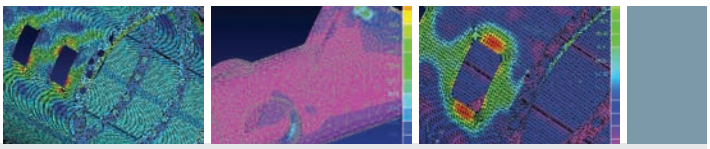
Velocity Series

Top 10 reasons to buy Femap with NX Nastran

www.siemens.com/plm/femap

white paper



Developing exceptional products that meet strict quality and performance criteria cannot be left to chance. Femap® software with NX™ Nastran software from Siemens PLM Software takes the guesswork and worry out of your product development process with a comprehensive suite of world-class digital simulation solutions.

PLM Software

Answers for industry.

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▶ Top 10 reasons to buy Femap with NX Nastran

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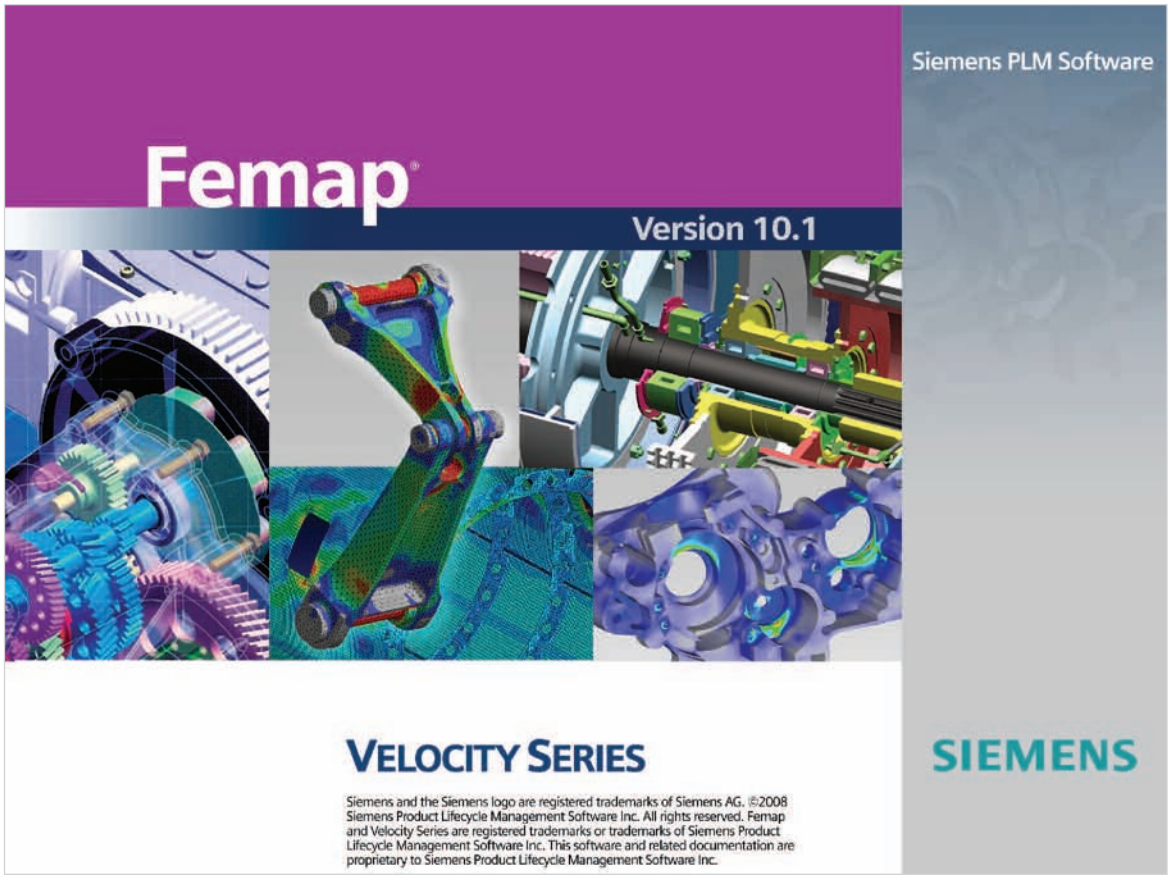
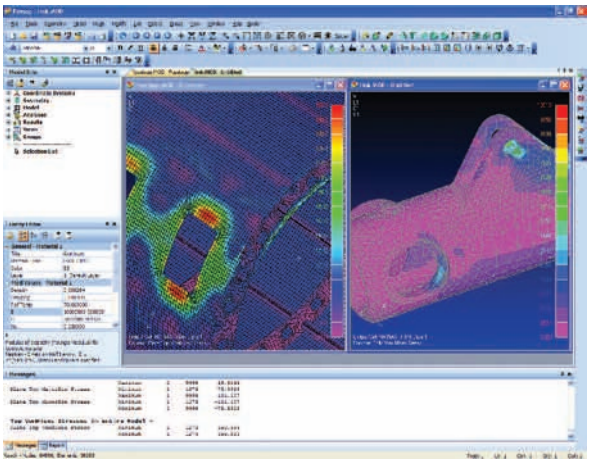
▶ Top 10 reasons to buy Femap with NX Nastran

This white paper presents just a sample of the many technical and commercial reasons for investing in Femap with NX Nastran that clearly show why Femap with NX Nastran is the leader for CAE products in the small to medium and large enterprise markets.

For more information on Femap with NX Nastran, go to www.siemens.com/plm/femap.

This document is intended to help you understand the strengths of Femap with NX Nastran. The following section lists the top ten differentiators that distinguish this product and its capabilities.





1. CAD access

Femap offers neutral CAD support that enables analysts and engineers to import many kinds of CAD data from various sources. Femap leverages the Parasolid modeling kernel that allows direct access to Parasolid data for surface and solid modeling, and provides robust advanced geometric tools necessary to access non-Parasolid geometry. In addition, Femap is associative with Solid Edge.

Competitive advantages

- Robust CAD import functionality
- Ability to import CAD data from many sources into Femap for modeling and analysis
- CAD-independent solution with most CAD access available in the base module

"Femap's ability to import geometry enhances the quality of the analysis. This feature of Femap lets us add more detail to the models so we get more accurate results."

Jan-Erik Larsson
Head of Engineering
RUAG Aerospace Sweden Mechanical Products Division

2. Geometry preparation tools

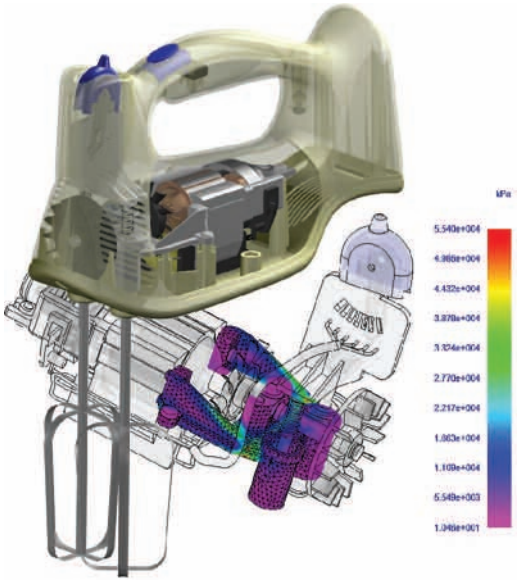
Preparation of geometry in readiness for finite element model creation and meshing is a task that can typically be laborious and time consuming. Femap works well with imported CAD data. There are numerous tools available to identify and clean up potentially problematic geometry and remove unwanted detail, such as small surfaces, edges and slivers. In addition, Femap offers a complete toolbox of functionality that can be used to modify and prepare the geometry for meshing, including surface splitters, and combination curves and surfaces. Femap also supports unique functionality such as solid stitching and manual and automatic feature suppression for model preparation.

Competitive advantages

- Robust import editing and modification of complex 3D geometry
- Easy identification of potentially problematic geometry
- Powerful geometry handling and cleanup tools
- Complete geometry preparation toolbox to prepare geometry for meshing

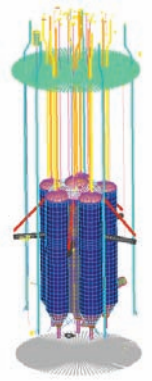
"We were able to import the geometry into Femap and very quickly produce different finite element models. Then we ran a number of analyses that gave the customer the answers they needed in time for the design review. With Femap and NX Nastran, we can provide that kind of turnaround."

Mike Pagnotta
President
Pagnotta Engineering



3. Preprocessing, modeling and visualization tool

With complete exposure to all finite entities and data, the need to effectively control entity display and graphics visualization is paramount. Femap includes an impressive array of versatile modeling, display and visualization tools to aid finite element model creation and verification prior to analysis. Visualization options include transparent display, dynamic viewing and the ability to interactively display and manage view options, groups and entities.



The depth of the model setup functionality allows for intuitive load and boundary condition creation, including support for complex loading definitions required by more advanced types of analyses such as heat transfer and dynamics. Femap also provides more advanced equation-based and function-based methods for defining loads.

Femap's modeling capabilities support the creation of contiguous weldment models and include powerful mid-plane extraction functionality that can easily turn thin-walled solid structures into plate type finite element meshes for accurate and efficient solutions.

Competitive advantages

- Complete exposure to all finite element entities and data
- Easy to use visualization management and viewing tools
- Ability to apply loads and boundary conditions both directly to the geometry model, or to the FE entities created after meshing
- Advanced load definition methods that can be equation or function based
- Setup and analysis of weldment-type models
- Efficient mid-plane extraction of solid thin-walled structures for plate model creation

"We use Femap for all of our consulting work. It's superior for the type of work we do, which is currently a lot of modeling where we're working with surface models of thin-walled structures. Femap is particularly good at handling that type of data"

Julian Holt
Co-founder
FatigueWizard Ltd

4. Meshing

Femap incorporates powerful 3D solid and surface meshers capable of producing top quality meshes the first time. Femap includes a comprehensive meshing toolbox that enables meshes to be updated and improved interactively, while simultaneously providing element quality feedback. Use of these tools allows efficient and accurate meshes to be created quickly and easily. Also available are unique model creation tools that facilitate 3D hex meshing and multi- and mid-surface modeling and meshing.

Competitive advantages

- Easy high quality mesh creation that ensures accurate results
- Full control over mesh creation and editing
- Interactive mesh editing tools with live element quality feedback
- Unique 3D mesh creation tools

"Creating meshes with multiple element types is much easier in Femap than anything else I've dealt with."

Ron Heberlein
Senior Mechanical Engineer
Columbia Helicopters

5. Assembly modeling

Femap provides powerful functionality that supports assembly model management with automatic assembly detection that quickly and easily determines which areas of the model are in contact. Depending on the nature of the contact, these contact regions can then simply be set in contact or be glued together. The iterative contact calculations performed by NX Nastran realistically represent the true contact condition, and update during the solution to take deformation changes into account.

Competitive advantages

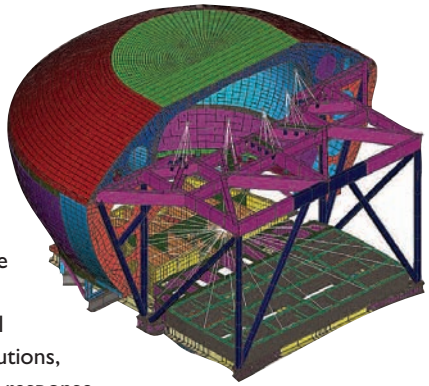
- Automatic contact detection with automatic or manual contact region definitions
- Realistic assembly and contact modeling with various contact types available
- Iterative contact calculation for more accurate results

"An important consideration in our selection of Femap was the fact that it can handle contact surface problems."

Dirk Koep
Designer
Ruhrpumpen

6. Analysis functionality support

Femap's high-level analysis functionality is supported by an intuitive user interface. This provides both occasional users and full-time analysts with an extremely valuable tool. By combining this functionality with advanced NX Nastran analysis solutions, Femap with NX Nastran is able to solve even complex engineering problems in a straightforward manner.



Traditionally, NX Nastran has been a very capable solver for dynamic response analysis. Femap with NX Nastran supports additional dynamics and nonlinear solutions, including random response, response spectrum, material and geometric nonlinearity with time dependent loading, and rigid and deformable body contact.

Other advanced analysis options include implicit integration nonlinearity, advanced thermal analysis solutions, and 3D computational fluid dynamics.

Femap with NX Nastran provides the tools necessary to get the job done, no matter what your engineering problem demands.

Competitive advantages

- A very high level of integration with the NX Nastran solver that enables users to access the power and dependability of the world's premier solver
- Advanced nonlinear, heat transfer and fluid flow analysis capabilities
- Base Femap with NX Nastran module that provides a wealth of analysis functionality including heat transfer and nonlinear capabilities, as well a linear and glued contact functionality

"We have we set ourselves up with an advanced solution that lets us perform a complete range of structural and thermal analyses. With the Siemens PLM Software (solutions), we can handle any analysis application related to space."

Nicolas Étienne
Mechanical Group Leader
ABB Bomem

7. Postprocessing

Post solution, Femap offers more results processing tools to enable quick and efficient understanding of the behavior of the system under analysis. Postprocessing tools include time animations, streamlines, cutting planes, free-body diagrams, grid point force balance, bar and beam visualization, shear and bending moment diagrams and user-defined reports. Furthermore, Femap offers versatile results data processing functionality that allows result combinations to be made after the analysis has completed.

Competitive advantages

- Comprehensive postprocessing display and reporting tools that facilitate faster comprehension of results
- Data manipulation post analysis
- Versatile results combination and post-analysis manipulation functionality
- User-defined report generation
- Beam visualization and results display options

"One of Femap's most important advantages is ease of use. For example, you can easily control how you want to view the data in postprocessing. That is one area in which Femap is extremely strong."

Milan Bureš
Structural Engineer
Evektor-Aerotechnik

8. User interface

Designed specifically as a native Windows application, Femap offers comprehensive analysis functionality that is easy to use and quick to learn. Key features promote usability and efficiency, including dynamic viewing, color and screen management, multiple model access and multiple undo steps – all within an intuitive user-friendly interface based on an up-to-date Windows look and feel. User interface panes include Model Info and Entity Editor that allow direct access to analysis modeling data without having to navigate a menu system. Similarly, the Data Table pane allows direct access to post-analysis results data. Also available is the comprehensive help menu and online help resources.

An efficient on-screen working environment reduces training overhead and allows engineers to maintain maximum productivity even when Femap is being used on an occasional basis. The learning curve for Femap is very short. Engineers can become productive in the use of the software after only two days of training.

Competitive advantages

- User friendly, Windows-native, command and menu system that includes up-to-date Windows style user interface features
- Fast learning curve that minimizes training time even before maximizing everyday user productivity
- Easy to learn user interface that allows maximum productivity to be maintained, even with occasional use
- Strong functionality in a familiar user interface that promotes usability and efficiency
- Direct access to analysis modeling data and results that enables rapid creation and editing of models and fast comprehension of results

"It's the small things that make Femap with NX Nastran more user-friendly, and the ease of working with it makes you want to do more analysis."

Joe Brotherton
Director of Product Development
KIC Holdings

9. Customization tools

Femap offers a comprehensive set of customization tools including a fully featured application programming interface (API) and a facility to record, edit and play user-defined macros. The powerful API capability provides full access to all Femap functionality and allows external programs to interact with Femap. In addition, macros can be leveraged to record particular processes or workflows and facilitate the automation of repetitive analysis tasks.

Competitive advantages

- Ability to extend Femap capabilities and add new applications
- Interface to other external programs such as Word and Excel
- Direct access to all Femap functionality
- Program using standard visual Basic language or industry standard programming languages – no special programming language knowledge required
- Ability to record, edit, debug and playback user-defined macros directly in the Femap interface

"Individual load results can be easily taken from the model and migrated to Microsoft Excel with the click of a mouse for specific evaluations. The ability to create a multitude of load types using the API facilitates recurring analysis tasks and saves a huge amount of time."

Jyrki Majamaeki
Femap User
Eurocopter

10. Scalability of solutions

Within the Velocity Series,™ a scalable set of simulation solutions is available, from Solid Edge Simulation that offers CAD-embedded analysis solutions within the Solid Edge environment for the design engineer, to Femap with NX Nastran, a CAD-independent standalone finite element analysis solution for more advanced finite element modeling and analysis applications.

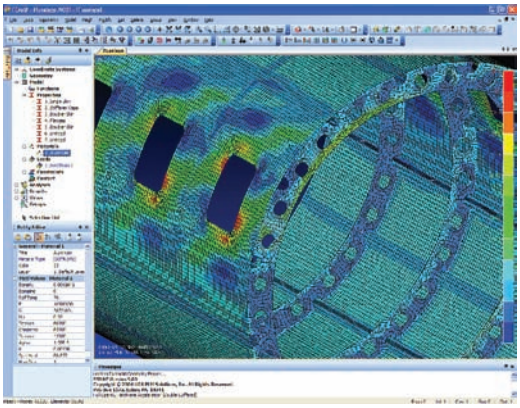
Femap itself offers scalable solutions and can be used to simulate everything from simple solid components to entire systems and assemblies, within the same user interface. Femap with NX Nastran can be tailored to specific customer needs and can expand to meet future demands without requiring additional product procurement or retraining.

Competitive advantages

- A complete set of scalable simulation applications within the Velocity Series that supports all simulation requirements, from CAD-embedded Solid Edge Simulation to standalone Femap with NX Nastran
- Highly scalable Femap with NX Nastran solution that facilitates even the most advanced type of analysis through a single user interface

"Femap is a functionally rich application that has been built to deliver a specific set of tools to a wide range of users from the design engineer to the advanced analyst. It serves both ends of the market equally well."

Al Dean
Technology Editor
MCAD Magazine



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