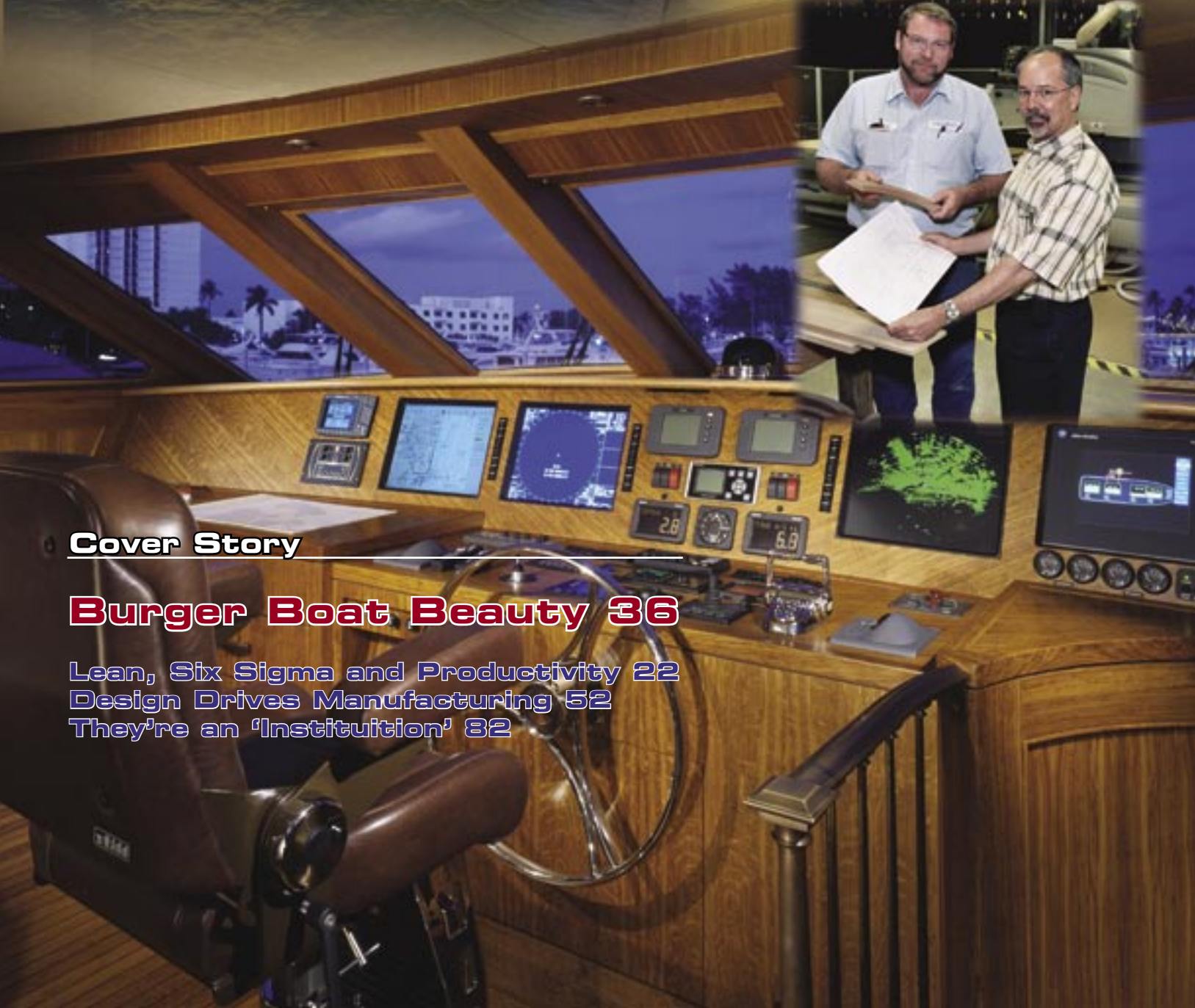


WOOD digest

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Productivity solutions for manufacturers of furniture, cabinets, millwork and specialty wood products.



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Yachts get CNC treatment

Burger Boat customers demand attention to detail for their custom interiors

By Steve Ehle



Mike Mitchell, Burger Boat millwork manager, oversees all wood-related fabrication.

Burger Boat Company

Location:

Manitowoc, Wis.

Established:

1863

Products/services:

\$15 to \$25 million yachts; boat refitting

Market area:

Worldwide

Facility size:

101,000 sq. ft. (7,500 sq. ft. in the millwork shop) on 7-1/2 acres

Employees:

330; woodworkers (15 in joiner shop and 35 on the boats)

Volume:

Two to three yachts per year, with five to seven in production at any one time

President:

David Ross

Vice President:

Jim Ruffolo

Millwork manager:

Mike Mitchell

They were making boats well before Henry Ford rolled his first Fliver off the line in Detroit. When their first boat was launched, the Civil War was in full swing. Now, 142 years later, it's still "all in the details" at Burger Boat Company. A lot of details.

This Manitowoc, Wis. company is one of a handful of boat builders worldwide which produce custom yachts for a select group of primarily private sector clients willing and able to write checks in the multimillion-dollar range.

People willing to invest in a Burger Boat yacht — or even two, as is the case most recently — know what they want. And what they want they get, thanks to a company philosophy and production scheme that places

strong emphasis on detail, quality control and, most recently, CNC manufacturing methodology.

Founded by the German immigrant Brauburger (later to become Burger) family, Burger Boat has produced more than 500 boats and yachts since 18-year-old Henry Burger started his own company after serving as an apprentice in Milwaukee. While starting out building small craft for professionals, Henry soon gained a reputation in the area for his quality and attention to detail.

It didn't take long for the Burgers to enjoy similar success in building large sailboats and refitting large ships, an activity still carried on today in the Burger yard in Manitowoc, about 80 miles north of Milwaukee on Lake Michigan. Originally building only wooden ships, the company evolved to where it turned out all types of vessels, including yachts.

Today, the company, run by President David Ross and Vice President Jim Ruffolo, is one of the most recognized and sought-after brands in the competitive yacht-building industry. Known for its design excellence — particularly its exotic wood-tinged interiors — and production expertise, Burger Boat produces yachts ranging from 125 feet to 165 feet with a price range of \$15 to \$25 million.

Currently, the company is building two identical 127-foot tri-deck motor yachts for a young Russian industrialist “with a global business and leisure interests,” as the company's latest promotion publication says. One of the yachts will be based in the Caribbean and Eastern Seaboard of the United States. The other will cruise the Mediterranean, Adriatic and Aegean Seas, and the Balkans.

For delivery outside of the Lake Michigan shoreline, typically yachts travel through the great Lakes, the Welland Canal, St. Lawrence Seaway and down the East Coast. Production time is between 18 and 24 months.

“He really didn't care to criss-cross the Atlantic with one yacht,” says Ruffolo. “So he bought two. Both will be delivered in early 2007.”

The road to 'World Class'

In May 2004, Burger Boat embarked on a company wide assessment and continuous improvement program to elevate the Burger Boat to true “World Class” status in all facets of the company.

Ross explains: “We commissioned ProKure, Inc., a Los Angeles-based company with expertise in organizational development and supply chain management, to assist in navigating the course to World Class. Their job was to assess all levels of the

organization in order to determine key areas of opportunity.”

With a clear focus on people, product, process and performance, it became evident that the path to World Class was dependent on successfully incorporating a system of integrated processes and management. The organizational structure would have to comprise the best leaders and work force to complement Burger's ‘can do’ culture.

The product of a 45-day in-depth assessment of the company was the formulation of these six teams:

- 1) Operational Business Planning
- 2) Organizational Structure Development
- 3) Role/Responsibility Development
- 4) Communication Matrix Development
- 5) Manufacturing Schedule Planning
- 6) Future State Process Planning

“Six months into the Burger Business System program journey, early results clearly suggest that the program was a success,” Ross explains. “Cross functional communication has markedly improved planning and minimized errors. Plus, manufacturing time has been reduced in key areas.”

One of those key areas is the two-level millwork shop, where most of the exquisite wood interior features are fashioned out of such species as makoré, mahogany, American cherry, English brown oak, other exotics — sometimes complemented with rosewood burl accents.

“Every yacht customer wants to put his or her individual stamp on their boat,” millwork manager Mike Mitchell explains. “We get requests to build some pretty interesting interior pieces. So we have to be prepared for just about anything.”

According to Mitchell, one of the most challenging facts of life in yacht construction is dealing with the curvature of the vessel. There are very few 90-degree corners. With the



Fine sanding and assembly is accomplished in the upper level of the millwork shop at Burger Boat.

exception of interior pieces that are not affected by the shape of the boat, every item must conform to the radius to which it is joined.

Mitchell and Ruffolo were asked about these challenges and other issues that influence quality, on-time delivery and manufacturing efficiencies.

Wood Digest: How do you deal with the curvature issue when making interior — or exterior for that matter — components and fixtures?

Mitchell: We use a digitizer, called Proliner, manufactured by Prodim International. This unit will record data which must be transferred to a PC. We can then open the measuring data directly or as a DXF format. Drawings are developed using our CAD software which can then be transferred through Auto-Link, a post software. Parts can then be machined using the Genesis software on the Busellato router. It's important that the person gathering the digitized data is the same person converting it for machining. As there is no record of some of the critical information, the operator needs to know certain things such as where he started and what direction and offsets of the probe that were used.

WD: You recently added a Busellato Jet CNC router and machining center. What were you using prior to this to produce complex parts?

Mitchell: Prior to having the CNC router, all complex and curved parts were produced by hand using hand-held routers, saws, block planes, etc. The router was delivered in December 2004, enabling us to produce parts by mid-January 2005.

WD: What was the selection process for the router? How did you evaluate the routers you consider for purchase? Why did you choose the Busellato? How much was price a consideration?



Douglas Richey, interior designer at Burger Boat, works with clients to develop custom interiors for their yachts.



A Butfering widebelt sander prepares exotic wood species for finishing in Burger Boat's millwork shop.



Panel cutting is handled by an Altendorf sliding table saw in the upper level of the millwork shop.



Mouldings and other profiles are produced on a Weing Profimat 26 Super moulder in the millwork department.

Ruffolo: Burger's executive management made a decision to look into the value of purchasing an NC Router to help produce quality manufactured joinery parts and expedite production. Mike and his team put together a specification which would guide us through our equipment selection process. The first step in researching a router started at the Grand Rapids Machinery Show in the fall of 2003. From there Mike narrowed the scope to four possible vendors. We visited with the intent to meet each vendor's sales, software, training and factory representatives. We analyzed each team based on their ability to understand our current needs as well as their ability to service and handle our growth moving forward. We determined that a combination bed, nesting on one side and pods on the other, was the machine necessary for Burger's highly customized product. We chose the Busellato Jet 5 WF XXL dual router/pod machining center, based on the following discoveries: We found the distributor, Delmac Machinery Group, to be technically superior; we found their software interface to be most closely aligned with our needs; Busellato was willing to build a custom machine that matched our specific needs, and lastly, but with great importance, we felt extremely comfortable with the people at Delmac. As we all know, a piece of equipment is only as good as the people who operate and support it. Though price is always an important factor, it wasn't as important as finding the "right" equipment and the "right" support team to back it up.

WD: Explain the dual router/POD concept on the Busellato.

Mitchell: The work table is divided into two independent zones — plenum table on the left and POD/rail on the right, each with separate vacuum control. The plenum table has a left-hand reference, and the POD/rail has four lateral reference points, plus two sets of Y-axis stops — mid and rear pins. So, the machine has a total of three independent zones, which makes it very flexible for our particular production needs. The router table is 5-by-10 with rear and side stops for one working area in "X."

WD: How did you cost-justify the purchase of the router? What is the internal process for the purchase of a major piece of capital equipment like the router?

Ruffolo: The cost justification for the router was done in a somewhat less traditional method. We compared the time it takes to program and produce a part vs.

the old method of producing by hand. We have been logging this data for the last six months and have seen a very short payback period as well as an increase in quality and precision.

WD: When your in-house designer has completed his designs and they've been approved, how are the drawings converted to CAD? How is a bill of materials created? How are G codes for the router created and by which software package?

Mitchell: All programming is done with Genesis Evolution software. Some information is transferred from Microstation CAD software through Autolink.

WD: How is quality control handled? What type of joinery system do you use in the shop? And, how do you deal with climate/moisture changes during the year relative to the wood expanding contracting?

Ruffolo: Quality control is the responsibility of each employee. It is also monitored by super-visors and managers. The joinery varies depending on the application. It ranges from dowels to biscuits to rabbets to mortise and tenon to screws to dovetails. We never use nails. The environment of the shop and boat interiors is closely monitored and adjusted year-round for temperature and humidity.

WD: How do you track production to make sure you're on schedule?

Ruffolo: We have a Scheduling Department that monitors production. The managers update their percentage of completion on a weekly basis.

WD: How many orders do you have in-hand and how far out are you scheduled?

Ruffolo: We have seven orders in hand. The next available delivery is 2008.

WD: How do you deal with the shortage of trained, skilled woodworkers and other skilled workers?

Ruffolo: We've launched a full, strategic staffing plan that is focused on the recruitment and retention of highly skilled finish carpenters. This campaign includes a broad range of initiatives such as state and national advertising through industry publications, numerous internet sites as well as our own recently enhanced website: www.burgerboat.com. We are working with a wide variety of recruitment employment partners, both local and national, with a specialization in the marine industry and beyond. Most significantly, we have established Burger University as a vehicle to strengthen the competency of our existing staff and to develop the skill set of our new hires on an accelerated timetable. This involves partnering with local and state training partners. Since each woodworking professional is both a gifted artist and a technician, our goal is to identify talent and then create the training and development opportunities to support and release the potential of that individual.

WD: Are the workers in the wood shop cross-trained? How many are trained to operate the router? How was training accomplished?

Mitchell: Cross-training is very important. We frequently move people to different areas, not only those within the joiner shop but also the boat carpenters. It is important for the people in the shop to be aware of the challenges on the boat and vice versa.

We took full advantage of Delmac's maximum class size of six people for on-site training at their North Carolina facility. We also hired an experienced CNC operator/programmer from the outside. He can be given most of the credit for our short learning curve in getting the router running efficiently.

WD: In terms of the wood shop, what is your biggest challenge and how do you address it?

Mitchell: We took a quantum leap in manufacturing technology and processes over the last year. Our biggest challenge will be to utilize this technology while still maintaining the high quality standards that Burger is known for. **WD**



Burger Boat added a Busellato Jet machining center to its millwork department. The unit produces complex parts for the custom interiors.



The super structures of the yachts produced at Burger Boat are made of 5,086 aluminum alloy.



Photo courtesy of Burger Boat

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