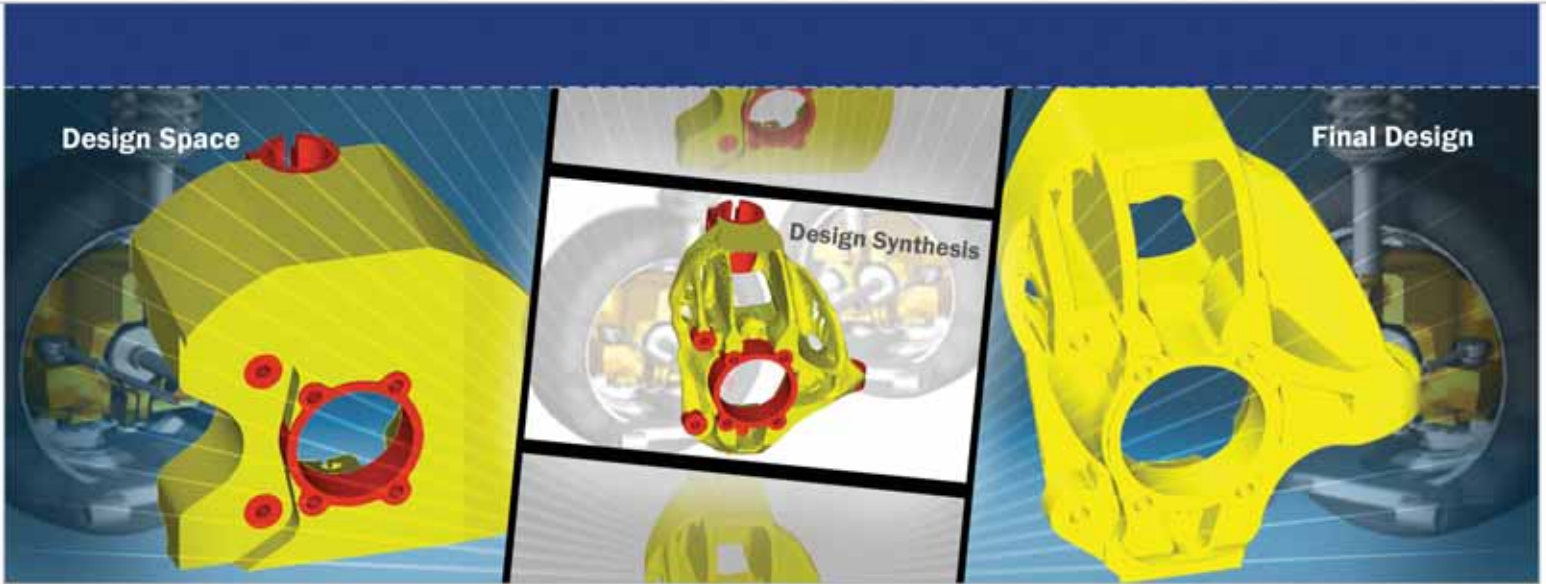




The Enterprise Solution for Product Innovation



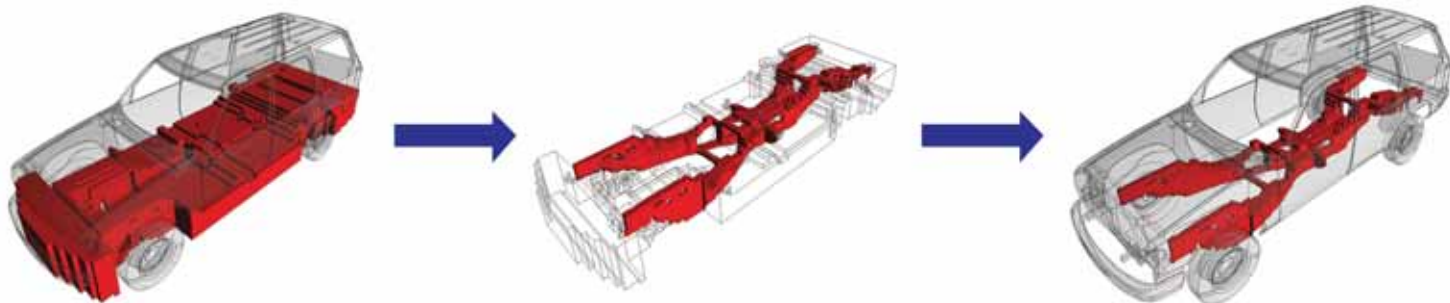
Altair® OptiStruct®

Meet Today's Complex Product Development Challenges
with Award-Winning Concept Design Technology

Engineers are continually challenged to improve designs, reduce engineering time and cut process costs. To achieve these complex goals and create innovative concept designs that will result in robust products, they are increasingly turning to the aid of simulation technology.

Altair OptiStruct is an award-winning, finite-element-based software for conceptual design, analysis and optimization. OptiStruct assists engineers and designers in developing lightweight, structurally efficient designs in a timely manner. Using OptiStruct, they can deliver dramatic improvements in design performance, and achieve product and business objectives faster.

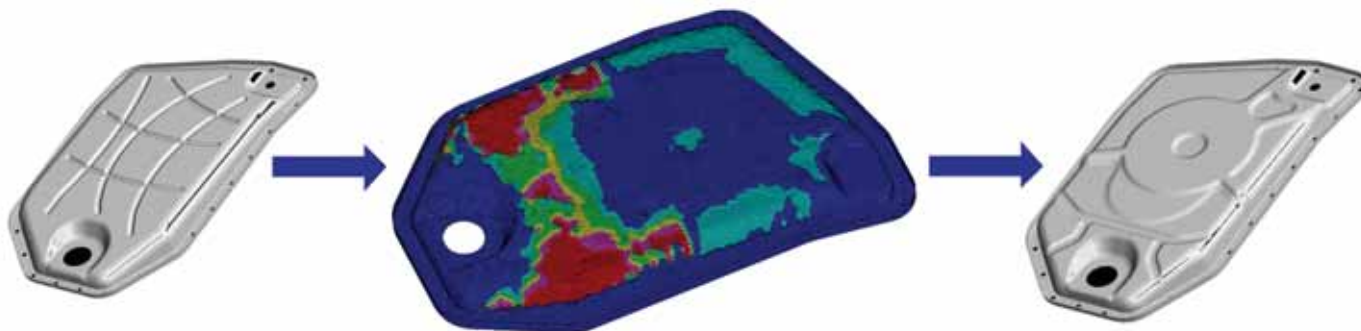




Optimum Material Layout for a Sport Utility Vehicle Frame within the Given Package Space

Altair OptiStruct is an award-winning, finite-element-based software for conceptual design synthesis and structural optimization. OptiStruct assists engineers and designers in developing lightweight, structurally efficient designs in a timely manner by creating innovative constructions from supplied package-space information. By predicting optimal structure shapes with minimum input early in the design process, OptiStruct facilitates analysis

that leads to more efficient, robust designs. As the design progress advances, OptiStruct's powerful shape- and size-optimization routines can be applied to further improve the design. Using the most advanced optimization algorithms, OptiStruct solves the most complex optimization problems with thousands of design variables in significantly less time.



OptiStruct Determines the Bead Pattern for the Stiffest Oil Pan

BENEFITS

Design

- Cuts development time and costs by providing clear design direction early in the design cycle.
- Develops competing design themes for alternative manufacturing methods.
- Creates unique, high-performance designs that satisfy required performance criteria.

Analysis

- Includes most-performed analysis types for structural analysis, which provides significant value to users.
- Generates reliable and highly accurate results with proven, industry-standard technology.

Optimization

- Enables enhanced competitiveness through increased product innovation.
- Provides an easy-to-use graphical user interface and tight application integration that cuts training time and maximizes end-user efficiency.
- Leads the industry with the ability to solve the largest, most complex optimization problems.

CAPABILITIES



Applying Manufacturing Constraints Results in Feasible Knuckle Design

Design

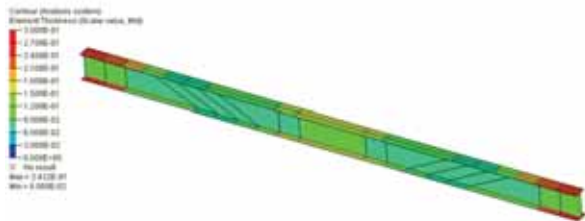
OptiStruct's award-winning design-synthesis technology uses the topology optimization approach to generate innovative concept-design proposals. In the initial phase of the development process, the user enters the package-space information, design targets and manufacturing process parameters.

OptiStruct generates a design proposal that is optimized for the given design targets.

Manufacturing process parameters are very important in achieving interpretable, feasible and manufacturable designs.

In sheet metal parts, beads are often used to reinforce the structures. For given allowable bead dimensions, OptiStruct's topography optimization technology will generate an innovative design proposal for the ideal bead pattern of reinforcement.

OptiStruct's methodology is also successfully applied in optimization of structures made of composites. Using OptiStruct, optimal thickness regions and laminate families for composite structures can be found efficiently.



Optimization of Composite I-Beam with OptiStruct's Free-Size Optimization

Analysis

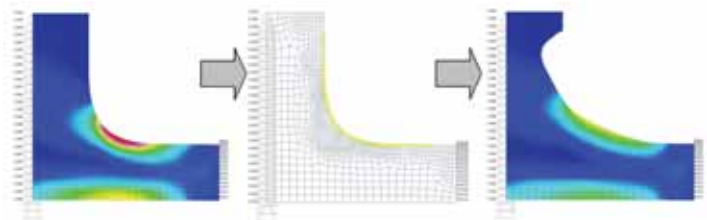
OptiStruct's analysis module uses the most recent element formulations and a fast, robust sparse-matrix solver for linear static, frequency, buckling or simple contact problems. With its large spectrum of solutions, material models and element types, OptiStruct covers the majority of all analysis activities performed by manufacturers today. OptiStruct's high accuracy has been proven by numerous industry-standard comparisons, including standard NAFEMS benchmarks.

Optimization

Usually analyzing the performance of structures is only one of the many steps in product development. More often than not, engineers are called upon to make proposals for where and how to modify a part to meet stress, weight or stiffness requirements. OptiStruct's seamless integration of state-of-the-art, gradient-based optimization methods make size and shape optimization easy.

Shape Optimization

Shape optimization is applied on existing product components. OptiStruct's free-shape optimization can be used to reduce high-stress concentrations. OptiStruct can also use HyperMesh's morphing technology to prepare finite-element meshes for optimization. As a result, dramatic shape changes are possible without mesh distortion. OptiStruct can easily propose design modifications without underlying CAD data, with minimum user interaction.



Free-Shape Optimization Reduces Stress Concentrations

Size Optimization

Size optimization defines ideal component parameters, such as material values, cross-section dimensions and thicknesses. Within the OptiStruct environment, optimization parameters can be defined with only a few mouse clicks.

Easy Model Set-up, Post-Processing, Automation

OptiStruct is tightly integrated into the HyperWorks environment. Thus, models can be set up completely in HyperMesh. Animations, contour plots and charts can be generated using the post-processing tools in HyperView. OptiStruct uses the NASTRAN syntax to ensure closed-simulation process chains. Moreover, jobs can be easily automated by using a powerful automation and data management layer available in HyperWorks.



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