

ANSYS Structural Mechanics

Advanced Structural Mechanics for All Stages of Product Development

Structural mechanics solutions from ANSYS provide the ability to simulate every structural aspect of a product, including linear static analyses that simply provides stresses or deformations, modal analysis that determines vibration characteristics, through to advanced transient nonlinear phenomena involving dynamic effects and complex behaviors.

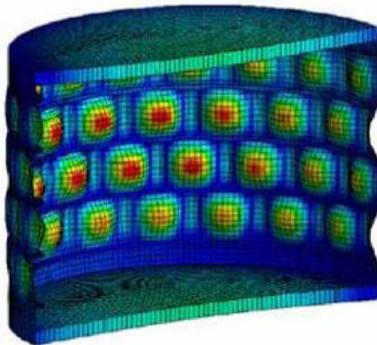
All users, from designers to advanced experts, can benefit from ANSYS structural mechanics solutions. The fidelity of the results is achieved through the wide variety of material models available, the quality of the elements library, the robustness of the solution algorithms, and the ability to model every product — from single parts to very complex assemblies with hundreds of components interacting through contacts or relative motions.

ANSYS structural mechanics solutions also offer unparalleled ease-of-use to help product developers focus on the most important part of the simulation process: understanding the results and the impact of design variations on the model.

High Fidelity Simulations

ANSYS offers a broad range of structural mechanics analysis types:

- Static analysis with or without nonlinearities for stress and deformation evaluation
- Dynamic analysis ranging from simple determination of vibration characteristics (eigenmode, harmonic or spectrum analysis in the frequency domain) to complex time-dependent transient phenomena, including dynamic effects and time-dependent material properties
- Steady-state or transient thermal analysis that can be efficiently coupled to subsequent stress analyses



Post-buckling analysis of a ring-stiffened cylinder

Product Features

Structural Analysis

- Static analysis
- Modal analysis
- Harmonic analysis
- Transient analysis
- Spectrum analysis
- Buckling analysis

Geometric Nonlinearity

- Large strain
- Large deflection
- Stress stiffening
- Spin softening
- Coriolis effects

Contact Definitions

- Surface-to-surface
- Node-to-surface
- Node-to-node
- Beam-to-beam
- Beam-to-surface
- Deformable – deformable
- Deformable – rigid

Contact Formulations

- Penalty
- Augmented Lagrange
- Assembly contact (MPC)
- Lagrange multiplier
- Mixed Lagrange and penalty

Contact Properties

- Contact with friction
- Thermal contact
- Electric and magnetic contact
- Spot welds

Boundary Conditions

- Solid and FE model BCs
- Initial conditions
- Tabular and function loads
- Structural and thermal loads
- Prestress loads

Material Modeling

- Linear elasticity