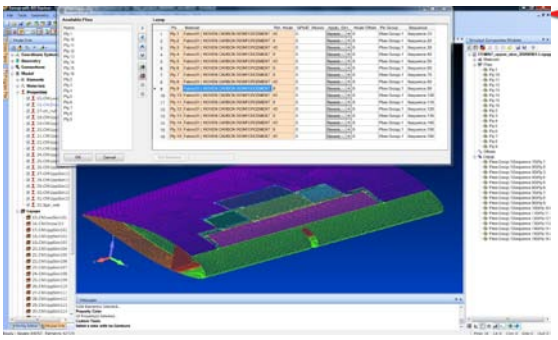
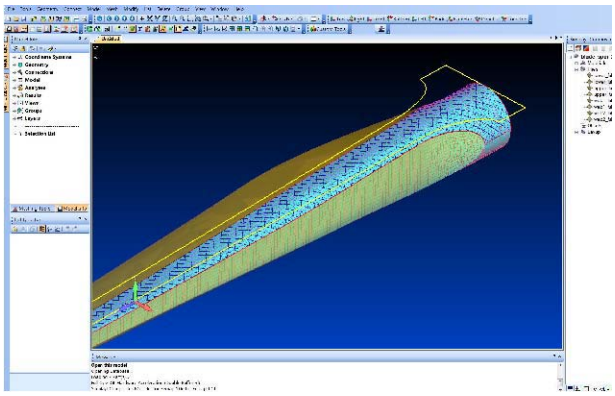
Composites Modeler for FEMAP

State-of-the-art fiber simulation and ply modeling, with property verification, results utilities and direct integration with the Layup Pipeline

Composites Modeler for Femap (CMF) provides proven fiber simulation capabilities and advanced plybased model building — all seamlessly integrated within Femap. Analysis properties are generated and verified efficiently. Layered results can be calculated and browsed. Finally, complete integration with Simulayt's Layup Pipeline allows direct linkage with Design and Manufacture functions.

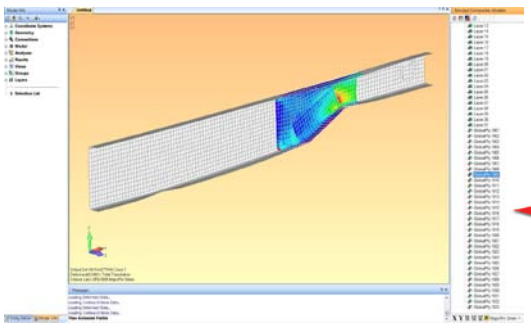




The fiber simulation ensures that unmanufacturable plies cannot be specified, right at the beginning of the process. This avoids costly re-engineering late in the development cycle. Manufacturing data is generated to ensure that the final part matches the analysis model.

Now, continuously varying fiber orientations and ply thicknesses can be fed directly to solvers for detailed analysis. The resultant orientation of plies on each element faithfully reflects the simulated and actual fiber architecture. This ensures simulations of unprecedented fidelity. Analysis results can be sorted by global ply for realistic interpretation, and failure loads determined.

Simulayt develops the **Layup Technology** which includes advanced fiber simulation capabilities. This technology has been developed continuously since 1992 for the **aerospace composites** industry, and is now used extensively in many other applications utilising fiber reinforcement. Simulayt is focused on meeting the evolving needs of the advanced composites market.



CAPABILITIES

State-of-the-art fiber simulation, proven since 1992.

Efficient ply-based layup modeling to reflect manufacture and allow rapid modification.

Automated analysis property generation and verification.

Efficient results visualisation, sorting by global ply, and calculation of failure.

Direct integration with the Layup Pipeline for seamless communication across the enterprise.

BENEFITS

Prevents specification of plies and structures that cannot be manufactured, avoiding costly mistakes.

Improves model fidelity and reduces setup time to allow rapid design improvement. Allows seamless analysis, design and manufacture integration across the enterprise to promote development efficiency.

PREREQUISITES

Femap 10.01 or later

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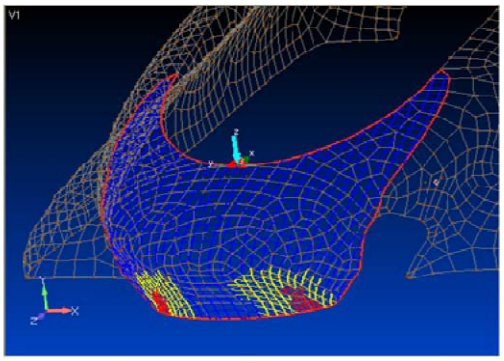
Proven Fiber Simulation

The Simulayt fiber simulation technology is routinely used to analyse draping over complex surfaces, particularly in the aerospace, helicopter and motorsport industries. These awkward surfaces continue to drive the development of Simulayt simulation solutions as composite structures become increasingly sophisticated.

Stable Propagation Types

CMF includes optimized propagation types that yield stable results for commonlyused fabrics used for composites structures. The simulation can be controlled closely to reflect manufacturing practices and results.

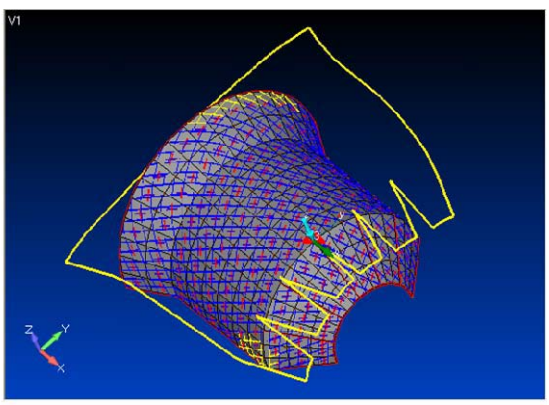


SeedCurve Constraint

The seed curve capability allows warp, weft or bias directions to be constrained along a curve. This allows accurate and realistic simulation of the application of plies over surfaces such as Csection spars and oval window frames.

Order of Drape Specification

On the shop floor, plies are applied in stages to allow accurate placement. CMF allows the user to specify the order of draping over multiple regions to bring a new level of accuracy to fiber simulation.

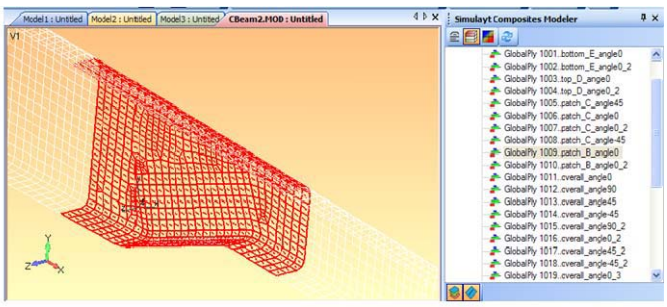


Flexible Dart Handling

The algorithms allow the specification of plies with darted boundaries to reduce shear.

Analysis Properties

CMF creates analysis properties corresponding to the ply layup within userdefined tolerances. Laminate orientations can be specified by coordinate system or rotations from nodes. For complex assemblies, properties can be generated on a partwise basis to aid traceability.



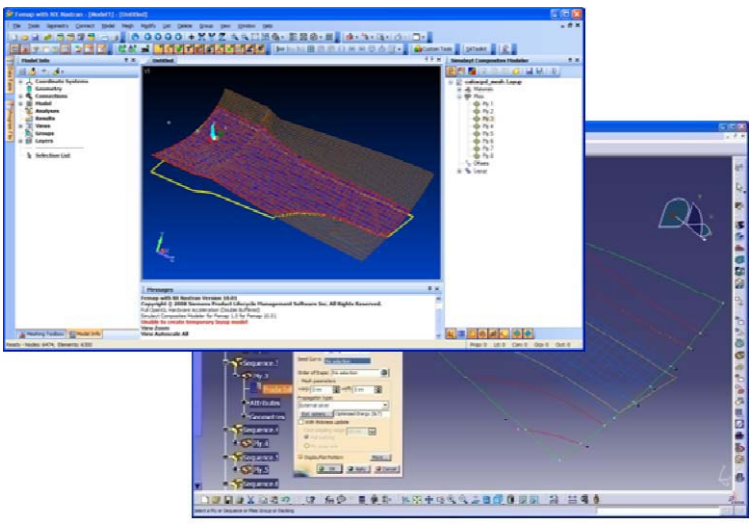
Property Visualisation

The thickness and orientation of laminate properties can be verified on a layer or global ply basis. This capability can also be used to verify legacy models.

Failure Criteria and Results

CMF can generate results based on commonly used failure criteria. Custom failure criteria can be added using an addin architecture.

Results can be processed and displayed efficiently on a plybyply basis in a tree view.



Compatible with LayupTechnology

Finally, direct access to Simulayt's Layup Pipeline allows seamless integration of analysis, design and manufacturing for composites structures. For example, a model developed in CATIA V5 can be transferred seamlessly to Femap structural analysis and certification. By transferring the model unambiguously, design iterations can be made quickly to improve the efficiency of the entire development process.