SIEMENS

Marine

Kooiman Group

Shipbuilder uses NX to simplify production and enhance outsourcing efforts

Product

NX

Business challenges

Utilize quality information

Quickly create detailed designs

Increase overall operational efficiency

Keys to success

Use NX for comprehensive product development; increase insight through 3D

Integrate all engineering disciplines in the product design

Use shipbuilding-specific functionality to automatically generate production information

Results

Notably improved understanding of design

Responded faster to customers

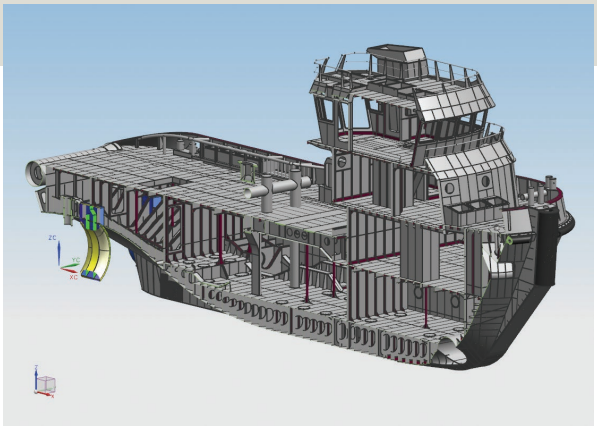
Significantly reduced late changes

Siemens PLM Software solution enables Kooiman Group to respond faster to customers

Achieving a high level of flexibility

The Kooiman Group (Kooiman) started almost 130 years ago in Dordrecht, Netherlands as a shipyard for constructing river barges. Acquisitions of companies and other shipyards in the past 30 years have led to a conglomerate that offers a broad spectrum of nautical services and disciplines. The Kooiman Group has production locations in Zwijndrecht, Dordrecht and Yerseke for constructing, modifying and repairing ships as well as installations. The Kooiman Group employs about 150 people. The design and engineering office of Kooiman supplies its services to other companies in the Group.

The Kooiman Group has always kept its shipbuilding and ship modification activities generic, never specializing in a specific kind of ship or market. “It is this approach to markets and products that differentiates Kooiman and offers continuity,” says Peter



Results *(continued)*

Implemented more effective design-through-production process, including enhanced outsourcing

Increased quality built into each product

Vrolijk, project manager with the design and engineering office at Kooiman. "It requires a high level of flexibility from the organization as well as from our skilled workers; something that is especially important with new ships and modification projects in which our design office is involved."

Examples of the kinds of modifications Kooiman performs include lengthening a ship, making a double hull, changing the transport purpose, converting a freight vessel into a dredging vessel, adapting trawlers for new fishing methods, installing cranes and making the wheelhouse height adjustable.

Providing better information

In the past, the design office produced 2D drawings with a lot of emphasis on the expertise of the shipyard to fill in the details.

"The shipbuilding expertise to make 3D ships from 2D drawings is notably decreasing," says Vrolijk. "Experienced workers retire and the influx of young talent is scarce. This makes it necessary to provide the yard with more detailed and production-focused information. The information should be so good that even a non-shipbuilder is able to build beautiful ships. But we also want to inform our customers early in the process about the construction we developed in order to get feedback. That requires data containing details right from the start."

Other considerations are that ships become increasingly more complex and the demands for deployment ever higher. If these considerations are not incorporated in the design, the requirements and expected functionality cannot be met, so the design office is involved in discussions with the customer from the beginning.

"Usually our customers are independent entrepreneurs and/or even the skippers of the ship that is being ordered," says Vrolijk. "Personal involvement is very important. We therefore have special teams working on the contract from preliminary design until

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Project Manager, Design and Engineering Office
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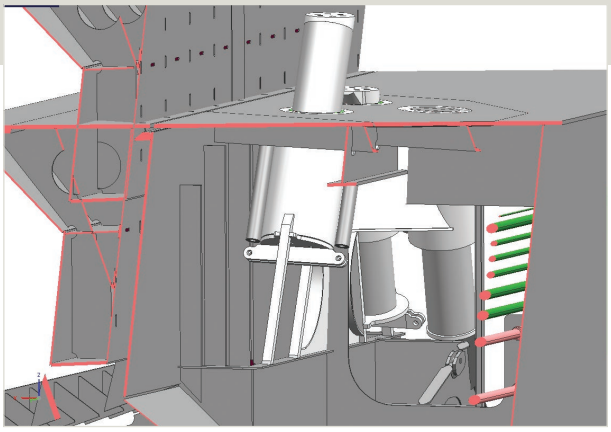

the commissioning, classification and costing. The customer appreciates having his own personal contacts."

The team creates the first design using NX™ software from product lifecycle management (PLM) specialist Siemens PLM Software. The design office, which has 15 employees, has 12 NX software licenses. Vrolijk expects to purchase more licenses in the near future.

Utilizing 3D

"When starting new ship construction, 3D is ideal for communication with the customer," says Vrolijk. "It allows for an effective approach to establishing the layout, functionality and form. No geometric details are added in this phase, but we plan every necessary utility, such as the engine and deck equipment, tables, chairs and the washing machine. This layout design is the basis of the contract."

With ship modifications, 3D is also important as a way to quickly present concept designs. Because there is usually no 3D design data available of the existing ship, 3D photography is used to create a digital model.

"The advantage of 3D photography is that the structure of the ship becomes available, which is notoriously difficult to measure with conventional methods," says Vrolijk. "Stickers are attached to the outside of the ship on all relevant points, like decks and the frame structure. A special 3D camera and computer software featuring triangulation are used to create a point cloud that is editable using NX."

Minimizing costs and disruptions

Using NX, the hull design is derived from the point cloud. Subsequently, all structures, such as frames and decks, are modeled. Even the ship's carpentry is designed with NX, all in intricate detail. Based on the ship's volume and the hull shape, hydrostatic calculations are made using special software.

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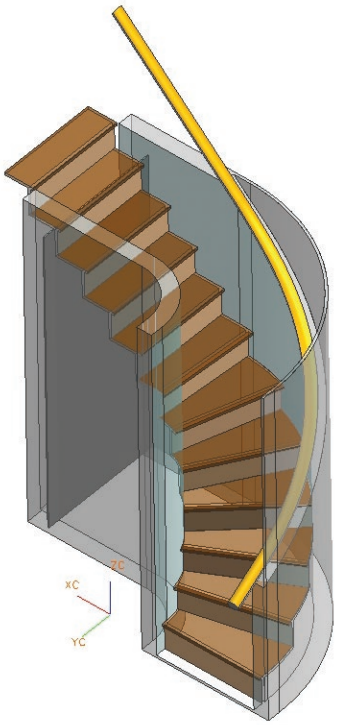

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Kooiman especially benefits from the optimization and improvement of data quality. "Ship hulls are mostly built abroad," says Vrolijk. "NX Ship Design allows us to automatically deliver the production data the shipyard needs. For instance, these are flattened hull plating, markings and numbering, frame lists, frame bend forms and frame finishing. The quality of the data increased enormously, so outsourcing became a lot easier."

Vrolijk wants to obtain the same results for piping, raceways and ducts, while at the same time maintaining design flexibility.

"An integrated design allows controlled changes late in the design process," says Vrolijk. "And there will always be late changes due to customer wishes. The challenge is to implement these changes at minimal cost and disruption. NX allows that."

The process with modifications and repairs is similar. The design is made to fit the existing structure of the ship. The power of NX is it can be used to create and optimize 3D surfaces of the hull based on the point cloud.

"The engineering construction is placed inside that hull using NX," says Vrolijk.

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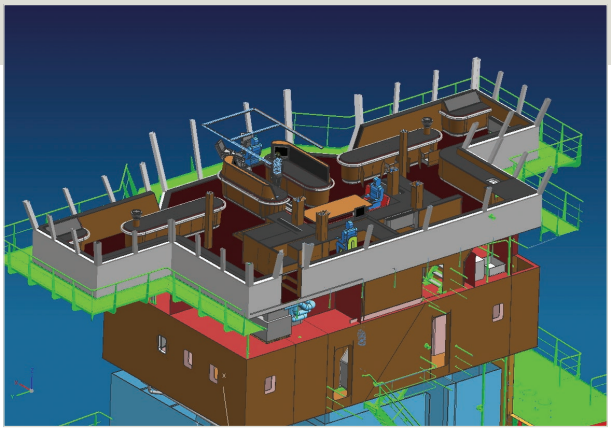


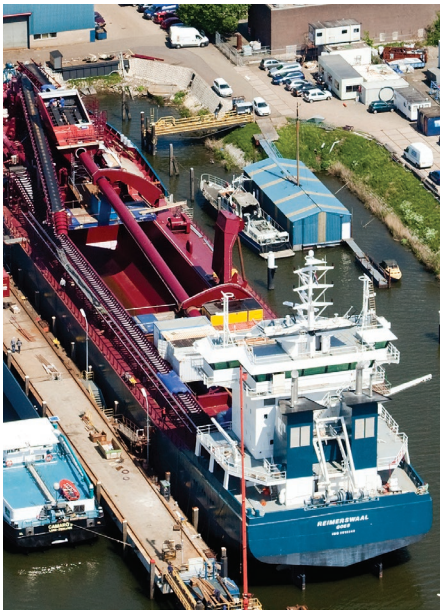
"Cutting files can be generated for production, and the production of the new section can start even before the existing structure is taken off the ship. After modeling, the hull construction, including routing of the piping system, starts. Cutting and bending of the piping is based on the 3D routing data. Prefabricated segments shorten the time needed for assembly aboard the ship."

Enhancing efficiency with "impeccable" output

The production for new builds and modifications also takes place at Kooiman's shipyards. The input for production is based on the shipbuilding-specific functionality of NX Ship Design.

"Thanks to NX Ship Design, the workshop gets precise instructions for how to assemble the parts for production," says Vrolijk. "The output is impeccable. NX replaces manual expert labor and partly fills in the shortage of nautical expertise. The thousands of parts fit perfectly, making the workshop so much more efficient."

Looking back on four years of using NX, Vrolijk is glad to see the entire company benefit from the investment in the Siemens PLM Software product.



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Solutions/Services

NX
www.siemens.com/nx

Customer's primary business

The Kooiman Group consists of a number of independently operating companies that work together closely to construct, modify and repair a variety of ships. The Group offers comprehensive capabilities, from new construction to the installation of engines, piping, electrical systems, winches and carpentry.
www.dekooimangroep.nl

Customer location

Dordrecht
Netherlands

"Due to the broad usability of NX, we are more flexible than ever and are able to handle all kinds of commissions," says Vrolijk. "We see earlier involvement and agreement of our customers based on the 3D design, which is commercially very interesting to us. And, because of the earlier involvement of the customer, the number of changes later in the process is reduced."

"With NX, production challenges are easier to meet," says Vrolijk. "Owning the correct data means controlling the process. The data is error-free, which makes the production more effective and efficient and leads to a higher-quality product, providing better possibilities for strategic outsourcing. In short, we are very happy with NX."

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