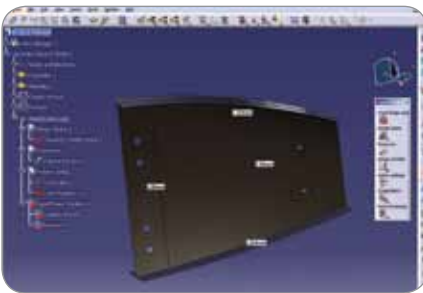


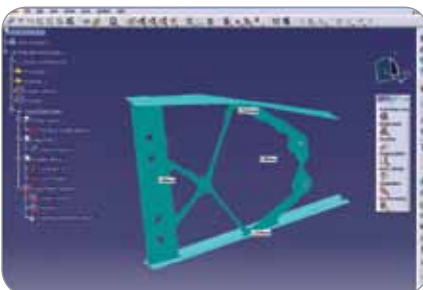
Altair® HyperShape®/CATIA

Concept Design Synthesis in CATIA V5

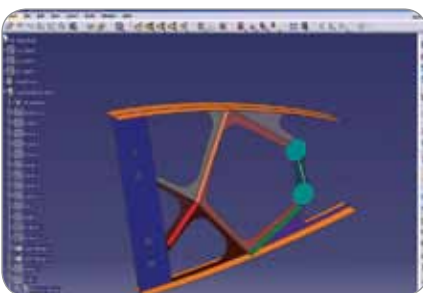
HyperShape/CATIA is a direct integration between Dassault Systèmes CATIA V5 and Altair's award-winning design optimization technology Altair® OptiStruct® that generates structurally optimal design concepts based on user defined performance criteria. HyperShape/CATIA delivers dramatic improvements in design performance and allows companies to quickly achieve product and business objectives.



Generating the Design Space



Design Proposal



Design Interpretation

Benefits

- Creation of lightweight, high-performance designs through optimization.
- Geometry recovery & import into CATIA V5.
- Reduced development time and cost through the rapid creation of best initial design concepts.
- Early assessment of the engineering feasibility of concepts.
- Reduced training through direct integration to CATIA V5.
- Optimum designs for the desired manufacturing process.
- Design refinement of metal and composite components

How Does It Work?

Generating the Design Space

Generating the design space is the first step in setting up a HyperShape/CATIA simulation. The full CAD modeling and GPS functionality of CATIA V5 is available to define design areas, directly apply loads and boundary conditions.

Definition of the Optimization Problem

With HyperShape/CATIA, an intuitive menu system efficiently guides users through the problem setup: definition of design objectives, manufacturing constraints and job submission to OptiStruct in the CATIA V5 environment.

Design Interpretation

After the optimization run OptiStruct's design proposals can be visualized using GPS. These design proposals are automatically imported as a new part in CATIA V5 and are used as the basis for the new design.

Used in Real World Applications

Numerous companies from a variety of industries are successfully using the technology behind HyperShape/CATIA to bring better products to market in a shorter amount of time.

Key Functionality

Optimization Disciplines

- Concept Design Generation
- Bead Pattern Generation
- Shape Refinement
- Gauge Refinement

Manufacturing Constraints

- Minimum member size
- Draw direction
- Grid constrains
- Pattern grouping

Optimization Constraints

- Displacements
- Frequency
- Compliance
- Mass
- Volume
- Stress
- Strain
- Synthetic
- Volume fraction

Materials

- Isotropic
- Anisotropic
- Orthotropic
- Composites

Post-Processing

- Displacements and stress
- Proposed material density with threshold
- Bead pattern contour
- Gauge values
- New design proposal evaluation
- Design proposal geometry automatically imported
- h3d output for web sharing and reporting





Conventional Proposal



Design Proposal



Optimized Final Design

Auto/Steel Partnership Lightweight SUV Frame Concept

Example: Auto/Steel Partnership Lightweight SUV Frame Concept.

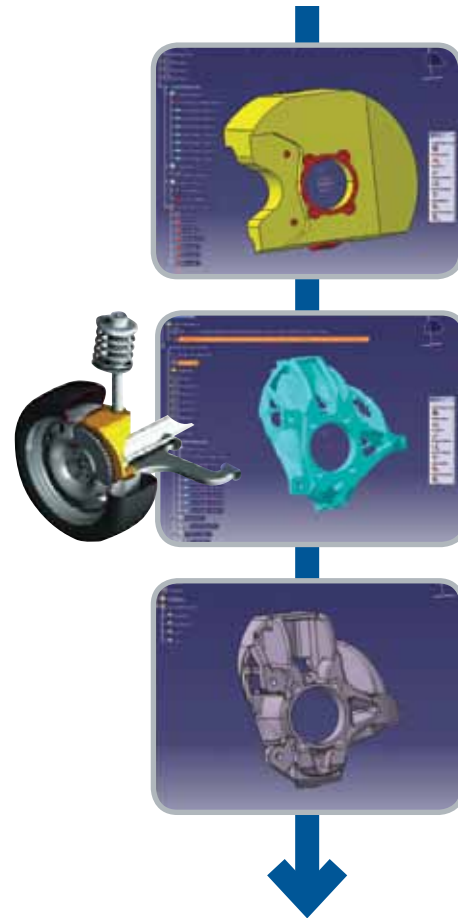
Through concept design and gauge optimization, the mass of a steel-based sport utility vehicle frame was dramatically reduced while exceeding aggressive targets for bending and torsion modes.

**50% Weld Length Reduction,
23% Mass Reduction.**

Example: Droop Nose Rib Optimization for Commercial Aircraft.

Concept design optimization was used to generate an innovative, light weight wing rib design that meets stress, buckling and stiffness constraints.

**Total Weight Savings:
Over 500 kg Per Aircraft.**



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