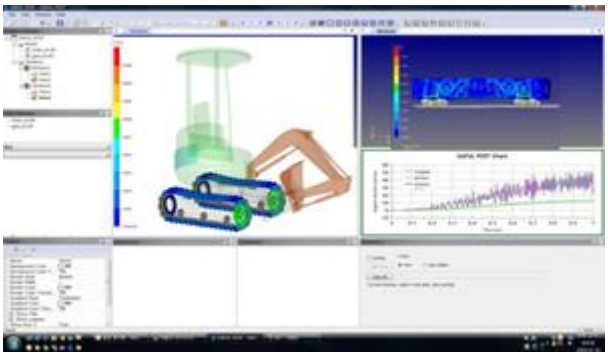
ANSYS Structural Mechanics Update 2019 R1

ANSYS-Motion: New product family for professional multi-body simulation

- Analyze rigid and flexible systems efficiently in any contact situation
- Flexible bodies can be considered without networking and thus be fast in the model preparation.
- Supplemented by powerful special applications for gearboxes, bearings, belts, chains and complete drive trains
- Integrated into the ANSYS product environment with direct interfaces to SpaceClaim for the geometric model preparation as well as to TwinBuilder with the link to the system simulation
- Bridges the gap between classic FEM and classic multi-body simulation
- Developed with the support of Prof. Daesung Bae as the world's outstanding expert in the field of multi-body simulation



ANSYS Motion for professional multi-body simulation

HPC

- Distributed Memory Parallel now standard for all analyzes (new: DMP for SMART Crack Growth Method)
- Nonlinear contact analysis: Automated splitting of contact areas for performance enhancement on models with large area contacts

- Reduction of RST file sizes by up to 50% with new compression method

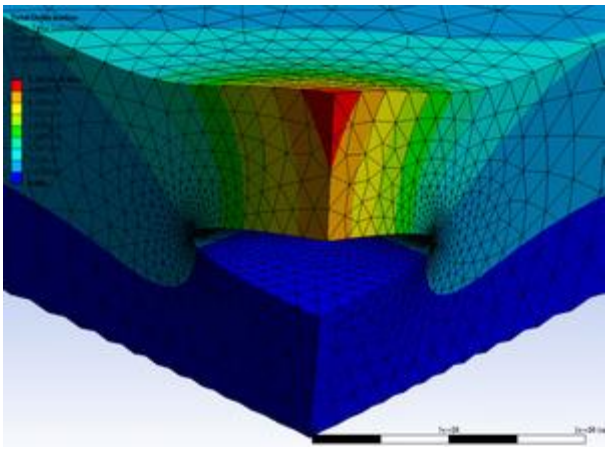
Automated division of a large-area contact into individual sections for non-linear contact analyzes

Solver

- Semi-implicit method: In the case of non-linear analyzes, switch from an implicit solution procedure to an explicit solution procedure in the short term in order to avoid convergence difficulties.

Fracture Mechanics

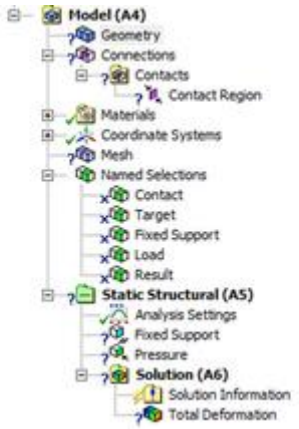
- Consideration of pressure loads on the crack surfaces as well as temperature
- Automatic cracking on cracks over edges



Automatic crack creation on edge cracks

Mechanical handling

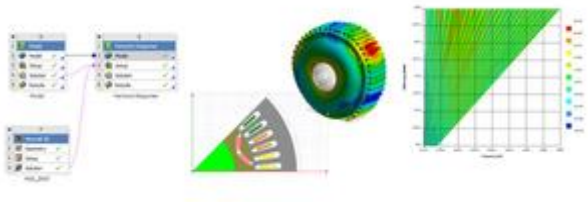
- Move or rotate model areas within the mechanical environment
- Simulation Template: Create a non-CAD mechanical setup to prepare for analysis
- New solution combination method for efficient load case overlay including import of load case tables from csv files.
- Advanced keyframe animation for moving presentation of results
- Export animations in MP4, WMV, AVI and GIF formats



Simulation template in ANSYS Mechanical

Dynamics

- Component Mode Synthesis for harmonic analysis (modal superposition) within the mechanical environment
- Reuse system matrices of multiple built-in substructures to reduce disk space requirements
- Rotor dynamics: consideration of Coriolis effects in the Rotating Reference Frame
- NVH: Complete workflow for vibration simulation of the run-up of an electric motor (including waterfall diagram of the resulting structure-borne sound power)



Workflow for vibration simulation of the run-up of an electric motor

Multi-body simulation

- On-Demand Query of deformation, stress and strain results in flexible structures and thus significant reduction of analysis times by abandoning the expansion of results

ANSYS LS-DYNA

- Consideration of thermal loads of a previous thermal simulation
- Further use of a deformed model geometry as a result of an explicit analysis for further mechanical analysis

General axisymmetric structures in ANSYS Mechanical

- Suitable for 3D static analyzes

General Axisymmetric Model in ANSYS Mechanical

APDL Elements

- Thermal Reinforcing Element REINF264 for imaging thermal fibers
- CABLE280 element for robust simulation of flexible cable and cable structures
- Consideration of anisotropic viscoelastic behavior in piezoelectric analyzes
- Heating of piezoelectric models by anisotropic electrical losses

Material Designer

- New predefined lattice basic structures
- Unit cells with unevenly distributed short fibers

Topology Optimization

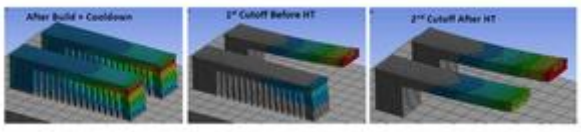
- Topology optimization for stationary temperature field analyzes to determine the optimum installation space with the most effective possible heat dissipation via heat conduction

- Structure optimization for shell structures
- Automatic smoothing of resulting structure surfaces

Topology optimization in thermal analyzes (left) and shell structures (right)

Additive manufacturing

- Layered tetrahedral mesh
- Analysis of a subsequent heat treatment
- Consideration of remaining powder after the printing process
- Consideration of already existing secondary structures



Simulation of thermal post-treatment after 3D printing