

CADFEM Consulting

ViTAL – Virtual Test Analysis System

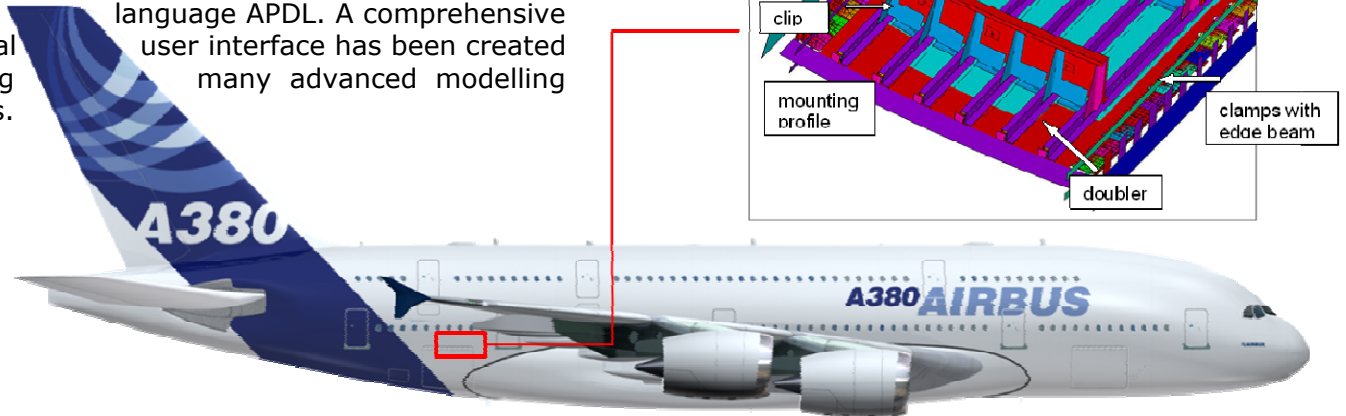
Software Tool for Parametric Modeling and Analysis of Aircraft Fuselage Panels

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Task

ViTAL is a software tool created by CADFEM on behalf of AIRBUS for the fast generation and fully nonlinear analysis of fuselage skin panel within the FE solver ANSYS®. The generation process is fully parametric using the ANSYS Parametric design language APDL. A comprehensive graphical user interface has been created including many advanced modelling features.

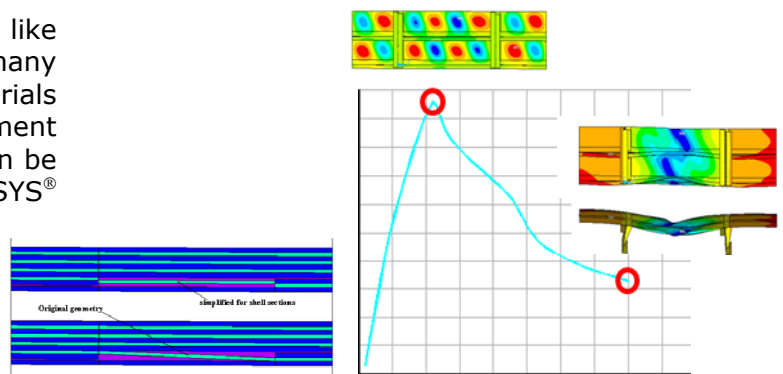
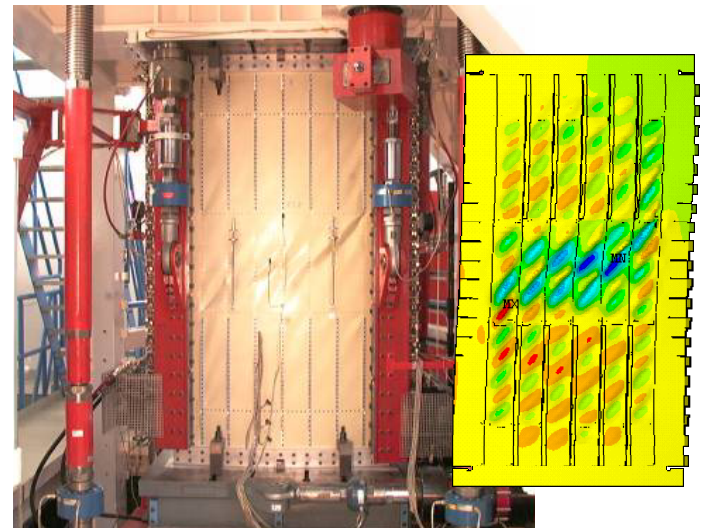


Solution

The behavior until failure of stiffened fuselage panels is crucial in the design procedure of aircrafts. Extensive experimental testing is performed to study the mechanical behavior and determine the allowable loads under different loading conditions. Simulation is used to reduce the number of necessary tests, perform parametric studies and get additional information on loaded structures which are inaccessible to measuring devices.

ViTAL provides boundary conditions to simulate shear pressure tests and frame bending tests performed at AIRBUS. Special „aircraft-like“ boundary conditions are an approach to the environmental deformation constraints of the panel as part of the fuselage and enable variable panel sizes.

The modeling accounts for joint technologies like riveting, welding, bonding and splices, many nonlinear material models and stacked materials (AL-GFRP, CFRP), force and displacement controlled loading. Structural Components can be imported from CAD-Systems via ANSYS® DesignModeler™.



Figures Courtesy of AIRBUS