

## Marine

# Princess Yachts

Optimizing 50 years of yacht-building expertise with Siemens PLM Software portfolio

### Products

NX, Teamcenter

### Business challenges

Balance attention to detail with delivery date pressure

Develop and build larger boats

Deliver consistently high levels of quality

### Keys to success

Integrated CAD/CAM capability

Complete visibility for all

Advanced CAM capabilities to drive 5-axis machine tools

### Results

Majority of owners upgrade within the Princess range (over 60 percent)

Streamlined development facilitates innovation

Up to six new designs brought into production each year

Workflows support consistency and communication

Unique designs from clever re-use of library parts

Improved accuracy by using advanced 5-axis machining methods

Design clarity in the factory speeds up production and increases efficiency

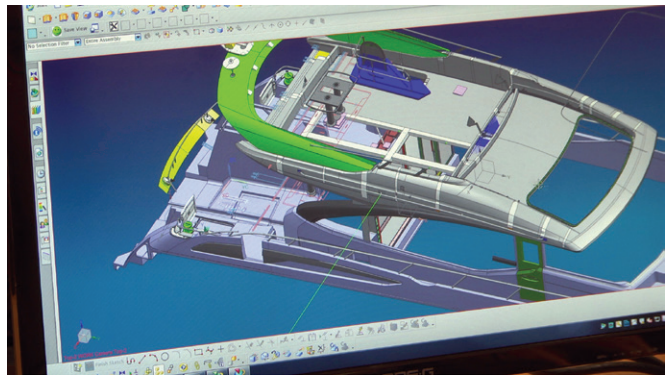
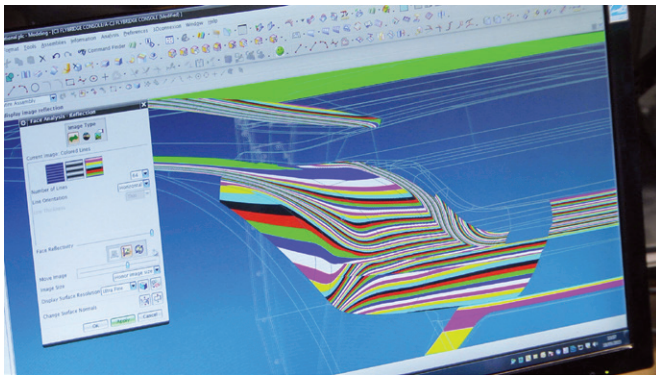
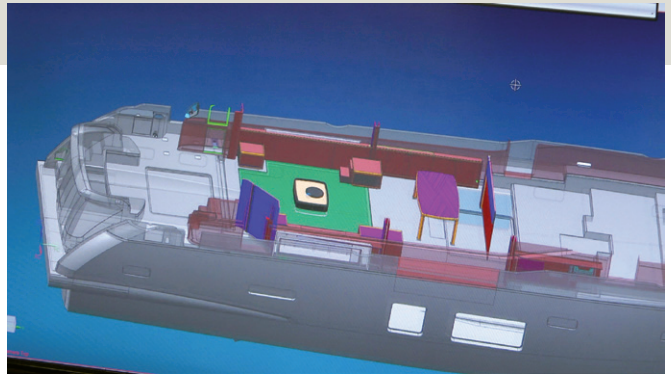
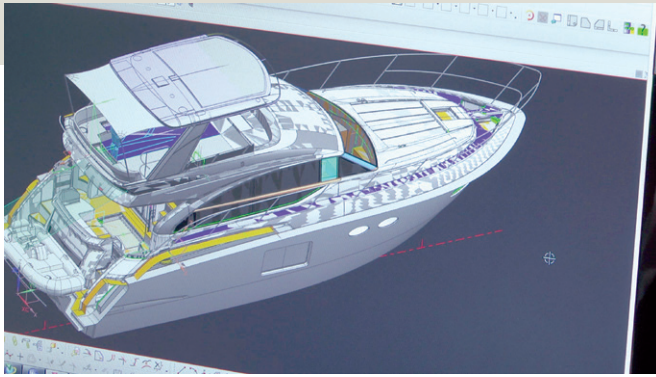


### Princess elegantly balances attention to detail and speed with NX and Teamcenter

#### Effortless and exhilarating elegance

As Princess Yachts International (Princess) marked its 50th anniversary with the launch of three new class-leading products across its S Class, V Class and M Class ranges, it simultaneously revealed the lovingly restored Project 31, one of its original 1965 models. The company sympathetically restored original features, yet incorporated modern materials and production techniques for a new level of luxury.

The combination of bold technical innovation and detail-oriented craftsmanship epitomizes Princess. After five decades of designing and manufacturing motor yachts, the company is renowned for graceful hulls that are both agile and efficient, and interiors that exude quality and style and are cleverly resolved. One of the largest employers in the southwest of England, the company has more than 2,300 staff members across five sites in and around Plymouth. Not only does Princess embody the maritime heritage of the area, it exemplifies the international standards of excellence set by the LVMH (Louis Vuitton Moët Hennessy) family of companies to which it belongs.



“Designers can review different aspects of the boat in context and finesse tiny details well before the production stage.”

Andy Lawrence  
Head of Design  
Princess Yachts International

The extensive range of sport and flybridge motor yachts features custom-made furniture, beautiful textiles and bespoke lighting. Founder David King explains the appeal of a Princess yacht: “We have a product that performs in all conditions and is timeless in its good looks. For Princess, every aspect of a boat has to be thought through and resolved, with elegance and without compromise.”

**Passionate about producing the best**  
King is involved right from first concept, working closely with the company’s Head of Design, Andy Lawrence, and its naval architect studio for 35 years, Bernard

Olesinski Limited. Together, they establish the hull form, structure, performance criteria and unique features of each new design. “It is all about allocating space and headroom yet retaining a low, sleek profile,” says King. “That means attending to every detail, from the performance of the hull to the way in which a shower drains, or the crockery drawer layouts.”

Between three and six yacht designs are brought to market each year, and as the first of a new design begins sea trials, the second is ready to commence fit-out. “We schedule a gap between hull number one and hull number two, but this often gets





compressed, and with the first six boats already sold with allocated delivery dates, the production teams frequently face pressures,” King explains. The only way to maintain this rate of production and advance the highest standards of quality is to utilize technology to facilitate the development process. Princess has a long-standing partnership with product lifecycle management (PLM) supplier Siemens PLM Software, and uses NX™ software for computer-aided design (CAD) and Teamcenter® software for storing information and managing workflows.

#### **Facilitating attention to detail with NX and Teamcenter**

When a new design is confirmed, the NX model files of the hull and deck are placed in Teamcenter, which acts as the hub controlling all data in and out of the product development department. At this point, the design team takes responsibility for the general arrangement, which includes the final exterior and interior layouts. Careful thought goes into the detail of each item as well as the look and functionality. Although the work starts in 2D for simplicity and speed, the final result is a fully detailed 3D model of the entire boat showing how all components work together, and includes third-party supplier items. “With this complete NX assembly, designers can review different aspects of the boat in context and finesse tiny details well before the production stage,” Lawrence notes.

David Hough, head of the company’s development engineering, leads the team responsible for mechanical and electrical systems, ranging from fuel and water tanks to hydraulic bathing platforms. “We design electrical circuits in a dedicated software program, then we use NX to measure the looms and show how they fit into the overall design,” he explains.

Andy Hay, head of naval architecture at Princess, is responsible for compliance with safety regulations and shipping class rules. “My team uses NX to ensure that the design meets structural and performance standards and will meet expectations right down to the allowance of light switches and window blinds in the structure,” says Hay.

**“Data delivered direct to the 5-axis machine gives accuracy and a better surface finish.”**

Rob Coleman  
Development Operations  
Manager  
Princess Yachts International



**"We always know where we are in our virtual world because Teamcenter is infinitely searchable."**

Andy Hay  
Head of Naval Architecture  
Princess Yachts International

Meanwhile, Rob Coleman, the company's development operations manager, organizes schedules and coordinates different processes. "NX gives us speed, efficiency and design freedom, and Teamcenter enables us to control information," says Coleman. "We can all view a complex product design and make sense of it."

Siemens PLM Software provides ongoing technical support and guidance as required, for example, assisting with a major upgrade of the company's database and working with Princess to review and improve in-house skill levels and working practices. Siemens PLM Software also delivered customized training that enabled everyone to follow consistent methods of design. "This resulted in a significant efficiency improvement which has enabled us to reallocate resources to allow more complex surface modeling of interiors and improved designs," says Coleman.

### **An effortless passage from design into manufacturing**

Princess has several 3- and 5-axis numerical control (NC) machines. The company uses the advanced computer-aided manufacturing (CAM) capabilities of NX to drive the advanced equipment on the shop floor. The NC programmers use NX CAM to create and validate 5-axis operations needed to machine the complex geometry of plugs from which molds are made. Besides NC programs, NX CAM enables Princess' engineers to generate complete work packages, including setup sheets and tool lists. When the mold is ready, resin infusion techniques are used to create a hull that is strong, light and thin, maximizing internal volume. "Data delivered direct to the 5-axis machine gives increased accuracy and a better surface finish," comments Coleman.







Direct output from NX CAM to production machinery maintains precision, yet attention to detail is taken even further with the construction of a physical mockup so that subtle details can be verified and refined; for example, King sits at the console, checking sight lines and the layout of the console. Team leaders in the factory have access to the latest digital information for boat fit-out and furniture, and also use it for production planning and various technical systems within the boat design.

### Navigating with knowledge

Princess Yachts uses Teamcenter to manage information on hundreds of thousands of parts and provide visibility and traceability across the company. Everyone can see the evolution of a structure or component, its production status and any background data. In addition to storing design, analysis and performance data, Teamcenter holds all due-diligence and compliance documentation and can be used to create business reports.

"We always know where we are in our virtual world because Teamcenter is infinitely searchable," says Hay. "When I go to Teamcenter to locate a part, I can see every revision and who is working on the latest release."

Princess Yachts uses Teamcenter to manage a library of standard parts, each with associated analysis and performance data. These range from nuts, bolts and washers to generators and larger items such as tenders. The company enables re-use of items and establishes standard process and protocols using Teamcenter, supporting the smooth development of boat designs that are unique. "There is very little straight re-use," comments Hough. "One object may be used in various ways to create an end result that is different each time."

Rob Dewe, who is responsible for NX in development and Teamcenter as an information hub, notes: "We previously used Teamcenter workflows simply to release subassemblies. Now we use them to ensure consistent standards of quality and communication."

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Rob Dewe  
Senior CAD Designer  
(PLM Specialist)  
Princess Yachts International



### Solutions/Services

NX  
[www.siemens.com/nx](http://www.siemens.com/nx)  
Teamcenter  
[www.siemens.com/teamcenter](http://www.siemens.com/teamcenter)

### Customer's primary business

One of the world's leading luxury motor yacht manufacturers, Princess Yachts International has more than 2,300 employees across five manufacturing sites in the southwest of England. With a reputation for high standards and engineering excellence, Princess offers a superb range of sports yachts, flybridge motor yachts and super-yachts ranging from 39 to 130 feet.  
[www.princessyachts.com](http://www.princessyachts.com)

### Customer location

Plymouth  
England

### A focus on product

"Through the use of NX and Teamcenter, Princess has increased efficiencies across all processes and is building bigger and better boats," says Coleman. With a constant focus on improvement, the company is now looking at enhancing the way in which it exchanges data with Bernard Olesinski, and improving procurement through closer communication between Teamcenter and its manufacturing resource planning (MRP) system.

"We are fundamentally a product company," comments Chris Gates, Princess' managing director. "We work with like-minded partners around the world who

focus on customer care, and we put all our passion into the product because we believe that the customer will decide which product is best. The quality of our product grows ownership, and our greatest achievement is the fact that the vast majority of the Princess family of owners upgrades within their product range."

King concludes: "It takes two years to develop a boat, which typically has a five-year lifecycle. That means we are always looking ahead, for example, to what engines and new materials are in development. It really is all about details, just as Leonard da Vinci said: 'Details make perfection, and perfection is not a detail.'"

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Rob Coleman  
Development Operations Manager  
Princess Yachts International

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