

Femap • NX Nastran

Noesim

Using the right toolset is key to providing advanced CAE consulting services

Industry

Design and engineering services

Business challenges

Manage CAE analysis and simulation activities for companies of any size at affordable costs

Implement CAE software that can interface across CAD packages

Acquire multi-disciplinary analysis tools to fully utilize in-house expertise

Keys to success

Define a CAE process with clearly defined and standardized tasks

Use de facto standard solver for the aerospace industry

Work with Windows-native software

Noesim automates its CAE process using Siemens PLM Software technology; helps customers make smarter design decisions early in the development process

CAE expertise, aerospace-specific know-how

Noesim was established in 2005 to consolidate the engineering and management know-how its founders acquired by working with major Italian companies. The company's objective is to make its expertise available to organizations that strive for success through innovation and competitiveness. Based in Cesate, Italy, a few kilometers from Milan, the core focus of this design and engineering company is the aerospace industry. Noesim has also extended its services to companies in other industries that require computer-aided engineering (CAE) expertise and simulation tools in the design and validation stages of a project.

From the very start, Noesim built its business on a sound foundation, providing engineering consulting services to the aerospace industry. "We have been working in aerospace for many years and we know the requirements of companies in this industry very well," says Guglielmo Barbiani, one of Noesim's co-founders. "For example, there are non-official habits and standards, such as the use of Nastran as the de facto standard CAE solver. We also

needed a CAE tool that could interface with all the different CAD (computer-aided design) packages adopted by our customers."

To create an efficient and competitive organization, Noesim develops internal standards and procedures that are independent of their customers' processes. Noesim engineers acquire competence using software tools that help them deal with multi-disciplinary tasks. They have expertise not only in static and dynamic structural analysis, but also in composite materials, kinematics, fluid dynamics and heat transfer.



Noesim's core focus is the aerospace industry, applying its significant experience in the design of structural parts for aircraft.

Results

Automated the CAE process from simulation model generation to analysis and final reporting

Reduced finite element modeling time

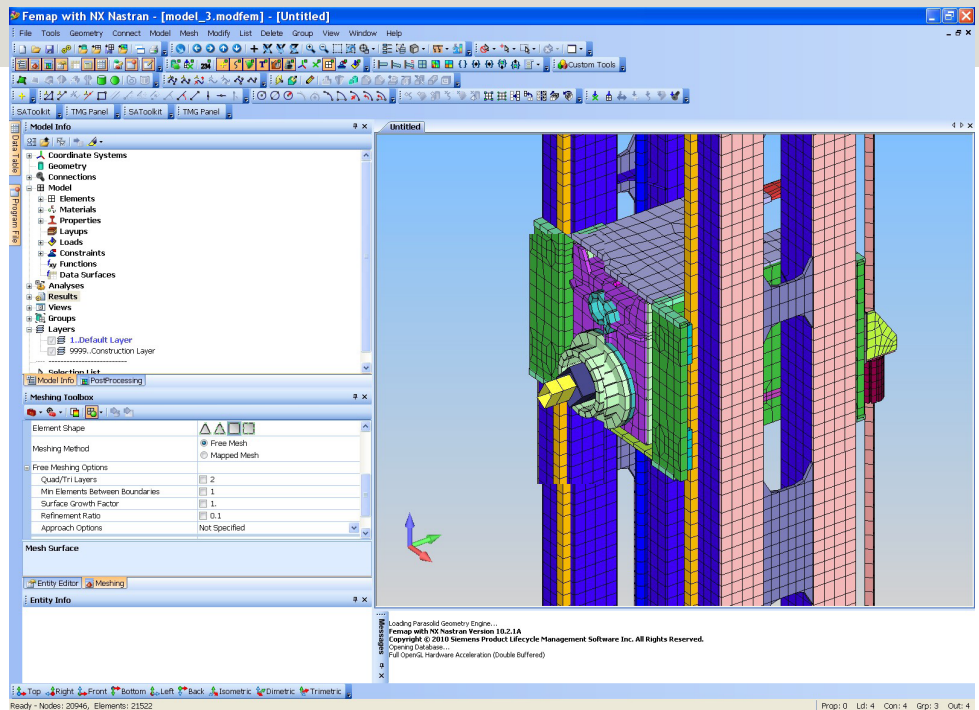
Ensured reliability of final data by eliminating manual tasks

Extended utilization of downstream resources

Early design validation and reduced prototyping costs for customers

“It was an easy decision. With an affordable investment we could acquire NX Nastran and Femap, a Windows-native tool that can integrate with other applications for downstream analysis execution, and support different industries. Plus it has multi-CAD integration and a FEM pre/post-processor that can interface to other solvers our customers use.”

Guglielmo Barbiani
Co-founder
Noesim Srl



With Femap, Noesim can generate highly realistic simulations that span the entire range of analyses.

“Another key factor for us is quality, which relates to how realistic CAE simulations should be,” says co-founder Franco Belloni, “Traditionally, FEM (finite element modeling) codes and CAE analyses are conceived to solve linear problems. But the real world is full of non-linearity, from contact modes to material-related issues, up to large displacements. Therefore, we looked for software that can deliver highly realistic simulations, supporting a full range of analyses and not limited to a single domain.”

Process integration and standardization

Noesim’s decision to adopt Femap™ software and NX™ Nastran® software from Siemens PLM Software was driven by two additional factors. The first factor is the cost of the application, not only for the initial investment, but also from total cost of ownership (TCO) and staff training standpoints. The second factor is the opportunity to integrate the software with downstream simulation operations. In addition to acquiring CAD geometry from its customers, Noesim’s work process includes conducting calculations with ad-hoc applications or Excel® spreadsheet software. They needed a CAE tool that

would enable easy integration with other software systems and add-on modules developed internally by Noesim.

“In view of possible developments and future needs, we were also looking for a tool that would help us set up clearly defined and standardized processes to access the CAE data of projects, simulations and verifications performed on behalf of our customers,” says Belloni. “Unlike CAD, where you normally have established procedures and workflows for development, validation and approval and all designers follow a fixed route, the CAE process is still largely entrusted to each individual. In this respect, it was useful and interesting for us that the Siemens PLM Software proposal included an advanced data management tool like Teamcenter.”

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The value of ongoing product development

When Noesim adopted Femap in 2006, the company also valued Siemens PLM Software's sharing of its plans for the future development of the application. "As we searched for a tool that could offer increasingly realistic simulations, we appreciated the clear roadmap and constant upgrades of this software, including such features as contact simulations, bolt preload, and flexible and advanced CAD geometry management," says Belloni. "A tangible example is weight reduction, which can be achieved using tools in Femap that optimize the structure and minimize material usage. For instance, with the design optimization module, you can identify the ideal shape solution in the early design stage, given certain load conditions, constraints and materials."

Normally, when Noesim receives a CAD model from a customer, the first step is to clean the model by removing features and details unnecessary for analysis, in order to streamline the process. The next steps are mesh construction and the application of loads, constraints and material properties, followed by the analysis and evaluation of results, and then the production of a final report that can range from a simple note to a detailed report for an institute certification.

Advanced support services

Besides validating the functional behavior of a product developed by a customer, Noesim offers advanced support services. Belloni explains, "We often start at the product development stage. Through the acquisition of CAD geometries created by the customer in the preliminary design phase, we build a FEM model that enables us to perform engineering verifications to provide the customer with accurate feedback about required modifications. Iteration between the FEM model and new CAD geometry necessarily requires an efficient tool like Femap, which can update some operations rather than repeating them, and a high-quality solver like NX Nastran, which can minimize the gap between simulation and real-world behavior of structures, thus reducing prototyping costs for the customer."

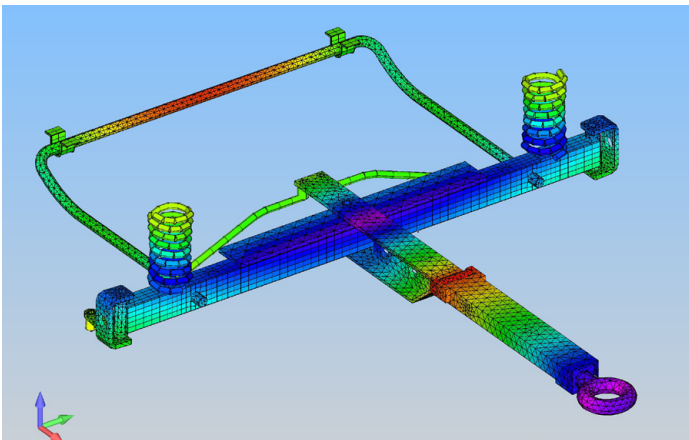
Noesim has also developed methodologies for companies outside the aerospace industry to help them understand how CAE tools can solve their product-related issues with a standardized approach. "As an example, we studied a cover for a pressure container," says Barbiani. "Customers have learned to apply a method to reduce weight, while preserving strength levels by incorporating analysis into their product development processes. As a result, product designers can directly apply and

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Co-founder
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With Femap, Noesim found a CAE tool that can interface with all of the different CAD packages used by its customers.

Solutions/Services

Femap
siemens.com/plm/femap

NX Nastran
siemens.com/plm/nastran

Customer's primary business

Noesim provides advanced consulting services to companies in the aerospace industry for the design of structural parts, manufacturing tooling and ground maintenance equipment. The company has also extended its services to organizations across other industries.
www.noesim.com

Customer location

Cesate, Milan
Italy

Partner

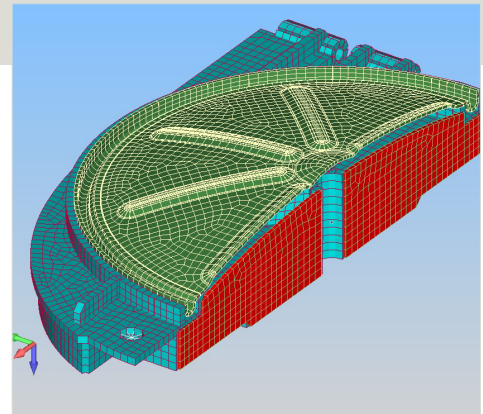
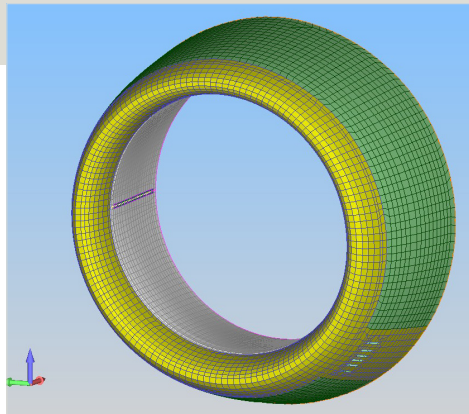
Team3D

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Noesim supports businesses that don't have the resources, skills and tools to reap the benefits of CAE simulation.

use these analysis methods, although they may not have specific experience and advanced know-how. Our consulting service is aimed at making customers independent."

Wide spectrum of benefits

The use of Femap has proved most useful and effective in the development of methodologies, especially because of its extensive configuration and customization capabilities. "Femap can be customized and enriched with tools to automate the entire process of model generation, analysis, calculation and data management," says Belloni. "It's very practical to develop programs for data extraction and management, even for a small company like ours that uses standard Microsoft applications. Femap is Windows-native and generates documents, such as Excel spreadsheets, with no import or formatting operations. This means shorter cycle times and more reliable data, because error-prone manual steps are eliminated. Femap is Windows-native, so it can fully utilize hardware resources, without requiring powerful machines to analyze complex assemblies comprising hundreds of parts."

Ease of use is also important. According to Barbiani, Femap is easy to learn and intuitive to use, as a result of its familiar and configurable interface. He explains, "With Femap, commands are easy to find. Femap is easy to use even for those who have never used a CAE tool. This is much appreciated by new users, including students from the Milan Polytechnic who join us for two- to three-month periods. They can focus on engineering issues, rather than on learning how to use the software. They are normally amazed at the power and versatility of Femap, compared to other tools they use at their university."

Barbiani adds that excellent technical and sales services are essential to a high-value, deploy/utilize software paradigm, noting that he is quite pleased with Siemens PLM Software partner Team3D, which has been providing support to Noesim since the first implementation of Femap.