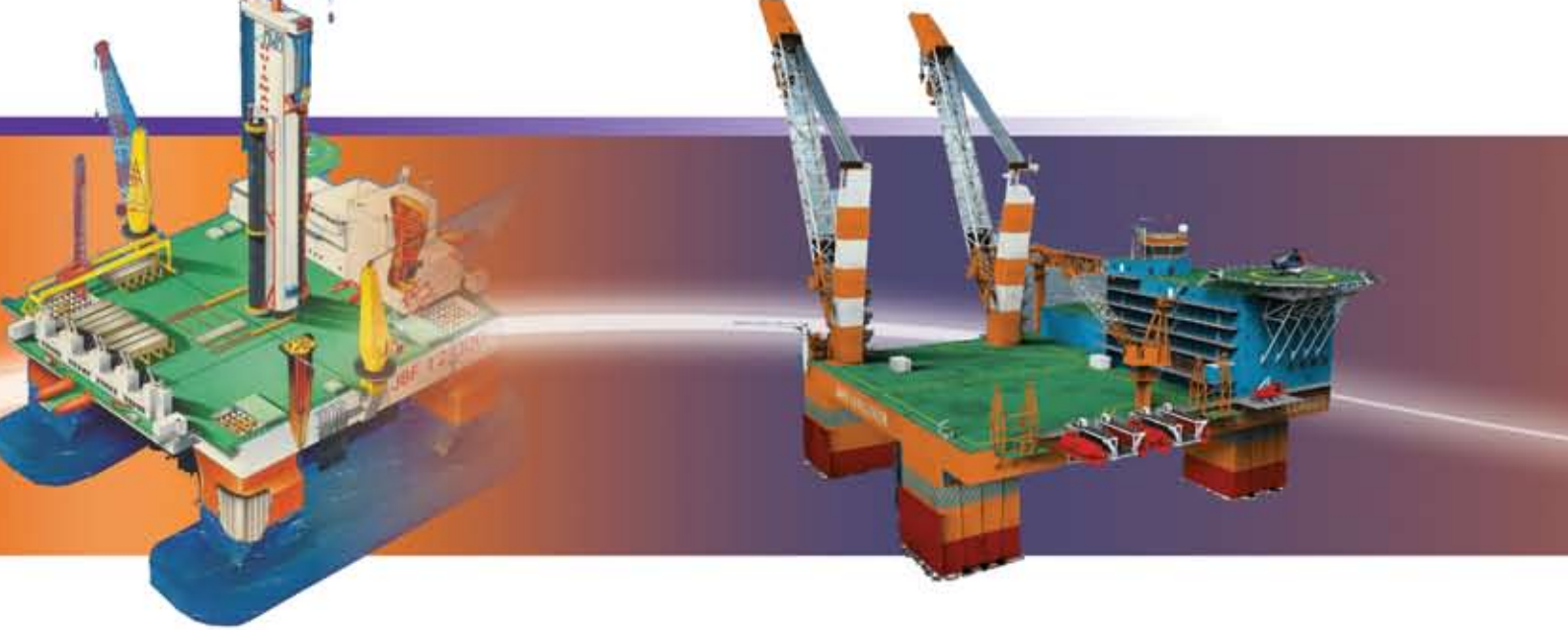


Yantai Raffles Shipyard

Charting the future of the offshore and marine industry with Dassault Systèmes PLM Solutions





YRS Objectives

- *Streamline processes for greater efficiency and lower costs*
- *Implement design innovations faster to maintain market competitiveness*
- *Reduce delivery time while improving product quality*
- *Increase production capacity through smarter allocation of resources*



“Our goal is to reach the highest productivity levels possible in our industry. In order to achieve this, we are constantly improving using a combination of our people, facilities and technology.”

Brian Chang, Executive Chairman,
Yantai Raffles Shipyard

Company Overview

Singapore-headquartered Yantai Raffles Shipyard (YRS) Ltd. is a leading offshore and marine fabrication specialist. Founded in 1994, the company's production facilities are located in Yantai, China. YRS specializes in the construction of marine and offshore projects that include jack-up drilling rigs, semi-submersible drilling rigs, pipe lay vessels, floating production, storage and offloading vessels (FPSO) and other prototype vessels, as well as luxury yachts. As of fiscal year 2007, it has secured approximately US\$700 million in new orders, bringing its order book up to about US\$1.8 billion.

YRS's 2,000 employees build vessels for customers in the USA, UK, Saudi Arabia, Norway, Holland, Sweden, Japan, Singapore, China, Israel, Italy and Brazil. Today, YRS is the largest rig builder in China, boasting state-of-the-art building facilities, including Taisun, the world's largest crane.

Business Challenges

The emergence of the Shipbuilding and Energy industries in China has given YRS a strategic chance to further strengthen its leadership position in the domains. Given that these sectors are enjoying continued double-digit growth worldwide, YRS is presented with tremendous opportunities to increase sales and expand its market share. Conversely, the upsurge in demand has also resulted in shortages in manpower, materials and facilities, causing delays and price increases.

Like its competitors, YRS is under pressure to deliver vessels faster and at a lower cost. To stay truly competitive, it needs to demonstrate consistency in innovation, product quality and customer service. To address these challenges, YRS is working to optimize its work processes and use of resources.



Solution

Faced with the dramatic rise in demand in the offshore and marine industry, YRS realized that it needed to quickly move away from paper-based systems and 2D tools and migrate to a 3D-based model system to stay ahead of the competition. YRS chose Dassault Systèmes Product Lifecycle Management solutions (DS PLM) including: CATIA for offshore structural design; SIMULIA for stress analysis on parts and assembly; ENOVIA VPLM for collaborative product lifecycle management and decision-making; and DELMIA for vessel production and simulation.

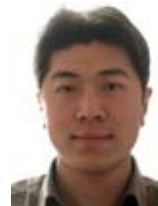
CATIA and SIMULIA for improved design process and quality

YRS adopted CATIA for their offshore structural designs and now has more than 50 users. “The use of CATIA and its intelligent templates for design has also allowed YRS designers to work more efficiently, which has allowed them the freedom to come up with more creative and innovative ideas such as the creation of Taisun’ the world’s largest crane.” said Liu Hu, IT Manager, Yantai Raffles Shipyard.

CATIA’s inherent information sharing capabilities make it simple for the different parties involved, such as suppliers and clients, to review designs and update information. Moreover, with the use of SIMULIA, engineers are able to conduct finite element analysis on the fly to determine structural weaknesses in the design and to determine the impact of design changes made in CATIA, allowing for fast and seamless design-analysis loops.

DELMIA for optimized manufacturing processes

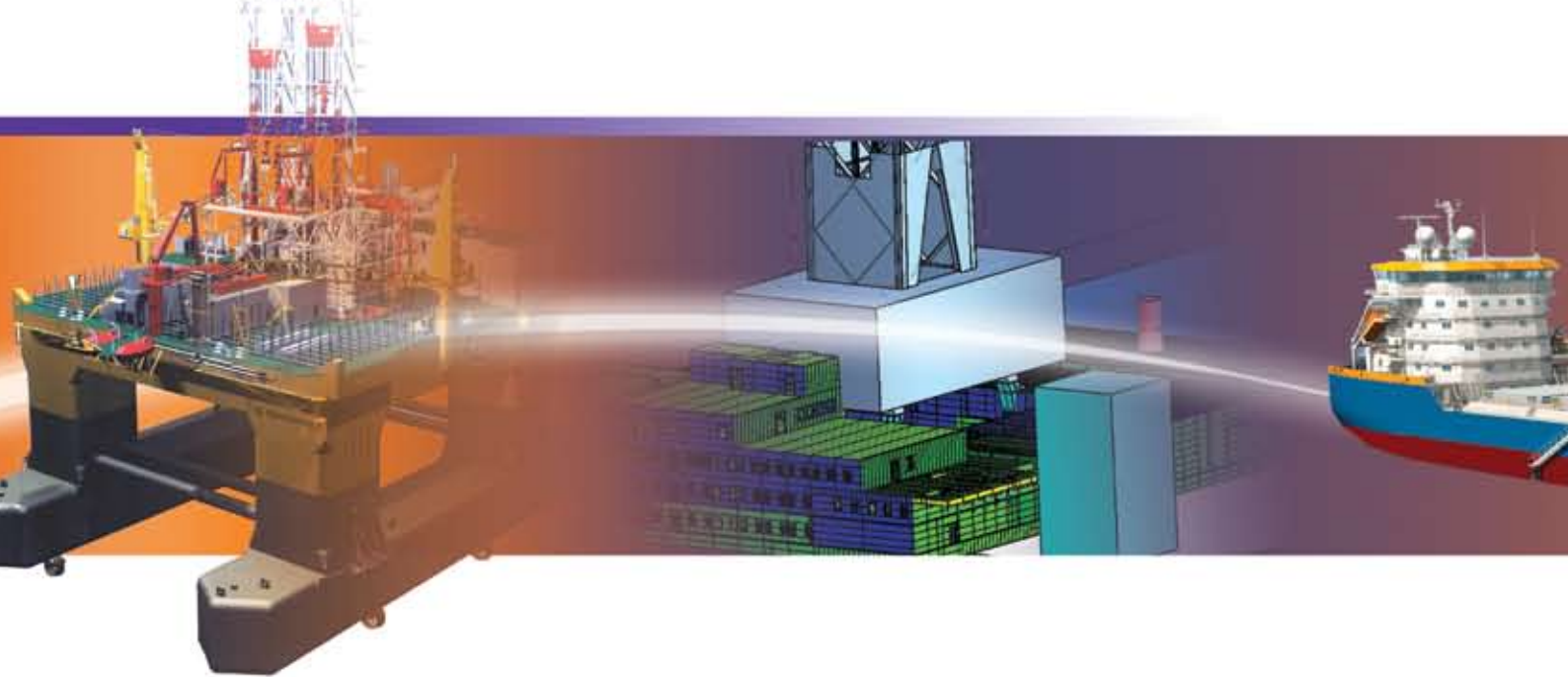
Enhancing manufacturing efficiency was the main driver behind YRS deployment of DELMIA. YRS uses DELMIA to virtually simulate manufacturing processes in 3D and derive test cases on which designs are analyzed.



“With vessels becoming more technologically advanced and sophisticated, it was critical that our company be supported by a highly skilled engineering force, cutting-edge facilities and a superior PLM solution.”

Liu Hu, IT Manager, Yantai Raffles Shipyard





YRS engineers can accurately determine what resources are needed for each production scenario, identify the best procedures and the fastest way to fabricate vessels and pinpoint possible problems before they happen. For instance, simulated maintenance activities in DELMIA assist YRS in visualizing the most effective method for a technician to work on a section of a vessel.

ENOVIA for better collaboration

Designing and building ships involves large volumes of data that are accessed, shared and managed by the different parties in the lifecycle. ENOVIA VPLM ensures that there is a smooth flow of information among the users by providing a central data repository. ENOVIA VPLM's advanced relational design manages the knowledge captured in the CATIA designs created by YRS engineers. It automatically propagates any changes across hundreds of parts and communicates them to the relevant teams.

YRS also uses the virtual assembly capabilities of DS Digital Mock Up (DMU) in CATIA and ENOVIA VPLM for simulation of assembly and human maintenance flow. "This helps us to ensure that the design can actually be assembled and maintained, a key factor given the limited space on offshore vessels." said Lan Gongying, PLM user, Yantai Raffles Shipyard.

Results

Designing engineering feats

DS PLM solutions have not only helped YRS to improve vessel design, but it has also made it possible for the company to build its own mega structure - Taisun, the world's largest crane.



"With the use of DS PLM solutions, YRS was able to design Taisun in an unprecedented six months rather than the two years it would have taken without the use of PLM."

Lan Gongying, PLM user,
Yantai Raffles Shipyard



DS PLM Key Benefits

Taking seven years to conceptualize and one year to build, Taisun has a lifting capacity of 20,000 metric tons or the equivalent of 10,000 cars in one lift. This manufacturing marvel would not have been possible without DS PLM solutions to simulate the entire design process. Using CATIA for offshore structural design, DELMIA for crane production and simulation, and ENOVIA VPLM for creating digital 3D mock ups helped YRS accelerate Taisun's building process, reduce costly design errors, and significantly improve production efficiencies.

Given the scale of the Taisun project, YRS engineers used DS PLM solutions to simulate multiple design options virtually in order to come up with a revolutionary new structure that would meet the building requirements. DS PLM solutions also made it possible for YRS to evaluate, understand and solve many of the unique problems the company faced in building a crane of such magnitude. "With the use of DS PLM solutions, YRS was able to design Taisun in an unprecedented six months rather than the two years it would have taken without the use of PLM," said Lan Gongying, PLM user, Yantai Raffles Shipyard.

Increased productivity and capacity

With Taisun earmarked for ten lifts over the next twenty months and with each lift estimated at 10,000 to 16,000 metric tons, YRS will be able to build offshore structures by as much as 70% faster and see increases in design productivity of as much as 30%. This will allow the company to save over two million man hours on each semi-submersible built, as well as increase YRS overall building capacity.

Improved collaboration

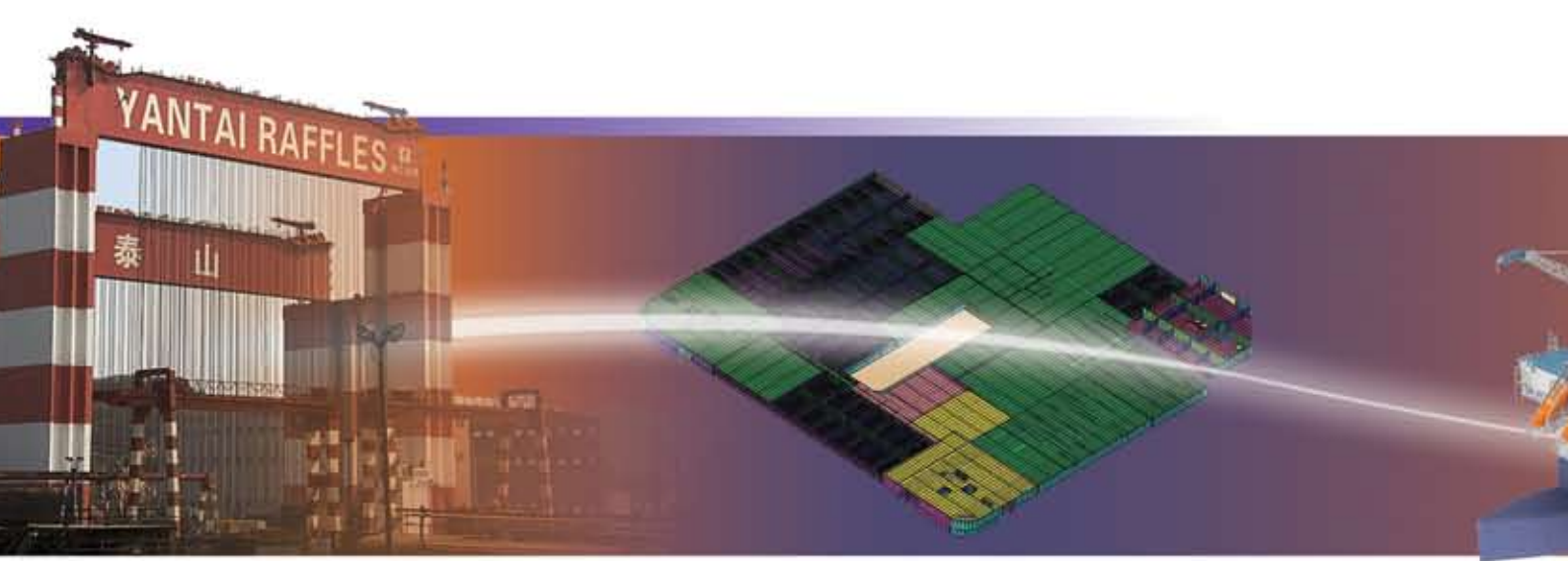
DS PLM solutions transformed the way YRS did business with its third-party suppliers. By making information readily shared and easily updated, ENOVIA opened the lines of communication between YRS and its partners and suppliers.

+30 to 40%
Design efficiency
Significant improvements
in vessel design efficiency

2,000,000
Man-hours
Anticipated saving on
every vessel built with
YRS new crane designed
with DS PLM

-70%
Engineering time
Reduction in engineering
man-hours

Over 30
Stress analysis tests
Used to determine
strongest design
configuration for Taisun
using SIMULIA



“Using ENOVIA VPLM to manage full 3D digital mock ups and standardize product development processes, we were able to outsource work to the best partners and suppliers and ensure strict quality control, design precision and other mission-critical elements in the end-to-end process of planning, designing, building and project management. Moving forward our PLM platform will be an integral part of our strategic plan to drive future business and become the ‘Yard of Choice’ for partners and clients,” explains Brian Chang.

Shorter manufacturing cycles and reduced costs

By shifting towards CATIA’s 3D virtual design approach, YRS is now enjoying production cycles with limited rework. Previously, projects required up to 30% rework due to changes or problems in the design. “With CATIA and DELMIA YRS can avoid unnecessary manufacturing costs caused by unforeseen errors, streamline processes, optimize resources and shorten production time,” said Teng Yao, PLM Manager.

Greater client satisfaction

The ability to walk a client through a virtual digital model of their vessel before production begins has proven an invaluable tool for YRS and its customers.

“PLM gave us and our customers many ways to pre-visualize our designs,” Chang said. “In our business, there are multiple parties involved in every project. As a result it is critical they understand the design. We demand that vendors be involved early, so that they can better understand the requirements. Making modifications at the digital mock up stage can also reduce rework later. Plus being able to view a digital model of a vessel before production begins is an unforgettable experience for our customers.”



“With CATIA and DELMIA, YRS can avoid unnecessary manufacturing costs caused by unforeseen errors, streamline processes, optimize resources and shorten production time.”

Teng Yao, PLM Manager,
Yantai Raffles Shipyard



Future

The benefits it has accrued from deploying DS PLM have motivated YRS to further expand its existing solution. It has already successfully deployed DS ENOVIA MatrixOne, which will play a central role in managing the collaborative product development business and data processes of YRS and its partners.

As an affirmation of their ongoing partnership, YRS and DS have committed to opening a PLM Competency Center in order to help them fully understand the value and impact of PLM to YRS. The center will employ three international PLM experts from DS who will not only monitor the effects of PLM, but will also ensure that YRS realizes the full potential of its PLM platform.



“It is getting to the point where I personally cannot see how we can live without DS PLM, having been working with it for several years.”

Brian Chang, Executive Chairman,
Yantai Raffles Shipyard

PLM solution for the Shipbuilding and Energy Industries

With almost 25 years of experience developing solutions for the Shipbuilding and the Energy industries, Dassault Systèmes has a legacy of innovation and success in one of PLM’s most challenging markets.

Developed in close collaboration with leading shipbuilders, naval designers and key Energy industry actors, the DS PLM Shipbuilding and Energy offerings combine Dassault Systèmes’ PLM portfolio of CATIA, DELMIA, ENOVIA, SIMULIA and 3DVIA

with specialized Shipbuilding and Energy best practices or work methodologies called DS PLM Practices.

Leveraging the same digital manufacturing tools widely used in the automotive and aerospace industries, DS PLM Shipbuilding and Energy solutions allow manufacturers to significantly reduce time-to-market and costs, while advancing innovation and product quality.

For information about DS PLM for Shipbuilding and Energy, visit www.3ds.com

The Dassault Systèmes home page can be found at www.3ds.com

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As a world leader in 3D and Product Lifecycle Management (PLM) solutions, the Dassault Systèmes group brings value to more than 90,000 customers in 80 countries. A pioneer in the D software market since 1981, Dassault Systèmes develops and markets PLM application software and services that support industrial processes and provide a 3D vision of the entire life cycle of products from conception to maintenance.

The Dassault Systèmes PLM offering consists of CATIA for designing the virtual product, DELMIA for virtual production, ENOVIA for global collaborative lifecycle management (including ENOVIA VPLM, ENOVIA SmarTeam, and ENOVIA MatrixOne), SIMULIA for virtual testing and 3DVIA for lifelike experience.

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