

Ship Building

i n d u s t r y

Pilotage Triplets

CLEAN TENDERS

In Africa

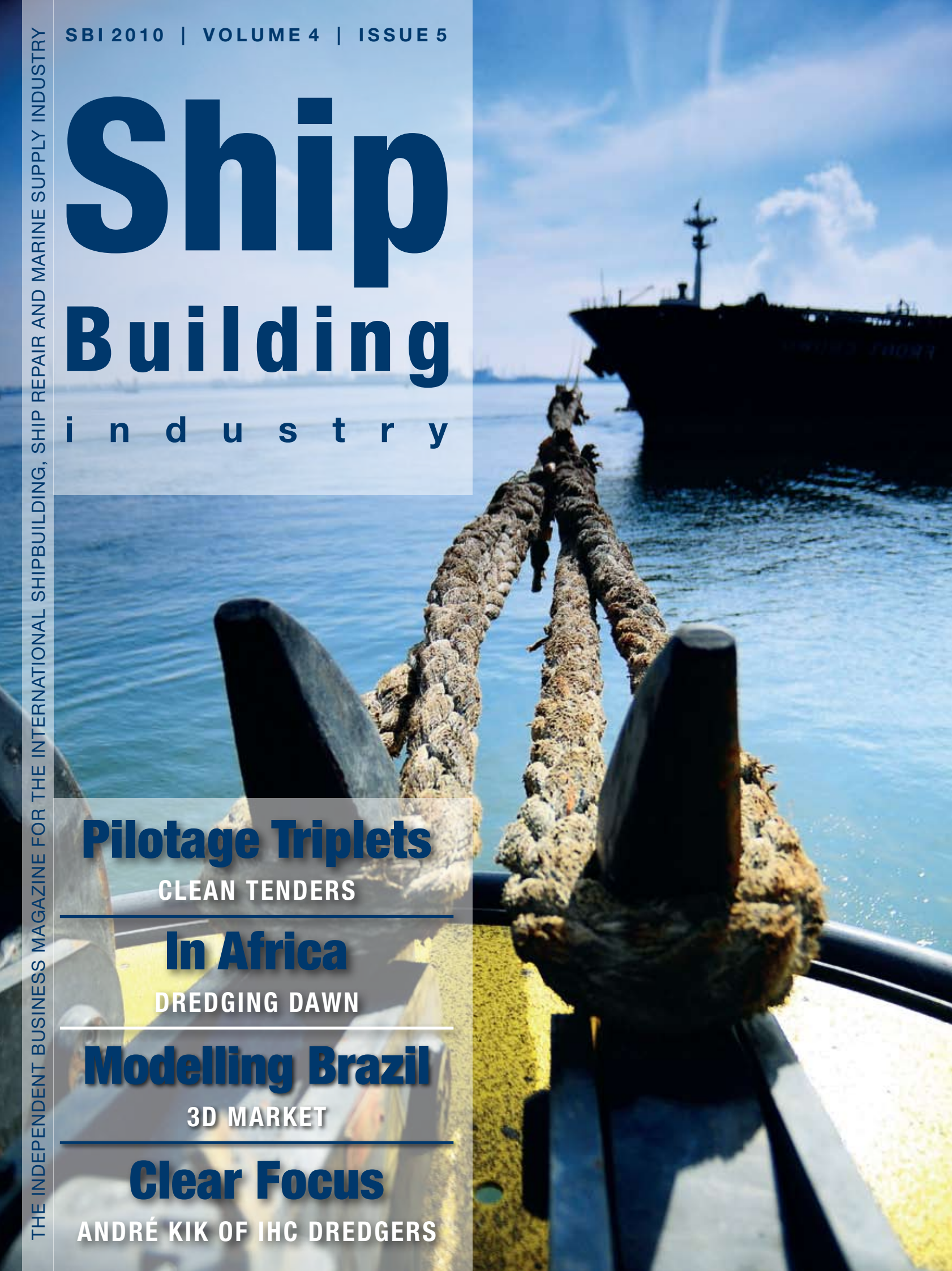
DREDGING DAWN

Modelling Brazil

3D MARKET

Clear Focus

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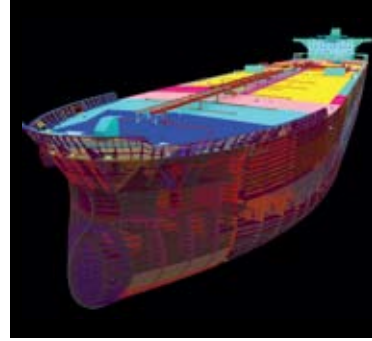


Revitalising Brazil



Modelling Upcoming Markets

The database-driven, AutoCAD-based 3D Modelling CAD/CAM suite of products called ShipConstructor, has now emerged as the most widely used production design and modelling program for shipbuilding in Brazil, according to its developers ShipConstructor Software Inc.



Starting from almost nothing ten years ago, Brazil has risen to become the largest shipbuilding region outside the traditional heartlands of Asia and Europe. This spring, Clarksons reported that Brazil now represents 74% of the 'rest of the world' shipbuilding as compared with just 4% at the start of the millennium. A decade ago, there were only 2,000 workers in the industry while currently there are approximately 50,000.

Offshore oil discoveries have propelled this phenomenal growth since the Brazilian Government, via its state-sponsored energy company Petrobras and its shipping subsidiary Transpetro have whenever possible, required the associated rigs and vessels to be built within the country. The scale of the orders is enormous with work for years to come. For example, in 2008, the government launched the Petrobras Fleet and Support Vessel Modernisation and Expansion Program (PROMEF) which included orders for 146 support vessels, 40 survey/drill ships, 23 tankers, and eight offshore rigs. As could be expected however, creating an industry from scratch has not been without problems and one of the largest challenges has been finding skilled workers with shipbuilding experience. Finding people to do production engineering and detail design work has been particularly difficult and this factor has significantly influenced the choice of CAD/CAM software for engineering departments.

Amazing Accomplishment

An examination of the selection process that Brazil's largest shipyard, Estaliero Atlântico Sul (EAS) used for choosing its CAD/CAM toolset shows why ShipConstructor has had such enormous success in the rapidly growing Brazilian market. Furthermore, the lessons learned in Brazil are applicable elsewhere, particularly in other emerging markets or any markets where due to factors such as growth, an aging workforce, or technological transition, there is a need to quickly train staff.

The story of what Estaliero Atlântico Sul has accomplished is amazing. EAS had USD 3.4 billion of projects on order before they had even finished constructing a shipyard. The company

had won orders for fourteen Suezmax tankers, eight Aframax tankers as well as the hull of a P55 semi-submersible platform. Starting with an empty beach in Recife in February 2007, EAS was able to create what is now the largest shipyard in the Southern Hemisphere, commence shipbuilding while the yard was still under construction and then launch its first Suezmax tanker, only three years later on May 7, 2010.

Shipbuilding Specific

Along the way, company President Ângelo Bellelis noted that EAS had had to scour the country to find its team of 194 engineers, designers and draftsmen. This human resources challenge guided the company's analysis of its technological needs. At a presentation to his industry peers in 2009, Ricardo Barcellos, Coordinator of Modelling for EAS, listed and explained the criteria EAS had used in their evaluation. To meet its needs, EAS believed the software had to:

- be shipbuilding-specific;
- have seamless engineering to production integration;
- be easily learned and used;
- allow for working on the model in different offices at the same time.

EAS wanted a CAD/CAM software package that was specifically designed to fit the needs of shipbuilders. They saw that while some software packages were ideal for projects involving industrial plants or general 3D modelling tasks, they were actually weak when it came to modelling the complex structure of a ship. EAS also realised that many different groups must interact during the design and construction of a vessel so it was important that they would all be able to communicate using common terminology – the terminology of shipbuilding. This principle applied directly to how information was stored and displayed in the ship's 3D product model since the model is utilised throughout the shipbuilding process by various groups using different pieces of software for production automation and planning.

Defining Geometry

Unfortunately, some CAD/CAM programs define the product model's geometry and relationships in





terms of parametric geometric elements rather than common marine-specific terms. This can confuse end-users who have little understanding of concepts having no real-world counterparts and that do not easily map onto the processes used in a shipyard. Since EAS was building a modern shipyard designed to facilitate modern shipbuilding practices such as extensive pre-outfitting and design for production principles, they required a software capability that incorporated these principles directly into the 3D product model and facilitated the production of a vessel using these techniques. In addition they needed a software package that would allow seamless integration with shipbuilding production methods without requiring a high degree of production knowledge in the majority of their engineering staff. Only a shipbuilding-specific software package could fulfil all of these requirements.

More Than a Picture

Due to the fact that EAS was working with an inexperienced staff, the company determined it was critical for the engineering information from the 3D model to be able to be easily transferred to production. Drawings had to be easily created and information for NC machine-cutting had to be accurately extracted. This meant that the model had to be more than just a picture. Large amounts

of detailed, shipbuilding-specific production output had to be able to be generated semi-automatically. With some software, especially those focused mainly on the 3D modelling tasks or those that are not dedicated to the shipbuilding industry, this is not possible so a significant amount of information for production must be created manually. This requires a high degree of expert knowledge and skill in the entire engineering department – things that were in relatively short supply in Brazil. Manual creation of

CAD/CAM technology has helped EAS overcome Brazil's shortage of skilled labour

production documentation would also have been costly, more prone to errors and much more time-consuming. This could have jeopardised the tight schedule EAS was facing in order to complete their first project.

By contrast, EAS saw that the ShipConstructor application allowed for the semi-automatic creation of accurate production output such as assembly drawings, arrangement drawings, spool drawings, plate nests and profile plots etc. because all relevant information is contained within a relational database. The relational nature



of the data also made possible interference checking, clash detection and other error-reduction features which helped speed up the process and improve the quality of work. These were especially important to EAS.

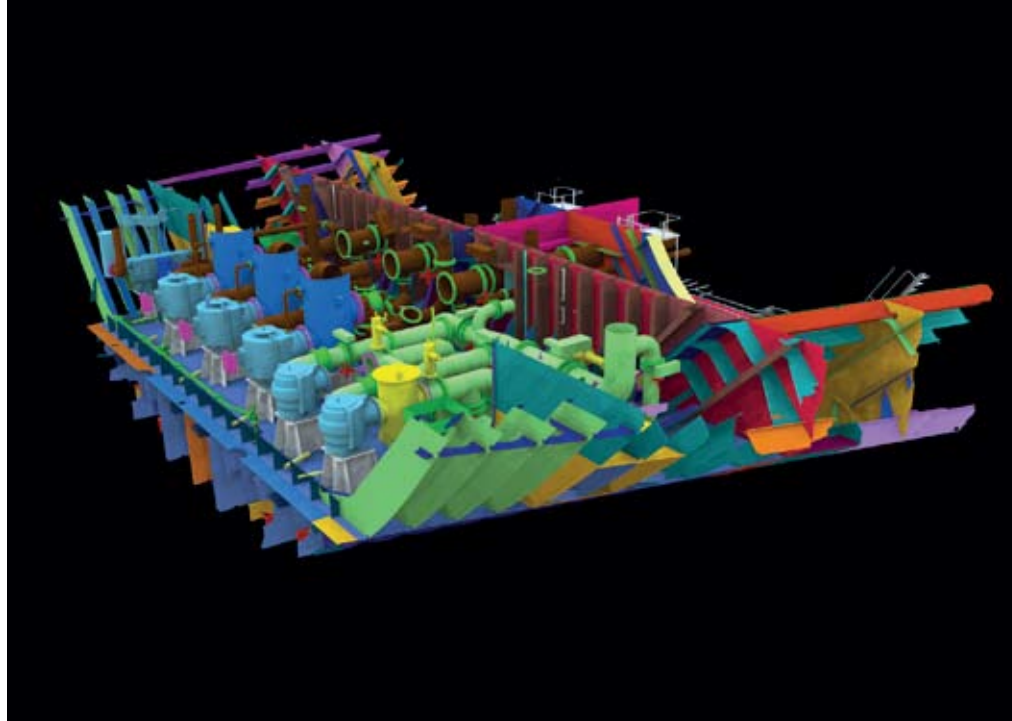
Speed to Proficiency

In order to be able to start work as soon as possible, EAS believed it was critical to be able to quickly train new workers on the CAD/CAM toolset. EAS could not afford to delay the engineering schedule while users gained a sufficient level of proficiency. The software had to be relatively intuitive so that work could start almost immediately. EAS learned that with ShipConstructor this would be possible due to the way the software is designed. Its philosophy is to incorporate shipbuilding-specific capabilities with familiar, widely-used, commercial-off-the-shelf software.

ShipConstructor utilises the widely-known AutoCAD software as a viewport into its SQL database. Users open AutoCAD directly and ShipConstructor provides a set of shipbuilding-specific menus and tools within the familiar interface. A consistent user interface is maintained across several disciplines such as Structure, Piping and HVAC. All disciplines utilise AutoCAD as a viewport and workspace for interacting with the 3D model.

ShipConstructor works in the background via its patent-pending method for storing three dimensional geometry and attribute information within a Database Driven Relational Object Model (DDROM). The database which stores the ship's 3D model is easily accessible for both importing and exporting to and from other best-of-breed programs which specialise in different aspects of the ship design and production process such as initial design, virtual reality visualisation, document management and ERP.

EAS was able to find staff who already knew AutoCAD since it is a widely known design program used in most industries. These AutoCAD users were able to become productive after only a few weeks of training. The fact that new employees could quickly become proficient in the software was critical in a country where the industry was being built from the ground up and growing at a rapid rate.



Model Sharing

EAS had another requirement that is becoming more and more prevalent in the global shipbuilding industry. EAS wished to split some of the production design and engineering work with another company. They had arranged for engineering firm CONSUNAV to handle the production engineering of distributed systems such as HVAC, Piping and Equipment while EAS was to be responsible for the structural detail design. That meant that both companies had to have access to the 3D model at the same time while separated by a distance of over 2,000 km. Working on the model over a real time network or internet connection was not a viable option due to the vast distances involved as well as the lack of sufficiently robust and reliable infrastructure. However, trying to work on two different versions of the 3D product model would have resulted in an error-prone project management nightmare. ShipConstructor fortunately provided a lightweight technological solution. The software allows parts of the model to be 'split off' and 'sealed'. In other words CONSUNAV could work on some parts of the model, safe in the knowledge that EAS would not have the ability to overwrite those areas and vice versa. The split model could then be merged back together when required. This solution was critical in giving EAS staff in Recife the ability to

work on the model simultaneously with the CONSUNAV staff in Rio de Janeiro.

Ongoing Success

On May 3, 2010, President Lula of Brazil was amongst the cheering crowd of spectators, who celebrated the EAS launch of the João Cândido Suezmax tanker. Following this success, EAS has recently started project-detailing on five PROMEF-related Aframax tankers. A variety of other noteworthy Brazilian shipyards and engineering offices have also purchased ShipConstructor, including CONSUNAV, Kromav Engenharia, Estaleiro Inance and ETP Engenharia. These companies' careful selection of CAD/CAM technology has helped them overcome Brazil's shortage of skilled labour and played a key role in the on-going revitalisation of Brazil's shipbuilding industry.

i. www.shipconstructor.com

