ADINA®

Finite Element Analysis – Infinite Possibilities

When you need to solve the most challenging problems that involve nonlinear material behavior, time-dependent loading, large deformations, or complex contact conditions in which reliability and accuracy are of critical importance, choose ADINA. Engineers have trusted ADINA for more than 30 years, with continuous user feedback that has strengthened and enhanced the software.

ADINA is a series of leading finite element analysis software for linear and nonlinear dynamic analysis of all types of structures, as well as their interaction with fluids and heat transfer between materials. ADINA was developed to solve the most difficult nonlinear problems in a wide range of engineering disciplines, such as:

- Automotive design
- Aerospace engineering
- Mechanical engineering
- Civil and structural engineering
- Construction
- Product design

ADINA

The ADINA standard license includes ADINA Structures and the ADINA User Interface. ADINA User Interface provides a fully interactive graphical interface for all your modeling and post-processing tasks. The software can create or import models from various CAD systems, including Parasolid, FEMAP, STL, or other industry-standard file types to maximize the efficiency of the analysis and design process.

ADINA Structures is commonly used to analyze special structures and custom structural components to perform forensic and root-cause analysis, or to evaluate the resiliency of existing infrastructure. Direct interfaces with other Bentley Systems analysis and design applications, such as STAAD.Pro® and RAM® Structural System, enable you to automatically export structural models into ADINA for the development of more advanced analyses.

ADINA Structures offers the following advanced features:

- Geometric, material, and load nonlinearities
- Bathe implicit and explicit dynamics (including automatic switch)
- Large deformations
- Frictional contact between structural components
- Low-speed dynamics for collapse analysis of structures
- Element birth and death
- Impact analysis
- Frequency analysis and modal superposition technique
- Buckling and post-buckling analysis
- Special bolt element with automatic preload

ADINA Structures provides a variety of element types for linear or nonlinear analysis, including:

- Solid elements (2D and 3D solid elements)
- Structural elements (trusses, beams, pipes, shells, membranes, cables, bolts, and springs)
- Fluid elements (2D and 3D potential-based subsonic fluid elements)
- Special purpose elements (alignment, connectors, and rigid links)
- User-defined elements

ADINA Structures also offers a rich library of material models, including:

- Metals
- Concrete
- Soils and rocks
- Plastics
- Rubber
- Fabrics
- Wood
- Ceramics
- User-defined materials

SYSTEM REQUIREMENTS
MINIMUM: 1024 x 768 resolution, Windows 10 or higher, 8 GB RAM, Intel or AMD 64-bit processor
RECOMMENDED: 1920 x 1080 resolution, 32 GB RAM
BROWSER COMPATIBILITY: ADINA 9.10 supports Windows and Linux

ADINA ADVANCED

ADINA Advanced includes everything in ADINA Standard, plus ADINA Thermal and ADINA Thermo-Mechanical Coupling (TMC). ADINA Advanced solves heat transfer problems in solids and structures. The applications can range from early age thermal effects in concrete to fire analysis on structures, or the heat generated in a disk brake, for example. Some key features include:
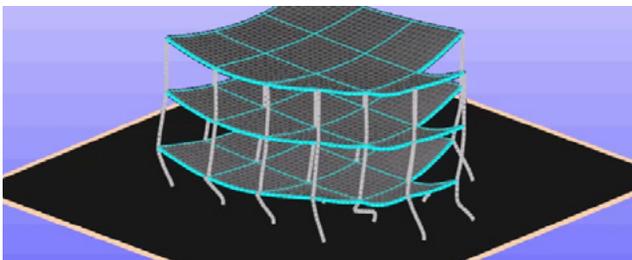
- Heat transfer, including radiation between surfaces
- Heat generation due to friction
- Conduction, convection, and radiation
- Time- or temperature-dependent material properties
- Internal heat generation due to plastic deformation or viscous effects
- Latent heat effects (freezing and thawing)
- Residual stress from welding

ADINA ULTIMATE

ADINA Ultimate includes everything in ADINA Advanced, plus ADINA Computational Fluid Dynamics (CFD), ADINA Fluid Structure Interaction (FSI), ADINA Electromagnetics (EM), and ADINA Multiphysics coupled analysis.

ADINA CFD solves the full Navier-Stokes equations or the Reynolds equations for incompressible or compressible flows. The software is capable of modeling:

- Compressible and incompressible fluid flows in the laminar and turbulent regimes
- Thin-film Reynolds flow with smooth or rough boundaries
- Two-phase flow utilizing the Volume of Fluid (VOF)
- Non-isothermal flow and conjugate heat transfer
- Porous-media flow
- Flows with mass transfer
- Low- and high-speed compressible conditions

Building collapse due to various effects can be modeled in ADINA to perform progressive failure analysis.

ADINA CFD comes with material models for handling compressible and incompressible fluids and gasses.

To solve the coupling between the fluid and the structural models, ADINA FSI includes direct fluid-structure interaction or iterative FSI coupling methods. In both cases, the conditions of displacement compatibility and traction equilibrium along the structure-fluid interfaces are satisfied. These schemes are applicable to any Reynolds number flow, from low to high Reynolds numbers. Where large displacements of the structure occur, ADINA provides advanced adaptive mesh capabilities to control the mesh quality, including leader-follower constraints, slipping boundaries, and extended walls.

ADINA EM solves general Maxwell's equations governing electromagnetics for electric field intensity and magnetic field intensity.

ADINA Multiphysics helps you gain deeper insight into the performance of your designs and understand the interaction between distinct physical fields, including structural deformation, fluid flow, electric field, temperature, and pore pressure.

What's Included:	ADINA	ADINA Advanced	ADINA Ultimate
ADINA Structures	◆	◆	◆
ADINA User Interface	◆	◆	◆
ADINA Interfaces (Import/Export)	◆	◆	◆
ADINA Thermal		◆	◆
ADINA TMC (Thermo-mechanical Coupling)		◆	◆
ADINA CFD (Computational Fluid Dynamics)			◆
ADINA FSI (Fluid Structure Interaction)			◆
ADINA EM (Electromagnetics)			◆
ADINA Multiphysics			◆
ADINA Parasolid Modeler*	◆	◆	◆

*Not included. Optional extra.