CASE STUDY

HyperWorks Cuts CAE Modeling Time by Up to 50 Percent at Dunlop Aerospace

Overview

Using HyperWorks for the creation and modification of complex finite-element meshes, Dunlop Aerospace was able to dramatically cut modeling time. The software's stability, ease-of-use and superior technical capabilities for HEX meshing contributed to the successful deployment.

Business Profile

Dunlop Aerospace is a leading provider of high-technology solutions to the aerospace industry, with key customers at various levels of the supply chain, from aircraft engine constructors to airlines and operators. By integrating highly complementary technologies, Dunlop aims to bring improved products and systems to the world's aerospace and defense industry.

Challenge

In order to stay ahead of competition in the aerospace market, Dunlop identified the need to reduce time to market by cutting the average cycle time for CAE projects. Dunlop needed to create complex solid element models in order to simulate the performance of aircraft braking systems. Generating hexaeder-based meshes for these models sometimes took more than a week with the existing environment. Dunlop required a very time-efficient solution in addition to the technical specification. When Dunlop had the requirement to increase the number of pre-processor seats, the aircraft supplier rethought its software landscape.
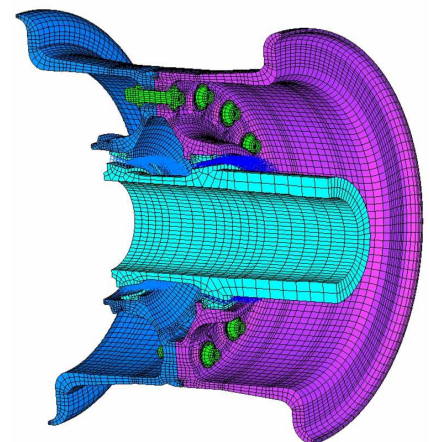
Fig. 1
A typical finite-element model of an aircraft braking system

Solution

Altair HyperMesh, the pre-processor of HyperWorks, was evaluated as an alternative system for CAE modeling. Five major technical advantages where identified during the benchmarking process:

- Geometry handling: Being able to directly import CAD data from major systems eliminated the need to "repair" geometry prior to meshing.
- Interactive 2D mesh quality correction is handy when creating a base line shell mesh before solid modeling. The functionality interactively changes the color of an element during mesh editing according to its quality.
- HyperMesh's Solid Map functionality is the major algorithm for the creation of Hexaeder meshes. Solid map provides the analyst with a very flexible tool for rapid solid mesh creation on complex geometries. It combines the power of shell mesh routines with an "intelligent extrude."
- Contact Manager, a tool for the administration of contact definitions, supplied vast improvements in the control of surface interactions.
- Mesh morphing, a parametric model manipulation function, performs major design modifications without degradation of mesh quality.
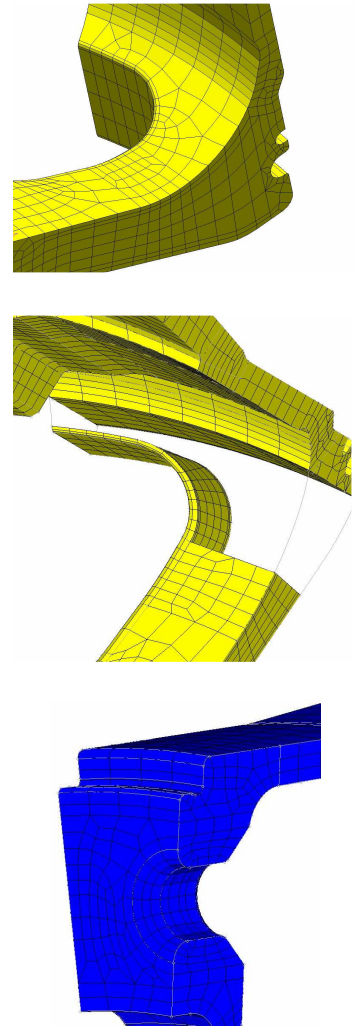

Fig. 2
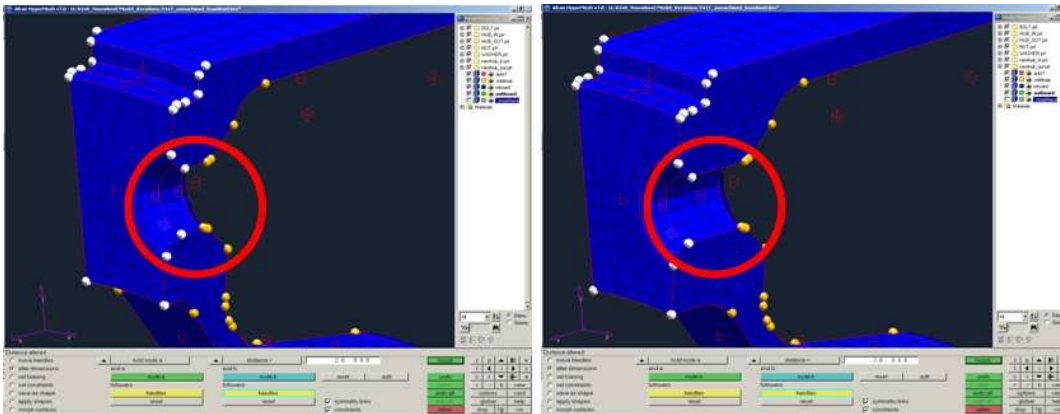*Examples of geometry details, which can be difficult to HEX mesh*

Fig. 3
Mesh morphing for quick mesh modifications without the need for parametric CAD

Benefits

Dunlop Aerospace identified the following benefits after the successful integration of HyperWorks into the product development environment:

- **Finite-element model generation times reduced by up to 50 percent**
- Innovative licensing system to run multiple CAE solutions simultaneously without additional costs
- Very stable platform
- Easy to learn and use

Altair HyperWorks

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