



# ELEGANT EFFICIENCY



Jeanneau combines traditional craftsmanship and high-tech production techniques

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**T**he Jeanneau story has all the twists and turns of a good novel. Frenchman Henri Jeanneau started building powerboats in 1957 and began building fiberglass sailboats in 1970. As the years went by ownership of the company he created changed hands several times, and by the mid-1990s mismanagement had forced it into receivership. By 1995 a bankruptcy court was taking bids on the struggling company, and Zodiac, the powerful French manufacturer of inflatables, was poised to enter the sailboat business by making a substantial offer. Then, Groupe Beneteau's chairperson, Madame Roux, stepped in. She knew Zodiac had the capital to turn

Jeanneau around and possibly drive Beneteau out of business, so she convinced the court to sell Jeanneau to Groupe Beneteau.

Since then Jeanneau has been more than just surviving—it's thriving. Jeanneau's workforce, based in several factories in France, has grown from 700 to close to 1,500 people. Last year its power- and sailboat production topped 4,700 units worldwide; total sales were north of \$330 million. What's the reason? As I saw firsthand during a visit to Jeanneau's main sailboat factory in Les Herbiers, capital investment in high-tech production techniques and efficient management have enabled the company to increase both production capacity and customer satisfaction while reducing warranty claims. According to Jeanneau America's president, Paul Fenn, "The factory is building bigger, better, more-affordable boats more quickly." Needless to say, that's good business.

The sheer size of the facility surprised me. I had thought Jeanneau was the smaller sibling to Beneteau. Wrong. Beneteau, Jeanneau, Wauquiez, and Lagoon are all part of Groupe Beneteau. Each company benefits from



When I visited the fiberglass shop, there were over 20 hulls in various stages of layup. They are built in rotating molds that make it easier and quicker to lay out the glass and resin. Polyester resin is used on the inner layers, and osmosis-resistant vinylester resin is used on the outer layers. No cores are used; all hulls are built of solid fiberglass. Styrene levels in the shop are kept in check by an air-filtration system that is constantly pumping styrene emissions out and fresh air in.

After the NPG/ISO gelcoat is sprayed on, experienced layup teams apply pre-cut fiberglass cloth, roll on the resin, and roll out air bubbles by hand. Each roll of cloth is numbered, and fiberglass cloth of different weights is used for specific design requirements. This shot shows a layup team unrolling woven roving cloth that will add strength and stiffness along the centerline.



Each hull goes together like pieces of a puzzle. Once the shell has been laid up and cured, structural members are completely glassed in to give the hull strength and stiffness. Each plywood structural member is pre-cut and numbered.



After the structural members have cured, the hull pan is bonded into place. This hull has the engine mounts and part of the bilge pan in place in sections. The yellow grid forward of the engine platform is a jig that holds the hull in place and ensures that the molded pan sections are straight and installed exactly where they are supposed to be.

Decks, cored with end-grain balsa, take shape upside down alongside hulls in the layup shop. The hand-layup process is quite labor intensive. Teams of detail-oriented workers place core sections (numbered, pre-cut, and perforated pieces) according to the deck's production plan and work the resin into all the corners. Mounting spots for deck hardware are solid fiberglass.



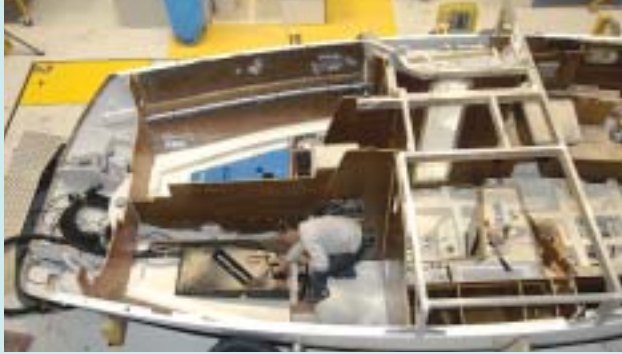
Once the hull and deck are laid up and cured, they make the short trip from the fiberglass shop to the beginning of the production line. The hull comes from the fiberglass shop with its structural grid in place; seacocks, plumbing, wiring, and motor mounts are some of the first things added. The hull and deck progress side-by-side down the line. While the hull is being worked on, hatches, handrails, ports, and hardware are fitted to the deck. If the boat has been ordered with a teak deck, it's fitted (in a separate shop) before it's sent to the production line.

collaborative buying power, economies of scale, and capital investment, but each is quite autonomous in management. According to Fenn, "There may be a friendly rivalry between dealers, but the truth is that Beneteau builds only several hundred more boats [sail and power] than Jeanneau." Part of the reason the marriage has succeeded is that each company has a different design philosophy and focuses on different areas of the market. For example, Jeanneau is making waves with its new deck-saloon models, especially the highly stylized 49 and 54 DS, while Beneteau is doing well with its 373 and 423 cruisers.

On average, five completed sailboats—the Jeanneau line ranges in size from 32 to 54 feet—roll out of the factory every day of the year, and the company is currently planning to expand production. The demand for more boats is there, and continuing plant upgrades make such

an expansion feasible. A single operator working one of three computer-controlled CNC machines in the wood shop, for example, can cut components like bulkheads or drawer fronts for 10 boats (three sheets at a time) in less time than it would take to cut pieces for one boat using older techniques. Waste is sharply reduced since the computer nests components close together and cuts to much finer tolerances than a human could.

High-tech mechanization has also completely changed the way varnish is applied to Jeanneau's trademark teak interiors. Applying three coats of varnish on both sides of a sheet of veneered marine plywood is now a one-man pushbutton operation. The varnish applicator is actually a series of machines connected by a large U-shaped line of powered rollers. Suction cups pick up a sheet and gently place it on the line. As the sheet is propelled down the line



The boat goes together from the bottom up as it moves down the line. Once through-hull fittings are mounted, tanks and bulkheads are fitted. The deck doesn't go on until the end. This makes it easy to drop the heavy and hard-to-handle equipment into place. A steel jig is used to ensure the hull retains the exact shape it will have once the deck goes on. Bulkheads are tabbed into the hull and bonded to the deck.

Equipment carts like this one, which is stocked with an engine, a propeller shaft, and associated hardware, are set up and waiting for each boat as it moves down the line. To speed up production, similar carts for each boat are filled with necessities like pre-cut fiberglass cloth, deck hardware, and bulkheads. Workers don't waste time searching for what they need on the line. It's all right there.



Wooden components that end up on a cart—bulkheads, doors, drawer fronts, and the like—are cut from sheets of veneered marine plywood. One operator programs precise measurements (supplied by the design team) into one of three computer-



controlled CNC machines; the machine's multiple mobile cutting heads do the rest. The motions of the heads (back and forth) and the sheets (forward on a conveyor belt) are synchronized to allow the machine to quickly cut intricate curves on any component. The machine also drills holes exactly where they are needed. It can cut through three ¾-inch sheets stacked together with such fine tolerances that waste is reduced to little more than sawdust.

The varnish machine represents another quantum leap in efficiency. Plywood sheets move down the line on computer-controlled rollers and pass under sanding, varnishing, and drying machines that apply three coats of flawless varnish. At right, a sheet with a fresh coat of varnish passes under a UV dryer. The sheets never slow down on the line. The sand-varnish-dry cycle is repeated three times. Ten sheets can be on the line at any one time, and it takes about two minutes for a sheet to move from beginning to end. The system loads and unloads the sheets from the rollers.



Jeanneau is aggressive about perfecting labor-saving techniques, but hand craftsmanship is still a big part of the job. At right, a worker trims a hole that was cut for a locker door with wood veneer. Components are constantly being built and finished to keep the production line fed and up to speed.



Farther down the line, the boat shown below has its engine, bulkheads, sole, plumbing, and wiring installed. Below, workers are installing the hoses for the engine exhaust. Tasks are done in sequence so that crews don't get in each other's way. The engine guys are in the stern and the woodworkers are farther forward. Staging around the hull is designed to drop easily into place (and be disassembled when it's time to move to the next station) so workers aren't going up and down stairs all the time.



it passes under an ultra-precise sprayer that applies a fine coat of varnish; then a high-intensity UV light dries it almost instantly. The dried sheet then passes under a large 220-grit sanding machine. Total time: 35 seconds. The sequence is repeated twice more as the sheets return about 10 feet from where they started. No human, no matter how skilled or efficient, can apply three coats of flawless varnish in 2 minutes with a brush. The net savings has to be spectacular to justify the huge capital expense of the machine—and it is.

The CNC machines and the varnish applicator are pieces of a large, efficient, integrated, system. I got an idea of the size of the place when our tour guide told us we would drive through the plant. "It's too far to walk," she said. Each building we entered—wood shop, fiberglass layup, teak-deck installation, store room, varnish—was

well lit, well ventilated, and measured in the thousands of square feet. Gleaming white boats on jackstands awaited treatment throughout the facility. The employee parking lot is as big as a mall's. We dodged forklifts moving engines, plywood sheets, and barrels of resin, plus hundreds of workers returning from lunch break, before we finally got to where the boats are put together. Almost all Jeanneau sailboats are assembled in a stadium-size facility that houses eight separate production lines. Hulls, decks, wires, components, and hardware go in one end, and completed shrink-wrapped boats on trailers drive out of the other.

On average each boat on the line moves every five to six hours, and time truly is of the essence. The deck goes on close to the end so components can be lowered quickly and easily into the open hull rather than being passed



Many components are built in the woodshop and brought to the line in one piece. Here a head module is being lowered into place. The walls of the head are curved to correspond to the curve of the hull and are notched to accommodate structural members. Once lowered in place, the module gets tabbed in, plumbing and fixtures are connected, and *voilà*—a working head that also adds stiffness to the hull.



The boats lined up in front of those enormous garage doors are in their final stages of production. This is where the cove stripe and other graphics are applied and each boat is thoroughly cleaned and then inspected for quality. All work must pass a rigorous inspection process.

This deck is just about finished. The rigging terminals are in, the hatches are mounted, teak handrails run the length of the coachroof, and the silicone on the tinted ports is being checked. Note that the deck is raised so that workers don't have to bend over (both uncomfortable and inefficient) when working on the headliner.



Once the deck is on (we just missed seeing the deck being lowered onto this boat), bulkheads are bonded to the deck, the hull-to-deck joint is both bonded and bolted, lifeline stanchions and pulpits are installed, and deck hardware is mounted. The boat is fast approaching the end of the line.



The boat in the foreground is one step away from the end of the line where the steering pod, cockpit table, and other deck hardware are installed. Meanwhile, electronics and other last-minute items are finished up down below.



through the companionway hatch. Hulls move along the line on tracks and are quickly surrounded with staging that makes it easier for workers to move around them. Beams over each line have powered cranes mounted on wheels to do all the heavy lifting. The keel is the last thing to go on before the boat is lowered into a tank to check for leaks; the tank is literally steps from the end of the line.



Last stop—test tank. Each new Jeanneau is floated in the test tank adjacent to the end of the line to check for leaks and to confirm that the engine works properly. It's only after a trip to the tank that the boat is loaded on a trailer, shrink-wrapped, and readied for the road.



This Jeanneau is off to Annapolis, Maryland. Over 8 to 10 weeks it will travel overland to Antwerp, Belgium, be loaded into a fully enclosed container ship, be off-loaded in Baltimore, and get rigged, commissioned, and ready for its new owners.

High-tech equipment helps speed up the process, but it is Jeanneau's skilled workforce that puts the pieces of the puzzle together. During my two-day visit, everywhere I went was buzzing with activity, but the production line was a full-on beehive. Plumbers were running hose in an open hull, electricians were running wire farther along the line, decks were flying on cranes overhead to be joined with their hulls, and teams of men and women were mounting hardware near the end of the line.

As I watched a completed Jeanneau 49 being loaded onto a truck to start its journey to Annapolis, Maryland, I could literally see where it came from. As it left the yard, the engine team was installing the diesel in the 49 at the beginning of the line, and other 49s moved up a spot. There was elegance in the efficiency.

