

Femap

## Cideon Engineering

FEA improves railway vehicles

### Industry

Automotive and transportation

### Business initiatives

New product development  
Regulatory compliance

### Business challenges

Market demands for high reliability  
Pressure to lower costs

### Keys to success

Precise finite element modeling  
Extensible material database  
Easy-to-use tools for visualizing FEA results

### Results

Precise information during the design stage about how a part will behave  
Ability to optimize designs  
Confidence that regulatory requirements are met

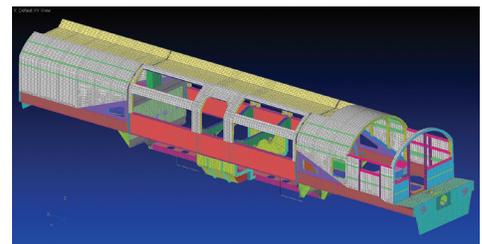


**Femap and NX Nastran help a German company design railway vehicles that are safer, more efficient and more comfortable**

### Trains and more

Cideon Engineering GmbH was founded in 1992 under the name IKB as a provider of engineering services. What started out as a 10-man operation is now a company with more than 100 employees and two offices in Germany. In 2002, the company changed its name to Cideon Engineering GmbH, which together with the companies Cideon Systems and Cideon Software, belongs to Cideon AG, a corporate group with a headcount of approximately 170.

Cideon Engineering GmbH is primarily involved with railway vehicles but also



*Finite element model of a railway construction vehicle.*

with the development of production equipment for the automotive industry. More than 80 percent of the company's activity involves railway vehicles. The company basically develops anything that runs on rails including high-performance locomotives, switchers, mining locomotives and railway construction vehicles, as well as railway cars and street cars.

## Solutions/Services

Femap

[www.siemens.com/plm/femap](http://www.siemens.com/plm/femap)

## Customer's primary business

Cideon Engineering GmbH provides a comprehensive range of engineering services with a primary focus on railway vehicles.

[www.cideon.de](http://www.cideon.de)

## Customer location

Bautzen, Saxony  
Germany

*"Femap's extremely good visualization of analysis results was certainly one of the points in its favor."*

Thomas Labedzki  
CAE Engineer  
Cideon Engineering



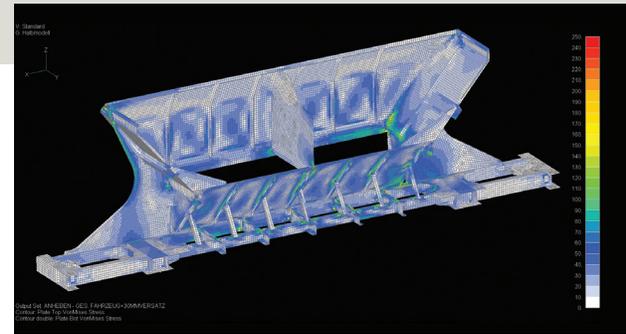
One of the FEA workstations at Cideon Engineering.

Cideon Engineering's customer portfolio includes renowned railway vehicle manufacturers such as Siemens, Vossloh, Bombardier, Alstom, Stadler and Deutsche Bahn. The company provides these customers with services such as business consulting, project planning, mechanical design engineering, technical documentation, trial monitoring, construction supervision, approval procedures and professional assessments.

### Comprehensive FEA solution

To ensure that its products are as reliable and optimized as possible, Cideon Engineering performs a wide range of computer simulation during the design process, using tools such as the NX™ Nastran® finite element analysis (FEA) solver and the Femap™ pre/postprocessor. The selection of Femap was based on its solid cost-performance ratio, very good data interfaces to all leading CAD systems and excellent options for visualizing the analysis results.

When designing railway vehicles, each part is analyzed separately due to the fact that there are specific rules relating to the performance of each individual part. Typically, engineers perform linear static analyses but occasionally also vibration analysis and the examination of contact problems.



Analysis of a bulk cargo wagon.

Femap provides appropriate modeling tools for all these situations, and its tools offer the full range of functionality required by the specialists at Cideon Engineering.

An analysis project commences with importing the CAD data. This data is subsequently simplified and cleaned up and then converted to a surface or finite element shell model so that the analysis calculations can be performed more quickly. Some of the meshing is done automatically using Femap automatic meshing tools while other parts of the mesh are created manually. Models comprising 120,000 or more elements are created, depending on the part involved. The amount of time typically needed to solve an analysis using the NX Nastran solver on an up-to-date Windows PC is approximately two minutes.

Once an analysis has been completed successfully, the results are visualized and evaluated in Femap. A wide variety of tools are available for displaying displacements, tensions, forces and so on as tables, diagrams and figures. Since Femap is a native Windows application, results can easily be transferred to other Windows applications such as Excel and Word.

## Siemens PLM Software

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[www.siemens.com/plm](http://www.siemens.com/plm)

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