ANSYS Composite PrepPost

ANSYS simulation technology enables you to predict with confidence that your products will thrive in the real world. Customers trust our software to help ensure the integrity of their products and drive business success through innovation.

### Model the Most Complex Composite Structures
Define the optimal material formula, including the number of layers, shape, thickness, and orientation of each layer.

Predict How the Composite Will Perform Under Working Conditions
Predict ultimate strength and progressive damage over time, including delamination, cracking, pull-out, and other mechanisms.

Design for Manufacturability
Optimize your manufacturing processes by ensuring that designs meet the needs of real-world production facilities and equipment; import ply specifications directly into industry standard tools.
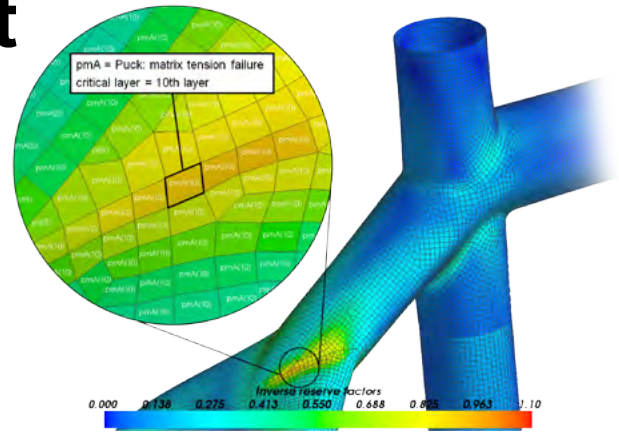
KTM Technologies developed the KTM X-Bow super sports car — the world's first production car with an external vehicle skin that provides structural support. ANSYS Composite PrepPost helped them layup the 300 plies of carbon composite material into a shell that was 20 percent lighter than previous designs.

Neptune Research, Inc., designers use ANSYS Composite PrepPost and ANSYS Structural to compare linear and nonlinear analyses of steel pipe and to help determine the effectiveness of repairs using fiber-reinforced polymers.

Faced with a luxury yacht design that was 300 tons over weight specifications, ar engineers GmbH used ANSYS Composite PrepPost to design carbon composite doors that reduced the total door weight by 70 percent in just five days.

Material & ply definition

- Basic materials with engineering constants
- Uni-axial fabrics with vendor-specific data
- Multi-axial fabrics with vendor-specific data
- Standard laminate templates
- Material degradation factors

Material orientation

- Easy definition of material 0° direction from rosettes
- Innovative concept for the definition of material application direction independent of shell normal for easy asymmetric laminate definition
- Analysis of draping, write and load draping data
- Analysis of fiber-angle correction
- Flat-wrap analysis and export of plies with distortion

Failure Analysis

- Global indicators: Inverse Reserve Factors (IRF), Reserve Factors, and Margin of Safety
- Arbitrary combinations of failure criteria
- Max. strain, max. stress, Tsai-Wu, Tsai-Hill, Hashin, LaRC, Cuntze
- Puck 2D and 3D for UD and weave materials
- Core failure and face sheet wrinkling for sandwich structures
- Multiple load case consideration
- 4 result values per in-plane-data point: Maximum IRF of all criteria of all layers, Active failure mode, Layer index with highest IRF, Critical load case
- Unique method to evaluate inter laminar normal 3D stress in curved laminates based on shell elements
- Sampling element for ply-based strain, stress, and IRF visualization

Advanced Failure

- Delamination
- Virtual crack closure technique (VCCT)
- Progressive damage

General

- ANSYS Workbench Integrated
- Fully associative with all major CAD-Systems
- Direct access to complete range of Workbench Pre-processing capabilities
- Full support of ANSYS Workbench parametrization for sensitivity analysis and optimization
- Python scripting for automation

Model Topology

- Thin models using shell elements
- Support of CAD entities for extrusions

ANSYS Multiphysics solutions

help cross-functional engineering organizations predict the performance of complex products influenced by multiple physics and improve their designs through simulations of the interactions between physics.
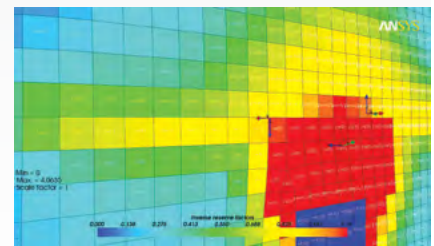
Team Alinghi used ANSYS solutions to build their 33rd America's Cup yacht. The work included a laminate optimization study for the hull that considered multiple load cases. ANSYS Mechanical provided structural analysis, and ANSYS CFD optimized the hydrodynamics.

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