Losing Weight

Designer Tom Wylie and builder Steve Rander combined to create a super-light 77-footer using wood-foam sandwich construction
by Peter J. Marsh

Only a decade ago, carbon fiber in boats was considered “exotic.” A material associated primarily with aerospace technology, carbon fiber’s steep cost severely limited its marine applications.

High-budget racing yachts found uses for carbon in rudders, spars, space frames, and occasionally wherever the rules allowed. As this sailing “arms race” accelerated, carbon found its way into hull laminates and, once the processing techniques were perfected, the material gained acceptance by more and more boatbuilders.

Today, we appear to have reached a point where “state of the art” in racing sail means the hull is nothing less than 100% carbon or Kevlar or related advanced reinforcements. Although carbon costs may be coming down, this trend has caused a huge increase in the price of a competitive design and has rendered many of the world’s racing yachts virtually obsolete in just a few years. The growth of one-design and PHRF (handicap) fleets is a visible reaction to this trend, but it is a mass reaction rather than rational utilization of materials that is keeping the price of these boats down.

When it comes to custom work and bigger boats (those over 50’), the new standards in construction mean that few owners can compete with the super-rich. This phenomenon has been well documented in the heavily publicized races, but it also affects regional events, and is especially noticeable on the U.S. West Coast, where downwind racing for line honors in 70-footers is an established class.

A small yard located on the Columbia River in Portland, Oregon, has developed an interesting response to the carbon fiber dilemma. At Schooner Creek

Above—Fresh out of the shop at Schooner Creek Boatworks, the Wylie-designed 77’ Jelik awaits for its ballast keel. The boat’s internal structure (lower photo) stiffens a wood-composite, carbon-sheathed hull.
Her exterior hull complete, Jelik is rolled upright (right) to facilitate the application of carbon and E-glass to the inner wood laminate. The large cockpit (photos, opposite page) keeps the mainsheet trimmer clear of the belshaws and provides a centralized location for the rest of the crew. With only 24,000 lbs of full-load displacement, the Wylie 77's clean deck layout and sail-handling gear match those of a conventional boat half its size.

Boat Works, the alternative material is wood. In a recent series of four Tom Wylie-designed sailing yachts—made with wood, Gougeon Brothers' epoxy, and Klegecell foam core—Schooner Creek has demonstrated wood's potential as the original “high-tech” material.

**The Designer**

Since the 1970s, San Francisco Bay Area designer Tom Wylie has produced an eclectic portfolio of designs, including the 21' *American Express*—which introduced water ballast to the biannual Mini-Transat and won the 1979 race—and the WylieCat 30, a surprisingly fast, cat-rigged cruiser. He's also made occasional forays into grand prix racing with a series of IOR designs, and conceived a popular, 24' trailerable keelboat with minimal accommodations—the Wylie Wabbit.

In 1992 Wylie's work took a new turn when the owner-operator of Schooner Creek, Steve Rander, asked Wylie to design him a 70' ultralight high-performance cruiser for personal use. Rander wanted to build in wood-foam sandwich construction, intending to cruise with just his wife as crew. Wylie, who prefers to keep a low profile in the yachting world, took these requirements in stride and designed *Rage*.

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Rander built the boat using a wood-composite method he named the COVE system (for CORe-Veneer-Epoxy), and kept the weight down to 21,500 lbs. Her deck layout had no more gear than you'd expect to find on the average 40-footer, but Rage proceeded to demolish the Pacific Cup record (San Francisco to Hawaii) in successive races in 1994 and 1996. These triumphs led to the commission of two Wylie-designed, Schooner Creek-built 52-footers for Pacific Northwest owners, both boats being constructed of the same materials as Rage, but designed with a more typical beam-to-length ratio for all-round performance.

The Builder
Steve Rander has been building and racing wooden boats since the mid-1970s, favoring craft that employ double-diagonal epoxy construction. These molded hulls proved to be robust, so Rander began experimenting with Klegee cell coring for a proposed cruiser-racer, the 42' Magic Carpet. That experiment was an absolute success: since 1984, Magic Carpet has completed five San Francisco-to-Hawaii races, and has logged nearly 100,000 miles of hard, offshore sailing while showing no signs of structural fatigue.

By 1992, Rander was convinced that
a wood-foam-epoxy combination was the key to cost-effective raceboat construction, leading him to develop the COVE method for his 70' Rage. Subsequent use of similar COVE laminates on the two Wylie 52-footers prove this system can deliver a strong, lightweight, relatively economical semi-custom yacht.

The latest project at Schooner Creek, a line-honors 77-footer, features water ballast, a minimal interior, and some radical engineering to handle the keel loads. It has given Rander further opportunity to explore the limits of wood-composite construction.

COVE Construction

Magic Carpet was built using double-diagonal 1/4" planking sandwiching a 1/2" Klegecell core, with three spruce stringers.
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Schooner Creek prefabricated four laminated-mahogany ring frames, along with four foam-cored frames for the forward sections. These were securely tabbed to the hull and to a pair of deep wooden stringers spaced 2' apart, which run from the fo'c'sle to the cockpit. Forward of the companionway, these stringers form the base for a centerline box girder, where we find the Volvo Penta MD22 59-hp engine and saildrive, and the galvanized-steel keelbolt box and aluminum mast-step. The 58-gal fuel tank is housed in the upper, foil section of the keel, bringing all significant weight amidships.

The girder extends up to the deck and is engineered to fully distribute the loads from the keel and rig throughout the hull. Although the girder, in effect, splits the accommodations, the interior arrangement features a functional centerline galley. Port and starboard water-ballast tanks have a capacity of 3,400 lbs each, and are connected by a 6"-I.D. rapid-transfer pipe, controlled by a manually operated butterfly valve. Initial loading is achieved with an engine-driven Jabsco pump via 2"-I.D. piping. This system also serves for auxiliary bilge pumping and fire suppression. The tanks are emptied overboard through four 3"-wide "dump" ports fitted with Kevlar flaps.

Carbon vs. Wood

Rander concedes that, while it's certainly possible to build this design entirely in carbon, the cost would be astronomical and, he believes, the competitive life of the yacht would be shorter. It's interesting to note that, to avoid flexing and possible delamination in their bows, the newest of the Open 60 class of racers (the boats that competed in the latest Whitbread) no longer have foam coring in their forward sections; it is a solid carbon-fiber laminate. Laboratory tests, says Rander, in which wood is properly encapsulated in epoxy, continue to demonstrate wood's natural resilience long after carbon, Kevlar, or glass laminates have failed.

The Wylie 77's spars also emphasize cost-effective use of carbon fiber. The 87' mast is a tapered tube with a circular cross-section built by Composite Engineering (Concord, Massachusetts) with this company's triaxial braiding process—a method, Rander contends, more economical than labor-intensive, hand-layup procedures for making carbon spars. [Composite Engineering was the cover story of PBB No. 41, page 28 —Ed.]

With his building system working as well as he had hoped, Rander sees continuing potential in the COVE system; he is using it for a Wylie 42—an updated version of Magic Carpet—currently under construction. "The carbon fiber could be replaced by less costly E-glass in less weight-sensitive designs," Rander points out. "But the best part of the concept is that wood is easier to work with and also has great resistance to fatigue. When built with modern resins, wooden boats can enjoy a very long life."

About the Author: Born and raised in England, Peter Marsh worked with designer-bUILDER Derek Kelkall on early sandwich construction. In 1973 Peter moved to the U.S., where he has cruised extensively in small craft and is now a freelance writer on the West Coast.

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