

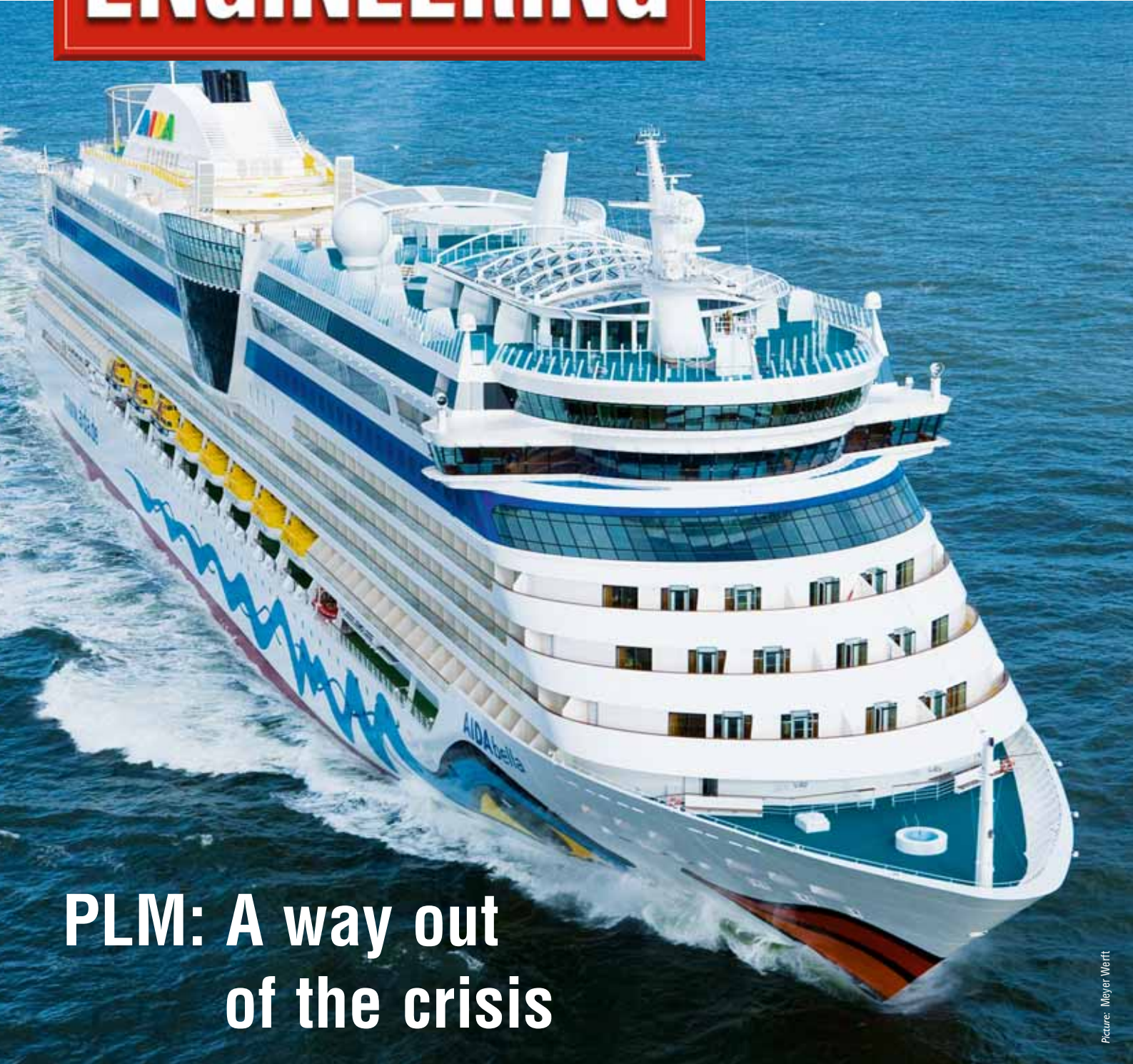
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PLM: A way out of the crisis

Picture: Meyer Werft

PROSTEP

integrate the future



The "AidaLuna" leaves the Meyer Werft shipyard

Picture: Meyer Werft

PLM: A way out of the crisis

After enjoying a number of boom years, German shipbuilders are also feeling the impact of the worldwide economic crisis. A decline in new orders and an increase in order cancellations pose a problem for the shipbuilding industry. IT experts recommend using the crisis as an opportunity to improve competitiveness. Data integration and data communication in the development networks concerned with the ship development process in particular still offer significant rationalization potential.

By MICHAEL WENDENBURG

With a global market share of approximately three percent in terms of total tonnage produced, shipbuilding in Germany would not appear to be a major economic force on the world stage. But this impression is misleading: Measured by the number of ships and offshore platforms equipped, German suppliers in the shipbuilding industry and maritime technology sector assume a leading position worldwide, coming in just behind their Japanese competitors. Whether or not they will be able to hold on to this position in the current economic crisis and in the face of growing competition from Asia and other non-EU countries will depend on

the answers they find to the technical and organizational challenges posed by distributed ship development. The competition in low-cost countries is not the only threat to suppliers in the shipbuilding industry. Supply bottlenecks and rising prices for high-quality materials, as well as lack of young design and service engineers, are threatening the competitiveness of an industry which in Germany comprises approximately 400 predominantly small and mid-sized companies who employ a workforce of about 70,000. Their small and mid-sized structure allows suppliers to provide innovative, customer-oriented solutions for technically complex ships but also ma-

kes them susceptible to the financial consequences of the crisis. The capital cover of most companies is relatively thin, which means that the financial difficulties of one or two shipyards can quickly spread to them.

One possible way out of the crisis is to assume more development responsibility, which is gradually leading to the formation of hierarchical structures in the shipbuilding supplier industry similar to those in the automotive and aircraft industries: "System providers with a high level of technological competence are better equipped to weather a crisis", pointed out Jörg Mutschler, managing director of the VDMA's Marine and Offshore Supplier Equipment Industries working group, at this year's Shipbuilding Forum. The forum, which is organized by Darmstadt-headquartered PROSTEP AG, has become an important venue for the industry to meet. As a specialist for product data integration and communication in cross-enterprise development processes, PROSTEP helps shipbuilders develop the technological competence required for product life-cycle management (PLM).



Picture: PROSTEP AG

Jörg Mutschler from the VDMA at this year's Shipbuilding Forum, which is organized by PROSTEP

Work intensive with a highly complex supply chain

Building ships is a work-intensive business based on a highly complex supply chain

Similar to the aerospace industry, there are a large number of specialist suppliers and sub-contractors who contribute up to 70 or 80 percent of the value added depending on the type of ship involved – the proportion is by nature higher in the case of a cruise liner compared with a container ship.

As rule, over 100 different companies are involved in the development and construction of a ship, and they all have to carefully coordinate their work with one another to ensure that all the components, such as machinery, outfitting and accommodation components, are available on time and fit together perfectly. There is little time available for changes since it usually takes only a year for a vessel to evolve from initial design to launch. Coordinating the various tasks involved in ship development is extremely time consuming. At present, some employees spend up to 50 percent of their working time procuring, preparing and documenting information and performing other indirect tasks, as revealed by a study conducted by the Center of Marine Information Systems at the University of Rostock. Between the shipyard and engineering office alone, approximately 800 communication processes take place over a period of a little more than a year after a contract has been concluded, and 80 percent of these are

in response to communication errors. The supplied information is either unsuitable for the task in question, uninterpretable, incomplete or incorrect. In addition, the parties involved often fail to understand who needs the information in the process and when. Heterogeneous IT systems, a lack of appropriate interfaces and manual processes mean that data communication in development projects is a time-consuming task that is prone to errors. Shipyards, shipping companies and suppliers are therefore looking for solutions that will allow them to reduce the time and effort involved in communication and use their sparse manpower more efficiently. According to PROSTEP, there are three main starting points for accelerating data communication in the shipbuilding industry:

- improving the quality and compatibility of the original data
- consolidating all the data relevant to development with the corresponding product structure information in a central data management platform
- harmonizing and automating the actual data exchange processes.

How and in what order the individual measures are implemented ultimately depends on the priorities that the company in question has specified when formulating its PLM strategy. With the help of a standardized reference model approaches for the procedures involved in PLM projects like the one developed by PROSTEP, the most important areas of activity for projects of this type can be defined relatively quickly.

Data quality: a work in progress

Many of the problems with communication in distributed ship development projects originate from an inadequate level of data quality. When the data is generated, the quality of the data will determine how smoothly collaboration later in the development process will function. If the data is inconsistent and exhibits a low level of quality, it will be impossible to convert and transfer it. Therefore, on the one hand, companies in the shipbuilding industry need help implementing methods that guarantee the creation of models that are well suited to data exchange and, on the other hand, they need efficient interfaces between the various CAD systems used

for ship development. In addition, services such as OpenDESC®.com, which provides them with support for quality-assured data conversion, thus allowing them to avoid having to maintain all the various CAD systems, are a great help. The CAD landscape in the shipbuilding industry is relatively heterogeneous since no one system can satisfy all the requirements, and the shipyards cannot always tell their suppliers which tools they ought to use. Alongside the special systems for hull form design and analysis or the vessel's steel structure, the machinery, piping, equipment and outfitting components are often designed using leading 3D CAD systems such as Catia or NX, which are only loosely incorporated in the existing system landscape and established processes. One of the main requirements to be satisfied by the interface that PROSTEP developed together with Blohm + Voss Nordseewerke in Emden, a shipbuilding company belonging to ThyssenKrupp Marine Systems (TKMS), was therefore the ability to transfer the NX-based outfitting design data to the Tribon M3 Hull steel construction package, where it can be used for the subsequent CNC-based manufacturing processes.

In principle, it can be assumed that the variety of systems and thus the need for conversion will continue to grow in order to meet the growing requirements in ship development. Shipbuilders are therefore now thinking about how they can put virtual reality (VR) technologies to good use, for example, to examine the ergonomics of the interior fittings or the wheelchair-accessible layout of escape routes. Widespread use of VR is currently being hampered by the high overhead involved in converting and preparing the CAD data.

Integration platform for the shipbuilding industry

The most important prerequisite for efficient data communication in the shipbuilding industry is the consistent management and versioning of all the data relevant to development in a uniform data management environment so that the most current information can be made available to everyone involved in the process at any time. To the extent to which suppliers become system suppliers who assume respon-

sibility for an increasingly large proportion of the development activities, they have to communicate increasingly larger and more complex amounts of data with the shipyards. The exchange of the CAD data is no longer enough. If this data is to be efficiently processed, the recipient needs structure information, attributes and other metadata normally stored in a product data management (PDM) system. It may be the case that this metadata also needs to be made available to partners who themselves are not yet using a PDM system. Unlike other industries, cross-system PDM systems are only slowly establishing themselves in the shipbuilding industry. The metadata is often stored in a number of databases that first of all have to be consolidated. The introduction of a central data backbone not only requires a competent implementation partner who is familiar with the industry's requirements and can map its processes in the software but also an open integration platform with connectors to shipbuilding-specific CAD applications, legacy databases and other business applications such as ERP systems.

Over the past few years, PROSTEP has continued to develop its OpenPDM® integration platform with a view to satisfying the requirements of the shipbuilding industry so that, for example, CAD data, product structures and metadata from Tribon M3 can be synchronized with other CAD and PDM systems – no easy task due to the special system architecture. In conjunction with PROSTEP's PDM Editor, the neutral data model allows structured development data to be exchanged with partners who either have no PDM system or who use a different PDM system and the automated re-import of supplier data in a structured form into the backend systems used by the respective shipyards. It is a good idea to convert the development data to the standard, open PDF/A format in order to safeguard it over the long term. Solution components for long-term archiving can also be incorporated into the OpenPDM® Shipbuilding Edition. Consistent PDM is an important step on the way to more efficient data communication, but it alone is not enough. To minimize the organizational effort involved in preparing the data, the engineers at the shipyards, shipping companies and suppliers need tools that al-



Picture: Blohm + Voss

Luxury yachts made in Germany are in great demand. Our photograph shows the yacht "Eclipse" built by Blohm + Voss in Hamburg for Roman Abramovic.

low them to automatically extract data from different source systems, convert the data if necessary, and make the data available to other parties involved in the process. At the same time, the information must be protected against misuse, especially in collaboration scenarios in global development networks where you no longer know each exchange partner personally. The protection of intellectual property is also becoming increasingly important in the shipbuilding industry.

Secure and automated data exchange

One approach is a portal-based solution for the secure and automated exchange of mass data via the Internet such as the OpenDXM® GlobalX Shipbuilding developed by PROSTEP. When the data is uploaded to the data exchange platform, it is encrypted in such a way that it can only be opened by authorized users. With the help of digital rights management (DRM) functions, usage can also be made subject to time constraints. Publish and subscribe mechanisms permit version control of the published documents, thus fulfilling an important requirement in the shipbuilding industry. Change management is one of the most important challenges in the shipbuilding process since designs change frequently even once the ship is already under construction. As a result, there is a constant need to create and exchange new documents. Intelligent PDF forms, which are automatically filled with certain information from database systems and can include both 2D data and 3D

models, provide new possibilities for speeding up the cross-enterprise harmonization of intended changes. Experience in other industries indicates that this allows the lead times for changes to be reduced by 40 percent. The server-based solutions are based on the PDF technology from Adobe Systems, with whom PROSTEP maintains a strategic partnership. They represent a useful addition to the data exchange portal for all cases in which document-based information from heterogeneous source systems needs to be communicated quickly and securely.

More efficient data communication in the development networks involved in the ship development process reduces the multitude of errors that are responsible for the majority of the communication processes in shipbuilding and thus improves collaboration between all the parties involved. Thanks to the automatic mechanisms, engineers can once again concentrate on their actual work, and they no longer have to invest so much time in data preparation. These benefits ultimately allow suppliers in the shipbuilding industry and maritime technology sector to respond more quickly and more precisely to the demands of their customers, thus making an important contribution to improving their competitiveness.

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You will find more information on data communication solutions for the shipbuilding industry at www.prostep.com



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