

Siemens PLM Software

NX CAE environment for LMS Samtech Samcef Solver Suite

Accelerating pre- and postprocessing for an efficient FE solver

Benefits

- Enables engineers using NX Advanced FEM and NX Advanced Simulation to generate finite element models for the LMS Samcef Solver Suite
- Simplifies and speeds the modeling process by enabling engineers to create analysis models based on geometry
- Immerses engineers in the LMS Samcef Solver Suite environment by using familiar LMS Samcef terminology and providing extensive support for LMS Samcef-specific elements and entities

Summary

The NX™ CAE environment for LMS Samtech Samcef™ Solver Suite software enables engineers to build finite element (FE) models, define solution parameters and visualize results using the LMS Samcef Solver Suite. This environment allows you to take advantage of the powerful geometry editing, meshing and general preprocessing capabilities in NX CAE to build analysis models for the LMS Samcef Solver Suite faster than traditional CAE tools. The environment also allows engineers using NX CAE to employ advanced solutions offered in the LMS Samcef Solver Suite. With the LMS Samcef Solver Suite, you can run linear and nonlinear static analyses as well as modal and buckling analyses. The LMS Samcef Solver Suite also includes unique capabilities for the prediction of complex, nonlinear phenomena, such as progressive damage in the unidirectional and woven fabric plies of a laminated composite structure, and delamination with coupling to the damage inside the plies.

Using NX CAE to create LMS Samcef Solver Suite models

NX CAE preprocessing is ideal for creating LMS Samcef Solver Suite models and solutions. Using NX CAE simplifies the modeling process by integrating high-end analyst modeling tools with world-class geometry capabilities that assist you with developing analysis models faster than with traditional computer-aided engineering (CAE) preprocessors. Adding the LMS Samcef Solver Suite environment to NX CAE enables you to build LMS Samcef Solver Suite run-ready input data files, so little or no intermediate processing is ever needed. In addition to building LMS Samcef Solver Suite models, the LMS Samcef Solver Suite environment in NX CAE enables you to import solution results directly from LMS Samcef Solver Suite results files into NX CAE for postprocessing. The environment delivers import/export capabilities so you can import LMS Samcef Solver Suite data decks into NX CAE for modification and then export run-ready decks for solution.

NX CAE environment for LMS Samtech Samcef Solver Suite

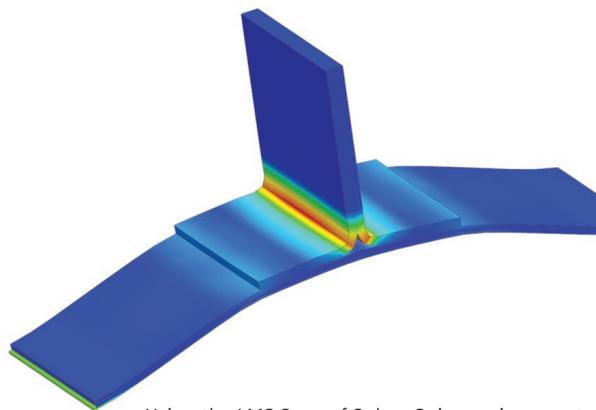
Benefits *continued*

- Delivers unique capabilities to predict nonlinear phenomena, such as progressive damage and delamination of laminated composite structures

Importing LMS Samcef Solver Suite models into NX

By using the NX CAE environment for the LMS Samcef Solver Suite you can import LMS Samcef Solver Suite finite element models defined using either the ASCII or binary format database files into NX CAE. The following entities are supported:

- Elements
 - 1D
 - 2D: fully linear or parabolic
 - 3D: fully linear or parabolic
 - 3D cohesive element
- Material
 - Isotropic
 - Orthotropic
 - Composite damaged materials
 - Elastoplastic material
- Physical
 - Shell thickness, shell offset
 - Material orientation
 - Sections, rod area
 - Coordinate systems
- Group nodes, elements, face
- Explicitly defined function



Using the LMS Samcef Solver Suite environment with NX Laminate Composites to model and simulate delamination.

Creating and exporting LMS Samcef Solver Suite models from NX CAE

After you have created an FE model in NX CAE, you can export complete ready-to-run LMS Samcef Solver Suite input decks with supported FE element and solver parameters. The NX CAE environment for the LMS Samcef Solver Suite supports export for the following analysis types, elements and other entities:

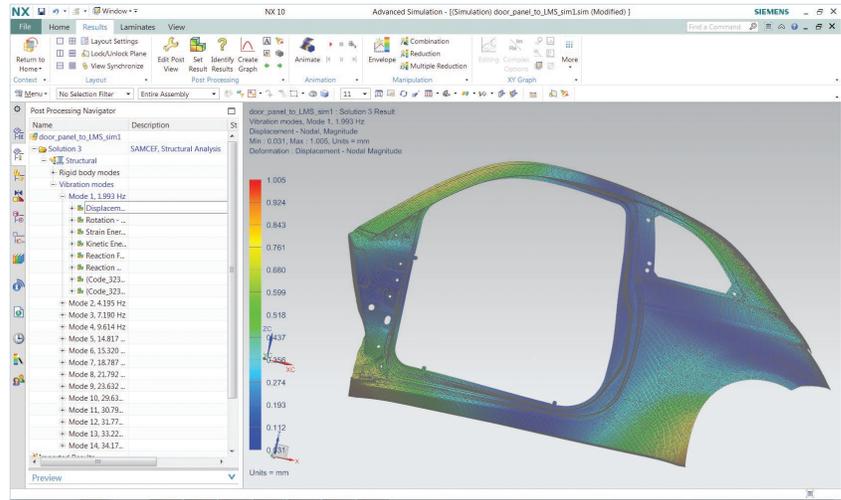
- Analysis types
 - Linear statics with several load cases
 - Modal analysis
 - Buckling analysis (from linear statics analysis) with several load cases
 - Nonlinear static analysis with several subcases
- Elements
 - 0D lumped mass, grounded bushing and spring elements
 - 1D beam and rod elements with predefined or user-defined profile
 - 1D connection elements: rigid links and averaged kinematic constraints, bushes, springs and bolts
 - 2D Mindlin thin shell, heterosis shell, 2D membrane or shell membrane, metallic or composite
 - 3D solid and solid shell, metallic and composite elements
 - 3D cohesive elements
 - Rigid surface, contact element
- Glue conditions
 - Nodes-to-surface gluing
 - Solid-to-edge gluing
 - Edge-to-edge gluing
 - Surface-to-surface gluing
- Edge-to-surface gluing
- Contact conditions with option (such as sliding)
 - Surface-to-surface contact
 - Edge-to-surface contact
 - Rigid-flexible contact
 - Ancillary display preview for contact and glue conditions displayed in FE elements

- Materials
 - Isotropic with thermal dependency
 - Orthotropic with thermal dependency and stress limits
 - Elastoplastic material with different hardening measures
- Composite damage models
 - General orthotropic ply (LMS Samcef unidirectional ply damage)
 - Enhanced ply for noncrimp fabrics (NCF) and LMS Samcef enhanced unidirectional ply damage
 - Woven fabrics material (LMS Samcef woven ply damage)
 - Damage interface for cohesive element
- Loads and boundary conditions
 - Speed, acceleration
 - Nodal force, nodal temperature, rotations, moments, initial temperature
 - Pressure
- Constraints
 - Fixed, enforced displacement and rotations
 - Symmetric
 - Manual coupling

Postprocessing LMS Samcef Solver Suite results in NX CAE

The NX CAE environment for the LMS Samcef Solver Suite reads the *.des / *.fac result files directly so you can visualize and evaluate product performance.

NX CAE can be used to postprocess all classical structural results (scalar, vector, tensor and complex values), such as displacements, stresses, strains, shell resultants and beam results. For laminate structures, you can visualize in-ply stresses, out-of-ply stresses, matrix damage, delamination between plies and other native failure criteria results. Results can be displayed in absolute, material, native or user-defined coordinate systems, and can be plotted in XY graphs.



Modal analysis of an automotive panel using the LMS Samcef Solver Suite.

Compatibility

The NX CAE environment for the LMS Samcef Solver Suite supports the following LMS Samcef releases:

- LMS Samcef V16.1 (build V16.1-02) and higher

Supported hardware/OS

The LMS Samcef Solver Suite environment is an add-on module within the NX CAE suite. It requires a license for NX Advanced FEM or NX Advanced Simulation. It is available on all NX-supported hardware/OS platforms.

Contact

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