



OTC 20261

Streamlining Offshore System Development and Life-Cycle Management

Rolf Gibbels, Dassault Systemes

Copyright 2009, Offshore Technology Conference

This paper was prepared for presentation at the 2009 Offshore Technology Conference held in Houston, Texas, USA, 4–7 May 2009.

This paper was selected for presentation by an OTC program committee following review of information contained in an abstract submitted by the author(s). Contents of the paper have not been reviewed by the Offshore Technology Conference and are subject to correction by the author(s). The material does not necessarily reflect any position of the Offshore Technology Conference, its officers, or members. Electronic reproduction, distribution, or storage of any part of this paper without the written consent of the Offshore Technology Conference is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgment of OTC copyright.

Abstract

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. 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.

This paper will present a case study of how YRS applies a "virtual" approach to product development and lifecycle management of next-generation FPSO units. These highly complex units are designed primarily for deep to ultra-deep offshore petroleum applications. In recent years, YRS has completely re-engineered its product development process by adopting technology that allows it to collaborate with engineering partners. It does so using a single 3D definition throughout the product lifecycle – from design concept to fabrication to on-going operation and maintenance. In an industry where approximately 80% of all projects experience tremendous cost overruns and schedule delays, YRS is able to gain control of critical development processes, improve its business performance, and expand its business focus from product to a full range of solutions.

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 these domains. With these sectors enjoying continued double-digit growth worldwide, YRS is presented with tremendous opportunity 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. However, in addition to market challenges, the company faced many technological challenges as well. For example, physical prototyping took so long that construction had to begin before the design was complete. Employees and partners often discovered they were working with different versions of the same data. Engineering changes were difficult to propagate throughout the system. Mismatches between related ship systems sometimes remained undetected well into construction, driving up cycle times and costs.

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 to use a comprehensive suite of Product Lifecycle Management (PLM) solutions including:

- ◆ Computer automated design (CAD) for offshore structural design
- ◆ Simulation for stress analysis on parts and assembly
- ◆ Digital manufacturing to simulate vessel production
- ◆ Collaborative product design platform to enable communication between the different products and functions.