and such simulations required experts in the use of Finite Element Analysis (FEA) software.

Altair SimSolid is a full-featured structural analysis software package that was developed specifically for design engineers. It can solve multiple physics problems such as linear and nonlinear static, resonant mode, heat transfer, thermal stress and linear dynamics scenarios. It eliminates geometry simplification, meshing and solver setup, which are the most time consuming and expertise intensive tasks in traditional FEA.

The SimSolid difference

Altair acquired SimSolid late in 2018. It is a next generation, high-fidelity, structural analysis tool that uses computational methods that operate on original, unsimplified CAD geometry without the need for an FEA mesh. Altair SimSolid can solve very large assemblies on a standard desktop computer and is the perfect complement to existing CAE specific or CAD embedded simulation. It extends their analysis range to larger models and provides feedback within minutes, if not seconds.

"Altair is continuously developing and looking for game changing technology that fits with our ethos of simulation driven design. Altair SimSolid positions engineering simulation technology and structural analysis far earlier in the design process than has been feasible in the past and makes simulation accessible to a much broader spectrum of designers, improving decision making in every stage of the product design cycle." says Burger.

"It is time consuming to do geometry clean-up and to make an accurate mesh to run classic FEA simulations, so often the simulation of product behaviour is only done once a CAD design is nearly finalised. This process often requires several iterations and multiple people to support it. During the design process, design engineers will go through multiple iterations of a CAD design, but, without this simulation feedback, they lack a full understanding of how the changes and design trade-offs might affect the product's performance," he argues.

"When we saw this software, our CTO said: 'This is going to change the way product designers create products'.

"We truly believe that SimSolid is something that will help the community of CAD designers and CAE Engineers. We are democratising technical knowledge about the performance of products and making this knowledge available to a much broader array of users. Giving people the ability to understand the way products are going to react in the real world while they are still in the initial design phases allows users to make decisions and arrive at optimal designs much more quickly," Burger explains.

A common misnomer is that, by introducing simulation in early-stage design, you run the risk of making functional but boring designs and losing uniqueness and the human touch.

Altair believes that empowering users with information and simulation tools enhances the creative freedom a designer has. With simulation feedback, designers can explore bold design modifications to see if they are going to have a positive, negative or neutral effect on the product's real-world behaviour.

"By leveraging simulations early in the design process, designers can confidently make styling decisions without compromising performance and risking multiple redesign iterations with engineering teams. Great designs that will perform to the company's engineering specifications can be created quickly, speeding up reaction times and time to market," concludes Burger. ❑