SIEMENS

Oil and gas

Allseas Group

Engineering under pressure

Products

Femap, NX

Business initiatives

Regulatory compliance

Business challenges

Design and verify changes to pipe-laying ships as quickly as possible

Meet insurer's requirements for structural integrity

Keys to success

User-friendly preprocessor compatible with all the company's CAD and analysis solutions

FEA solver that can run on parallel processors

Powerful functionality for presenting results

Results

Fast preparation of analysis models

Solution times are more than 50 percent faster with parallel processing

Results are presented quickly

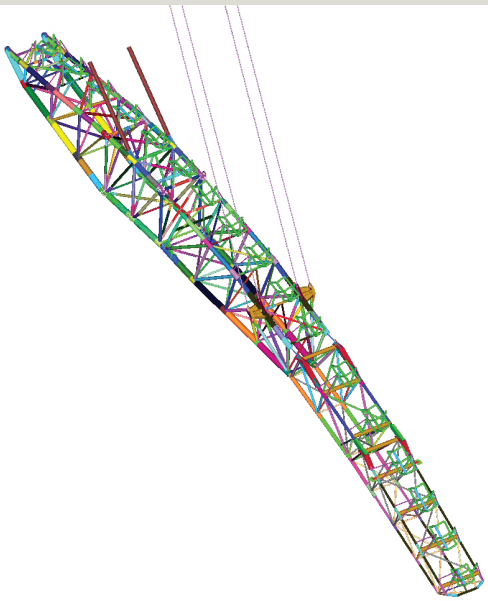
With Femap and NX Nastran, time-critical changes to pipe-laying ships are done right the first time

Undersea pipelines, all over the world

The Allseas Group is one of the major offshore pipe-laying and subsea construction companies in the world. Working with specialized vessels that are designed in-house, Allseas lays pipe in every sea and at every depth. The company's deepest pipe-laying project so far was in the Gulf of Mexico where pipe was installed at a depth of 9,000 feet. Founded in 1985, Allseas handles projects where the scope ranges from straightforward subsea pipeline installation to contracts involving design, installation, engineering, procurement and fabrication.

To say that engineers at Allseas sometimes work under pressure might be understating the case. At times, to keep the onboard work going, engineers in the Allseas offices must figure out how to make a change to the vessel within hours. This could range from determining how to reinforce a critical piece of equipment, to designing a support structure for a new crane. "We are constantly making changes onboard the ships," says Basem Sharoubim, coordinator of the Allseas Structural Group. "Many of these changes are time-critical, and the operation of pipe laying can't go on if they aren't done."

Not only must the engineering work be done quickly, it must be done to the approval of the company's insurer, Lloyd's Register. "Lloyd's has established certain



design rules for all offshore construction, and we have to work within the design rules they establish," Sharoubim adds. "Before we can carry out any change on a ship, we have to send it to them and get their approval. So we have to be sure our work is right the first time."

FEA speeds the process

Finite element analysis (FEA) helps Allseas get these changes made as quickly as possible, with the assurance that they will meet the insurer's regulations. The company's main FEA solution is the Femap™ pre and postprocessor and the NX™ Nastran®

Thanks to NX Nastran's support for parallel processing, running an analysis on the server cuts solution time by more than 50 percent.

solver, both from Siemens PLM Software. Allseas uses a variety of other CAD and analysis software as well, and one reason they use Femap as their primary preprocessor is because it can import data from all of the other programs, acting as a sort of "communications center" for the analysis work. "Femap has very good support for third-party products," says Moshir Daoud, a structural engineer at Allseas. "We use this functionality all the time."

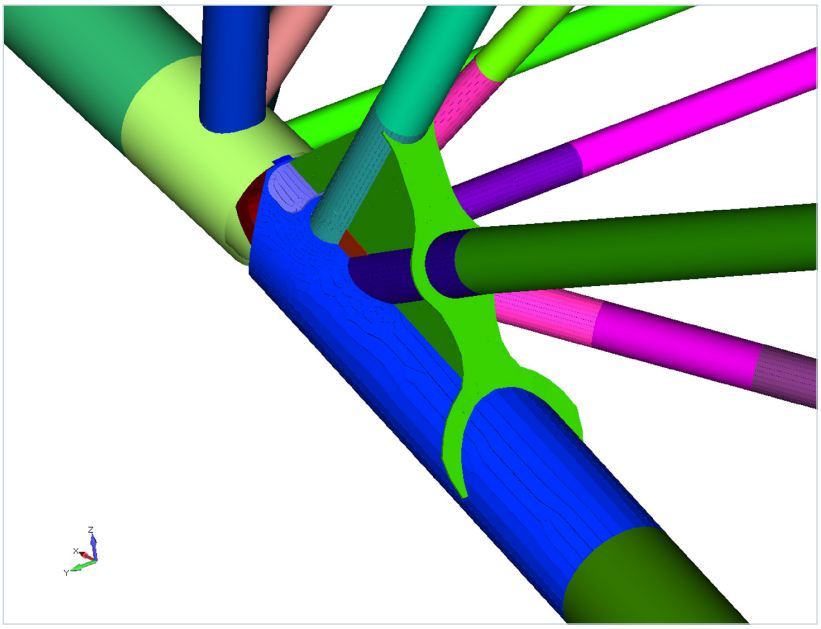
Another reason Daoud and his colleagues prefer Femap is that it is user-friendly. "Many of our engineers can work with Femap very well," Daoud adds. "It is easy to learn because it is visual. You don't need to memorize a lot of commands. Because of this, engineers can perform an analysis and present the results more quickly with Femap than with other programs. That is why we have more licenses of Femap than other preprocessors."

In addition to being able to prepare an analysis model faster, the actual solution is arrived at sooner now that Allseas is taking advantage of NX Nastran's support for parallel processing. "Compared to using a desktop computer, running an analysis on the server cuts solution time by more than 50 percent," Daoud adds.

The other advantage of Femap is how easily the engineers can manipulate the results, especially results for large analyses with many load cases, which is typical for Allseas. "The new version of Femap lets us make an envelope of load cases, which was very difficult to do in the past with big models. This is a good tool and we use it a lot," adds Sharoubim. Typically, engineers paste Femap images into Word documents for reports.

Fast FEA for a critical repair

André Steenhuis, manager of Allseas' Innovation Department, illustrates the value of the Femap/NX Nastran solution by describing a recent scenario where the software was used in the repair of a key piece of equipment. The problem involved the Stinger, a large structure that protrudes from the bow of the ship and guides the heavy pieces of pipe from their horizontal position on the deck to the vertical position as they travel to the sea floor. Some cracks appeared in the Stinger after the ship went through heavy seas.



Solutions/Services

Femap
www.siemens.com/plm/femap

NX Nastran
www.siemens.com/nx

Customer's primary business

The Swiss-based Allseas Group is one of the major offshore pipe-laying and subsea construction companies in the world.
www.allseas.com

Customer location

Allseas Engineering bv
(Project Management and Engineering Office)

Delft
The Netherlands

"Femap lets us prepare analysis models quickly, and present the results quickly. And it gives us the functionality we need for a good price."

Moshir Daoud
Structural Engineer
Allseas

After the cracks were found, the Stinger had to be repaired as soon as possible to the satisfaction of Allseas, the client and Lloyd's Register. "They called us from the ship in the middle of a Saturday night," recalls Steenhuis. "Immediately after that they sent some pictures of the damage and by early Sunday morning we had started designing the repair."

This was not something the engineers could have done using hand calculations; the problem with the Stinger was local, not global. They chose to do the work using Femap and NX Nastran because speed was critical. Using these tools, they designed and simulated reinforcements, and even optimized them for weight and ease of installation, and had a solution by 6 pm Tuesday evening. "After finishing the calculations, the structural engineers went straight away to the client and to the vessel," says Steenhuis. "At the client we showed them the analysis model and they were convinced. When they arrived on the vessel, the repair was finished and they could witness the final inspection." In all, the problem was solved in about five days. "We could have used other analysis software but it would have taken longer," Sharoubim adds. "Because Femap is so user-friendly we were able to prepare the analysis quickly and use the results to convince everyone that the reinforcements would work."

"Femap is so user-friendly we were able to prepare the analysis quickly and use the results to convince everyone that the reinforcements would work."

Basem Sharoubim
Coordinator of the Allseas Structural Group

Siemens PLM Software

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

www.siemens.com/plm

Z4 13118 10/13 A