ROVINGS

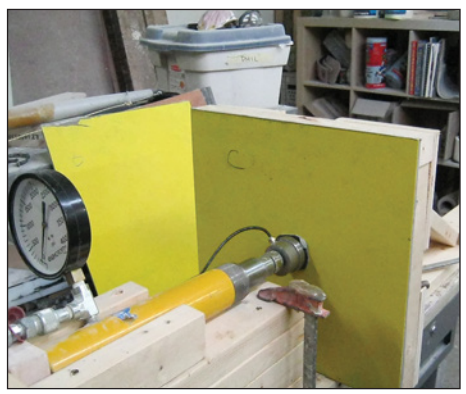
Compiled by Dan Spurr

Parts and Panels

Competition Composites, Inc. (CCI), a small six-year-old company in Ottawa, Ontario, Canada, two years ago broke the $1 million mark in sales, largely by making parts for boatbuilders, but also for the military and telecommunications sectors. Owners Dave Brady and Phil Locker are two guys who might say that losing their jobs was the best thing that ever happened to them. Locker actually took a buyout from Nortel Networks (Toronto), but Brady was laid off from a management job at the software firm Cognos (Ottawa). Locker had already started Phil's Foils in 2002, making composite foils for small sailboats. Brady joined him in 2007, and the two incorporated as Competition Composites.

Today the company fabricates rudders, spars, tubes, tillers, and other boat parts, working with carbon fiber, fiberglass, and various core materials—wood and foam. A typical wood-cored rudder begins with a strip-planked/epoxy blank. Any through-holes are filled with thickened epoxy; then the blank is shaped by a CNC milling machine, sheathed with fiberglass/Kevlar/carbon fiber as specified, and vacuum-bagged. Once cured, the rudder is coated with epoxy, sanded, primed, wet-sanded, and painted. Parts that don't stay in the water are painted with Imron two-part polyurethane; parts that remain submerged for lengthy periods are coated with Awlgrip 545 epoxy primer. CCI's website has a long list of one-design sailboats for which rudders are readily available. Custom work is another staple; recent jobs included rudders for an Empacher 70 (21.3m) and an Eggemoggin 47 (14.3m) under construction at Brooklin Boat Yard, in Brooklin, Maine; and foils for a Gunboat 55 (16.8m) being built at Gunboat's new facility in Wanchese, North Carolina.

Recently we heard from Locker, who described an interesting project. Though Locker and Brady are avid sailors, members of the Nepean Sailing Club in Ottawa, and have made parts for numerous builders, they'd never built a complete boat of their own. Looking for a high-performance boat they could race, they decided to build the popular 18′ (5.5m) i550 sportboat, designed to be built of ¼″ (6mm) plywood and sheathed with 10-oz (339-g/m^2) fiberglass cloth. As composite specialists, they investigated building the boat with ¼″ Divinycell H80 foam core, but worried that it might be too thin to "match the mechanical properties of plywood without resorting to prohibitively heavy fiberglass skins," Locker wrote. "Remember that in sandwich cored construction, stiffness of the panel goes up with the cube of the distance between skins."



COMPETITION COMPOSITES (ALL)

Above—*When CCI partners Dave Brady and Phil Locker decided to build an 18′ (5.5m) i550 sportboat designed for construction in ¼" (6mm) plywood, they tested composite panels as possible substitutes.* ***Above right—****The hand-pumped hydraulic ram pushes on the gelcoat side of a panel.* ***Right—****The first test employed a square on the back side of the panel to measure the potential oilcanning of the hull.*

To check their desired panels against the specified plywood, Locker and Brady made up four 16″ (406mm) square panels. One was plywood, and the other three, which they guessed would rival the plywood panel, were perforated and infused Divinycell H80 between fiberglass skins. Each panel was set up as a supported beam, supported on all four sides as a flat plate, and then pushed in the center by the shop's hand-pumped hydraulic ram. The test was stopped when a small amount of deflection was measured.

They tested for impact resistance by dropping a 5-lb (2.3-kg) steel rod through a tube (to keep it vertically aligned) onto the panel. Result: the plywood panel showed the most damage; the foam panels showed little effect. And for panel stiffness, the men opted for the ¼″ Divinycell panel with 12-oz biaxial E-glass, ¾-oz mat, and gelcoat on one side, and 17-oz biaxial E-glass on the other.

Locker and Brady contracted naval architect Eric Sponberg to design the carbon mast and beam for the i550, and he offered six different laminate schedules. Two tubes of each were made up and placed in a bending jig and bent until they failed. Of the laminates Locker wrote, "These were fastened into our bending jig and bent until failure, while noting deflection versus load (using the same load cell as used in the test panels described earlier). These numbers were then sent to Eric, and that's when it became apparent that while shop-built test equipment can work very well for *comparative* testing, it is a different matter to try to use it for determining *absolute* numbers. The numbers that Eric derived for Young's modulus and tensile modulus were considerably lower than the specifications sheet data. We suspected compliance in the test jig to be the culprit, and we made some adjustments to re-test one of the tubes, only to have even lower numbers as the result! Without very stable and accurate test equipment, shop testing is only comparative."

The two men decided to build the smaller 8′ (2.4m) stitch-and-glue MiniMax Sea Flea hydroplane first, before taking on the more-demanding i550. Eventually both boats were successfully completed.

Meanwhile, CCI continues to grow. A major contract was producing flat panels for a U.S. military contractor supplying portable shelter walls. Other nonmarine jobs have included components for Canadian armored military vehicles and structures for housing Honeywell International telecommunications equipment.

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