

## Oil and gas

# Korndörffer

## Optimizing the design of large steel structures

### Products

Femap, NX

### Business initiatives

New product development

Regulatory compliance

### Business challenges

Design cost-effective steel structures tailored to customers' unique needs

Meet oil and gas industry regulations

Arrive at efficient structures as quickly as possible

### Keys to success

Users like working with Femap software

NX Nastran software generates fast solutions and supports environmental loading (wind)

Femap data used in reports to inspection agencies

### Results

Femap/NX Nastran combination offers best FEA price-performance ratio

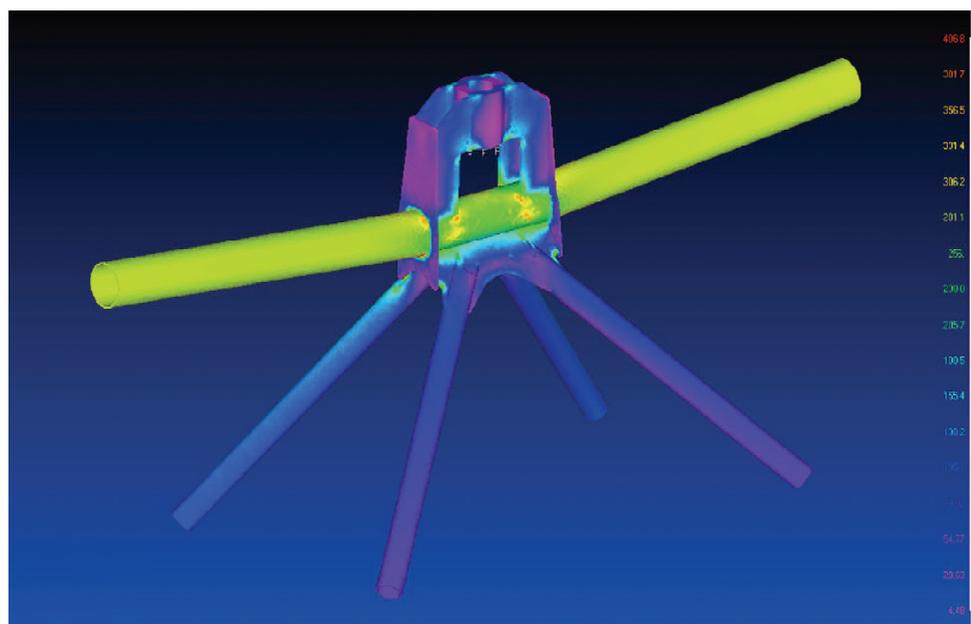
**Siemens' Femap and NX Nastran ensure the safety of oil and gas platforms – and the world's largest observation wheel now under construction in Dubai**

### Custom solutions for energy extraction

Korndörffer Contracting International (KCI) delivers complete engineering, design and consulting services for on- and offshore oil and gas extraction. The company specializes in total field development. Its strong suit lies in designing cost-effective structures tailored to customers' specific needs. KCI covers all engineering disciplines

including process development, mechanical design, piping, electrical installation, instrumentation and inspection. In addition KCI, which has an active R&D effort, can perform computerized explosion analyses. KCI was founded in 1987 and has 75 employees. It has been part of the British Wood Group since 2003. The Wood Group has 18,000 employees in 44 countries, making it a major service provider in the energy sector.

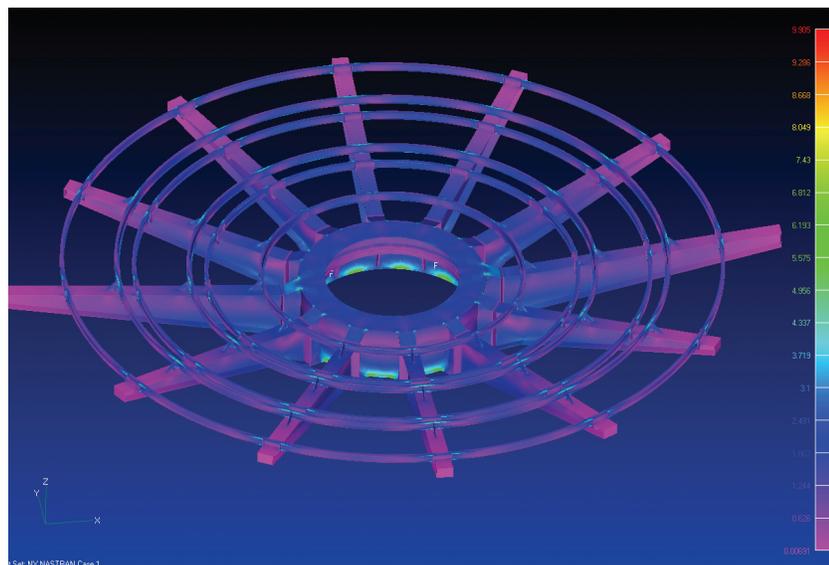
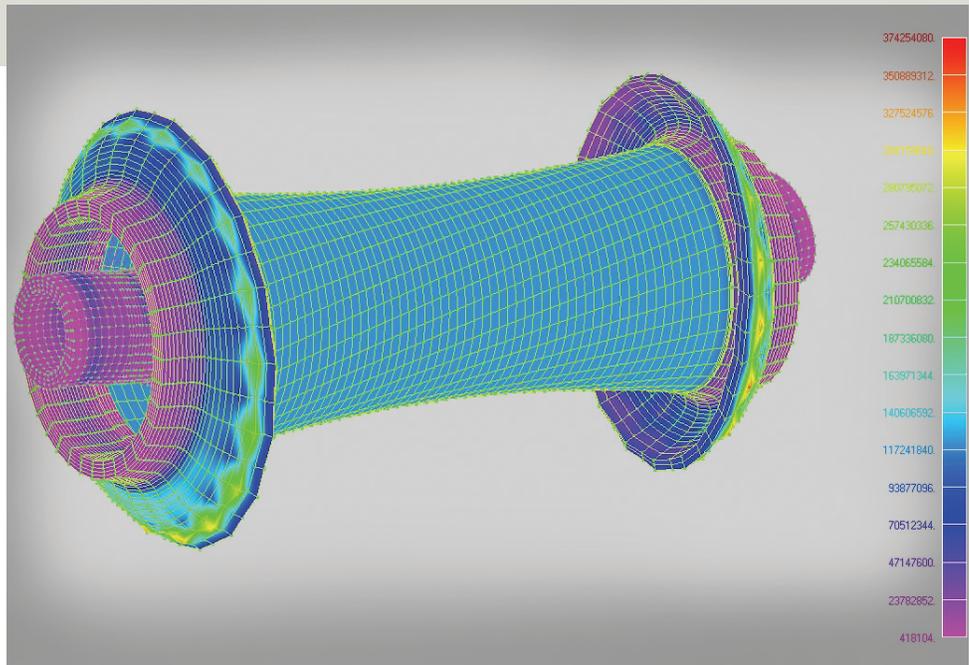
"What typifies our work is that we help our clients with cost-effective solutions that are customized to the ends they're supposed to serve," says Dieter Korndörffer, KCI's technical manager. "This means that



### Results (continued)

Structural designs are optimized for strength, safety and cost-effectiveness

Fewer design iterations are needed to arrive at an optimized design



**“Through the efficient use of Femap and NX Nastran, the number of iterations is reduced and the run time is shortened.”**

Dieter Korndörffer  
Technical Manager  
Korndörffer Contracting  
International

we start projects from scratch, using our accumulated expertise and experience to arrive at efficient structures as quickly as possible, with the right tools. The client provides us with the requirements and initial conditions.”

### Designing to strict requirements

After determining what the client needs, KCI develops various design concepts that are discussed with the client. Large steel structures are almost always subject to strict requirements and must be certified

by inspection agencies. Modeling is the order of the day in the design process, even in the early stages. “Designs are already being modeled while we are discussing the concepts with the customer, and in this phase we do this primarily analytically,” says Korndörffer. “The reason for this is that we have to maintain a feel for the values and the order of magnitude of the forces at work.”

KCI uses 3D AutoCAD (with many proprietary LISP and macro programs) to set up the design of the structures. “In the future we really don’t want to be developing that kind of software ourselves. We’d prefer to dovetail with what’s commercially available,” Korndörffer explains. “We’re not taking any chances with this because we’re talking about a big user group and the costs of acquisition and training are going to be considerable.”

### FEA for optimization

Finite element analysis (FEA) is applied later and is mainly aimed at optimizing the structure once it has been established that it is operational. In June 2006, KCI began using Femap™ and NX™ Nastran® from Siemens PLM Software for FEA. This software was selected after an evaluation process because the combination of Femap

## Solutions/Services

Femap

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

NX Nastran

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

## Customer's primary business

Korndörffer Contracting International is a full engineering design and consultancy service for the onshore and offshore oil and gas production industry. [www.kcibv.nl](http://www.kcibv.nl)

## Customer location

Schiedam

The Netherlands

(the pre- and postprocessor) and NX Nastran (the solver) offered the best price-performance ratio for detailed calculations.

"It's also important here that the users accept the software," Korndörffer notes. "This was very successful with Femap. In June we purchased three licenses and already by October the number grew to five. Our software supplier, Femto Engineering, briefed a group of veteran modelers on the use of Femap/NX Nastran in one day. They practiced with the software for a couple of days so that they could ask the right questions and make the introduction as efficient as possible."

The Femap/NX Nastran combination is used to make detailed calculations on structures with the intent of optimizing them for strength, safety and cost-effectiveness.

### The world's largest observation wheel

Data is easily read in from AutoCAD, initial conditions and loads are applied, then NX Nastran is used to solve the analysis. "Through the efficient use of Femap and NX Nastran, the number of iterations is reduced and the run time is shortened," asserts Korndörffer.

Femap pre- and postprocessing data are meticulously documented because they play a big role in reporting to the inspection agency. The agency ascertains whether the initial conditions used are acceptable and whether the calculations for the structure were done accurately before it issues a certificate.

An interesting and slightly different example of how KCI used Femap and NX Nastran is the company's work on the Great Dubai Wheel. This will be the largest observation wheel in the world when it is completed in 2009. "It's comparable to the London Eye, except bigger; its diameter is about 575 feet," Korndörffer recounts.

"We designed all the junctions and successfully ran all the calculations with Femap and NX Nastran," he continues. "We developed this design with the same software that we use for drilling platforms, with the same safety features. What was unusual with this structure were the so-called environmental loads, loads caused for instance by wind effects at this altitude. A nice challenge, and we hope to model a lot more of them with Femap and NX Nastran."

# "We designed all the junctions and successfully ran all the calculations with Femap and NX Nastran."

Dieter Korndörffer  
Technical Manager

Korndörffer Contracting International

## Siemens Industry Software

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

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

© 2013 Siemens Product Lifecycle Management Software Inc. Siemens and the Siemens logo are registered trademarks of Siemens AG. D-Cubed, Femap, Geolus, GO PLM, I-deas, Insight, JT, NX, Parasolid, Solid Edge, Teamcenter, Tecnomatix and Velocity Series are trademarks or registered trademarks of Siemens Product Lifecycle Management Software Inc. or its subsidiaries in the United States and in other countries. Nastran is a registered trademark of the National Aeronautics and Space Administration. All other logos, trademarks, registered trademarks or service marks used herein are the property of their respective holders. Z7 10996 11/13 F