SIEMENS

Automotive and transportation

Exnovo

Motorcycle component supplier uses CAE to optimize structures

Product

Femap

Business challenges

Virtually simulate behavior of structures under loads and constraints

Manage large finite element models with millions of nodes

Optimize topology of structures or substructures

Keys to success

Implement Femap for finite element analysis

Simulate component behavior

Predict product performance

Results

Enabled the exchange of finite element models between different brands of software

Used super elements to manage large finite element models

Created database of stiffness values

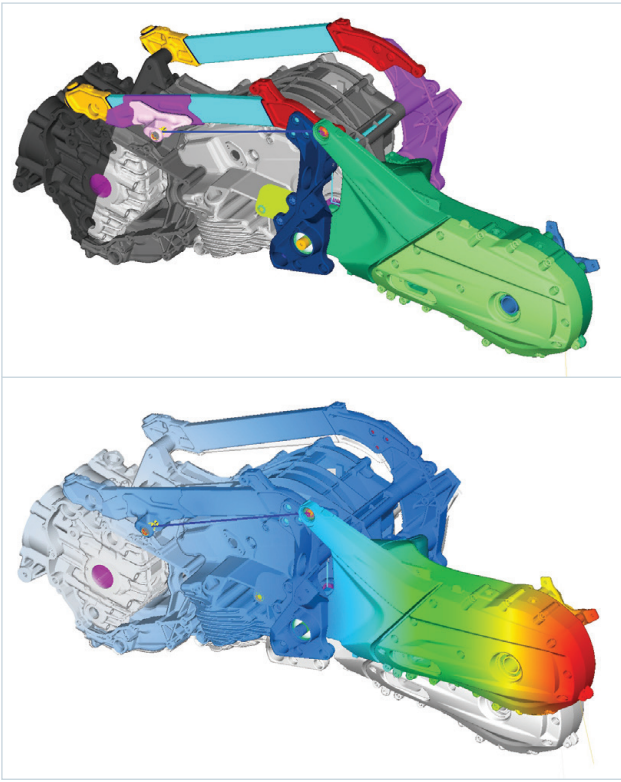
Exnovo studio relies on Femap for structural analysis and design validation

Femap helps Exnovo validate complex motorcycle structures

A design and engineering studio, Exnovo serves the motorcycle industry by providing customers with everything from product aesthetics definition to the development of complex "turnkey" industrial processes. The use of Femap™ software from product lifecycle management (PLM) provider Siemens PLM Software is helping Exnovo determine if the components it develops can withstand expected loads and stresses.

Exnovo's computer-aided engineering (CAE) department meets customer demands for structural analysis of two and three-wheel vehicles, as well as individual components made with isotropic and composite materials. The goal is to optimize structures early in the design stage, as well as to verify whether parts and components have sufficient stiffness and are able to withstand expected stresses. The CAE department carries out structural analysis, validation and optimization tasks, providing customers with finite element modeling (FEM) and finite element analysis (FEA), plus linear and non-linear analysis, as well as static, thermal, buckling, modal, dynamic and fatigue analysis.

"Customers require FEA validation of structures for resistance and stiffness," says



Pietro Del Negro, manager of Exnovo's CAE department. "Our department uses Femap to help us virtually simulate the behavior of a component or complete structure when subjected to specific loads and constraints. We then share the final results with the customer."

FEA is also used to predict the behavior of components made with new or different materials, including managing pre-loads, contacts between parts and the quality of

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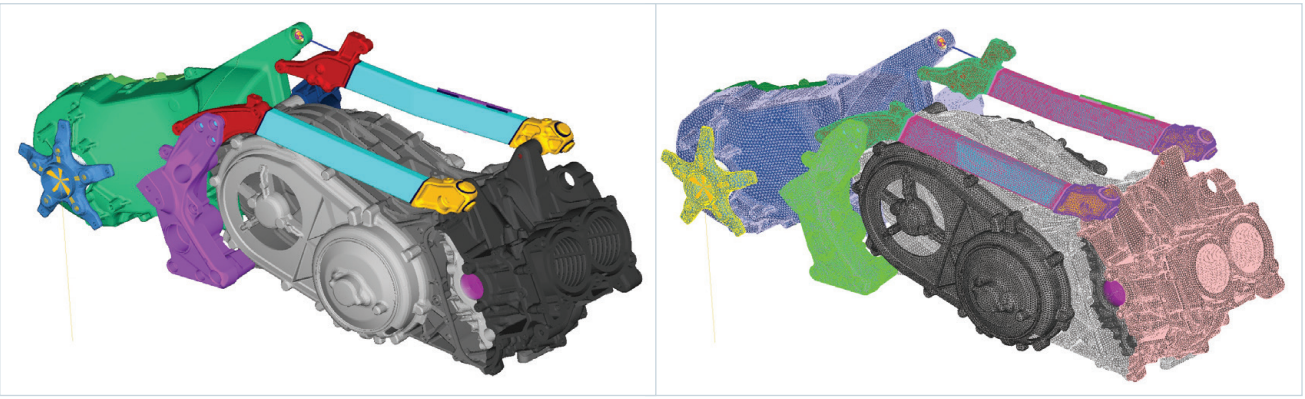

the mesh. “Often customers ask us to create a structural basis for a component which will form the basis of a new style, or to achieve the topological and structural optimization of a structure or sub-structure,” says Del Negro.

Working with large models

While performing such activities, Exnovo sometimes needs to work with large models containing millions of nodes. Engineers must be able to replicate laboratory tests for model validation. Del Negro and his team have found the answer to these requirements in Femap, an FEA solution which is CAD-independent and runs on the Windows® operating system.

“Femap is a valuable pre- and postprocessor that simplifies the exchange of finite element models between Exnovo and our customers, including those who are using other analysis software systems,” says Del Negro. “Femap has enabled us to solve several problems, helping us develop significant know-how in the structural validation of motorcycle components. Femap also enabled us to create a database of stiffness values for the frames, swing arms and other components.”

Among the most useful features of Femap, Del Negro cites the Bolt Preload application, which enables you to choose the type of contact between the parts and the Vertex Buffer Objects option, which allows you to manage models with millions of

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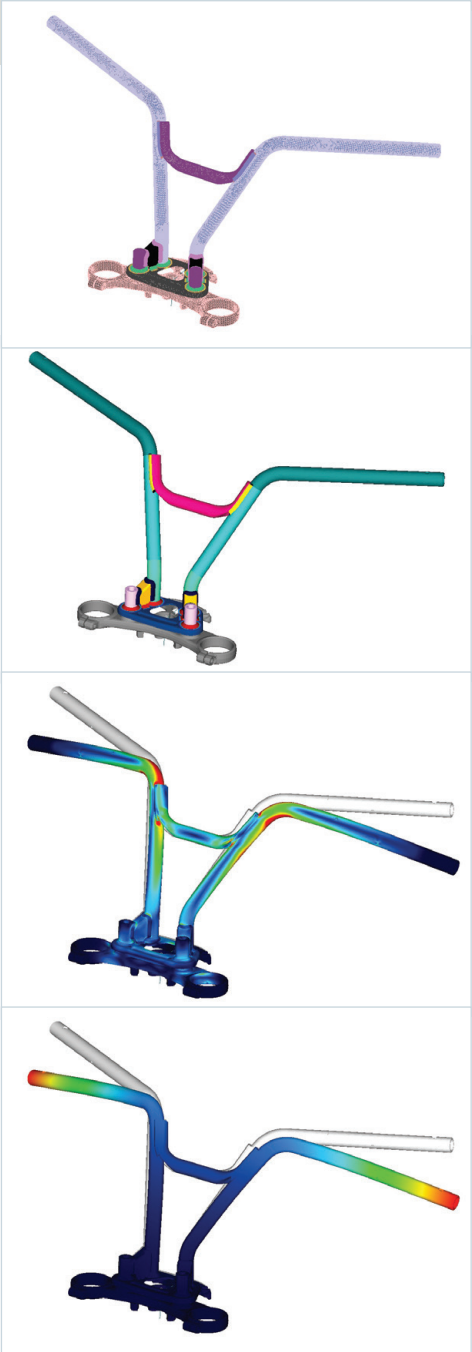

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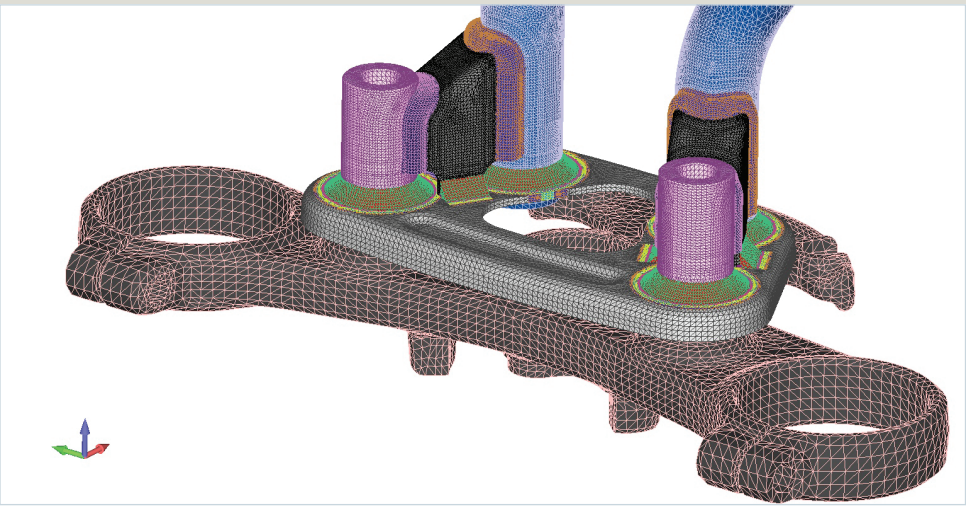
nodes. "Our CAE department has used Femap to help analyze a large model that included the complete rear frame, the engine and the swing arm of a BMW scooter, for a total amount of 4.5 million nodes," notes Del Negro. "We will also provide finite element analysis of all the body parts of the new BMW scooter."

For the selection and implementation of Femap, which offered the best cost-to-quality ratio among all solutions evaluated by Exnovo, the company was supported by SmartCAE, a Siemens PLM Software partner. "Exnovo had specific issues and needs related to mesh quality, matching surface management, the management of large models and the exchange of models with other software," says Francesco Palloni, business development manager at SmartCAE.

Del Negro adds, "SmartCAE's support was valuable, especially in helping us solve typical initial difficulties. The training SmartCAE provided was very effective. Within a short time, our users were able to become fully versed in the use of software."



Solutions/Services

Femap
www.siemens.com/plm/femap

Customer's primary business

Exnovo Studio is a design and engineering studio offering services that range from the definition of product aesthetics to the development of complex "turnkey" industrial process projects for motorcycles, scooters, maxi-scooters and 3-wheel tilting vehicles.
www.exnovostudio.com

Customer location

Coriano, Rimini
Italy

Partner

SmartCAE

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Siemens PLM Software

Americas +1 314 264 8287
Europe +44 (0) 1276 413200
Asia-Pacific +852 2230 3308

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