Volume 24 • Number 13
July 1, 1998

Practical Sailor™

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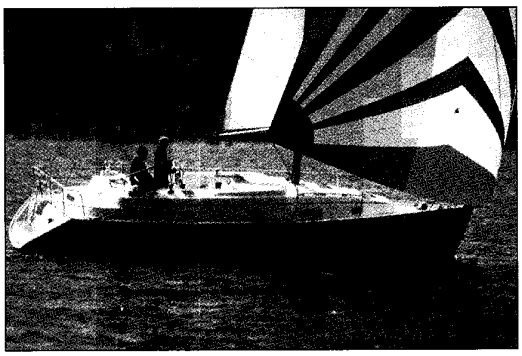

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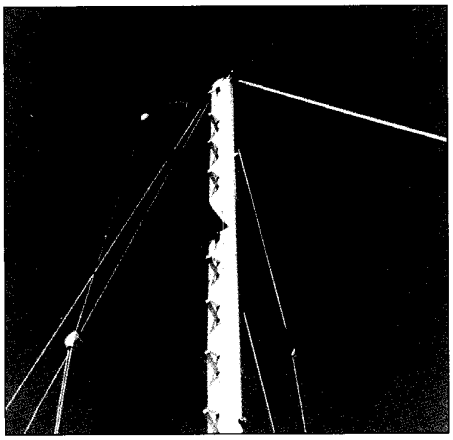

Also in this Issue

The Holes That Wouldn't Close

Viva, our 1975 Tartan 44 test boat, has, like most fiberglass boats, a hollow fiberglass rudder and skeg. The rudderstock is solid stainless steel, to which are welded horizontally oriented steel webs or plates. The rudder is molded in halves, with foam filling the spaces around the rudderstock and webs. It's the conventional method of building a rudder, but it has serious shortcomings. To wit, it fills with water, and when that water is salt, it tends to cause corrosion of the welds. Worse, according to Bill Seifert, who worked at Tartan during the 1970's, *Viva's* webs are probably mild steel and rust easily.

Keeping water out of the hollow rudder is difficult because stainless steel and fiberglass have different coefficients of expansion, causing the joint around the rudderstock to open up, however microscopically, and admit water. On some boats it may be possible to apply a bit of flexible caulk around the rudderstock where it enters the rudder, but on *Viva*, the clearance is only about 1/8", so you can't effectively work on the area.

The telltale sign of trouble is rust-colored water weeping from the joint. About the only way to stay the advance of trouble is to drill drain holes in the rudder during fall lay-up. The idea is to let the water drain over the off-season, then fill the hole with epoxy and microballoons before launch. (Alternatively, Bill Crane, a local boatperson of many skills, suggests tapping the hole to accept a brass plumber's plug; insert the plug with caulk; throw away in the fall and replace with a new one each spring.)

Depending on the condition of the foam, however, a hole in the bottom of the rudder may not drain water that has entered at the top. You've got to find the "sweet spot." Water most likely will migrate down the rudderstock and travel along the webs. So you may have to drill holes where you think the webs are located to drain off pockets of water there.

Last fall, we noted rust-colored water weeping not only from *Viva's* rudderstock/rudder joint, but from a pinhole on the trailing edge of the rudder, and from the leading edge of the full skeg. I drilled drain holes in both skeg and rudder. They weeped off and on all winter and early spring.

Last May, before launch, I sanded around the holes, washed with acetone, and filled them with epoxy and microballoons. All sealed except the lowest hole in the skeg. Where it had been dry the day of the repair, the next morning I was surprised to see water again weeping from the hole and the epoxy uncured.

I stuck a rag soaked with alcohol into the hole, then tried Pettit Polypoxy, an excellent product I've successfully used underwater before. It didn't set either, which made me think there was more than just water weeping out of the hole (perhaps caused by a chemical reaction with the foam?).

Finally, it was noted that the hole was wet only during the heat of the day, dry in the cool of the evening. Indeed, during the day, pressure inside the skeg actually pushed the epoxy out. When I tried the repair at night, it sucked the epoxy in.

My God, it lives!

Two evening applications of Pettit epoxy sealed the hole. Unfortunately, the skeg sprung a new pinhole leak higher up the leading edge. In desperation, I consulted Bill Seifert, who said, "Forget it. When we built the skeg we knew water would probably enter through the gudgeon bolts. But water won't enter the boat. Some day, drill a 2" hole from inside the boat into the top of the skeg so water can run freely out the bottom."

Meantime, I'm more worried about the rudder. Next year I'll drill holes to inspect the rudderstock welds. If they look nasty, I'll remove the rudder, split it in half and have new stainless steel webs welded to the rudderstock.

I keep thinking I've done the last "major" restoration job, but now I know better.

—Dan Spurr

Practical Sailor

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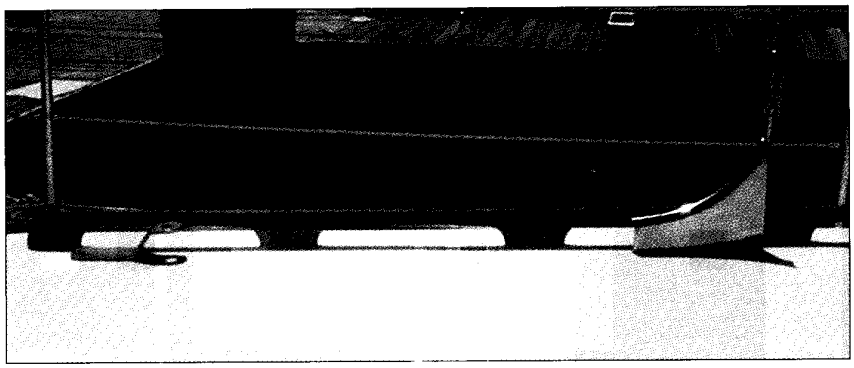
PRACTICAL SAILOR ACCEPTS NO COMMERCIAL ADVERTISING

Another Inner Forestay Stowage Method

This system was on our CAL 39 when I bought it and works very well. We have a 140% genoa on a roller furler. Rather than trying to use it partially furled when the wind comes up, we fly a relatively flat heavy #1 jib on a second forestay located just inside the furled genoa. The stay is attached near the bow and tightened with an ABI lever. The stay is stowed in a curved bracket that retains the stay and maintains a large bending radius. It was fabricated from a section of bent stainless tubing (with the outside half cut away) welded to a piece of stainless plate which was then bent 90° for through-bolt mounting on the deck ($100 from a local fabricator). I recommend thick wall tubing and .050" or thicker plate since loads may be substantial. The front bracket, also through-bolted, was made from 1/4" stainless plate; it contains a hole which fits the pin in the ABI lever. In the photo, the stay was deployed and is not shown.

The aft edge of the curved bracket is in line with the forward lower shrouds and, thus provides no additional interference when tacking the large genoa. This location also places the stowed forestay about 8" forward of the spreader. The location of the forward edge of the curved bracket, about 1/2" below the top of the handrail, keeps the sheets from getting caught when tacking the #3 jib.

Duane J. Knize
La Jolla, California



Above: *Duane Knize stows his inner forestay in a curved bracket.*

Walker AIRSEP

I recently read Steve Dashew's excellent article in the April 15 issue. It was very well done...until I reviewed the mention of the Walker AIRSEP closed crankcase and silencer system mounted on the engine. The last line in the paragraph indicates what would appear to be a proofreading error where the author cites, "I would never do another boat with a Walker AIRSEP."

Our customers, *PS* readers, as well as our dealers, would seem to indicate they would, "Never do another boat WITHOUT a Walker AIRSEP."

I trust this was the author's intent.

Michael DeLillo
Walker Engineering Enterprises
8321 DeCelis Place
North Hills, California 91343
818/895-7788
818/895-7785 fax

Sorry about that. Steve wrote it that way and we didn't catch the error. When we checked with Steve he reiterated that it is a "fantastic product."

Outboard vs. Inboard

Mr. Chulski's letter in the March double issue regarding the pros and cons of outboards versus inboards is on the money, as is your reasoned response.

We have sailed a 1976 Ranger 33 in Northwest waters for the past 10 years. Our Atomic 4 gives us good service, but we are concerned it will give up the ghost at an inappropriate time. The solution: Last spring we mounted a Mercury 8-hp. outboard on the transom. We fire up the Mercury occasionally to keep it running properly. The Atomic 4 gives us 6 knots in calm waters, the outboard 5 to 5-1/2.

This letter is directed at sailors with older gas engines who might feel safer with a "go home" outboard for emergencies.

Bruce Beh
Port Townsend, Washington

Charter Survey

One of our charter guests just faxed us a copy of your Reader Survey on bareboat chartering (February 15, 1998). Obviously, we were quite upset at having a "No" registered against us.

For your information, we are one of the oldest owner-operated companies and have been in business for over 16 years. We have one of the highest repeat businesses in the industry.

Your advice to first-time bareboaters to charter only with The Moorings or Sunsail is absolutely ill-advised as those companies are far more expensive than some of the smaller ones and quite often cannot give the personal attention the smaller companies give to charter guests.

Rolf Steinhuebl, President
Tropic Island Yacht Management Ltd.
Maya Cove, Tortola, British Virgin Islands

While chartering with another company in the BVI's, my wife and I looked longingly at the meticulously kept yachts out of Tropic Island Yacht Management, with whom we had previously chartered on several occasions. As we dealt with the many problems we had with our boat, we laughed and said, "Rolf would never have allowed this boat out of Maya Cove!"

David Frizell
Metuchen, New Jersey

We have chartered roughly 15 times in 25 years. We have had all kinds of things happen: clogged fuel filters, propeller falling off, dead batteries, inoperable bilge pumps, stoves that would not light, windlasses that wouldn't pull, bent anchors that wouldn't hold...the list is very long.

We just had our best charter ever, with Tropic Island. We will definitely go back.

Problems happen when people charter. It's the response to the problems that counts most.

Dave Woodman
Wayland, Massachusetts

Terminology

In your January 1, 1998 issue, I note that several readers took exception to your use of torque/energy, so I thought it best to point out a few misnomers on page 24 on chain locker design.

A hawsepipe runs between the deck and the side shell of a vessel and is normally found only on larger boats or ships. With hawsepipes, stockless anchors usually stow in the hawsepipe.

The pipe running between the deck and the chain locker is called a chain pipe.

You state to "not rely on the windlass gypsy to hold it" (the anchor). I agree in that since a gypsy is a horizontal drum for hauling in lines and not for chain, it can easily slip. I believe you really meant "wildcat," which is a cog-like wheel that is used to haul in/pay out the anchor chain. To secure the anchor for sea, a devil's claw is used.

Also, an easy way to seal a chain pipe for sea is to pack the deck opening around the chain with children's modeling clay. It will easily mold in and around the chain, it won't harden and in an emergency it doesn't need to be removed to let go the anchor.

William Stemwell
Savannah, Georgia

Another reader, J.A. Hamilton, also notes that a chain pipe is sometimes called a spurling pipe. Other terms include spilling or spill pipe, deck pipe, naval pipe and monkey pipe.

Hunter 310 Cockpit

I've been reading *PS* since its beginnings and as time goes on, I can't help feeling that your "critical eye" is in need of a new prescription.

I refer to the evaluation of the Hunter 310 in the March 1 issue, in which you miss some very disturbing features of the current cockpit designs that Hunter employs.

In December 1996, my wife, myself and two other couples took a new Hunter 430 for 10 days in the BVI's. The trip out of the harbor revealed that every time the boat pitches, the persons sitting near the arch smacked their heads on it. This may sound funny, but it made the best part of the cockpit—the part with all the back support—totally useless while moving.

So now we're at anchor in the Bight at Norman Island with a hot Caribbean sun and we find that there is no seat long enough and straight enough for a normal person to lie down to read without having to curl up like a shrimp.

And finally, coming back from Anegada through a rain squall we discovered that the lower half of the cockpit fills up with water and only has the decency to empty when a tack is accomplished.

Our 10 days aboard this boat led us to the question, did anybody spend any time on the prototype before this design went into production?

I can understand most people seeing this boat at a show and picturing themselves at the dock entertaining guests with food and drink, proud of their new purchase, but you guys? A pox on your bottoms!

Capt. Fred Schenker
Island Park, New York

Paint for Props

For most sailors like myself, whose boats are hauled at the end of each season, exotic bottom paints are applied more as a superstition than for any practical results. After all, the bottom paint only has to last anywhere from four to six months. Only serious world cruisers need worry about keeping clean for years at a time. Almost any bottom paint from any manufacturer—in my 21 years of experience—works reasonably well for a summer...with one exception: propellers. Someone will make a lot of money when they come up with a product that will reliably keep propellers clean for an entire season.

My current boat has a two-bladed prop with a 2' length of exposed shaft and a J strut. Each year I have tried something different—ordinary bottom paint, two coats, zinc but no bottom paint; no bottom paint, no zinc; Desitin (messy, very messy); outdrive paint (TBT in a can for aluminum outdrives, illegal), etc. Desitin was actually the best the first year I tried it. Except that the second seson the barnacles grew thicker than ever.

Last year I tried something different. I'd been reading about the use of copper/epoxy hull applications. It occurred to me that I could try something like that. I called the Gougeon Brothers, makers of WEST System epoxy and got from them the name of a supplier in Massachusetts (M-D Both Industries, Box 306, Nickerson Rd., Ashland, MA 01721). They were kind enough to send me a sample of copper powder.

I prepared my prop by carefully wire brushing old growth off, then sanding it smooth with #100 grit paper, leaving some tooth for the epoxy to grip. Then I mxed up abut 2 to 3 ounces of epoxy. While it was in the mixing jar I added an equal volume of pure copper powder, stirred it well, then painted the whole mess on the prop. It dried lumpy, but I expected that. After it set up I sanded it as smoothly as possible, trying not to expose bronze anywhere on the prop. For control, I used US Yacht Copperkote on the shaft and strut, as well as on the rest of the hull and keel.

Results? Some growth on the prop, including slime, but just one barnacle by Labor Day, two or three at haul-out after 220 hours engine time. And the best part is that the copper/epoxy is good to go for the next year after another sanding. Best results yet! The US Yacht Copperkote worked well on the rest of the bottom, except the J strut and shaft, which were thickly coated with barnacles and soft growth.

Cliff Moore
Rocky Hill, New Jersey

Poli-Glow & New Glass Still Shine

After one year of exposure, several of our do-it-yourself restorers, as well as professionally applied Microshield, retain their protective glow.

Last spring, we took nine badly weathered, dull, and splotchy fiberglass panels and brought back their gloss and appearance (to varying degrees) with a collection of products known as "hull restorers." We then hung them on south-facing racks to face the Connecticut weather. We reported on them in the October 1, 1997 issue. Now, after a year of exposure, we took them down so that we could a) examine them, b) apply a fresh coat, and c) determine if there are any problems in removing them from the fiberglass surface.

As we said in the last report, these products are best thought of as temporary fixes; all of them can markedly improve the appearance of a weathered fiberglass surface, but none of them will stand up as well as a good paint job. On the other hand, most are a lot less expensive than a paint job, and last considerably longer than wax.

How They Work

When a boat is new, it's shiny with a uniform color. That's because the gelcoat, which gets its color from very fine particles of opaque pigment suspended in the plastic film, has a very smooth surface. It's glossy because rays of light that strike the surface at an angle are virtually all reflected back at the same angle. As the fiberglass ages, sun and weather cause the pigments to change color from oxidation and UV exposure, and the gelcoat surface becomes microscopically pitted, so that light, instead of being reflected in one direction, becomes scattered, reflecting back in random directions. The change in pigment color results in a faded or blotchy appearance.

What can you do about this? Remove the surface layer with an abrasive. Sandpaper is generally too coarse, so a polish (very fine) or a coarser rubbing compound is used, followed by polishing. But it's just about impossible to polish the surface to a high gloss. Instead, a transparent film is applied.

Almost any liquid, including water, will provide a high gloss—for a while. The classic approach is wax. Our experience with waxes is that the best of them will keep a shine for six months or less, with three months being more typical. The most durable waxes we've found are the paste waxes, which contain more high-molecular-weight wax than liquid waxes; they're also more labor intensive.

Fiberglass restorers use even higher molecular weight to form a more durable film. Typically they use acrylic or acrylic-urethane resin. Just about all of the fiberglass restorers we tested consist of water-based emulsions of resin droplets, which form a clear film when the restorer is applied and the water evaporates. These emulsions have very low viscosities—much like water or liquid floor wax—and dry rapidly. This combination of characteristics makes multiple coats necessary, but means that application is easy and you don't have to wait for more than a few minutes before applying the next coat. Instructions usually call for about five coats, with three maintenance coats at the end of each year.

The Test

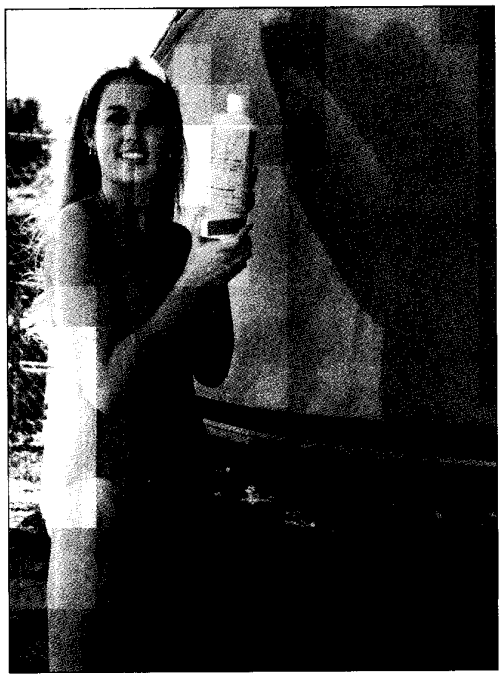
We found seven products, plus one for professional application, for a total of eight. Most are sold in kits (cleaners, strippers, polishes, final coat plus applicators).

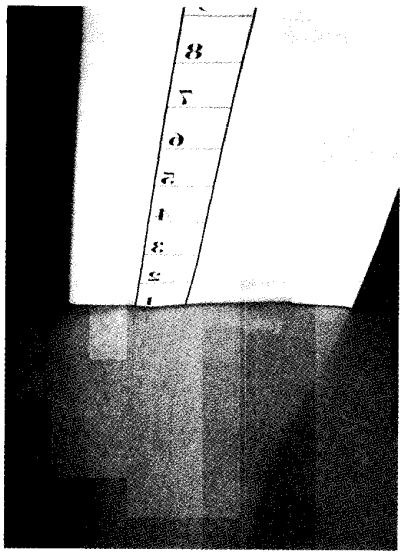
Our test panels were taken from a severely storm-damaged 32-foot sailboat. All of them had a mottled surface with no trace of gloss.

We applied each product to a different panel, following the instructions provided with each system. For the dealer-applied Microshield, we sent a panel to the manufacturer, and asked him to mask off half and apply his product to the other half.

We checked each panel to see if water would bead on its surface, a good indication of protection. We also measured the gloss of each panel, then placed the panels outdoors, examining them after one, two, three, six, nine, and 12 months' exposure.

Below: *Check out the shine on this hull coated with Poli Glow, one of our preferred products.*





Above: In our yardstick test for gloss, one reads the highest possible number reflected.

After a year, we brought the panels down. We divided each (except for the Microshield-treated one) in half, washed each down with a soft brush and a solution of liquid dishwashing detergent to remove surface soil, and again measured gloss and tested for beading. We then applied a maintenance re-coating (three coats, actually) to half of each panel. There have been in the past some concerns about the difficulty of removing these coatings, so we stripped the other half to bare fiberglass, using the stripper provided with each product, or, if there was no stripper provided, with the stripper from another product.

We stripped each half-panel down to a flat finish, and then applied five new coats of restorer, in order to see how a stripped and recoated surface would perform when compared to one that had been maintenance coated without being stripped.

What We Found

After a year, gloss had declined on all the test panels, but all still produced beading and most looked much better than the untreated panels had looked.

Microshield

Although the gloss reading dropped from an initial value of 24 (spectacular) to 15 (merely very glossy), the panel coated with Microshield looks very good. After a year's exposure, it's as glossy as any of the other products we tested was initially. We're not trying stripping or applying maintenance coats; the manufacturer claims 8 years of gloss retention, and, in any case, we don't have the means of re-application (Microshield is sold on a professionally applied-only basis, at $90-$100 per linear foot). We cleaned the surface with a detergent and a soft brush, and put it back on the roof.

Sea Breeze

The initial gloss reading of 2 dropped to zero after a year's exposure, although a water-beading test indicated that there was still something there. We found it easy enough to strip; although Sea Breeze doesn't provide a stripper.

We applied a maintenance coat of one application of Sea Breeze Polish and Sealant followed by one coat of Sea Breeze Boat protectant to the unstripped portion of the panel; we used two coats of each product on the stripped portion. Gloss readings of both halves were 2—the same reading we had obtained with our original application last year.

Vertglas

Vertglas, while it didn't have an exceptionally high gloss (6) in its original application, retained enough of it after a year to give us a reading of 1. This may sound unimpressive, but there's a huge difference in appearance between the dead-flat look of a panel scoring zero, and one that shows any gloss at all. Vertglas stripped easily using Vertglas Sealer Remover.

After we published the results of our first tests, The manufacturer commented that the product's initial gloss may have been adversely affected by our method of application; we had some problems controlling how much liquid was put down with the brush/sponge applicator supplied, so we used the alternative of a soft lint-free cloth. We practiced a bit with the applicator and then applied six new coats of Vertglas to the stripped portion of the panel and three maintenance coats to the unstripped portion. This time, our initial gloss reading was a respectable 9.

New Glass

With an initial gloss reading of 12, New Glass retained enough gloss after a year to register a 2 on our yardstick gloss meter. Despite some comments we've received about difficulty in stripping old coats of New Glass, we encountered no trouble using New Glass Stripper/Prep and a scrub pad. As a matter of fact, we also tried stripping it from a small boat that had been restored five years ago, and had been given yearly maintenance coats (three coats) every year since. It, too, stripped easily down to bare glass.

The recoated portion of the panel produced a gloss of 10—a bit lower than the initial reading we obtained last year, but probably within the margin of error of our test procedure.

Sea Glass

Sea Glass is a multi-step system, requiring (in addition to the cleaner) several coats followed by a topcoat of Sea Shell Protector. Its initial gloss of 8 wasn't bad, but after a year outdoors gloss dropped to zero (although water beading still occurred).

The Sea Glass kit comes with a handy scrubber and this, in conjunction with Sea Glass Fiberglass AU Remover, made stripping easy. Sea Shell Protector, as far as we can tell, is a wax. We found that enough of it remained so that we couldn't apply a maintenance coat of Sea Shell Protector without stripping the old surface. We applied two maintenance coats of the Protector to the unstripped portion of the panel, and applied our original schedule of five coats of Sea Glass followed by two coats of Sea Shell Protector to the stripped portion. The gloss of the maintained section was only 2 (the gloss of the original application was 5).

TSRW

TSRW (an acronym for This Stuff Really Works) behaved, in many ways, like Vertglas. Although its initial gloss reading last year was only 3, it held up

well, giving us a reading of 1 after a year. We weren't impressed with TSRW's Stripper, though. Label instructions call for applying it diluted with water, but we found that it didn't do a complete job that way; we tried it again full-strength. Even then it failed to completely remove the old coating. We found ourselves with a streaky surface. Finally, we tried New Glass Stripper, which did the trick.

When we re-applied TSRW (six coats over the stripped portion, three maintenance coats) we once again got an initial gloss reading of 3, the same as we obtained by just applying three maintenance coats to the unstripped portion of the panel.

Higley

Higley's initial gloss of 5 dulled down to zero after a year's exposure, although it continued to cause water to bead. It stripped easily with Higley FiberPrep Cleaner. After three maintenance coats applied to the unstripped portion, gloss came back to 4, or virtually the same as the original. The stripped and recoated section produced a gloss reading of 5.

Poli-Glow

Poli-Glow, with an original gloss of 15, provided the best gloss of the do-it-yourself products. After a year, the gloss dropped to 2, the same as New Glass. This still represents a considerable improvement in appearance over a product that scored zero.

Poli-Glow's stripper removed the year-old coating easily.

The panel section that had not been stripped was given three maintenance coats of Poli-Glow, and achieved a creditable gloss of 11; the stripped and re-coated section produced a gloss of 13.

Conclusions/Recommendations

The most permanent fix for a loss of gloss is a good paint job, preferably with a two-part polyurethane.

A bit lower in cost, and possibly in durability, is dealer-applied Microshield. If it lasts for its claimed eight years (all we know is that it looks good after one year) its $90-$100 per linear foot becomes attractive, compared to Awlgrip's $100-$200 per foot (when applied professionally).

Considerably lower in cost are the DIY restorers. These cost $35 to $60 for a kit ($15 to $40 for the restorer alone) that will cover a 25' boat. The best of these will provide a reasonable gloss for at least a season; a maintenance application of another three coats at the end of the year will bring back the gloss. All are quick and easy to use, and dry in minutes.

We've heard reports of some of these products going milky, flaking, or cracking; we've never experienced any of this in our five years of testing this type of product. We've also heard reports of difficulty in removing these restorers; again, we've encountered no problems.

Fiberglass restorers aren't a good idea for new boats. Best to apply wax for surface protection.

For boats that have become dull and streaky, though, fiberglass restorers provide a moderate cost, moderately durable fix. Based on our tests, we prefer Poli-Glow, New Glass, TSRW, and Vertglas. And, while Microshield looks great, we'll have to wait a while longer to see if it's worth its stiffer price. ■

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*Contacts- **Microshield,** Marine Resources, 1651 Browns Rd., Suite 101, Baltimore, MD 21221; 410/687-7293. **Sea Breeze,** Rolite Co., 596 Progress Dr., Hartland, WI 53029; 414/367-2711. **Vertglas,** Lovett Marine, 682 W Bagley Rd., Berea, OH 44017; 800/636-7361.* **New Glass,** *KAS Marine, 6 Lago Vista Pl., Palm Coast, FL 32164; 904/829-3807. **Sea Glass,** Port of London, 6101 Dory Way, Tampa, FL 33615; 813/855-5983. **TSRW,** Edgewater Distributing, 55 NE Bridgeton Rd., Portland, OR 97211; 503/282-7006. **Higley,** Higley Chemical Co., 40 Main St., Dubuque, IA 52001; 319/557-1121. **Poli-Glow,** Poli-Glow Products, 15476 NW 77th Ct., Miami Lakes, FL 33015; 800/922-5013. **Boat Armour,** Boat Armor Marine Products, 6600 Cornell Rd., Cincinatti, OH 45242; 513/489-7600.*

Performance Guide: Hull Restorers

Product	Size	Price/ Kit	Price/ Restorer	Ease of Application	Ease of Stripping	Initial Gloss Rating	Gloss after 12 Mos.
Microshield	n/a	n/a*	—	n/a	n/a	24	15
Sea Breeze	16.9 oz.	$35.60	$15.10	Fair	Excellent	2	0
Vertglas	16 oz.	$69.95	$26.95	Very Good	Excellent	6	1
New Glass	32 oz.	n/a	$40	Very Good	Excellent	12	2
Sea Glass	35.2 oz.	$107.60	$39.95	Good	Excellent	1	0
TSRW	32 oz.	$52.90	$39.95	Very Good	Fair	3	1
Higley	32 oz.	$45.00	$35.00	Very Good	Very Good	5	0
Poli-Glow	32 oz.	$49.95	$37.95	Very Good	Excellent	15	2

* $90/$100 linear ft.

Offshore Log

The continuing voyage of Nick Nicholson's Calypso

The Bottom Line

After six months in the tropics, keeping Calypso's *bottom clean proves to be a weekly—and bothersome—chore. Because it's soft, Pettit ACP-50, one of our top paints in our annual tests, disappears quickly during scrubbing. What to do?*

When *Calypso* was hauled at New England Boatworks last September for bottom painting, we decided to switch from Micron CSC Extra to Pettit ACP-50 bottom paint. Our experience in Florida in the winter of 1997 verified previous test results that showed CSC Extra to be only an average performer in tropical waters. ACP-50, on the other hand, has consistently tested at or near the top in warmer waters.

Switching paints, according to Pettit, called for a heavy hand or machine sanding with 80-grit paper, followed by a wipe-down with ACP-50 thinner. As expected, the CSC sanded easily, making the switch fairly straightforward.

NEB applied the new paint, using short-nap rollers. They reported that the ACP-50 dried so quickly to the touch that a follow-up brush smoothing after roller application was impractical. This resulted in a substantially rougher surface texture than the sprayed-on Micron CSC finish applied by Jamestown Boat Yard the previous year.

While drying quickly to the touch, ACP-50 dries slowly for re-coating, so that it took longer to apply the four coats of bottom paint that are specified for longest antifouling protection than we have experienced with other paints.

For our first two months in the tropics, the ACP-50 bottom stayed remarkably clean. With no scrubbing at all, we found only scattered patches of very light soft fouling, which wiped off with a sponge. We left most of this soft fouling in place to test for longer-term results.

After the third month, the bottom was generally clean, but began to show more patches of a much harder soft growth—a red, coral-like substance—that required light scrubbing with a medium Scotchbrite pad. Scrubbing with the abrasive pad removes clouds of bottom paint, so it remains to be seen how long the paint will hold up if we try to keep it really clean.

In addition, areas that see very little water flow—the rudder pintles, for example—began to grow stringy, grass-like fouling, although it, too, removed quite easily.

After six months in the tropics, the areas of the bottom that have not been scrubbed began showing significant fouling, including scattered barnacles. After a month without moving from Mt. Hartman Bay, Grenada, all of the bottom, including the areas previously scrubbed clean, were covered with a soft fuzzy fouling. This comes off fairly easily with a stiff bristle brush, and the areas which have been previously scrubbed clean—the rudder, for example—are easily brushed to a clean surface.

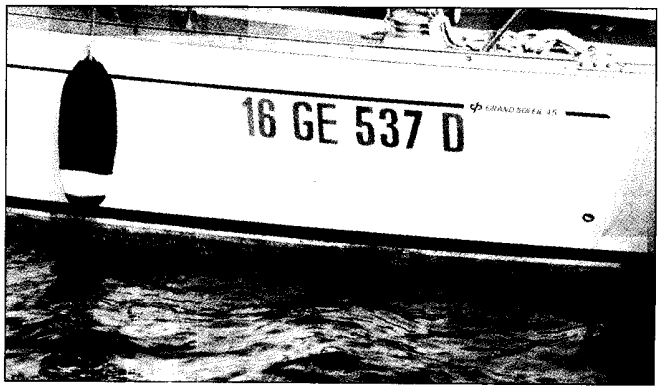
Areas which have not been kept scrubbed, however, are not so easy to clean. In fact, it has reached the point that we have declared the experiment over. After eight months—six in the tropics, two in New England—we are to the point that the bottom needs a heavy scrubbing with medium or coarse Scotchbrite pads to remove the tenacious harder fouling under the softer surface fouling.

Based on the condition of the paint in the areas that we have kept reasonably well scrubbed—the waterline, the rudder, and the prop aperture—a significant portion of our antifouling paint has been removed. On the leading edge of the rudder—an area of great turbulence under either sail or power—we are down to the signal coat of contrasting color. The waterline, which received an additional coat of paint, still appears to have a fair amount of life left.

We have decided to give the bottom a very thorough scrubbing before heading to Trinidad, our next stop. *Calypso* will be hauled in Trinidad in early fall to repaint the bottom and clean and wax the topsides before heading west toward the Panama Canal

Just how bad are Caribbean waters for fouling? Very bad, indeed. Water temperature is around 85°F—about 30°C. A weekly scrubbing of the waterline above the antifouling is required to remove algae.

The speed impeller, coated with a thin



Below: *Failure to scrub the waterline and bottom regularly in the Caribbean will leave you with a waterborne jungle.*

antifoulant designed for transducers, needs to be picked clean of seed barnacles every week. We could remove the impeller when in port, but its location well below the waterline allows a fountain of saltwater into the boat every time we do. Going over the side to clean the impeller is simpler.

The unpainted bottom of the inflatable dinghy must also be scrubbed once a week to 10 days, or you end up with a terrible mess. Seed barnacles start to grow in a week, and by two weeks they are so tenacious that it is a major task to remove them. The grass that grows on the dinghy bottom is even harder to get off.

On two occasions we have really let the bottom of the dinghy go—three weeks without scrubbing. The result has been nightmarish. The only way to remove the long grass and other marine growth on the bottom is scrubbing with a stiff brush using full-strength chlorine bleach. Needless to say, this requires heavy rubber gloves and eye protection. It's no wonder that the smart cruisers haul their dinghies out of the water every night.

The unpainted MaxProp requires a weekly polishing with a Scotchbrite pad, and both the big hull zinc and the Dynaplate grounding plate are scrubbed at the same time. The rough surface of the Dynaplate is particularly difficult to keep clean.

Maintaining the bottom of a boat in the tropics is no simple task. We are undoubtedly more concerned about keeping the bottom clean than most cruisers. The reduction in efficiency from a dirty bottom is significant under either sail or power .

Will we re-paint with ACP-50 when we haul? That remains to be seen. Ablative paints like ACP-50 work best on boats that are constantly underway. Cruising boats do a lot of starting and stopping—usually, a lot more stopping than starting. It may well be that a hard paint with a very high copper content, a paint that can be scrubbed frequently without removing much of the paint film, is a better choice for the typical cruising sailboat.

In any case, our original plan—to spend two years in the water until we do an extended haulout in New Zealand—is unrealistic, if we want to have any bottom paint left on the boat. The simple truth is that today's bottom paints do not seem to be good enough for true multi-year service in tropical waters. ■

Full-Service Caribbean Chandlery

If you are a sailor living in the US, you don't know how spoiled you are when it comes to finding bits and pieces for your boat. At its simplest, you get into your car and drive five or 10 minutes to a big local chandlery. At the very worst, you pick up the catalog from West Marine, BOAT/US, Defender, or one of the other big mail-order chandlers, dial a toll-free telephone number, and a few days later the UPS man drops off a package full of goodies at your door.

In much of the rest of the world, the level of service and the variety of products that American sailors take for granted are virtually unknown. Even in the Caribbean—an area overrun with charter sailboats, megayachts, and cruising boats—finding what you want or need to maintain or upgrade your boat is not always an easy job.

Traditional West Indian yacht chandleries are geared toward maintaining boats. They stock paints, varnishes, sandpaper, solvents, and fastenings, but have a much more limited range of equipment for upgrading your boat, as they carry little safety equipment, galley gear or sailboat hardware.

A notable exception to this rule is the expanding chain of stores called Budget Marine. Headquartered in duty-free, Dutch St. Maarten, Budget Marine consciously and unabashedly styles itself after West Marine, publishing a big, US-style catalog with an excellent array of equipment from around the world.

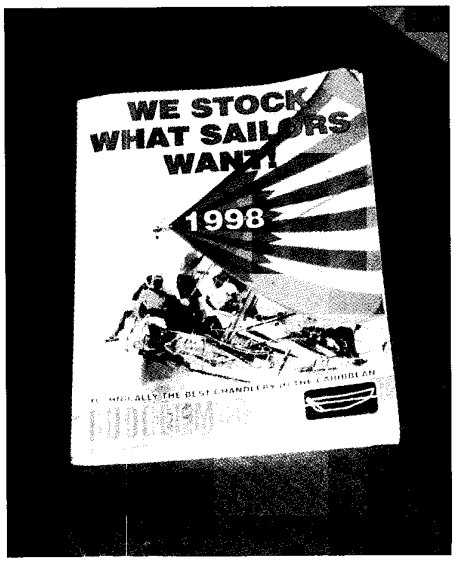
The only clues that this might not be a US company are the large percentage of European products in the catalog, the fact that payments can be made in US dollars, Dutch guilders, or French francs, and the method of delivery for mail or phone orders. Instead of UPS, there is Karma Shipping, a sea freight line that operates in the Leeward Islands.

Because of complex delivery logistics and varying tariffs, catalog prices are valid for St. Maarten only, and prices at the other major Budget Marine stores—Antigua and Trinidad—may be higher on many items.

Price comparisons with US chandleries are difficult. Some European products are actually cheaper than the same item from one of the US catalogs. Most, however, are higher, as you would expect, given the logistical hassles and relatively small scale of the company compared to its US counterparts. Cash gets you a 10% discount at the St. Maarten store.

What counts in the West Indies, however, is that they actually have the variety of goods that US sailors have come to expect, and they have them in stock. Their "warehouse" consists of more than 20 big storage containers crammed full of stuff, including everything from inflatable dinghies to wind generators.

Budget Marine, PO Box 434, Philipsburg, Sint Maarten, Netherlands Antilles 5995-22068; fax 5995-23804.



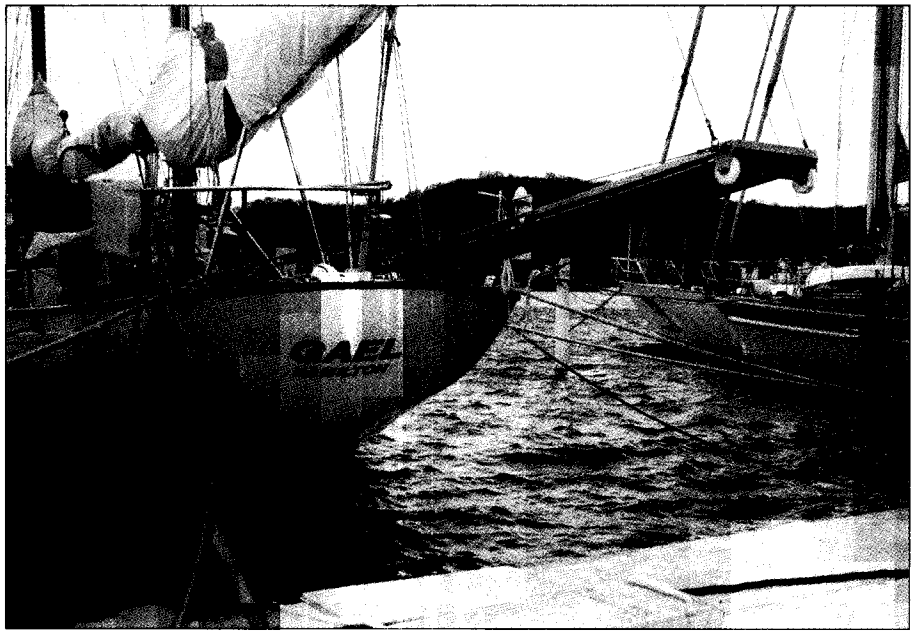
Right: *Budget Marine's catalog is an unabashed tribute to its West Marine counterpart.*

All Aboard: Med-style Mooring

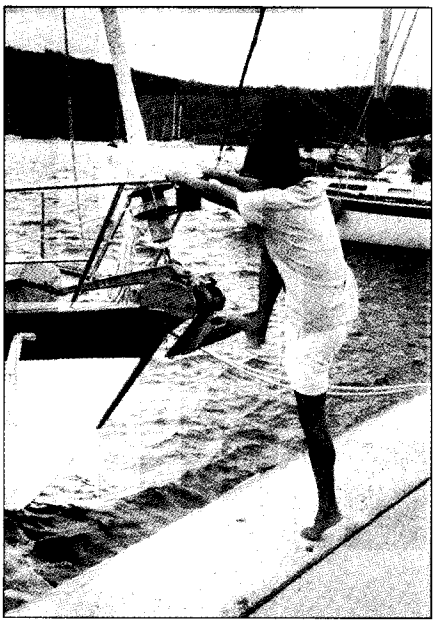
Once you leave the US, the type of marina facilities we take for granted—strong, secure floating docks with full-length finger piers—are a rare commodity. In the Caribbean, the term "marina" is most likely to refer to a concrete or wooden quay, where boats drop an anchor and back down stern to the dock.

Once you've survived the maneuver of positioning the boat's bow or stern a few feet from something solid, how do you get on and off the boat? Aboard *Calypso*, the answer is simple, but not very elegant. If possible, we go bow to the dock, which allows us to use the housed anchor as a step. Then, you clamber over the bow pulpit, which is quite a feat with a bag of groceries. Our stern, cluttered with wind vane and safety gear, presents an even more complex boarding dilemma.

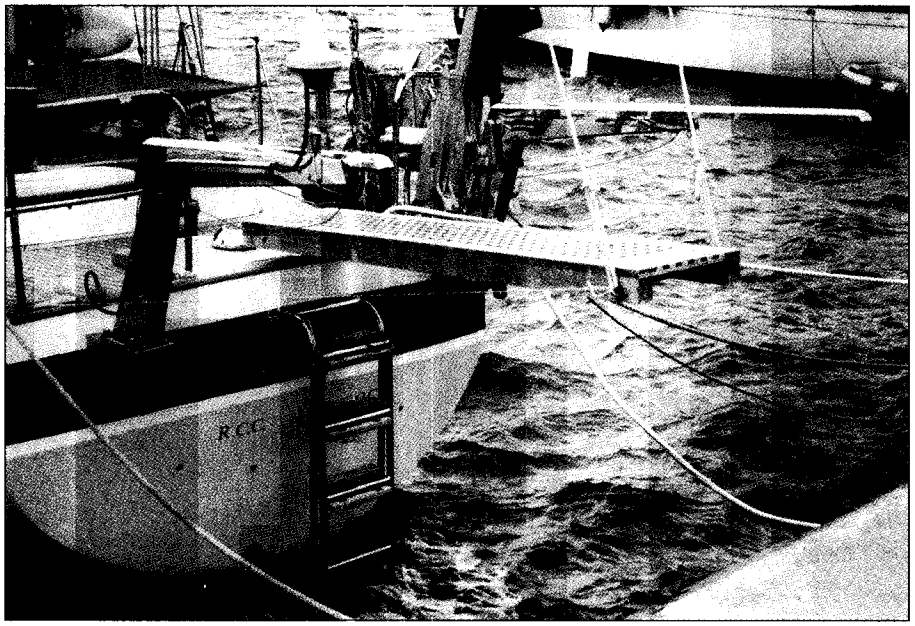
We spent most of the month of May at The Moorings Secret Harbour charter base on the south coast of Grenada. This is primarily stern-to or bow-to dockage, without finger piers. In the accompanying photos, we show a number of boarding solutions more elegant, or at least more practical, than our difficult anchor-and-bow-pulpit gymnastics. ■



Above: Gael *is a big Abeking & Rasmussen ketch, and she has a passerelle (gangway) to match. The 3-meter-long stainless steel ramp is hinged in the middle for more compact stowage. Stanchions—here removed—support a hand rail. Large plastic wheels at the dock end compensate for the boat's movement. Tackles at each corner of the transom allow the ramp to be stabilized and adjusted at any transverse angle. Finally, lifting the ramp off the dock at night keeps furry creatures at bay.*

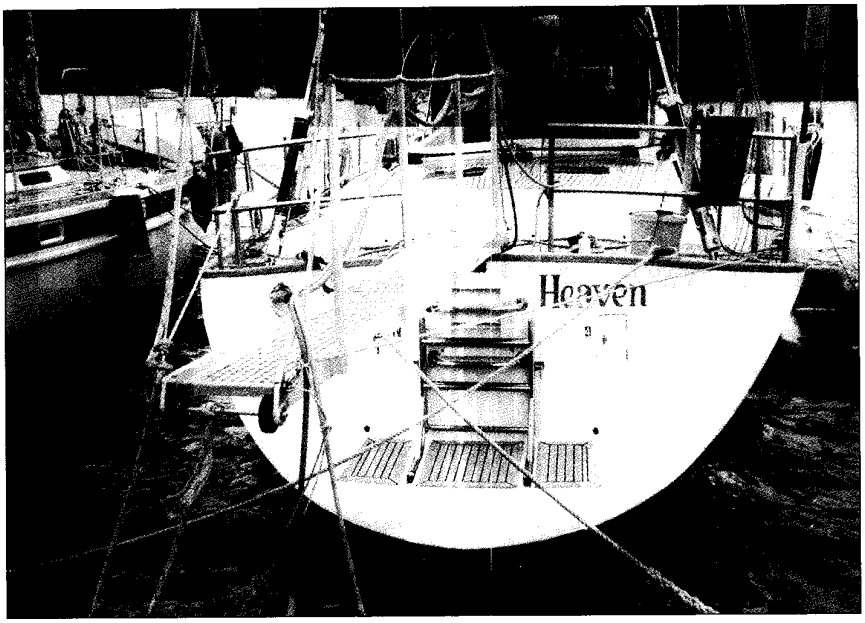


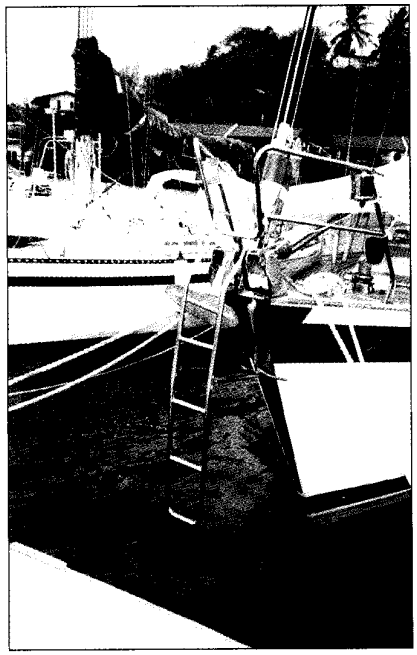
Above: *Climbing over* Calypso's *bow is far from elegant.*



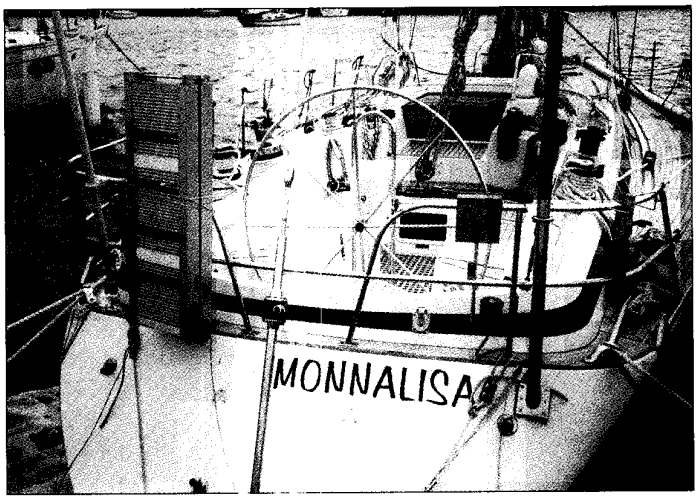
Above: *The well-equipped Halberg-Rassy 42,* Island Moon, *has a simple, classic Euro-style teak passerelle. Mounted in a socket on the stern, it is supported by a halyard, with light lines to stabilize it athwartships. Since it is heavy, a gangway like this can be awkward to handle and stow. And, with dinghy davits mounted on the stern, obviously the dinghy will have to be kept elsewhere, possibly alongside.*

Right: Sam's Heaven *has a heavy aluminum and teak passerelle and the removable handrails are used to support water hose and power cord.*

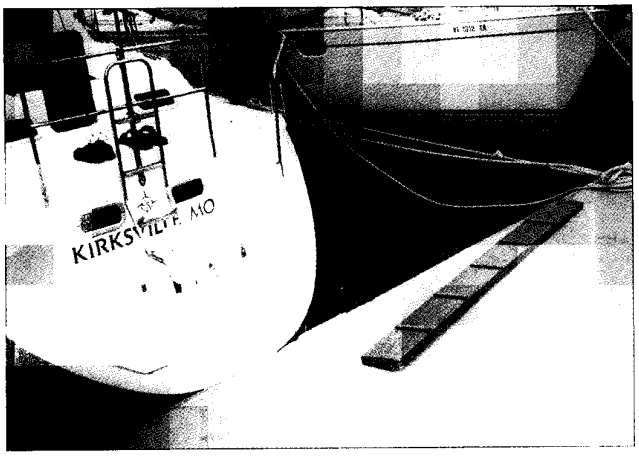




Above: *The bow pulpit on this Halberg-Rassy 45 is open in the middle for access, and a custom stainless boarding ladder is used to climb over the bow.*



Above: *Aboard the Grand Soleil 45* Monnalisa, *the aluminum ramps folds against the stern rail for storage.*

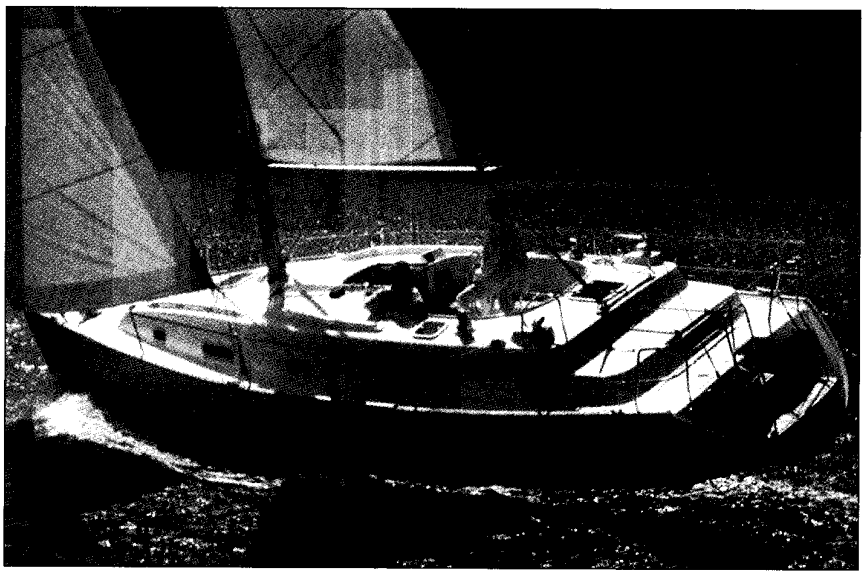


Above: *The* Compass Rose, *a Hunter, built in the United States and hailing from Missouri, uses a simple plank, which rests on the dock, and the transom step.*

Above: *On modern cruisers with back porch steps, it is possible to simply step from the dock to the boat, although it may be a long stretch.*

The Beneteau Oceanis 36CC

The French giant introduces several center cockpit designs, including this beamy 36-footer that sails well...for a family boat.



Center cockpit sailboats still make good cruisers. Time was (in the early '80's) the Morgan Out Island 41, a pioneer among center cockpit production boats, was the most popular auxiliary over 25 feet. The pendulum has since swung toward all-round performance and a "yachtier" aesthetic; nowadays most new cruising boats have aft cockpits. Still, the center cockpit alternative can be a good one. Center cockpit cruisers offer the maximum in "two-couple" privacy, simplify "control from the cockpit" sail handling, afford superior maneuvering visibility, and most sailors find enclosed center cockpits more secure than lower, more-open aft cockpits. And a center cockpit plan "layers" functions one atop the other to provide, especially in the 35 to 45-foot size range, the maximum in interior space and living room.

Taking one upwind in a chop may not be an exquisite experience and many are boxy and hard to look at but center cockpits have their strengths.

The Beneteau 36CC is a good example of the modern center cockpit cruiser. What mid-cockpit boats do well, she does remarkably well. Her accommodations are exceptional. And she is a better sailboat than "her kind" have tended to be. Making a hull that is one third as wide as it is long perform well is a trick. Making a snub-nosed, turtle-back profile look "pretty" is a trump. Designer Jean Berret (Berret/Racoupeau) and stylist Armel Briand, have, however, come quite close.

Above: *The Beneteau 36CC has a very high beam-to-length ratio. On the plus side, this offers a lot of room below, and gives good initial stability. But excessive beam becomes a liability at more extreme angles of heel, and coupled with the low ballast-to-displacement ratio, she becomes somewhat tender*

The Company

Beneteau is now the planet's largest sailboat builder (over 25 feet). The company dates back to 1884 when Benjamin Beneteau founded a yard at Croix-de-Vie on the Atlantic Coast of France. Today, it is a worldwide operation, including a plant in South Carolina. It is hard to find economies of scale in sailboat building. Niche builders and custom shops are much more prevalent than colossi. Still, Beneteau's size offers advantages.

The hours that it takes to build a boat are a very significant variable in its price. From "designed to be built" stipulations in the planning stages through production line efficiencies and labor-saving automation, Beneteau succeeds at taking out of its boats hours that smaller builders can't. Further benefits include serious purchasing power, ongoing in-house research and development, and the resources to engage design masters like Berret, Finot, Andre Mauric, Philippe Starck, Pinafarina, and Bruce Farr.

The Beneteau "giant", though, employs a mere 1,800 people. It spans the globe but has kept sailors in the company loop, retained most customers as friends, and been responsive to market realities. It would be hard to confuse Beneteau chairwoman Annette Beneteau Roux with Henry Ford, and the Oceanis 36 is hardly a cruising Volkswagen. Still, Beneteau's size helps it market sailboats.

The Design

Jean Berret's rise in Grand Prix racing began in the 80's with Ton Cup successes and climaxed with the Beneteau One Ton that dominated Admiral's Cup competition in 1987. He has since worked closely with Beneteau, drawing more than a dozen models in the "First'" (racer/cruiser) line.

Beneteau's Oceanis (full cruising) line began in the early '80's with designs to "emphasize ties with the ele-

ments instead of shielding sailors from the sea and sun." The Oceanis series was well-received, with their swim platforms, transom showers and hull "windows." They left, however, something to be desired in point-to-point speed and sailing efficiency. New models, like the 45f5 from Farr, have helped address that. Enter now M. Berret, to add sizzle to the center cockpit cruisers.

The shape of the 36's hull throws no roadblocks in the way of performance. The hull began, in fact, as the First 36 performance cruiser. It has a narrow entry. The forebody is relatively straight sided. This entry "wedge" is what most tubby center cockpit hulls lack. The Oceanis 36CC is thus an improvement on the breed upwind. Her transition to wide-bodied midsections is graceful.

What is essentially a very beamy boat is differentiated from a swimming float by the way in which her sectional shape and hull rocker are massaged to make her powerful without being clunky. Her beam-to-length proportions are not sylph-like, but both wetted surface and displacement are kept to a minimum. She also has a long, gradual exit that lengthens her effective waterline. A deep (4' 8") high-aspect ratio rudder is generous. What it costs in wetted resistance is more than paid back through control. Given a 315 sq. ft. mainsail and a 6-foot deep keel, the hull works well for the First 36s7, which has the same hull. However, with a 258 sq. ft. mainsail and a 5' 2" wing keel, the Oceanis 36CC won't sail the same.

The First displaces 11,684 pounds, the Oceanis 13,382. Factor in the drag of the keel wings at moderate or slow speeds and performance suffers again. Add the reduced efficiency of a roller-furling main and performance goes down further. Even though its hull is race-bred and efficient, the Oceanis 36 has performance limitations. Her displacement/length ratio is 197, and the sail area/displacement ratio is a lackluster 15.65.

Beneteau 36 CC

LOA: 36' 5"
LWL 31' 2"
Beam: 12' 6"
Draft: 5' 2"
Ballast: 4,155 lbs.
Displacement: 13,382 lbs.
Sail area 551 sq. ft.
Disp./Length ratio: 197
Sail area/Disp. ratio: 15.65

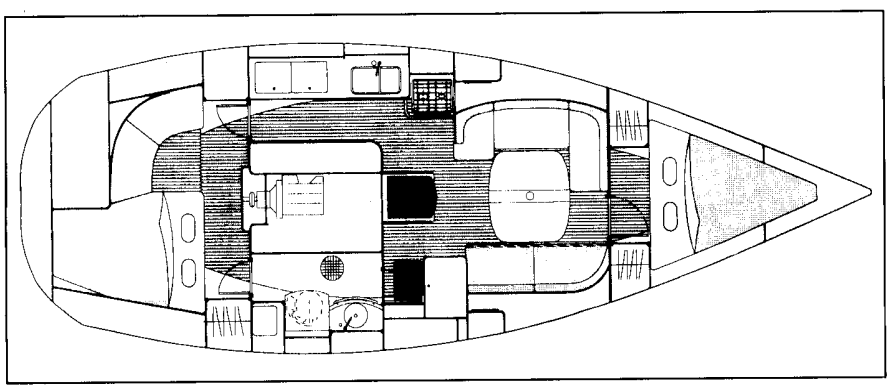
But you can look at it the other way. The Oceanis 36 is built for comfort. She offers more head and elbow room, more usable space, than many larger boats. Putting all of that in a race-bred hull, while it doesn't equal "built for speed," still improves the sailing abilities of "built-for-comfort." The rig is a standard, if slightly short, masthead configuration. The genoa is 60% of the overall sail area. It is an efficient and time-tested combination but one which means more muscle work in a breeze than many cruisers like to expend.

In 1988, Beneteau teamed up with Philippe Starck. Called the "new le Corbusier" by some art critics he made his name by designing furniture, then night clubs, then jewelry, even pasta. When it came to working with Beneteau, he said, "Everyone has dreams in their head of how things should be. I try to match the thing to the dream. Boats are no different." Styling for the "Firsts" then went into an "old time luxury liner" motif on the inside and "designer" signature patches on the transoms (just like blue jeans). Beneteau still uses a designer/stylist modus operandi, but Armel Briand, stylist for the Oceanis 36, is more traditional than Starck. A faceted transom; a subdued, blister house line; and an elongated hull port are elements of his exterior style. Below there is nothing as unique as Starck's pewter fixtures, gull wing windows, and birds' eye mahogany paneling, just understated "wood and white" with splashes of upholstery.

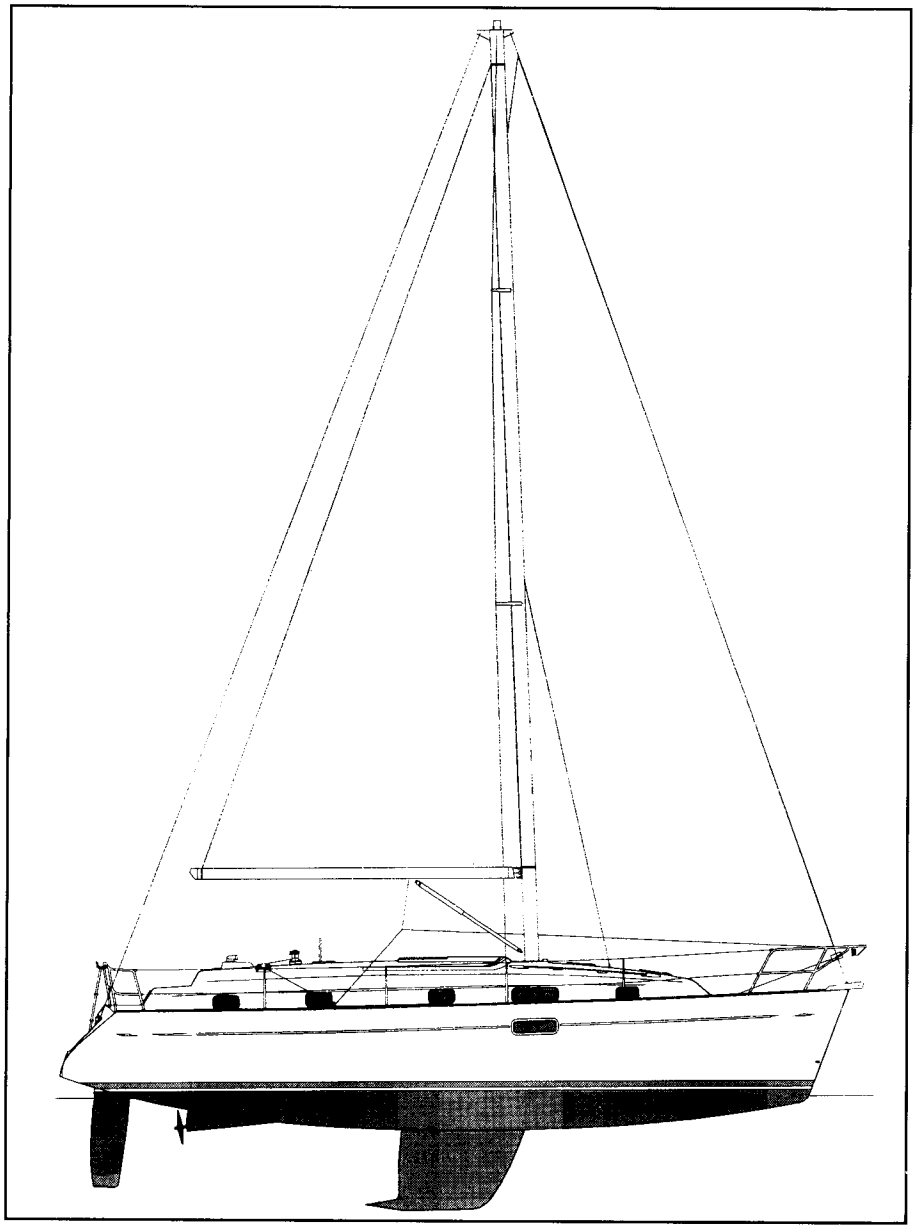
The Interior

While the Oceanis 36 is wide, she's not overwhelmingly deep. That helps her appearance, but it means that headroom throughout is limited to 6' 1" with 6-foot clearance in the head and galley/passageway. That said, the staterooms, head, galley, and saloon are all exceptionally roomy. The engine room (beneath the companionway) is also much bigger than most. Access to filters, injectors, oil fill, et. al., is superior. Hard to find in most boats this small, there's also realistic room for auxiliary machinery (air conditioning, generator, etc.).

While both platform double berths are wide, they are short (6' 2" aft and a tapered 6' 4" forward.) The aft cabin is a master cabin, however, with settee, vanity mirror, and hanging locker. Forward on the starboard side is a generous and well-designed head/shower. One of the few tight spots is where the forward head door swings open into the navigation area, but a "disappearing" seat for the oversized nav table helps.



Left: *One of the few tight spots in an otherwise large interior is where the head door swings into the nav area.*



Above: *The rig is not particularly large, perhaps because beamy boats like to be sailed level, and the draft is moderate. The hull and cabin profile look a bit like a turtle, thought not necessarily unattractive. It simply illustrates how difficult it is to design a mid-size center cockpit boat that doesn't appear chunky.*

The galley is ranged along the port side outboard of the passageway. Well-designed for work at sea, it affords 6' of counter space as well as good light and air. The saloon makes use of the boat's beam with wide shelves extending out to the hull sides behind the settees. Big areas of convenient stowage plus an open feel are the advantages. Hull ports provide light plus a view. The forward cabin has two hanging lockers. Locker fronts throughout are caned. Interior finish is a Beneteau hallmark. Few production boats offer the same amount and quality of lustrous, well-worked wood below. We wonder about the "living in a show room" feel of life aboard, but we're not complaining!

Construction

Most Beneteaus are built using interior liners. The Oceanis 36 hulls are hand-laid in a female mold using vinylester resin in the skin of the laminate to combat osmosis and polyester resin in the rest of the laminate. The company says no more about laminate schedules. Compared to resin transfer methods such as SCRIMP, which improve glass-to-resin ratios (yielding lighter, stronger hulls), hand lay-ups now are pretty ordinary.

While still in the mold, the hull is reinforced with a full-length fiberglass grid structure. Extending in most areas to a foot above the waterline, the grid is a complex system of athwartships and longitudinal molded stringers and floors that stabilize the hull and distribute rig loads and working strains. It incorporates molded-in, stainless steel chainplate tie-downs, engine bed, water tanks and sump. The liner is made of woven plus unidirectional glass and polyester resin and is bonded over much of its surface to the hull. The success of the method depends on the precision and strength of the bond. Beneteau has been building boats this way since the late '70's. Its track record is good.

One thing that has changed is the rudder assembly. It is a composite rudderstock (made of unidirectional glass and vinylester resin) wound with a continuous filament of unidirectional glass (and polyester resin) to form an integral shaft/blade. The stainless/fiberglass amalgams that it replaces were costlier and trouble-prone. The composite shaft has a breaking strength nearly three times greater than the stainless. However, a number of Beneteau owners complain about play in their steering systems. One owner, who had a new bearing plate installed (at no charge by Beneteau) between the top of the shaft tube and the quadrant, said that Beneteau "fixed the problem just about completely." The composite shaft also eliminates the widespread problem of corrosion inside the rudder, usually where the rudderstock is welded to the webs.

End-grain balsa forms the core for the deck. Beneteau does the right thing in terms of using solid glass wherever hardware is attached, but, as is true with most boats, you may face a sub-

stantial chore to mount additional deck gear correctly.

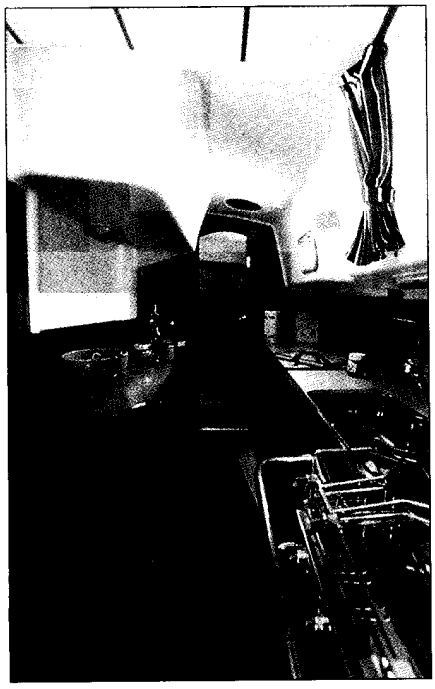
The deck is placed atop an inward-turning hull flange. The joint is bonded with "space age polyurethane glue" and mechanically fastened through the teak toerail with screws. There is no "fail-safe" aspect to the design; it depends on care, precision, and experience (as well as the properties of the adhesive.) Here again, Beneteau's history is good and its five year (limited) hull warranty is comforting.

The keel is iron, which requires an epoxy treatment to prevent corrosion. We prefer lead, which is denser and non-corrosive, and, of course, more expensive. Don't forget that Beneteau, like Hunter and Catalina, is highly value conscious.

A furling mainsail and genoa are standard. Beneteau used to use Isofurl, but after some problems in Europe last year with some Isofurl headsail furlers failing (a number of rigs fal down, all in Europe) a recall was issued. The Isofurl headsail furlers were replaced with Facnor, another French vendor not widely known in this country.

Performance

Most boats are at their worst beating in light to moderate air and a seaway. In these conditions, we found Ocean-



is worse than most. She gets almost all of her power from her headsail, and the rail-mounted genoa car tracks don't allow tight sheeting angles. The parasitic drag of a winged keel is most insidious in these conditions and the roller-furling main isn't big enough (or shapeable enough) to be much help. From here, things get better. More breeze provides more power and puts less of a premium on the efficiency of the overall rig.

The Oceanis is beamy. This gives her fine initial stability. Her ballast/displacement ratio is only 31%, however. That means that once she starts to heel her righting moment drops sharply—she becomes tender. Reefing is an easy solution, but, especially with the standard (too full when rolled part way) headsail, it didn't prove to be a good one. The boat is not meant to be raced nor is she designed to supply "that last 10%" of optimal upwind speed.

Off the wind, the 36 is a chunky rocket. Her relatively clean underbody, good initial stability, fine entry, long waterline, and graceful exit help her click off the passagemaking miles very quickly. Even when she heels in a puff and buries a hip, she will answer to her deep rudder rather than spinning out.

Under power, the 27-hp. Yanmar diesel pushed her easily to hull speed with plenty of throttle in reserve. Backing to starboard is hard until she gets moving. She climbs to port right away in reverse (with a three-bladed prop) but will steer once she develops even a small amount of stern way.

Conclusions

For people under 6 feet, the Oceanis 36CC offers more living space than any boat we've seen of comparable size. The accommodations are not only roomy but attractive, practical, and functional—either for cruising or for living aboard. She goes to weather better than most similar boats, but she falls short of being a good upwind performer. She reaches and runs with good quickness.

In some ways, Beneteau can offer more product for less money than many of its competitors, especially in the area of finish and outfitting. The breadth of its dealer network and the depth of its building history are additional plusses. That, and the fact that there aren't many other new boats quite like the Oceanis 36CC, make it a new boat to consider.

Base price is $126,500. For comparison, a Hunter 376 starts at about $120,000 and a Catalina 36MKII at about $107,000. ■

*Contact- **Beneteau USA**, Inc., 24 North Market St., Suite 201, Charleston, SC 29401; 803/805-5000.*

Left: For a high-volume production builder, Beneteau does a superior job with joinerwork and interior design.

At A Glance

Strengths

- Strong company
- Roomy interior
- Attractive woodwork

Weaknesses

- Light air performance
- Iron keel
- Restricted headroom
- Low ballast-displacement ratio

Conclusion. It is clear that a lot of thought went into the design of the Beneteau 36CC. The same is true of Beneteau's highly refined engineering. For a high-volume production builder, the result is a reasonably well-built boat that represents good value. Still, buyers should be aware of cost-cutting measures, such as iron keels and hull/deck joints that are screwed together rather than through-bolted. The 36CC has a big interior. It sails well enough in most conditions.

Mast Steps: No Perfect Design

Part 1—Among nine different steps, of three distinct types, each has its pros and cons. But when all is said and done, we see advantages to the removable Fastep.

High on the list of chores for which it's difficult to find volunteers are trips to the masthead.

But aboard most boats, it sooner or later is unavoidable. A fouled or lost halyard, an expired lightbulb, a damaged antenna or wind sensor...and up you go.

But how?

Perhaps the least tremulous ride is in a well-made boatswain's chair slung from a recently inspected, powerhouse halyard, on an integral masthead sheave, whose tail is tended by your two best friends, neither of whom is a beneficiary on your insurance policies.

Doing the window shade trick rarely is that idyllic. Sometimes you even have to go it alone, sometimes on something other than a flat calm morning, sometimes even underway.

Some good minds have worked on this problem. They've come up with steps attached to the mast; web ladders; drums that contain multi-purchase mechanisms; and mountain-climbers' hand grippers and stirrups (the hand grips contain cam cleats). We'll look at all of them we can find, plus a "home brew" block-and-tackle/chair-cleat system used by an expert rigger.

For this report, we'll deal only with mast steps, which probably constitute the most commonly seen mast climbing method aboard shorthanded cruising boats. In a subsequent issue, we'll look at the other systems mentioned above.

Nine Mast Steps In All

We collected all the steps we could find—nine in all. Shown in the photos on the next page, they are mounted on a short section of mast once aboard a Prout 37 catamaran that, while doing the Inland Waterway, snagged a spreader on a tree and ripped out a big chunk of mast. Paul Boyce, manager of Hood Yacht Spars, responded to our request by grabbing a saber saw and cheerily saying, "About six feet, you say?"

The mast steps come in three basic flavors—fixed, folding and one demountable.

The five fixed versions carry twin liabilities. Except for one very small step, they create considerable wind resistance and there's little you do about that. They also snag errant lines, such as halyards and sometimes sheets, a tendency that can be minimized (with some of them) by rigging a fine wire or light line along their outside edges, tensioned with turnbuckles. That creates even more windage, of course, and makes the mast begin to look like a truss left over from the Eiffel Tower. In our experience, even this wire, however, may have a tendency to catch lines, especially those with a soft hand.

The three folding models eliminate much of the windage and virtually all of the snag potential, but do not provide footing as secure and comfortable as most of the fixed steps.

The ninth sample? It's a permanent or demountable step that the inventor intends should be used with an attendant safety harness manipulated with a sliding cam cleat device.

All of these steps involve drilling many holes in your mast. We've never read or been told that drilling holes in a mast removes enough material to worry about. Further, we've never heard of a mast failing because of such holes. Nevertheless, one surely likes to minimize the number of holes.

Because it is considerable work to install such steps, it's not recommended that it be done when the mast is stepped. Exerting pressure on a drill bit (and applying lubricant to preserve the bit) is difficult enough to do when the mast is on sawhorses, let alone aloft. It's minor, but you also would wind up with a lot of nasty sharp aluminum curlicues on your deck.

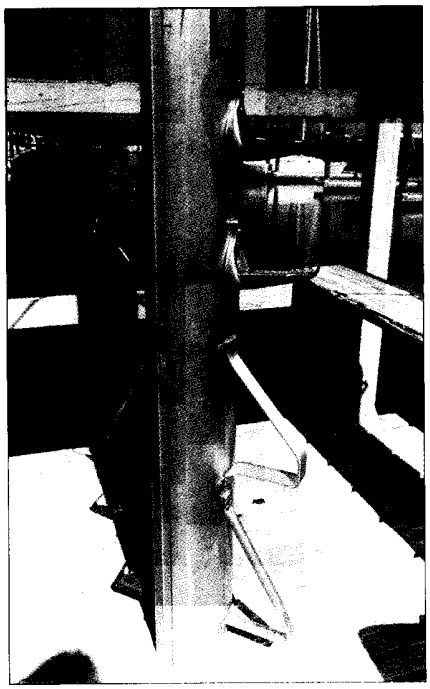
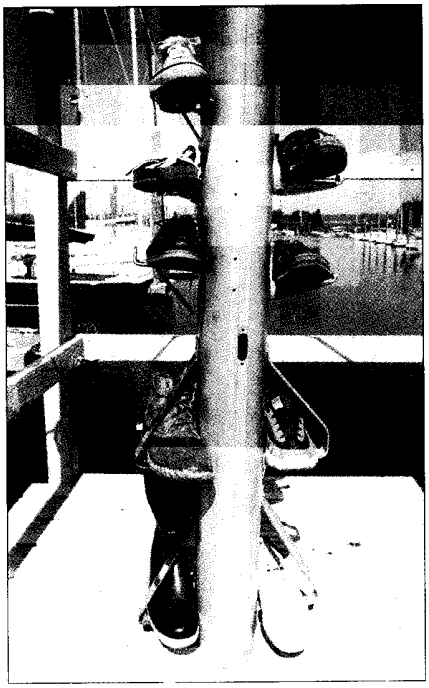
And whether you intend to use plain aluminum rivets or stainless machine screws or 305 stainless rivets (with a threadlock or insulating paste to inhibit corrosion), tapping good, clean threads or operating a rivet gun also is difficult if you're confined to a boatswain's chair.

Stainless steel machine screws are nearly twice as strong as pop rivets, but 3/16" 5052 aluminum rivets have a shear strength of 500 pounds (1/4" 5052 rivets go up to 850 pounds). Nobody recommends self-tapping screws for this job.

For our tests, we took the easy way and installed all the steps with aluminum rivets. (We had enough practice in drilling and tapping aluminum when we last year worked on the mast of our Tartan 44 test boat.)

To attach these steps, we used a stock rivet gun that cost about $30. If you use stainless rivets or aluminum rivets larger than 3/16", you'll need a compound-action gun that'll set you back a hundred and a half, unless you can rent or borrow one.

Aluminum rivets go for 2¢ to 8¢. Stainless rivets cost 8¢ to 22¢. Stainless machine screws are not cheap. Whatever you choose, with two or more per step, you'll need quite a few to attach alternating steps the recommended 16" to18" apart. Measure and divide to get the steps evenly spaced. You'll want two opposing steps for


Above: *Shown here are three views of the nine mast steps discussed. In each view, the steps are, from the bottom left up, The stainless West Marine triangular step; the ABI triangle; the Fastep, fashioned of stainless rod; the ABI folding step that works better on a transom, and the little Ronstan, an old design that is very popular. On the right side of the mast are, from the bottom up, the flattened aluminum tube sold by Defender; the Pace-Edwards extruded aluminum step; the folding Almag Mast Walker, and ABI's very similar cast aluminum version.*

standing at the top; consider carefully how far these two should be from the top of the mast.

The Stainless Triangles

The most flattering thing to be said about the strap-type steps is that they sort of enclose the foot, once it is inserted, and provide a more secure feeling than the open steps.

The two stainless steps—one sold by ABI Industries, Inc. ($18), the other by West Marine ($14)—appear to be identical except for the tread material. The West version, bottom left in the photo, has a grooved teak piece. The ABI, second from the bottom left, has a black "urethane instep pad."

These steps are heavy. They weigh 11-1/2 ounces.

Both have tightly spaced holes for six fasteners...too many in our opinion. If either of these steps were our choice, we'd utilize but four of the holes, two at the top, two at the bottom.

The least flattering thing to be said about these steps is that a size 10-1/2 male shoe can just barely be inserted in the opening. Extracting a foot requires a bit of a bowlegged cant.

These steps provide lateral security and are very nice hand grips. However, the difficulty of inserting and removing a foot makes them—at least for those with average to large feet—a bit clumsy and perhaps even slightly dangerous.

Further, they snag halyards and, being stainless, need careful anti-corrosion treatment to isolate the stainless from the mast.

If you favor either of these steps (we don't), try one (mounted) for size before you commit.

Triangle & Trapezoid

On the bottom right in the photo is an aluminum step shown in the Defender Industries catalog. It sells for $8.60. Our files show it used to be made by United Die and Manufacturing Co. in Sebring, Ohio, but we got a "not in service" message when we telephoned and Defender could not supply the name of the maker.

So, we do not know who makes it now, but most anybody could.

That's because it is a piece of anodized aluminum tubing, bent and flattened in the proper places to form a step and for mounting holes for fasteners. (We've never been taken with anything that utilizes flattened tubing; too many failures.)

This step has three closely spaced fastening holes at the top and three of the same ilk at the bottom and that's several holes too many, in our view. Even if using two at the top and two at the bottom, the holes are very close together.

It's simple and strong and cheap.

It weighs but 8 ounces.

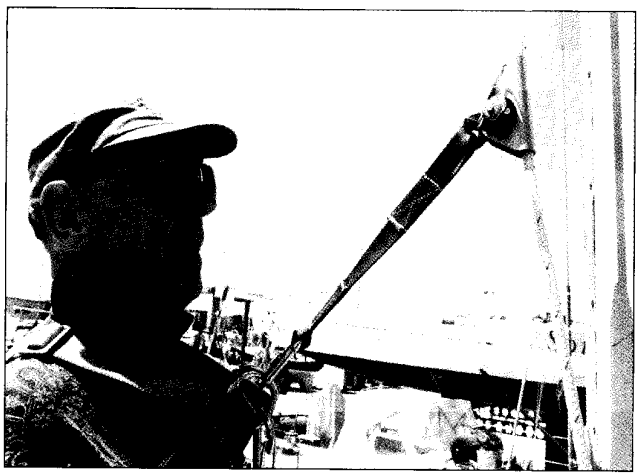
It makes a fairly comfortable hand hold.

The opening for one's foot is more generous than the two discussed above. However, the narrow rounded "tread" is tough on the instep. If you wear thin-soled boat shoes, you'll get enough in a hurry.

A minor objection: This step is very unattractive; we've seen boats with a full set and the steps stand out very noticeably.

A major objection: Windage.

Unless saving a few bucks is para-



Above: *Whether used, as recommended, with Fasteps or any other steps used to climb a mast, the Saf Brak is a sound idea. A short web strap with a cam cleat on one end and a carabiner on the other to attach a harness or boatswain's chair, the Saf Brak mounts on a taut, stowed halyard. When going up, the Saf Brak's cam cleat follows along obediently. When coming down, lifting up on the web strap permits a controlled, segmented descent.*

mount, this is not the way to go.

The other aluminum step, which makes a trapezoid with the mast, has been made for years by Pace-Edwards.

It is a wide extrusion, ribbed on one side, grooved on the other side. The ribs are for strength and ridigity, but they also make for good footing on the 2"-wide tread. The grooves, on the surfaces facing outboard, are said to make it more radar-reflective.

Being a tradezoid, the step has ample width for even a big seaboot (see photos).

The anodized extrusion is tabbed (by punch pressing away part of the flange) at the top and bottom for fastening with four rivets. The holes are widely spaced, which we like.

The Pace-Edwards step weighs 7 ounces.

It is available with an "extra," a small clip, fastened with two very small rivets, that can carry a wire to vertically connect the steps and prevent halyard fouling.

In a *PS* review years ago, it was observed that the wide tread makes a somewhat difficult handhold. If one has small hands, this is true.

It's also true that, along with the other triangular steps, there will be considerable windage.

However, for size, rigidity, finish and comfort, we think this is the best step of its type. West Marine's catalog displays the Pace-Edwards step, priced at $26.99 a pair.

The Seabird, aka Nicro aka Ronstan

The Ronstan, known in an earlier life as a Seabird Mast Step then as a Nicro product, is derived from a step used aboard Bernard Moitessier's *Joshua.* It is described in the famous French sailor's book, *The Long Way.*

A one-piece cast stainless half circle with an integral supporting strut, the Ronstan probably is one of the strongest steps made. It can be bent to shape. Attached with but three widely spaced fasteners, it also is, by far, the lightest at 3 ounces.

It also has, by far, the least wind resistance.

It doesn't snag halyards. (It's also used by some sailors at the base of the mast to stand on while flaking the mainsail and dealing with the cover on boats with high booms.)

The West catalog shows it for $16.99, only $1.04 more than it cost almost 10 years ago, when we last evaluated mast steps.

So why isn't it the perfect mast step?

Maybe it is, if you're intrepid and have small feet.

Besides being a very poor handhold, its principal liability is that it projects from the mast less than 2". Because the average shoe is about 4" wide, you get support for about half of your arch or even less if you elect to place the ball of your foot on the step.

To compensate somewhat, the Ronstan step has cast into its step surface six fairly sharp teeth. They're intended to grip the bottom of rubber-soled boat shoes; it also means you wouldn't go up the mast barefooted.

We wouldn't consider for an instant going up the mast with these steps unless we were wearing a harness or chair on either a tended halyard or, if singlehanded, one with a sliding cam cleat we will be discussing in a moment.

The Folding Steps

The two folding steps, both made of cast aluminum, may appear in the photo to be identical. They're the two on the top right. In one of the photos, they're shown in the stowed position.

Each is made up of two aluminum castings.

One casting is a movable step with a tread about 4-1/2" long with non-skid gooves and a prominent hook on the outer edge for lateral security.

The other casting, to be mounted on the mast with four fasteners (aluminum rivets would be our choice), is shaped to permit the step to be folded up when not needed and slid down to lock in place.

As one ascends the mast, the steps are popped up and open. Those who own and use this type of step probably only forget once or twice to fold and stow each and every step while descending.

They make good, long, wide footholds; as handholds, both serve better than any others. They don't foul halyards. Windage? About medium. They're a bit heavy, about 10 ounces.

The Mast Walker, made by Damage Control, is smoothly made of Almag 35. There's evidence of careful shaping, fitting, grinding and polishing. It operates easily and has a nylon button insert, threaded for adjustment, to bear against the mast and preclude rattling.

There are six versions of the Mast Walker to fit different mast curvatures. Priced at $14.50, the Mast Walker would be especially attractive for anyone looking for a good snug fit.

The ABI folding step, well pol-

ished and anodized, also has the important nylon insert that engages the mast when the step is folded. (The ABI step used to have a black rubber button, but somebody must have decided that the adjustable nylon button was worth copying.) With either make of step, the button should be adjusted before mounting, if possible. You'll see why, on the first one you mount.

The ABI step is sold by West Marine for $15.99.

There seems to us to be little to choose between these two well-made folding steps whose principal advantages are that they reduce windage, avoid snagging lines and eliminate corrosion (if mounted with aluminum rivets).

Another folding step, also made by ABI and sold in several catalogs for $14, is more commonly used as a transom step. However, ABI feels this heavy (15-ounce) chromed brass assembly can be used on a mast. In the photos, it is the second from the top left. It folds and is held firmly by a stainless spring. It does not, however, fold quite flush enough to the mast to preclude it from snagging a 1/2" halyard. That and its weight, plus the mish-mash of metals, make it a choice we'd avoid.

A Demountable Step

In the photos, half way up the left side of the mast, is another man's approach to mast steps.

Looking for a better way or the best of all worlds, Alfred Gilbert fashioned his Fastep from two pieces of 1/4" stainless rod. Bent properly and assembled with four simple welds, the Fastep is, for an "open" step, very strong and quite secure.

More importantly, Fasteps can be mounted when needed and demounted coming down. No windage, no fouling, no fasteners.

Fasteps can, of course, be left in place, in which case there would be a little windage and the threat of a fouled halyard. If you mount and demount them as needed, there is, of course, the risk of dropping one.

A Fastep requires only two holes in the mast. Gilbert admits the holes are a "bit fussy" but he supplies stick-on templates, instructions to keep the holes perpendicular to a fore and aft line (not to the curvature of the mast) and suggests a center punch and a bradpoint bit to get clean 9/32" holes.

Going up the mast with a canvas bucket of Fasteps, the steps are inserted in the two holes and pulled down 90° to seat them snugly in place. They have small nylon-tubing fenders to make them fit snugly and not vibrate. Coming down, a step is rotated upward 90° and pulled free of the two holes.

Gilbert strongly recommends that his Fasteps ($12.95 each) be used with what he calls a Saf-Brak. The Saf-Brak is a 12" web strap with a cam cleat device on one end and, on the other, a locking carabiner to attach to a good harness or soft boatswain's chair. The cam cleat assembly, from an Idaho mountaineering gear manufacturer, seems, by marine standards, a bit clap trappy but it's certainly rugged. Rigged on a taut, stowed halyard, the Saf-Brak rides up easily as one climbs up the mast, but belays securely with a down load. One would lift the strap momentarily and slide it down a bit when coming down the mast one step at a time.

The Saf-Brak, which sells for $68.95, is a sort of store-bought Prusik knot but better, because Prusik knots can jam and require two hands to work loose. (The Prusik knot, really a hitch, was invented during World War I by an Austrian professor of music, Dr. Karl Prusik, as a way to join the broken strings of musical instruments. There are several versions, one of which, made of tape or webbing, is what is called a Chinese finger. Mountain-climbing experts using two Prusik slings, both led through a ring on a harness to foot stirrups, have climbed 100' in about one minute.)

With the Fastep system, a mast ascent will take a bit longer than with permanent steps. And, in addition to your bag of tools for whatever job it is you're about to perform, you'll have a second bag of steps to contend with. In a controlled situation this doesn't worry us, but if going up the mast underway, the extra time and fuss could be a liability.

The Bottom Line

There are here probably more than the usual personal preferences to be sorted out. Included are cost, comfort, safety, windage, esthetics, whether you fear halyard fouling and how many holes it takes to make you uneasy about your mast.

For those who want permanently installed steps and care little about windage or esthetics, the Pace-Edwards trapezoid is a good choice.

If you want an open folding step that creates less windage and is a bit more sightly, choose either the Mast Walker or the ABI's nearly identical folding aluminum step.

If very little windage and no fear of fouling is your wont, consider the small, strong Ronstan...but only if you're willing to be faithful about using a harness attached to something that will catch you if you slip.

Best overall? Unless there's something we've missed, a canvas bag of Fasteps, used in conjunction with the Saf Brak, makes sense. They can be left in place, which we wouldn't do. No fasteners and only two holes per step. Mounted only when needed, there'd be no corrosion fears, nothing to foul halyards, nothing unsightly.

And if you're going up alone with any of these steps, we'd recommend the use of the Saf Brak. ■

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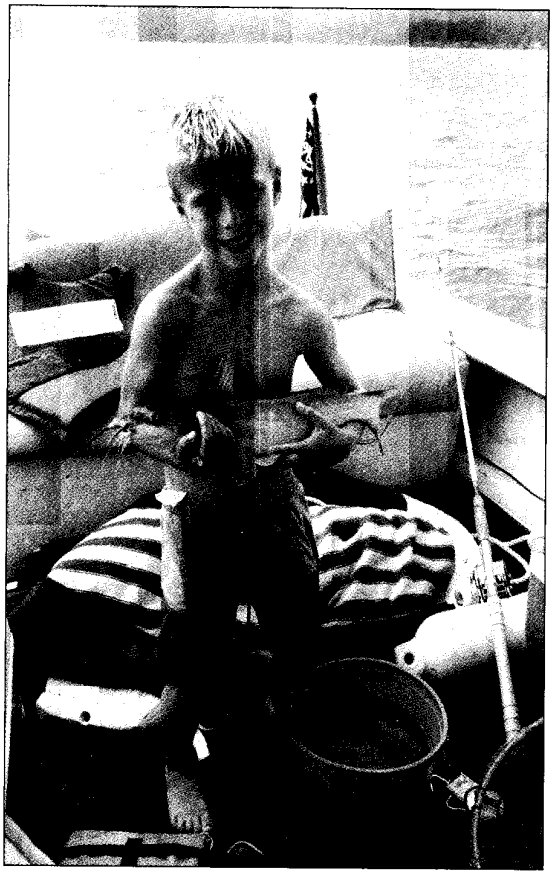
*Contacts- **ABI**, 1160A Industrial Ave., Petaluma, CA 94952, 707/765-6200. **Defender Industries**, 42 Great Neck Road, Waterford, CT 06385, 800/628-8225. **Fastep & Saf Brak**, Alfred Gilbert Enterprises, 2921 Wood Pipe Lane, Phila., PA 19129, 215/849-4016. **Mast Walker**, Damage Control, 7670 Bay St., Pasadena, MD 21122-3433, 410/360-2445. **Pace-Edwards**, 2400 Commercial Blvd., Centralia, WA 98531, 800/338-3697. **Ronstan**, 7600 Bryan Dairy Rd., Largo, FL 33777, 813/545-1911. **West Marine**, 500 Westridge Dr., Watsonville, CA 95076, 800/262-8464.*

River of Forgotten Days

When it comes to promoting my books, my wife says I'm much too shy. She tells friends that I won't even ask a book store clerk if they have one of my titles in stock. (In the big super stores like Barnes & Noble and Borders, often carrying 100,000 titles, I've found *Steered by the Falling Stars* under "Travel," "Travel Essay," "Sports," and "Of Local Interest.") Maybe one reason I'm reluctant to ask is that I always expect the clerk to give me an incredulous look, as if to say, "Never heard of it." Or, "That title didn't sell well." (Indeed, *Steered by the Falling Stars* is out of print.)

Well, this month's editorial is an unabashed self-promotion for *River of Forgotten Days*, published in May by Henry Holt & Co. ($23; 800/288-2131). Those of you who have been with us for a few years may recall my March 1, 1996 editorial, "Putting the Hammer Down," in which I summarized the 1,400-mile trip I took in the summer of 1995 with my young son Steve and daughter Adriana. We bought a 20-foot powerboat, trailered it to Starved Rock Marina, 90 miles southwest of Chicago, then traveled down the Illinois and Mississippi Rivers to the Gulf of Mexico. The trip culminated a 20-year interest in the 17th century French explorer, Robert de La Salle, the first European to journey all the way down the river to the gulf (in 1682), thereby proving it emptied into the Spanish Sea and not the Vermilion Sea (Gulf of California) or the Sea of Virginia (Chesapeake Bay). There on the marshy firmament of the delta, La Salle donned his crimson coat, stuck a flag in the soil and claimed for France the entire watershed of the Mississippi, 1.25 million square miles of land—41% of the continental US. The recent attention given Lewis & Clark's 1804 expedition to explore the newly acquired Louisiana Purchase, slightly annoys me in that no mention is made of the man who made all this possible—La Salle. If he hadn't claimed it, then possibly the English or Spanish would have. Maybe we Americans would have ultimately taken it for ourselves anyway, but it probably would have taken a war and a higher price than the $20 million Napoleon charged.

Below: *Steve and his first catfish.*



There is a little sailing in the book, but not much (a brief relation of a cruise in search of La Salle's ship, the *Griffon*, first ship on the upper Great Lakes that sank in 1679). Mostly it's about driving down the river and camping out on the beautiful white sand towheads, playing Huck & Tom on the great river that divides the continent. And there are my usual musings about fathers and sons and daughters and boats and the vanishing wilderness. In the words of Eddy L. Harris, author of *Mississippi Solo* and *Still Life in Harlem*, who graciously offered a quote for the dust jacket, "It is a great read and will have us all journeying in search of something larger than ourselves."

A good cruise—whether by sail or power—is always two journeys in one, the outer and the inner, and any adventure with one and not the other is incomplete.

—Dan Spurr

Alarm Annunciator

The buzzers that come with engine panels generally are not made for marine use and do not last very long. I have had very good success by replacing these inexpensive panel alarms with a Preco model ELT-248 truck back-up alarm made to mount on the undercarriage of a truck. You hear them on garbage and delivery trucks. The annoying "beep-beep" sound is loud and attention getting, and can be heard over the noise of the engine. The units cost about $30 at auto parts stores.

—Bill Seifert

And Now They're Down

Just after reporting in the April 1 issue that North American sailboat sales for 1996 were up 11% for 1996, we now hear that sales for 1997 fell 9.4%.

Thud.

The number of units as reported by The Sailing Company, publishers of *Cruising World* and *Sailing World* magazines, dropped 1,496 units from 15,939 to 14,443. Boats under 20' dropped 15% and boats over 36' dropped 12%. In the mid-size range (20' to 35') however, sales rose 16%.

The study also reported that the bareboat charter business is booming, having increased 23% in 1997 over the previous year. It listed the number of charter weeks as 37,594, accounting for $76 million of business.

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Odyssey: A Lightweight 12-volt With Punch

The first thing we can tell you about the 12-volt Odyssey battery is that it came in the mail—UPS to be exact—which is an unusual mode of delivery for a lead acid battery. For one thing it's light—13.3 lbs.—for another, it's a "starved electrolyte" battery, in which a small amount of sulfuric acid is injected under pressure and then sealed. It is, the manufacturer Hawker Engery Products told us, a "dry" battery and "nonspillable."

This is not a gel cell; it differs from conventional lead acid batteries in a number of ways, one of them being that the plates are pure, unalloyed (and very thin) sheets of lead. Without the presence of other metals (commonly antimony, to provide grid strength), there's little chemical reaction going on internally so it loses very little charge in storage. Hawker says the Odyssey has a shelf life of about two years.

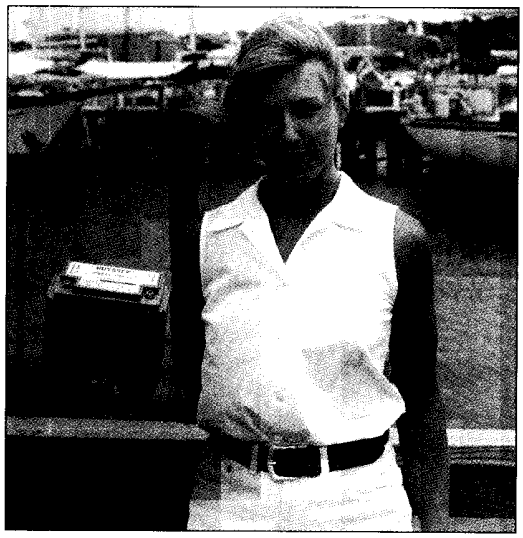
Hawker makes a number of startling claims about this small (6.7" x 3.9" x 6.9") package. It will, the company says, deliver up to 700 pulse current amps for 3-5 seconds, the normal time required to start an engine, 245 cold cranking amps, and has a reserve capacity of 30 minutes. It is also a "true deep-discharge" battery, says Hawker exec Bruce Essig, delivering 400 cycles and providing a service life of 3-5 years. And because it operates with a starved *recombinant* electrolyte system, you can slap on a charger with little worry because any gases produced (hydrogen, oxygen) are converted back into water. There is no current limit for those using a (preferred, in this case) constant voltage charger; the voltage limit is 14.7-15.0 volts for those using a constant current charger.

Hawker, which makes batteries for electric cars, and also manufactures the starved electrolyte battery for autos under the Black Panther name, has changed some of the industry standards for "100% discharge" or "reserve" time, for example. But Essig said the battery technology requires a different means of measurement. The Odyssey, he said, doesn't operate like conventional lead acids, and can be discharged 100% (to 10.5 volts, essentially) without damage, compared to just 30-35% for regular batteries. It can use up to 60% of its reserve rating, the company says, and still start an engine, where conventionals will start to stutter after discharging 30-35%. "Our voltage discharge is very stable through 50% of discharge," he said.

The Odyssey was developed as a replacement (competitor) to the ubiquitous Japanese-made Yuasa 12-volt for personal watercraft, the impetus being the introduction of the larger (110-120-hp.) three-seaters. At $150 per, the Odyssey costs significantly more, but will, Essig said, deliver far more starting amps than the Yuasa and last years longer. (Some PWC owners have told us their Yuasas must be replaced yearly.)

We tested the Odyssey first on a Honda CRX 1500 (about-90 hp.) and turned the engine over twice—no problem. We then went to Kiwi Marine Services in Portsmouth, Rhode Island, where we put a 225-amp drain on the battery and watched as the fully-charged unit dropped to 10.25 volts, then rose to 11 after 30 seconds; on a second test, the voltage dropped from full to 11, and the battery was still pushing 700 amps 20 seconds later when the Snap-On battery/alternator test gauge lit up like a toaster and began smoking. Without recharging, we then turned over a four-cylinder VW diesel twice, with just a hint of hesitation each time. At this point, the charge was down to 12.3 volts, no load.

We don't know whether the Odyssey will crank a Detroit Diesel. Nor do we know whether it will produce a full 400 cycles. We do know that, in terms of cranking amperage, it produced above its specs. And, at 13 lbs., we think it would make a great back-up starter battery, especially for smaller boats, or to power running lights and such. (Odyssey, Hawker Energy Products, 617 N. Ridgeview Dr., Warrensburg, MO 64093; 816/429-7506.)



Above: *Okay, so it's light, for a 12-volt battery, but what else can the Odyssey do? Well, according to the manufacturer, it delivers a peak of 700 cranking amps, produces 400 deep cycles, and lasts five years.*

The HotBlade

Good amateur rope work, which takes a bit of time and patience, isn't seen much anymore. You occasionally run across a nice tapered splice, but a crown knot is rare and nobody can find a use for a six-strand double Matthew Walker.

However, almost everyone who owns a boat sooner or later must cut a line. The easiest way to cut today's tough synthetic line is to lay the sharp blade on the line, temporarily taped at the point where the cut will be, and simple press or rock slightly. Creating a bight and sawing with the knife dulls the entire length of the blade.

Once the line is cut, how many

know how to apply a good-looking whip, which range from what Hervey Garrett Smith called a common whipping, which can be done barehanded, to a palm and needle, snaked or British Admiralty whipping that will outlast the rope?

Many boat owners resort to what the professional rigger, Brian Toss, scorns as a "butane backsplice," usually done poorly with a cigarette lighter that won't make enough heat to do a good job. Such rope-end treatments rarely last a season, eventually coming unraveled to create what is called, perfectly descriptively, a "mare's tail."

Here's an alternative to the "butane backsplice." It's called the HotBlade™. It resembles New England Ropes' 110V "Hot Knife," $163 list, $99.95 discount, that you see in every chandlery. (There's another 110V version, a pistol grip model, in the Defender catalog, for $58.95/$39.95.)

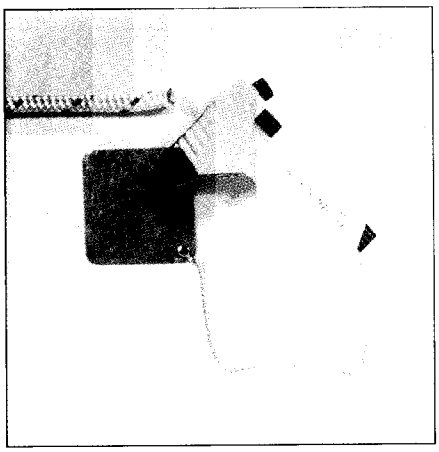
The HotBlade runs on butane, but the flame is directed from the inside onto a well-shaped, stainless steel nose. In about 30 seconds the nose heats up well enough to melt fairly quickly and neatly through line up to 3/8". Don't press; it does no good. With line larger than 3/8", the blade can be moved around the circumference of the rope to make a clean cut. Even if the cut turns messy, the HotBlade can be used to "dress" the cut.

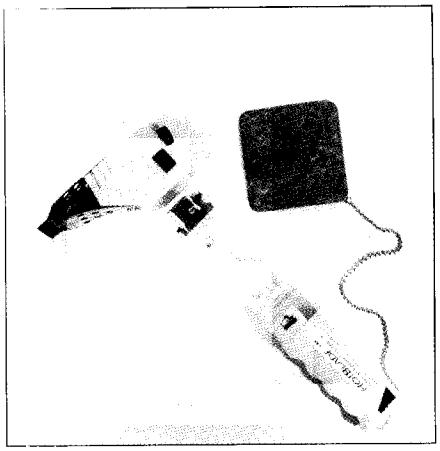
It's easy to touch off. Finger a switch and you can hear the hiss. Push a button and the gas is ignited. You're not supposed to leave it running for more than two minutes. Presumably the heat build-up (butane burns at several thousand degrees) might work back into the plastic case. Also, and this may be trouble, the burning gas does not turn off by itself, like a cigarette lighter; it must be switched off.

The literature says there's enough butane to do 10 to 15 lines. After that, you slip out the butane container, which looks like a cigarette lighter, and fill it in the customary fashion.

The cost is $28.95, everything included.

The HotBlade was developed by John Halter, a Texan who sails a Hunter 30. You can contact him or his sidekick, Jim West, at 800/877-4797 or write American Business Concepts, Inc., 4400 Sunbelt, Dallas, TX 75248.





Above: *The HotBlade, powered by butane, makes a decent cut in synthetic line. Not for industrial or continuous use, it is shown in the photo at the right with the butane container removed. The small square metal plate is a rest on which to place the line being cut or as a cool-off parking place for the tool.*

Comprehensive Cruising Advice

The first edition of Steve and Linda Dashew's *Offshore Cruising Encyclopedia*, which came out in 1989, was reprinted four times in six years. By anybody's publishing standards, that's success.

Now there's a second edition. This huge (1,232 pages) book is what the title says it is—an absolute compendium of concise, definitive information for cruising sailors. It's loaded with black and white photographs, nearly a thousand of them—some descriptive, others illustrative.

The Dashews, man and wife and two daughters (Elyse, now 27, and Sarah, 24), all of whom were involved in the writing and production of this book, are an interesting family. They're primarily big-boat folks. Their first cruising boat was *Intermezzo*, a Tripp-designed Columbia 50. Then came the 62' cutter, *Intermezzo II*, followed by the widely known *Sundeer*, a 67' aluminum ketch, and finally the 78' water-ballasted *Beowulf*, which has full-battened sails for her ketch rig.

Because he designs, has built and sells boats, it was perhaps logical for Dashew to convert his voluminous research into a reference book.

The second edition, refined and updated from the first, contains so much information that it defies a quick description. There are more than a thousand subjects grouped in section headings: Ground Tackle; Self-Steering; Cruising Sails; On-Deck Comfort; Dinghies; Electronics; Safety Equipment; The Cruising Life; Cruising Design; Design Concepts; Steering Systems; Structural Engineering; Construction; The Rig; Deck Gear; Propulsion Systems; Plumbing; Refrigeration; Heating; The Electrical System; Deck Layout; Interior Design, and one called Perspective.

For thoroughness, then, the *Offshore Cruising Encyclopedia* is unparalleled. For instance, in the On-Deck Comfort section, under just one subheading called Dodgers, there are referenced pages for Size, Windows, The Back Porch, Window Design, Pram Hoods, Fabric, Hardware, Construction Details and Maintenance.

A book of this size comes dearly. For first-time buyers, it's $89.95, plus $7 for postage and handling. For those who own the first edition and want to update, just tear out the title page and send it along with a check for $65 (no P & H!) and you'll get the new edition. It comes with a 9-day money back guarantee. And, the book is now available on CD-ROM, free with purchase of the book, or $74.95 without the book. (Beowulf, Inc., 12635 Pineville, NC 28134, call 800/421-3819.)

Encapsulated Keels

Our Cheoy Lee 35 has an encapsulated keel. A North Channel of Lake Huron piloting error a few years ago led us to discover that the contents of the keel capsule are by no means solid. Once holed, the hollow spaces in the keel capsule allowed the incoming water to test the integrity of the fiberglas seal between the keel and the boat's interior. The hull-to-keel seal on our boat failed that test and created an opportunity to exercise our damage control knowledge and our bilge pump capacity.

We drained the keel, patched the hole, reinforced the leading edge and bottom of the keel and have reglassed the leaking portions of the hull-to-keel seal. We are in the process of beefing up the hull-to-keel seal in the places where it is reasonably accessible. Unfortunately, getting at some of the seal would require complete removal of the head and the forward structural bulkhead. Not in this lifetime, thank you. Redundant high-capacity bilge pumping systems will have to suffice.

Our investigation of this problem found information that should be of interest to *PS* readers. First, our experience is not at all unusual. Often, an impact that is hard enough to rupture the keel capsule will flex the hull enough to loosen some of the hull-to-keel seal; usually at the leading or trailing edge of the keel. Second, the ballast found in encapsulated keels is often of nebulous origins. The good stuff includes lead shot and steel punchings. The other stuff may include sand, concrete or whatever the boat yard was trying to dispose of that week. (Knock three times if you are in there, Mr. Hoffa.) Many if not most boats with encapsulated keels will allow water to flow fairly freely from a hole in the capsule to the keel/hull seal. If that seal is not completely intact or has been ruptured by the force of the collision, water will enter the cabin.

If the seal holds, that may not be the end of it. We know of one instance where a grounding ruptured the keel capsule, however, that caused no leakage of water into the cabin. But over the next hour of sailing, the boat became more and more tender as lead shot poured out of the keel and was replaced by much lighter water.

What we need is a cure. Is there a way of injecting something into the keel that will solidify its contents? Is that a stupid idea? Wouldn't curing epoxy get too hot? How about hydraulic cement? It's got to be wet inside there, right?

Randall Tumblin
Orange Park, Florida

You raise interesting issues about encapsulated keels. We had a similar experience with a Pearson Vanguard. We hit a rock in Narraganset Bay rather lightly and didn't worry about it because no water entered the cabin. In fact, we didn't even know there was a hole in the keel.

During the next haulout, however, we saw that a hole of about 4"-6" in diameter had been made in the lower, leading edge of the keel, the usual location. It also became apparent that the boat had been holed there before and poorly repaired as unwetted pieces of fiberglass fell apart and chunks of Bondo or some other filler fell out. Worse, water continued to weep out of the hole. After grinding away the fractured fiberglass, enlarging the hole considerably, we discovered that the builder had wedged sheets of balsa coring on either side of the lead, which, fortunately, was one piece. The balsa was soaked and it took more than a month before it dried sufficiently to effect the repair to the hole. Indeed, a number of times when the weeping stopped we thought it had dried. We'd laminate the first plies of new fiberglass over the hole, only to return the next day to find water seeping through the repair and the resin uncured.

A proper repair requires feathering the hole so that the overlap of old and new fiberglass is about 12 times the thickness (for a 1" thick hull, the largest pieces of new fiberglass would overlap about 12"). Behind the patch we had fashioned a hardwood block that wedged against the lead.

When we finished, we drill several holes high in the cavity and poured (as best we recall) polyester resin into the cavity. We didn't attempt to fill it, but wanted to add something to the backside of the wood used to reinforce the hole patch. There was no problem after that, but we don't know how effective these measures were.

Polyester resin does get hot, but epoxy resin no. Depending on the volume, it could be expensive to fill the entire cavity, but perhaps worth the attempt if lead shot were at large. (We don't like the idea of shot and other loose pieces drifting around in the cavity. Nor do we like concrete, which tends to get mushy after prolonged immersion in water). And, the insides should be as dry as possible or the resin may not kick properly. This could require drilling drain holes at the keel bottom and maybe even larger windows along the sides to air it out before the repair is completed.

Suggestions are welcome from readers.