

Leading Edge Technology for Composites Engineering

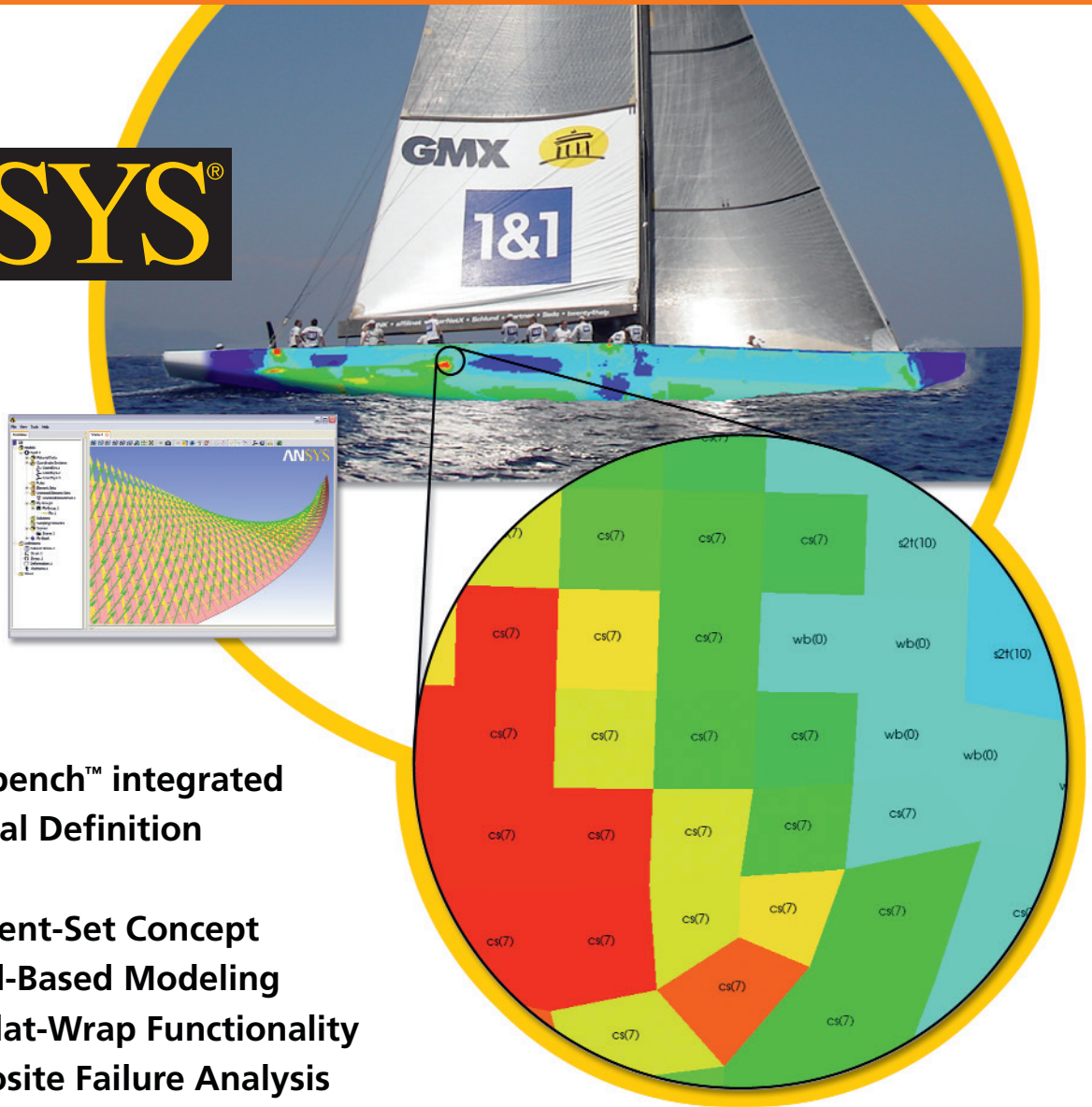
ANSYS Composite PrepPost

Efficient Engineering of Layered Composite Structures

Definition & Modeling · Modification · Pre- & Post-Processing



ANSYS[®]



- **ANSYS[®] Workbench[™] integrated**
- **Unique Material Definition Functionality**
- **Oriented Element-Set Concept**
- **Shell and Solid-Based Modeling**
- **Draping and Flat-Wrap Functionality**
- **Unique Composite Failure Analysis Capabilities**
- **Ply-Book Generation**

ANSYS Composite PrepPost is a powerful ANSYS[®] and ANSYS[®] Workbench[™] integrated software package designed for efficient composites engineering. ANSYS Composite PrepPost integrates leading composite-specific technology, state-of-the-art pre- and postprocessing, and simulation capabilities of ANSYS.

ANSYS Composite PrepPost has been developed jointly by EVEN AG (www.even-ag.ch), CADFEM (Suisse) AG (www.cadfem.ch), CADFEM GmbH (www.cadfem.de), and ANSYS, Inc. (www.ansys.com).

ANSYS Composite PrepPost Capabilities

ANSYS® Workbench™ integrated

- Fully associative with all **major CAD-systems**
- Direct access to complete range of **Workbench Pre-processing capabilities**
- Direct Access to **ANSYS variational technology**
- Full support of **ANSYS Workbench parametrization**
- Optimization of **fiber orientation**
- Direct access to full **ANSYS simulation & solver technology**
- Interface to **import data from other FEA software and ESAComp**
- Powerful graphical user interface with OpenGL visualization and model tree

Unique Material Definition Functionality, tailored for modeling of layered Composite Structures

- Basic materials with engineering constants
- Uni-axial fabrics with vendor-specific data
- Multi-axial fabrics with vendor-specific data
- Stack-up materials element wise still treated as multiple layers for correct analysis and failure evaluation
- Standard laminate templates

Coordinate Systems

- Cartesian; Cylindrical; Spherical

Oriented Element-Set Concept

- Definition of material application direction independent of shell normal
- Definition of material 0° direction
- Overlapping multiple oriented element sets
- Unique possibility of easy asymmetric laminate definition
- No need of ply-subdivision

Shell and Solid-Based Modeling

- Generation of layered solid composite models the same way as for layered shell-models
- Identical layer-wise post-processing of layered solid and layered shell models

Draping and Flat-Wrap Functionality

- Analysis of draping, write and load draping data
- Analysis of fiber-angle correction
- Flat-wrap analysis and export of plies with distortion

Composite Failure Analysis Capabilities

- Inverse Reserve Factors (IRF), Reserve Factors (RF), and Margin of Safety (MoS) for composite failure criteria at all integration points of all layers
- 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

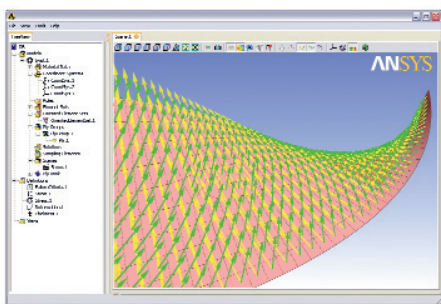
- Core failure and face sheet wrinkling for sandwich structures
- Multiple load case consideration
- 4 result values per in-plane-data point
 - Maximum IRF of all criteria of all layers
 - Active failure mode
 - Layer index with highest IRF
 - Critical load case
- Simple definition, configuration, and combination of desired composite failure criteria
- Unique method to evaluate interlaminar normal 3D stress in curved laminates based on shell elements
- Sampling element enables ply-based strain, stress, and IRF visualization. It provides the stacking sequence (laminate) of this element
- Result visualization for each ply of the laminate
- Text plot highlights critical failure mode, layers and load case
- Sensors for the evaluation of material quantity and cost
- Python scripting interface (e.g. for user specific failure criteria)

Ply-Book Generation

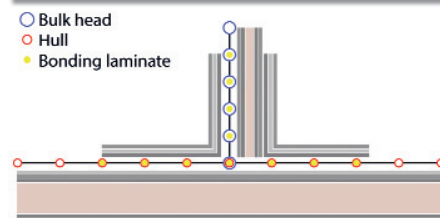
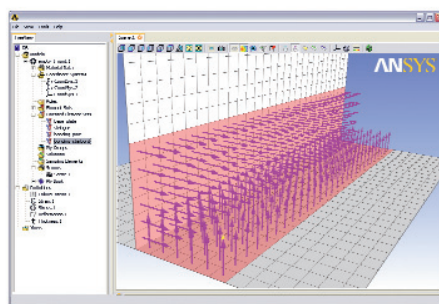
- Generation of individually formatted ply-books in restructured text-format
- Ply-books can be exported in various formats (*.html, *.pdf, *.odt...)

Overview |

Visualization of element reference direction and material direction



Oriented element set used to define bonding laminate of a joint



About CADFEM

ANSYS and a vast competence in FEA – this is what the CADFEM brand stands for in Germany, Austria and Switzerland since 1985. Moreover, through shares and partnerships, CADFEM is a global player in CAE, e.g. in the US, in China, India, Poland, Czech Republic, and Russia.

CADFEM offers a complete portfolio of leading software tools for numerical simulations, including all product-supporting services such as expert advice, seminars, and support.

Furthermore, CADFEM offers CAE consulting and software customization services.

- ANSYS Competence Center FEM
- Complementary CAE-Software
- CADFEM Innovative: CAE in new application areas, e.g. Biomechanics, Material Design

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