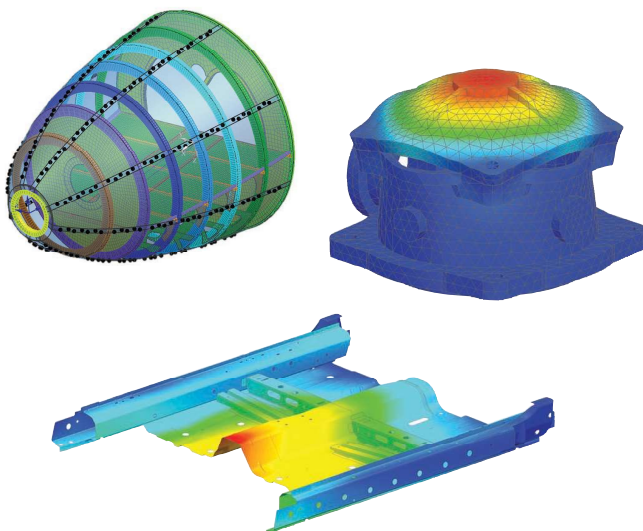


Simcenter 3D Structures

Simcenter 3D Structures software is a unified, scalable, open and extensible 3D computer-aided engineering (CAE) environment for simulation analysts. Simcenter 3D Structures is a bundle combining the Simcenter 3D Engineering Desktop, Simcenter Nastran environment and the Simcenter Nastran Basic solver. Together, Simcenter 3D Structures gives you best-in-class simulation modeling with the power to perform basic structural analysis with an industry-standard solver. The Simcenter 3D Engineering Desktop contained in Simcenter 3D Structures speeds the simulation process by helping you efficiently build the simulation model you need from 3D geometry faster than traditional CAE preprocessors. The integrated Simcenter Nastran solver in Simcenter 3D Structures lets you seamlessly submit analysis models for linear statics, normal modes, buckling and basic heat transfer analyses. Simcenter 3D Structures also forms the foundation on which you can add additional solutions for structural dynamics, multistep nonlinear, thermal, flow, acoustics, motion, optimization and multiphysics analyses, all from a single environment.



Module benefits

- Speed simulation processes by up to 70 percent
- Perform accurate, reliable structural analysis with the integrated Simcenter Nastran Basic solver
- Increase product quality by rapidly simulating design tradeoff studies
- Lower overall product development costs by reducing costly, late design change orders
- Efficiently manage large, complex analysis models
- Capture and automate best practices and commonly used processes
- Easily add multidiscipline simulation capabilities as your analysis needs grow

Key features

- All-inclusive software package with Simcenter 3D Engineering Desktop for pre/post together with Simcenter Nastran Basic for structural analysis
- NX is a leading geometry kernel which is used as part of Simcenter 3D to provide rapid geometry editing and abstraction
- Comprehensive meshing tools combined with efficient FE assembly management
- Immerses engineers in the Simcenter Nastran environment by using familiar terminology and extensive support of product-specific elements and entities
- Simulate structural analysis for linear statics, normal modes, buckling and heat transfer using the trusted Simcenter Nastran solver

Simcenter Nastran

Simcenter Nastran allows you to initiate digital simulation into your product development process by providing access to a broad library of finite element types and material models, robustly manipulating load cases and delivering several efficient solution sequences for analyses on models of unlimited size. You can also perform sensitivity studies based on these analysis types.

The Simcenter Nastran basic license comes with a full base set of structural capabilities as the entry point for Simcenter Nastran. It also comes with a basic heat transfer solver and the resulting temperatures can be used as loads in a structural solution.



Module benefits

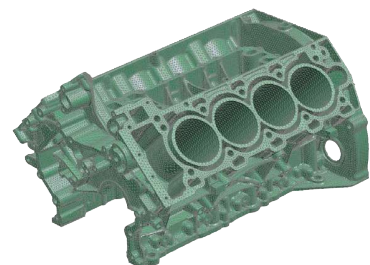
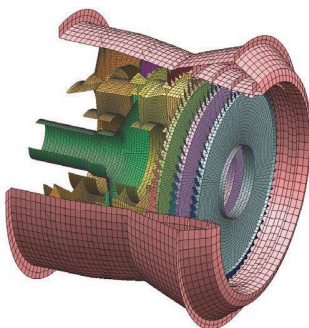
- Reduce risk by using simulation to save time and cost compared to physical test cycles
- Accelerate innovation with rapid iteration and numerous what-if studies
- Investigate product performance virtually under all possible operating conditions, including thermally influenced operating conditions

Key features

- Linear statics, normal modes, buckling
- Design sensitivity
- Basic nonlinear
- Composites
- Shared memory parallel (SMP) processing

Beyond the base set of capabilities, users can add more advanced structural capabilities including:

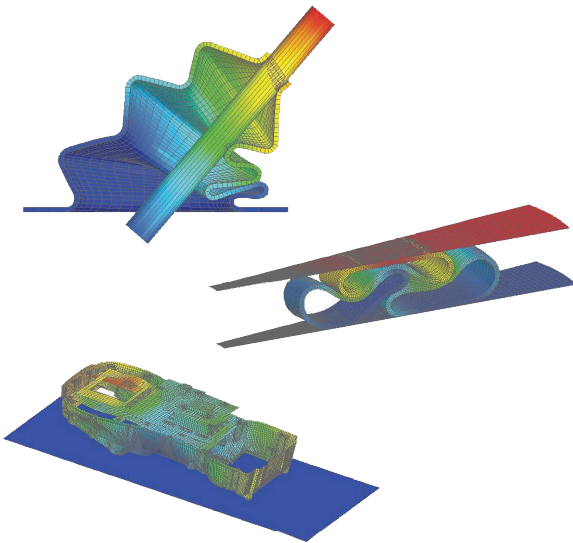
- Multistep nonlinear (static, transient)
- Distributed memory parallel (DMP) processing
- Linear dynamics (transient, frequency, random)
- Rotor dynamics
- Design and topology optimization
- Aeroelastic
- Vibroacoustic



Simcenter Nastran Multistep Nonlinear

Simcenter Nastran Multistep Nonlinear is an advanced solution that provides comprehensive capabilities for geometric nonlinear, contact, plasticity, creep, hyperelasticity and other material behaviors. The multistep solution allows users to set up sequential subcases for preload, nonlinear statics, nonlinear transient, modal, buckling, post buckling and harmonic modes.

This is an add-on product to a basic license that provides two nonlinear solution options: Simcenter Nastran solution SOL 401 and SOL 402. Both are suited to a similarly wide range of nonlinear problems, but each also has unique features.



Module benefits

- Use the same models already built and analyzed linearly with Simcenter Nastran Basic
- Improve confidence in final designs by virtually investigating your product's performance under all possible operating conditions
- Obtain more accurate solution results than linear analysis when standard linear assumptions are not valid

Key features

- Static/dynamic analysis of models, including material and geometrical nonlinear behaviors
- Multistep solver allowing the following analysis types in different steps: static, dynamic, preload, modal, buckling, cyclic symmetry modes, Fourier harmonic modes
- Material nonlinear: hyperelasticity models (Mooney-Rivlin, Ogden, hyperfoam, Mullins effect, damping with Prony series), elastoplastic (Von Mises yield criterion, isotropic hardening, kinematic hardening, mixed hardening), thermal elastoplastic, creep, combined creep and elastoplastic
- Geometrical nonlinear: Large deformations, large strain, snap-through analysis (post buckling), follower forces
- Contact: Shell and solid element face contact, edge contact for axisymmetric modeling, single- and double-sided contact, self-contact, multiple friction models, tied contact, contact surface offsets, gap elements, contact activation/deactivation per subcase, contact pressures and force results, contact separation and sliding results

Simcenter Nastran DMP

Simcenter Nastran DMP is an add-on module to Simcenter Nastran Basic. It enables parallel processing using distributed memory. It is an efficient approach to solving large models and can be used on workstations with multiprocessors using Windows. DMP solutions are available for static solves (SOL 101), modal eigenvalue solves (SOL 103), modal dynamic response solves (SOL 111 and 112), direct frequency solves (SOL 108) and nonlinear solves (SOL 401 and SOL 402). DMP can also be used in combination with SMP, which comes as part of Simcenter Nastran Basic.

Module benefits

- More cores provide faster solutions
- Allows solving large models that are not possible to solve on a single central processing unit (CPU)

