

Femap

## Femtec

Using Femap, expert CAE service provider accelerates simulation of complex designs, delivery of optimized products

### Industry

Mechanical and structural engineering

### Business Challenges

Fast digital simulation of complex designs

Accelerated CAE process

CAD models imported from different sources

### Key to success

Rapid modeling (in both the draft and the final phase)

Automation of repetitive tasks

Open software with interfaces to most CAD and CAE formats

### Results

Scaling up the simulation between the draft and detail level during the design phase, creating a better base for design advice

Easy-to-use programming language to automate own projects or develop tools for customers

Project flexibility

A strong track record of reducing product weight while retaining full product functionality

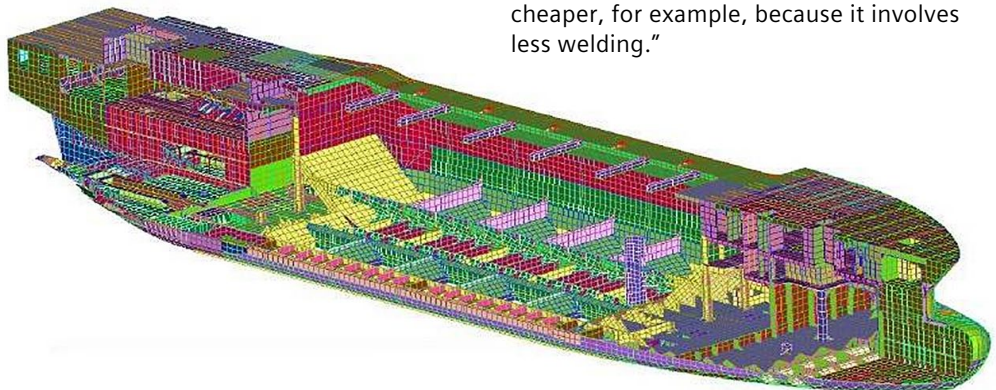
### Details on-demand, automation where necessary – Femap is the perfect fit for Femtec

As a computer-aided engineering (CAE) service provider, Femtec bv (Femtec) is pleased to see that digital design simulation is gaining popularity and is almost always required by inspection agencies. Design simulation is performed earlier and earlier in the development process, because eliminating uncertainties earlier in the process allows for greater design complexity/sophistication. Design boundaries can be pushed to their limit. However, doing so requires that difficult tasks be accomplished in less time, and that quality and productivity drive the approach.

Based in Eindhoven in the Dutch province of Brabant, Femtec specializes in digital simulation that addresses mechanical and

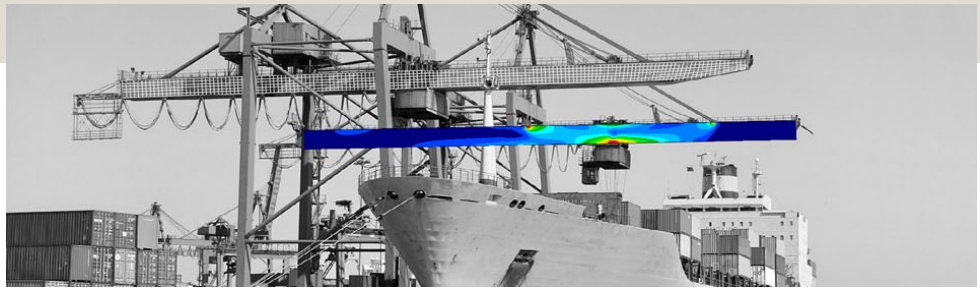
structural design primarily for the off-shore, automobile, entertainment, high tech, mechatronics and mechanical engineering industries. Femtec consists of a group of eight senior and junior consultants who support and help customers optimize a design across all phases of product development.

Femtec is thrilled with the emergence of digital simulation as an essential product development tool. "The interest in CAE means that more companies are seeing the benefits," says Martijn Wubbolts, senior mechanical and structural engineer, and owner of Femtec. "A design's behavior is easier to predict and there are fewer uncertainties, which reduces the warranty costs. It increases a company's ability to make a unique product, and rising material costs make it especially interesting to look into using less material. Another way of lowering costs is to reduce the cost of production. An alternative design can be cheaper, for example, because it involves less welding."



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Martijn Wubbolts  
Senior Mechanical and  
Structural Engineer  
and Owner  
Femtec



Digital simulation used to take place at the end of the product development phase as a final check of the product's features. A final check is still carried out, because it's required by the inspection agencies, but now, simulations are performed earlier in the process. Product development almost always occurs under time pressure, so digital simulation has to be efficient.

As an experienced CAE user, Femtec knows what the market has to offer in the way of CAE software. Wubbolts is always on the lookout for new CAE solutions that meet market requirements: fast, good and flexible (customizable with a lot of import options). He explains, "We've been using Femap since 1995, because it meets our needs. The software's price/quality ratio is unbeatable. The software uses NX Nastran, which is based on the Nastran solver that was originally developed by NASA. Femap also imports all common CAD (computer-aided design) formats and numerous CAE formats, and is particularly good in calculations involving plate elements like those used in ship and offshore constructions. One of strengths of Femap is the modeling of plate elements with multiple pipe/plate connections."

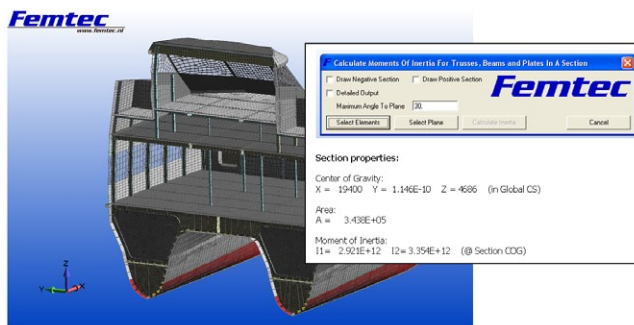
Femtec's product development process is very efficient. According to Wubbolts, it's important to adapt the calculations' level

of detail to the development phase. He explains, "In the draft phase, we mainly use draft designs and very little detail, because it saves time. We create the draft designs for the customer in Femap, because the product has such excellent modeling options. Too much detail distracts from the main issues." The details are added to Femap™ software throughout the development phase or customer models are used.

The ability to import geometry is another factor that contributes to the company's efficiency. "Femap imports geometry from every imaginable CAD system and can also process major neutral CAE formats from other packages," says Wubbolts. "Femap is very open; a mesh can be exported and delivered to the customer as a surface model. The customer can digitally examine whether the component with the maximum distortion conflicts with other components in the design."

Femtec has also increased its efficiency by automating repetitive work or data processing that would take months if done manually. Automation and data processing are frequently done during a project to increase the team's efficiency. In some cases, special tools are developed for customers. "The application programming interface (API) is easy and quick to learn," says Wubbolts. "We use automation, for example, to calculate the input for standard fatigue calculations. Femap has successfully automated the very time-consuming calculation of the input for all components and load cases."

Another example of how the programming language of Femap is engaged involves calculating load distribution across several tanks on a ship to enable optimal stability.



## Solutions/Services

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

## Customer's primary business

Femtec helps customers optimize their designs, simulating product behavior that is mainly caused by mechanical loads and advising customers on improvements to make products more efficient and less expensive.  
[www.femtec.nl](http://www.femtec.nl)

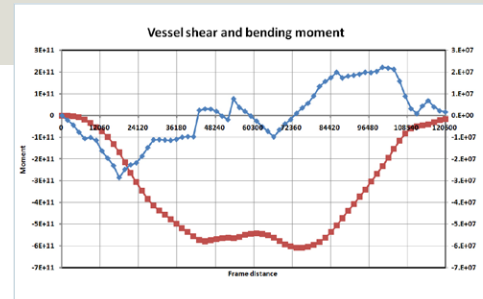
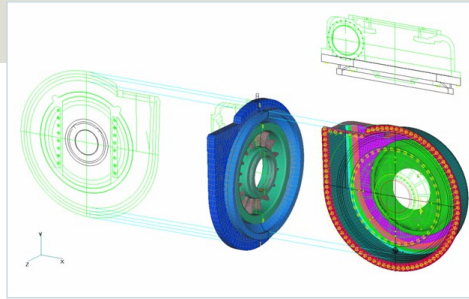
## Customer location

Eindhoven  
Netherlands

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"The ship has thirty tanks that can be filled with various liquids," notes Wubbolts. "The fuel and water supply is also stored in the ballast tanks. The calculation has a lot of repetition, which we automated in a tool. The software produces a bending moment and a shear stress graph [see figure]. With another tool we developed, generating the quadratic surface moment for the mesh of a random ship section is as easy as baking apple pie. Our employees program the tools on the job." According to Wubbolts, the most important requirement is a good understanding of mechanical engineering. Programming knowledge is useful, but not necessary.

Aside from all of the technological capabilities, it is workmanship, active project involvement and collaboration that are the key contributors to delivering good work. "We spend time with our customers to make sure we understand exactly what they need," says Wubbolts. "What demands are put on the product? Under which conditions will it be used? What is the factor of safety? Has it been added to the load?" The result of using Femtec's analysis is sound advice for the next project steps and a calculation report that includes the standards used by the inspection agencies. Moreover, Femtec works with the customer to improve a design's efficiency by providing analysis during product development and finding alternatives that have the same functionality but are lighter and use less material.

Wubbolts says that all of Femtec's employees are entrepreneurs at heart, noting that they are experts in their field and passionate about their work. He points out that this purposeful mindset results in increased company's flexibility: when customers are working according to strict deadlines, employees don't go home because it's time to leave.

At Femtec, the company's open culture makes work fun instead of tedious. Employees collaborate internally as well as with other consulting firms in order to successfully complete larger projects. The entrepreneurial spirit goes hand-in-hand with curiosity about new options and features in Femap software. According to Wubbolts, that's why Femtec always uses the latest Femap version on the newest hardware.

Over the years, Femtec has gained experience with a wide range of CAE applications, as customers regularly demand that their own CAE software be used. Wubbolts points out, "We're always happy to work with Femap. Femap is technically strong in a wide range of areas. As an entrepreneur, I think the price/performance ratio is unbeatable. Our employees like its user friendliness, openness and its programming possibilities. In short, Femap is perfect for us."

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

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