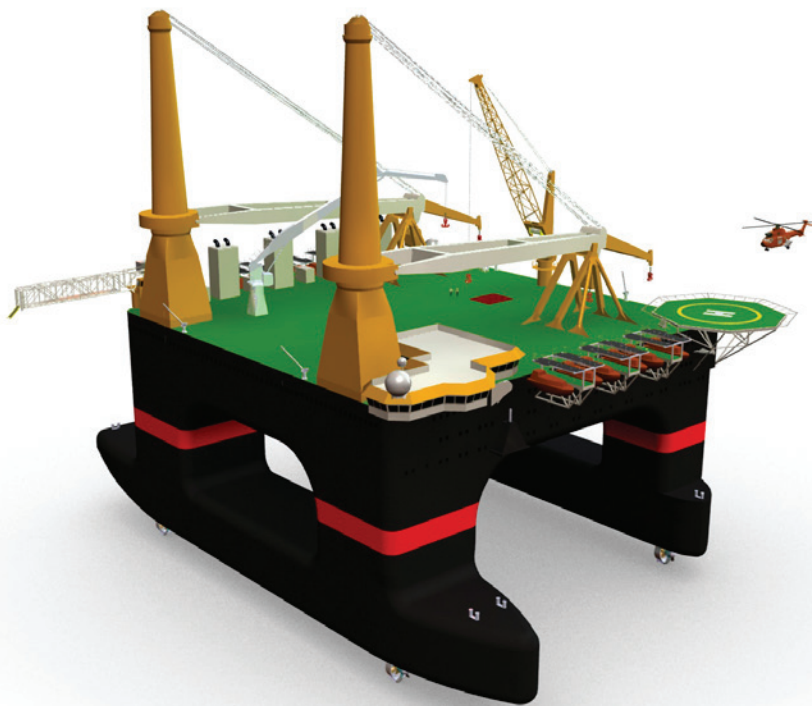


LEENAARS MARINE & OFFSHORE DESIGN BV

Optimizing marine and offshore design performance with SolidWorks Premium



Leenaars Marine & Offshore Design relies on SolidWorks Premium integrated analysis tools to optimize the structural performance of its designs.

The maritime industry demands reliable vessels, equipment, and platforms. By consistently meeting the industry's needs for more than 30 years, Leenaars Marine & Offshore Design BV has become a leader in creating innovative designs for ships, offshore platforms, and marine equipment.

Staffed by naval architects, structural engineers, mechanical engineers, and captains, the Dutch company draws upon its expertise to play a leading role in the introduction of new maritime technologies. Leenaars Marine & Offshore Design has initiated notable research projects with international partners, holds several patents related to offshore equipment, and remains at the technical forefront of the marine and offshore industry.

Until 2007, the firm contracted all of its analysis work. However, that approach limited the use of analysis to confirming the validity of a single design rather than evaluating other approaches and potential innovations, according to Managing Director Cees Leenaars. "Using an external party to perform analysis served as a final check on our design but really didn't contribute to evaluating new concepts," Leenaars notes. "We needed to conduct analysis more frequently and believed that by doing it internally, we would become more productive and be able to evaluate more variations on a design.

"For example, weight is critical, especially for ship designs because it is one of the main factors that determine a vessel's final cost," Leenaars adds. "When two vessels have the same deck area and general characteristics, the lighter one will be more competitive. By bringing analysis in-house, we can optimize weight and make our designs among the most competitive in the industry."

In evaluating analysis packages, Leenaars Marine & Offshore Design understood the importance of CAD integration. "We already had experience with the SolidWorks® CAD package and wanted to increase its functionality to do FEM (finite element method) analysis on models that we had previously built," Leenaars explains.

Challenge:

Improve the ability to examine innovative, cost-saving approaches to the design of ships, offshore platforms, and equipment while simultaneously increasing productivity.

Solution:

Implement and use SolidWorks Premium simulation tools to conduct analysis work in-house.

Results:

- Shortened design time by 40 to 50 percent
- Doubled productivity of engineers
- Cut design weight by 15 to 20 percent
- Reduced lost ship days, saved customers money

"The ability to use one model for presentations and renderings, design, and simulation made SolidWorks Premium software attractive," Leenaars continues. "We chose SolidWorks Premium software because CAD-integrated simulation is more efficient and better for incorporating results as part of design."

In-house simulation saves time

In many cases, Leenaars Marine & Offshore Design has cut development time in half since implementing SolidWorks Premium software. "We don't have to hire an external consultant and can do the analysis ourselves, which results in shorter communication, no need for a lot of meetings, and the freedom to test a large number of variations," Leenaars says.

"For some projects, such as sea-fasteners and wind turbine foundations, SolidWorks Premium reduces design time by 40 to 50 percent," Leenaars adds. "When we need to test an idea, we can do it in about the same amount of time that it would have taken us to document the idea and communicate it to an outside consultant."

CAD integration makes engineers more productive

In addition to reducing development time, SolidWorks Premium has allowed engineers at Leenaars Marine & Offshore Design to become more productive and collaborate more effectively with designers. "SolidWorks Premium software helps put our engineers' time to more efficient use," Leenaars stresses.

"We usually pair a CAD operator with an engineer for each project," Leenaars points out. "The CAD operator works out the specifics, builds the model, and creates the mesh. The engineer determines the loads, constraints, and boundary conditions. They then work together to resolve issues or make improvements, with the engineer interpreting and communicating simulation results and the designer modifying and refining the model. With this approach, engineers can simultaneously work on multiple projects, which doubles the output of an engineer."

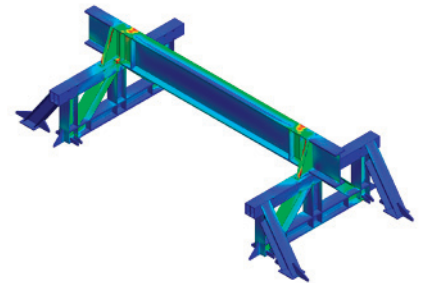
Reducing weight, saving customers money

Using SolidWorks Premium, Leenaars Marine & Offshore Design has also achieved many of its design improvement goals, such as reducing steel weight and introducing innovations. For example, the firm's LNG module supports, which serve as the interface between the vessel and multiwheel transporters, is 15 to 20 percent lighter and eliminates 10 lost ship days, or \$450,000 in cost.

"The original LNG module support had three legs," Leenaars says. "The SolidWorks simulation study showed that the two outer legs distributed the weight and that the middle leg was redundant, so we scrapped the middle leg. This also eliminated the need for specialized reinforcements and cut 10 lost ship days from the vessel conversion process. Simulation allows us to identify areas of risk or overdesign and address them in a way that benefits our customers."

**"SOLIDWORKS PREMIUM SOFTWARE
HELPS PUT OUR ENGINEERS' TIME
TO MORE EFFICIENT USE."**

Cees Leenaars
Managing Director



SolidWorks Premium simulation capabilities help Leenaars Marine & Offshore Design innovate lighter, better-performing designs, such as eliminating the middle leg from its LNG module support.



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