



# FEMPRO

ALGOR's finite element modeling, results evaluation and presentation interface, FEMPRO, provides an easy-to-use, single user interface for all analysis types including static stress and Mechanical Event Simulation (MES) with linear and nonlinear material models, linear dynamics, fatigue, steady-state and transient heat transfer, steady and unsteady fluid flow, electrostatics and full multiphysics. This Windows-native interface provides a smooth, efficient workflow to increase the productivity of engineers. It includes environments for meshing models, applying FEA data, reviewing results and creating reports.

## GRAPHICAL USER INTERFACE

FEMPRO features:

- docking toolbars for quick access to common options
- multiple view windows
- shortcut keyboard and mouse controls for dynamic viewing options
- tree view of model parts and associated data that visually guides users to provide all necessary information
- context-sensitive menus tailored to particular steps in the analysis process
- Windows-native input screens
- real-time data checking for reasonable input to reduce user error
- right-click functionality for applying, modifying and deleting loads, constraints and FEA properties
- load and constraint set capabilities for managing different design scenarios
- Material Library Manager and built-in library of materials
- HTML help with indexing and search capabilities
- graphical user interface and user documentation in Chinese (simplified), English, French, German, Italian and Spanish

## MODELING

A suite of modeling capabilities includes:

- InCAD technology for direct CAD/CAE data exchange with Alibre Design, Autodesk Inventor, Inovate, IronCAD, KeyCreator, Mechanical Desktop, Pro/ENGINEER, Rhinoceros, Solid Edge and SolidWorks
- full associativity with each design change for most CAD solid modelers
- CAD support for 2- and 3-D CAD universal files
- Superdraw 2- and 3-D sketching tools
- 2- and 3-D parametric structured meshing
- automatic, unstructured 2- and 3-D meshing
- automatic, intelligent, feature-based mesh refinement and point-and-click definition of areas where a finer mesh is desired
- a midplane mesh engine for reducing thin, solid features in a CAD model to plate/shell elements with automatic handling of parts, assemblies, multi-thickness regions and mixed element type models
- automatic, hex-dominant hybrid solid meshing to produce higher quality elements on the first pass and more accurate results

## RESULTS EVALUATION AND PRESENTATION

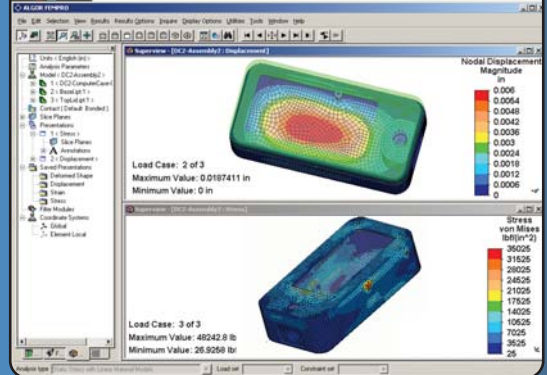
Extensive results evaluation and presentation capabilities include transparent display options, multiple-window displays, fast dynamic viewing controls and customization options including user-defined color palettes and annotations. All analysis results can be:

- displayed graphically as contours or plots
- output in the BMP, JPG, TIF, PNG, PCX and TGA formats
- animated with AVI creation and display tools
- presented in text, HTML or PDF reports

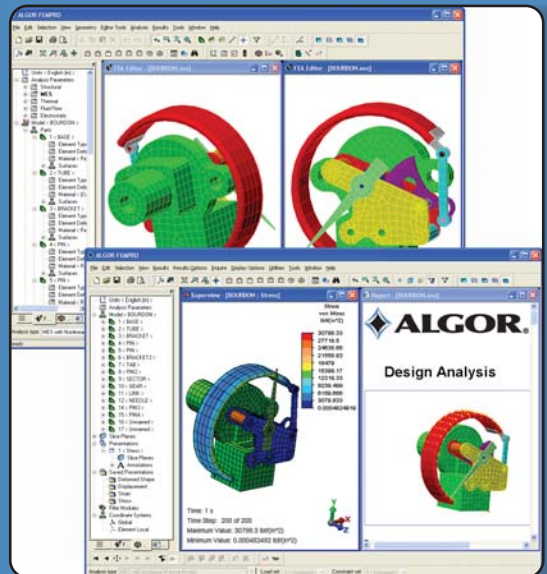
*"ALGOR is a complete FEA solution that offers a good combination of cost-effectiveness, quality and features. ALGOR provides all the necessary features within FEMPRO, an easy-to-use interface, for directly capturing 3-D solid geometry from Autodesk Inventor, generating a high-quality solid FEA mesh, easily setting up loads and constraints, performing analyses quickly, evaluating results and presenting a final design."*



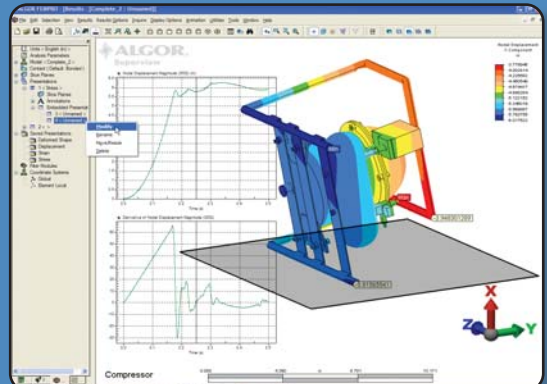
Ted Fryberger, P.E.  
DeepSoft, Inc.



*Ted Fryberger used linear static stress analysis to study the effects of pressure on this oceanographic instrumentation housing.*



*ALGOR's single user interface supports a wide range of CAD solid modelers and provides an easy-to-use finite element modeling, results evaluation and presentation interface for all available analysis types.*



*The capability to display graphs in the same window as result contours makes presentations vivid and effective.*

# FEMPRO FEATURES

## Modeling

- Beam modeling including direct access to AISC section property data for use with beam elements
- Capability to combine all element types available for a given analysis type in a single model
- Capability to import FEA models that are stored in ABAQUS, ANSYS, FEMAP®, NAS-TRAN, PATRAN or SDRC file formats
- See the CAD Support product data sheet (Part No. 3201.331) for additional modeling features

## Meshing

- See the CAD Support product data sheet (Part No. 3201.331) for the complete list of meshing features

## Results Evaluation

- Integrated environment for model visualization and results evaluation
- 3-D dynamic viewing options and rich colors provided by OpenGL-based displays
- Result displays of:
  - Displacement, stress, strain, plastic strain, strain energy density, reaction force and factor of safety
  - Vector plots of principal stress directions
  - Plate/shell thickness
  - Isosurfaces
  - Mode shape plots
  - Static and time-dependent temperature distribution, heat flow and heat flux
  - Fluid flow velocity, pressure, vorticity and streamlines
  - Reaction force, stress tensor and maximum principal and minimum principal stress resulting from the flow of fluids
  - Vector plots of fluid flow velocity
  - Particle tracking of fluid flow
  - Voltage distribution
  - Steady-state flow of electric current
  - Current flow lines and vector plots
  - Force flow lines
  - Electrostatic reaction force
  - Electrostatic charge
  - User-supplied functions operating on calculated results, user-supplied constraints and material properties
- AISC (ASD 1989) code checking
- Shear and bending moment diagrams
- Precision contouring for accuracy assessment
- Stress linearization utility for use with a linear static stress analysis on 2- or 3-D thin-walled structures
- Built-in, virtual instrumentation through Monitor for result graphs
- Fast Fourier Transform (FFT) display
- Point-and-click result inquiry options
- Result text listing
- Support for exporting results to common Windows applications

- Annotations to highlight the location of minimum and maximum results
- Capability to define result probes at desired locations
- Dynamic clipping planes for slicing models
- Realistic visualization of elements
- Capability to display parts as transparent (translucent)

## Results Presentation

- Capability to save all settings for a specific presentation and view that same display at any time or use those settings with a different model
- VRML utility to generate 3-D, web-based models with results
- Export a model's visualization data to third-party HOOPS Stream File (HSF) format
- Output result contours and graphs as BMP, JPG, TIF, PNG, PCX and TGA formats
- Integrated animation creation and display tools
- Automatic image generation of each result presentation for inclusion in reports
- Report Wizard and environment for automatic HTML or PDF generation and display

## User Interface

- Windows-native interface with tree views, multiple views and docking toolbars
- Right-click application, modification and deletion of loads, constraints and FEA properties
- Capability to import constraints from ASCII text files
- Shortcut keyboard and mouse controls for dynamic viewing options
- Capability to use mathematical expressions for data entry
- Built-in data checking for reasonable input
- Ruler to display scale when viewing models
- Multiple undo and redo capability
- Load and constraint set capabilities for managing different design scenarios
- Drag and drop
- Material Library Manager includes a library featuring materials from MatWeb and provides the capability to import, create and manage customized libraries
- Right-click, context-sensitive help
- Data management utility for archiving models

## Automation

- API for reading ALGOR results and using the automatic 3-D meshing tools
- Published, centralized file format
- Built-in script and macro tools
- Add-In Manager provides ability for third-party plug-ins that offer extended software functionality
- Support for plug-and-play analysis add-ons
- Capability to define a user-defined result type
- EAGLE, a programming language designed to assist in performing repetitive tasks, conducting parametric or variational FEA studies, optimizing designs and performing FEA and MES analyses which require multiphysics

## Configuration

- Customization options for user control over default settings, displays, annotations, reports and much more
- Internationalized language support including:
  - Graphical user interface and user documentation in Chinese (simplified), English, French, German, Italian and Spanish
  - Automatic language detection based on Windows regional settings
  - Convenient selection of language of user's choice
- Support for Windows and Linux operating systems (32- and 64-bit)
- Ability to run an analysis on a remote computer
- Support for 3-D motion controllers from 3Dconnexion including SpacePilot, SpaceBall, SpaceMouse and SpaceTraveler
- Customizable mouse functionality including pre-defined and user-defined templates
- Support for LAN and WAN networked license sharing; enterprise-wide and remote-use licensing; and single, node-locked licensing
- Support for redundant servers

## Service and Education

- "What's New" dialog summarizes recent software updates
- "Getting Started" demo to guide first-time users
- Keystroke-specific tutorials
- Users' Guide with robust search and index capabilities and available in international languages
- Integrated HTML Programming with ALGOR Guide with robust search and index capabilities
- ALGOR Assistant for expert, on-demand support through a real-time chat or design session
- Technical support and software updates with a current Software Updates and Support subscription
- Automatic software update wizard periodically checks for new software
- Tools for managing your customer account available from the My Account section of the ALGOR web site
- Regular e-mail newsletter

*Note: For complete details on FEMPRO features, see the "Products" section of [www.ALGOR.com](http://www.ALGOR.com). ALGOR's web site contains additional information about our wide range of simulation capabilities including static stress and Mechanical Event Simulation (MES) with linear and nonlinear material models, linear dynamics, fatigue, steady-state and transient heat transfer, steady and unsteady fluid flow, electrostatics, full multiphysics and piping.*



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