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Success Stories

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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 1,800 employees, Altair has offices throughout North America, South America, Europe and Asia/Pacific. With a 27-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 solidThinking Inspire

solidThinking Inspire enables design engineers, product designers, and architects to create and investigate structurally efficient concepts quickly and easily. Traditional structural simulations allow engineers to check if a design will support the required loads. Inspire enhances this process by generating a new material layout within a package space using the loads as an input. The software is easy to learn and works with existing CAD tools to help design structural parts right the first time, reducing costs, development time, material consumption, and product weight.

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Altair

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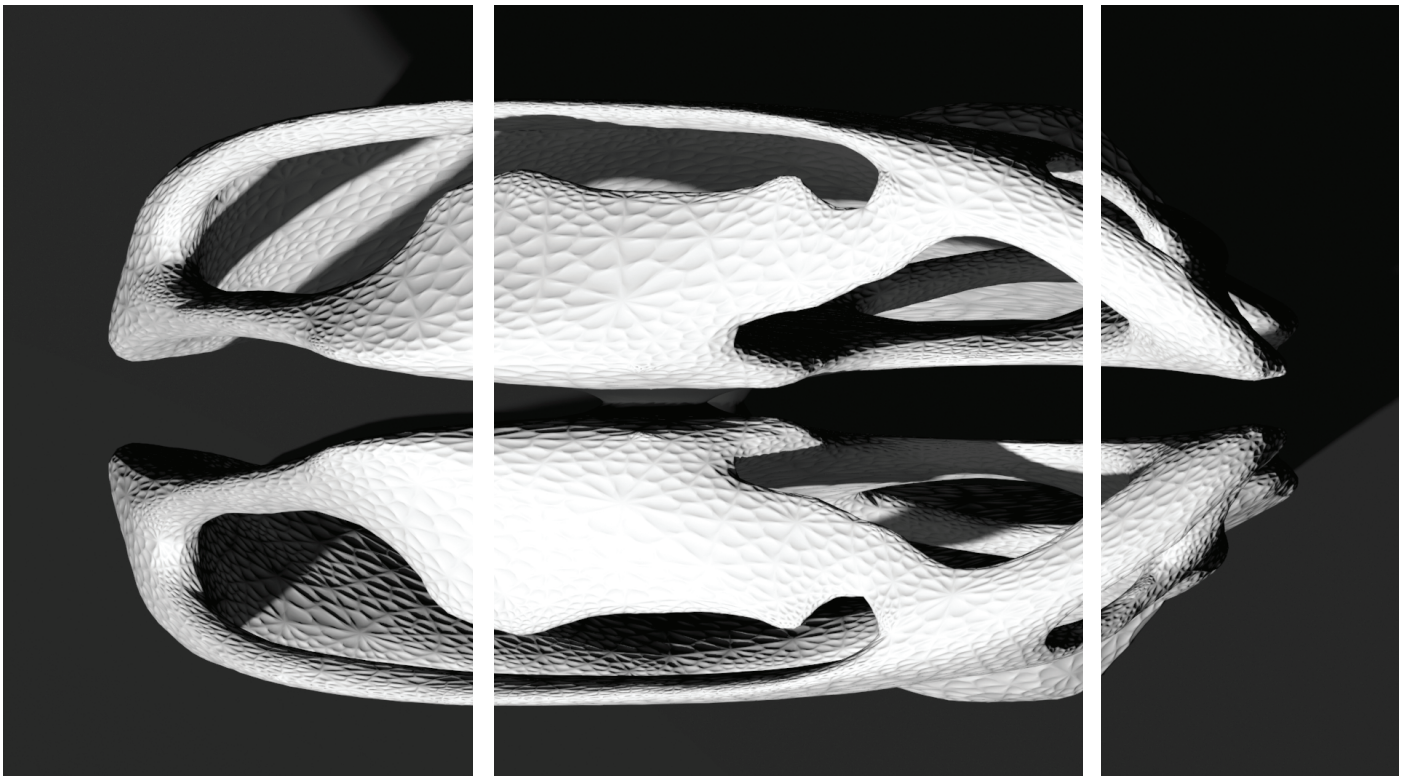
Assa Ashuach uses solidThinking Inspire to Optimise 3D Printed Stool Design



Assa Ashuach Studio

Key Highlights

Industry
3D Printing

Challenge
To produce a light and economical 3D printed stool

Altair Solution
Use solidThinking Inspire to remove any redundant material according to stress zones on the surface

Benefits
- Faster production time
- Energy saving

Designing and making products can be a time consuming and costly process. There is also an issue of material waste along the way. Designers are increasingly looking to produce more customised products suitable for the individual user without compromising on quality and cost.

Thanks to Additive Layer Manufacturing, products can now be designed using the least amount of material to achieve substantial weight and cost savings, while still meeting their required performance criteria.

Industrial Research and product design consultancy Assa Ashuach Studio, design and manufacture lifestyle products and also limited edition studio pieces using new design and production methods to achieve unique forms and aesthetic qualities.

The studio today includes a network of highly skilled specialists from the design, science and manufacturing sectors, using dedicated 3D software development, electronics and engineering as an integrated part of its design methodologies and philosophy.

Director Assa Ashuach wanted to design a stool which would be customised to support the weight of 120 kg. He was curious to find out how much material you could take away from the design space whilst still supporting this weight and at the same time achieving a unique design. In collaboration with Altair, Assa used solidThinking Inspire to complete this design process.

Keywords: Assa Ashuach, OptiStruct, solidThinking, Inspire, Design, Optimisation

Assa Ashuach Studio Success Story

“A 3D object has no boundaries. We are all unique. We can conform geometries on your body shapes. That is why the user is in the centre of what I do. If we understand the user better. We can design better products.”

Assa Ashuach
Assa Ashuach Studio

solidThinking Inspire

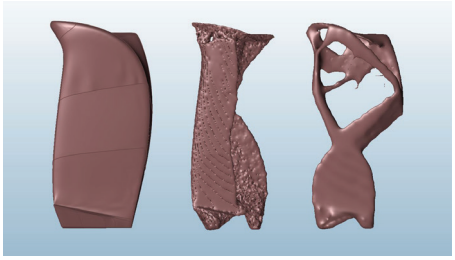
Altair's solidThinking Inspire uses industry-leading OptiStruct technology to enable product designers to generate and investigate structurally efficient concepts quickly and easily. Traditional structural simulations allow engineers to check if a design will support the required loads. Inspire enhances this process by generating a new material layout within a package space using the loads as an input.

Inspire allows you to import your design, create the design space and then define materials and loading conditions. From this point the ideal material layout is generated which you can then control to achieve the desired result of the final design. Reviewing the resulting concepts often reveals valuable insights.

The Making of the Femur Stool

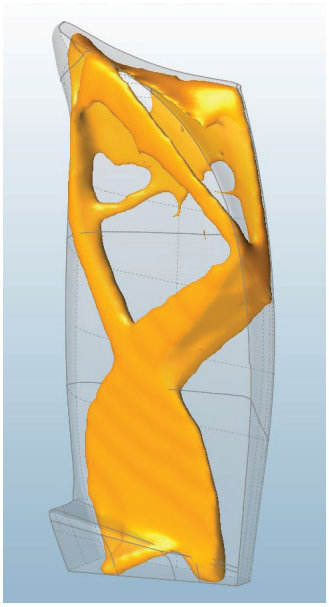
In this project Inspire removed any redundant material according to stress zones on the object surface. An optimisation of the exterior and material use was made to achieve a light and economical form. Produced by laser sintering, Assa Ashuach Studios managed to achieve a faster production time and energy savings by reducing the laser millage and distance to the final object layer.

‘Femur on Femur’ like the internal human pelvis and femur, this object shape follows the internal human bone structure and providing support that is optimised to a 120 kg.



Credits

The Femur stool was designed and data engineered by Assa Ashuach Studio in London at www.assaashuach.com in collaboration with Altair solidThinking for the mathematics and simulation and 3T RPD for the digital manufacturing and post processing.



Digitally designed and manufactured (3D printed) using real life physics and optimisation

If you change the sitting load, the object form proposed by Inspire will change to accommodate and adjust performance.

This object shaping is driven from the mathematical intelligence of the human bone formation.

Additive layer manufacturing gives designers unprecedented freedom with only minimal limitations in comparison with conventional manufacturing processes. Being able to literally grow the stool layer by layer meant that the designer could focus solely on the form without being distracted by production feasibility.

The Results

Assa Ashuach was very pleased with the results achieved from the use of solidThinking Inspire in his design of the stool.

"The Femur Stool looks like a bone structure. I designed the main volume to follow the internal bone structure of the human body and that's why the name Femur."

"We use tools that allow us to optimise and reduce the amount of material we use. the fact that the aesthetics come out completely different, for example a bone structure is very interesting."

The cornerstone of solidThinking Inspire - topology optimisation - has been successfully used in engineering design for more than two decades. Assa Ashuach's Femur Stool project stretches the application of this technology beyond the engineering field and applies it on the process of finding the ideal form from the designer's point of view. As a consequence, the Femur Stool became an object where the aesthetics met performance.

"It is about animating objects but also to study the user. The user can co-design and interact with the object and add from his personal set of values to his future object," stated Ashuach, "Part of the magic is the concept of materialising your thoughts."

The final concept of the stool was reanalysed using OptiStruct (finite element solver and optimisation code), simulating 120 kg distributed load on the seating area. The analysis results confirmed the structural integrity of the stool.

The analysis assumed homogenous isotropic material properties of Nylon 12, which the stool was made of. This type of material is commonly used for plastic additive layer manufacturing.

Saving production time, weight and material means saving money.

The Femur Stool was shown as part of 'The Future is Here' exhibition at London Design Museum and also at 'The Language of Process' exhibition in the Manchester Metropolitan University Special Collections Gallery. It is also on display at London Science Museum for the duration of 2014. For more information, please visit assaashuach.com/#femur-stool/0.

Visuals and product design by Assa Ashuach Studio