Good Old Boat

The sailing magazine for the rest of us!

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This issue

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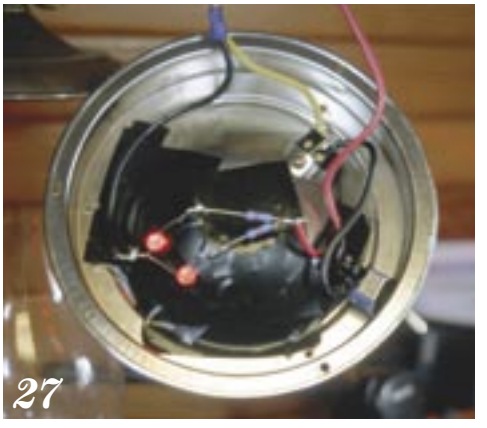

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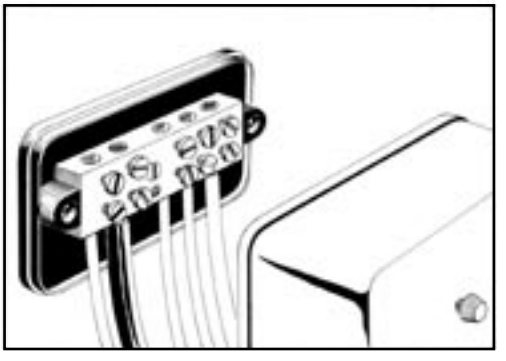

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Our contributors

Ed Lawrence (*Precision 23*, Page 4) is a contributing editor with *Good Old Boat*. He writes about boats and off-beat subjects for several national magazines. He and his wife, Judy, sail a San Juan 23.

Marianne Scott (*Bill Lee: wizard of speed*, Page 9) started writing about marine subjects when she and her husband, David, sailed from Victoria, British Columbia, to Bora Bora on their good old boat, *Starkindred*, a Niagara 35. She's the author of *Naturally Salty — Coastal Characters of the Pacific Northwest.*

Gregg Nestor (*The trailersailer's galley*, Page 13; *Simple solutions: Tongue extender*, Page 85) is a contributing editor with *Good Old Boat*. More than 20 years and four boats ago, he discovered sailing and has been an avid "trailersailor" ever since. He and his wife, Joyce, sail an O'Day 222, *Splash*.

Gerry McGowan (*Replacing that cabin sole*, Page 16) started sailing when a skiing accident ended that passion and caused him to hobble to a neighbor's 10-foot sailing dinghy. A series of 11 sailboats from 9 to 46 feet brought him and his wife, Marolyn, to their 1978 Nor'West 33, *Sailor's Joy*.

Philip Allum (*Camper & Nicholsons*, Page 21) hails from the east coast of England. He's been sailing since his parents started him off with an 11-foot sailing dinghy, at the age of 12. He has since owned a variety of boats, ranging from racing dinghies, Dragons, and small offshore racers to traditional smacks, ketches, and schooners. His present boat is a 1965 Nicholson 32, *Cymbeline*.

Greg Delezynski (*Lightening up*, Page 27), and his wife, Jill, are liveaboards on *Guenevere*, the Nor'Sea 27 featured in *Good Old Boat* in November 2002. They plan to cut the docklines soon and are counting the days and hours until they begin a South Pacific cruise.

Nathaniel Poole (*Two-stroke vs. four-stroke*, Page 30) grew up as a liveaboard in California. He discovered wooden boats and fell in love with carpentry and other traditional craft. He sails a Thunderbird.

Ted Brewer (*How much power?* Page 32) is a contributing editor with *Good Old Boat* and one of North America's best-known yacht designers. He also is the man who designed scores of good old boats…the ones still sailing after all these years.

Dave Martin (*Maintaining the pulse*, Page 35) is a contributing editor with *Good Old Boat*. In the early 1980s, he spent two years sailing his Cal 25, *Martini*, from Seattle to New York City, via the Panama Canal. Between 1988 and 1995, Dave and his wife, Jaja, circumnavigated aboard that Cal. Between 1998 and 2002, the Martins, along with their three children, voyaged to the Arctic aboard their 33-footer, *Driver*.

Bill Sandifer (*Nimble 24*, Page 36) is a contributing editor with *Good Old Boat* and a marine surveyor and boatbuilder who has been living, eating, and sleeping boats since the early '50s when he assisted at Pete Layton's Boat Shop. He and his wife, Genie, sail an Eastward Ho 32.

Larry Zeitlin (*A disappearing breed*, Page 40) says his professional career and his personal life have been primarily focused on boats and boating. These days he and his wife, Maggie, sail the East Coast on *Puffin*, their Willard Horizon motorsailer.

Stiv Wilson (*My boat is a she*, Page 44) lives in Portland, Oregon, where he writes for the *Willamette Week* and is a frequent contributor to other journals. He sails his 1947 Johnson Y when he can.

Don Launer (*Fiberglass 101*, Page 46) is a *Good Old Boat* contributing editor. He has held a USCG captain's license for more than 20 years. He built his two-masted schooner, *Delphinus*, from a bare hull and sails her on the East Coast from his home on Barnegat Bay in New Jersey.

Gary Miller (*Photo spread: New York! New York!*, Page 48) has been sailing, photographing, and writing about boats since he was a staffer at *Motor Boating & Sailing* magazine back in the Pleistocene era. After a career as a corporate photographer, he's getting back into boats and loving it.

John Vigor (*The fifth essential*, Page 50), copy editor for *Good Old Boat*, is refitting his Cape Dory 27, *Sangoma*, for sailing in Puget Sound and the San Juans. He is the author of many marine books. The newest is *How to Rename Your Boat…and 19 Other Useful Ceremonies, Superstitions, Prayers, Rituals, and Curses.*

Theresa Fort (*The right interior fabric*, Page 53) is a contributing editor with *Good Old Boat*. Until recently, Theresa and family lived and cruised aboard *Lindsay Christine*, a Mercator Offshore 30. The kids have been growing lately, however, and *Lindsay Christine* has been replaced by *Coquette*, a Van de Stadt Agulhas 12.5 meter.

Jim Morrison (*Fighting fire*, Page 58) worked as a fire protection specialist for 31 years before he and his wife retired to live near their boat on the Kitsap Peninsula. Although Jim raced one-designs most of his life, he and his wife, Julie, now mostly cruise the Northwest waters in their 1976 Ericson 29.

John Butler (*Dancing the electrical two-step*, Page 66) was a Coast Guard search and rescue pilot. He retired as a commander in 1974 and now lives with his wife, Mary Lu, on Beaver Lake in Northwest Arkansas and sails a 1963 Cape Cod Catboat whenever he gets the chance.

Tor Pinney (*Simple solutions: Springing the rode*, Page 81) is a cruising sailor and writer. His articles appear often in boating magazines around the world. Tor is the author of *Ready for Sea! — How to Outfit the Modern Cruising Sailboat.*

Alan Lucas (*Simple solutions: Electrical first aid*, Page 83), an Australian from New South Wales, has been cruising for 40 years, primarily south of the equator. Alan is the author of several Australian cruising guides.

Harry Brunken (*Simple solutions: Fixing leaky ports*, Page 84) has been a sailor and marine engineer for more than 40 years. He has maintained and upgraded two wooden and four fiberglass sloops. He'd like to hear from anyone attempting the window leak repair method described in this issue (941-927-3370).

Dyke Williams (*Quick and easy: Dripless ice*, Page 87) fell in love at the age of 10. The object of his affection was a 1930s varnished cedar lapstrake International 14. He then raced 14s all over the United States. along with Finns, Lasers, Flying Dutchmen, 505s, DN iceboats, Ensigns, and J/22s. These days he cruises on a Little Harbor.

Michael Hewitt (*Quick and easy: Traveling light*, Page 88) lives in Tucson, Arizona, perhaps the worst place to be a sailor (he says). Fortunately, only 400 miles west is San Diego, where he keeps his Valiant 32, *Concordia*. Michael was smitten with the 32 after reading a feature article about Valiant in *Good Old Boat* (March 1999).

Garry Prater (*Reflections: A sailor's dream*, Page 97) once escaped to the sea for three years aboard *Rosebud*, a 28-foot sloop he completed from a bare hull and deck. He's currently stoking the cruising kitty while dreaming of an escape to the Caribbean aboard *Rosita*, an Allied Princess 36.

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About the cover . . .

Gary Miller went out of his way for this photo: up the mast of the *Clearwater*, the "de facto official boat of the Hudson River," as he puts it. The wind was blowing 35 knots that day. For more of Gary's photos, see Pages 48 and 49.

Welcome aboard!

Dave Martin, outstanding seaman, shares his experience with readers

OUR NEWEST CONTRIBUTING EDITOR, Dave Martin, was a good old boater long before the term was invented. His affinity for sailboats began at age 7, when his father bought a Cal 25. It was strengthened in 1983 when Dave and his dad left Seattle to cruise north around Vancouver Island, south to the Panama Canal, east to the Caribbean, north to Rhode Island, and south to Florida.

By then his dad had lived his cruising dream. Dave began his own dream on that Cal, cruising the Bahamas and, when the cruising funds ran out, heading to New York for a job in Ralph Naranjo's Sewanhaka Boat Yard.

The Cal had already done more cruising than ever was intended for a coastal cruiser, and it had developed structural problems. That's when Dave became a good old boater. He decided to fix the boat he owned rather than work for decades to buy another. He gutted it, reinforced the hull, and decreased the size of the overlarge cockpit. Of this refit, Ralph Naranjo wrote, "I watched Dave transform a stock Cal 25 into a cutter-rigged cruising boat with the structural integrity of a Niagara Falls barrel."

Two years later, Dave finished the project and set sail for the Caribbean. In St. John, U.S. Virgin Islands, Dave met Jaja, who'd grown up sailing on the East Coast and was teaching sailing at a beachfront hotel. The tourist season ended, and Jaja left for a commitment in Japan. Dave sailed to England.

Jaja recalls: "Sailing was no fun alone, Dave wrote, and if I would come to England, he thought we could make a great team sailing together . . . I caught a plane to England. Dave met me at the airport, and I moved aboard. As we were sailing down the Solent in a gale, Dave proposed to me."

They were married in Barbados and have indeed made a great team whose saga has been followed by the readers of *Cruising World* since 1995, when the couple was awarded the magazine's Medal for Outstanding Seamanship. In explaining their selection of the Martins that year, Quentin Warren wrote, ". . . the innate ability to transform a small coastal cruiser into a vessel capable of taking two toddlers and their intrepid parents bare-poled across the Indian Ocean without so much as minor gear failure . . . amounts to consummate preparation and impressive boat handling."

Toddlers? Chris was born in Australia in 1990. Holly joined them in 1991 in New Zealand. Teiga was delivered aboard *Direction* in 1996 after they'd completed their circumnavigation and had settled briefly in North Carolina. "The only major gear failure we suffered during our years of bluewater sailing was in the birth-control department," Dave quips.

That 25-footer was clearly too small, so the Martins found a 33-foot steel hull. In 18 months Dave gutted the interior and rebuilt it. As a five-some, they were off again, on a shakedown cruise to the Bahamas. They left there in the spring of 1998 bound for Bermuda and ultimately Iceland. This story is told in their wonderful book, *Into the Light*. They liked Iceland so much they wintered over, living aboard and sending their children to the local school. They headed for Norway the following spring. There again they wintered over not far from the Arctic Circle. For now, the Martins have settled in Maine, where the children have a bit more room to run.

We're delighted to welcome Dave as a contributing editor. That title means you'll be seeing his articles regularly. He joins an already high-powered group of sailing writers. We look forward to ongoing contributions by Dave Martin, who thinks outside the box and calls it as he sees it. He is likely to delight and occasionally dismay us.

Welcome aboard, Dave.

Karen Larson

Precision 23

Nearly 20 years in production, and this centerboard cruiser is still going strong

by Ed Lawrence

Given the choice, I'd rather test boats when the sun is shining, the temperature is in the 70s, and the wind is blowing. So when those conditions appeared on the day I was scheduled to test the Precision 23, I donned shorts and a T-shirt, laid on the sunscreen, and headed for the Buffalo Bill Reservoir near Cody, Wyoming, with a smile on my face.

The reservoir may not be San Francisco Bay, but wind is wind and water is water, and we had the entire 8,000-square-acre patch to ourselves except for a handful of retirees on the beach guarding fishing poles and bottles of Bud. Filled by the North Fork of the Shoshone River flowing from Yellowstone National Park, the reservoir provides plenty of swirling wind during summer months and room enough for a 23-footer to stretch her legs on a downwind run.

My hosts were owners Carol Jackson and Chris Allen, residents of Red Lodge, Montana, a 50-mile jaunt from their favorite cruising ground. On this day, Carol was a schoolteacher playing hooky. She grew up as a cowgirl on a family-operated ranch that runs cattle drives between northern Wyoming and southeastern Montana. Her introduction to sailing occurred when she and Chris crossed paths in Indonesia.

Chris, a self-described wanderer before finally enrolling in college at age 32, had migrated to Indonesia to take his first real job as a high-level manager with a mining company. After years in the corporate world, he is now consulting, and in between paid jobs he says he is "making up for 15 years of no sailing by spending most summer days on the water."

On the beat

Initially sailing with a full mainsail and jib, the Precision beat to weather under Chris' steady hand on the tiller while Carol trimmed sails and soaked up Vitamin D. In moderate winds the Precision sails at 4 to 4.5 knots and tracks well with just enough helm to keep the skipper on his toes. She easily tacks through 90-degrees and accelerates quickly after every turn, reaching 5 to 5.5 knots with sheets eased.

However, the easy sailing disappeared when afternoon thermals produced 15- to 25-knot winds and 3- to 4-foot waves that extended from one end of the lake to the other. A characteristic of the boat is that when windspeed exceeds 15 knots, it's time to tuck a reef into the main, and when it pipes up into the mid-20s, the jib works best from the inside of a sailbag.

Nonetheless, though we beat and slammed to weather, she was very manageable, her helm light and responsive, except when a 4-foot wave elevated her bow more than 45 degrees above the horizon. With the mainsheet

Chris Allen and Carol Jackson's Precision 23, *Amamapare*, adds a taste of salt water to the desert hills of the Buffalo Bill Reservoir in Wyoming, above, and at top of facing page. Precision Boat Works founders, brothers Bill and Richard Porter, at the factory in Palmetto, Florida, below on facing page.

"…when windspeed exceeds 15 knots, it's time to tuck a reef into the main, and when it pipes up into the mid-20s, the jib works best from the inside of a sailbag."

cleated near his fingertips on the backstay, Chris was able to quickly ease the sheet when she felt overpowered. On a beat, her flared topsides deflected most of the waves, except the rare rogue that found its way onto the deck. Sailing downwind, the ride was faster but bumpy. I bet she'd surf down the waves under spinnaker.

The company

Now celebrating their silver anniversary year as the owners of Precision Boat Works, Inc., in Palmetto, Florida, brothers Bill and Richard Porter have unceremoniously and unobtrusively carved a niche in the boatbuilding world that, like clockwork, results in the production of 140 new vessels every year. (Actually, with business up 16 percent this year, they'll do more.) More than 3,000 14- to 28-footers have been completed since they opened the doors for business. During my tour of the factory on Florida's west coast, Precision 23 hull #500 was in the mold being readied for completion.

Interestingly, the brothers' sales accomplishments have been produced by a distribution system that fluctuates between 25 and 35 dealers, most located east of the Mississippi River, and virtually zero advertising in the glossy magazines. Word of mouth among happy owners is a major contributor.

Following childhoods spent in Detroit, and after disdaining academia, the brothers, now in their 50s, gravitated to southern Florida. As Bill says, "We began our careers as boatbuilders not as the owners of a boatbuilding company." They eventually found a home at Hidden Harbor Yachts, the manufacturer of the Seaforth sloop. During their tenure there, they established a reputation as the builders of high-quality molds, among the most critical ingredients in the construction of a boat. When that company went out of business, the brothers purchased the molds and started their own firm. "We started in 1978 with the idea of bringing sailing to the average person," Richard says.

Eventually crossing paths with Jim Taylor, they began the first of the new breed of Precision yachts with an 18-footer introduced in 1984. Other similar keel-centerboard weekender-style boats (including a cabin) included the 21 and the 23. The most recent of the company's Taylor designs is the Precision 185, which is a high-performance daysailer.

Never far from the shop floor — "we're not the type to sit in a second-story office and watch the workers," Richard says — they both spend five to six hours a day overseeing the construction of new boats, assisting their crew, and training workers to do things the Precision way.

The company also manufactures Steve Colgate's well-known daysailer, the Colgate 26, a zippy learning platform for newcomers to sailing. It has produced 200 of that model, including a fleet used for training purposes at the U.S. Naval Academy.

The design

Despite her age, the Precision 23 has as much curb appeal as the most recently designed sloops on the market. The underlying theory of Jim Taylor's boat design as it related to Precision yachts is that "fast is fun, we want quality, and they should be easy to build." That this 1980s design still looks as fresh as many New Millennium production boats is a testament to the fine eye and skill of the noted naval architect, who fashioned designs for the Precision 18, predecessor to the 23, and the 28, her big sister.

Of the Porters, Jim says, "to their everlasting credit, Precision Boat Works has always eschewed flash-in-the-pan gimmickry in favor of structural integrity and long-term functionality."

Jim Taylor began his career by spending five years in the Ted Hood design office. He was involved in the 1974 and 1977 America's Cup, working on Hood's *Independence* and the reconfigured *Courageous* that Ted Turner drove to victory in 1979. After opening a solo practice, he produced a fleet of 40-footers in the 1980s that were designed to the emerging Inter-

national Measurement System (IMS) rule and was a member of the design team on Bill Koch's winning *America*^{3} Cup effort. He also designs production boats for Sabre, including the 386, a traditional-looking cruiser with a contemporary underbody.

Jim's challenge from the Porters was to provide the trailerability of the 18-footer while adding a cruiser aspect to the bigger boat. "We wanted the biggest trailerable cruiser possible, a 'maxi-trailerable,'" he says. Coming on the heels of the 1980s fuel shortage and a (short) period during which auto manufacturers were more interested in producing small, fuel-efficient vehicles than SUVs, matching boat weight to towing capacity was added to the mix. However, he managed to design a craft that displaces only 2,450 pounds, so is towable by a typical family sedan or half-ton pickup.

"Jim's challenge from the Porters was to provide the trailerability … 'We wanted the biggest trailerable cruiser possible, a "maxi-trailerable," ' he says."

Careful refinement

The hull represents "a very careful refinement of the basic form that has proven successful in other trailerables," Jim says. She sports a fractional rig that, except on a scattering of raceboats, was unusual at the time. The sail plan is "fairly simple," he says, though inboard chainplates improve sheeting angles.

A "racer-sharp waterline entry, which we learned really does carve through waves, is augmented by flare in the topsides," he notes. That keeps the crew dry in gnarly conditions. The boat also has "powerful quarters that taper to a shapely and relatively small transom." The underbody is the product of tinkering he did with his personal craft, a 23-footer that he successfully raced in MORC and Mini-Ton racing divisions. On the circuit, the Precision 23 PHRF rating is 220 to 225, depending upon the locale.

"We wanted to produce a well-balanced boat with good fore-and-aft distribution forward so that when she's heeled, the bow does not go down, which stalls the rudder. She's not cranky when heeled," Jim says.

Having learned the intricacies of

Chris Allen and Carol Jackson prepare to launch *Amamapare* for a day on the water, above. Carol prepares the sail, at left, and Chris checks the windspeed, at right.

The Precision 23's uncluttered bow, at left. The boat's cockpit, at right, contains a sail locker and an open-sided fuel-tank-storage locker.

centerboards during his tenure with Hood, Jim's design for the keel incorporates 850 pounds of inboard ballast and a relatively light, 85-pound centerboard that tucks into the hull when on the trailer.

"Heavy centerboards require a lot of machinery to operate and don't produce boats that sail well with the centerboard up," he says. Since the centerboard on the Precision 23 is primarily a lifting foil, it contributes to weather performance, but does not produce a boat that spins out with the board up.

"Another requirement was that she be open and stylish," Jim says. To that end, chainplates and genoa track were moved from the rail to the side of the cabin, a move that allowed the house to be moved outboard, creating space belowdecks, while still leaving a deck wide enough to allow crew to move forward easily. As a result, "the seating area in the main saloon produces comfortable backrests and plenty of headroom when seated," he adds.

Construction

One of the large financial institutions recently developed a slogan to attract new investors: "We make money the old-fashioned way. We earn it." The same could be said of the construction methods employed at Precision by the Porters as they oversee the day-to-day activities of a year-round workforce of 20 employees.

As Richard says of the construction process, "Jim Taylor designs boats that go together well, so our workforce doesn't have to be acrobatic in order to lay up a boat. Since we're using and maintaining our own tooling, the product is consistent." Sticklers for detail, Richard carefully monitors the lamination process, and each boat must pass Bill's quality-control inspection before going out the door.

"We don't ship a boat until we're happy with it," Bill says.

Hulls are constructed of hand-laid fiberglass. As Bart Bleil, the firm's sales manager, says, "We don't even *own* a chopper gun." Vinylester resins are employed in the skin coat on most recently constructed boats; early models were constructed using a polyester resin, although at that time the company offered an epoxy barrier coat for sailors concerned about blistering of boats that were wet-sailed.

The layup includes woven roving on the hull with two additional layers below the waterline that overlap 12 inches on both sides of the centerline. The thinnest sections are a combination of 1.5-ounce mat, 24-ounce roving, and another layer of 1.5-ounce mat. The cabinroof is a foam-cored sandwich with Divinycell or Klegecell inlaid between three layers of 1.5-ounce mat; extra roving is added along the rail and in high-stress areas.

The hull liner is integral to the structure, replacing the old-fashioned method of laying beams and stringers, and extends to the sheer clamp, where it is sandwiched between the deck and hull flanges. It is bonded with 3M 5200 and bolted to form the hull-to-deck joint. My survey of used boats reflected only one owner who experienced a leak at the joint; odds are that was caused by a bonding compound that deteriorated with age.

From a historical standpoint, the extra time and care taken to build each boat have resulted in a mostly happy fleet of owners.

Precision 23

Designer: Jim Taylor
LOA: 23 feet 5 inches
LWL: 20 feet 0 inches
Beam: 8 feet 6 inches
Draft: 1 foot 11 inches/5 feet 4 inches
Sail area: 248 square feet
Displacement: 2,450 pounds
Ballast: 850 pounds
Trailer: 1,000 pounds

Cockpit and deck layout

Sailing the boat is a simple matter of pulling a string here, turning a winch there, and managing the tiller . . . unless the wind pipes above 15 knots or you're flying a spinnaker. The length of the cockpit at seat height is 7 feet, so there's plenty of room for four adults.

The cockpit is equipped with two primary winches that were initially installed too far forward to be easily reached by the helmsman; these were relocated further aft in newer boats, an improvement.

My only complaint about the layout of gear is the location of the Harken 4:1 mainsheet at the end of the boom, which is sheeted to a cam cleat on the backstay. Though that allows the helmsman to control the sail, the angle

The interior of the Precision 23 makes good use of space by omitting most of the forward bulkhead. Cabin headroom is 54 inches.

of the sheet does not allow the mainsail to be trimmed for maximum performance, a condition that will be of little importance to most sailors. A mid-cockpit traveler is not an option since it would be a nuisance for most sailors, so the best alternative is the addition of a vang, which will improve sail trim.

There's a sail locker in the cockpit, as well as an open-sided fuel-tank-storage locker that is large enough to stow a 12-inch x 24-inch x 9-inch-high fuel tank.

Belowdecks

One of the appeals of this boat is that the designer managed to maximize space belowdecks without altering the hull shape, perhaps sacrificing performance in the process. Moving the chainplates inboard increased interior volume, and cutting away the middle section of the forward bulkhead created a visual sightline from companionway to bow. The V-berth, which measures 77 inches on the centerline, is enclosed by a privacy curtain, as much privacy as can be expected on a 23-footer. Cabin headroom is 54 inches, and aft berths are 73 inches and 138 inches long (for sleeping head-to-head).

"During my tour of the factory on Florida's west coast, Precision 23 hull #500 was in the mold being readied for completion."

Settees port and starboard amidships provide comfortable seating. The galley, equipped with a small stainless sink, two-burner alcohol stove, and room for a 48-quart ice chest, is large enough for camper sailing. Accent pieces are nicely finished teak plywood, a headliner constructed of a polypropylene fabric that is mold resistant, and 3-inch-thick cushions protected with Scotchguard.

Pricing

New boats sold in 1984 for $18,415 from the factory. Base boats, with sails and all standard equipment, have a suggested retail price today of $23,195. A trailer, which adds $3,695 to the price, was specifically designed by Richard to locate trailer bunks in a fashion that does not put stress on the hull. A welcome addition to the trailer is a standard mast-raising winch system mounted on the tongue that makes hoisting the rig a snap.

Conclusion

Bottom line: nearly 20 years after noted yacht designer Jim Taylor completed the design for this little number, she's still in production and very competitive with similar boats on the market.

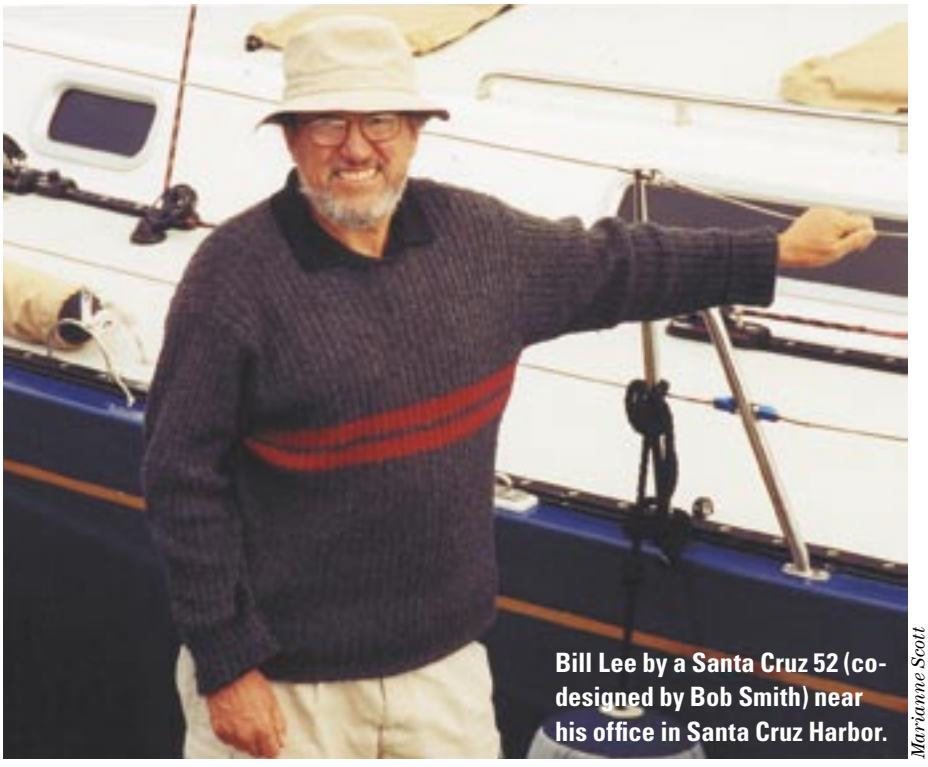
Resources

Precision Boat Works
1511 18th Avenue Drive E.
Palmetto, FL 34221
941-722-6601
<http://www.precisionboatworks.com>

Owner comments

Here are the comments of Precision 23 owners from all points of the compass, including Florida, the Chesapeake, Maine, Great Lakes, lakes in Kansas and Oklahoma, Texas, and Vancouver, British Columbia:

"I sail on weekends with my wife and a 100-pound Labrador retriever…Over four in the cockpit becomes uncomfortable…Not much of a galley…I've sailed in 25-knot winds and 3-foot seas. I was uncomfortable but not scared …Good compromise between all-out performance, trailerability, and cruising accommodations…Sail one and you will fall in love with her…I have sailed in 50-mph winds with 6-foot waves with a double-reefed main only. Progress was slow and wet, but we were under control and making headway…This is the biggest, easy-to-launch-and-retrieve boat two people can handle easily…Leaky ports and chainplates are to be expected. The key is timely maintenance lest you be faced with replacing a bulkhead, as I was."



Bill Lee by a Santa Cruz 52 (co-designed by Bob Smith) near his office in Santa Cruz Harbor.

Marianne Scott

Reducing the black art of design to light weight and long waterline

by Marianne Scott

Bill Lee, wizard of speed

Bill Lee, who introduced ultralights into the sailboat race circuit in the 1970s, calls designing racing sailboats a "black art." Commenting on the collapse of the carbon fiber mast on Team New Zealand during the last America's Cup races in Hauraki Gulf, he says the designers pushed the safety limits past the breaking point.

"How close you can get to safety's edge without failure is always the question," the Hall of Fame designer explains in his Wizard Yachts brokerage office in Santa Cruz, California. "Building light, but strong, is the issue. And building today's carbon parts is trickier than using more traditional materials. The orientation of the carbon fibers, their straightness, the resin mix and cure temperature … all these are important. You can experiment with those materials in the lab, but if there's the slightest disconnect in the shop, masts and booms fracture."

In his own designs, which focused on ultralight-displacement boats (ULDBs), Bill believes he always stayed within the structural safety margin. "Few of my boats had failures," he says. His approach to sailing became his motto: "Fast is fun," a philosophy shared by other revolutionary designers like Hobie Alter, who equated his fast catamarans with "fun on the water," and contemporary designers like George Olson and Ron Moore.

" 'How close you can get to safety's edge without failure is always the question … Building light, but strong, is the issue.' "

Bill Lee's brokerage is located in a two-story clapboard building on the edge of Santa Cruz Harbor; his two-room office overlooks a conglomeration of sailboat masts, their halyards making their percussive music in the Pacific breeze. As is typical of California, greenery and flowers are profuse. The houses across the street are as jammed together as in an old-fashioned European village, albeit with a wonderful view of the ocean. One house is listed for sale at $1.6 million — an indication of just how desirable Santa Cruz is as a place to live.

Bill is wearing his trademark red socks and has brought his friendly black dog to work. His bike hangs from ceiling hooks, and a massive painting by Jim DeWitt of *Merlin*, Bill's signature yacht, hangs above his untidy desk. Bill is known as an offbeat person as well as an iconoclastic boat designer, with a different cut to his jib, not an easy person to talk with.

Magician's hat

The term "black art" seems to be part of Bill's personal and professional life.

He refers to himself in the third person as the "Wizard" and often appears in a magician's hat and a cape covered in stars. Photos from the past and today depict his bearded visage with thick, horn-rimmed glasses that magnify his eyes into bulging globes. His nonconformist approach to boat design, which disdained the "deformities" imposed by the IOR rule and concentrated instead on creating fast boats, was seen by some as demonic, by others as enchanted.

Yet by breaking the bonds of conventional wisdom and standard design rules, he broadened people's minds on the outside limits of fast boats. As fellow yacht designer Robert Perry says, "Bill just refused to be drawn into the B.S. of letting others tell him what a boat should be."

In 1971, calling his firm Bill Lee Custom Racing Yachts, Bill built his first racer, called *Magic*, a 30-footer cored with balsa and weighing only 2,500 pounds. Bill has described it as "too light" and resembling a longish sailboard. Next, he designed and built a 35-footer, *Witchcraft*, which sailed the South Pacific. After accompanying an owner on a Cal 40 in the 1971 Transpac, he received a commission for a faster boat for the 1973 race. He built two boats, the 40-foot *Panache* and the 35-foot *Chutzpah*, which both entered the next Transpac race. The latter took corrected-time honors in 1973 and 1975.

"Bill's personal favorite, the one that made his name synonymous with dash — some say rash — was **Merlin**, *68 feet long, 12 feet wide, and weighing only 25,000 pounds . . . with speeds topping out at 25 knots."*

But the innovative, long and skinny "sled" that's still Bill's personal favorite, the one that made his name synonymous with dash — some say rash — was *Merlin*, 68 feet long, 12 feet wide, and weighing only 25,000 pounds (about half of other 68s at that time), with speeds topping out at 25 knots. In 1977, he himself tested this radical boat in the first singlehanded race to the Farallon Islands and won it easily. Later that year, the boat he named after the sorcerer of Arthurian legend outsailed every other boat in the 1977 Transpac by completing the race in a record-breaking 8 days, 11 hours, and 1 minute. Bill arrived in Honolulu to tumultuous acclaim and, for the first time, wore his star-covered magician's robes — a most unyachtie outfit.

Aerial photograph

Merlin won the Transpac again in 1981, 1987, and 1995. On Bill's website <http://www.fastisfun.com>, a 1977 aerial photograph shows the yacht running with main, jib, and spinnaker fully deployed but the bow wave nearly submerging the hull and superstructure — a submarine with sails. "Just one boat winning this most competitive race over a 20-year period says a lot," says former Santa Cruz production manager Stewart Waring (now at the Westlawn Institute of Marine Technology). "With *Merlin*, Lee was ahead of his time. And with this pioneering boat he rejuvenated the Transpac."

The boat's success eventually led to Bill's being named "Sailor of the Decade 1977-1987" by *Latitude 38* magazine and his elevation to *Sailing World's* Hall of Fame in 1992. *Merlin* was chartered by a number of racers over the years and remained the boat to beat. It's been sold and altered several times and was for sale at Bill's brokerage for $219,000 when this article went to press.

Giant Slayer, **a Santa Cruz 27, adds a colorful accent to Mt. Rainier.**

Sean Trew

The fast racing sleds were not Bill's first designs, however. In 1973, a customer walked into his shop (a 200-foot converted chicken coop, which itself grew famous — or notorious — over the next decades) and asked for an IOR Quarter-Tonner like *Chutzpah*, but in a size he could afford. After studying the racing rules, Bill drew the ultralight Santa Cruz 27 with its 24-foot waterline and 8-foot beam. Its slimness and flat, almost dinghy-like, bottom contrasted markedly with the bulbous, beamy IOR boats in vogue at the time. "Racing rules have 'go-slow' factors in them that improve handicaps but reduce speed," says Bill. "I eliminated the go-slow factors."

Under the right conditions, the boat can surf in mid-teen speeds. He liked his 27 so much — as did several of his employees, including yacht designer George Olson — that the idea for a production boat bubbled up, and tooling for this one-design class was created. Constructed of roving, mat, and balsa core, the first hull was aptly called *Vanishing Point* and, although it had a modest 400 square feet of sail area, it could surf in 15 knots of wind. Several owners have singlehanded their 27s from California to Hawaii. Bill calls the 27 a "breakthrough boat, quite conservative, structurally sound, and easy to sail."

Downwind race

Over the next five years, Bill built 145 Santa Cruz 27s. They became especially popular in the 225-mile Santa Cruz-to-Santa Barbara downwind race, which passes Point Sur and Point Conception, two of the roughest spots on the California coast. To survive the challenges, Bill states he designed the boats to be strong, seaworthy, and offshore capable, with a small self-bailing cockpit, low freeboard, small hatch, and functional — albeit Spartan — accommodations below. "I had some very wild and exciting rides on this course in a Santa Cruz 27," says Bill. "We learned the answer to the question, 'How fast can you go in the middle of the night in 35 knots of wind and 15-foot breaking seas?' Well, just wear your safety harness and be sure to take your spinnaker down before Mother Nature does it for you."

This highly successful boat is still racing in three fleets: the Pacific Northwest group in Puget Sound and the California fleets in San Francisco Bay and Santa Cruz. The 2003 National Championships were held at Port Townsend, Washington; the 2004 National Championships will be held in San Francisco in August. And in 1997, the SC 27 was inducted into the American Sailboat Hall of Fame. Interestingly, the boat's base price in 1975 was $8,995; today the prices for used boats listed at the SC 27 National Association's website range from $5,000 to $19,500.

" 'Racing rules have "go-slow" factors in them that improve handicaps but reduce speed,' says Bill. 'I eliminated the go-slow factors.' "

Santa Cruz 27 offspring

The SC 27 also had offspring. Hobie Alter says that before he designed his monohull Hobie 33, his company bought a SC 27 and analyzed the boat to learn how she could go so fast. "Bill did a great job," Hobie says. "We knew this boat was the forerunner of the downhill sled. We raced it against another lightweight design, the Olson 30." On his website, Bill makes a wry comment on the Hobie knockoff. "The Santa Cruz 27 is a much better boat," he writes, "and they should have come to the Wizard in the first place."

Bill's love of the water and boats was not part of family tradition. Both his parents were reared in Idaho, and Bill was born there in 1942 in Coeur d'Alene. He remembers being on a boat on an Idaho lake when he was just a tyke, but his real introduction to boating came when the family, with its four offspring, moved to California after World War II. "My father was in law, and the economic opportunities were just so much better in California," says Bill. "I became interested in boats as soon as I was old enough to notice them. We were in Newport Beach, and next door Costa Mesa was an enclave for boatbuilding: Islanders, Cals, Columbias, and Ericsons were all being constructed there. I was surrounded by boats."

Like many salty characters, teenaged Bill got his weather legs in the Sea Scouts. He recalls that many postwar Navy veterans were more interested in powerboating, but he got into "the dinghy racing business." First to test his mettle were the Lehman 10s, fiberglass catboats designed and built by Barney Lehman in the 1950s.

During this time, Bill also acquired a taste for bigger boats. "I'd go around the docks," he says with a small grin, "and chat people up. Throughout high school I'd get rides on every kind of racing and cruising sailboat. Great experience." After high school, he enrolled at California Polytechnic State University in San Luis Obispo, studying mechanical engineering because "that's what I had a feel for." He graduated in 1965.

During his first job at the Mare Island Naval Shipyard about 20 miles northeast of San Francisco, he built submarine parts. He then performed stress and weight analysis for armored personnel carriers for agriculture and chemical giant FMC Corporation, experience that aided him later in his boat design calculations. He also did a stint working in the food machinery industry. By 1968, he'd moved to Santa Cruz and taken a job with Sylvania. But all along, he "tagged along sailing on other people's boats and participating in the Wednesday night races."

Yacht design career

While racing and hanging around docks, he continually analyzed how boats were built, how they sailed, and what impeded their swiftness. Although he never formally studied yacht design, his mechanical engineering training, combined with reading and discussing design with others obsessed with speed, led naturally to his seeking a career in yacht design. The opportunity came after sailing his first Transpac in 1971, on Art Biehl's Cal 40, *Quasar*. He received the commission to design *Chutzpah*.

Unfortunately, Bill was not aboard that boat. "I came in tenth and missed the best parties," sighs Bill, who's renowned for his enjoyment of social events and their grog rations. "That's why I designed *Merlin*, to get there in time for the parties," he continues, his tongue only partly in cheek. "The Santa Cruz 27s were the way to pay for it. It was good to be in the boatbuilding business, better than, say, filling teeth."

Nevertheless, it wasn't all smooth sailing. Bill had fun building boats, but he had to be a businessman too.

"The government makes it expensive to have employees, and I had to meet payroll for up to 40 people every two weeks. So after keeping *Merlin* for five years, I sold her. She was expensive to maintain. It had turned into a question of the fun-to-dollars ratio." He turned to building other fast boats. From the Santa Cruz 27, he leapt to a 50-footer, of which 27 were built. Fifteen 40-footers were also completed. The Santa Cruz 33 was another, less-successful design. In 1983, Bill began a series of 70-footers that became a racing class. One of the 20 built became a cruiser; the other 19 were dedicated racers, first competing on the California coast, then moving to the Great Lakes with fleets in Chicago and Detroit.

Maximum waterline

In his ads, Bill described his 70-footer in these words: "We took all of the fast things we knew about and blended them as gracefully as possible with the IOR rule — no bumps, no hollows; just maximum waterline, maximum power to carry sail, minimum wetted surface, and instant boat speed. Just add water. Heavy wind, light wind, upwind, and of course downwind, these new flyers easily do a horizon job on what used to be thought of as fast yachts." He added that sailing these sleds will "give you that well-justified feeling of superiority."

" 'We all owe Bill a debt. Any sailor who doesn't revere Bill Lee hasn't done his homework.' "

In 1983, Bill married Lu, whom he'd met on a sailboat. They have an 18-year-old daughter, Hillary.

Throughout the 1980s he continued to build boats and race, and in 1992 he and Bob Smith co-designed the Santa Cruz 52, which turned out to be another triumph and was named *Cruising World* magazine's 1996 Overall Boat of the Year. It was also the first Santa Cruz that combined cruising and racing elements, even including a proper stateroom with berths. Unfortunately, the success of the 52, of which 28 have been built, did not benefit Bill.

The story of what happened to Bill Lee Yachts and why the firm closed its doors remains sketchy. Bill is vague about the event, saying simply that it was time to move on. According to one source, disputes with an owner over the change orders of a Santa Cruz 70 led to nasty lawsuits in 1994. To avoid bankruptcy, Bill closed down his production facility. When an offer to buy the firm came from San Diego resident Paul Ely, Bill sold the plant.

Running a brokerage

With his boatbuilding days evidently behind him, Lee also stopped designing and switched to running a yacht brokerage. Besides selling yachts, he still keeps his oar in the sailing world. His expertise is sought as a judge of new boats for *Cruising World*, in the development of Transpac rules and a level class rule for 86-footers, and as

Continued on Page 78

***Giant Slayer*, a Santa Cruz 27, races in the Gig Harbor Yacht Club Islands Race earlier this year.**

Sean Trew

The trailersailer's galley

How to eat well despite a lack of space and equipment

by Gregg Nestor

EATING WELL IS AN INTEGRAL PART of boat safety. A hungry crew is more prone to seasickness, lethargy, and lower morale. Any one of these conditions can adversely affect the cruise. However, many owners of trailerable boats overlook this aspect because, I suspect, their Spartan galleys make food preparation a daunting task. This does not have to be the case. Like any other aspect of sailing, a little forethought, preparation, and proper equipment can add to the safety and enjoyment of the outing.

A trailersailer's galley can take many forms depending upon the type of sailing it does. If you usually daysail, your galley may be nothing more than a picnic basket, cooler, and insulated thermos. While this is the simplest galley, it can be versatile, producing meals from cold-cut sandwiches to wine, caviar, and paté using paper plates or leaded crystal and linen napkins. You are only limited by your imagination. You may choose to dine on board or, depending upon your sailing area, in a secluded cove, on a picturesque beach, or in a picnic area. Its versatility is what gives this galley its appeal.

Trailerable pocket cruisers used for weekend adventures or longer usually have a dedicated galley of sorts, and your planning and creativity will be centered on it. For a couple of days on the water, you can rely more on perishable, home-prepared, and otherwise bulky food stocks. Weekenders often have the added versatility of having a lot of activities on shore. Grilling and picnicking ashore allows you to use your standard backyard barbecue techniques for meals and also provides you with unlimited preparation space, a commodity not available on your boat.

Except for the stove, our galley gear is shown above.

A new dimension

For trailersailors who spend most of their cruise on the water, the galley takes on a new dimension. Just because your galley is small does not necessarily mean that your meal options need to be limited. However, as the amount of time you spend on board increases, you will want to decrease the amount of perishable, home-prepared, and bulky food stocks. Your onboard galley equipment will also change with increased time on the water. Don't be envious of the daysailer with his wine and caviar. With careful planning and equipping the galley ahead of time, you can also be enjoying those finer things. Think "out of the box" — or in this case "out of the boat."

"Just because your galley is small does not necessarily mean that your meal options need to be limited."

Cruising on a 22-foot trailerable, we have developed a galley that allows us maximum versatility and variety in minimal space. Our approach to the galley on board *Splash* is not that much different from our approach to backpacking. Having close to 30 years of Scouting experience, we merely modified our woodland techniques to account for our change in venue. While we're talking about backpack provisioning, we're not talking about trail mix, beef jerky, and freeze-dried foods. Rather, we enjoy meals like rice scampi, calzones, and beef pot pie.

Our technique for selecting galley equipment (also sailing gear and provisioning, for that matter) is based on our "three-pile method." Everything (and we mean *everything*) that goes on board goes through the same selection process. The first pile consists of those items that we absolutely, positively, must have on the boat. In the second pile are those things that would be nice to have along, making life easier or more comfortable. The third pile contains those items that can be broadly classified as "luxuries." Once we have our piles established, we stow everything from the first pile, skip the second altogether, and select

one or two things from the third pile. How else could we reasonably include our wine glasses and corkscrew? Once things are stowed, we check for space. This is our opportunity to stow a few things from the second pile.

Non-skid bottoms

Instead of relying on disposables, we use real, unbreakable dishes, cups, glasses, and flatware. These have non-skid bottoms or have been modified by the addition of silicone beads to their bottoms. Another way to make these items non-skid is by using rubberized non-skid drawer liners as placemats. Using real eating utensils makes us feel more at home and decreases the amount of trash that we need to store on board. Going back to one of our backpacking corollaries ("what you bring in, you need to bring back out"), if we bring in a minimum amount of disposables, we'll have a minimum amount of trash at the end of the cruise. It is possible to generate a lot of trash if you do not plan carefully. Once the trash is generated, it becomes unwanted cargo until you reach a port where it can be tossed out.

Refrigeration on a trailersailer means an ice chest. Ideally, depending on your space, two ice chests would be better: one for frozen items, which is opened up maybe once a day, and a second one that you go into more frequently. But most trailersailers will only allow space for a single ice chest. In any case, consider keeping a separate, smaller, soft-sided cooler containing cold drinks and snacks readily available in the cockpit. The fewer times you open your galley ice chest, the colder the food will stay.

The BakePacker, an aluminum grid that fits in a 7½- to 8-inch cook pot.

Food preparation usually requires some degree of slicing or dicing. An assortment of knives and a cutting surface are essential in the galley. Our knife assortment consists of a small paring knife, a mid-size serrated-edge knife, and a large chopping knife. With these knives we can prepare fruits, vegetables, meats, and fish. Some pocket cruisers are equipped with a cutting board that covers the galley sink when not in use, but ours is not. We have had good luck using an inexpensive plastic cutting mat purchased from a marine retailer.

Backpack kit

Our collection of pots and pans has been scaled down to a stainless-steel nesting backpack kit. The kit consists of a frying pan and three pots. For serving and cooking pieces, we have found that the oversized fork and spoon from a stainless-steel, government-surplus mess kit are sized just right. Our Scouting adventures gave us a lot of experience cooking in heavy cast-iron Dutch ovens. While we don't consider a Dutch oven to be a good choice in your trailersailer's galley, we find that Dutch-oven pliers come in very handy. These versatile pliers are meant for grasping hot cooking vessels, either with the pliers portion itself or by using the hook on the opposite

Sample BakePacker recipes

Chicken and Rice

- 1 packet of flavored rice/sauce mix. (I like to use Lipton's Rice Medley variety, because it also contains dehydrated vegetables. Lipton also offers Chicken Broccoli Rice, Chicken Fried Rice, and a Cajun variety, all of which work well. ***Note:*** *I tried replacing the rice/sauce mix with noodles/sauce mix, but the noodles/sauce tended to stick together on the bottom of the BakePacker bag.*
- Whatever ingredients are listed on the back of the rice/sauce mix bag. (Usually, that is water and butter or margarine. In place of real butter or margarine, you can use butter-flavored granules. The granules are available in the grocery store, come packaged in a plastic bottle, and do not require refrigeration.)
- 1 6- or 8-ounce can of chicken. (I've substituted other canned meats and even tuna.)

Follow the directions on the back of the rice/sauce mix bag. Add all ingredients, including the meat, into a BakePacker bag. Mix the ingredients inside the bag by gently and thoroughly squeezing the bag. Place the plastic bag of food on the BakePacker, covering as much of the grid as possible. Loosely fold down the top of the plastic bag, and place the BakePacker into the pot. Be sure to have the proper amount of water in the pot. Cover the pot, and bring water to boil. Start rice cooking time when water begins to boil. Depending upon the rice variety, total cooking time is about 10 minutes.

Beef Pie

- 1 package of pizza crust mix
- 1 10- to 15-ounce can of beef stew.

Add pizza crust mix and water (per mix package instructions) into a BakePacker bag. Mix the ingredients inside the bag by gently and thoroughly squeezing the bag.

Place the plastic bag of food on the BakePacker, covering as much of the grid as possible. Pour beef stew over the top of the crust mix. Fold down the top of the bag, and place the BakePacker into the pot. Be sure to have the proper amount of water in the pot. Cover and bake for 20 minutes.

"Poached" Fish

The BakePacker is worth your investment if you only use it to prepare fish. The smell that comes from cooking fish is eliminated (and so is the messy clean-up) when you cook it with the BakePacker system.

- Add a teaspoon of flour to a cooking bag. Shake the bag to coat. Place bag over grid.
- Season 1 or 2 pounds of fish to your liking. Place fish in a single layer in the bag. Dot with butter or sprinkle with butter-flavored granules. Add 3 lemon slices, if desired.

Close bag as above. Bake for about 18 minutes.

end to loop the bail on a pot or kettle.

We wash our galley gear in the water around us, using dish soap, and then rinse things with a spray bottle of potable water to which a few drops of chlorine bleach have been added. The rinsed gear is placed in a mesh bag and hung outside to air dry. When the gear needs to be quickly stowed below, we dry it with a chamois. We have found that a synthetic chamois works just as well as the more expensive natural chamois.

Even though you can minimize cleanup by not using real dishes, cups, and flatware, the cooking utensils still need to be cleaned. However, we have discovered a cooking technique that spares us ever having to scrub our cook pot.

Novel cook pot

The BakePacker is the most novel galley item we discovered while backpacking, and I have found it to be very useful aboard our trailersailer. This is a cook pot accessory in the shape of a 7⅜-inch-diameter vertical aluminum grid (see photo on Page 14). It was developed and originally promoted as a way to help American soldiers reheat prepared foods in winter conditions. The BakePacker became popular among outdoorsmen as a better way to prepare their food.

This cook pot accessory is designed to cook solid foods, although it is not a steamer or pressure cooker. It is an aluminum grid that fits into your 7½- to 8-inch cook pot and functions as multiple mini-heat exchangers. Water is poured into the cook pot to the top level of the grid. The food to be cooked is placed in a 1-gallon freezer/storage plastic bag or an oven roasting bag and then set inside the pot on top of the grid. The cook pot is then covered with its lid, and the water is boiled. The rate of heat transfer from the water via the BakePacker grid to the food in the plastic bag is higher than that of traditional cooking techniques. This is accomplished at a relatively low temperature of 212° F. Cooking is done by means of the grid, not from the boiling water.

We usually don't have a full-sized container of anything aboard. For condiments, fast food restaurant packets are great.

Since the food is cooked in a plastic bag, it does not get scorched or dried out. Due to the high heat transfer rate, foods cook faster, and you can actually bake in the cook pot! The BakePacker Standard version cooks enough food to serve three to four people. Furthermore, with the BakePacker, cleanup of the cooking vessel is non-existent. What you are left with is a cook pot containing about an inch of hot water, which you can use to wash your eating utensils, unless you decide to use it for coffee or tea.

"Using real eating utensils makes us feel more at home and decreases the amount of trash that we need to store on board."

As the length of our time out on the water increases, it is important to have cooking versatility. We wouldn't want a steady diet of one-pot meals from the BakePacker. By combining traditional cooking methods (with our stainless-steel nesting backpack kit) along with the BakePacker cooking method, we can vary our diet and meal types.

No experimenting

Since both of us have scientific backgrounds, we tend to take a rather analytical approach to life in general. When it comes to meal planning for our trailersailing, an analytical approach helps to decrease the number of unwanted surprises and disasters in the galley. Another one of our corollaries is: no experimenting with a new recipe on board. All recipes are tried first on shore, even using the same pots, pans, stove, and utensils that will be used aboard. This not only determines the viability of the recipe, but also its complexity, timing, and whether or not we even like it.

When planning a sail, we also plan the meals. Once the menu is set on paper, we figure out what ingredients are needed. Keeping in mind that space is limited, we usually don't have a full-sized container of anything aboard, unless we know that the whole amount is necessary for the planned recipes. Typically, we take just enough onion powder, garlic, flour, or paprika called for in the recipes. We use little vials and pouches specifically designed for small amounts of spices (available at outdoors stores), 35-mm film canisters that are labeled, and even labeled zipper-type bags to hold what we'll need. Fast-food restaurant packets of condiments are great, unless a recipe calls for a larger amount. Many food products that you buy will be exorbitantly packaged. Eliminate any unnecessary and bulky packaging before you stow it in the galley.

The galley aboard a trailersailer is what you make it, and meals can range from a brown bag to a gourmet meal. All it requires is a little forethought, imagination, and the right equipment. Of course, knowing a little bit about how to cook is also helpful.

Bon appétit!

For further reading...

More simple but tasty boat-tested recipes, as well as advice on meal planning and provisioning, can be found in *The One Pan Galley Gourmet* (2004) by Don Jacobson and John Roberts. It's available at <http://www.goodoldboat.com/bookshelf.html> or by calling 763-420-8923.

Resources

BakePacker
Strike 2 Industries, Inc.
8516 N. Greenwood St.
Spokane, WA 99208
509-484-3701
<http://www.bakepacker.com>

The finished cabin sole, at left. The small rubber-backed area rug at the bottom of the companionway ladder helps catch sand before it is tracked on the varnished sole. During the planning stage, carefully consider access hatches, such as the one for the batteries on facing page, bottom. Make a pattern and transfer it to the new sole, facing page, at right.

Replacing that cabin sole

Your guide to making a tricky job simpler and easier

by Gerry McGowan

When you peer into the companionway of an unfamiliar boat, the first thing you notice is the cabin sole. It may be a textured fiberglass liner, a piece of carpeting, or a genuine teak-and-holly sole. It may also be a thin piece of plywood masquerading as the latter. Some boats combine the look of the molded fiberglass sole with teak-and-holly plywood inserts. I think this looks better than an all-fiberglass liner, and it is pretty easy to replace the plywood inserts when they are damaged.

The problem with wood is that it can look ratty after a while. Given the inevitable sand, water, and dropped tools, that gleaming sole can be turned into a hunk of banged-up wood in several years. In fact, a banged-up sole is just about the standard issue in a typical older boat.

Years ago when I decided the laid teak-and-white-oak sole of our Ericson 46 was no longer in keeping with the rest of the upgraded and refinished interior, I sanded and refinished it. This involved many hours of sanding with huge sanders followed by a similar number of hours spent varnishing. I was rewarded by the gleaming cabin sole of our dreams, and it lasted as long as we owned the boat. But what if the sole is beyond refinishing?

There are several steps to installing a new sole. The sequence of steps depends on the original construction of the sole. The traditional sole is built up of strips or planks of teak and holly or other woods. These may be thick (½ inch or more) planks held in place with adhesive and countersunk screws, or they may be thin strips (⅛- to 3⁄16-inch thick) held in place with adhesive. The simpler method uses ¼- to ½-inch plywood in which the surface veneer is teak-and-holly strips.

Veneer must be varnished

This plywood is readily available but not cheap. I paid $120 per sheet for ¼-inch material. The plywood is very attractive but must be varnished if

long life is expected. This material usually has a top veneer thickness of about 0.040 inch, allowing for no more than one careful refinishing. It is easy to finish it, as the plywood is sanded very well at the factory and only requires touching up the screw hole plugs. The primary weakness of this plywood is that it dents readily, as the core laminates are not teak but a softer hardwood such as okoume. It is much easier to install and finish. This is what I ended up using.

First, a general overview of the installation process.

- ***Planning:*** Figure out what techniques and materials you are going to use and how you are going to fasten the sole in place. Allow for access to whatever is under the sole where required (I had to have access to eight large bolts countersunk in the existing sole). If you have curved surfaces, how will you cover them? How will you handle hatch openings? If you have the typical teak-and-holly sole, will it be symmetrical, and where will the joints fall? How will you align the planks and holly strips on the hatches and sole? If you use screws to hold it down, how many will you need and where will you place them? If you are using adhesive, how will you align everything as it hardens? *(**Note:** This step is the most important, as the appearance and functionality of the finished sole will depend on how well you preplan the details.)*
- ***Layout:*** Remove trim and obstructions where possible. Make a pattern if necessary and transfer it to the new sole. Dry-fit the new sole if possible. Have a means of aligning the sole when you actually install it and of holding it in place as the adhesive hardens.
- ***Surface preparation:*** Clean and prepare the old surface with solvent wipes and coarse sanding. If the surface is uneven, fair it somehow. Make sure you know where existing screws and other things are so you won't try to drive a new screw into a previous one.
- ***Installation:*** Work in sections so you can move around as necessary. Mix and apply the adhesive. Install the new sole and hold it in place with temporary or permanent screws and/or weights. If you are concerned about removing temporary screws, coat them with a release material, and remove them after the adhesive has kicked but before it is fully hardened. Countersink and plug screw holes (if used). Sand the sole as necessary (a little or a lot depending on the sole construction technique used). If you are going to finish any of the trim along with the sole, install it now (I don't like to do this since future removal of the finished-in-place trim will damage the sole finish).
- ***Finish:*** Clean up everything (sawdust and debris) and wipe down the surface with solvent and tack cloths. Apply finish (if varnish, this will probably mean five or more coats with sanding and cleaning between coats). Install any finished trim you did not finish along with the sole.

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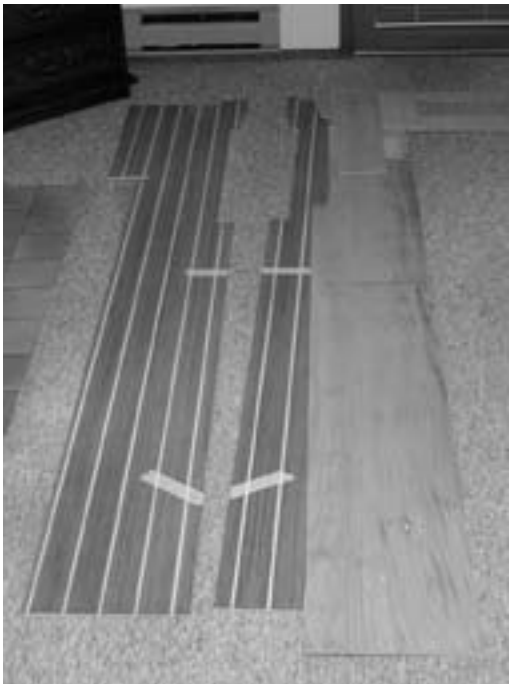


List of materials

- Teak-and-holly plywood, ¼-inch, 2 sheets at $120 each; Edensaw Woods Ltd.; $240.
- Marine-grade fir plywood, ⅝-inch, 1 sheet; Edensaw Woods Ltd.; $49.
- Turning lock lift handles, Taco F61-2583CH-1, 2 at $30 each; local chandlery; $60.
  Note: *I actually purchased three of these used at a nautical swap-meet for $5 total, so I paid a lot less.*
- Lifting rings for hatch, 2 at $10 each; local chandlery; $20.
  Note: *The round ones are easier to install, but I had a hard time finding them.*
- Stainless-steel piano hinge, 12-inch length; $10.
- Stainless-steel flathead screws, #8 x ⅝-inch, 100; Admiral Ship Supply; $7.
- FHSD bronze screws, #8 x ¾-inch, 100; Admiral Ship Supply; $8.
- Epoxy and low-density filler, about 1 quart; $30.
- Varnish, Interlux Goldspar Clear Gloss and Satin, 1 quart each; Admiral Ship Supply; $45.
- Thinner, sandpaper, miscellaneous supplies; $30.
- **Total spent: about $500.**

Practical instructions

While all details may not apply to the installation on a different boat, the general flow of my project will be similar. Just remember that the planning stage is critical.

In the May 2004 issue of *Good Old Boat* I described the replacement of the fuel tank on our Nor'West 33 sailboat, *Sailor's Joy.* The fuel tank, which was located in the keel, required cutting a rather large hole in the cabin sole to remove the old tank and install the new one. Since I didn't want to destroy the new cabin sole if I needed to remove the tank in the future, I decided to make the center hatch large enough to cover the existing opening. I made a new hatch of ⅝-inch marine-grade fir plywood. Recesses were cut into the underside of the hatch to clear the crossbeams, and I fastened pieces of ½-inch marine-grade fir plywood to the underside of the edges of the recess to support the new hatch. The hatch was made flush with the existing floor. Similarly, the remaining hatches running down the centerline of the cabin sole were duplicated using ⅝-inch marine plywood.

I did not remove the existing cabin sole because the interior furniture had been installed on it. The loss of headroom resulting from a thin cabin sole installed right on top of the existing sole was not enough to justify the additional work involved in removing the original floor. In the V-berth, where headroom was limited, I did remove the countersunk screws and the flooring. I also removed the existing trim pieces where possible.

Chose plywood

I considered fabricating a sole of individual teak-and-holly strips glued to the existing flooring. I had covered a small hatch this way, and it worked well. The costs would be similar to teak-and-holly plywood, assuming that I used strips of 3/16-inch thickness resawn from 1-inch lumber. Thicker material has a tendency to delaminate from the flooring because of swelling and shrinking as moisture content changes. It would also cost more and, if too thick, affect the headroom more than I could tolerate. I decided against the fabrication technique because glue (and no screws) had to be used to fasten the strips in place (the thickness would not allow for countersunk screws) and also because I remembered the 40 hours required to sand and finish the sole of my Ericson all too well and with little fondness.

The alternative method was to install an overlay of teak-and-holly plywood. If I used ¼- inch plywood fastened to the original floor, I would not lose a significant amount of headroom, and installation would be done in large sections and move along relatively quickly.

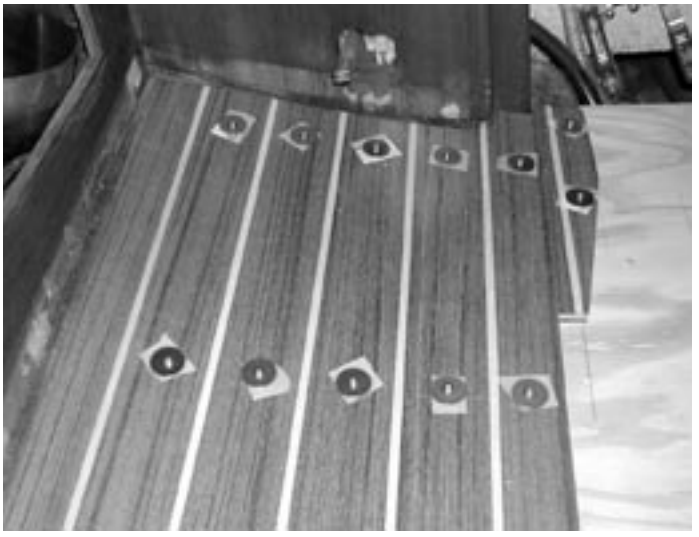
"The loss of headroom resulting from a thin cabin sole installed right on top of the existing sole was not enough to justify the additional work involved in removing the original floor."

Planning

Planning means trying to think of everything that might go wrong and figuring how to prevent it. Since-teak and-holly plywood costs $120 per sheet, I couldn't afford many mistakes.

The first step was to make a scale drawing of the cabin sole to insure that the holly seams would line up in the finished sole and hatches and that the finished sole would be symmetrical about the centerline. I decided to place a teak plank on the centerline. This allowed the joint between the narrow center hatches and the large hatch over the fuel tank to fall in the middle of a teak plank. This paper step was an essential part of the planning stage. Final layout of the cuts on the expensive plywood was done with careful reference to this drawing.

Not wanting to experiment with fit on the expensive plywood, I purchased two sheets of ⅛-inch mahogany plywood for $8 a sheet. I made careful measurements, transferred them to the pattern material, and cut the patterns out. I did not attempt to make them in a single sheet. Instead I fabricated the complex shapes in the galley/navigation station area from 4- to 6-inch-wide strips of material and fastened them together on site using a staple gun. These smaller pieces were trimmed and fitted using a saber saw, files, and a hand scroll saw and then stapled together. These patterns, along with the drawings, were used to lay out the required shape on the back of the teak-and-holly plywood. I cut the plywood using a saber saw and a fine-tooth blade and smoothed the



Marine plywood hatches run down the centerline of this boat, above. These were later covered with teak-and-holly plywood. Temporary screws and plastic squares cut from milk cartons hold the panels in place during the dry fitting, at right.

edges using an assortment of sanding blocks.

Since the cabin sole was longer than the plywood, I had to decide where the joint would fall. I ended up placing it adjacent to the mast to make it as inconspicuous as possible. The sole on the port side of the boat was L-shaped with a short leg at the aft end under the navigation station. I made this area as a separate piece and covered the joint with a small teak batten. This detail was the same as what had been used in the original flooring. It was necessary to make four oval openings in the flooring to provide access to large flathead bolts that held the table supports beneath the existing cabin sole. The openings were filled with matching plugs of teak-and-holly plywood, each held in place by a single bronze screw.

Installing the sole

I installed the sole using filled epoxy as an adhesive and mechanical fastenings. These fasteners were countersunk and filled with teak plugs as in a traditional teak sole. The ¼-inch thickness of the plywood was just sufficient to allow for countersinking the screws. I checked the fit of the cut plywood and trimmed it where necessary before installation. Then I laid it in place and secured it using panhead stainless-steel screws and 1-inch-diameter fender washers. I didn't countersink the holes yet. I placed the screws where the final plugged screw holes were to be located. I used enough screws to securely locate the plywood and to pull it into a curvature to fit the curved cabin sole in the aft part of the cabin. This dry fitting ensured that when the epoxy was added, the plywood would end up in exactly the desired spot, held by the predrilled and fitted screws.

After removing the fitted plywood, I cleaned the old cabin sole with lacquer thinner and rough-sanded it to ensure good adhesion. I sprayed the panhead screws with silicone mold release and placed plastic washers cut from a milk bottle under the fender washers. (Do not spray the washers or use excessive silicone. Silicone is almost impossible to remove from the wood and will cause fish-eyes in the final finish.)

I mixed the epoxy and spread it on the old cabin sole using a notched trowel. Then I put the new plywood in place, reinstalled the screws, and placed sandbags on top to insure good contact. I did only one side of the cabin at a time. After three hours when the epoxy had kicked, but the leftover epoxy was still soft enough to dent with a fingernail, I removed the screws. Leaving them in until the epoxy has fully hardened may make them difficult (or impossible) to remove.

Glued the plugs

After letting the epoxy set overnight, I removed the sandbags, countersunk the existing holes, installed the flathead screws, and glued the teak plugs in with epoxy. Before countersinking, I adjusted the depth setting on scrap pieces of the plywood. I used sufficient depth to allow a plug of 0.150- to 0.187-inch length to be installed over the screw. When the epoxy holding the plugs was set (I used five-minute epoxy), I sawed or chiseled off the protruding portions and carefully sanded them flush.

The port side of the cabin sole was installed in an identical fashion. After it was finished I installed the small area under the navigation station. Because of the significant curvature in the sole, I scored the back side of the plywood parallel to the curvature. I used a table saw to cut a series of grooves to a depth of about half the thickness of the plywood and spaced about ¾-inch apart. The plywood bent easily to conform to the curvature. I installed a small teak batten over the joint. This batten also provides a convenient foot stop while sitting at the navigation station.

Next I covered the centerline hatches with the teak-and-holly plywood. The large hatch over the fuel tank acted as the key alignment point for the planks. I laid the uncovered plywood hatch in place and carefully marked the location of the holly inlays in the newly installed cabin sole on it in pencil.

Bolted through sole

Then I installed the latches for the hatches. Two of the centerline hatches were held in place by the drop-leaf

Screws and sandbags hold the cabin sole in place while the epoxy sets up, above. The hole plugs are sawn off, at left, with a flush cutting saw that has no set to the teeth. The back of the plywood is scored to allow the panel to curve properly under the navigation station, at right.

table, which was bolted through the cabin sole into aluminum crossbraces. The small hatch aft of the table was hinged by a length of piano hinge to the one held down by the rear table support. A ring pull was recessed into the hatch surface on the other end to allow easy access to the bilge. The hatch over the fuel tank and the hatch under the table, where canned goods are normally stored, were secured by installing locking latch lifts.

For the V-berth area, where I removed the old cabin sole, I used the same procedure for installation except the inset hatch and sole were cut from a single piece of plywood using the removed sole as a pattern. I took care to align the holly inlays of the V-berth sole with those of the cabin sole. I set the hatch in place and temporarily installed the new plywood sole using the panhead screws/fender washers. I removed the screws from the sole base and lifted off the new plywood with the hatch still attached.

Using the hatch as a guide and a thin, very fine-tooth blade in a saber saw, I cut the plywood around the hatch. I used a series of small overlapping drilled holes instead of a large single one to insert the saber saw blade to start the cut. I sanded the edges carefully and had a hatch cover that exactly matched the surrounding sole in grain and holly strip alignment. To secure the hatch, which is primarily for access rather than storage, I installed a small piece of plywood on the front end, which slips under the sole, and secured the hatch at the aft end with a pair of bronze screws.

Urethane varnish

The sole was complete and required only finishing using urethane varnish. I started with a light sanding with 150-grit sandpaper, followed by vacuuming and wiping with lacquer thinner.

A plywood lip under the hatch crossbar holds the front of the hatch down.

Before varnishing I did a final wipe with a tack rag. I used gloss urethane exterior marine varnish and sanded, vacuumed, and wiped with a tack rag between coats. I applied enough coats to fill the grain of the teak and give a smooth surface, typically five coats. I finished with a single coat of satin urethane varnish. By using the satin varnish only for the final coat, the finish did not end up cloudy but still had the visual depth that can only be achieved with many coats of varnish.

"Planning means trying to think of everything that might go wrong . . . Since teak-and-holly plywood costs $120 per sheet, I couldn't afford many mistakes."

I then repaired and refinished the trim, which I had removed. I filled the original drilled-out plugs, which had covered the countersunk mounting screws, with new teak plugs, cut the plugs off, and sanded them flush. I redrilled and countersunk the flathead screws flush to the top surface. After finishing it with four coats of gloss varnish, I reinstalled the trim using flathead square-drive bronze screws. These match the trim, resist bunging during installation and removal, and match the teak trim very well. They also allow easy removal of the trim without damage at any time.

One year later, the finished sole is very attractive and functional and almost unscarred. We keep a small area rug at the bottom of the companionway ladder to catch sand, which is hard on varnish. The rug, purchased for less than $15, has a rubberized base. I did not record the amount of time spent (this is for fun, right?) but would estimate my time at between 60 and 80 hours. I spent quite a few hours planning before I made the first cut and a long time waiting for the varnish to dry (the 45-degree water temperature kept the sole very cool despite the use of an electric heater).

Installation problems

With the advantage of hindsight, we always see things we could have done differently. In this project, there were two things I could have improved. I did not groove the back of the installed plywood in the galley area before installation. It was a little difficult to draw down the plywood to fit the existing sole evenly and, if you look very carefully, you can see slight depressions where the screws are located. Although it would have been complicated to partially groove this area (and not locate the grooves under the screw holes), it may have been worth trying.

The major problem I encountered was spraying too much silicone on the screws holding the plywood in place initially. I did not remove the plastic washers before spraying and was rewarded with fish-eyeing around some of the holes. This was despite liberal and repeated cleanings with lacquer cleaner and silicone remover before varnishing. It took an additional week of cleaning and re-varnishing to get even coverage in these areas.

Considering the complexity of the entire project, the problems were few and the results extremely gratifying. The final compliment came when having the boat re-surveyed to increase its coverage; the surveyor commented on the woodwork being done to "professional standards."

Resources

Edensaw Woods Ltd.
800-745-3336
<http://www.edensaw.com>

Admiral Ship Supply
866-611-0984
<http://www.admiralshipsupply.com>

For further reading . . .

For more on joinery projects for your boat, try the book *Boatowner's Weekend Woodworking* (1998) by Garth Graves, available at <http://www.goodoldboat.com/bookshelf.html> or by calling 763-420-8923.

Camper & Nicholsons

Since its inception in 1782, Camper & Nicholsons has occupied several sites. The current one, in Gosport, England, is the site of Francis Amos' original plot. It is shown here in the 1970s.

Photos courtesy of Camper & Nicholsons Yachting Ltd.

English boatbuilders boast a 220-year history of doing things right

by Philip Allum

One of the oldest and most enduring boatbuilders in the world is the English company Camper & Nicholsons. Its impact on sailing has been immeasurable, from the design and construction of folding canoes and dinghies for an afternoon's club racing to the mighty J Class yachts, from small offshore racers to elegant steam yachts and the largest cruising schooners. For more than 220 years, "Camper Nic," as it is affectionately called, has influenced boating in all its facets.

In terms of fiberglass sailboats, Camper & Nicholsons' heyday was the 1970s and 1980s, when it built more than 20 models of sloops and ketches, ranging from the Nicholson 27 and a 29-foot Half-Tonner to the C&N 70. First, and well-loved, was the Nicholson 32, introduced in 1963. Before telling her story, let's recount the history of this most famous of English yards.

The company traces its roots back to Francis Amos. Almost nothing is known about his early career beyond the fact that he came from London and arrived in Gosport, situated across the harbor from the Royal Naval Dockyard at Portsmouth, in 1782. There, he leased a small plot of land to set himself up as a boatbuilder. The beginnings were modest, probably confined to building and repairing small, open boats for local watermen and fishermen. The venture prospered and by 1821 Amos had expanded into the building of small trading ships. Amos had no children to succeed him, and in 1824 his great nephew, William Camper, took over the lease of the yard and began trading in his own name.

"By the mid-1850s the Camper yard had produced a string of successful yachts, mostly schooners."

Yachting flourished

In the time of peace and commercial optimism that followed the end of the Napoleonic Wars and fueled by the fortunes being made from trade and the burgeoning Industrial Revolution, yachting began to flourish. Due in no small measure to his carefully nurtured contacts with members of the newly formed Royal Yacht Squadron, William Camper was able to add yacht-building to his activities. His first known yacht, *Breeze*, a cutter launched in 1836 for James Lyon, whom he had canvassed for patronage and who was to become a staunch supporter, won the King's Cup that year, furthering his reputation with the squadron. Buoyed by technical help from the Master Shipwright of Portsmouth Royal Dockyard and the close cooperation of the Gosport sailmaker, James Lapthorn, the demand for Camper's vessels blossomed.

The J-class sloop *Endeavour II* (being launched, middle of photo) was campaigned for the America's Cup by Sir T. O. M. Sopwith. Built and launched in 1936 at Camper & Nicholsons, she was designed by Charles Nicholson.

By the mid-1850s the Camper yard had produced a string of successful yachts, mostly schooners. The *Nancy Dawson*, built in 1847, recorded one of the first circumnavigations by a yacht and was the first yacht to visit the Bering Strait. The Marquis of Dufferin made a widely publicized voyage to Iceland and Spitzbergen in *Foam*, and the *Wyvern* recorded a fast passage to Australia to join the Gold Rush.

In 1842, 14-year-old Ben Nicholson joined Camper as an apprentice. The young Nicholson, after his successful apprenticeship and further studies in naval architecture, became increasingly involved in the yard's design work and management.

Temporary decline

The outbreak of the Crimean War led to a temporary decline in yachting, and it was not until 1860 that Ben was able to demonstrate his true potential with the design and building of the innovative racing schooner, *Aline*. *Aline's* outstanding success led to demands for a string of similar vessels. These, together with a smattering of cutters and yawls, were to be the yard's main production for the next 20 years.

In 1863, William Camper retired, and Ben Nicholson — with the financial support of the Camper and Lapthorn families — took over the business and changed its name to Camper & Nicholson.

Underpinned by the success of the schooners, Ben launched into an ambitious program of expansion. By 1880 he had more than doubled the size of the yard — erecting sheds, joiner shops, and a sawmill — as well as expanded the laying-up and maintenance facilities. The arrival of his three sons in the firm occasioned a final company name change to Camper & Nicholsons.

New generation of Nicholsons

The emergence of Ben's second son, Charles, as a talented designer heralded a further upturn of fortunes for the company. Charles' design prowess took time to develop, but from 1887 onward he began to receive commissions for small racers. In 1892, the *Dacia's* 14 first-place finishes in 14 starts propelled him to prominence. Charles' burgeoning fame as a designer coupled with Camper & Nicholsons' reputation for quality eventually brought the wheel full circle; by the turn of the century large yachts were once again being built to in-house designs.

"…the new owner of a motor yacht, which had cost less than the quoted price to build, received along with his new yacht a check for the difference, handed over at the commissioning launch."

Further expansion

The early years of the 20th century saw further expansion with the acquisition of a yard in nearby Southampton and diversification into the production of a series of large steam yachts. Further innovation came in 1914 with the world's first large diesel-powered yacht, the *Pioneer*, which permitted a reduction in overall tonnage without reducing accommodation.

Capitalizing on this breakthrough, Camper & Nicholsons remained the world's leading builder of motor yachts right through to the outbreak of World War II. The largest of these, *Philante* at 1,629 tons, was built for Sir T. O. M. Sopwith, owner and campaigner of *Endeavour* and *Endeavour II* for the America's Cup. *Philante* later became the Norwegian royal yacht, *Norge*.

New thinking also continued on the sailing front with the introduction of a Marconi rig on *Istria* in 1912, Charles' first and resoundingly successful attempt to design a 15-Meter. However, of even greater long-term significance was the boat's lightweight, laminated-wood construction. This led to further developments and growing expertise in the use of lightweight materials that saw its fruition in the use of plywood in deck construction and in the building of high-speed boats and launches, minesweepers, and flying boats in both world wars. Among Camper & Nicholsons' lesser known, but vitally important, contributions to the war effort in the 1940s were the modified motor gunboats, used as blockade runners for the import of high-quality Swedish ball bearings.

Hard on the heels of *Istria's* triumph, Charles achieved a long-held ambition when he received the commission to design and build the next America's Cup challenger, *Shamrock IV*, for Sir Thomas Lipton. Although his ultimate goal of winning the America's Cup continued to elude him, he designed and built all the subsequent challengers up to 1939.

First Bermudan rig

Other innovations of this period included the first Bermudan rig on a large racing yacht and the three-masted staysail schooner rig on the giant 689-ton *TM Vira*, later renamed *Creole*. *Vira* was built for the famous American yachtsman Alexander Smith Cochran, who on his first visit to her took fright at the height of the masts and had 30 feet removed. At the conclusion of her first Mediterranean cruise, Cochran further ordered the removal of lead from the keel in

compensation for her cut-down rig. But too much was removed, and her performance suffered. Later she was restored to her original condition.

It is for the J-class yachts that Charles Nicholson is best remembered. He designed and built *Shamrock V, Velsheda*, *Endeavour*, and *Endeavour II*. Two of his earlier designs, *Astra* and *Candida*, were altered to conform as closely as possible to the racing rules. In addition, Camper & Nicholsons undertook the alterations and re-rigging of King George V's yacht, *Britannia*. It is quite a tribute to the standard of Camper & Nicholsons' building quality that, with the exception of *Endeavour II* and *Britannia* (which was not originally built by the company and which was scuttled after the king's death), all are still sailing.

This was an expansive era with larger-than-life characters and grand gestures. One commission illustrates this perfectly. At the end of a day's racing, dominated by a Fife-designed schooner, Charles was approached by a prospective, titled buyer.

"Nicholson!" the man exclaimed, pointing at the fast schooner. "I want a boat to beat that one. I want all white paint and red upholstery. Good day!" Charles' next glimpse of his client was on launch day.

It was also a period in which the courtesies were properly observed. In 1932, the new owner of a motor yacht, which had cost less than the quoted price to build, received along with his new yacht a check for the difference, handed over at the commissioning launch.

Art, not science

Charles' predilection for the grand manner probably also cost him the America's Cup. His conviction was that yacht design was an art, not a science. At the end of *Endeavour's* America's Cup challenge, defeated by management failure despite the agreed consensus that *Endeavour* was the faster boat, he initiated an exchange of plans with *Rainbow's* designer W. Starling Burgess. *Endeavour II*, the next challenger, was simply a larger development of the original *Endeavour*. *Ranger*, the defender, designed by Starling Burgess in collaboration with Olin Stephens, was the end result of extensive tank testing and analysis, not only of their own concepts but also of the original *Endeavour's* hull form. The result was, as the saying goes, "not pretty but highly effective," and *Endeavour II* was comprehensively beaten.

"Charles' predilection for the grand manner probably also cost him the America's Cup. His conviction was that yacht design was an art, not a science."

Despite the glamour associated with the big racers, cruisers, and motor yachts, smaller classes were not neglected, and a number of successful racers conforming to the 6-, 8-, and 12-Meter rules were commissioned and built. The trend away from big racing yachts, accelerated by the death of George V and the disappearance of *Britannia*, was also mirrored in the world of offshore racing, where smaller boats sailed by amateur crews were coming to the fore.

Charles was also successful in this field. One of his cruising yachts, the 20-ton yawl *Ilex*, built in 1899, took part in every Fastnet Race between 1925 and 1939, winning the 1926 race.

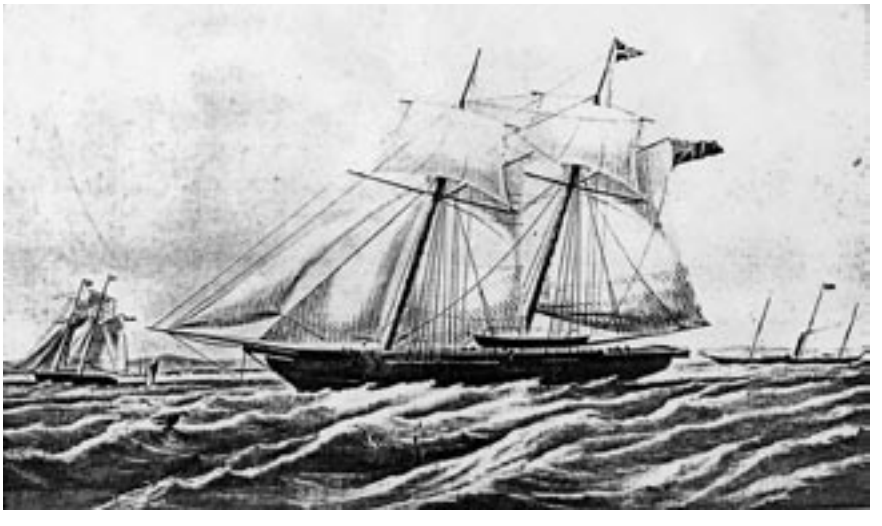
It was during this golden period that the third generation of Nicholsons started to make its mark in the company. Charles' son, John, began to help his father with his designs. In 1939 he sowed the seed for what was to become the next significant development, with the design and subsequent building of a "batch" of six 30-foot sloops. John remained under the shadow of his father, who never really retired and remained chairman until he died in 1954, aged 86. Not until then did John acknowledge that he had designed some of the yachts that had appeared under the Charles Nicholson design banner.

His cousin, Charles A. Nicholson (universally known as Young Charlie), who worked out of the company's Southampton premises, did not suffer from the same shadow and launched his successful design career with the offshore racer, *Yeoman*, in 1937. After the war, he went on to produce a series of successful designs.

Frantic time

World War II was a frantic time with both yards working flat out. Southampton was engaged in repair work, and Gosport — despite the destruction of nearly 80 percent of its capacity in air raids — continued with prototype development, building motor torpedo boats, motor gun boats, landing craft, and folding canoes for commando units.

Immediately after the war, a shortage of wood precluded a swift return to yacht building, and the yards relied on repair work and government contracts. Gradually, restrictions were eased and new orders started to



The *Nancy Dawson*, one of a number of schooners that helped establish the reputation of Camper & Nicholsons, was built in 1847. She was one of the first yachts to make a world circumnavigation.

trickle in. In spite of racing successes and the production of such high-profile boats as the Queen and Duke of Edinburgh's Dragon-class boat, *Bluebottle*, the company's situation was precarious, and it received a further blow when the government's demand for minesweepers and other small craft dried up in the late 1950s.

By this time, the fourth generation of Nicholsons was coming to prominence, with Young Charlie's son, Peter, assuming a leading role. Peter was well aware of the looming dangers to the company occasioned by the tailing off in demand for large motor yachts, lack of continuity in orders from the defense sector, and the declining market for one-off boats. He fully realized the need for a range of standard boats, foreseen by his uncle John in 1939, and he clearly understood the potential of the new wonder material, GRP (glass-reinforced plastic, or fiberglass). Camper & Nicholsons, however, was not equipped to handle GRP construction, so, in 1960, Peter turned to Halmatic Ltd. for assistance.

The fiberglass era

Halmatic, part of the Hunting Group, was an expert in the field of GRP hull construction and had already been approached by the American designer John Alden with a view to building hulls for the Alden 34, 36, and 38. Camper & Nicholsons' first project with Halmatic was the Nicholson 36, the hull being molded by Halmatic and finished in wood to a very high standard at the C&N Gosport yard. About 20 boats were built, and such is their popularity to this day that whenever one appears on the market it is quickly snapped up.

The Nicholson 36 was only a first step. Halmatic needed an improved and smoother workflow, and Peter was wedded to the concept of a 32-foot yacht, which he termed "The People's Boat," to be built entirely of GRP and needing only final touches at the Southampton yard. The boat had to meet three conditions: it should be around 32 feet overall with 24 feet on the waterline, it should be easy to build, and it must cost no more than £5,000 (around $14,000 U.S. at the time).

Thus was born the Nicholson 32. Her appearance was to prove a defining moment in the development and marketing of small sailing yachts at a time when the only other GRP production sailing yacht available was the Van de Stadt-designed Pionier (Dutch for pioneer) class, a concept that made no attempt to disguise or soften its "plastic" origins. Based on Peter's design concept and accommodation plan and his father's lines plan, he soon reached an agreement with Halmatic. Camper & Nicholsons would finalize the design details and market the finished boats. Halmatic would build the tooling, mold the hulls and decks, and complete them.

"The 32 would also prove to be a magnificent sea boat and fast enough for Peter to comment later that, although the boat was conceived as a cruiser, 'the trouble with Nic 32 owners is that they will insist on racing them!' "

Design first

The head compartment was designed as a one-piece molding — another design first — and the wooden interior, cockpit coamings, and deck trim were built to a high standard. The lead keel was encapsulated within the hull molding. There was good headroom, and the interior was well ventilated and insulated. Five berths in two cabins (including a pilot berth) and adequate locker space, together with a usable galley, provided good accommodation. Much thought went into the sailplan, deck, and cockpit layout, making the Nicholson 32 comfortable and easy to sail. The 32 would also prove to be a magnificent sea boat and fast enough for Peter to comment later that, although the boat was conceived as a cruiser, "the trouble with Nic 32 owners is that they will insist on racing them!"

To finish the new boats, Halmatic turned to another company within the Hunting Group, Field Aircraft Services, which specialized in fitting out the interiors of executive aircraft. Brochures and sales literature were prepared, another innovation.

The Nicholson 32 has a traditional hull form and quite heavy displacement, making it seakindly but hardly fast by modern standards.

Many modifications

The first boat, *Forerunner*, was launched in May 1963, followed by a pre-production run of another five boats with mahogany joinery. Over the next seven years, a total of 236 boats were built with many modifications, including the switch from mahogany to teak woodwork, changes to hatches and ports, and relocation of features such as fuel tanks, anchor stowage, and battery boxes. Finishing work was transferred to a new Halmatic factory.

The year 1972 saw a major restyling program with a 3-inch increase in freeboard and a totally new deck, cockpit, and superstructure, as well as completely redesigned accommodations. When stock production finally ceased in 1981, 369 boats had been built, most of them finished by Halmatic and Camper & Nicholsons, although some were bought as kits and finished by other yards. A set of molds was exported to Australia as well, and at least 10 boats (possibly as many as 20) were built there. In 1976, when Camper & Nicholsons introduced the Nicholson 31, Halmatic withdrew the selling rights to the Nicholson 32 and marketed the yacht themselves.

Although shipwreck, fire, and neglect have taken their toll (10 boats have been lost), 320 Nicholson 32s are known to be sailing, and an active owners' association has members in Europe, North and Central America, Australia, and Asia. The association has lost track of 39 boats, but it can be assumed that most of them are still in commission somewhere.

There were a few problems. Early boats had chainplates that passed through the joint between the hull and deck moldings, and remedial treatment was needed to eliminate the resultant leaks. Price increases in petroleum-based products in the wake of the 1966 Middle East crisis led to scantlings being reduced. This resulted in a few hulls having too much flexibility and, in hard conditions, damage to the furniture in the forward cabin. Minor design changes to the hull reinforcing solved the problem. When one takes into account the number of innovations involved in so many facets of the Nicholson 32's emergence, the history of this traditional-looking boat has been remarkable for the lack of serious problems.

Wherever people get together to discuss "the ideal cruiser," the Nicholson 32 is sure to be mentioned. For 40 years, the 32s have kept their crews safe on circumnavigations, Arctic explorations, transoceanic racing, and passage-making, as well as over the whole spectrum of smaller, unspectacular adventures that are the limit of what most of us care to face. Not bad for the first, real "People's Boat" of the fiberglass age and not a bad milestone on Camper & Nicholsons' 220-year journey through the history of yachting.

Design a year

Further production boat designs appeared at a rate of roughly one per year, ranging in size from the Nicholson 70 down to the 27. The size and opulence at any given time mirrored the roller-coaster nature of the British economy. Highlights were the Nicholson 35 with 228 built; the Nicholson 38, based on the Alden Mistral design, with 134 boats; and the Nicholson 33, with 120 boats built. In all, more than 1,400 production boats emerged during this period, along with one-offs and a stream of prestigious restorations.

In spite of the unblemished high standing of the Camper & Nicholsons name and a continuing run of successful yachts, the company was struggling. At the end of WW I, even with 1,700 employees, the management structure had been adequate for the control of the two yards. Subsidiary companies such as the Gosport Aircraft Company, which were not crucial to the core business and which brought no profit, were quickly axed and by the beginning of WW II, there was only one subsidiary, a chandlery in Southampton.

"Further production boat designs appeared at a rate of roughly one per year . . . The size and opulence . . . mirrored the roller-coaster nature of the British economy."

After the war, the picture had become much more complex. On the positive side, the defense contracts of the 1950s had spawned C&N Electrical Ltd., originally set up under the Gosport yard's foreman electrician, Roy Taylor, to fill a gap in the supply of control boxes for minesweepers. By the early 1970s, this had grown to employ 1,250 people in five factories and had spun off further developments such as Dialled Despatches, which manufactures pneumatic tube systems.

Separate company

Other successful acquisitions and startups were instigated, including the first marina, constructed on old Admiralty premises adjacent to the Gosport yard, which became a separate company, Camper & Nicholsons Marina Ltd. Set against such successes, the Gosport yard had come under intense pressure from the town to relinquish part of its premises for post-war redevelopment.

Through it all, Camper & Nicholsons Holdings Ltd. had remained a privately owned company and now found it impossible to raise sufficient investment capital to ensure its survival. In 1972, the company struck a deal with Crest Securities Ltd., a house-building company with ambitions to expand into the leisure industry. A new company, called Crest Nicholson, was formed. The timing was propitious and, initially, everything looked rosy: a successful London Boat Show, more than £2 million sold in exports, and much improved profit margins. C&N Electrical, which did not fit into the new mix, was sold for cash.

But prosperity was not to last. By the end of the following year, the country was crippled by strikes, subjected

The Nicholson 33, above, was launched in 1976. The Nicholson 43, at right, was introduced in 1969. On the used boat market, the 33, a more modern design than the 43, sells today in the low- to mid-$20,000s.

In 1979, Camper & Nicholsons' "B" shed had several models of production fiberglass sailboats under construction. From the foreground looking back is a Nicholson 33 hull, two 35s, a 32, and a 31. To the left is a deck for the 33 and behind it two decks for 35s.

to spiraling inflation, and beset by IRA terrorism. The whole British market for new boats was stopped dead in its tracks when the government raised the VAT (value-added tax) on yachts from 8 to 25 percent. Crest's shareholders panicked over the labor intensity of boatbuilding, and Gosport was under serious pressure to widen the client base with smaller, cheaper boats. A further setback occurred when a new bridge was built over the River Itchen, affecting access to the Southampton yard. In 1979, the yard was sold and the design facility closed.

Final ties broken

In 1981, a management buyout, financed initially by Tony Taylor, the then managing director of the yard, broke the final ties with the Nicholson family. He was given further financial and moral support by several of the yard's clients, including Nick Maris, and the company became Camper & Nicholsons Yachting Ltd. Production of stock boats at Gosport continued until 1989, and the yard continues to build motor- and sail-powered luxury yachts. The following year, Camper & Nicholsons Yachting Ltd. (but not Camper & Nicholsons Marina Ltd.) was bought by the shipbuilding organization Cammell Laird, and in 2001 they sold it to the Nautor Group, whose ultimate owner is the Italian industrialist Salvatore Ferragamo. Stock production will start again in Gosport in 2004 with a 42-foot motor yacht.

Brokerage business

From the very earliest days, laying up, repairs, and brokerage had been an integral part of the Camper & Nicholsons activities. Most Mediterranean-based yachts returned to Britain at the end of each season. However, after WW II, cheap living, the Mediterranean climate, and the chance to avoid paying British taxes provided a powerful incentive for British professional crews to persuade their owners to keep their yachts in the Med permanently. The resulting loss of business persuaded Young Charlie to send his second son, George, to the south of France to help a family friend run a brokerage business there and to persuade the errant yacht crews back into the fold.

Given the quality of life on the Côte d'Azur, compared to the austerity of post-war Britain, this plan was never likely to succeed, but by 1961 George was generating enough business to be able to persuade his father to buy the brokerage, which became Camper & Nicholsons International. Over the years, other offices were opened and a very successful business was built up, both on the brokerage side and with a stream of prestigious building commissions for the Southampton yard.

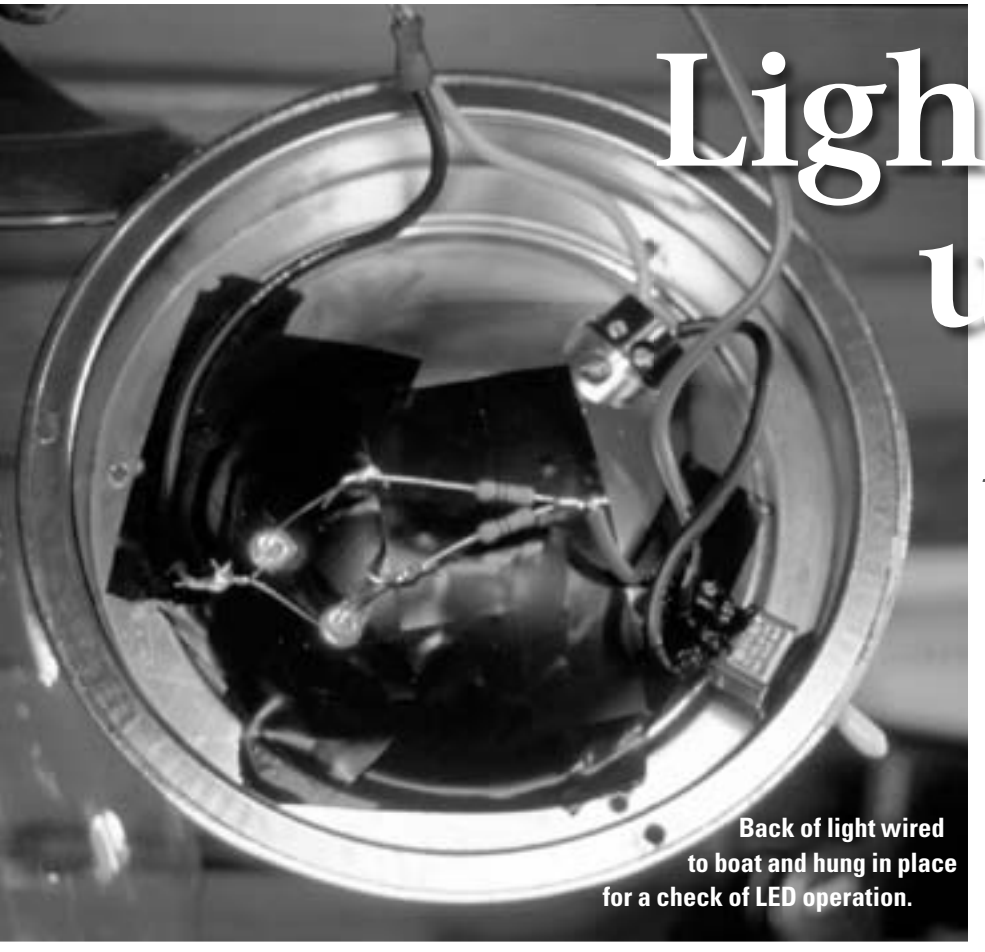
Unhappy George

George, however, was not happy with the impending merger with Crest, so shortly before details were finalized, he resigned to form a separate company, Solidmark, which he also built into a successful business with brokerage, consulting, and yacht management as its principal activities. Then in 1992, in a further turn of the wheel of fortune, Nick Maris, by now the controlling shareholder in Camper & Nicholsons Yachting, proposed a merger between Solidmark and Camper & Nicholsons International, which resulted in George resuming control of the company he had left some 12 years previously. He has now retired, and Camper & Nicholsons International SA is part of the French Rodriguez Group.

Camper & Nicholsons Marinas Ltd. continues under the ownership of Nick Maris, specializing in all aspects of marina and waterside real estate development.

All three companies continue to uphold the name and, although no longer bound by formal ties, cooperate closely, each conscious of their responsibility to carry forward the unbroken tradition begun so many years ago when the young Francis Amos left his home on the banks of the Thames to seek his fortune.

A breakthrough boat in the early days of fiberglass, the Nicholson 32 was very popular in Europe and the United States. With a full keel and stout construction, the 32 is an able bluewater cruiser.



Back of light wired to boat and hung in place for a check of LED operation.

Lightening up

Add light-emitting diodes to your existing cabin lights

by Greg Delezynski

Because my wife and I are outfitting our Nor'Sea 27 for extended cruising, we wanted to replace our cabin lights with some that have red and white capability.

In searching marine store catalogs, we found no 5-inch lights offering red and white light. There was a 7-inch model that did both. It was larger than we wanted and cost $27.99. The six lights we wanted to replace would therefore have cost $168. The lights drew 20 watts each.

I was interested in light-emitting diodes (LEDs) since they use less power. They are also dependable and long-lasting. I soon learned that it's fairly simple to add LEDs to our old lights. It took longer to write this article than to modify the lights.

I don't count the cost of tools in a job like this, since I think they should already be aboard any well-found vessel. Here's what I needed for the project:

- A drill with bits to match the size of the diameter of the LED.
- A voltmeter for indicating positive and negative wires. These are available from Radio Shack for $15. I have seen them for as little as $7 on sale.
- A small soldering iron and rosin core solder also available from Radio Shack or an electronics store.
- A small bit of wire: red and black.

"I was interested in light-emitting diodes (LEDs) since they use less power. They are also dependable and long-lasting."

Each light I wanted to convert also required a few parts:

- A new switch that would do on-off-on. The previous switch would only turn the white light on and off. But now I needed one that would turn either the white or the red light on or the entire unit off. I removed the switch from one of our lights and took it to the store with me to insure that the new switch would be the same size as the old one. I found one at Radio Shack for $3.29.
- The red LEDs to mount in the old light base. At this point there is a choice to be made. A few numbers are listed on the LED package. The first number is the millicandela (mcd) rating of the LED. This is a measure of how bright the LED is *(1,000 mcd = 1 candela = 1 candlepower –**Ed**.)*. The minimum I would use is 5,000 mcd. With anything less than this you need to add more LEDs in order to be able to see anything.

  I started by installing two LEDs in the first light I rebuilt. The beauty of building your own light is that you can customize each light to add the amount of light that is required at the spot where it is used in the boat. I later changed the two 5,000 mcd LEDs for two with a brightness of 1 candela each.
- A resistor. A bit of simple math is required here. Somewhere on the LED package are a couple of num-

Resources

This site has a small program that will tell you the resistor needed:
<http://www.theledlight.com/technical.html>

LED source
<http://www.superbrightleds.com/>

Resistor source
<http://www.alliedelec.com>

bers needed to determine what size resistor is required to make this LED work with the voltage supplied by the boat. The package will list the LED voltage and amperage. Normally for an LED, the amperage will be expressed in milliamps (mA).

Choosing the resistor

To find out what size resistor you will need, use this formula:

(Boat maximum voltage* – LED voltage) ÷ amps

For example, to use one red LED with a voltage drop of 2.1v, and an amperage of 20mA, the formula would be:

14.2v - 2.1v = 12.1v ÷ .020
= 605-ohm resistor

*(*Use your highest charging voltage, not 12 volts.)*

Get a resistor with a value as close to 605 ohms as possible, since not every value is made. Use a resistor rated for at least the wattage of the circuit. Don't round down more than 5 percent; round up to the nearest stock value.

"The beauty of building your own light is that you can customize each light to add the amount of light that is required at the spot where it is used in the boat."

One set of LEDs I found at a local store listed the proper resistor to use on the package, but it used an even 12 volts, not the elevated charging voltage, so that calculation could shorten bulb life.

Even if you are going to use more than one LED, you can use one resistor for each bulb. I feel that this is the easy way to work it. If you prefer, you can wire the LEDs in series. In this case, the negative side of the first LED attaches to the positive side of the second LED, and you use one resistor for both LEDs. For wiring the LEDs in series, add up the voltage of all the LEDs. Do not exceed 80 percent of the boat voltage. For a 12-volt boat system, for example, do not let the LEDs add up to more than 9.6 volts.

For two of the above LEDs, the formula would be:

14.2v – 4.2v = 10v ÷ .020
= 500-ohm resistor

As the cost of the resistors is so small, (eight for less than a dollar), I used one per LED. I simply added one light at a time until I had the correct brightness required for the area of the light.

Documentation on LEDs says not to wire two or more LEDs in parallel

Honey, shine the light over here

by Jerry Powlas

It is widely held that LEDs are very efficient producers of light. Actually, they are not. If we rate various light-producing devices based on lumens per watt, they come out something like this:

Xenon 8-13
Incandescent 10-17.5
Halogen 15-20

LED. 10-20
Fluorescent . . . . . 50-100+

Another limitation of LEDs is that they don't produce very much light per LED. If you want a lot of light, you need a lot of LEDs.

Given all that, why is Greg so happy with his LED lighting? If you have ever had someone hold a flashlight for you while you worked on something in the dark, you know that directed light is a big deal. All the light sources rated above, except LEDs, emit light in all directions. If wide-area lighting is what you want, that is all usable light. If you want focused light, like a chart light or a reading light, there will be losses associated with doing that. LEDs are very narrowly focused; therefore, they get a head start whenever focused light is desired.

Still, you simply won't get a lot of light unless you use a lot of LEDs. Greg is happy using only two per fixture, and he is using so little power he can't measure it with his battery monitor. This is explained by the nature of the human eye, which truly is a miracle device. Our eyes are able to adapt to these widely varying light levels found in nature:

Moonlight . . . . . 0.04 lumens/sq. ft.
Outdoor shade . . . . . 1,000 lumens/sq. ft.
Sunlight . . . . . 10,000 lumens/sq. ft.

Bright sunlight is a quarter of a million times brighter than moonlight, but our eyes can adapt to either level, and when our eyes are dark-adapted we can detect light from a single candle at a range of 13 to 20 miles.

The minimum light necessary for reading is about 10 lumens/square foot, but for just getting around in a darkened space, the light level of moonlight is enough.

Greg's trick is that he is not using much light when he does not need much light. At brighter levels of illumination, and especially for wide-area lighting, the efficiency crown currently goes to fluorescent lights, which are five to 10 times as efficient as anything else available.

Now you want colors?

LEDs jump ahead in the production of colored lights. The common method of making our red and green running lights is to put white light through a filter, letting only the desired color through. That takes an incandescent light down to 1 to 5 lumens/watt, but leaves the LEDs at full-rated efficiency because they already produce colored light. There is nothing to filter out.

Popular opinion is that future developments in LEDs will change the pecking order. Even when that day comes, a few things — such as flowers, soft music, a little wine — will deserve a candle. Just one.

LED, switch, and resistor packages

with each other using one resistor. If you need to add another set of LEDs to the light, each LED or set of series-wired LEDs needs its own resistor.

In practice

It's time to wire the light. Working with electrical power can be dangerous (even in a 12-volt system), so first shut off the power to the circuit you'll be working on. Once the power was off, I removed the light from the overhead. When cutting the wires, I left the portion of each wire that would remain in the boat as long as possible.

The bulb base of my lights had small setscrews holding the old wires. I loosened these and removed the old switch. Next I installed the new on-off-on switch. To do this, you wire the positive wire from the boat to the center connector of the switch. On our boat, I use red wire for all positive wires. Some boats may use another color for this.

Next I ran a red wire from one of the outside terminals of the switch to the old bulb base.

Then I drilled one hole for each LED close to the center of the base. This was to insure that when the LED is in place, it does not interfere with the old bulb. I drilled holes just large enough to allow the top of the LED to fit through but too small for the base. I used a bit of sealant to hold each LED in place. Then I wired in the new LEDs. In the drawing, I show two LEDs. The resistor can go on either side of the LEDs.

I soldered the leads from one side of the switch to the resistor (either side), then from the other side of the resistor to the positive (anode) side of the LED. Then I soldered the negative (cathode) side of the LED to the common negative wire. When doing this, I made sure that none of the bare wires touched the back of the lamp housing. I covered the back of mine with electrical tape to prevent shorts.

Next I connected it up with the red wire (center terminal of switch) to the positive wire coming from the boat. Then I connected the negative wire. I used one spade male connector on the positive boat side and one spade female connector on the negative boat side. I used the male for positive (boat side) for all the lights in the boat. That way I can put any light in any position on the boat.

"It took me about 45 minutes to convert the first light. It took less than 30 minutes for each of the others."

At this point I was able to switch the light on. For anyone doing this project, these two troubleshooting suggestions might help:

- If you pop the circuit breaker, check for shorts between wires. Be sure not to go too light on the black tape.
- If the LEDs do not light, make sure that you have the positive and negative wires attached to the correct lead on the LED.

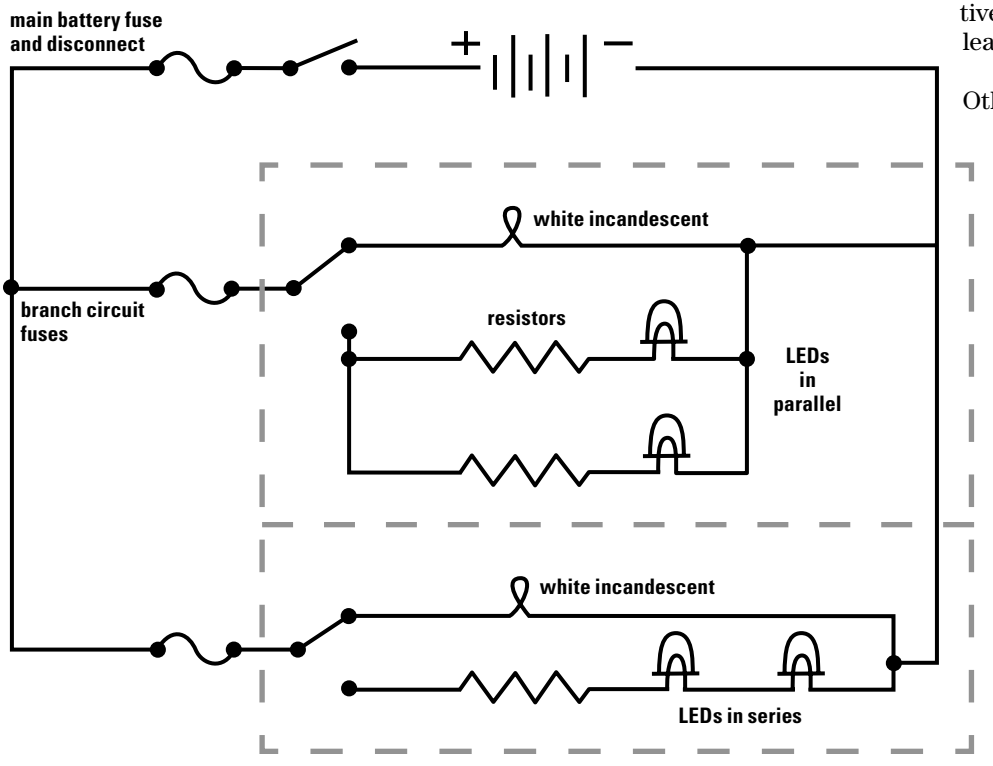
Other than that, not much else can go wrong.

It took me about 45 minutes to convert the first light. It took less than 30 minutes for each of the others. The cost breakdown was:

Cost per light to convert:

2 LEDs	$3.78
1 resistor	$0.32
1 switch	$3.29
Total	**$7.39**

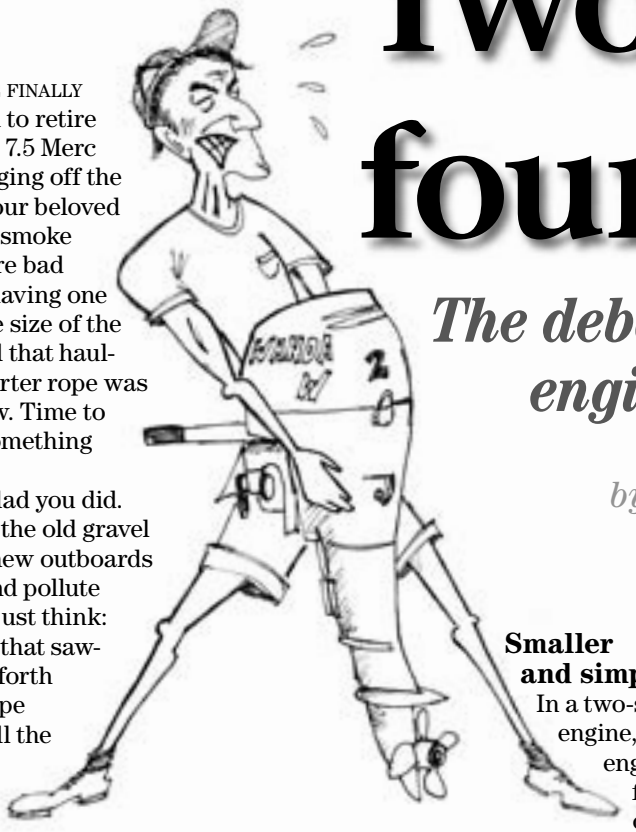
This comes to about $44.34 for the six lights on our boat: a savings of $123.66. There's also an energy savings. Now when I turn on the nav station and the main cabin LED lights (4 red LEDs), my Link 10 electric monitor (that reads to 0.1 amp) does not indicate that I am using any power at all.



Two-stroke *vs.* four-stroke

The debate over outboard engines continues

by Nathaniel Poole



So you've finally decided to retire that old 7.5 Merc you have hanging off the transom of your beloved sailboat. The smoke and noise were bad enough, but having one arm twice the size of the other from all that hauling on the starter rope was the final straw. Time to upgrade to something new.

You'll be glad you did. Compared to the old gravel crusher, the new outboards are quieter and pollute far less. And just think: instead of all that sawing back and forth on the pull rope (enough to fell the average giant sequoia), now you can get an electric start. Just push and listen to a quiet buzz as the motor comes to life. You'll wonder why you waited so long.

Things have changed in the world of auxiliary power. In the old days, your only real concern was horsepower choice. With the introduction of four-stroke outboard motors, an ongoing debate has emerged regarding the merits of the two kinds of power plants.

There are two basic types of internal combustion (IC) engines: two-stroke and four-stroke. The "stroke" refers to the movement of the piston through the cylinder of the engine. Every IC engine has four distinct cycles that it moves through while running: intake, compression, ignition, and exhaust. In a four-stroke engine, one cycle occurs with each passage of the piston through the cylinder. Four strokes, four cycles. Note that only the ignition cycle actually gives power; inertia moves the engine through the other three.

"With the introduction of four-stroke outboard motors, an ongoing debate has emerged regarding the merits of the two kinds of power plants."

Smaller and simpler

In a two-stroke engine, clever engineers figured out that you could accomplish the same four cycles with only two strokes of the piston through the cylinder. The result was an engine that could be smaller, lighter, simpler (fewer parts, no valve train), and more powerful (one ignition for every two strokes instead of every four strokes of the piston). But the universe always balances its books, and there are significant drawbacks to the two-stroke: noise, lack of fuel efficiency, and pollution.

The biggest problem for the two-stroke outboard concerns emissions. They are dirty engines. No way around it. Approximately 20 to 30 percent of the fuel/oil mixture from conventionally carbureted two-stroke engines passes unburned into the air and water. The next time you fill up your fuel tank, try to imagine that a quarter to a third of it will be dumped overboard. One source claims that almost 1 billion liters of unburned oil and gas flows straight into North America's lakes and waterways via recreational watercraft. That's equivalent to about 15 *Exxon Valdez* disasters annually. Four-stroke outboards have emissions 75 to 90 percent lower than conventional two-stroke engines.

Don't think that the powers that be haven't noticed this either. Some North American lakes have banned the use of two-stroke motors. In 1996, the Environmental Protection Agency (EPA) adopted a new standard, requiring a 75 percent reduction in outboard and personal watercraft engine hydrocarbon emissions from 1996 levels by the year 2006. The government's intention is that boatowners will eventually require a compliance sticker for their engines or face fines up to $500.

Phasing out

What this means for the industry is not clear, but many are predicting the ultimate phasing out of the two-stroke motor, at least the smaller ones. A quick examination of manufacturer's websites will show a lot of boasting about how their four-stroke engines meet the tough new EPA require-

For further reading...

Ed Sherman's *Outboard Engines: Troubleshooting, Maintenance & Repair* (1997) is an excellent resource for keeping your two- or four-stroke outboard motor in shape. It's available at <http://www.goodoldboat.com/bookshelf.html> or by calling 763-420-8923.

ments, but they'll have little comment on their two-strokes. Most emission improvements for two-strokes (such as direct injection) have been implemented on the really big engines, not the ones used as auxiliary powerplants on sailboats. Manufacturers are emphasizing their four-stroke lines and are producing far fewer two-stroke engines than in the past.

Four-stroke engines are far more fuel-efficient than two-strokes, burning 30 to 40 percent less fuel. Obviously this is more of a concern if you're hanging twin 300s off the back of your 14-foot runabout, but even with a little 9.9-hp, the difference can add up over time. In addition, there is no need to add oil to the fuel of a four-stroke. Folks at Honda assured me that the cost difference between the two types of engines can be made up by this difference in fuel efficiency within a couple of seasons of normal use.

A four-stroke is notably quieter than a two-stroke. Again, this is more of an issue with some of the really big engines, but remember how you had to shout to be heard when you revved up that old 7.5 Merc?

Because they have more parts, four-strokes are significantly heavier. For example, the Yamaha 9.9 two-stroke weighs 79 pounds while the four-stroke equivalent weighs 91 pounds. Honda's 9.9 can reach a whopping 107 pounds. I hope you have a good chiropractor, especially if your boat has an extending transom mount. For this reason alone, many sailboat owners won't touch a four-stroke.

Physically larger

For the same reasons listed above, in a horsepower-to-horsepower comparison, four-stroke engines are physically quite a bit larger. For a lot of vessels, this probably isn't an issue. I sail a Thunderbird, however, and there is no way I could get a 9.9 four-stroke in the enclosed motor well.

Four-strokes used to be considerably pricier than their two-stroke cousins, but the difference in price is declining. Currently, the difference is approximately 10 percent, which can add a few hundred dollars to the purchase of a new outboard. I checked at a local Mercury dealer where a 9.9-hp four-stroke sells for $1,757, while the two-stroke version goes for $1,582.

"Approximately 20 to 30 percent of the fuel/oil mixture from conventionally carbureted two-stroke engines passes unburned into the air and water."

There is no doubt about it, with the absence of a valve train, camshaft, and timing gears, a two-stroke is mechanically far simpler than a four-stroke. Talk to the dealers, and they will claim that both engine types are exceptionally reliable. This makes sense. Given how dependent we are on our outboard motors (less so for us smug sailors out there), if these engines had a habit of leaving us stranded in the middle of a lake or out in some saltwater bay with a riptide carrying us away from shore, we would quickly stop using them. There are outboards out there more than 30 years old that are still being used.

Lubrication problem

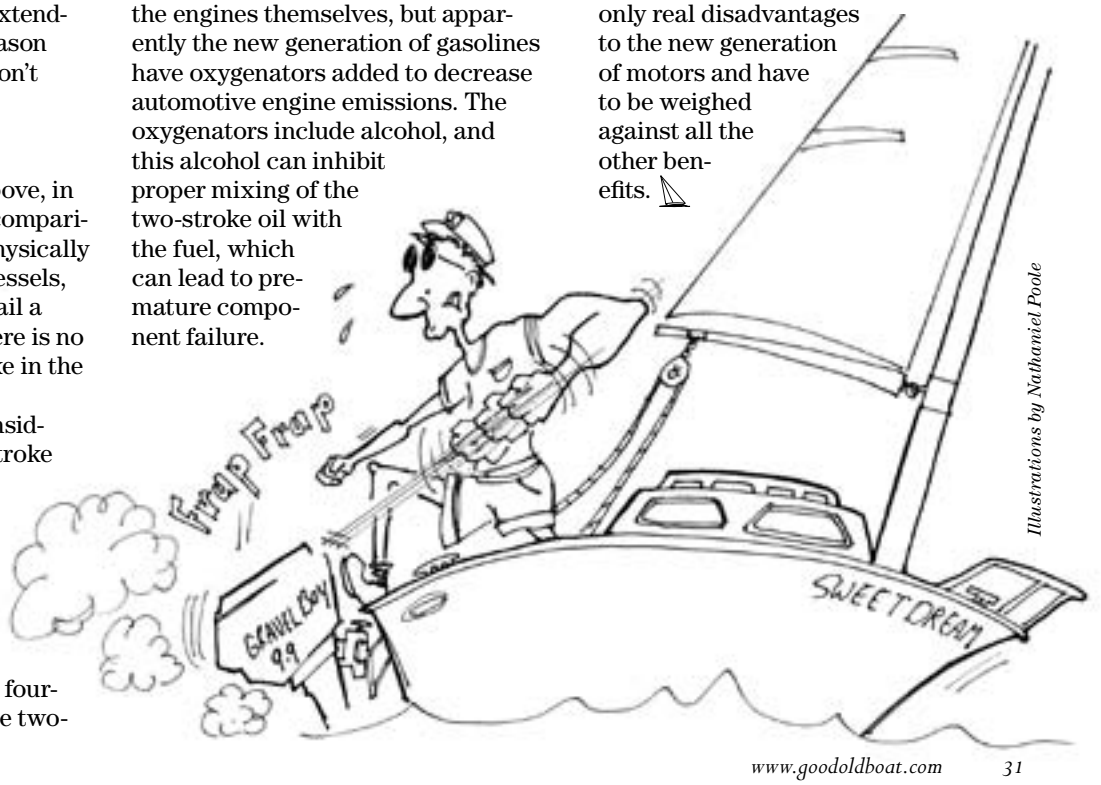
But there are other issues, and I'm not sure how far to take this. One dealer I spoke to whispered behind his hand that he is starting to see increased reliability problems with two-stroke engines. The cause? Not a fault with the engines themselves, but apparently the new generation of gasolines have oxygenators added to decrease automotive engine emissions. The oxygenators include alcohol, and this alcohol can inhibit proper mixing of the two-stroke oil with the fuel, which can lead to premature component failure.

Intrigued by this information, I phoned several marine mechanics in my area for their opinion, and to a man, each one told me that he believed four-stroke engines greatly outlast and are more reliable than the two-strokes. The reason given? It's a lubrication issue. Having to mix the engine oil with the fuel in a two-stroke greatly reduces lubrication efficiency, increasing wear on moving components.

From everything I could gather, it would seem that four-stroke engines would be the more thoughtful choice for the modern boater. In terms of environmental and fuel-efficiency factors, there is no comparison. And after the new EPA regulations come into effect in 2006, the argument may be moot.

The cost difference is not terribly significant. Four-stroke engines are quieter and smell better. The importance of this should not be underestimated. We've all been awakened in the middle of the night by a late arrival in the anchorage — the noise and smoke so bad you'd think something the size of the *Queen Mary* had pulled alongside. You open the curtains and find a little 18-foot daysailer busily dropping anchor, grandpa's beloved 1947 Iron Horse outboard rattling away on the transom, belching out more noxious gas than all hell can muster in a single day.

Size and weight seem to be the only real disadvantages to the new generation of motors and have to be weighed against all the other benefits.



Illustrations by Nathaniel Poole

How much power?

Too big an engine for an auxiliary can be a mistake, warns Ted

by Ted Brewer

OWNERS PLANNING TO repower their yachts almost always decide to put in bigger engines, reasoning that they will achieve higher cruising speeds and also help buck the inevitable tides and headwinds. In many cases this is a mistake, as the change rarely brings the anticipated result. If you think the subject of powering an auxiliary cruiser can be reduced to a cut-and-dried formula, you couldn't be more wrong.

Indeed, an intelligent, experienced guesstimate of the amount of power required to move the boat at X knots will be about as accurate as all the formulae available, as I will show. There are simply too many variables involved, making it impossible to reduce the problem to a definitive solution.

How the calculation is made

Your boat's characteristics (what you need to know)

- Waterline length
- Prismatic coefficient (your best guess)
- Displacement
- Prop efficiency

To determine the horsepower for your boat

- Take your best guess at the prismatic coefficient
- Choose realistic speed/length ratio
- Find the resistance
- Find the effective horsepower
- Allow for prop efficiency
- Allow for heavy weather
- Allow for alternator and pumps

There is a general belief that sailing yachts, being displacement hulls, can be powered to a speed/length ratio ($V/\sqrt{L}$) of 1.34. Unfortunately, the ability to achieve a given speed/length ratio depends on the hull having the proper prismatic coefficient (Cp) for the desired speed. The Cp is the relationship of the volume in the ends of the yacht to its total displacement; the higher the Cp, the more fullness there is in the ends, preferably in the stern. As Douglas Phillips-Birt points out in *The Naval Architecture of Small Craft*, fine bows are essential to speed, but a full stern with flatter lines aft also is required to prevent squatting as the speed/length ratio approaches 1.34. The table below shows the correct prismatic coefficient for various speed/length ratios.

$V/\sqrt{L}$	1.0	1.1	1.2	1.3	1.34
Cp	.52	.54	.58	.62	.63

Unfortunately, the majority of sailboats are designed with Cps of .54 to .58 for the obvious reason that the designer is far more concerned with speed under sail than performance under power. To achieve the Cp of .60 to .63 necessary for maximum displacement-hull speeds would require a hull form similar to that of a low-speed motor yacht or trawler, one with a fairly wide and deep transom, to reduce squatting at the stern as the speed increases. This may suit some motorsailers but is not a good hull form for the usual sailing yacht where speed under sail is paramount, because it increases resistance at lower speeds, those speeds that most of us achieve when sailing.

Speed under sail

Due to the vagaries of the wind, the speed under sail of the average monohull auxiliary varies widely, from a speed/length ratio of 0.0 to 1.2, and probably averages somewhere in the range of .8 to 1.1 on a good day. Obviously, a hull designed for these speeds is not suited to the higher speed/length ratios without undue squatting when under power. So the vessel's potential speed is the first variable and, since owners rarely know their yacht's Cp, they can only estimate the appropriate speed/length ratio when planning to repower the yacht.

Having guesstimated the desired — or possibly achievable — hull speed, the next problem is to calculate the resistance. For the auxiliary yacht, this depends on the vessel's displacement as well as the desired speed. The table below shows, very roughly, the resistance in pounds per ton of displacement for the various speed/length ratios assuming the hull has the proper Cp. You'll note that the resistance (R) increases slowly up to a speed/length ratio of 1.10 and then begins to increase more rapidly with each increase in speed.

$V/\sqrt{L}$	1.00	1.05	1.10	1.15	1.20	1.25	1.30	1.35
R in lb. per ton	17	19	22	27	33	42	54	70

At these speeds, the frictional resistance is 20 to 30 percent of the total and residuary resistance (wave making) is 70 to 80 percent. Obviously a fin-keel/spade-rudder yacht with minimal wetted surface will have less frictional resistance than a full-keel yacht so the table can be only reasonably accurate. A practical approach might be to add 5 percent to the resistance for a full-keel yacht and deduct 5 percent for a fin-keel boat.

More resistance

Again, the table assumes the yacht has the correct Cp for the speed/length ratio. I must point out that a yacht with

"Even allowing for the inefficiencies of modern high-speed engines . . . there is no real reason to power an auxiliary cruiser with more than 3 to 5 hp per ton of displacement."

too low a Cp for the desired speed will develop considerably more resistance per ton than one that is correctly designed, and this can amount to a penalty of 25 percent or more!

Fortunately, the penalty for a yacht with a high Cp sailing at a lower speed is not nearly as serious, so designers usually favor slightly high Cps, in the range of .55 to .56. And, of course, the resistance table also assumes a clean, smooth bottom. So the owner who knows the waterline length and the displacement of his sailboat can now roughly estimate her resistance at any desired, and reasonable, speed.

For example, consider a 30-foot-waterline, full-keel sailboat of 20,000 pounds displacement and a Cp of .55. The owner wants to power her to a speed/length ratio of 1.20, 6.6 knots, so we'll figure on about 33 pounds of resistance per ton. With 8.93 tons displacement (20,000/2,240) the resistance is 295 pounds. With 5 percent added for the full keel, the result is 309 pounds total resistance.

Effective horsepower

With that information, the owner can work out the effective horsepower (the power put out by the propeller) required from the formula EHP = R x V x .0031, where R equals resistance in pounds and V equals velocity, or boat speed, in knots. So the EHP for the 30-footer = 309 x 6.6 x .0031 = 6.32 EHP. Now that sounds ridiculously small to move such a large yacht at 7 knots, and it is. This brings in another variable: propeller efficiency.

The efficiency of the typical propeller will differ with the type, and it can vary widely, as shown below:

- Folding two-blade propeller: 10 to 15 percent efficiency.
- Fixed two-blade propeller: 35 to 45 percent efficiency.
- Fixed three-blade propeller: 50 to 55 percent efficiency.

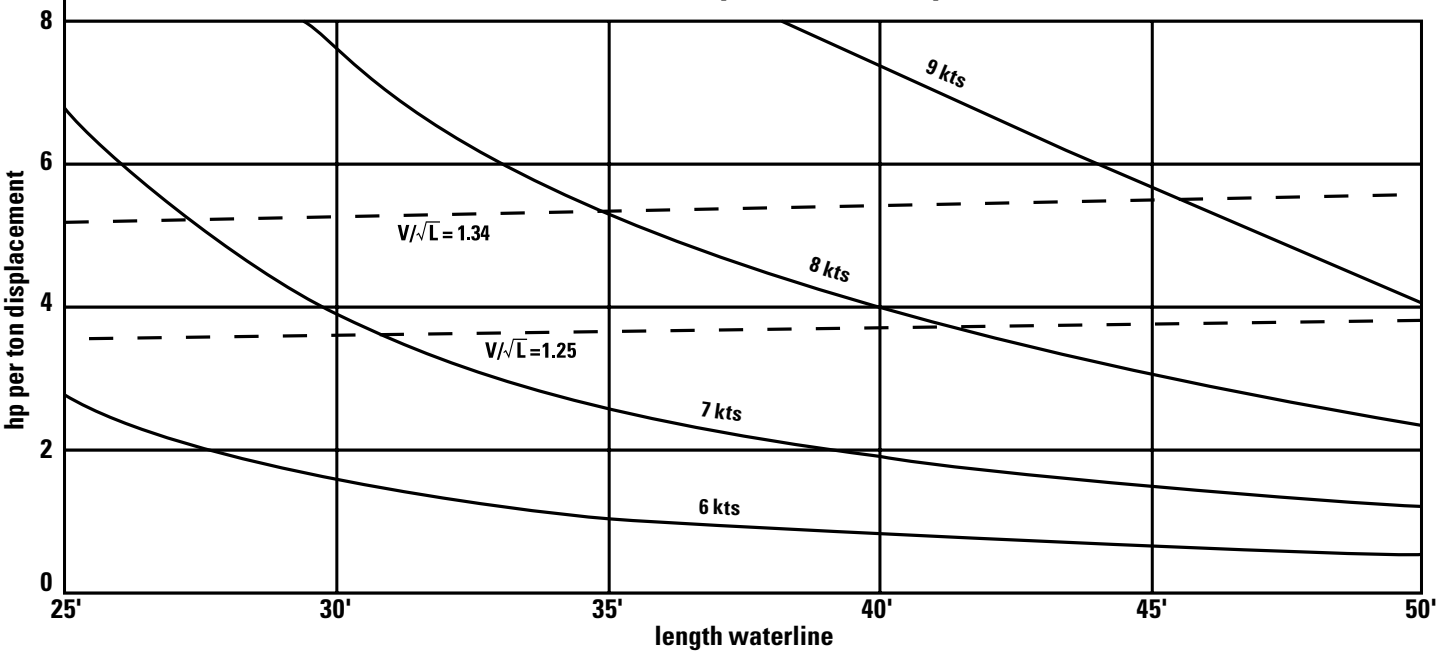
Most efficient

The highest efficiency would be that of a three-blade wheel with big, wide Mickey Mouse-ear blades, the type of wheel that you might find on a motorsailer but only rarely on an auxiliary cruising yacht. Of course, the location of the propeller also affects its efficiency. A blade in the clear will have the higher of the efficiencies shown above while one stuck behind a wide, unfaired deadwood will have minimal efficiency, perhaps even less than noted.

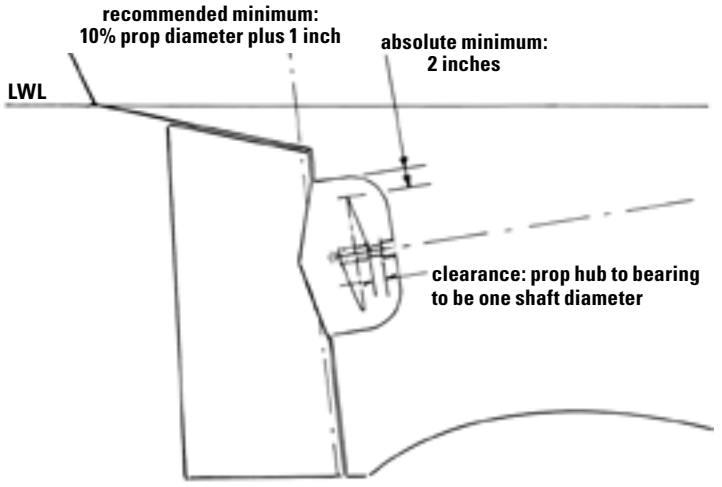
Also affecting propeller efficiency is the available maximum diameter. The larger the prop diameter, the larger the slipstream and, for any given turning speed, the greater the volume of water that will be set in motion. There is an ideal propeller diameter for a given power, shaft speed, and hull speed, but this ideal is more likely to be found on a tugboat than a sailing yacht. Unfortunately, undersized propellers are too often the norm for auxiliary cruisers.

According to Caterpillar, the absolute minimum distance that the blade tip must be below the hull is 2 inches and the ideal clearance is one-third of the blade diameter. This is almost never achievable as the resulting prop would then be too small for good performance. My rule for blade-tip clearance, either below the hull or in an aperture, has usually been 10 percent of the diameter plus 1 inch (see illustrations on Page 34). In the case of a wheel in an aperture, both the size of the aperture and the distance of the propeller from the deadwood or sternpost can greatly affect efficiency. The designer is always of two minds when laying out the aperture; he wants the smallest possible aperture to reduce drag for efficiency under sail and a nice big aperture for efficiency under power. As a rule, efficiency under sail wins out with most cruising yacht designers. The result can be a performance as bad as that of a propeller the size of an eggbeater working in a very small aperture.

A rough guide to speed and horsepower



Aperture tip clearance



Two-blade prop

So, assuming our skipper wants to swing a two-blade propeller to reduce drag under sail, the required horsepower would be EHP/e where e = prop efficiency, or 6.32/.35 = 18.06 hp. Note that an efficiency of 35 percent was selected because the yacht is of full-keel type with the prop in an aperture. So we have 18.06 hp required to drive the yacht in calm water.

However, another variable raises its viperous head: choppy seas and headwinds. We don't want to slow to a crawl when the conditions turn sour so it is usual to increase the horsepower by up to 35 percent or so to allow for weather, and now we are looking at a 24.4 hp requirement.

One more variable is the power losses in the stern gear from the gearbox, stuffing box, and stern bearing, so we'll add 10 percent to cover that, and now we have 24.4 x 1.0 = 26.84 hp.

And, for the final variable, since it is not uncommon for engine manufacturers to rate their engine on a stand without all the usual pumps, alternators, etc., working, we'll add a final 10 percent to allow for that, and look for an engine of about 29.5, say, 30 hp. Simple, eh?

Of course, if you don't want to go through all those calculations, there is an easier way, and that is to base the power requirement on the yacht's displacement in tons. Phillips-Birt suggests that 1 hp per ton will provide performance close to a speed/length ratio of 1.0; for yachts of 25-foot LWL, that gives a reasonable 5 knots speed. I can agree with that theory provided the engine is putting out real Clydesdale power and not Shetland-pony power. Phillips-Birt does point out that smaller yachts, say of 20- to 24-foot LWL, may require additional power, perhaps 1.5 to 2.0 hp per ton (the reasoning being that a yacht of 20-foot LWL will usually be operating in a slightly higher speed/length ratio in order to achieve a reasonable rate of knots and, as we have seen, that increases the power requirement).

Chunk of iron

I can recall sailing on Bill Luders' *Storm*, of 27-foot LWL and about 8 tons displacement. Her 8-hp diesel (1 hp per ton) was a British, slow-turning chunk of iron, chosen more for its 450-pound deadweight as uncounted ballast than its power output. Still, once we got out the can of ether and fired up that reluctant hunk, those eight Clydesdales probably moved the yacht along at speeds close to *Storm's* theoretical speed/length ratio of 1.0, or 5.2 knots; surprisingly good considering the narrow two-blade prop was fitted in an aperture abaft her full keel. Unfortunately, there was no speedometer aboard so it is impossible to say how closely we approached that velocity, but it certainly *felt* close to 5 knots on a calm day. Well, maybe 4.5 knots.

Of course, that 8 hp would not drive the yacht to 5 knots in choppy seas and headwinds. Slowing to 3 knots would have been normal under power in adverse conditions but, certainly, it was always faster to sail when things turned nasty. Probably *Storm* would have been better with 1.5 to 2.0 hp per ton if the skipper had wanted to power, but that was unlikely with Bill Luders aboard. If it blew, we sailed.

One yacht of my design that proved the rule of moderate horsepower per ton was the *Sophia Christina*. This 38-foot-waterline, 20-ton, full-keel schooner powers beautifully through Northwest waters, despite headwinds and adverse tides, with only a 30-hp Saab engine, just 1.5 hp per ton. Admittedly that slow-turning Saab, with its large-diameter, variable-pitch propeller, produces Percheron power, not pony power. But that illustrates what can be done when proper gearing reduces the engine speed to a reasonable shaft speed so that a good-sized prop can be swung, provided the designer leaves room for that big diameter wheel.

"There is an ideal propeller diameter for a given power, shaft speed, and hull speed, but this ideal is more likely to be found on a tugboat than a sailing yacht."

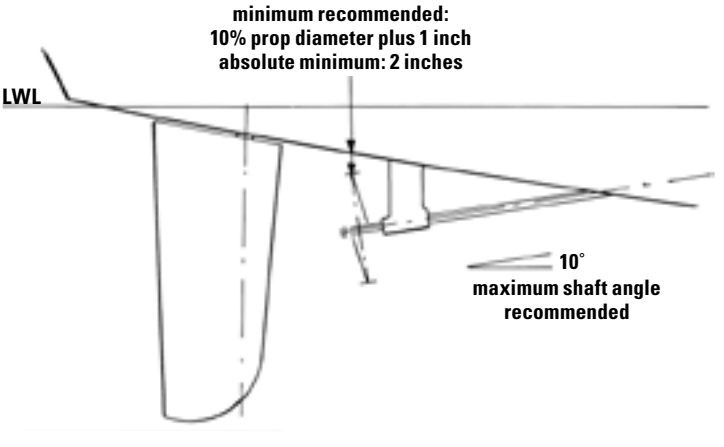
No real reason

Even allowing for the inefficiencies of modern high-speed engines, too high a gearing, minimal-sized propellers, adverse weather, and all the other variables, there is no real reason to power an auxiliary cruiser with more than 3 to 5 hp per ton of displacement. The upper figure is probably on the high side, except for motorsailers and sailing yachts with less than optimum hull forms. And then we might look for as much as 6 hp per ton.

Our theoretical 30-foot LWL yacht required 30 hp for 6.6 knots, or about 3.35 hp per ton of displacement, and that

Continued on Page 79

Tip clearance with spade rudder



Maintaining the pulse

How a circumnavigator overcame his fear of sailing

by Dave Martin

Driver **in the Spitsbergen ice with the kids on the bow in 2000.**

Whether outfitting for an extended cruise or a sail on a protected bay, there is no piece of gear that can take the place of good seamanship. My childhood sailing heroes adhered to this principle too. When I was a young boy I became entranced by the stories of John Guzzwell and Robin Lee Graham. Back then, many of the electronic gadgets we consider standard now weren't even dreamed of. Those guys had no choice but to rely on sound boat-handling skills, confidence, and intuition.

When I think back to the voyages of *Trekka* and *Dove*, I realize how technology has changed cruising. These days, it seems that "confidence and intuition" are tightly interwoven with an array of electronics. Don't get me wrong, electronics definitely have their place in cruising, but if the electrical pulse is removed, the human pulse should not falter.

I began my sailing career in 1971, at the tender age of seven. Our Cal 25, *Martini*, was the epitome of simple: it sported cabin lights and an FM radio. I had endless amounts of fun on the boat while it was safely tied to the dock, but the moment we untied the lines the fun ended. I hated the actual sailing part. The mainsail would go up, sail slides chattering, boom swinging. Noise and commotion. Next came the genoa. As the sailcloth inched its way up the forestay, sheets flapping, I sat in the cockpit paralyzed with fear. I knew what was coming next; the genoa sheet would come in, and the boat would heel … farther, farther, farther. I'd cling to the windward gunwale and scream, "Daddy, Daddy! We're gonna die!"

Fortunately, during my fourth summer of sailing, my feelings of terror began to fade. My parents enrolled me in a sailing program that taught boat handling and theory. I learned how to sail from the keel up, step by step, nice and logical. Instead of panicking, I began to critically analyze "cause and effect." I realized that if I was going to lead a life of adventure, I had to get a grip.

"Whether it's crossing the bay or crossing an ocean, adventure is any experience that tests personal limits."

What's the difference?

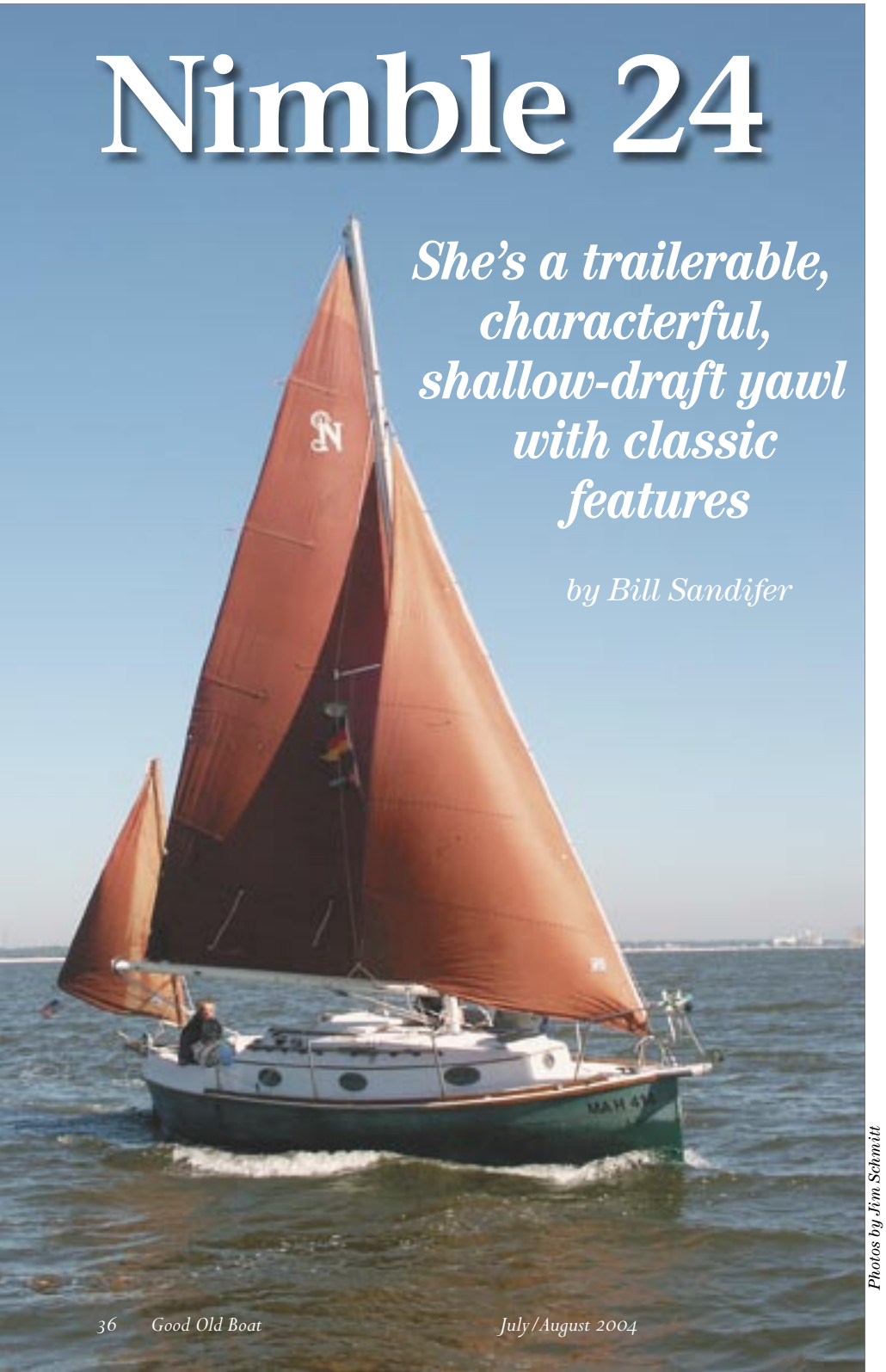
That was the same summer I read about the feats of John Guzzwell and Robin Lee Graham. At first their experiences intimidated me. But then I thought, what made them different from me? If John could circumnavigate on a 20-footer and Robin on 24-footer, why couldn't I do something similar? By summer's end I knew that I would sail around the world.

Continued on Page 63

Nimble 24

She's a trailerable, characterful, shallow-draft yawl with classic features

by Bill Sandifer



Photos by Jim Schmitt

THE OLD SAYING THAT "IF IT LOOKS right, it probably is right" applies to the Nimble 24. This is a canoe yawl in the English Rob Roy tradition started in the late 18th century. Today's 24-foot version of this boat is a good-looking, capable coastal daysailer and overnighter. This is not to say that longer cruises or wider waters are not within her capabilities, but she is more suited to cruises of limited duration in near-shore waters. The main reason for this is her lack of internal volume and headroom.

In the Nimble 24, designer Ted Brewer has created a sweet-looking, sweet-sailing boat with low freeboard, a handsome sheerline, and double ends. To have increased the headroom belowdecks would have severely detracted from the beauty of this classic design.

The first thing you notice when stepping aboard is her stability. She is not overly tippy or sensitive to a person of my size stepping directly on the gunwale. The next thing you see is all the beautiful bronze hardware — cleats, portlights, and chocks — that is standard on this boat. It is obvious that the builder, Jerry Koch, took great pride in his product and did not skimp on the hardware. This high quality in materials and workmanship is repeated in the glasswork, the teak joiner work, the hardware installation, and the overall fit and finish of the boat.

Sailers and trawlers

Ted Brewer and Jerry Koch were the designer and builder, respectively, of the Nimble and Nomad series of boats. These hulls doubled as sailboats and trawlers, depending on their deckhouse configuration. They range from the Nimble 20 and 24 through the Nomad series of trawlers, which run 20, 24, and 26 feet. The size difference was gained by simply cutting the Nimble 20 in half and adding the appropriate midship section.

"…designer Ted Brewer has created a sweet-looking, sweet-sailing boat with low freeboard, a handsome sheerline, and double ends."

The queen of the line, the Nimble 30, is a true round-bottomed hull that is not readily trailerable. The builder is quoted as having said that the rest of the line can be towed behind an average sedan. When we pulled the Nimble 24 test boat from the water, we used a 1-ton van. I would not like to do it with anything less.

Tesseract, our test boat, is the centerboard model with a stub keel and centerboard trunk. She has a draft of 1 foot 1 inch, board up, to 4 feet 2 inches, board down. An offshore version with a fixed-keel configuration was also built. That model has a draft of 2 feet 6 inches. Sail area is 275

***Tesseract*, Bob Dumaine's Nimble 24 yawl, has all the right stuff in 24 feet, on facing page. However, she is not an "instant boat," at right. Launching and haulout require a fairly good effort, and the best tow vehicle for this boat when fully loaded is a full-sized truck or SUV with a towing package.**

square feet, divided into main, jib, and mizzen. The quality of the standard hardware is excellent, and more was available as an option, all of equally good quality. If I were selecting a Nimble 24, I'd go for the centerboard model for its ability to anchor in shallow water.

Other than a GPS, fathometer, and safety equipment, there is little extra that one might want aboard. There is adequate stowage for a crew of two, but a crew of four would be pushing the envelope for more than perhaps an overnight, and that is a real "perhaps." I can see where they would all sleep, but how they would get out of the bunks is another matter. A singlehander would have no problem and could easily cruise the Bahamas in this seaworthy small craft. Because it's trailerable, this boat opens up most cruising areas: you could tow her to Maine, the Chesapeake, the North Channel, or Puget Sound. She could even go to Alaska via the Inside Passage as long as a capable crew is carefully watching the weather, of course.

In spite of the quality of the boat overall, Bob Dumaine, the owner of our test yawl, is baffled by broken hinges for the cockpit seat cover over the area molded in for the outboard fuel tank. Apparently these hinges were through-bolted to the deck before the deck was installed on the hull. This makes it faster to assemble the boat, but the owner suffers from this shortcut in the end. The Nimble has quality bronze hinges, but those on Bob's boat broke just inboard of the hinge pin, and there is now no way to unbolt the outboard section to replace them. This may be quibbling a bit, but it would be nice if you could get at the fasteners for all deck hardware when replacement is required. Bob is considering cutting a 4-inch diameter hole in the vertical outboard face of the gas-tank locker in order to reach the bolts and then closing the hole with one of the screw-in access hatches available on the market. This may be a future project.

Getting under way

Under way the Nimble 24 is easily singlehanded, but with two of us aboard, I handled the lines while Bob backed out of the slip and turned toward the open Gulf. The boat has a 9.9-hp, 4-stroke Yamaha outboard, but the Nimble 24 was also built with a small diesel inboard. The price difference between these options was $6,300.

"This boat opens up most cruising areas: you could tow her to Maine, the Chesapeake, the North Channel, or Puget Sound. She could even go to Alaska via the Inside Passage . . ."

Once clear of the jetties, I removed the sail ties and Bob easily raised sail from the cockpit. The sails are a 100 percent jib, full main, and full mizzen. Bob plans to add roller furling and a 135-percent genoa for a little more sail area and ease in singlehanding. We settled down in the comfortable cockpit for a daysail in light air.

Because this is a trailerable keel/centerboard boat with a fin-type centerboard in a low trunk, she really does not point well until the board is fully down. The bottom of the hull is interesting in that it is nearly flat athwartship, with a stub keel and fore-and-aft rocker similar to a sharpie's. Without the board, there is just the stub keel to keep her from sliding sideways through the water when the sails are up. The original Rob Roy yawls were built of wood and were round-bottomed. They would have had even less internal room, but they may have had a better grip on the water.

Ted Brewer says the round-bottomed yawls were a little tippier than the Nimble. He felt that such a small, light yacht needed more form stability than was available with the round bottom so he designed the hard-chine sharpie shape. The fore-and-aft rocker was added for hull strength, not aesthetics. Earlier, Ted had designed the Rob Roy 23 yawl with a round bottom similar to the original English yawls, so he has had experience with both types of bottoms.

With this flat-bottom configuration, going to windward in a steep chop produces a slapping noise when the boat encounters a wave, but this does not translate into physical motion and it is not really objectionable. To compensate for the pounding, the boat performs well off the wind and would probably surf in appropriate-sized seas. Bob and I had several hours of enjoyable off-wind sailing followed by a short motorsail to windward to gain harbor.

Belowdecks

The bunks are 6 feet 8 inches long. The Porta Potti is adequate, although the

head area is cramped. The boat has a water tank of about 20 gallons, a sink, and a pump. There is room for a stove, though with the limited headroom I think I'd cook in the cockpit with a propane grill suspended overboard.

I would think that a person of my size — 6 feet and 200 pounds — would get very tired of crouching belowdecks. In the cockpit or in the companionway it is, of course, possible to stand upright. In foul weather, however, it becomes a sitting-on-the-bunk exercise to get one's pants on. This in no way detracts from the appropriateness of the boat for its intended use but is simply a statement of fact.

Trailerability

By definition, this is a trailerable sailboat, but it is quite big and heavy. With a beam of 8 feet 3 inches and a length overall of 27 feet 3 inches, this is a good-sized vessel. Its weight is advertised at about 3,000 pounds. Add assorted personal gear, such as an ice chest, water, fuel tanks, sails, and other options, and the actual weight may come close to 4,000 pounds. It requires at least a four-wheeled trailer with surge or electric brakes. To tow it, you need a V6 or V8 engine in a full-sized truck or SUV. A vehicle rated by the manufacturer to tow 5,000 pounds with a towing package — transmission oil cooler, frame hitch, and oversized brakes — is the best bet for towing the Nimble 24.

After our sail, it was time to put her on the trailer and take her home to Bob's house. This exercise took two experienced people a couple of hours to accomplish as Bob needed to wash the bottom, remove the sails, drop the masts, and get her ready for the trip home. With a little less of an agenda and more help, the time from trailer to water or water to trailer could be cut to less than an hour, but this is still no "instant boat" to launch. The boat floated onto the trailer nicely with no need to winch it aboard. Winching it onto a trailer would be a lot of work.

"After our sail, it was time to put her on the trailer and take her home to Bob's house. This exercise took two experienced people a couple of hours . . ."

Conclusion

I like this boat. She is an excellent daysailer or overnight cruiser for a party of two. Ted Brewer has done an excellent job by creating a capable, beautiful small boat that would be a joy to own and sail.

Unfortunately, the Nimble company recently ceased operations with the death of Jerry Koch. The Nimble 24 sells used for around $15,000 and is good value for the money. I think it will hold its value in today's economy.

Down below, the Nimble 24 has crouching headroom, at top, plus a 20-gallon water tank, a Porta Potti, and 6-foot bunks. The rudder, at left, for the centerboard model is a curious affair with a pop-up section. The mizzen mast, tiller, outboard, and boomkin, at right.

Rob Roys, Nimbles, and Nomads

Designer Ted Brewer remembers builder Jerry Koch with fondness

by Ted Brewer

In early 1982 I was approached by Jerry Koch, who asked me to come up with a unique small boat design unlike anything then in production. My mind immediately went to the small and charming English Humber yawls of the late 19th century, and I suggested that this type of yacht would find a niche in the market. Jerry was not familiar with the type. I drew up a rough sketch of a trailerable version, mailed it off to him, and awaited his comments.

It was an instant hit with Jerry. I was immediately commissioned to design the boat that became the Rob Roy 23. That name was based on the yacht featured in the 1867 John MacGregor book, *The Voyage Alone in the Yawl Rob Roy*. Jerry Koch was actually more entrepreneur than boatbuilder at that time and arranged for the little yawls to be built by Marine Concepts in Florida. Eventually he tired of this arrangement, sold the rights to the design to the builder, and started his own production shop, Nimble Boats.

In 1984, Jerry came to me for a new design. This time he had much bigger ideas. He wanted another Humber canoe yawl, but this time he wanted a 30-footer, the Nimble 30. He also wanted a much smaller boat to start the line and, in 1985, commissioned the Nimble 20 design before the ink on the 30's drawings had dried. The plug and molds were still in the works.

In the meantime, I'd been sailing my own Rob Roy 23 in the San Juan Islands, and my first thought was that a 20-foot version was too small and would be on the tender side. I'd taken my little yacht through some rather heavy weather and, while quite able, she was not an ideal craft for a beginning family. The Rob Roy had a fairly narrow, round-bilged canoe hull. One way to increase stability is to widen the beam, another is to use a more powerful hull form. The narrow beam was easily answered by adding 10 inches to the 6-foot 11-inch beam of the Rob Roy, and the hull form was modified to that of a more powerful, hard-chine, arc-bottom sharpie. That solved the form stability part of the problem, and the tiny Nimble 20 proved to be a rugged little cruiser for a couple or a small (very small) family.

Quick and easy answer

Eventually, Jerry wanted a new boat somewhere between the Nimble 30 and 20 in size. The problem was that Nimble Boats was always one step short of Chapter 11 and could not afford completely new tooling. So, in 1987, the quick and easy answer was to stretch the Nimble 20. That boat was actually 20 feet 10 inches; by cutting one of the hulls in two amidship and pulling it apart about 3½ feet, we arrived at a 24-foot 3-inch LOA for the new boat. At the same time, we let the deckline follow its natural curve to the new midships, and that increased the beam to about 8 feet 3 inches. Notice that I said "about," as I don't think that anyone ever measured the final result. I certainly didn't!

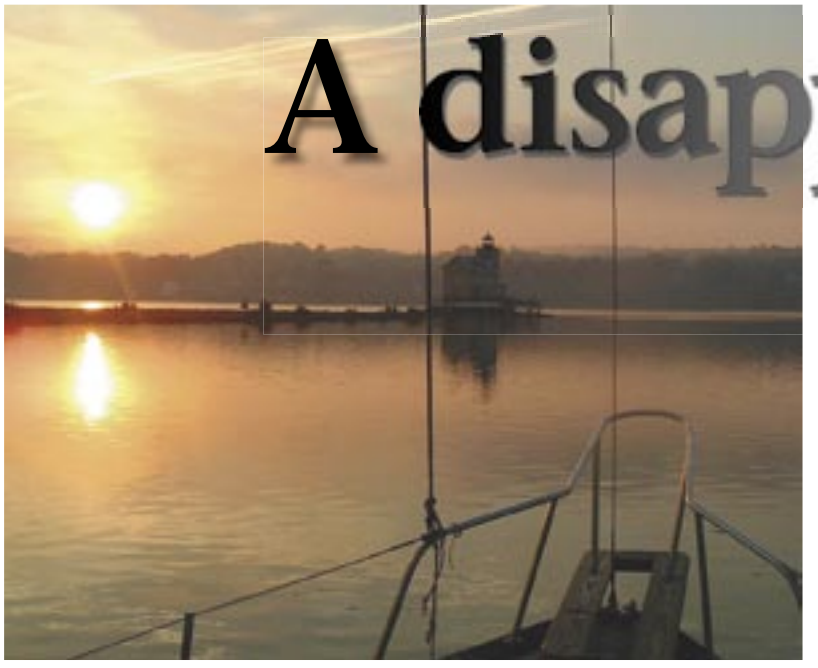
Nimble Boats then proceeded to fair up the new "24" and ready it for use as a plug for a new mold. I returned to the drawing board to work up a new deck plan (based on the 20's deck mold of course), a new layout, and a larger sail plan.

Jerry was always a man with ideas, so we also did a deep-keel version and, later that year, I was drawing up the pilothouse version of the 24 that became the Nimble Arctic. The Nimble 20 also spawned the Vagabond "trawler," and her 24-foot sister was later developed into the Nomad trawler. Finally the Arctic was enlarged with a longer pilothouse to become the Kodiak. So that little Nimble 20 had a great many descendants over the years.

My last design for Jerry was the 29-foot Wanderer trawler/motorsailer in the early 1990s. Jerry Koch passed away last fall, far too young. He was, undoubtedly, the most maddening, annoying, obstinate, inventive client ever . . . always coming up with some new and wild idea for me to translate into a working design. But we had a lot of laughs and a lot of great times together for more than 20 years. I loved him, and I miss the crazy devil.

Nimble 24 yawl

Designer: Ted Brewer
LOA: 27 feet 3 inches
LOD: 24 feet 6 inches (excluding rudder and sprit)
LWL: 23 feet 5 inches
Beam: 8 feet 3 inches
Draft: board up, 1 foot 1 inch; board down 4 feet 2 inches
Displacement: 2,800-3,000 pounds
Ballast: 1,100 pounds
Sail area: 280 square feet (sloop); 275 square feet (yawl)



A disappearing breed

Living with an old motorsailer calls for patience and special skills

by Larry Zeitlin

Motorsailers are a vanishing breed. Every year one or more manufacturers drops from the field. If not in actual Chapter 11, they usually convert their production lines to make tugboat trawler look-alikes. In the words of Rodney Dangerfield, we motorsailors "don't get no respect."

In my area of the Lower Hudson there are only two true motorsailers in a fleet of several hundred recreational boats, both made by Willard a full generation ago. It's hard to say who designed the Willard 30. Apparently the design was made by a committee, albeit a very talented one. The original lines for a 30-foot boat were laid down in 1957 by Bill Tighe, the founder and long-term president of Willard Marine. The boat was custom produced for several years.

In 1961 Bill Garden designed a slightly enlarged version, the Willard 36. This was Willard Marine's first production boat. The Willard 30 was introduced in 1972. Bill Garden lists it in his catalog of designs, so it appears that he had a hand in modifying the original concept. The sailing rig and the topsides of my Willard Horizon were designed by Bill Crealock. In 1974, in response to the fuel crisis, he modified the Willard 30 hull by adding a bigger mast and rig, modifying the topsides, and enlarging the keel to create the Willard 8-Ton Cutter, a true cruising sailboat.

Tighe, Garden, Crealock — quite a trio. Apparently they got it right because the hull was in production from 1972 to 2003, a 31-year run. Willard stopped making recreational boats last year because they were swamped with military orders following 9/11.

It is hard to define a motorsailer. Francis Kinney, who revised *Skene's Elements of Yacht Design*, lists a general rule that a motorsailer is a yacht with enough engine power to achieve hull speed and enough sail power to claw off a lee shore. Insurance companies conclude that this requires at least a sail area equal to the waterline length squared, divided by two. Thus, a motorsailer with a 40-foot waterline should, for insurance purposes, have at least 800 square feet of sail area. Less than that, and it is basically a powerboat with steadying sails.

> *"All current motorsailers feature a pilothouse with full headroom and an internal helm. In fact, this feature almost defines the class."*

Juan Baader, in *The Sailing Yacht*, has a much more pragmatic rule. He says that if a yacht is faster under sail than under power, it is an auxiliary-powered sailboat. On the other hand, if it is faster under power than under sail, it is a motorsailer.

Internal helm

All current motorsailers feature a pilothouse with full headroom and an internal helm. In fact, this feature almost defines the class. Several manufacturers, including Pacific Seacraft, build boats with identical hulls but differing deck moldings. Those with a pilothouse are called motorsailers, those without are called auxiliary-powered sailboats. The type is much more popular in Northern Europe where typical boating conditions are such that most American yachtsmen would be heading for the nearest bar in search of a hot toddy.

Most motorsailer owners slip into the class as a waystation between sailboats and trawlers. They figure they can use their hard-learned sailing skills in the air-conditioned comfort of a full-powered trawler. They couldn't be more wrong. I've been there, I know.

A motorsailer has twice the maintenance problems of the average boat. Not only do you have a full mechanical plant to agonize about, but you also have sails and rigging to consider. These take up space on deck and impose the ever-present threat of getting hit by a wildly swinging boom when jibing. Jibing, as I tell my non-sailing friends, is roughly the equivalent of backing your car into a garage. Easy when you know how, but the learning curve is full of dents and dings.

I have an older Willard Horizon motorsailer, *Puffin*, essentially the

Willard 30 trawler hull with a mast and sail. This 30-foot hull has been produced by Willard Marine, Inc., of Anaheim, Calif., since the Jurassic Age, or at least since 1973. The hull has been in production as the Willard Passagemaker 30, although like most of us, it has grown slightly heavier with age. It has been fitted with a variety of topside moldings ranging from a commercial fishing boat through a luxury liveaboard for people who are content to reside in small spaces.

Feels larger

Puffin's LOA is 30 feet, but the boat feels larger. The waterline length is 27.5 feet. It has a displacement of 16,000 pounds, of which 4,000 pounds is internal ballast. On my boat there is a wide, short bowsprit, and a full-width stern boarding/swimming platform. These appendages bring the length between perpendiculars to about 35 feet. The beam is nearly 11 feet, and the draft a measly 3 feet 6 inches, thanks to a full-length broad keel. The hull shape is vaguely similar to a Colin Archer turn-of-the-century lifeboat with a high bow and a canoe stern.

Like the Colin Archer designs, the Willard has very good seakeeping characteristics — a necessity, since it cannot outrun any storm. The rounded bottom gives it a tendency to roll more in a beam sea than hard-chine trawlers do, but not as much as most sailboats under power. It is seaworthy but not altogether comfortable in bad weather. Boat motion is excessive in beam seas of 3 feet or more; it is unwise to have breakable crockery on the table or open beer bottles on deck when being passed by a powerboat.

Power is supplied by a Perkins 4-107 driving an 18- by 14-inch prop. The boat carries 260 square feet of sail on a low-aspect rig, a large foresail and a smaller main. This is only about half the sail that a cruising sailboat of similar specifications would carry, and *Puffin* can be considered to be sailing under perpetually reefed conditions. It is best considered a 30/70 motorsailer (see Ted Brewer's article on motorsailers in *Good Old Boat*, January 2003).

"Like the Colin Archer designs, the Willard has very good seakeeping characteristics — a necessity, since it cannot outrun any storm."

Easily maneuvered

Maneuverability under power is exceptional with the sailboat-sized rudder, a 3.25-square-foot, half-inch-thick bronze plate mounted behind the prop. The inertia is fairly high, given the hull's mass, but if you have the dexterity of a six-ball juggler, you can manipulate the engine controls and rudder to turn 360 degrees in the boat's own length, convenient in crowded marinas.

The specifications were established when fiberglass construction techniques were still in flux and err on the conservative side. Trawler mavens speak of the Willard as the "pocket battleship" of trawlerdom and, judged by solidity of construction, they are certainly correct.

My boat is laid out like a cross between a cruising sailboat and a contemporary trawler. It has a conventional standing-headroom forepeak with two sleeping berths. Immediately aft and up a couple of steps is the pilothouse with full engine controls and navigational equipment. There is a complete electrical panel with

Puffin, **Larry Zeitlin's 30-foot Willard Horizon takes him comfortably into the sunset, on facing page, and rests contentedly at anchor, at right.**

circuit breakers for all onboard equipment and a 110-volt distribution system for the infrequent times we use shorepower.

The engine lies below the pilothouse floor at about the midpoint of the hull. It is easy to reach by raising a hatch, but all maintenance has to be undertaken upside down. Not good for someone prone to headaches. Fuel is stored in two 60-gallon black-iron tanks on either side of the engine. The engine's central location requires a 13-foot-long propeller shaft with two support bearings, each of which must be greased periodically. There is little sound treatment, and noise levels are fairly high under power.

Double bed

Aft of the pilothouse is the main saloon with a galley and sink to port, and a table and dining area to starboard. The couch to the side of the table can be converted into a double bed for friendly guests. There are plenty of storage areas and cabinets. Aft of the dining area is the head and shower, small but adequate. The freshwater capacity is 100 gallons. Exit the saloon by climbing a couple of steps, and you are on the stern deck. There is sufficient space for a small party of, say, six people. It's just about right for a summer barbecue but too small to host a school reunion unless you went to a very small school.

The water tanks and our LectraSan waste treatment system are in the lazarette below the stern deck. There is an additional large storage area there as well.

Above the pilothouse is the upper steering and sailing-rig control station. This is not the same as a flying bridge on a conventional trawler. A seating area and footwell for the helmsman are molded into the starboard side of the deck. A destroyer wheel is placed before the helmsman with a set of engine controls but no instruments. The mast is immediately to the left on the centerline of the boat. All sailing lines are led to the helmsman; the boat can be sailed singlehanded. Visibility is excellent but because the boom swings directly overhead, a Bimini with adequate headroom is impossible to fit while sailing. Sailing conveniences, as delivered, were minimal. We had to add cleats, winches, topping lifts, and so on. The boat could be sailed without this extra gear, but it wouldn't be fun.

"There is sufficient space [on the stern deck] for . . . a summer barbecue but too small to host a school reunion unless you went to a very small school."

The interior decor is reminiscent of a well-appointed workboat, say, the private boat of the owner of a fishing fleet, rather than a floating boudoir. This is not a boat that was intended to appeal to the ladies. There is a lot of varnished teak inside and out and relatively small ports. The Willard 30 hull permits only about 200 square feet of living space . . . about that of a Sing Sing jail cell. This means that the boat is too small to live on comfortably for extended periods, particularly for those desiring a high degree of privacy. It is not an ideal marina-bound family "summer home."

Comfortable cruiser

We have found that, compared to sailboats, the increased cabin space and relatively stable hull form make for comfortable cruising, but the practice of sailing takes some relearning. First, the drag of the prop is so great that sails alone move the boat at only 4 to 5 knots in 15 knots of reaching winds. Pointing is similarly poor. Sailing closer than 60 degrees to the wind is a chore. Under sail alone, *Puffin's* performance is roughly on a par with Columbus' caravels. We motorsailors learn to sacrifice a lot for creature comforts.

Running the engine at a tick over 900 rpm (about 350 rpm at the prop) when sailing makes all the difference. This compensates for the drag of the large propeller and provides enough prop wash to assist in turning the boat. Otherwise, you will spend half an hour backwinding the jib and getting caught in irons (another best-forgotten nautical term) every time you try to come about. The slight motor assist also permits you to sail closer to the wind than you can in a conventional sailboat, and you can move faster too.

You can overtake sailboat racers in a light wind with a boat that looks like Tubby the Tugboat with a mast. Just remember to turn off the engine as you pass so they can't see the telltale exhaust, then make a quick turn downwind as if you've grown tired of a contest too easily won. The embarrassed and confused sailors will spend the next half-hour fidgeting with their sails to see what has gone wrong.

Apart from such puerile amusements, what is gained and lost with a motorsailer as compared to a conventional motorboat or trawler? Well, as

Motorsailors learn to sacrifice some sailing ability for creature comforts. It helps to run the engine to compensate for the drag of the large propeller and to assist in the tacks.

I said, the maintenance offers more opportunities for worry, and you have the nagging problem of the mast for winter storage. Do you leave it up or down? The mast also inhibits your ability to pass under low-lying bridges, and you find yourself consigned to the parade of circling sailboats waiting for hourly openings while boats with less elevation scoot through.

Alternate propulsion

On the other hand, you gain the confidence of an alternate means of propulsion. If your motor ever packs up, you could eventually maneuver back to shore. This mitigates some of the obsession that motorboat owners have with fuel filtering, electrical malfunctions, and other power plant-killing gremlins. That, of course, and the confidence that sails provide unlimited range. Although it must be said that the wind, as an alternative source of power, leaves much to be desired. It either blows in the wrong direction, doesn't blow at all, or provides an overabundance of propulsive effect in the form of gales, storms, and hurricanes.

But there are pluses. Motorsailers are, by and large, very attractive boats. Most landlubbers, and many yachtsmen too, equate boating with sails. Do tramp steamers attract as much admiration as tall ships? The necessity of mounting sail hardware spares most motorsailers from the futuristic design excesses of sedan cruisers. After all, who needs tail fins at 8 knots? In almost every marina I've had people come up to me and compliment the looks of my 30-year-old motorsailer. "It looks like a real boat," they say. OK, so it can't go faster than a 6-year-old on a tricycle — it's better to look good than perform well.

In addition to the inherent "get home" ability, there are several real functional advantages of the motorsailer over a trawler of similar size. First, when compared to trawlers, the sails provide very good roll damping in beam winds and seas. I can ignore all the yacht club bar discussions about active vs. passive damping, paravanes, and flopper-stoppers. Who needs them? When the sails are up in a beam wind, my boat is rock steady, although it helps if your upwind leg is a few inches shorter than your downwind leg. And when those sails are up and

"When the sails are up in a beam wind, my boat is rock steady, although it helps if your upwind leg is a few inches shorter than your downwind leg."

the motor is going, fuel consumption drops to amazingly low levels. I am grateful that with fuel prices climbing to the stratosphere, I can squeeze an entire season's cruising of about 1,000 miles out of one fill of diesel fuel. If I were to attempt a circumnavigation (fat chance), I would choose a motorsailer for that fact alone.

More gunkholing

Most motorsailers have less draft than sailboats of comparable size, opening up many miles of previously risky shoreline. This includes much of the eastern Chesapeake, the Florida Keys, and the coastal Carolinas. I don't know about the West Coast, but I'm sure there are plenty of shallow, but desirable, areas. The easily lowered sailing rig makes canal cruising relatively simple. I can drop the mast singlehanded in about five minutes. This converts my motorsailer into a somewhat awkward trawler. At my disposal, I have the New York circumnavigation Little Loop (Hudson, Erie Canal, St. Lawrence, Lake Champlain, back to the Hudson) and the eastern U.S. Big Loop (ICW, Hudson, Erie Canal, Great Lakes, Mississippi, Tenn/Tom, Gulf Coast, Florida, and back to the ICW). Sailboats, with their masts and lower-powered engines, can make these trips but with far greater difficulty.

A motorsailer presents somewhat less challenge to basic seamanship skills. Full power turns contrary winds into a mere inconvenience. You can even plan trips and meet a schedule. My dedicated sailing friends accuse me of copping out, but I remind them that I have already paid my dues.

The Willard's forte is extended cruises to remote anchorages for a reasonably adventurous couple. Here the seaworthiness and self-contained nature of the boat pay off. Its size and power requirements make for economical operation and a long range. The dimensions of the boat and conservative nature of the mechanical plant permit most maintenance to be carried out by the owner.

Solid hull

The Willard's quality of construction is generally good. The very solid hull molding, the inner liner, and the deck molding are well bonded together making for a very rigid structure. Like many factory-made boats, the mechanical components are inserted during construction and access for repair or replacement is minimal. Most owners who have repowered their boats report that considerable surgery has to be performed to get at all the bits and pieces. Fortunately, the mechanical parts are very conservatively rated and last a long time.

The older Willard hulls are susceptible to osmotic blistering. This seems to be characteristic of many boats made during the 1970s. The gelcoat on my boat shows an overall superficial craze of fine cracks. I was told by a factory engineer that the early series hulls were constructed of the same plastic used for military-specification boats. Willard supplied many of the craft used to pacify the Mekong Delta during the Vietnam War, and halogen salts were incorporated into the resin as fire retardants. Unfortunately, the salts also absorbed water. Obviously, Navy combat and surfboats were never intended to last 25 years. We have repaired more than 300 blisters below the waterline, some up to 4 inches in diameter. There are numerous small gelcoat blisters above the waterline but, since they pose little structural threat, they have been largely ignored. The final fix, total below-waterline repair with six layers of Interprotect epoxy barrier coat, seems to be holding; only a few new blisters emerge each year.

Barring the annoying blistering and crazing problem, the Willard 30 motorsailer is just fine for a retired couple who want to experience the cruising lifestyle without selling the old homestead and moving aboard. It is small enough to keep the costs reasonable, especially for a handyman, yet large enough to take any coastal voyage imaginable. It is more comfortable than our previous sailboats and provides almost enough room to swing a very small cat. My wife and I have lived aboard a month at a time

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My boat is a she

A 57-year-old pile of junk turns into a beautiful Johnson racer

by Stiv Wilson

I drove 1,100 miles from Montana to Minneapolis after graduation from college. I was anxious to get home as there was a sailboat waiting for me that my father had bought as my college graduation present. But when I pulled into my parent's driveway, my excitement turned to horror. What I found there was not a sleek little racer, but a hideous pile of wood not fit to burn.

Had my parents moved? Certainly *this* couldn't be the boat. No way! Not my college graduation present. This wasn't a boat at all. This was a pile of junk *shaped* like a boat. The thing was in such a state of disrepair that if I wagered on its ever floating, the bet would be nominal and definitely not rent money. But Dad was real excited — he did that funny walk that men over 50 do when they're real happy. Dad quickly tried to invoke some optimism in me. But he shouldn't have parked the sparkling new trailer next to it. "The trailer cost more than the darned boat did," he said.

There was a shocker for you. Did he think this would surprise me? My *shoes* probably cost more than this thing did.

Dad made a few placatory remarks about its sleek shape and stunning erstwhile craftsmanship. I was utterly unmoved, hopelessly unconvinced. Arms crossed, face twisted, I stood there like a brat. I tried to be restrained about expressing my disappointment to my father, but all the shock and horror I felt registered on my face. My dad, who knows me too well, anticipated this reaction and began to explain that the boat was in much better condition than it appeared.

He explained that we needed to do a "little work to make her strong and restore her to her glory." Clearly the man had lost his mind. And why was it a her? This was a pile of splinters, not a she. Last time I checked, my dad sold computers, and I was an aspiring writer. We didn't know jack about old wooden-boat restoration.

> "Clearly the man had lost his mind. And why was it a her? This was a pile of splinters, not a she."

Dad grabbed some sandpaper and removed some of the paint, looking at me with a big grin on his face. He scratched and scratched at the hull until he found some virgin hardwood beneath.

"This here, son, was the first boat Johnson Boat Works made after the Second World War. Heck, Truman was in office. Johnson halted production for a few years because of the steel shortage during World War II. I was just about 10 years old when they built this; it's half a century old. Look, there is virtually no dry rot. It's amazing, more than that, unbelievable … and, I don't mean this is one of the first

"Arms crossed, face twisted, I stood there like a brat…all the shock and horror I felt registered on my face."

ones they made after resuming production, I mean this is the actual *first* one…look at that wood," he said.

It was nice enough wood, as far as wood goes. I went into the house. Mom didn't even say hello. She told me to get back out there.

"But Mom…"

"Do you want to hurt your father's feelings?"

"Maybe," I said.

I went back out. I watched Dad work for a little bit. An hour passed. Dad gave me some sandpaper. I scratched away, still more than a little peeved. After an hour or so, something happened. My mind began to think that this boat had potential. I worked on the mast for a while, becoming more and more convinced that this thing could actually float. The wood was old, sure, but it didn't look as terrible as I first thought. It even smelled like new timber. And then, as I sanded a little more, it happened. I started to get a smile on my face.

"See? I told you," said Dad.

Restoration and infatuation

Yes. I did see it. But restoring this boat was not just a matter of carpentry. I would have to sand, patch, paint, scrape, varnish, and epoxy for endless hours if this thing was going to float. Throughout the summer the enterprise became a constant learning process: an assessment of the boat's physical strength and structural integrity. My work was idiotic at first — dripping epoxy all over the place and getting dirt in the paint. But after a while I got steadier. And after a few weeks I quit referring to her as it. It became she. It dawned on me then that boats were shes because they're the only thing besides women that men obsess upon endlessly.

At my summer labor job I was infatuated with the thought of her. I hadn't sailed since high school, and I couldn't wait to take her out. Days were passed by solving restoration problems in my head. I'd imagine the conditions that had caused the stress fractures. In my dreams I redesigned the jibboom to have the sheets controllable from farther astern. I thought of her as a skeleton now, seeing how everything related to her body.

But each newfound aberration was a link in a chain of endless footnotes to more problems. It was frustrating, to say the least. Dad said some of the non-crucial problems would have to go untreated and that I'd be able to determine which ones those were. How was I qualified to make such decisions?

My relationship with her was simple: she would show me her faults, and I would show her mine. She would see when I messed up. She was witness to my crooked drilling for some of the screws. She knew I wasn't a real boatbuilder. She laughed at me while I kept slathering epoxy, thinking more is better…more makes her stronger. These were the moments when physics eluded me, and though it was odd, I began to trust her. Trust myself. I realized that every old boat is somewhat jury-rigged.

At night I would lie in bed thinking about who might have sailed her before. I imagined her on a Minneapolis lake in bygone days, sailing with ghosts at the helm. Seeing these images helped me begin to understand how she flexed, how she behaved, and, most of all, her limitations. She would not be as strong as in her own day. But what did that mean? It meant that I would have to get to know her better than her previous captains. It was I who would have to soothe her aches, put casts on her broken bones, put Band-Aids on her open sores, and hope that my work was enough. When I sailed before I was my father's first mate. Now I would be captain. But a captain, to be a captain, has to become the boat's soul mate.

As the summer grew to a close, she started to take on the semblance of a seaworthy vessel. The dark, chipping varnish on the mast and boom were now sleek coats of gold. The hull was sea green, the deck was bright yellow. The only additions in the rigging were a cam cleat for the mainsheet and couple new blocks up front. I wanted to keep as much of her original character as possible.

Eventually she became the talk of the neighborhood. My dad's old sailing buddies quit thinking he was insane. The boat no longer looked like a shipwreck; she was a beauty. My mother looked at her in disbelief with each passing day. Mom couldn't believe that Dad and I had brought her back from the dead. My father beamed with satisfaction; he loved this kind of work. Working with his hands was a romance he missed. The boat had become somewhat of an enigma to us. It was the product of a combined effort, beginning to take on something like a spirit. Much to my satisfaction, nobody had a boat like this. She was gorgeous, rare, a diamond out of the rough.

Ready to launch

"When should we launch her?" Dad asked me one day in August. The question took me off-guard. I was sort of waiting for him to tell me when she would be ready.

"I don't know. What do you think?" I said.

"This is your boat, son," he said.

He was right. This was my call. I agonized the next few days, reassessing all the work we had done. A few more minor problems were fixed, and at night I lay awake in bed imagining the worst. In twilight sleep, my thoughts went to the absurd: rogue waves, white whales, tsunamis. Choosing *Godforsaken Sea* as bedtime reading while restoring an old boat is, quite frankly, a terrible idea.

But after a few more days it became clear. It was time to test our work. We planned the maiden voyage. Lake Minnetonka was only a few miles from my parents' house. Dad and I agreed it would be a good place to give her a spin.

At the launch ramp, which was rather busy, I received many compliments about her. The kind of looks the boat engendered were like the looks I'd get if I were to walk down a street with a pretty girl on my arm. I felt proud to stand next to my boat. Dad, however, wasn't as giddy as I

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The magic combination of plastic and glass that changed boatbuilding

by Don Launer

Composite construction in the United States began in the 1940s — during World War II — when a southern California company, Chemold, was contracted by the military to produce molded plastic hulls. It used an acetate resin with a cotton fabric as the reinforcing agent. After the war, the tooling was sold to Wizard Boat Company, which produced a line of small outboard hulls for the recreational boating market. In 1946, the Wizard Company began using polyester resin and eventually switched to a reinforcing material made from glass fibers. In June of that year, the Winner Company, in Trenton, New Jersey, received a Navy contract to develop 28-foot motorboats from this new material. Those early boats were formed over a male mold. Sailboats were first produced by this new process in 1947 by the Glasspar Company.

The original polyester resin was a difficult material to use and required a sunlight cure. Not surprisingly, many of the first companies to use this process were based in southern California. This curing process was soon replaced by curing the polyester resin with a catalyst mixed into the resin before application. This catalyst, methyl-ethyl-ketone-peroxide (MEKP), along with a cobalt accelerator that is usually pre-mixed in the resin, allows the builder a limited amount of layup time, depending on the amount and type of catalyst and the ambient temperature.

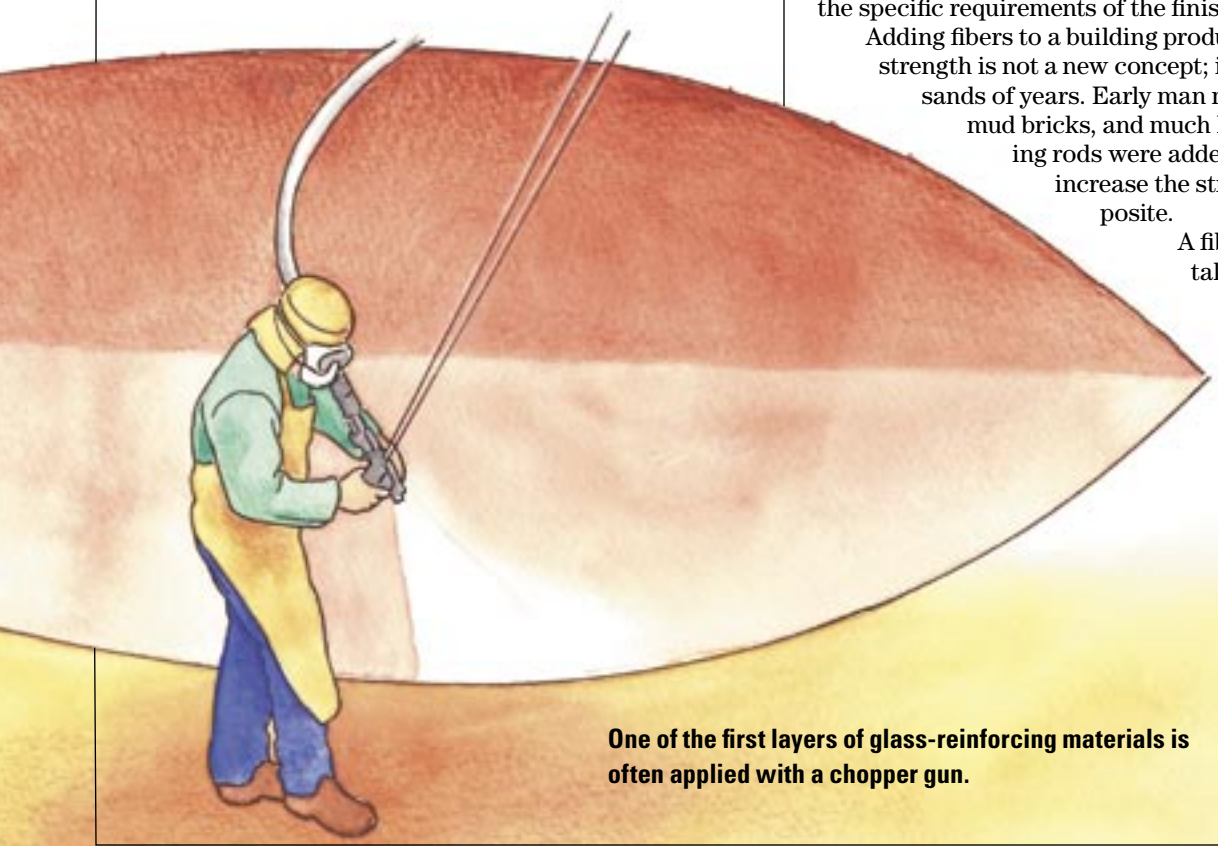
It wasn't long before boatbuilders around the world began using this new technique. However, the word "plastic" was regarded with distrust in the mid-1950s, so manufacturers avoided the term in their advertising. Instead, "fiberglass" became the generic term for this new product. Fiberglass-reinforced plastic, FRP, is the proper name for this material. In Europe it is called GRP, for glass-reinforced plastic.

Low-strength resin

Basic construction of a fiberglass hull uses a relatively low-strength resin, reinforced and made stronger with internal fibers of various types. The most common of these fibers is glass, although Kevlar and graphite fibers are also sometimes used. The plastic, mainly polymers, but sometimes epoxy or vinylesters, is usually of a thermosetting type. Thermosetting is the capability of a substance to become permanently rigid when heated. The thermal agitation of the molecules of the resin aids the chemical process that links the molecules together in a process called polymerization. There are wide variations in the formulations of these resins, depending on the specific requirements of the finished product.

Adding fibers to a building product to increase its strength is not a new concept; it goes back thousands of years. Early man mixed straw into mud bricks, and much later steel reinforcing rods were added to concrete to increase the strength of the composite.

A fiberglass hull usually takes its shape inside a female mold, onto which a special wax with no affinity for the resin is applied. This prevents the layup from sticking to



One of the first layers of glass-reinforcing materials is often applied with a chopper gun.

Layout and illustrations by Ted Tollefson

the mold. A gelcoat is then applied, usually by spraying. This is a special thin, pigmented formulation, which contains no reinforcement. It is followed by alternate layers of fiberglass reinforcements, plastic resin, and sometimes core material. These are applied until the desired thickness and strength are obtained.

One of the first layers of glass-reinforcing materials is often applied with a chopper gun, which sprays the resin and the catalyzer, in the proper proportions, while simultaneously cutting a loose bundle of continuous glass-fiber strands, or rovings, into short pieces and projecting the composite mix into the mold. It has the advantage of filling the angles and corners in the mold and making the layup of subsequent layers easier. Since these glass fibers are in random orientation, strength will be equal in all directions.

Woven roving

The bundles of fiberglass rovings used in the chopper gun can also be woven together at right angles into a coarse cloth, which has the appropriate name of woven roving; when laid at right angles and stitched together, it is known as stitch mat. These materials are the basis of most laminates, but since they have a coarse texture, chopped stranded mat (CSM) is usually interspersed between layers.

Chopped stranded mat, commonly known as mat, consists of chopped fiberglass fibers, about 2 inches long, that are compressed and loosely bound together in random directions into a mat with a binder that dissolves in the resin. Mat produces a layer similar to that of the chopper gun and is the most used material in fabricating boat hulls.

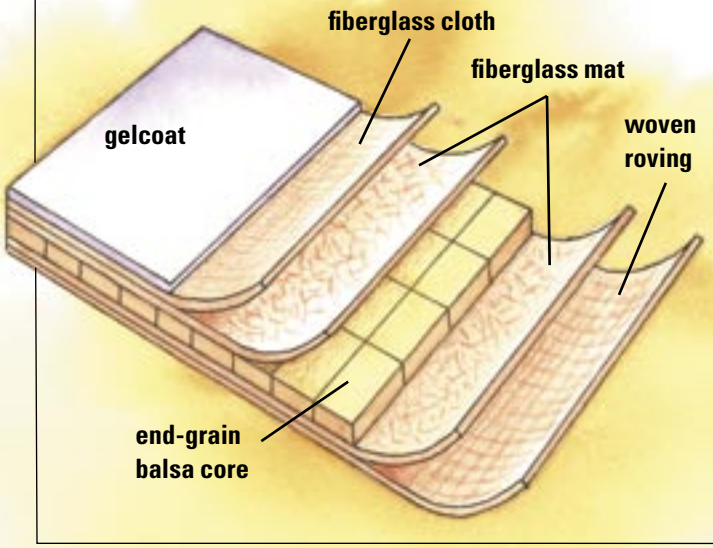
Fiberglass cloth is a fine and tightly woven fabric made from continuous glass fibers. It gives a nice smooth finish and was widely used in the early days, but because of the expense, it is now seldom used except in places that demand a high strength-to-weight ratio. Cloth, woven roving, and stitch mat have strands at right angles and are said to have bidirectional strength.

Unidirectional fabric consists of fibers that only run in one direction and are held together with a binder. These fabrics are used when strength in only one direction is required.

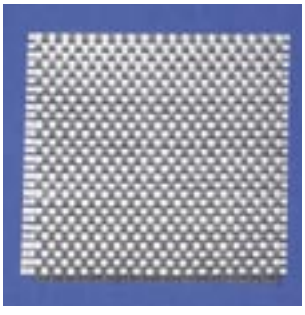
During hand layup, the resin can be applied by brushing, troweling, rolling, or spraying. The resin penetrates the reinforcing fibers and, when cured, the result is a strong monolith.

Weight-saving stiffeners, or cores, are often incorporated in the layup and can be materials such as plywood, end-grain balsa, or synthetics.

Although fiberglass weighs about 106 pounds per cubic foot — about three times the weight of hardwood — it only needs to be about half the thickness of the hull of a wooden boat and will not require heavy frames, so the entire hull ends up weighing less than a wooden boat of similar size.



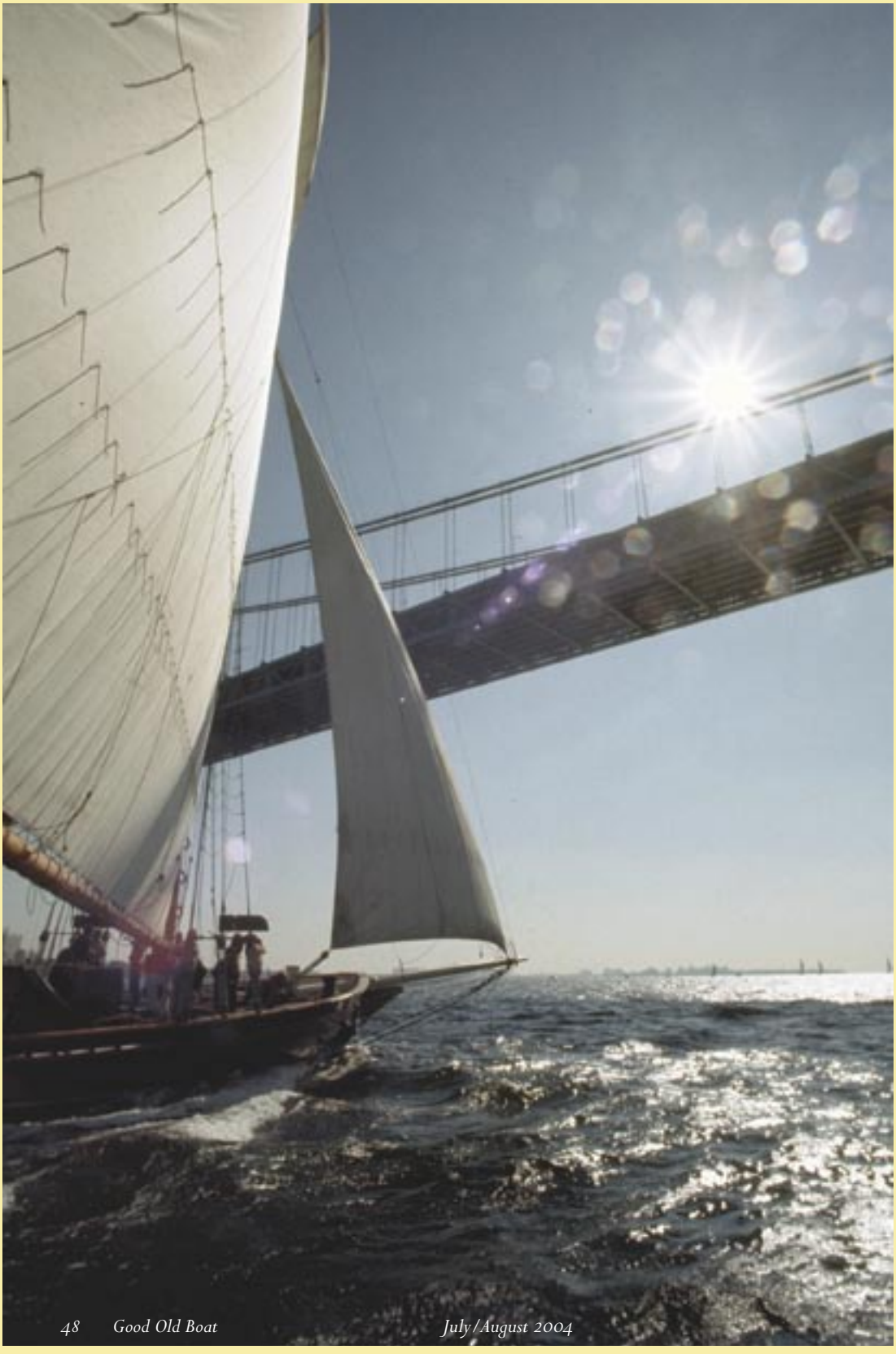
Fiberglass mat/CSM



Woven roving

Fiberglass cloth

End-grain balsa core

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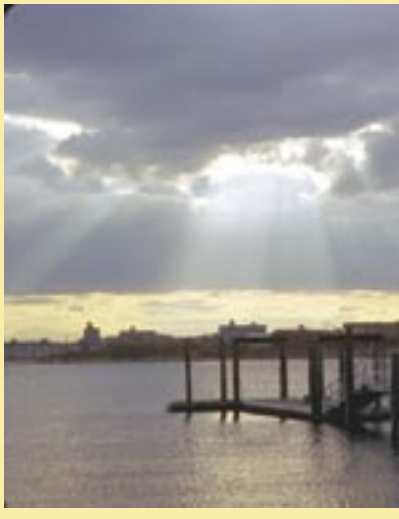
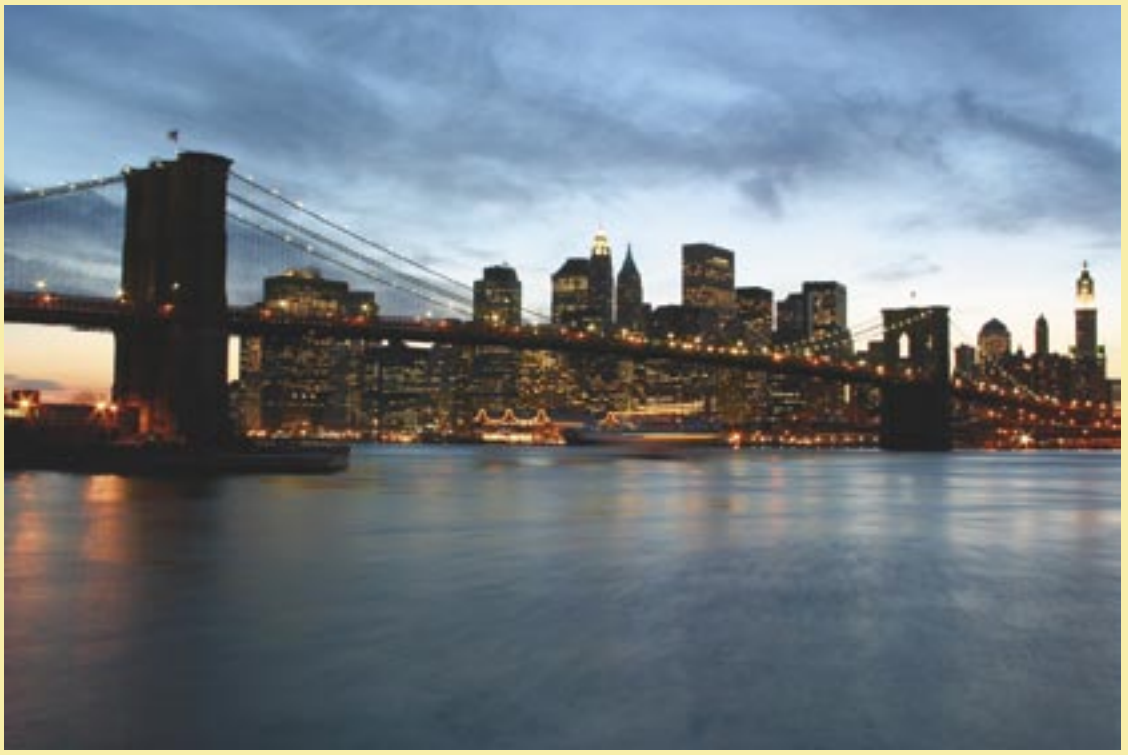




New York! New York!

PHOTOGRAPHY BY
Gary Miller

The Fifth Essential

What you need for cruising . . . besides the boat

BY JOHN VIGOR

I've been giving a lot of thought lately to what kind of coin to put under the mast of *Sangoma*, a 1983 Cape Dory 27 I'm refitting. My wife is no help. She doesn't believe in coins under masts. She says they perpetuate a despicable ancient tradition of payola and subservience to petty tyrants — the gods of the wind and sea. She accuses me of being hopelessly superstitious and wants to know when the heck I'm going to get a life — a modern life.

I'm a reasonable person and I can see her point, although I'm not so much superstitious as supercautious. Anyone who has read *Hamlet* knows there's more in heaven and earth, Horatio, than modern life can account for, which is why most sailors are supercautious. They have to be. Out at sea, you're on your own. Just you and the guys waiting to snatch the coin from under your mast.

I once knew a sailor so supercautious he couldn't bring himself to say out loud a four-letter word ending in "uck." He was a scientist named Dr. Earle Reynolds, and I heard him give a Rotary Club speech about his ocean crossings in a ketch called *Phoenix*. He listed the essential requirements for safe, successful passages as:

- A well-found ship,
- A good crew,
- Adequate preparation and maintenance,
- Seamanship, and
- The fifth essential.

Not once in a half-hour speech did he mention the uck word or define the fifth essential. Instead, he described it by giving examples of how, um, fortunate some famous round-the-worlders had been. Harry Pidgeon, for example, fell asleep and ran aground in *Sea Bird* near Cape Town — in the only sandy bay on a hostile, rock-strewn shoreline. Joshua Slocum's *Spray* was being run down by a pirate vessel off the coast of Morocco when a squall hit — and dismasted the pirate ship. They — and many others — enjoyed large helpings of the fifth essential.

"I once knew a sailor so supercautious he couldn't bring himself to say out loud a four-letter word ending in 'uck.' "

I'm not surprised that Dr. Reynolds was supercautious, even if he was a pragmatic scientist. There are already too many things a sailor can do to bring bad uck. Here are just some:

Changing the name of a yacht. Strangely enough, while it's supposed to bring good uck in Europe, it's said to be unucky in America. I even had to invent a denaming ceremony for my boats. While my wife is predictably disdainful about groveling to Neptune and Aeolus, she is quite partial to the champagne that seals the pact.

Giving a yacht a presumptuous name. No owner in his or her right mind should call a boat *Sea Conqueror* or *Wind Tamer*. That's a direct affront to the sea gods, who like boat names to be suitably humble. You can't be too careful in this respect. The name *Titanic* may seem pretty harmless, but in Greek mythology the most important of the 12 Titans, the vengeful Kronos, cut off his father's genitals with a sickle and threw them into the sea. No wonder Neptune was upset.

Painting a boat green or blue. Ancient sailors believed every ship had its own soul and personality. Thus, a vessel could never presume

to be part of the sea, so boats were seldom painted in the sea's colors. If there was one thing the gods hated, it was presumptuousness. For sailors, it could be fatal.

Launching a boat without a figurehead. This was a very serious offense in the old days because figureheads represented another major sacrifice to the ancient gods, one that riles my wife even more than a coin under the mast.

In the beginning, real human heads were placed on the bowsprit of a vessel starting her first voyage. They were invariably the heads of beautiful virgins—hence, the term *maiden voyage*. This great sacrifice was intended to ensure the safety of crew and ship on the stormy waters ruled by Neptune, Aeolus, and their groupies, a thuggish bunch of minor deities. When the maiden's head fell off the bowsprit, it was a sign that the gods had accepted the sacrifice and that the maiden's soul had entered the ship.

Today, in these times of female emancipation, it's difficult to find young women willing to donate their heads to such a worthy and noble cause, so we have to make do with wretched carved figureheads.

Whistling while on watch. We all know that this brings stormy weather. After all, it's perfectly obvious that if a sailor has time to whistle, then he or she isn't working hard enough. But the sea gods delight in finding work for idle hands, and a storm is a really quick fix for that problem.

Sticking a knife in the mast. In these days of aluminum spars, this problem is not as common as it once was. However, if you have a wooden mast, be aware that a knife will bring heavy weather—unless the knife has a black handle. A black-handled knife is fine to stick in the mast on calm days when you need a little breeze to get you home before the pub closes. To be safe, make sure all your knives have black handles and all your masts are wooden.

Sailing on a Friday. I don't think this applies to round-the-buoy races or short trips around the bay. I believe it's meant for passage-makers, although the belief that it will bring bad uck is found all over the world,

"In the beginning, real human heads were placed on the bowsprit of a vessel starting her first voyage."

possibly because Christ's crucifixion took place on a Friday.

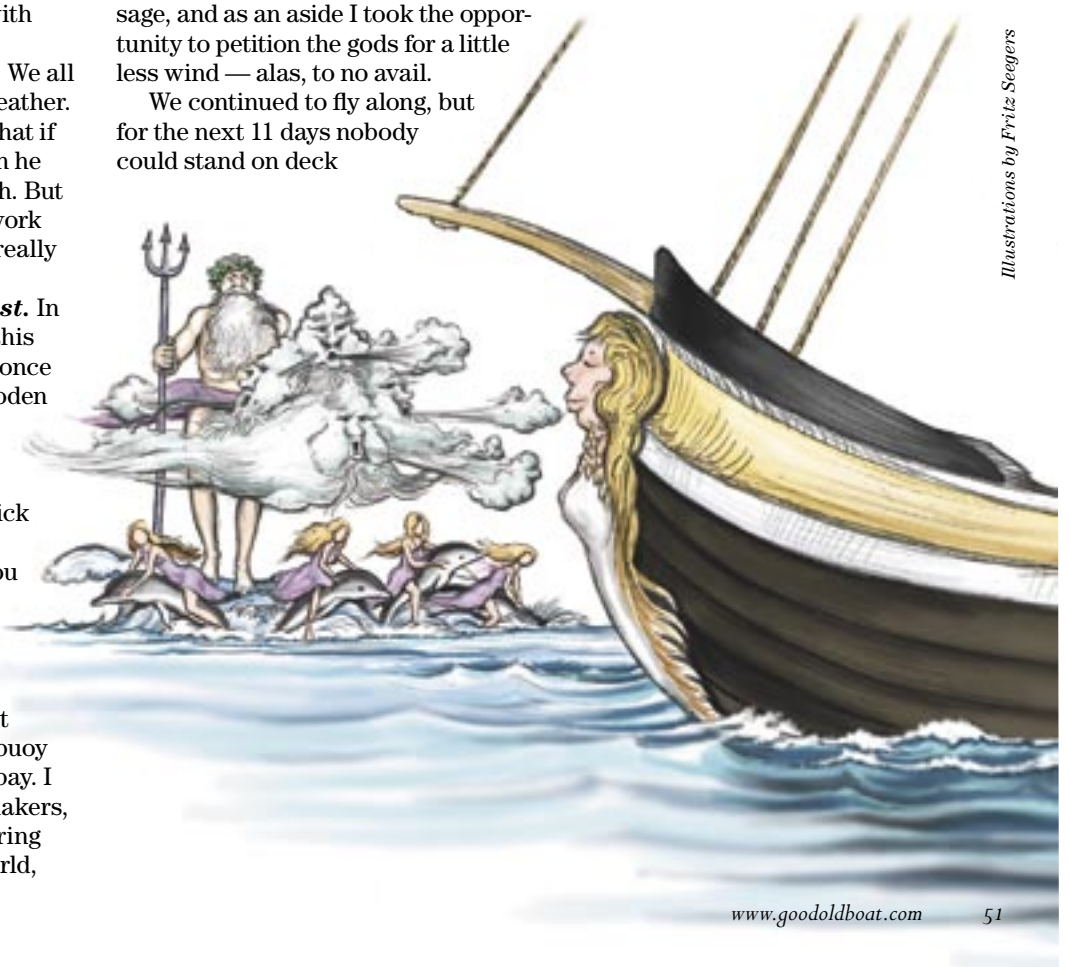
I once overstayed my visa by a whole day while calling at a small island 200 miles off the coast of Brazil in my 31-footer, because I would have had to sail on a Friday. They didn't call out the gendarmes to arrest me. The Brazilians understand these things.

Crossing the equator under sail without offering sacrifice. Last time I crossed the line I conducted a splendid little ceremony that involved (among other things) spraying my wife and son with beer and lowering two unopened cans into the sea. The extent of that sacrifice is evident when I tell you that we carried only a dozen beers to start with, and we were 13 days from land. It was a rough passage, and as an aside I took the opportunity to petition the gods for a little less wind — alas, to no avail.

We continued to fly along, but for the next 11 days nobody could stand on deck without clinging on. We strapped ourselves in our berths. We ate cold meals. The mast wedges fell out and the toilet clogged up. The lesson is simple: never try to piggyback a wheedling request onto a sacrificial ceremony the way Congress tacks barrels of pork on to legislative bills. The gods won't stand for such deceitful maneuvers.

Throwing back the sea's gifts. Never throw overboard anything the sea deposits on your deck. The old belief is that it must remain there until you safely reach port, unless, of course, it is reclaimed by the sea. My startled son once hurled back a flying fish that slapped into his face in the cockpit at night. The next day it clouded over so we couldn't get sextant sights. Purely by great fortune and foresight (the possession of a GPS) were we able to avoid the calamity of missing the only island within hundreds of miles.

Being unpleasant to ships' ghosts. A surprising number of boats have ghosts. The last haunted one I visited was *Destiny*, an 83-foot schooner in San Diego that once belonged



Illustrations by Fritz Seegers

"A BLACK-HANDLED KNIFE IS FINE TO STICK IN THE MAST ON CALM DAYS WHEN YOU NEED A LITTLE BREEZE TO GET YOU HOME BEFORE THE PUB CLOSES."

to Howard Hughes. Debbie Reynolds and Jane Russell were said to have been hidden aboard *Destiny* as a publicity stunt. Ava Gardner, Terry Moore, and Marilyn Monroe had been aboard too. The Joseph Kennedy family and Douglas MacArthur are supposed to have been guests on board, as was the actress Marion Davies.

The ghost is pleasant and appears to be curious. She is a woman in a long, white satin gown. Which woman? Nobody knows. But everybody's very careful not to scream or startle her or get out a handgun and take a potshot. And that's the way it should be. It's very bad uck to upset a ship's ghost.

Dying in the zone of suspended retribution. Despite all their supercaution, oldtime American whalers believed that once you had battled your way around Cape Horn into the Pacific, you entered a zone where retribution for most minor human failings (liquor, lust, lying, laziness, and lack of respect for the sea gods) was held in abeyance.

In this area, on the Pacific west coast of North and South America, a sailor could get away with almost anything without bringing his ship bad uck, provided he was willing to recant and repent when he passed the Horn again on his way home.

Mind you, it wasn't all honey and roses. If you died in this zone of suspended retribution, from the effects of overindulgence in any of the aforementioned failings, you went straight to Davy Jones' locker. Now, Davy Jones was the devil, of course, so your fate was the ultimate in bad uck. To prevent your coming back to haunt them, your mates sewed your body in a weighted hammock and put the last stitch through your nose.

I think I'm going to buy a copy of *Hamlet* and leave it somewhere for my wife to find and read. She needs to know the difference between superstitious and supercautious — and why I always polish the gearknob and genuflect to the instrument panel before I try to start the engine.

The right interior fabric

How to choose new cushion coverings for an older boat

by Theresa Fort

So many colors, textures, and patterns …how will you ever choose?

LIKE MANY OLDER SAILBOATS OUT there, *Coquette*, our "new to us" 1975 Van de Stadt Agulhas, is in dire need of new interior cushions. For the past few months I have been visiting fabric stores and upholstery supply stores, doing research, and calling on what I learned in several textile classes I took back in my college days. Even though I enjoy sewing, I want to choose a fabric that will last, one I will be pleased with in years to come even when styles change, and one that will hold up well with the constant use cushions get onboard a liveaboard sailboat.

"Finding a fabric that will be comfortable to sit on, pleasing to look at, and sturdy enough to hold up to years of abuse is my mission."

Aboard *Coquette*, our boat cushions are roughly used. They're moved and thrown around to get to storage compartments. Our salty, wet bodies or dirty, sweaty bodies sit on them. They may be exposed to engine oil, sealants, and epoxy. They are slept on. At times, intense sun beats down on them. And last of all, they are closed up in the damp, hot, and musty interior of our boat when we lock up. Finding a fabric that will be comfortable to sit on, pleasing to look at, and sturdy enough to hold up to years of abuse is my mission. Sounds like too much to ask of a fabric, doesn't it? With all the fabric and fiber choices available, it really isn't. It just takes some informed decision-making.

Some of the considerations that need to be addressed when shopping for the best upholstery fabric for interior cushions include: fiber type and its absorbency, abrasion resistance, care requirements, flammability, resilience, resistance to UV radiation, and colorfastness. To this, add the fabric itself and its dimensional stability, any finishes that are on the fabric, as well as the color, texture, and pattern of the fabric.

Fiber types

The choice of fiber type is probably the most important consideration. There are many different fibers on the market. For many people, natural fibers have no place aboard a boat. They just don't perform as well as synthetics. Natural fibers tend to soak up moisture, mildewing in the damp environment of a boat. On the other hand, some people prefer to have natural fibers around them for personal or ecological reasons. Some of the most common natural fibers used for upholstery are included here for those who prefer them. Just be aware that because natural fibers are "natural," they will have a much shorter lifespan than a synthetic fabric.

In the explanations below I have noted if a particular fiber has a tendency to pill. Pilling is the breaking or loosening of parts of fibers (or whole fibers) and their movement to the surface of the fabric. With abrasion, these loose fibers tend to ball up and make small "pills" that are unsightly and uncomfortable to sit on.

I have also included comparison tables so you can see how the different fiber types rank according to the following characteristics: abrasion resistance, strength, resistance to sunlight, absorbency, resilience, and flammability.

Natural fibers

Cotton: Cotton comes from the seed bolls of the cotton plant. Generally, it has a soft and comfortable feel. Cotton is naturally resistant to moths and easy to handle and sew. It has fair to poor dimensional stability and resistance to mildew. It takes dyes well and is easy to care for because it is usually hand- and machine-washable and dryable. Many boaters cover their cushions with cotton slipcovers that can be easily taken off and cleaned.

Natural fibers						
Fiber material	Abrasion resistance	Strength	Resistance to sun	Absorbency	Resilience	Flammability
Cotton	Moderate	Good wet and dry	Moderate	High	Low	High unless treated
Leather	High	High	Moderate	High unless conditioned	High	Self-extinguishes
Linen	Moderate	Good	Moderate	High	Low	High unless treated
Silk	Moderate	Good dry; poor wet	Poor	High	Good	High unless treated
Wool	Moderate	Moderate	Poor	High	High	Burns slowly; self-extinguishes

The tighter the weave or higher the thread count, the more abrasion-resistant the fabric. Look for fabrics that are made of combed cotton. These have longer and smoother fibers that will stand up better to abrasion.

Leather: Though not a fiber type, leather is often used in upholstery. Made from the hide of cows, leather has a supple and pliable feel. It is quite durable but requires special conditioners and treatments to make it easy to care for and fire retardant. Leather used for upholstery should also be treated with anti-mold agents and bactericides.

Linen: Made from the fibrous stem of the flax plant, linen generally has a comfortable, crisp feel. Twice as strong as cotton, it has no static or pilling problems. Linen has good dimensional stability and resistance to moths but fair to poor resistance to mildew. It tends to wrinkle easily. Linen can be machine washed and dried.

Silk: This is an animal fiber created by silkworms. It has a luxurious feel. It is the thinnest of all natural fibers. Silk has good dimensional stability, but it loses its strength when wet. Silk has little problem with static and no pilling problem. Silk fabric can be hand-washed, but some dyes may bleed.

Wool: Made from the fleece of sheep, wool has a soft feel but can be a little itchy. It is a good insulator, but moths are attracted to it. Wool can be laundered using gentle action, cool water, and mild detergent, though usually it is dry-cleaned or hand-washed.

When choosing to have wool aboard a boat, choose only very high-quality wool so there is a minimum amount of dander in the fibers. Dander tends to attract mold and mildew spores. Keep the wool well ventilated and clean. When it comes time to store wool, mothproof it.

Manufactured fibers

Acetate: Made from cellulose, acetate has a crisp, soft feel. It is often made into taffeta and brocade. It is shrink-resistant and moth- and mildew-resistant. It is relatively fast-drying and dyes well. Some types are hand-washable, but most are only dry-cleanable. Acetate is resistant to pilling and rarely has static problems. Acetate fibers will melt with temperatures over 300° F. Nail polish, paint remover, and some perfumes will dissolve the fibers.

Acrylic: This fiber feels similar to wool, but is much easier to care for. It is a lightweight fiber with good dimensional stability. It has excellent wicking properties and dyes very well. It is resistant to moths, mildew, oils, and chemicals. Static and pilling can be a problem, but it is quick-drying and usually machine-washable and dryable.

"How an upholstery fabric reacts to the application of moisture is a very important consideration for boaters. After all, it is impossible to keep boats totally dry in a marine environment."

Nylon: Nylon is the strongest of the man-made fibers. It can have differing qualities of feel; some feel crisp, others feel soft and luxurious. Nylon dries quickly, resists damage from oil and many chemicals, and has good dimensional stability. It is hand- and machine-washable and dryable. Pilling and static can be a problem.

Polyester: Polyester has differing qualities of feel; some feel crisp, others are soft and luxurious. It is resistant to most chemicals but has fair to poor resistance to oily stains. Polyester has good dimensional stability. It tends to have static and pilling problems. Blending polyester with dry clean-only fibers can enhance the washability of the fabric blend. Polyester is quick drying, and it is hand- and machine-washable and dryable.

Polyolefin: Also called Olefin or Polypropylene, polyolefin is a petroleum product. It has the lightest weight of all fibers. It even floats. It is stain-, static-, and odor-resistant. It has high insulating characteristics and resists deterioration from chemicals, mildew, perspiration, and rot. It also has high wicking properties. Colors are incorporated during the fiber-forming stage, creating a more colorfast fabric. Spills can be readily wiped up. Static and pilling can be a problem, but polyolefin is non-allergenic. It is extremely sensitive to heat, so ironing, washing, and drying need to be done at a low temperature. It resists waterborne stains and is fast-drying.

Rayon: Made from wood-pulp cellulose, rayon was the first of the man-made fibers. It dyes and prints well and has no static or pilling problems. It has fair to poor mildew resistance and dimensional stability. When rayon is wet, it actually loses 30 to 50 percent of its strength. Rayon fabric can shrink appreciably if you are washing a dry clean-only fabric. Some types are washable or dry-cleanable. Since laundering directions can vary so greatly, read the label on the fabric roll.

Triacetate: Triacetate is similar to acetate but can withstand higher temperatures. It has a luxurious feel with no problems with pilling. It can have a static problem. Triacetate has good dimensional stability. It is machine washable and dryable.

Vinyl: While not really a fiber, vinyl has been a favorite interior cushion fabric in the boating industry. New types are softer, more supple, and much more like leather or woven fabrics then ever before. Being a waterproof fabric, vinyl will not absorb fluids. It has excellent anti-microbial properties and is resistant to mold, mildew, insects, chemicals, and oils. It is easy to care for; usually you only need to sponge it off or use a stiff

brush to clean. Vinyl does not breathe, so moisture can build up uncomfortably between bare skin and the fabric when temperatures rise.

Microfibers: Microfibers are ultra-fine fibers used to produce ultra-fine yarns to make fabrics with a soft, supple feel. Some feel like suede or leather. They are not a separate fiber type and can be made of nylon, polyester, acrylic, and rayon fibers woven so tightly that the fabrics they produce aren't penetrated by wind, rain, or cold. Microfiber fabrics have excellent insulating qualities. Ultrasuede is the designer name for the first microfiber fabric, but there are many other brands available. They are usually machine-washable and dryable.

Fiber blends

Blending of fibers is done to improve the physical properties of the fabric and to enhance a fabric's aesthetic properties. Blending can create a fabric that is easier to care for or change how a fabric performs, like making it stronger against abrasion or less sensitive to ultraviolet rays. Proportions are chosen to bring out the best characteristics of each fiber chosen. Blending can be done with either natural fibers or synthetic in a multitude of combinations and percentages.

Yarn

With any fiber type you choose, if the yarn is fancy or complex, snagging and breakage can result from abrasion. Try to choose a fabric whose yarns are fairly consistent in its width without fancy loops or complex gatherings.

Absorbency vs. wicking

How an upholstery fabric reacts to the application of moisture is a very important consideration for boaters.

"Look for a fabric that has all yarns about the same size. Called a balanced weave, it will be a fabric that will wear better . . ."

After all, it is impossible to keep boats totally dry in a marine environment. Absorbency is the ability for the fiber to take water into itself; the moisture actually goes into the fiber. Some fabrics look as though they are absorbing moisture but in reality are only allowing the moisture to travel along the surface of the fibers. This is called wicking. Fabrics with good wicking properties dry faster than those that are absorbent. Wicking is definitely a plus for keeping your boat's interior drier.

Other considerations

When shopping for an upholstery fabric, look for ones that are firmly woven. Hold samples up to the light. Is the fabric compact? How much light can be seen through it? Is the fabric closely woven? Take a look at the raw edges of the fabric. Pull at the threads to find out if the fabric unravels easily. If it does, then the yarns may shift or pull away easily from your seams as the cushions get used. Stretch the fabric diagonally. If it stretches and recovers completely, it will hold its shape well. Grabbing the fabric sample in your fist and holding it firmly for a minute or two will give you an idea of how easily the fabric will wrinkle.

Look for a fabric that has all yarns about the same size. Called a balanced weave, it will be a fabric that will wear better than one with a combination of thin yarns in one direction and heavy yarns in the other. In general, a twill weave will show less soil and resist wear more than a plain weave of similar quality. A twill weave is a staggered weave where two to three warp threads are over and one to two warp threads are under respective filling threads. It has more threads per inch, which produces a heavier cloth than a plain weave, so it will resist wear longer. This type of weave will have diagonal right-to-left or left-to-right ridges to the fabric. The diagonal quality of the fabric makes it more pliable and less liable to show soil than a plain weave. The only drawback is that it will unravel easily.

Satins, damasks, brocades, and other flat-surfaced fabrics are not abrasion-resistant since they have long yarns on top of the fabric that are subject to wear. Fabrics with a pile, such as velvets and friezes, have excellent abrasion resistance if they are made with firm yarns and have a deep and close pile held to the ground cloth. Pile fabrics with uncut loops mat less easily than those with cut loops.

Sometimes upholstery fabrics have a latex backing applied to them. This coating adds stability to the fabric and helps prevent soil from sifting through the fabric to the cushion underneath. Applied to loosely woven fabrics, this backing can prevent threads from slipping and shift-

Synthetic fibers

Fiber material	Abrasion resistance	Strength	Resistance to sun	Absorbency	Resilience	Flammability
Acetate	Moderate	Moderate	Good	Low	Good	Melts at temps over 300°F
Acrylic	Moderate	Moderate; better than wool	Excellent	Low; high wickability	Moderate	Burns with melting
Nylon	Excellent	Exceptional	Poor	Low	High	Burns slowly with melting
Polyester	Good	Good	Good	Low	Excellent	Burns slowly with melting
Polyolefin	Excellent	High	Poor	Low; high wickability	High	High; burns with melting
Rayon	Poor	Poor strength when wet	Moderate	High	Poor, especially when wet	Very high; extremely flammable unless treated
Triacetate	Low	Moderate	Good	Low	High	Low
Vinyl	Excellent	Excellent	High	Low	High	Low
Microfibers	Excellent	Excellent (except rayon)	Depends on fiber made from	Low; high wickability	High	Depends on fiber made from

ing at the seams and make them easier to handle while cutting and sewing.

Color application

Fabrics that are pigment-printed (printed after the fabric is woven) can show color loss from abrasion. Bring fine sandpaper or an emery board with you to the store when shopping for fabrics and rub your sample 20 or so times with it to see how easily the color will rub off through abrasion (pick an end corner to test). Solution-dyed fabrics (man-made fibers that are dyed in solution before the yarn is extruded) have very high color retention.

Colorfastness

Colorfastness is the ability of a fabric to resist a change in color due to the effects of sunlight, abrasion, chemicals, and cleaning agents. Ultraviolet light from the sun can cause fading of colors and the deterioration of fabric. Because furniture is fixed aboard a boat, it is impossible to move it out of the sun if the cushions happen to be near portlights or hatches. So it is important to protect fabric from the sun, either with window treatments on portlights and hatches or through choosing fabrics that are resistant to solar radiation damage.

Color loss can also occur during cleaning. Test fabrics for color loss before cleaning by applying any cleaning agents in an unobtrusive area. Use a clean, white cloth so that you can see if any color is transferred.

Stain-resistant finishes

There are three main types of stain-resistant finishes applied to fabric. They usually only allow water-based stains to be blotted up easily and quickly. These finishes may retain oily stains.

Scotchgard, made by the 3M Company, is a fluorochemical finish that can be applied at the mill where the fabric is processed or by the consumer if an upholstery fabric does not already have a finish like this. It can be purchased in spray cans at hardware stores or applied by professional upholstery cleaners.

Scotchgard can be applied to new, unsoiled fabric with no problems. Before applying it to older upholstery fabric, make sure the fabric is thoroughly cleaned and that all residues from cleaning agents are removed from the fabric.

Teflon, by DuPont, is the newest fluorochemical finish that can be either applied to fabric at the mill or applied to cushions by a professional upholstery cleaner. Water will not dissolve the stain-resistant chemical but upholstery-cleaning agents will; reapply Teflon after each cleaning.

Zepel, by DuPont, is a fluorochemical finish that is applied only at the mill where the fabric is processed.

If the fabric you are considering has one of these finishes, find out if the finish is covered by a warranty, how long the warranty lasts, and exactly what it covers.

"In general, light colors can create a bright, airy feel and create an illusion of spaciousness. Dark colors absorb more light and create a more intimate space."

Colors, pattern, texture

When deciding on a color scheme for your boat's interior, take into account the color of any wood or other colors onboard that won't be changed. In general, light colors can create a bright, airy feel and create an illusion of spaciousness. Dark colors absorb more light and create a more intimate space. Warm colors like reds, oranges, and browns create a dramatic or energetic feel, if they are intense, or a warm or friendly feel, if subdued. They can even make you feel warmer — something to consider in a cool climate. Cool colors — like blues, greens, violets, or grays — create a feel of relaxation and peace, if they are softer shades, and a fresh, dramatic feel, if they are intense. Cool colors tend to be quite popular in tropical climates, where they can help you feel cooler.

Textures and patterns add interest and character to your boat's decor. Choose them according to the style you like and the type of atmosphere you want to create, but be careful. Complex patterns with several colors and diagonal, zigzag, or crisscrossing lines may be overwhelming in the small spaces of most boat interiors. These patterns also create a sense of motion and are very busy to the eye, something you don't want if any of your crew tends to get seasick.

Vertical lines can create a sense of height; horizontal lines can create a sense of breadth. Patterns change how you see proportion. In general, remember the scale and proportion rule when

The vertical lines intensify this high-backed settee and create a feeling of height in the cabin.

This cream-colored settee is made of leather. Its smooth texture and cream color add to the spacious feeling in the area, which also has light-colored bulkheads and overhead.

Using a gray-blue with a slight pattern adds a relaxing feel and interest to this settee.

choosing any pattern for your upholstery fabric: the larger your space, the larger the print/pattern; the smaller your space, the smaller the print/pattern. Also, the choice of colors affects how you see a pattern. High-contrast colors create an energetic feel to your space, while colors close in value create a more subdued feel.

Textures also have an effect on patterns as well as the look of the space. Rough textures will absorb light; smooth textures will reflect light. It is a good idea to bring fabric swatches (the larger the sample the better — maybe a square-foot piece) that appeal to you to the boat to see what happens when both natural light and your boat's interior lighting hit it. Live with your samples for a while to see how everyone aboard likes them.

"Vertical lines can create a sense of height; horizontal lines can create a sense of breadth. Patterns change how you see proportion."

The vibrancy of color in this settee makes it stand out in the space. The color goes well with the teak. The "pillowy" look and soft texture make it look and feel comfortable.

The lines and colors on the throw pillows, above, highlight the design of the back cushions of this settee and create an energetic feel with their high-contrast colors without adding too much for the eye to take in. The vertical lines help make the settee look taller.

Complementary colors are used in this cabin with the orange hues of the teak cabinetry and the blue cushions. Remember to consider the wood in your boat when choosing a color for cushions.

Shopping

In a perfect world, all fabrics would be labeled, and that information would be easily found in the same location on the fabric in each store. But, sadly, that's not the case. Here's a rundown of where to look for fiber content, washing directions, and (if you are lucky) test results for fabrics.

Home-sewing fabric stores generally have upholstery fabrics on long rolls. Look for the informational label at the end of the roll or attached to the fabric itself with a safety pin. Some fabrics may be folded in half and wound on a cardboard structure. In this case, the type of fabric should be on a label attached to the top of the cardboard (usually hidden under the first layer of fabric). If the fabric is folded up without a cardboard structure and piled on a large table with no information on the fabric with it, I take that to mean that the fabric is set up for quick sale and may be second-rate fabric sold without information. Your guess is as good as mine as to how it will perform. If the fabric table says "upholstery fabric," but there is no information on each bolt, I would look elsewhere. You'll spend too much time and energy sewing (or too much money paying someone to sew) to risk buying something that won't hold up.

Upholstery-fabric stores usually have more choices and better information than home-sewing centers. Fabrics may be on long cardboard rolls or folded on tables. Or there may be fabric samples in books or on hangars. The books of fabric will have information about the fabric on the back of each sample as well as in the back of each book. As in the home-sewing stores, fabric on long rolls should have their labels on the rolls themselves or pinned to the fabric. If you are not finding information on a fabric that you like, ask the manager or a knowledgeable clerk if there is any information about who produced the fabric, what it's made of, and how it should be cleaned. If there is no information available, don't buy it. These fabrics may be poor quality with dyes that may not be colorfast and weaves that may be misaligned.

Our decision

After many days of looking in stores and discussing the possibilities, we chose a black raspberry color of a microfiber fabric made of polyester for the tops and sides of our cushions and a vinyl of almost the same color for the bottoms. We chose vinyl for the bottoms of our cushions because of its superior stain- and moisture-resistance. In fact, we almost decided on all-vinyl cushions. There are wonderful color choices available; they have such supple, leather-like qualities these days; and nothing beats vinyl for durability in a marine environment. But the thought of sticky, sweaty seats in summer was too much for me. And I didn't feel like making cotton slipcovers to cover them in the summer after I had spent so much time sewing new cushions. I love the feel of velour, velvet, or suede-like fabrics. By using a microfiber fabric, I will get that soft comfortable feel in any weather with almost the same abrasion resistance and almost the same ease of cleaning that a vinyl fabric has.

May the interior fabric you choose for your boat perform for years — and bring you much comfort as well as service!

Illustration by Jim Morrison

Fighting fire

What to do when fire strikes on a boat and there's no place to hide

by Jim Morrison

There is always some uncertainty in life, especially when it comes to boats. It wouldn't be an adventure otherwise. But one adventure we all want to avoid is a fire on board. If a fire starts in a building, you can leave the building and go to a safer location. In a boat that isn't always possible.

Although it's unlikely, there is always some chance that a fire will occur and a fiberglass or wooden boat can burn to the waterline and sink. Most fires are preventable. Minimizing risk is the most effective means of dealing with fire hazards. If you keep the tiger in his cage, you won't have to deal with the emergency of his escape. However, if he does escape, you need to be prepared for that too. Quick detection of the smoke or fire is mandatory because unconfined fire spreads exponentially with time. Finally, depending on the situation, you must be prepared to fight the fire or make the decision to abandon ship.

A fire doesn't happen without a reason; there is always a cause and a sequence of events that lead up to it. One way to look at the possibility of an adverse event happening is by using what engineers sometimes call a fault tree analysis, a model to help identify alternative sequences of events that could lead to an accident.

For example, take a fire that started with the heat from an electrical system. To start, this fire needed fuel heated to ignition temperature (and oxygen, which is almost always present in the air). Look at the first branch below "Fire on Board" in Figure 1. Notice that it is an "and" gate. Both fuel and ignition temperature need to be present. To have fuel present, I made the chart indicate the existence of either an improper clearance to a combustible (like a wire lying on paper, cloth, or wood) or flammable or gas vapors. That is an "or" gate because either could supply the necessary fuel. On the other side of the chart is ignition temperature; either a spark can supply it (perhaps from a motor) or abnormal resistance can cause a wire to heat to ignition temperature.

Figure 1 isn't complete by any means. For example, the flammable liquid vapor had to come from some-

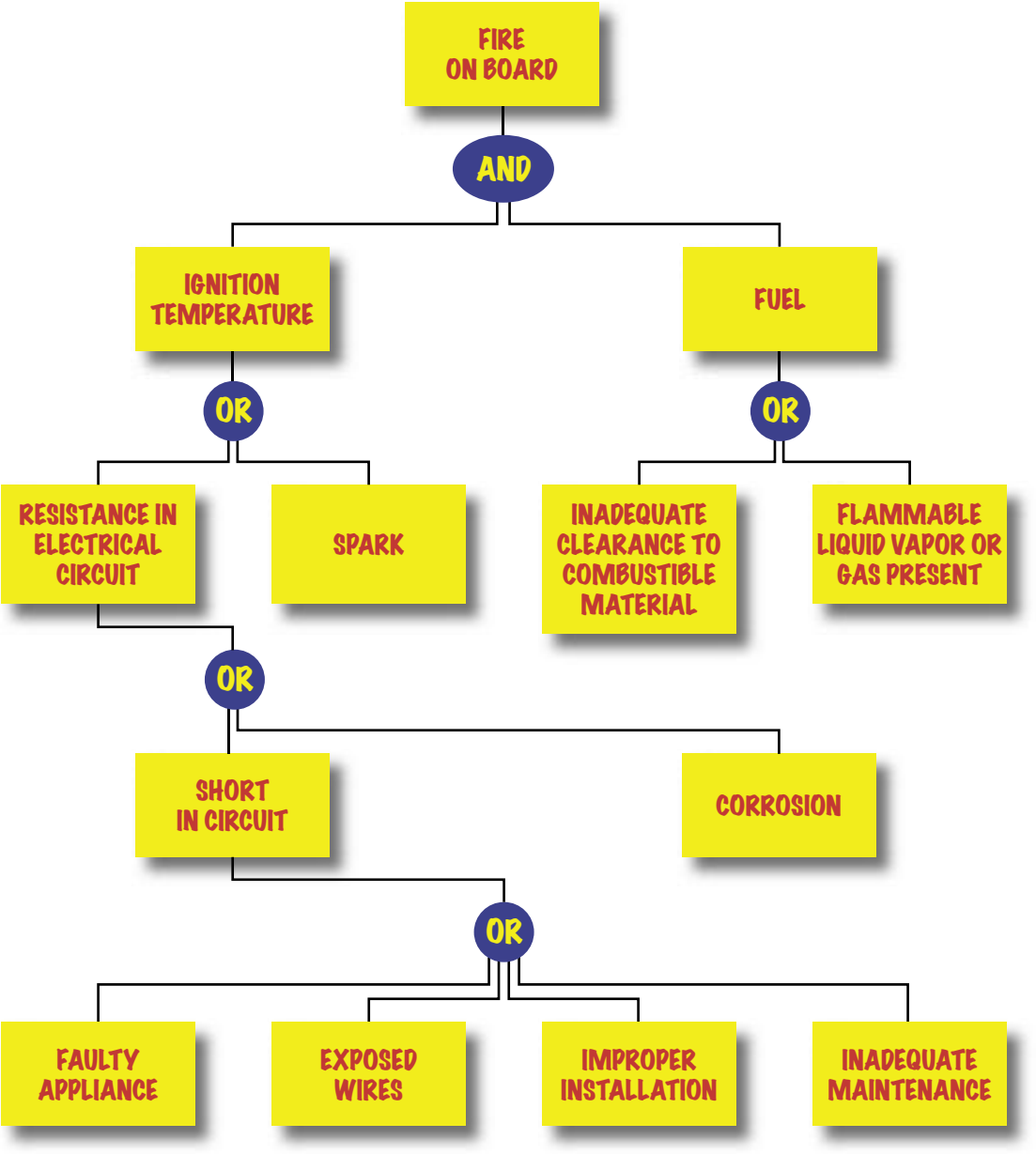
where, but one thing leads to another. Proper inspection, maintenance, and testing of the electrical circuits and appliances will break up the sequence of events that lead to fires caused by the electrical system. Be diligent about inspecting electrical connections in places where flammable vapors might be present, such as in the engine compartment. Be sure the batteries are well ventilated because charging, especially overcharging, produces explosive hydrogen gas. There are some excellent books on the subject, such as *Sailboat Electrical Systems: Improvement, Wiring, and Repair* by Don Casey. Also, read the article by Gord May in *Good Old Boat*, March 2003.

"The decision to fight a fire is a tough one. Certainly you shouldn't risk your life to save property. Yet, if you are at sea and fire breaks out, the alternative to extinguishing it may be as dangerous."

Flammable liquids such as alcohol and gasoline are commonly involved in boat fires. Here are a few preventive measures:

- Inspect all the components of the fuel system from the tank to the carburetor for leaks and condition.
- Look and smell for leaks. You may be able to smell a problem before you see it.
- After refueling, sniff the bilge for gasoline vapors, check concealed spaces, and run the blower before starting engine.
- Storage of fuels: use only containers approved by Underwriters Laboratories or equivalent for storing flammables.

Figure 1. Causes of fire



Gasoline is a mixture, and its flash point varies but is about minus 45° F. That means that it is always giving off flammable vapors at temperatures anywhere near any area where I want to be sailing. Diesel (fuel oil) varies also but has a flash point above 100° F, so it isn't nearly as volatile as gasoline. Yet, it can give off flammable vapors in a hot engine compartment.

Marine stove alcohol is just denatured alcohol and has a flash point of about 60° F. Propane is a gas under normal conditions, so it is always an explosion and fire hazard. By law, every manufacturer is required to provide you with a Material Safety Data Sheet (MSDS) that lists the flash point and much other important safety and health data. I find that manufacturers almost always provide the MSDS information online.

Since it is usual to cook over an open flame, it shouldn't be a surprise that galley fires are not uncommon. Propane is a great fuel for cooking, but if you have propane on board be sure the tank and piping arrangement are installed according to the latest standards. The tank, regulator, and solenoid valve have to be in a separate vapor-tight compartment with a drain that vents overboard. Propane has a density of about 1.6 compared with air at 1 (and gasoline at about 3) so it can accumulate in the bilge. Avoid that at all costs; use your blower before starting the engine to ventilate the bilge.

"A working smoke and fire detector is a real asset if a fire starts while you are asleep. Battery-operated smoke and fire detectors are inexpensive."

The safest alcohol stoves are the new non-pressure types. Alcohol fires can be put out with water. Be sure to store the extra alcohol in a safe place where it won't be damaged or spill when the boat is heeling or in a seaway. Don't take more alcohol than you need on a trip.

I notice that my curtains can be positioned over the stove if I am not careful. All combustibles — such as paper, clothing, and wood — should have adequate clearance from the stove, especially above it, since a flare-up (common in pressure alcohol stoves) or grease fire can reach quite high. When I had a propane-fired stove, I shut the valve at the tank when I wasn't using it. You should inspect the entire propane system regularly. Use soapy water and a brush to test for leaks when the system is under pressure.

Fight or flight

by Jerry Powlas

***Caution**: what follows is definitely my own (very controversial) opinion and not the standard advice given about fighting fires. If you read this, you still have to form your own opinion.*

Should you fight a fire at sea? Almost certainly yes, you should. If you can get at one or more of the little tiny fire extinguishers we carry on recreational boats, you owe it to yourself to use it on the fire. It will take only a few seconds to empty it, which is the good news and the bad news. You will know pretty quickly if your fire extinguishers are going to have any effect on the situation.

What if you can't remember what kind of fire extinguisher you should use for the fire you are confronted with, or you can't figure out what kind of fire you are fighting, or it has multiple attributes? This matching of the extinguisher to the fire type is very nice as far as it goes, but if that is not working out because you are confused, frightened, and generally uncertain, fight the fire with what you can lay hands on. It is still probably worth the fight.

Unless you are transporting hand-operated fire extinguishers as freight for hire, you are not going to have enough fire extinguisher capacity to do much. You should seriously consider carrying more than the minimum required, and still you may not have enough unless you catch the fire in the first few minutes or even seconds after it starts.

The one thing a sailor has for fighting fires in large supply is water. Every sailor who has worn a uniform knows that. First you break out the fancy stuff and run out of it, then you hook up hoses to the fire mains and spray the ocean on it. There is a lot of advice out there about not using water on an electrical or a grease fire or on an oil or fuel fire. The argument is that you might cause a short circuit or cause the grease fire to spread. Yup, you might. You also might put out the fire.

Many years ago my previous wife put out a kitchen grease fire in a neighboring apartment with the spray nozzle on the sink. Afterward she took a lot of guff from the occupant of the apartment and the firemen for doing that. The occupant grabbed the TV set and the baby and ran for it. The firemen didn't get there for 20 minutes. My wife put out the grease fire with water before it spread throughout the whole building. Even though she was told that she didn't do it right, the fire was out.

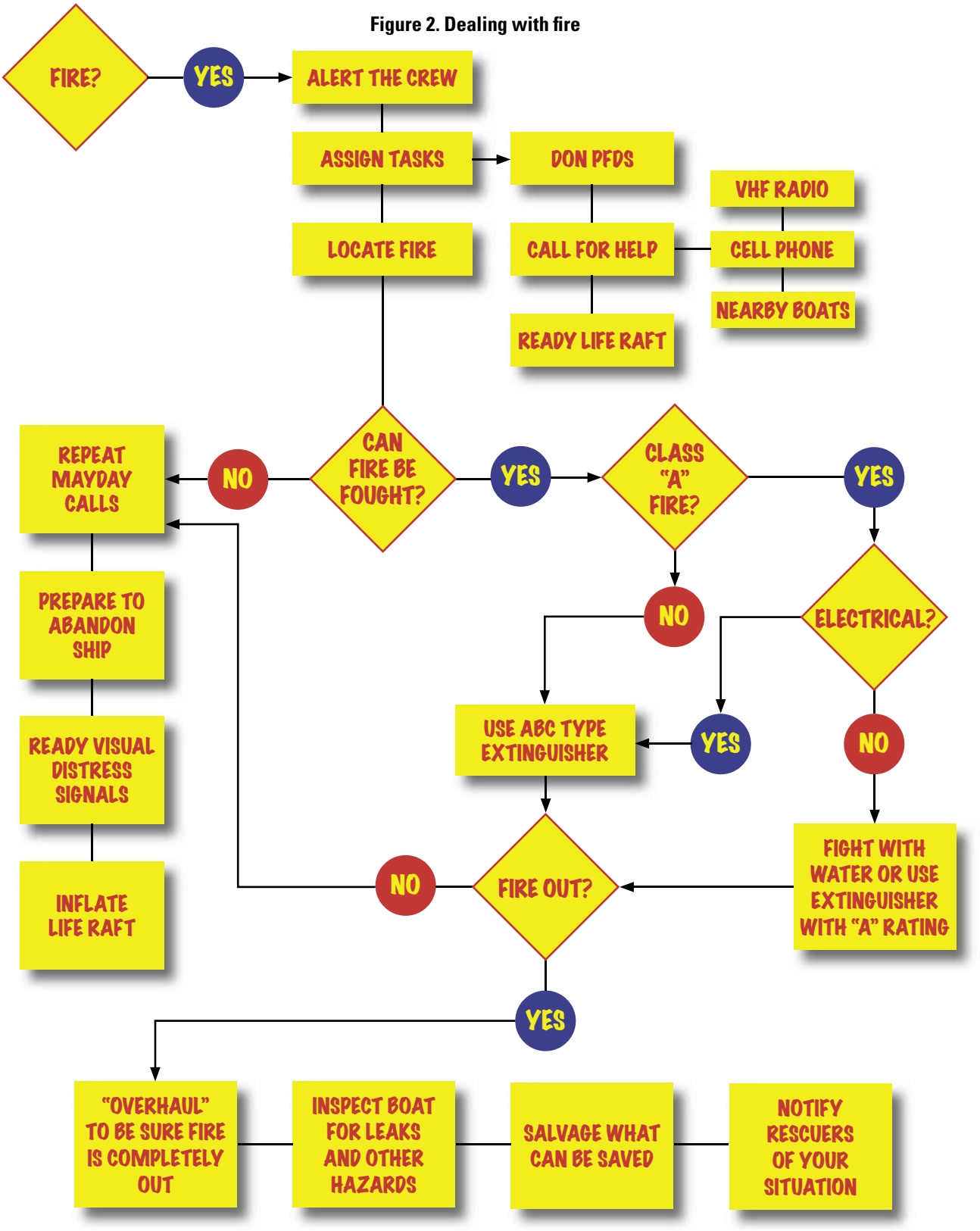
Fifteen years later I did the same thing. I put out a kitchen grease fire with the water spray nozzle on the kitchen sink. About half of the kitchen was on fire along with supper. There is no way to know for sure, but in that case — even though the fire department was more prompt — I doubt we could have saved the house if we had waited for them.

You can put out grease and oil fires with water. You can cool electrical equipment down and extinguish the surrounding wood and plastic with water. Many boats don't even have a high-voltage system. If you are just spraying water on the low-voltage system, there is not much danger of shock. Open the main battery breaker if you can, but don't let all that well-meaning advice prevent you from fighting the fire with whatever you can use, which includes water. Once you take to the life raft or dinghy, you will have all night to wish you had tried a little harder to save the boat.

Just my opinion.

Bernard Moitessier is said to have reduced the weight of his boat, *Joshua*, by a ton by eliminating what he didn't need to sail around the world without stopping. I doubt if you have a ton of unneeded material on you boat, but it is a safe bet that you could find considerable extra stuff. The fundamental principle of good housekeeping is to have what you need neatly stowed so it doesn't come loose when the boat rocks and rolls and so you can locate things when you need them. How much paper, paint, thinner, and extra fuel do you really need? How long has it been since you took everything out of those deep lockers and got rid of the stuff you haven't used for years?

Figure 2. Dealing with fire



Make sure that combustibles are stored away from exhaust pipes, heater vents, stoves, and ovens. Keep the engine area free of oil and rags. If you don't allow smoking on board, you have eliminated a serious fire hazard.

If the tiger escapes, you need to know quickly so you can protect yourself and make plans to put him back in his cage. A working smoke and fire detector is a real asset if a fire starts while you are asleep. Battery-operated smoke and fire detectors are inexpensive. Another good device is a gasoline fume detector (sniffer) that can detect gasoline vapors and sound an alarm before they reach an explosive mixture with air.

"…you might consider an automatic extinguishing system for the engine compartment. These systems sell for between about $100 and $800, depending on the size you need."

Figure 2 shows some of the decisions you will need to make if you discover a fire on board. If the fire is in the engine room, there is a problem with fighting it because opening the engine compartment will introduce more oxygen and could cause the fire to flare up and get quickly out of control. To help alleviate this problem, you might consider an automatic extinguishing system for the engine compartment. These systems sell for between about $100 and $800, depending on the size you need. They automatically activate at 165° F and use an agent that does not leave any residue.

The decision to fight a fire is a tough one. Certainly you shouldn't risk your life to save property. Yet, if you are at sea and fire breaks out, the alternative to extinguishing it may be as dangerous.

The first thing to do is to alert the crew and don PFDs, call for help, locate the fire, and, if possible, extinguish it. Notify any potential rescuers of your situation. If the decision is made to fight it, you will need the appropriate type of fire extinguisher (or a multipurpose ABC type). If you decide to abandon ship, you will need to prepare the life raft and collect emergency supplies. If you are successful in extinguishing the fire, make sure there are no smoldering embers.

A little fire is quickly trodden out,
Which being suffer'd,
rivers cannot quench.
Shakespeare — *Henry VI*

Resources

Fireboy
<http://www.fireboy-xintex.com>

MarineEast
Maker of Fire Port devices that allow you to look inside the engine compartment and to direct a portable fire extinguisher into the compartment without exposing yourself.
<http://www.marineeast.com/>

Maintaining the pulse, Continued from Page 35

The Martin gang on the beach in Greenland, at right: Jaja with Holly in front and Teiga in back, Chris, and Dave.

I didn't know how or when, I just knew it would happen. I didn't care what sacrifices or hazards I would have to endure to make ocean sailing a reality. Going was all that mattered. I think this is the same drive that each of my idols shared.

Now, with many years of offshore sailing behind me, I've realized that "adventure" is not just a word reserved for the things "other people" do. Whether it's crossing the bay or crossing an ocean, adventure is any experience that tests personal limits. Novice sailors are the lucky ones because they can get that "adventure sensation" close to home! But as the novice becomes more proficient, he or she will experience less adventure close to home and will have to travel farther afield for the same thrill. And so the cycle begins.

Although I have embraced GPS and a few other "advances of modern technology," I still have a fondness for a boat with simple systems. For me, sailing is all about "making do." If something breaks, I fix it. If I can't fix it, I do without it. Instead of thinking about what I can buy for my boat, I try to think about what my boat can buy for me: freedom.

"If I can't fix it, I do without it. Instead of thinking about what I can buy for my boat, I try to think about what my boat can buy for me: freedom."

I feel lucky that I began sailing when the world wasn't so controlled by electronic gadgets. I also have my sailing idols to thank — they were my real instructors. By showing me what was possible, they proved that confidence is all that's really required for seeking adventure. Let's face it, if it wasn't for them, I'd still be clinging to the rail, screaming.

The Martins' 33-foot steel-hulled *Driver* near a Greenlandic iceberg in 2002.

For further reading...

Both classic books by Dave Martin's heroes, John Guzzwell's *Trekka Round The World* (1999) and Robin Lee Graham's *Dove* (originally written in 1972), as well as Dave's book, *Into the Light* (2002), are available at <http://www.goodoldboat.com/bookshelf.html> or by calling 763-420-8923.

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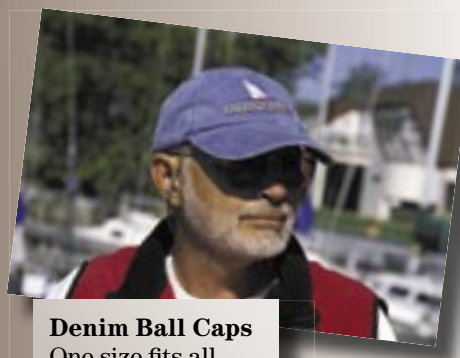

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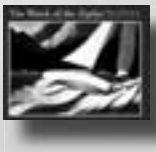

A boy's ambition to be the world's best sailor brings him to ruin when he misuses his new ability to try to sail his boat in the air. Memorable illustrations by the author. A children's book.

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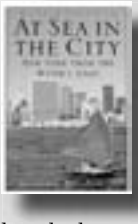

At Sea in the City
By William Kornblum, foreword by Pete Hamill

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By Daniel Spurr

The first telling of how this revolutionary material and the mavericks who dreamed of working with it brought boating to the masses. Spotlights landmark designs that continue to set the standards in the used-boat market and, in many cases, changed boating forever. 220 illustrations.

400 pages, paperback **INT028 $16.95**

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A well-told family sailing adventure. Under way for three years, the Martin family of five covered 11,000 miles and came within 610 miles of the North Pole. An inspirational page-turner. Excellent photos.

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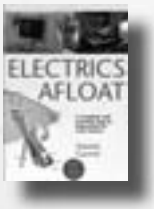
Electrics Afloat
By Alastair Garrod



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286 pages, paperback **FEP011 $18.95**

Ready for Sea!
By Tor Pinney
Illustrated by Bruce Bingham

This comprehensive handbook describes how to prepare an already sound sailboat for extended cruising and living aboard. Covers improvements above and below decks, rigging, systems, safety, and comfort. Photos and drawings.

224 pages, paperback **SHP068 $23.95**

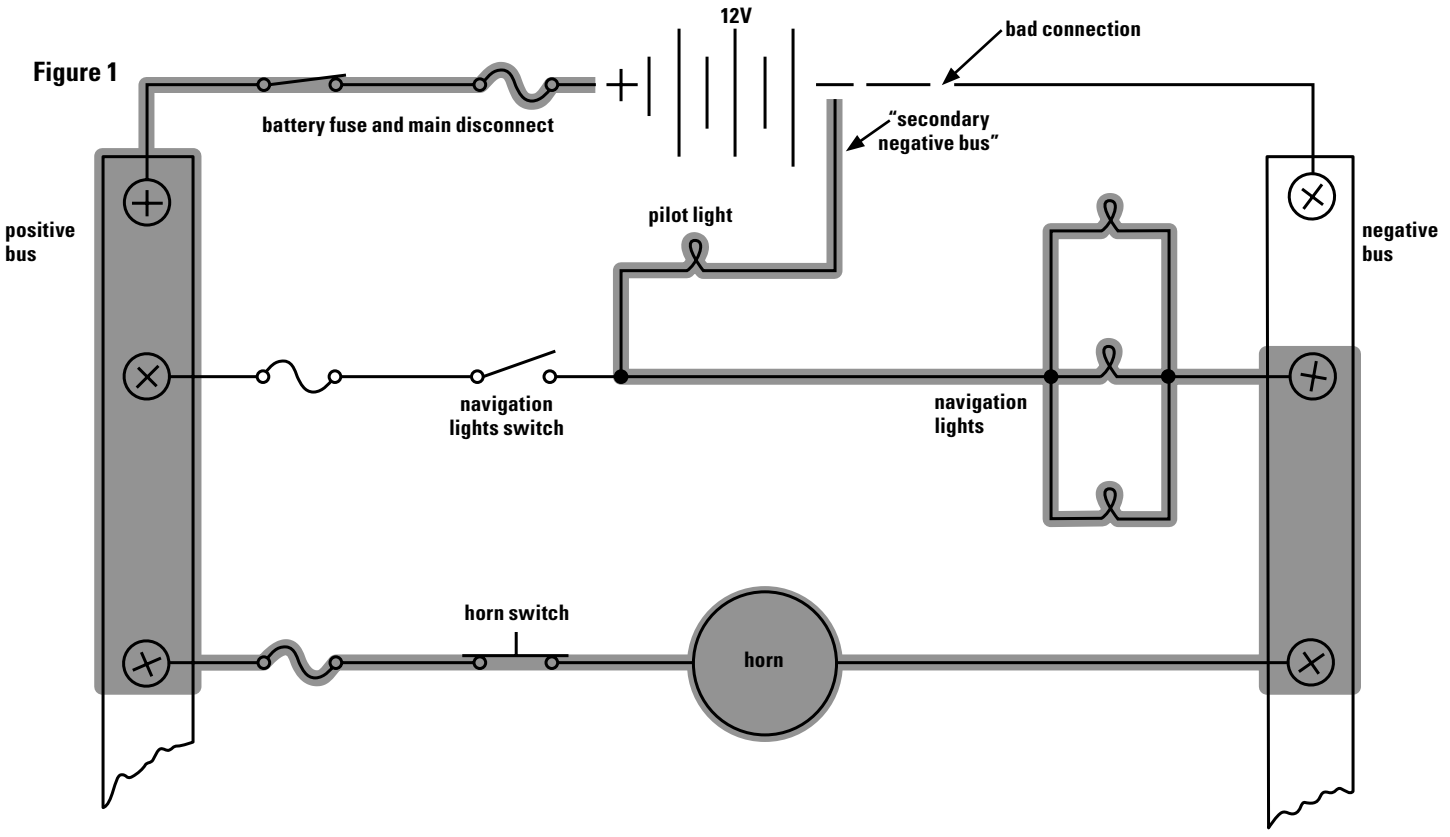


Figure 1

Dancing the

MY FRIEND CALLED WITH OBVIOUS concern in his voice. "John, something very strange is going on; I need your help! My boat is . . . possessed!"

"Possessed, George?" Even if he did own a powerboat, he was a brother boatman, a fellow military retiree, and a good friend. Perhaps I could help him.

"Well, I was getting ready for my annual Coast Guard Auxiliary safety inspection. And when I pushed the horn button," he continued, "the horn was weak, and the navigation lights came on." George paused. I could almost hear his brows furl.

"The lights wouldn't turn off until I stopped blowing the horn . . . " His voice trailed off in wonderment. Then he asked, half curiously, half sheepishly: "Do you do nautical exorcisms, John?"

Once aboard, I was certain I had solved that particular problem before. Which boat was it? And what was the solution? Where had I first seen the elusive gremlin that powers circuit "B" when the switch for circuit "A" is flipped? Then it came to me: I had encountered these symptoms on my first boat. I bought it back in the early '60s from "Honest John, Your Trustworthy Used-Car Salesman" while stationed in Biloxi, Mississippi.

Why buy an old wooden boat from a used-car salesman? I suspected it had been unloaded on him as a part of a "distress sale" and could be bought for a song. He knew his cars, perhaps, but not his boats. I did get a bargain: a well-built, homemade 28-foot cutter, complete with bunks, dedicated galley, enclosed head, even a fine little inboard.

Worried wife

Later, I found I was more than right on the circumstance of the boat's sale to Honest John. The owner's wife had been worried. Her hardworking professional husband was showing the warning signs of stress and overload. She had recommended that he get a hobby; she wasn't ready to be a rich widow just yet.

" 'The lights wouldn't turn off until I stopped blowing the horn . . . ' His voice trailed off in wonderment."

"How about buying some plans and building that boat you always wanted?" she had suggested. She was right on target. Build it he did, and he did a pretty fair job. Then he shipped it down to the Gulf Coast where a local sailmaker took care of the final work and launching.

His wife was pleased. He would return home to central Mississippi after a relaxing weekend on his boat, his mental and physical health much improved. She was no sailor, but one weekend she decided to drop by the boat for a surprise visit. She sure surprised him! She also surprised the little honey he had shacked up with him down below. Honest John had been the first to offer cash for the discredited cutter.

Not believing the old sailor's taboo against renaming boats, I immediately changed the cutter's name from the moniker of the previous owner's mistress to the *Mary Lu Too*.

As I became familiar with my new boat, I found the gremlin. When I turned on the spreader lights, the bilge pump ran. I finally discovered that a corroded ground connection

was the cause. When the spreader-lights switch (on a panel with pilot lights for each circuit) was turned on, the pilot light for the bilge pump glowed and the bilge pump ran rather anemically. I found that the common grounds for the pump and lights were lost due to the corrosion but that the fancy switch panel with the individual pilot lights was wired with a separate ground to the battery.

Hurries back

Electricity is speedy, tenacious, and predictable. When released from its confines by an operating switch, it rushes through its destination, doing its work (light, motion, heat), then hurries back to the confines of the battery. But if the return path is blocked — by a disconnected or broken wire or a loose or corroded connection — it will hunt for any other alternate electrical path that will take it home. Until you understand how there can be other paths and then how to find them, the strange symptoms can be a real mystery.

The seemingly troubled — but apparently independent — electrical circuits have this in common: faulty grounding circuits. Each of these circuits has a common source of power (the battery) and a common negative bus (sometimes just the negative battery post).

The gremlin is set loose when these independent circuits do not have a common negative bus. With more than one ground, they lack a single, common good ground. Multiple or poor return circuits are the breeding ground for those gremlins. When one of the multiple grounds fails due to corrosion, a loose connection, or a broken wire, the circuit served by that bad ground will attempt to find an alternate return path to ground.

Are you ready to dance the electrical two-step? There are just two easy steps in troubleshooting the bad-ground gremlin:

Step one: Determine which circuit (horn, anchor light, running lights) causes the problem when activated.

Step two: Find which circuit is simultaneously activated that should not have been activated.

"This is just one scenario, and if your boat develops a gremlin, you can bet it won't be exactly the same. First consider what has been done recently to the electrical system."

electrical two-step

Observe the ground rules and drive the gremlins out

by John Butler

The answer to the first step tells you which circuit has lost its ground; the answer to the second tells you which circuit is providing the mystery ground.

What changes?

Hoping to shorten the troubleshooting time on my friend's runabout, I asked what he had done to the electrical system recently.

"Not a thing. I just finished recommissioning her, dewinterized the motor, and put the battery back in." Good clue: the battery had just been reconnected. I checked the wires at the battery terminals. The heavy wire at the positive terminal going to the starter and the wire serving the positive bus were both snugged down properly. But he must have been distracted when he hooked up the negative wires; the nut wasn't tightened. The heavy ground wire to the motor block carried current (the motor cranked and started), but the wire serving the negative bus wasn't making good contact. Beneath the heavy wire there was a light wire that had been added later, and it was making good contact.

When George had installed a fancy electrical switch panel with lighted rocker switches some years previously, the small pilot bulbs required a ground. He had simply run that ground wire directly to the battery's negative post, rather than to the negative bus. In doing so, he had inadvertently created an alternate ground or a "secondary negative bus."

Looking at the wiring diagram of George's boat (Figure 1), the simplicity of the two steps becomes obvious. When he pushed the horn button, electricity flowed through the switch, through the horn, but then found there was no ground because the negative bus had been isolated from the battery by a weak connection.

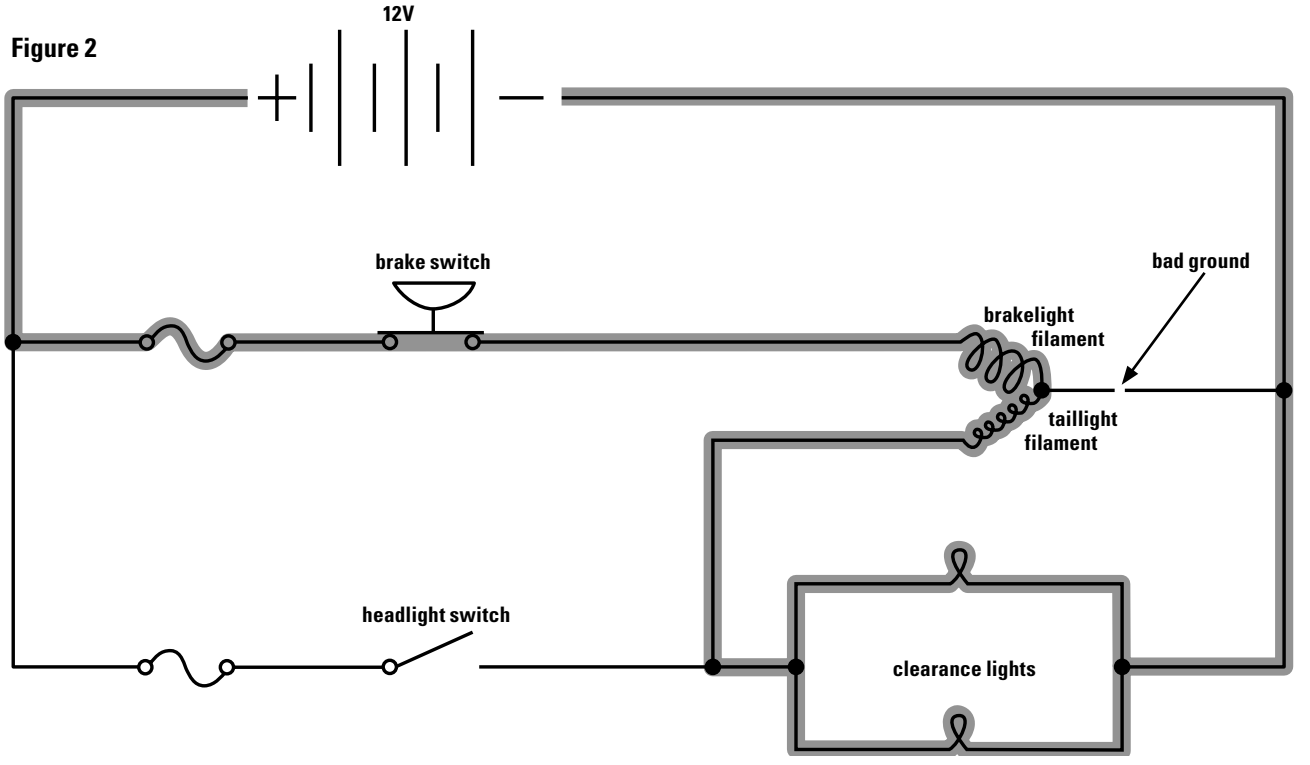
Diagnosis: That tenacious electricity did find a ground via the navigation lights and the bulb in the lighted switch, which had its own ground wire to the battery.

Solution? Confirm the diagnosis by attaching a jumper wire from the battery's ground terminal and fasten the other end to the horn's ground connection. Blow the horn. If it works right (and it should), search out the missing ground with a good multimeter. Also note that the navigation lights did not light up.

Impress your friends

This is just one scenario, and if your boat develops a gremlin, you can bet it won't be exactly the same. First consider what has been done recently to the electrical system. Additions or modifications are the usual sus-

Figure 2



pects. Then do the electrical two-step, restore the proper ground connection, and impress your friends with your expertise.

Another common place to find this sort of bad-ground gremlin is on a trailer used for towing smaller sailboats. The diagram of a tow vehicle and trailer hookup (Figure 2) illustrates the typical scenario. Remember the two-step: step one, the circuit you were trying to activate is the turn signal; step two, the circuit that shouldn't have worked is for the clearance lights.

Diagnosis: The most likely problem is either that the shell of the dual-filament bulb is corroded and not making electrical contact with the socket or that the bracket holding the socket to the trailer frame is corroded and not providing the required ground circuit. Therefore, the larger filament in the dual-filament bulb, not receiving its ground through the bulb's shell or the bracket holding the bulb, found a ground through the other filament in the bulb and through all the clearance lights.

"Another common place to find this sort of bad-ground gremlin is on a trailer used for towing smaller sailboats."

Solution? Confirm your diagnosis by attaching a jumper wire to a good ground, preferably your trailer or tow vehicle's frame, and touch the other end to the shell of the dual-filament bulb. If it works right (it will!), clean the bulb and run a separate ground from the socket to the trailer frame.

For further reading...

Newly-written and extensively illustrated, *Electrics Afloat* (2003) by Alastair Garrod covers boat electrical systems in detail. It's available at <http://www.goodoldboat.com/bookshelf.html> or by calling 763-420-8923.

My boat is a she, Continued from Page 45

was. He was worried that she would drop straight to the bottom once off the trailer.

"It's wood, Dad. She can't sink," I said.

"Does epoxy float?" he asked.

He had a point. Dad backed her down the launch ramp, and she slipped off the trailer without difficulty. The moment she was afloat, she was transformed. Suddenly she had what can only be described as grace. She was more than a she, she was a lady. My dad did the happy walk again as he came down from parking the car. Aboard now, we paddled out into open water, hoisted the sails, and felt her become what she unmistakably was: a sailboat.

There was a fleet of A-scows out, having just finished a race. A skipper of one of the boats sailed up on a beat astern and to windward wanting to take a look. He looked at my boat and I looked at his.

"That's an old Johnson racer, yeah?" he yelled.

"1947 Y-class," I yelled proudly from the helm.

"She's beautiful," he said. He was 10 feet from us.

"It dawned on me then that boats were shes because they're the only thing besides women that men obsess upon endlessly."

I looked him in the eye, steered a bit to windward and luffed him a bit. He laughed.

"I guess she's still got a little in her," I said, shrugging.

"That never dies, but I was mast abeam," he said.

"Protest?" I replied.

She's been with me for five years now. We've sailed on innumerable lakes in Minnesota, been knocked down in a reservoir in Wyoming, scampered on melted glaciers in Montana. At present she's stabled in a slip on the mighty Columbia River in Oregon. Each year she spends six months in dry dock, where I constantly find new problems with her. Each year I must learn some new technique to fix her. In the spring, friends will walk by on Saturdays, and they will see her in my driveway. They will see her there covered in sawdust, paint chips, and tarps. They will see power tools, clamps, and paint cans strewn about. And their faces will look suspicious . . . unbelieving. I will endure their looks because they don't know her. They can't know what I know. Because she's mine. And that's fine with me.

Boats For Sale

Ericson 25
1974. 7 sails w/good trailer. Needs TLC. $2,500.
John Bendickson
jgbendic@rockwellcollins.com
319-472-3481 (evenings)

Columbia 26
1966. Mk I. Fiberglass hull, teak interior, headroom over 6 feet. Enclosed head. Spartan double-axle trailer. 30-hp Atomic 4 inboard. LOA 26', LWL 19', beam 8'. Draws 3' 6". Sink, stove, 4 berths. Good old boat looking for a loving home. Very good cond. In La Crosse, Wis. $7,500.
R. Jerome Boge
rjboge@charter.net
608-784-3952

Merit 22
1986 sloop-rigged, fin-keel, freshwater boat. Stored indoors for winter, 6-hp OB, 150% genoa plus main and spinnaker. Sails maintained by Sail Care. Black anodized mast and boom. Exc. cond. Cushions re-upholstered. Sleeps 4. New battery for lights and accessories. New tiller and Porta Potti. Trailer included. $5,800.
Frank Kalnes
fkalnes@yahoo.com
563-557-1827

Glouchester 28
1935 sloop. Carvel-planked w/Eastern cedar on oak frames. Survey completed fall '03 followed by extensive work including refastening, installation of new through-hulls, and refinishing of 40-ft Sitka spruce mast at professional boatyard. Detailed specs, photos on request. Must sell. $16,500 OBO.
Jim Kellogg
203-623-4277

Bayfield 25
1976 pocket cruiser completely refitted '97. New furling genoa and spinnaker w/sock. Teak and mahogany interior, new upholstery. Complete galley w/electric fridge and alcohol stove. Shorepower w/2 battery banks. VHF w/remote mic. Strong gas engine. Self-launching highway-rated trailer. Classic clipper bow w/turned teak taffrail, a real head-turner. Includes everything needed to sail away; just add water and wind. $17,000.
Michael Harrigan
waternwood-boatsale3@yahoo.com
219-922-9333

Catalina 30
1980. Good boat, freshwater, wheel, AP, D/S, 11' beam, 5'3" draft, collapsible prop, good sail selection, stereo, VHF, hot water. Roomy, great interior, sleeps six, Atomic 4, 10,200 lb. displ., enclosed head w/shower, battery charger, bilge pumps, backstay adjuster, Bimini, fridge/freezer, alcohol stove, cockpit table. In Sandusky, Ohio. $14,900.
Mike Browne
carolbrowne@horizonview.net
740-998-6378

Tartan 27
1976 hull #631. RF, Atomic 4, autohelm. Draws 3'2" (6'4"), 7,900 lb., 5 sails, upgrades. In Nyack, N.Y. $9,000.
Richard Gressle
845-358-5590

Gulfstar 41
1973. Center cockpit ketch, equipped for cruising. Enclosed Bimini w/Strataglass '02, full awning, 10 barrier coats '02. Second owner. Lived aboard and traveled extensively [illegible]rs, selling for mo[illegible] his class[illegible] and g[illegible], 2 heads, teak sole, 6' sleep-in cockpit, extensive storage. 10' Avon w/4-stroke, 5-hp OB '03. In Fla. Photos, details at <http://www.shevard.com>. $55,000.
SOLD
Joann Embury

Nor'Sea 27
1990 aft cabin, 18-hp Yanmar, RF, upgraded electronics. No trailer. Lapstrake hull. Well mannered. Good sailor. Located in Mass. $40,000.
Brian Leibow
countfelix@earthlink.net
508-997-3149

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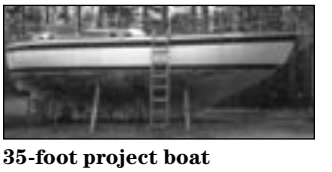
http://www.goodoldboat.com/classifieds.html

Allied Seabreeze 35
1967 yawl. AC, AP, fridge, new sails and exc. sail inventory. Too much to list. Stored indoors for 17 years. $46,500.
Richard Latorre
crfr1855@optonline.net
631-321-7311

Cape Dory 28 sloop
1978. Beautiful traditional cruising boat. In exc. cond. Set up for bluewater cruising. Newer Yanmar 2GM20F 18-hp diesel, windvane, wind gen, solar panels, stronger rigging w/insulated backstay. New interior cushions and foam. Metzler dinghy w/4-hp Evinrude OB, new propane countertop stove, 4 bilge pumps, 1-yr-old awning. 70-gal water and fuel for 250+ miles. Main, jib, cruising spinnaker, genoa, storm jib, and main. More info, photos via email. In SW Fla. $29,500.
John Halpern
orca36@copper.net
941-505-1354



35-foot project boat
1973 custom-built by Graham Byrnes of ferrocement. Serious ocean-going yacht. Comfortable liveaboard. Sails well. 35 feet on deck, 44 overall. Center cockpit, large engine compartment w/workbench, proper cruising gear. Hull's as fair as any other boat. Needs some work. Engine replacement recommended. Aft cabin needs to be rebuilt. Mast w/double-spreader rig, boom, and running pole in fine order, but new standing/running rigging needed. Sails usable. In North Carolina $12,000 OBO.
Stan Feigenbaum
stan@pamlico.net
252-249-4975

Islander 37
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Kathy Malloy
sailor1@adelphia.net
781-585-8021

Contest 30
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Terrence McMahon
temcmahon@aol.com
203-264-9917

Mahogony Snipe 16
Professionally repainted w/ heavy-duty trailer. Spruce spars, Dacron sails, bronze CB, displ. 900 lb. Not a racer but sails well and would place high in a competition based on beauty. Photos on request. In Austin, Texas. $4,000 or reasonable offer.

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Boat Gear
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Jim Tomkins
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George
waterrat@pathcom.com
905-319-6571

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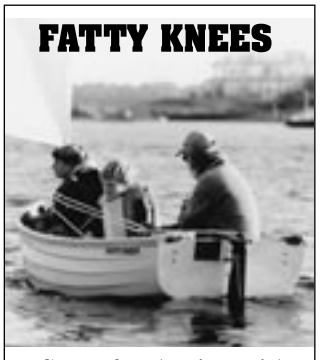

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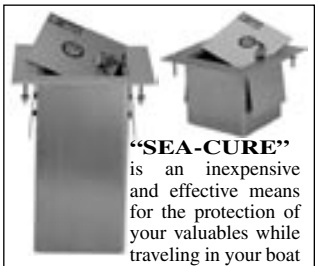
Products

Products, cont.



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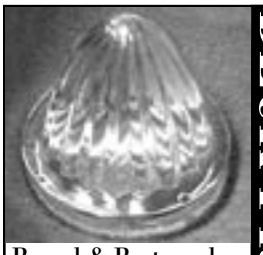

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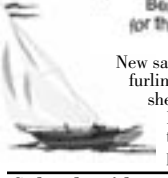

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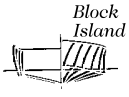

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Bill Lee, wizard of speed, Continued from Page 12

a consultant for yacht projects. Does he miss designing? He pauses a few seconds and then says, "You know, there've always been more yacht designers than customers. If someone asked me, I might consider designing another boat. It's not that likely. But I still strongly support sailing, and 'fast is fun' continues to be my slogan. But to be out there testing all the time? It's very wet. Very cold. I'm a bit older now.

"I recently spoke to the Cal Poly graduating class and told them how different things are today than when I attended there," he says. "New materials are so exotic and completely change how we run and design things — carbon fiber, for example. Instead of a car as a machine, it's an electronics factory. But I told them there are still lots of opportunities and left them with one idea: 'The world is not out of things to invent.' "

Bob Perry describes Bill Lee with these words: "Honesty, intellect, intuition, and chutzpah in the personality trait sense, not the boat." High praise from Bob, from whom kind words are difficult to earn. Bob recalls meeting Bill in San Francisco and seeing his designer's eye at work. "I was hanging out on a dock at the San Francisco Yacht Club Stag Cruise with Bill and some club luminary. A 40-foot Pacific Seacraft went by: shiny and blue. The luminary said, 'Now there's a beautiful boat.' Bill quietly replied, 'All I see is a boat with no waterline length.' We all owe Bill a debt. Any sailor who doesn't revere Bill Lee hasn't done his homework."

A disappearing breed, Continued from Page 43

and still speak to each other.

The basic problem of the motorsailer is that it requires a psychological straddle on the part of the owner. Sailboat owners find pleasure in the process of sailing. Trawler owners are much more goal-oriented. They find pleasure in the destination. A motorsailer requires that the skipper possess the attitudes and skills of the power community some of the time and those of the sailing community some of the time and to mix the two the rest of the time. Most owners lean one way or the other. Comparatively few owners seek the middle ground.

Besides, sailing a motorsailer gives me sails to fiddle with on those long boring passages. Who knows what trouble I might get into if I didn't have that diversion?

Too bad motorsailers are a vanishing breed.

How much power? Continued from Page 34

does not seem unreasonable based on the above. Another very useful rule of thumb for powering is by the engine size, in cubic inches per ton of displacement, as below.

Power rating	Yacht type	Engine displacement
Light	Bluewater cruisers/ocean racers	5-8 cu.in. per ton
Moderate	Coastal cruisers	8-11 cu.in. per ton
Generous	Heavily powered auxiliaries	12-15 cu.in. per ton
High	Motorsailers	15-20 cu.in. per ton

By this rule our 9-ton, 30-foot-LWL coastal cruiser could use an engine of 72 to 99 cubic inches and, at 60 cubic inches per liter, that works out to be in the 1.2- to 1.65-liter range. A check in a catalog of a well-known engine manufacturer shows that its 1.3-liter diesel engine will produce 38 hp at a rather high 3,600 rpm, but an easy 30 hp at a more reasonable 2,800-rpm range. Perfect for our theoretical yacht. As you can see, there is more than one way to skin a cat or select a new engine when repowering.

Having selected an engine, the skipper's next problem will be the propeller size and the gear ratio. That subject I will leave to the experts at the various propeller manufacturers, as they have the knowledge and experience to provide the necessary guidance on what is, always, a very tricky question.

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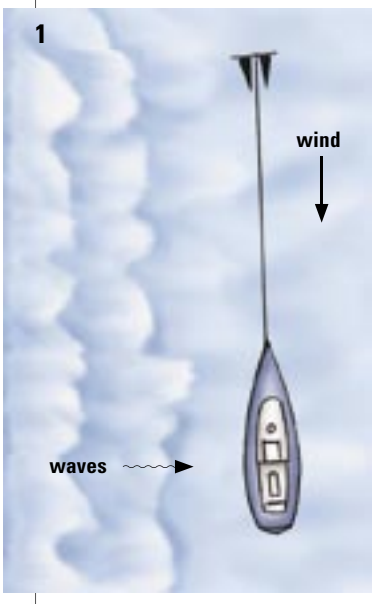
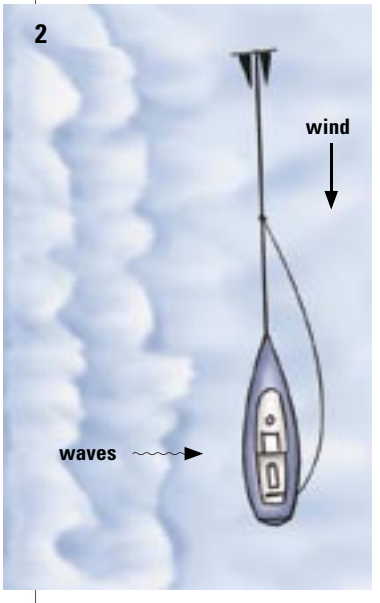
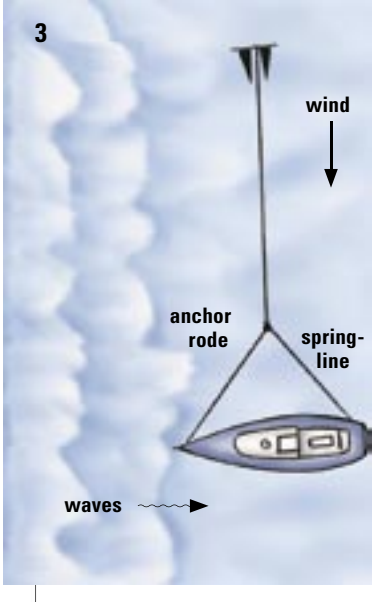






Illustrations by Ryan White

Springing the rode

Try this simple substitute for flopper-stoppers

by Tor Pinney

rolling hitch

HAVE YOU EVER ANCHORED IN AN APPARENTLY PROTECTED harbor only to find a surge running into it? The boat starts rocking and rolling, things slide around on the counters, locker contents jangle, and crew members tumble out of their bunks. Just moving about becomes a chore.

It doesn't take much of a surge to set up an uncomfortable motion aboard ship, and a big swell can make a harbor downright untenable. However, there's an easy way to overcome the effects of surge in an anchorage, even a fairly big surge, by employing a springline to the anchor rode. I call this technique "springing the rode."

To understand how this concept works, consider the conditions that would warrant using the technique. Suppose you're anchored in a harbor where the wind is blowing from the north. As long as there is no current tugging at her keel, the anchored boat will point north into the wind. Now picture a surge rolling into the harbor from the west. It could be a residual ground swell generated by some distant storm or the remnant of seas outside the harbor bending around the headland. Whatever the source, waves from the west will strike your boat on the port beam, causing her to roll.

"The rolling would cease, replaced by a more gentle fore-and-aft pitching motion. In moderate conditions it would hardly be noticeable."

Now imagine the effect of turning the vessel 90 degrees to port so that her bow is facing into the waves rather than into the wind. The rolling would cease, replaced by a more gentle fore-and-aft pitching motion. In moderate conditions it would hardly be noticeable. The obvious question, then, is what is the easiest, safest way to point the boat into the surge, broadside to the wind?

Second anchor

Most sailors would probably think of setting a second anchor from the boat's stern. In this example of a north wind and a westerly surge, the stern anchor would be set well out to the northeast. Then by hauling in on the stern anchor rode, and perhaps feeding out some on the bow's anchor rode, the boat can be made to face west. This isn't a bad solution except that it's a lot of work to carry out and later retrieve the stern anchor. It also means the boat will no longer swing with other boats nearby that are lying to only one anchor, so if the wind shifts you could find yourself bumping against your neighbor.

Attach a springline to the anchor rode or chain with a rolling hitch (see illustration, above right) (1). The line leads aft outside all rigging (2). Pay out the anchor rode about half a boat length. Haul in on the springline until the boat faces the waves (3).

There is a much easier, more efficient solution to the surge dilemma using only the bow anchor that is already set. All you have to do is add a springline to the forward anchor rode. Just tie a long dockline to the anchor's rode or chain at the bow of your boat. A rolling hitch works well for this. Then lead the slack line aft alongside the

hull to (in the case I've described) the starboard cockpit sheet winch. Be sure it runs outboard of the bow pulpit, stanchions, and shrouds. On a center-cockpit boat it may be best to pass the line through a (starboard) stern-quarter turning block before leading it to the winch.

Next, pay out the anchor rode about half a boat length. Finally, take up on the springline by cranking on the sheet winch until there's roughly equal pull on the rode and the springline and the two lines are forming a V-shaped bridle to windward. The boat will swing broadside to the wind and will face the swell. It's as easy as one-two-three! (See diagrams on Page 81.)

"There is a much easier, more efficient solution to the surge dilemma using only the bow anchor that is already set."

In my example the waves are running 90 degrees to the wind, but you can adjust the vessel's heading for other angles of wind and seas. If the surge is coming from forward of the beam, feed out less of the rode and/or take in less on the springline. If the waves are from abaft the beam, pay out more anchor rode and/or haul in some more on the spring. With a little experimentation you'll soon master this simple, useful technique.

Here are a few other pointers:

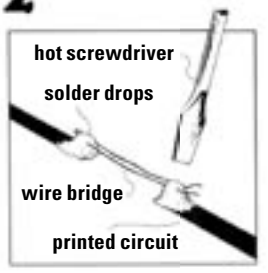
- If the waves are abaft the beam, it may be equally comfortable to face the boat's stern into them rather than the bow. This will require less line adjustment than swinging the bow all the way around.
- Remember that to turn the bow to starboard, you must run the springline to the port quarter. To turn to port, use a starboard-quarter springline.
- If the wind picks up, and you feel uneasy about the strain your boat's beam-on position is putting on the anchor, you can instantly return to the normal anchor mode, bow to the wind, by releasing the springline. The boat will quickly swing to the breeze. The springline can be recovered by shortening the anchor rode's scope, or it can be left attached to the rode until you weigh anchor.
- If the wind shifts you'll have to readjust the boat's angle by adjusting the length of the spring or the rode.
- If the breeze dies altogether, deploying a stern anchor may be the only way to hold your boat end-on to the waves.

When a surge has your boat rocking and rolling at anchor, give your boat, your crew, and yourself a break. Spring the rode!

Electrical first aid

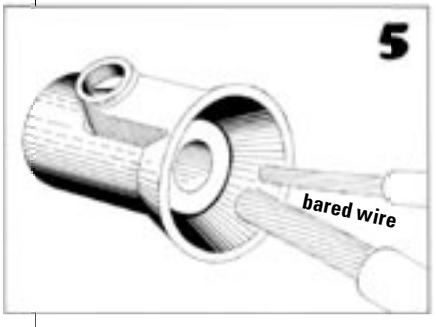
Try these simple temporary repairs in emergencies

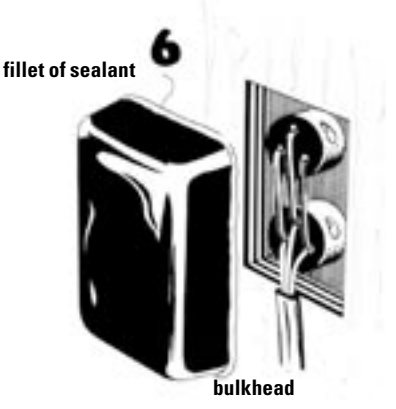
by Alan Lucas



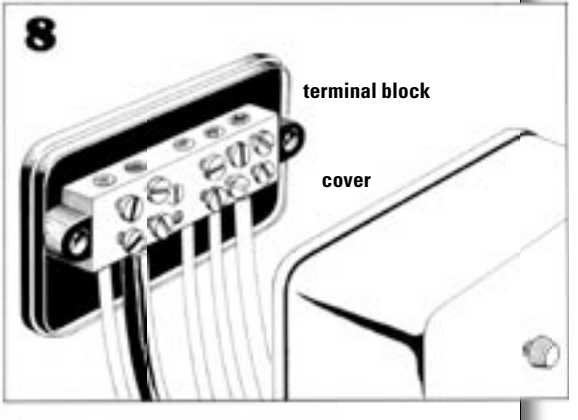
In an era when electronic development is leaving most of us behind, there are still ways to make small repairs and additions to the electrical system in an emergency. The following are a few:

1. If an electrical component has a flush-plug that is removed with a special tool (and the tool cannot be found), two small bullet-head nails driven into a wooden batten will do the trick.
2. It takes only the smallest drop of water finding its way onto a printed circuit board to fry a part of the circuit. If the board cannot be removed or reached with conventional tools, a hot screwdriver will act as a soldering iron in a confined space. Dollops of solder are "dripped" onto the separated circuit ends, after which a thin copper wire is melted into them.
3. In the absence of vigilant attention, battery terminals can fail completely, leaving you with a cable end and a battery pole with no means of reuniting them. A worm clamp will temporarily solve the problem by squeezing the cable end firmly to the pole. Components should be cleaned and coated with petroleum jelly.
4. If two wires need to be joined temporarily in the absence of proper fittings, twisting is satisfactory, especially if petroleum jelly is used. Whether the ends are to be taped over or not, they should be staggered to avoid shorting.





5. Have a few joiners in the kit for when extra wiring needs to be temporarily tapped into the system.
6. Exposed instruments and their wiring behind a bulkhead can be covered using such simple items as a plastic soap box, Tupperware container, and so on. A small fillet of sealant will hold them in place yet allow for easy removal.
7. Soldering in awkward places can often be effective using a pair of long-nose pliers with ends heated.
8. Carry a few terminal blocks for those times when the electrical system needs to be expanded beyond the potential of single joiners.



Illustrations by Alan Lucas

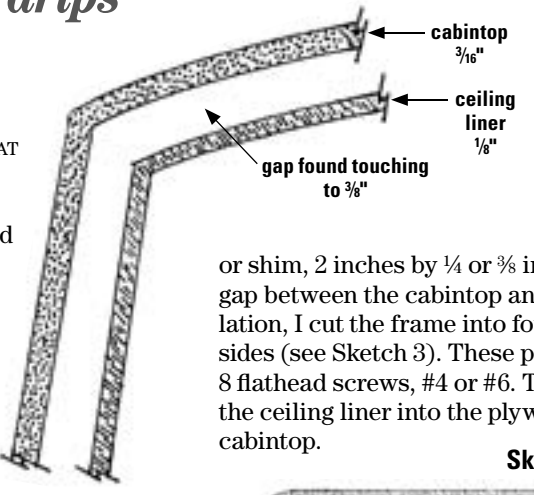
Fixing leaky ports

A sailor's ingenuity (and a little labor) stops those annoying drips

by Harry Brunken

In 1970 I purchased a new Columbia 36 that came with a very good dealer discount because I agreed to handle all small warranty problems myself. The windows leaked immediately, and I repaired them during the first winter. The boat has since been sold, so *I am relying on my memory regarding dimensions*. With the windows removed, I found the thickness of the cabintop to be approximately 3/16 inch and the thickness of the ceiling liner to be approximately 1/8 inch (see Sketch 1). The gap between the two surfaces varied from nothing to as large as 3/8 inch.

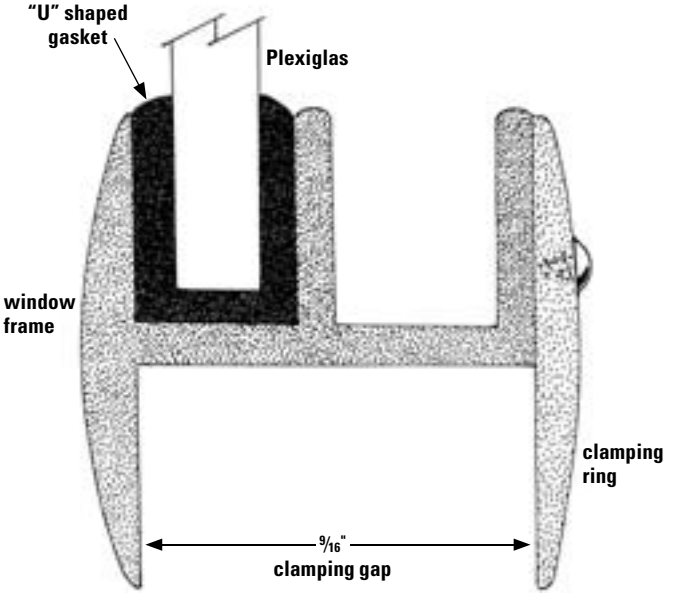
Sketch 1



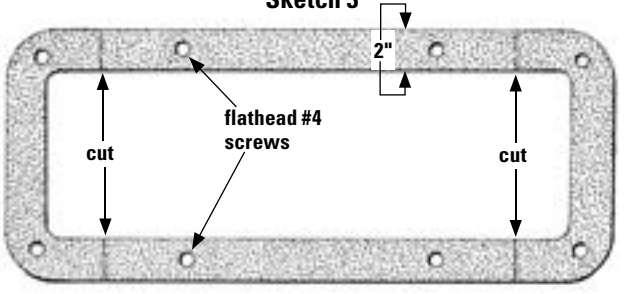
I assembled the portlight outside the boat and found a gap of 9/16 inch between the frame and the clamping ring (see Sketch 2). The minimum thickness for the frame to clamp onto was a mere 9/16 inch. With these conditions, the portlight cannot be made tight in the window cutout. It was being held in place by sealant alone. Flexing of the hull eventually breaks the sealant, resulting in a leak. I also found an insulation-type material between the cabintop and the ceiling liner.

I first cleaned out the insulation material to a depth of 2 inches around the cutout. Next I made up a plywood frame or shim, 2 inches by 1/4 or 3/8 inch, which I installed in the gap between the cabintop and ceiling liner. To aid in installation, I cut the frame into four pieces: top, bottom, and sides (see Sketch 3). These pieces were held in place with 8 flathead screws, #4 or #6. They were installed through the ceiling liner into the plywood and did not go into the cabintop.

Sketch 2



Sketch 3

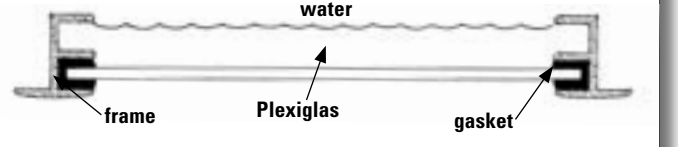


Plywood spacer frame approximately 2" x 1/4 or 3/8" thick. Fasten between cabintop and ceiling liner.

The portlights were installed dry, and they fit perfectly with the shape of the cabintop. No bending or adjusting of the portlight flange was required. I disassembled and cleaned the portlights. Then I reinstalled the serrated gaskets on the Plexiglas with clear silicone sealant.

After the gasket and sealant had cured, I installed the Plex and serrated gasket in the frame using clear silicone sealant. The portlight frame joints were also sealed with the sealant.

Sketch 4



I subjected the assembled windows to a water test by laying the window and frame flat and filling them with water to the top of the frame rim (see Sketch 4). There were no leaks. I reinstalled the reassembled windows in the boat using white silicone sealant. This repair was successful. I sold my boat to new owners in 1999. I believe the repair is still good to this day.

Illustrations by Mike Dickey

Tongue extender

The trailersailer's answer to low-water launch ramps

by Gregg Nestor

With its shoal-draft keel/centerboard combination, my trailersailer draws only 22 inches. However, if I want to float it off or onto its trailer, I need approximately 3 feet of water. This is because the trailer raises the boat an additional 14 inches. Normally this is not a problem. Proper scouting of the launch ramp, combined with the fact that my trailer has rollers instead of bunks, usually overcomes any potential launch ramp perils. With a push/pull effort, I can roll the boat on or off in water around 2 feet deep. However, in the past three years, below-normal precipitation in my sailing grounds has left many lake levels, including the Great Lakes, well below their norms.

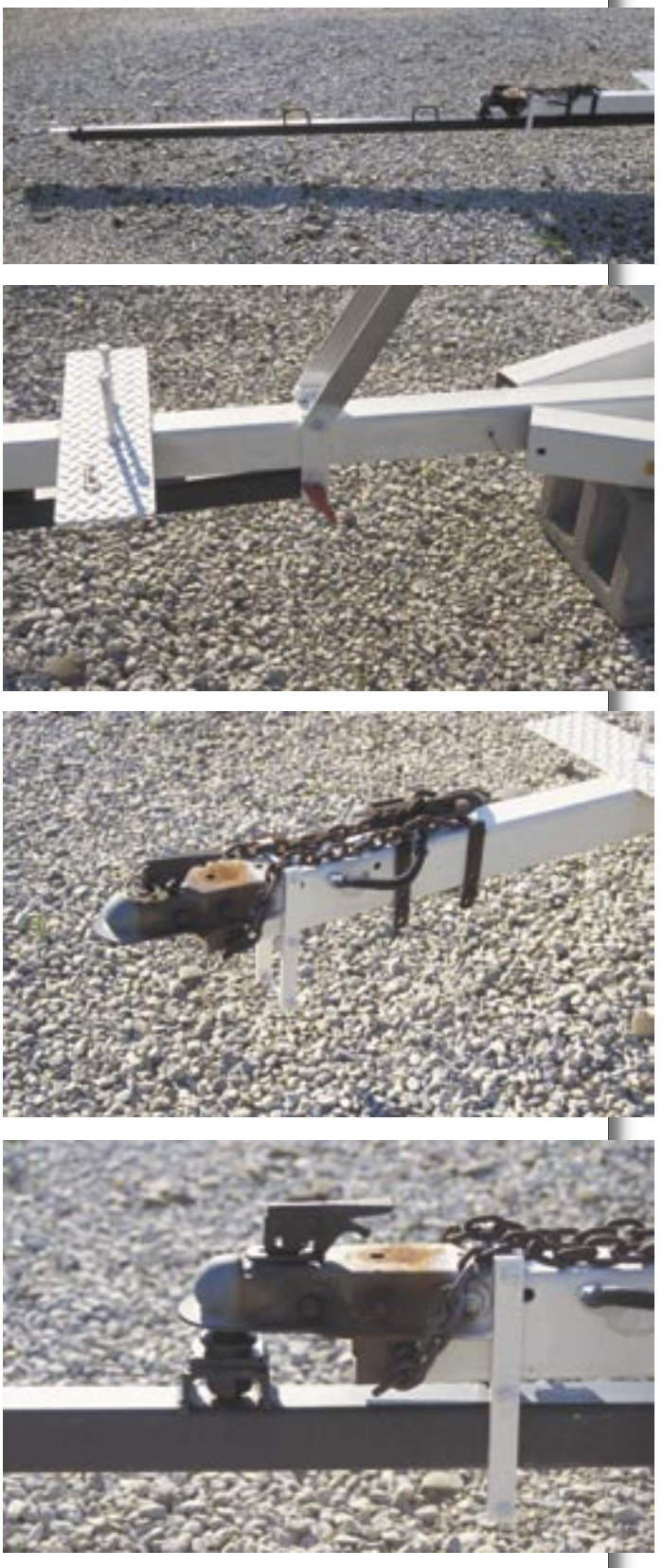
After struggling to retrieve my boat on two occasions and witnessing the towing eye of one boat being unceremoniously pulled out while the owner was attempting to winch it onto its trailer, I vowed to do something to improve my launching and retrieval ability. If I could get the boat and trailer farther out into deeper water, my problem would be solved. Unfortunately, my tow vehicle isn't equipped for submarine service. What I needed was a tongue extender.

Over the years, I have seen all manners and configurations of tongue extenders and associated trailer modifications. Having benefited from this, I elected to follow the KISS principle …Keep it Simple, Sailor. In selecting my materials, I made certain that all were commonly available.

Square steel box

The end result is a 12-foot length of 2½- x 2½-inch square steel box with a coupler bolted to one end and a ¾-inch hole drilled horizontally through the other. Four feet from the end with the hole, a hitch ball is welded in place. To make handling easier, two handles are welded to the top of the 12-foot extension, one at 5 feet from the end with the hole and another at 7 feet. Modifications to the trailer are minimal. Using two 6-inch lengths of ½- x 2-inch flat stock, one pair of the trailer's brackets now extends 2 inches below the tongue. A ¾-inch hole drilled horizontally through both straps mates with the hole in the tongue extender. To guide the extender into place, a pair of 10-inch long ½- x 1-inch bars are fastened with three 4½-inch bolts just behind the trailer's hitch, forming a box.

In operation, the tongue extender is slid through the trailer tongue's new guide box and back until the hole in the extender matches with the holes in the newly lengthened trailer bracket. Once achieved, a ⅝-inch hitch pin is inserted and clipped into place. The extension is then lifted up by its handles, engaging the ball on the extension with the trailer's coupler. Once the trailer's coupler is locked, the extension's coupler is connected to the tow vehicle's ball, and the wheel jack is raised, the extension is ready for use. For stowage, I simply bungee the tongue extender beneath the boat to the trailer's frame.



Extender ready for use, top. Extender pinned, second from top. Guide box, third. Extender coupled, bottom.

Rubbermaid to the rescue with refillable, refreezable, reusable block ice. And once you own the plastic tubs, the price of ice is nice.

Dripless ice

A cunning way to avoid ice-box odor

by Dyke Williams

TIRED OF SPONGING OUT THE ICE CHEST OR DRAINING ALL THAT MELT water (and what else?) into the bilge? When a yard worker changed our drain so it was really hard to use, we bought two Rubbermaid 15- x 9- x 5-inch plastic boxes with press-on lids, filled them 85 percent with water (room for expansion as it freezes), put them in our home freezer for 48 hours (24 won't do), and had instant, portable, mess-free ice. These two keep our ice chest cold for two to three days (our weekend), travel to the boat in their own cooler, and get refrozen for the next round. In a pinch, they've been known to provide a source for ice cubes, if your ice pick is handy and you wield it *very* carefully (yes, we had to buy a third box — the one with the "X" marked on the bottom is now used for spare parts).

Traveling light

One sailor's way to make a movable bracket for a cabin lamp

by Michael Hewitt

Shore power (or a good battery bank and electric lights) is convenient, but nothing beats the comfort of a cozy sailboat cabin illuminated by kerosene lamps. I keep *Concordia*, a 1979 Valiant 32, in San Diego, California. I spend frequent long weekends aboard and, while I love the look of a traditional yacht lamp, I am reluctant to drill unnecessary holes in the teak joinery. But I have found a solution for mounting the lamp without any permanent modifications to the interior, and the mount is both secure and movable.

Valiant sailboats are fitted with a stainless compression rod just aft of the mast. Technically, it's an expansion rod, designed to prevent the turning blocks at the base of the mast from lifting the coachroof. Whatever its official name and purpose, it is a perfect place to centrally mount a yacht lamp. The lamp can be positioned to light the main cabin and the saloon table, and the mast will block any light that might disturb guests in the forward cabin. Since the rod runs from the sole to the cabintop, the lamp can be mounted at any height.

A Weems & Plath lantern was mounted in Michael Hewitt's Valiant 32 without drilling a hole in the bulkhead, upper right. By making use of the compression rod, it's vertically adjustable. It will also hold a small flower vase (see *Good Old Boat*, March 2004 Mail Buoy). The parts for the project, above.

I used StarBoard to make a mounting plate for a Weems & Plath lamp bracket. Both are available at most marine chandleries. The expansion rod is ½ inch in diameter, so after cutting two pieces of StarBoard appropriately sized for the bracket, I clamped them together and drilled a ½-inch hole from top to bottom. Drilling the hole plumb and perfectly centered is essential but difficult even with a good drill press. I used a radial-arm saw to cut a shallow guide slot in each piece, and the drill bit followed the slot perfectly. Stainless bolts, washers, and knurled knobs hold the bracket to the mount and clamp it around the expansion rod. Standard nuts would make for a cleaner look, but I like being able to adjust the height of the lamp by loosening a few knobs and sliding the mount to the desired height.

For bright cabin illumination, the electric lights will always go on first. But at anchor with the rain gently falling on the cabintop, it is the golden glow of a kerosene lamp you'll see shining through *Concordia's* portlights.

111-year sailing tradition

The boats have changed over the years, but the concept of Lake Erie's Bay Week Sailing Regatta is the same: fun for any age sailor with any length of experience on the water. One of the oldest and most prestigious sailing competitions on the Great Lakes, this year's regatta runs July 31 through August 5 and features the Tartan Ten Nationals as one of the main events. Other classes include a number of handicap fleets, a cruising class, a casual racing class, and one-designs such as Thistles, JY15s, J/22s, J/24s, J/105s. Junior sailors have a racing event of their own July 19-23.

The regatta is held at South Bass Island's Put-In-Bay, a lakeshore Ohio town with a history dating back to the War of 1812. The regatta is sponsored by Inter-Lake Yachting Association (I-LYA) and hosted by the Put-In-Bay Yacht Club. For more information about classes, rules, fees, and forms, visit the I-LYA website at <http://www.I-LYA.com>, call Don Bartels at 330-562-8902, or send him an email message at legendsail@aol.com.

Plans and good old cleaning supplies

Loved the article "Simply Clean" in the May 2004 issue. If each of us could convince two to three friends to use products outlined in this article instead of commercial products, our sailing waters would be less polluted.

Also, I have original line drawings and specs for the Terrapin 24 and the Irwin 10/4. I'll gladly send a set to anyone for a stamped envelope.

Paul Atkinson
P.O. Box 625
Comstock, TX 78837

Correction about white anchor lights

In reference to the Mail Buoy item in the May 2004 issue, "Anchor lights," Patrick Matthiesen of London, England, is wrong when he says the Colregs stipulate that a white anchor light should be shown on the forward part of the vessel only. Actually, that applies to vessels over 50 meters in length. Rule 30, Anchored Vessels and Vessels Aground, says: "(b) A vessel of less than 50 meters in length may exhibit an all-round white light where it can best be seen, instead of the light prescribed in paragraph (a) of this Rule."

John Vigor
Bellingham, Wash.

We've come a long way?

I was amazed at the cost and technology needed by Geoff Cooke (March 2004) to make a modern boom. Some 45 years ago I built a 29-foot sailboat here in California. The spars were homemade too. The boom was a fir sapling, free from a forest. After some attention from a plane and varnish brush, the front end was socketed into the gooseneck, which was also homemade from odd bits of aluminum tube and plate. The back end had a hole drilled transversely through. This was the entire operation.

The clew of the sail was secured with a few turns of light line through the hole, and the foot was held to the boom with a zigzag lacing. The upper sheet block hung from a rope strop, and the twin topping lifts *cum* lazy-jacks were secured with clove hitches. Vangs were unknown, to me at least, in those far-off days, but a strop and thumb cleat would have sufficed.

I usually belayed the mainsheet with a slippery hitch under the upper block, but a pair of oak cleats were available. The whole setup was quite strong enough to allow repeated jibes all standing, perhaps because of the natural flexibility of wood and fiber rope.

Lest I be thought a troglodyte, I hasten to add that my present Aries 32 has a metal boom with all the bells and whistles and winches, but for the life of me it works no better than the old piece of wood with a hole.

Michael Barton
Sunnyvale, Calif.

Cushions with cush

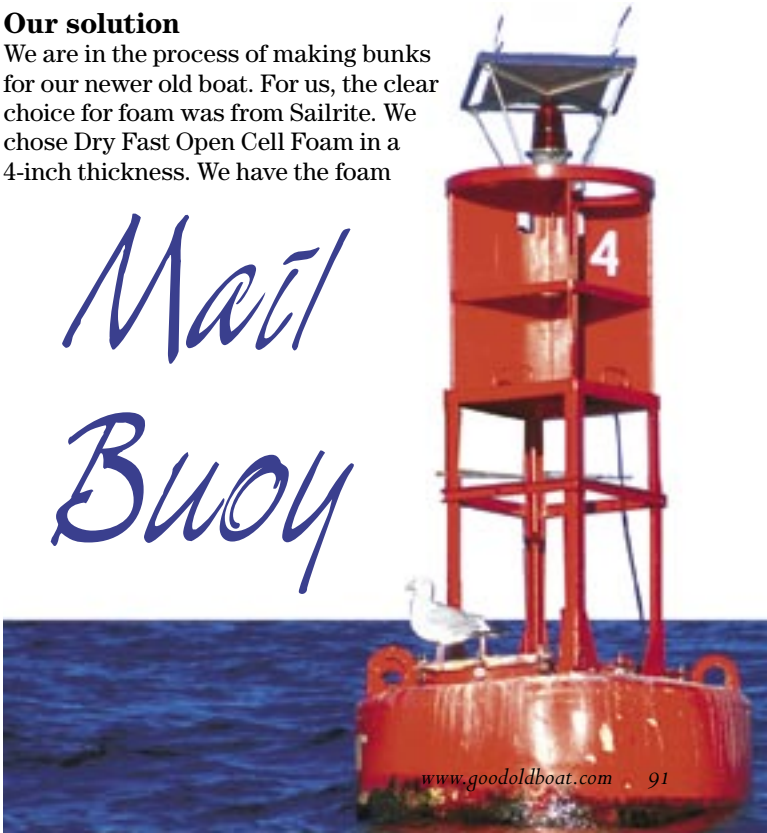
I have been a subscriber for several years — near the beginning, I think — and have come to rely on you and all your cohorts so much that I have let my other subscriptions to "those mags" lapse. One article that would be of interest to many of us would be about the options for replacing settee and V-berth cushions. As I age, I am finding the foam that was once luxurious and deep is now almost as brittle and unyielding as the joints that toss and turn on top of that foam. I have to try to sleep through the pain and the clanging of the radio cable that somehow can bang even while the boat is on a flat calm. I doubt I can do much about the clanging (at least so far nothing has worked), but I do think I am capable of some crude sewing to re-cover a new and thicker foam. But a quick Internet search left me bewildered by the choices and range of prices. Anyway, it would be an interesting article for a lot of us. If you have any suggestions that I could initiate this winter, I would be even more in your debt.

Craig Simpson
Salem, Mass.

Our solution

We are in the process of making bunks for our newer old boat. For us, the clear choice for foam was from Sailrite. We chose Dry Fast Open Cell Foam in a 4-inch thickness. We have the foam

Mail Buoy



here (and tested it by sleeping one night on it on the living room floor). There is no question that it is as good as the best mattress. Expensive but, like most boat parts, probably worth it: <http://www.sailrite.com>. It's in the Sailrite catalog on Page 78, item #2136. We will cover the tops and sides of our new bunks with Sunbrella Furniture Fabric and use a mesh called Nautolex Vinyl Underlining on the cushion bottoms. These items are also available from Sailrite. For more on marine fabrics, see the article in this issue on Page 53.

Jerry Powlas
Technical editor

No such thing as a weird question

I don't know how you keep up with what must be a blizzard of weird questions. I have been with *Good Old Boat* since nearly the beginning and continue to be extremely happy to read it cover to cover. My first email, in the early years, was to plead with you to never become a magazine of advertisements with a couple of stories surrounding them. Although the advertising is certainly far more significant now (and I am certain you are glad of that), you have managed to keep them in their place rather than in my face. You should tell potential advertisers that, as a result, I actually find myself working my way methodically through the ads each month. They have become part of my learning curve. Thanks again for the advice and the magazine for the rest of us.

Craig Simpson
Salem, Mass.

New reader

I'm sending a photo of my brother's little boy, Asher, being exposed at a young age to the joys of sailing and good old boats. I think age 3 months is a little young to recruit as crew, don't you?

John Danicic
Minneapolis, Minn.

Because it's so cute!

We can say "no" to a lot of product evaluations that well-meaning advertisers would send our way, but the Squid is so, well, cute it was hard to turn down. Besides, you don't have to attach it to anything. It doesn't need to interface with something electronic. You don't have to plug it in. That seemed like a simple enough evaluation.

It's an LED flashlight with pizzazz. You can aim it in one direction or use the flexible "legs" to turn it into a hanging chandelier or tabletop lantern of sorts or aim one thin "leg" around a corner when you need to see what you can hardly reach. There are two light levels: mood lighting and reasonably bright. It comes in an assortment of colors also (the unit itself, not the LEDs). It retails for $19.95. Order online at <http://www.squidlight.com> or call 877-666-8263.

Editors

Westsails have a new main contact

If you're a Westsail sailor with questions, your new answer man (or at least the guy to help you find answers and other Westsail sailors) is Louis Guillama, 4664 SW 149th Ct., Miami, FL 33185, lmguillama@bellsouth.net.

Pat Tilson
Safety Harbor, Fla.

Apostle Islands discussion list

One of the prettiest cruising grounds on Lake Superior is the Apostle Islands National Lakeshore near Bayfield, Wisconsin. For Apostle Islands sailors and those who'd like to know more, go to <http://groups.yahoo.com/group/apostlesailors> to take part in a new discussion list. Christian Gould, who created the list, says the focus is on hiking trails, anchorages, berry-picking spots, wildlife sightings, crew opportunities, stories, and so on.

Check that sheet bend

In the May 2004 issue, "Lots and lots of knots," Gregg Nestor has shown a dangerous use of the sheet bend as "…the knot you need to tie lines of two different diameters together." In addition, the knot shown as a sheet bend on Page 43 (pictured here on page 93) is a left-handed sheet bend, which all

authorities will tell you is weaker still. A much more secure knot and so a better choice is the double sheet bend.

The Ashley Book of Knots reminds me that there is yet another error in the description of this knot. The sheet bend is sometimes called, in error, a becket bend. The becket bend looks like a sheet bend but is made with a small line worked through an eye splice.

Stuart Hopkins
Wicomico Church, Va.

Yes, indeed

Yup, we blew that one. The knot pictured in the May issue and shown here below is the left-handed sheet bend (these days also known as the backward or reversed-lead sheet bend, according to Brion Toss), which *The Ashley Book of Knots* says "is often tied by landsmen and is not so reliable a knot" [as the true sheet bend]. As for using the knot for two different sizes of line, I let that go by during the editing process because that's what I was taught in the Boy Scouts. I could not find my old Boy Scout manual. I suppose the parchment just didn't hold up, but I was able to lay hands on a much more modern *Sea Exploring Manual*, copyright 1981, which shows the sheet bend and says of it:

"Sheet Bend or Becket Bend — This is used for securing a small rope to the bight of a larger rope."

Faithful to my training in the Scouts, I have specifically chosen that bend whenever I needed to join two lines of different size. While I would normally prefer *Ashley* to other references on knots, I must say that in the 50-odd years I've been using the sheet bend in this way (as recommended by the Boy Scouts), I do not recall a failure.

Jerry Powlas
Technical editor

The reversed-lead sheet bend, shown above and also in the May issue, is not as reliable as the right-handed sheet bend.

Adding a turn to a sheet bend makes it a double-sheet bend. This illustration is from Brion Toss' *The Complete Rigger's Apprentice.* Brion says the sheet bend is "perfectly adequate for most situations but will jam under heavy loads and can slip when made in slick material." In such cases, the double sheet bend is a better choice.

At first sight

My first encounter with *Good Old Boat* was with issue 30, and it was love at first sight. I am not a world cruiser, nor will I ever have to deal with the "problems" of a 100-plus-foot racing/cruising sloop that draws 16 feet and calls for a crew of 18. However, I do love boats and have been enamored of sail since I was 7 — and that was in 1939. One issue was enough, and I subscribed immediately. Since then I have been introduced to new products, new techniques, and new ideas, and I await each issue with enthusiasm. I also share it with my son who is yard manager of a marina here on Cayuga Lake. Yours is a very special publication.

John Pavia
Trumansburg, N.Y.

Techie questions

Your wonderful office person, Karla, suggested you might be a good source for some techie questions. I'm about to install a Signet depth sounder with a through-hull transducer. I've been told it might not be necessary to actually mount the transducer through the hull but I could instead bed the unit in silicone or wax on the interior side and still get good readings by shooting through the hull. There are definite advantages to that; I'm just not sure if it will work. I need to know so I can prep the boat before launch next month and sure don't want to have to haul it again to remount the transducer. Any thoughts/experience with this kind of thing?

Steve Grimes
London, Ontario

Techie responses

Airmar recommends mineral oil, castor oil, or propylene glycol (non-toxic antifreeze). Mineral oil and castor oil are somewhat preferred since they are more viscous, can handle higher-power levels, and are less prone to aeration. I had heard that the resolution was not as good, but then I think I saw something on the Airmar site saying there's not much difference. Not making a hole in the boat is always good.

Jerry Powlas, Technical editor

A new good old boat

Bryan Gittins, owner of Channel Cutter Yachts, was interviewed in the Lyle Hess profile in the May 2004 issue. Channel Cutter Yachts is currently custom-building the Lyle Hess-designed Falmouth Cutter 34 in British Columbia. You can reach the company at 250-722-3340 or email Bryan at ccy@island.net. The first 34-footer has been completed and launched in Texas, Bryan reports.

Another new boat

The thing about some of the new custom-built boats is that they're using good old plans. So should they be named *honorary* good old boats without passing the 10-year milestone? Maybe they should.

Eliot Spaulding's plans for the New Moon 25 are being recreated by Eastsail Yachts in New Hampshire. The first of these boats should be launched in June. It will join a small family of beautiful sailboats being produced by Eastsail. For more information, visit their site at <http://www.eastsail.com> or call Gerry Newcombe at 603-224-6579.

What about amateur radio?

In reference to an item in the May 2004 Mail Buoy, "Satellite Phones Come of Age," I recently read an article in another magazine written by a well-qualified author. It mentions GMDSS, HF is not dead, Sailmail Association, satellite communications, the Internet, limitations of mobile computing, etc., but fails to mention the role of amateur radio in cruising. There are various attitudes about amateur/ham radio, but it cannot be disputed that it fills the holes left by other services and is often the only thing left in a crisis . . . not to mention being a "free" email service.

There are various information radio nets using marine radio, but few of them have land-based stations as participants. Not so with ham radio — you can talk to people anywhere. Even if it only serves to alleviate any boredom on long Pacific voyages, it would be worth having. The information we glean in this way is invaluable.

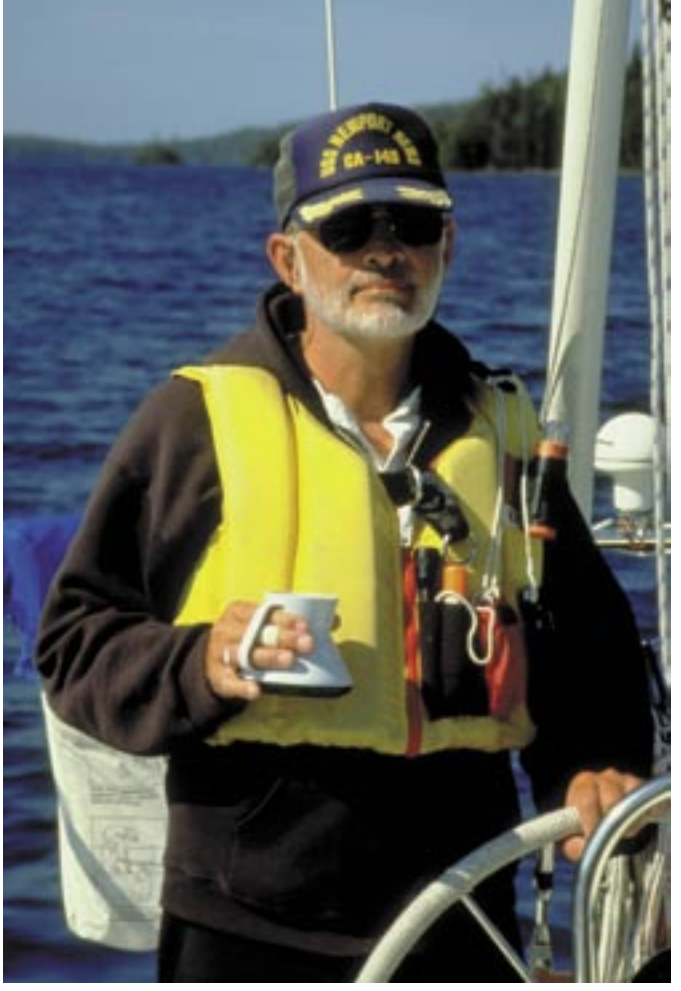
Personally, I would recommend that cruisers coming to the Pacific area seriously consider getting a ham radio license and making sure that their marine radio is capable of transmission on the amateur frequency bands and lower sideband. If it isn't, get a ham radio as backup. Models are cheap and a good value. Remember that telephone calls and communications down here have not got to the optical fiber age even in New Caledonia, where we currently are dodging cyclones. Although this is one of the richer Pacific islands, telephone calls here are horrendously expensive, the island satellite link overload slows down Internet browsing, and the bananas are three times the price you pay in Canada!

If you don't want radio on your ship, I respect that point of view. But look up <http://www.winlink.org> for information on the ham email system.

Ted Popham VK2EZQ, G4TBF
New Caledonia, Australia

Send questions and comments to Good Old Boat, *7340 Niagara Ln. N., Maple Grove, MN 55311-2655, or by email to jerry@goodoldboat.com. Please limit messages to 150 or fewer words. We reserve the right to edit.*

Slocum, seduction, and the boys' night out



I've singlehanded for a couple of weeks at a time, and I've cruised with an all-male crew as well. Both are OK, but not my preference. Joshua Slocum and other singlehanders have circumnavigated, and they have my admiration for that. I know how difficult singlehanding is, but I have no desire to circumnavigate and certainly no desire to do it alone. My preference is to cruise with my wife. Just the two of us. I suspect I'm not alone in this … that the most highly prized feature almost any boat can have is a woman aboard who is keenly interested in and completely involved in sailing it. Without such a woman, you have singlehanding or something like the boys' night out.

If you are inclined to this view but do not have such a crew, you may be interested in how I was able to achieve this. I am no expert in these matters. Even my friends would say that my relationship with the fair sex has had its ups and downs. I'll never be a ladies' man. Still, if I can do it, others can too.

When I met Karen I had a lot of things going against me. I was too old, too short, preferred motorcycles to cars, and was an engineer. Her father was an engineer, and she did not think she wanted another. For her part, she had spent a few hours in small boats, but this had only sparked a mild interest. I, on the other hand, knew that this was the woman for me and understood that, since sailing was very important to me, I needed to try to make it important to her too.

I bought a subscription to *Cruising World*, had it mailed to her address, and invited her to crew for me when I raced, which was three times a week. After a short but reasonable courtship, we spent our honeymoon in a chartered Catalina 30 on Lake Superior. A year later we bought our own boat, and the three of us — man, woman, and boat — have lived happily ever after.

The seduction to sailing goes like this:

Don't yell. Guys don't like screamers. Woman like them less. If you have already yelled, get on both knees and beg. Then don't ever yell again. It's that simple. No exceptions. None.

Give her control. Since I simply love to sail and don't much care about destinations, I designated Karen as the "Operations Officer." She chooses when we go, where we go, and when we sit tight. My input to these considerations is minimal. To do operations well, she needed to learn to navigate, which has been a not inconsiderable side benefit.

Make sense. Sorry, guys, women are much more reasonable than men. The sailing experience has to make sense. If you choose to sail around with the winches and leeward ports in the water, you are headed for a life of singlehanding or the boys' nights out. Be in complete control and appear to be in complete control of the boat at all times.

Involve her. One way or another, help her learn every skill aboard that she has an interest in. Keep trying to expand her interests. Make sailing knowledge open, accessible, and inviting.

Learn together. Frankly, there's not much skill required to be able to sail. On the other hand, sailing provides an opportunity for lifelong learning. Learn together.

Make a team, be a team. Even if you forswear sailing around with the lee rail in the water, there will be plenty of challenges to sailing. The pride of having met these as a team bonds all the rest together.

That's what worked for us, and I suspect similar versions have worked for others. I've kept this explanation simple and directed it to guys because they are the ones who seem to need it. Besides, guys are simple creatures, most of whom weren't meant to cruise alone.

A sailor's dream

A boat comes alive only at the interface of sea and sky

by Garry Prater

Few creatures inhabit both sea and sky. A sailboat is a creature of mass, displacing tons of water, yet sensitive to the very breath of the wind. She rides the currents of oceans, shoulders their massive billows, and nods in respect to each passing ripple. Treading an unmarked path, leaving no trace, governed by the immutable laws of physics, yet promising untold freedom, a sailboat fulfills a sailor's dream.

A sailboat is created by the hands of craftsmen from the stuff of earth. On land she is a dead weight to be moved only by powerful machines and propped up lest she fall over like a helpless infant. Conceived in the mind of a wizard, she comes alive only at the interface of sea and sky. That restless surface gives her life and energy, her soul comes from magic.

On those occasions when air and water move as one, she helplessly drifts or moves only with mechanical effort. She finds her true self in the struggle between the inexorable sea and the irresistible wind. She taps a small portion of their boundless energy to propel her purposeful strides, yielding to their power yet using it to achieve her goals. When they threaten, she slips through their grasp, resisting their courses to lay her own.

She is guided and cared for by her skipper and crew who love and serve her, feel pride in her presence, and struggle with her imperfections. They possess her only temporarily, for she is a creature of the sea and sky. Sailors, for all their love of the sea, are creatures of the land. Only together, caring for each other and testing each other, are sailor and boat set free to wander the oceans and visit distant shores.

A sailboat's connection to the land is tenuous yet inevitable. She seeks its shelter while carefully avoiding its searing touch. Perhaps she knows that someday, when she is tired or her skipper has grown old or careless, she will give up her life and return to the land, no longer feeling the tug of an anchor rode or the heel of a gust. No longer will she feel the sun hot on her skin while she patiently waits for her crew to set her free again.

One day her bones will lie rotting in a field or on a reef, or ground up in a pile of refuse, forgotten except, perhaps, by the one or two who shared her moments of glory. They will relive the delight of glistening spray, rolling swells, and her eager response to a freshening breeze. They will remember when the world was simplified to one boat, one crew, and one limitless horizon. And they will remember with humility how she carried them safely through the storm.

They will smile, with a catch in their throats, and she will sleep, lost to all except in their memories. Until they, too, are gone and her glimmer, like her wake on the sea, disappears. But her magic will linger and be reborn … in the mind of a wizard, the hands of a craftsman, and the dreams of a sailor.

Photo by Virginia Atkins