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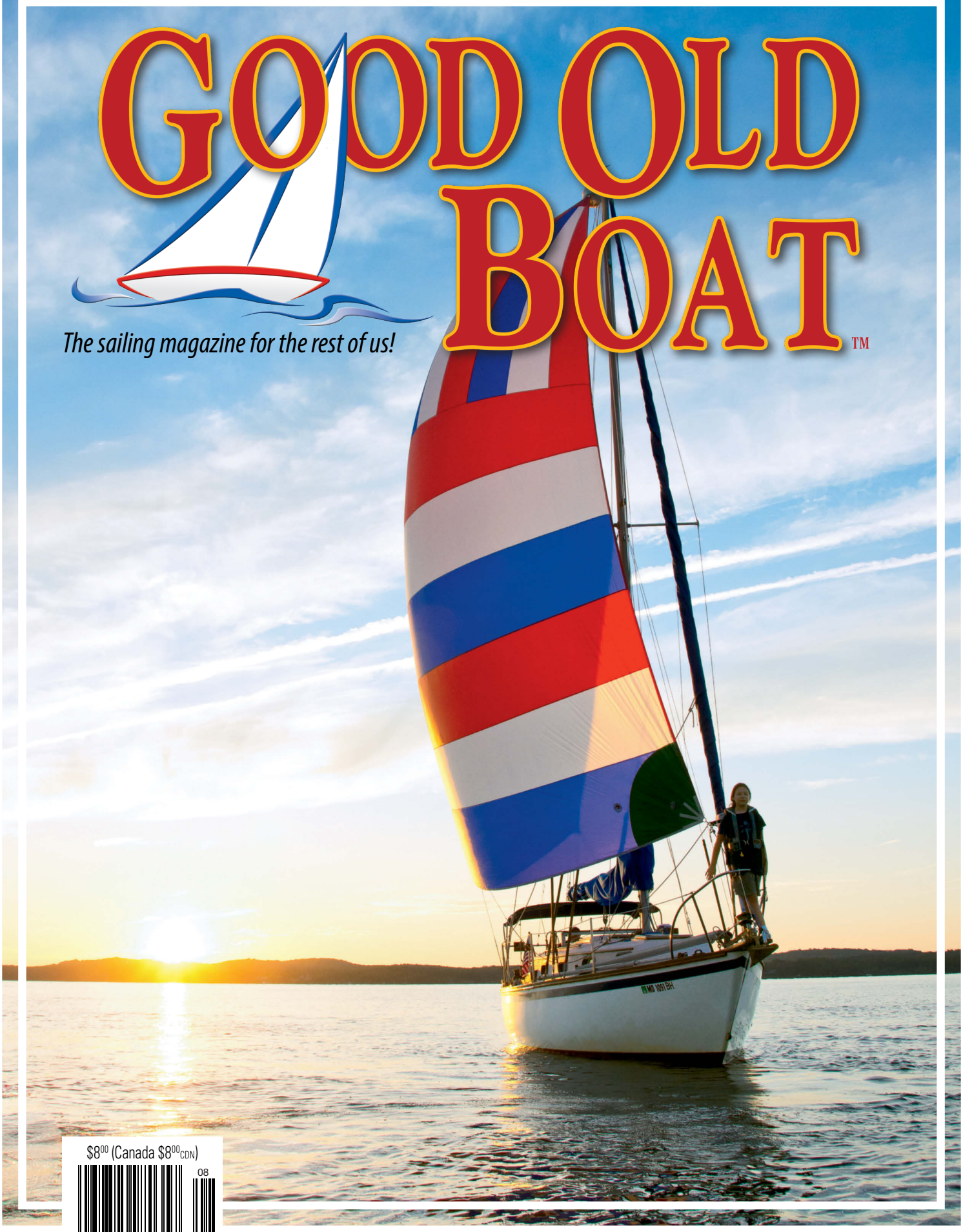

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Issue 115 July/August 2017

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Good Old Boat™

ISSUE 115 JULY/AUGUST 2017

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For the love of sailboats

On the cover . . .

Zephyr, showing she's well-named for how she performs in her namesake breeze, ghosts into Maryland's Bohemia River off Chesapeake Bay under spinnaker, with Molly (11) enjoying the view from the bow. David Wade took this photo of his 1978 Cape Dory 28 with a Nikon D7100.

Speaking seriously

What's more

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GOOD OLD BOAT

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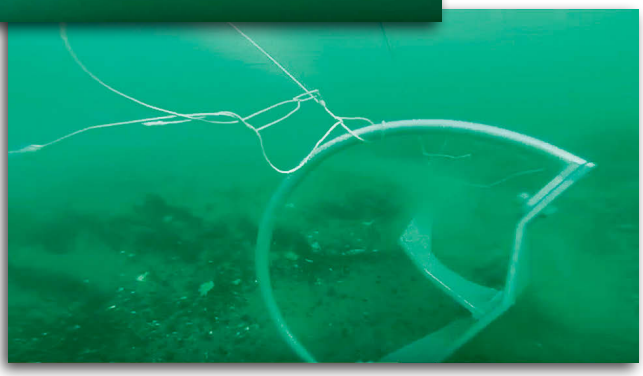
News from the world wide web

Anchors videoed in action

Jerry Thompson, who recently shared a list of some of his favorite sailing-related YouTube channels ("Aboard the Good Ship Vicarious," March 2017), stumbled upon Steve Goodwin's YouTube channel, SV *Panope*, and in particular a video in which Steve tests more than a dozen anchors. "Steve must be an engineer or mechanical whiz as he created an apparatus for his GoPro video camera that positions it perfectly to capture clear underwater video of anchors setting, resetting 180 degrees, and being retrieved," Jerry wrote.

Indeed, the perspective and action that Steve captured is riveting and informative. I've spent years sailing in warm, clear waters and have only once obtained an underwater perspective like that Steve offers over and over — for several anchor types — in this video. *Good Old Boat* founder and technical editor, Jerry Powlas, was also impressed, saying that every minute of the 40-minute video is worth watching.



Steve focuses on each anchor's ability to set and reset in worst-case scenarios, which he defines as: "short scope, haphazard deployment, and uncontrolled boat motion during the set." Accordingly, the tests he filmed are of anchors tossed overboard and allowed to free-fall before the rode was pulled taut at a relatively high speed. Once an anchor was set, Steve tested its ability to reset in extreme conditions by driving over it at a relatively high speed in the opposite direction to that in which it was set. The dramatic results are captured on video.

While he pays most attention to seven core anchors (Mantus, SARCA Excel, Manson Supreme, Spade, Super SARCA, Bruce, and Fortress), Steve also includes testing of real or knock-off versions of Danforth, Bruce, CQR, Fisherman, Forfjord, and Luke anchors. To find out how your anchor performed in Steve's test, go to YouTube.com and search on "Video #56 of an ongoing anchoring series." **–MR**

PHOTO BY TOM WELLS

PASSING THE HELM

. . . to a fresh crew of familiar old hands

PHOTO BY CHUCK KOUCKY

BY KAREN LARSON

In early April, Jerry and I experienced "the first day of the rest of our lives." This followed my waking one morning in late February and announcing to Jerry that it was time to retire. "We're not getting any younger," I said. Of course, it's not easy to retire if you own the business, to leave your creation in someone else's hands. But Jerry and I came up with a plan that, assuming you're reading this in the pages of the July issue, is a good one. Three younger staff members have taken the reins from us and will carry *Good Old Boat* forward. Other than improvements that you might expect enthusiastic new owners to bring, you'll hardly notice the change.

Karla Sandness is now the CEO, overseeing all company operations. She has been with us nearly from the beginning. She's the friendly voice you hear when you call and has been managing the company finances for nearly two decades. Karla has found that it pays to stay with a job and outlast the owners. We think of her as a daughter.

Joining Karla are two of the staff responsible for magazine production: Michael Robertson and Nancy Koucky. Michael, in one year, has shot to the top of the org chart from managing editor to become the new editor, filling my shoes. Nancy has been responsible for *Good Old Boat* page design for four years (ever since we began looking as good as we do today), and started with us several years before that managing advertising design and ad placement.

The new owners will continue to be ably assisted by the *Good Old Boat* staff. On the production side, the hand of Jeremy McGeary is probably most apparent to readers and deserves mention. He's the senior editor and creative genius who writes terrific headlines and offers superb technical editing.

So what of the founders and the first day of the rest of their lives? On the last day of March, we officially stopped functioning in our old capacities; hitched *Sunflower*, our C&C Mega 30 project boat, to our truck; and headed south to Florida for a six-week vacation.

The day after launching *Sunflower*, we put up the mainsail and headed toward a new berth for our yellow boat and the beginning of a new lifestyle for the two of us. We'll be sailing *Mystic*, our C&C 30, on Lake Superior in the summer and towing *Sunflower* to wherever the warm winds blow in the colder months.

Our thanks to all who have played a role in this magazine over the years as subscribers, as advertisers, as authors, and as friends. Jerry and I are proud of the community we've grown, built around the sailing magazine for the rest of us. We have enjoyed our relationship with each and every one of you.

Now we'll see you on the water!

Sidelight blushes, watermaker

Sidelight blushes

I was intrigued by John Churchill's article on sidelights (May 2017) and yesterday I took a stroll around the dock at Black Oak Marina in Jefferson City, Tennessee. This is the home of the Cherokee Lake Sailing Club (of which I am the secretary/treasurer) and home port to about 45 sailboats. I found almost every example John illustrated on these 45 boats. There were several of the "leading with its chin" and two with hull-mounted sidelights that were so dust-covered that I doubt even a feeble light would shine through.

However, I made the most astonishing discovery while looking at the 45-year-old boat owned by an ex-Navy sailor. I know with certainty that this ex-Navy sailor has spent countless hours on the bridge of a destroyer serving as a lookout and dutifully yelling out every half hour, "PORT LIGHT RED LIGHT BRIGHT LIGHT SIR!" or, "STARBOARD LIGHT GREEN LIGHT BRIGHT LIGHT SIR!" I also know that, as secretary/treasurer of the sailing club, this ex-Navy sailor is a role model for all members. Yet I noticed on my survey of sidelights that, on *his* boat, the red light was mounted on the *starboard* side and the green light on *port*. Somehow, in the 15 months this guy has owned this boat, he's failed to notice the reversal of his running lights. Rest assured he was humbled by the realization and immediately corrected the error.

The point is that anyone could have improperly installed running lights and your article certainly helped alerting us to this fact.

–Norman J. Stringfield, Jefferson City, Tenn.

Watermakers under pressure

Regarding Patrick Bouchet's watermaker article ("Fresh Water Freshly Made," May 2017), the positive-displacement-pump discharge circuit should be equipped with a self-acting pressure safety valve or pressure-relief valve. This would protect the pump and piping from excessive pressure even if the high-pressure flow path were blocked. The best installation location would be between the high-pressure pump (8 on the schematic, see above right) and the membrane vessel (9). The pressure-safety-valve flow-capacity rating should match or exceed the pump capacity, and the valve should discharge above the waterline into the cockpit or to another location where its discharge would be noticed.

Also, it should be emphasized that all high-pressure piping and components, including hoses, valves, tubing, and fittings, must be rated for brine service and for a pressure equal to or greater than the pressure-safety-valve setting. Consider installing the brine discharge through-hull (10) above the waterline, to avoid requiring a high-pressure through-hull valve assembly.

–David Penz, Cumming, Ga.

I am not normally incited to comment on articles in *Good Old Boat* but, having read Patrick's article twice, I feel obliged to raise several thoughts that the assembly text and schematic included in the article brought to mind.

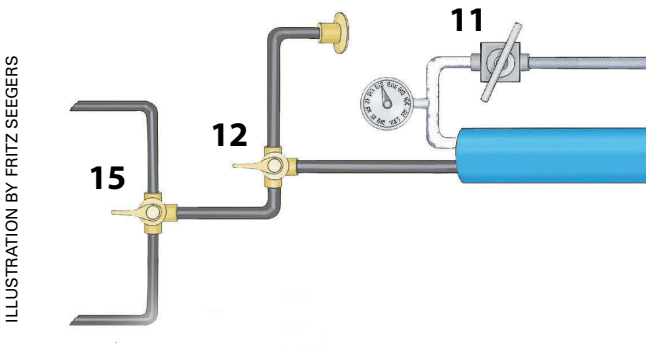


ILLUSTRATION BY FRITZ SEEGERS

Patrick refers to the schematic item numbers under his operating instructions and pickling procedure. Missing under the pickling sequence was any mention of the status of 3-way valve (15), the isolation between the vessel's water tanks.

I do not own or operate a watermaker, so perhaps my understanding of multi-stage pressure zones within a pressure system complicates my grasp? From what I can understand, the maximum operating pressure relies strictly on a pressure-regulating valve (11). Therefore, all tubing and fittings between the high-pressure pump and the control valve (including the pressure vessel) must utilize components rated for high pressure. The glaring omission is the lack of a high-pressure relief valve to protect the equipment and life and limb.

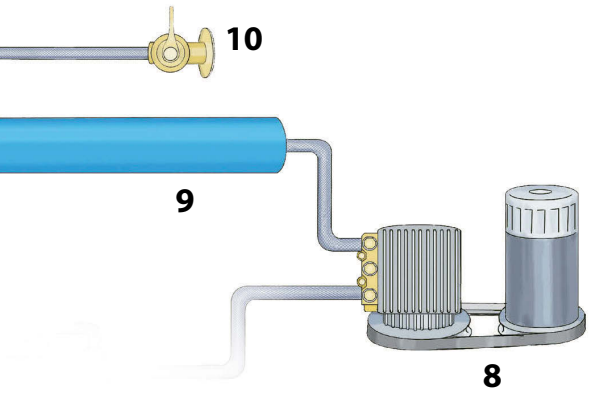
I do not know the failure mode of these systems. Patrick's text indicates the pressure vessel (Phoenix Vessel Technology) contains both high- and medium-pressure zones. If the membrane fails under pressure, will the balance of the pressure circuit considered medium pressure be exposed to full high-pressure-pump pressure? If so, it would require a separate, low-pressure pressure-relief valve to protect the rating of the piping and tubing and fittings used in that secondary circuit.

A quick Google search revealed a number of hits for RO watermakers. There's a good one at www.passagemaker.com/uncategorized/watermaker-doing-it-yourself. This particular DIY design includes a pressure- relief device on the high-pressure circuit. It also mentions a few automated features that would be nice additions, such as a pressure differential to provide filter status along with automatic salinity testing and rejection when elevated salinity levels are detected.

In summary, the missing pressure-relief device stands out as a significant safety issue with this particular article, whereas the above alternative DIY design I linked to provides a complete listing of component sources and discusses clearly the selection of properly rated fittings.

–Greg Ross, Laguna Beach, Calif.

pressure, and Old & Moldy?



Editors' response

Thanks for the feedback, Greg. About there not being a reference to the 3-way valve (15) in the pickling instructions, (15) is used simply to select which tank receives product, not whether the tanks are receiving product. The 3-way valve (12) directs the watermaker product toward or away from the freshwater tanks. In the pickling instructions, valve (12) was set to direct water to the cockpit discharge, bypassing 3-way valve (15). We'll let the author respond, below, to the other points that both you and David raised.

–Editors

Patrick Bouchet responds:

I know that my watermaker is very simple and has no safety devices. From my experience designing very complex industrial systems, I've concluded that the more safety devices you add, the more likely you are to experience a failure due to a malfunctioning safety device. In this case, adding a pressure-relief valve would mean another valve, more plumbing, and another through-hull (and, of course, more money!). All for something that is unlikely to ever be used.

The pressure-relief valve will be in constant contact with seawater and never opening or closing during normal operation. Will it be ready to do its job when called upon several years from now?

On my watermaker, the brine circuit (which is after the pressure-adjustment valve) is not rated for high pressure. In the event the circuit is blocked, the pipe is expelled from its fitting and the only casualty is a few liters of seawater in the boat's bilge. (I once closed the discharge valve (10) instead of opening it and that is what happened.)

In France we have a saying: "On a boat, the simpler the safer," and I designed my watermaker according to that principle.

Of course, I never leave the watermaker unattended when it's running.

–Patrick Bouchet, SV *Noulica*

A little past young and salty

I just saw the promo you guys are running for the Young & Salty website (youngandsalty.com) and mentioned to [my husband] David that I don't think we qualify as young and salty. He said, "No, we're Old & Moldy." Love it! And we love *Good Old Boat*!

–Terry Wade, West Chester, Pa.

Dispelling varnisher's angst

I agree with John Churchill that the biggest hurdle in varnishing is changing one's attitude toward it ("Making Peace with Varnish," May 2017). I have learned to treat it like mowing the grass: you have to do it regularly. But I don't have grass to mow and this is less work.

Like John, I used to throw away chip brushes and I do not try to be perfect; if people don't like the way it looks, they can go back to their own boats! I do divide my brightwork into three sections and do one section a month — I am apparently lazier than John. One thing I have learned is that it's using the varnish directly from the can that causes the varnish to skim over. If you pour the varnish you need into a disposable cup and use it from there (and close the can), the varnish in the can will remain like-new until the next time.

–David Carstens, Huntsville, Ala.

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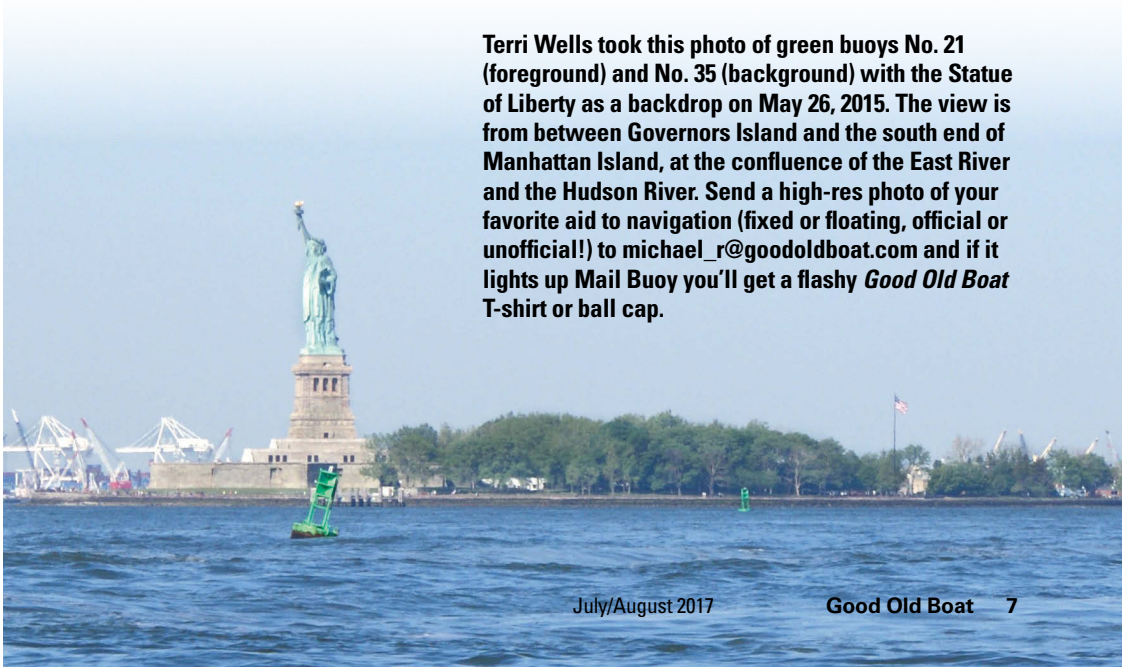


Terri Wells took this photo of green buoys No. 21 (foreground) and No. 35 (background) with the Statue of Liberty as a backdrop on May 26, 2015. The view is from between Governors Island and the south end of Manhattan Island, at the confluence of the East River and the Hudson River. Send a high-res photo of your favorite aid to navigation (fixed or floating, official or unofficial!) to michael_r@goodoldboat.com and if it lights up Mail Buoy you'll get a flashy *Good Old Boat* T-shirt or ball cap.

Spirit 28

BY ALLEN PENTICOFF

A versatile boat for different owners

In a stiff breeze on Greers Ferry Lake, the Spirit 28 *Rejuvenation* struts her stuff, upper photo, showing off her jaunty sheerline enhanced by the slotted toerail and hull stripes. A dead calm on Stockton Lake allowed only still-life photos of *Wastin' Time*, above.

For this review of the Glastron-built Spirit 28, I looked at two boats with identical hulls that have taken on vastly different characters at the hands of two south-central Midwestern owners.

Jim and Linda McCraw keep *Wastin' Time*, their 1981 Spirit 28, on Missouri's Stockton lake, not far from their home in Springfield. Jim is a longtime ham radio hobbyist and something of an electronics aficionado. He made many changes and additions to the boat in preparation for an extended Caribbean cruise . . . that did not happen after Jim decided against exposing their boat to salt water. *Wastin' Time* is loaded with electronics, gadgets, and innovations. Jim spends much of his free time "hanging out" at the marina, so *Wastin' Time* feels lived in.

Phil and Pat Shupe of North Little Rock, Arkansas, daysail *Rejuvenation*, a 1980 Spirit 28, on beautiful Greers Ferry Lake in the Ozark Mountains, where they keep her in a marina not far from their waterfront vacation home. Her name alludes to her having been raised from the bottom of the lake, after which Phil, an engineer, and Pat painstakingly repaired and restored her. She is nearly bone stock and carries none of the clutter of liveaboard use.

Design history

The Spirit 28 was the last in the line of five sailboat models built by powerboat builder Glastron (six if you count its 1966 Alpha Super Sailboard) in the early 1970s through 1981. Two of the five, the 1976 North American 23 and the 1978 Spirit 23, are the same boat. Glastron had been making the hulls for North American Yachts, based in Austin, Texas, and changed the model name when it acquired the company. The details of the history vary from source to source, but most accounts agree that all of Glastron's sailboat production was carried out at the former North American Yachts facilities.

Glastron was founded by Bob Hammond, a plastics engineer with aerospace and fishing boat experience who, in the early 1950s, was looking to build a performance powerboat with the new material fiberglass. Having designed the Meteor and other boats for Lone Star, Hammond built his first boat to his own design in a rented Austin, Texas, garage in 1956. He and three partners with business backgrounds were soon producing what are now iconic 1950s runabouts with fins on the top of the hull, like those on a

’57 Chevy. By coincidence, Phil Shupe once owned a 1958 Glastron inboard ski boat with fins that was powered by a 292 Ford straight six. He says it was a great well-made boat like the Spirit.

Interestingly, the company was not named after boat dealer/partner Bill Gaston, but was a hybrid name from the word “fiberglass” and the futuristic sounding “tron.” Hammond was still at the helm of Glastron in the early 1970s when the company decided to enter the sailboat market. Hammond retired in 1974, but quickly got back into boatbuilding, founding Hammond Boats to build more performance powerboats. Glastron was sold in 1987 to Genmar Holdings, which moved the company to Minnesota. In 2009, Genmar filed for Chapter 11 bankruptcy. In 2010, PBH Marine Group bought Glastron. Glastron boats are still in production.

Glastron’s flirtation with sailboats lasted 11 years, starting in 1970 with the Nacra beach catamaran called the Alpha Cat 18. The North American 23 followed (later to be renamed the Spirit 23), then the Hank Hinckley-designed Spirit 21 (aka 6.5), and finally the Robert Finch-designed Spirit 28. The sales brochure lists Robert Finch and Earl Blackwell as co-designers. Robert Finch did most of his 16 designs in the early 1970s, including the Catalina 27 and the Coronado 30. Glastron ceased production of the Spirit 28 in 1981 after building around 300 boats.

Our review boat has no connection to the Van de Stadt-designed Spirit 28 or the English boatbuilder Spirit Yachts.

Hull design

A typical cruiser/club racer of its day, the Spirit 28 is sloop-rigged with a fin keel and spade rudder. The hull has a straight raked bow, a sweeping sheer, and a slightly reverse transom that almost reaches the water. The tall cabin trunk allows for large windows. With a moderate displacement/length ratio of 253 and a somewhat conservative sail area/displacement ratio of 16.1, it has enough volume for adequate tankage and storage, and enough pep to satisfy most coastal cruisers.

The sidedecks on the Spirit 28 are a little narrow, at right, but the inboard shrouds and chainplates allow a reasonably clear passage for crew moving around the deck. The long handrails are also helpful.

The boat was available with either pedestal-mounted wheel steering or a tiller. Both our review boats have wheel steering, below right. An emergency tiller can be fitted to the tiller head recessed into the face of the helm seat. A manual bilge pump is mounted to starboard of the wheel. Aft of the wheel is a lazarette. A humped seat cushion on *Wastin’ Time* improves the view from the helm. The two scuppers appear to be adequate.

The seats in the T-shaped cockpit are quite short and narrow, bottom right, earning them a Penticoff Napability Index rating of only 2 on a scale of 1 to 5. Even then, getting around the wheel isn’t easy. The cockpit is fairly deep and the seats are a distance apart that permits bracing while heeled, but the edges of the coaming cuddies dug into my back.

Both boats reviewed here are the deep-keel version, which draws 4 feet 9 inches. The shoal-draft version drew only 3 feet 6 inches.

Construction

The hull and balsa-cored deck are hand-laid fiberglass joined together on a hull flange with ¼-inch-diameter stainless-steel screws on 4-inch centers through the slotted aluminum toerail. The owners of both test boats report that, even at this late date, the joint sealant is still soft and pliable. The same sealant is used on all other hardware and fittings, and leaks are minimal to non-existent. Our owners report no problems with the balsa core.

Two water tanks, one under the V-berth and the other under the port settee, hold a total of 19 gallons.

The holding tank holds 13 gallons and the fuel capacity is 15 to 19 gallons. Of the 11 bronze through-hull fittings in the stock boat, five are below the waterline.

Engine choices available from the builder were an inboard 2-cylinder Yanmar diesel, a 15-horsepower OMC Saildrive, or an Atomic 4 gas inboard. *Wastin' Time* has the diesel and *Rejuvenation* has the saildrive.

Rig

The Spirit 28 has a single-spreader masthead rig with double lower shrouds, which are mounted inboard. (The masts were originally black, but Phil has painted his white so it is cool to the touch). Typical for the era, the mainsail has a high aspect ratio, which makes it difficult to find a used one in good condition. One owner reported buying a used J/80 sail online and cutting it down to fit his Spirit 28. The mainsheet is rigged from mid-boom to a short traveler on top of the cabin trunk. There is also rigging for a staysail.

On *Wastin' Time*, Jim has a 120 percent genoa on a roller furler, while *Rejuvenation*'s headsails are hanked on. There are two #40 winches on the coamings for the headsail sheets but no stock winches for the halyards that are led to stoppers on the cabintop. A winch here would be handy for applying luff tension. Many boats may already have them installed.

Deck

At the bow, there is a large anchor locker, one large stout cleat, and chocks on either side. Stanchions bolted through the deck support single lifelines between bow and stern pulpits. Crew negotiating the sidedecks can hold on to long teak handrails on the cabintop.

The companionway has a low sill, so going below is quite easy. Three dropboards and a solid hatch slide (that is housed in a sea hood when open) secure the companionway.

Belowdecks

While Phil and Pat have restored *Rejuvenation* to near stock, Jim has added lots of his own touches to *Wastin' Time*, to the systems and to the the joinerwork. Both boats have new windows made by the original manufacturer (see "Resources, " page 12), and these, together with two overhead opening hatches and two small opening portlights, let in plenty of light and air.

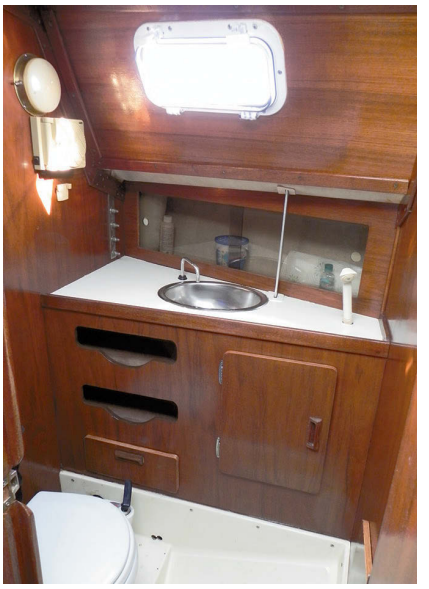
Under way

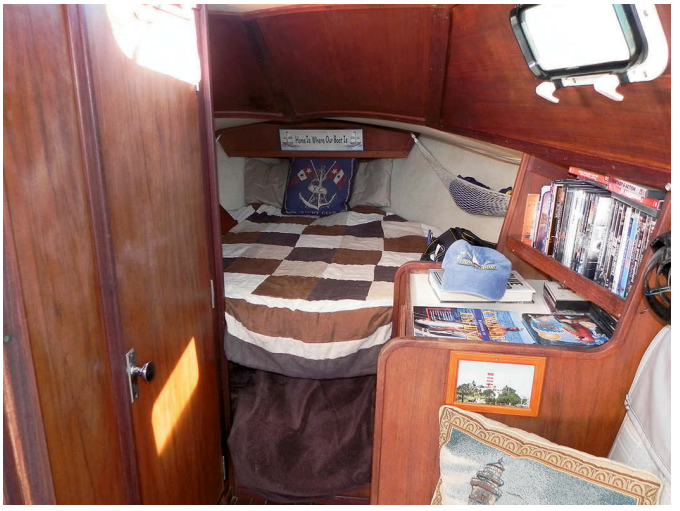
My wife, Ruth, and I traveled some distance to these large south-central reservoir lakes. Both lakes contain far more sailboats than one might imagine. Unfortunately, during our time with Jim, Stockton Lake was flat calm, so we couldn't test Jim's claim that the Spirit's high ballast-to-displacement ratio (42 percent) allows carrying full sail to about 20 knots of wind. We can say that *Wastin' Time*'s Yanmar 2QM15 purred and, with the wheel hard over, the boat would spin on a dime. I could feel the prop wash through the rudder, and considerable prop walk is evident in reverse; otherwise handling under power is typical.

I did, however, move about the boat to check on ease of movement and comfort. While the foredeck, sidedecks, and cabintop are plenty wide enough for working, the height of the coachroof aft makes stepping off it a

The galley is basic, but has decent storage. *Rejuvenation*'s galley, at top, is little different from the day the boat left the builder, but Jim has made a number of modifications to *Wastin' Time*'s galley, above left, with the result that it looks more lived-in. Jim also installed a lot of electronics on the port side aft and converted the port quarter berth to storage (see "From Quarter Berth to Nav Station," page 52).

The engine is behind the companionway ladder, and additional access to it is provided through the starboard cockpit seat hatch and side panels in the quarter berth, through which the stuffing box can also be reached. The top step of the companionway ladder is a toolbox — imaginative use of an often-wasted space, above right.





The saloon is furnished with a lot of teak, which may be oiled or varnished. The settees are comfy and long, far left, and the port-side one converts to a double berth. There is plenty of storage throughout the cabin. The liner on the overhead is insulated padded vinyl. There were no stock handholds, so Jim fitted long teak overhead handholds on *Wastin' Time*. He also made canvas covers to keep stowed items in place on the shelves, converted the starboard-side hanging locker to bookshelves, and added some storage behind the bulkhead-mounted table.

The enclosed marine head is to port. On *Rejuvenation*, above, it's pretty much original, but on *Wastin' Time* Jim has installed a portable toilet with a pump-out in lieu of the marine head. Due to its age, most owners find themselves replacing the entire waste system. A helpful description of this process and other tips can be found at the Spirit 28 website (see "Resources," page 12).

Forward of the head is a cozy, well-appointed V-berth area, at left. The forward hatch is above the V-berth, where light and air are always welcome. Aboard *Wastin' Time*, the top of the short hanging locker aft of the V-berth is a useful catchall surface, with a shelf behind for Jim and Linda's books, CDs, and DVDs.

bit awkward. The best place to step up or down from the coachroof is at the shrouds. The sloping forward end of the foredeck/cabin trunk has no non-skid, making it slick when wet, but great for sunbathing.

Cushions on the coamings and seatbacks would help but, because of the narrow seats and the cubbies in the backrests, the most comfortable way to sit in the cockpit is to lean back against the bulkhead. If it were up to me, I would avoid installing anything on the bulkhead and find a different place to belay and coil halyards. .

At Greers Ferry Lake we got some wind on our second day, so we saw the effect of the high ballast-to-displacement ratio. We didn't get 20 knots, but *Rejuvenation* was stiff in the puffs. When sitting on the leeward side to steer, I found I needed some padding behind my back as I leaned against the pulpit.

Curiously, *Rejuvenation* and *Wastin' Time* handled differently, and I hesitate to speculate as to why. While light on the helm, *Rejuvenation* did not feel "sweet" — that super-light responsive feeling you expect from a spade-rudder/fin-keel boat. Although I did not sail

Comments from owners of a Spirit 28

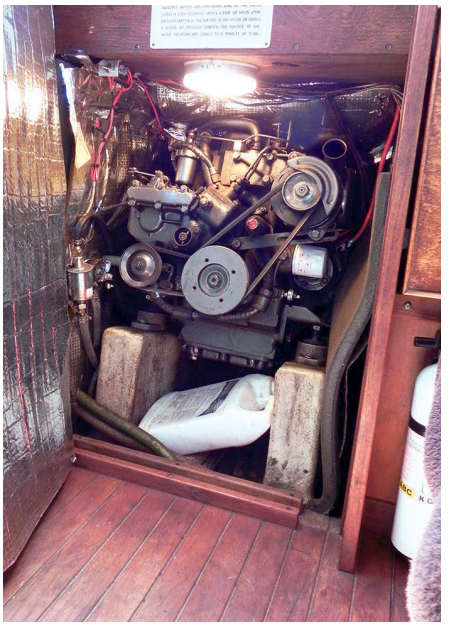
My wife and I are the owners of a 1980 North American Spirit 28 with a Yanmar 2QM15 engine. She sails very well. She is easy to handle even in stout winds. Her average speed is 5 to 6 knots. She is a well-built and very solid boat. When below in the cabin, one is surrounded with teak, which adds warmth and luxury. We love her teak sole.

As for sleeping, the choice for a couple is between the forward berth or the foldout double berth in the main cabin, which we prefer. She has ample storage under the forward berth, the starboard settee, the quarter berth aft on the port side, and in the cockpit. Her galley provides icebox refrigeration and a sink along with four drawers for galley items.

The cockpit could have been just a little bigger. It's difficult to get around the wheel when under way. When we are on the hook or docked, we remove the wheel.

Removing the prop shaft would be easier were it not aligned dead center with the leading edge of the rudder. That leaves two choices when removing the shaft: remove the engine or drop the rudder. Neither appeals to us. This design turns a small job into a major one.

–Peter and Karolyn Bowman, Westbrook, Connecticut



***Rejuvenation* still has the origial OMC Saildrive, near right. When he rebuilt it, Phil obtained an OMC ISO ring seal/gasket for the hull from Steve Roll of Port Credit, Ontario, who makes several per year (see "Resources,"below). *Wastin' Time* has the original Yanmar diesel, far right.**

Wastin' Time, Jim reports that his boat indeed has that sweet fingertip steering I had expected.

Apart from that, *Rejuvenation* accelerated well in puffs, tacked quickly, and otherwise handled normally on all points of sail, topping out at about 6 knots. With a PHRF of 186 to 200, the Spirit 28 compares well with a Sabre 28 at 192 to 210 or a Beneteau 285, also at 192 to 210. I have no reason to believe it would not do well in rougher conditions.

Motoring with an OMC Saildrive was a different experience — not in handling, but in sound and smell. The exhaust is above the waterline and it has the sound, smell, and feel of a smooth-running, muffled two-stroke motorcycle. Vibration is minimal, and with a fixed prop the boat handles well in reverse too.

Back from the dead

Now is the time for Phil's story. As a young couple Phil and Pat built a South Coast 22 from a kit, and then sailed it on their honeymoon in the Florida Keys. Years later, Phil saw *Rejuvenation* sunk at a Greers Ferry Lake dock. She was submerged for several days before being refloated, and Phil tried to buy her "as is, where is" but could not find the owner. A year later (2007), he and Pat purchased her for $300 in back dockage fees. Phil and Pat then worked on her for two years. She had no hatches; no sails; the cabin cushions were all missing; and the bottom had hundreds of blisters that they fixed with epoxy putty, gelcoat, three coats of Epiglass epoxy resin, and five coats of bottom paint. They had to strip the boat and start over. Phil finally found the previous owner, who then supplied a lot of the missing equipment.

The previous owner apparently had had trouble with the OMC, so he hung a large outboard on a bracket on the transom. This weight aft put the bilge-pump through-hull in the water, and a leaky hose let water in. The Shupes live in the North Little Rock area, quite close to the OMC manufacturing facilities, so Phil and friends took on rebuilding the original engine and Saildrive. Starting with a new engine block (Phil says not to expect to find another), he could have made it into a 25-horsepower engine during the rebuild but felt 15 horsepower was more than adequate.

Resources

Owner-based information
www.Spirit28.com

Window source:
Mark Plastics
www.markplastics.com

OMC Saildrive gasket source:
Stephen Roll
www.bristolmarine.ca

Conclusion

The Spirit 28 is a nice boat for coastal cruising or club racing — or both. Obviously there will be no factory support, and many components will be in need of restoration, but they are fairly easy to find or fix. It is nice to hear about a boat that does not leak at the hull-to-deck joint.

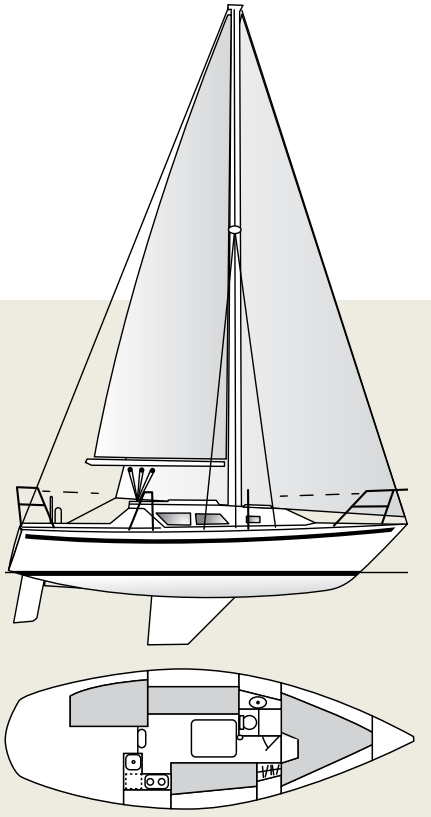
I found only a few for-sale listings online, and of those, ready-to-sail boats were selling in the low to mid teens. You may find Spirits for sale outside the U.S. and Canada as Glastron's dealer network was global.

Allen Penticoff, a Good Old Boat *contributing editor, is a freelance writer, sailor, and longtime aviator. He has trailer-sailed on every Great Lake and on many inland waters and has had keelboat adventures on fresh and salt water. He owns an American 14.5, a MacGregor 26D, and a 1955 Beister 42-foot steel cutter that he stores as a "someday project."*

ILLUSTRATION BY RICK BEDDOE

The Spirit 28

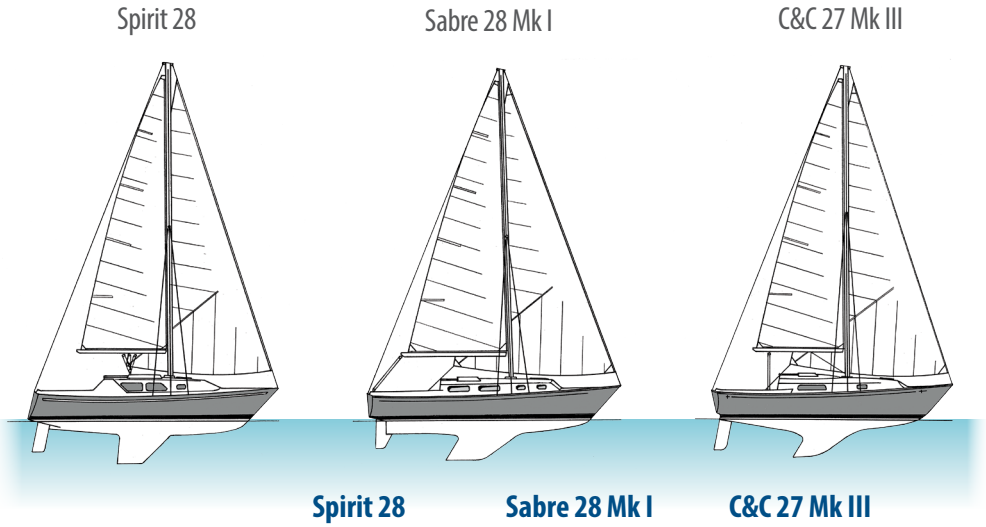
Designers:	Robert Finch and Earl Blackwell
LOA:	28 feet 10 inches
LWL:	23 feet 0 inches
Beam:	10 feet 0 inches
Draft	
Deep keel	4 feet 9 inches
Shoal keel	3 feet 6 inches
Air draft	40 feet 6 inches
Displacement:	6,900 pounds
Ballast:	2,900 pounds
Ballast/disp. ratio:	.42
Sail area (100%):	364 square feet
Sail area/disp. ratio:	16.1
Disp./LWL ratio:	253



The Spirit 28

. . . and two early IOR cruiser/racers

BY ROB MAZZA



Here is a trio of moderate 28-foot cruiser/racers from the 1970s. This was an extremely popular size during this period and builders often promoted these boats as "entry level," hoping that customers would get "two-foot-itis" and return every two or three years to purchase a larger boat.

I wish I knew more about Robert Finch, the designer of the Spirit 28. He freelanced on a number of designs from this period for Islander, Catalina, Coronado, and a number of smaller West Coast builders, then seems to have disappeared from the scene in the early 1980s.

The two boats I have chosen to compare to the Spirit 28 come from two of the most popular builders from this period, C&C Yachts from Ontario, Canada, and Sabre Yachts from Maine. Roger Hewson, founder of Sabre, also has a distinctly Canadian connection, having originally established the company in Montreal to produce his Sabre scow in the late '60s. The Sabre scow was a modern reproduction of Herrick Duggan's controversial tunnel hull *Dominion*, winner of the 1898 Seawanhaka Cup. Hewson started his Maine production (with "fierce pride") in 1970 with the Sabre 28, and upgraded it to a Mk II configuration in 1976.

The C&C 27 was also launched in 1970 and was the first boat designed and introduced by the newly consolidated C&C Yachts. One of the most popular boats built by C&C (more than 800 were built), the C&C 27 would go through four model changes, with the Mk III being shown here. All race-oriented boats at this time had to contend with the transition from the CCA (Cruising Club of America) rule to the International Offshore Rule (IOR), and the C&C 27 Mk III shows the effect of that transition most of all, specifically with the move to a higher-aspect-ratio sail plan and a reduction in ballast weight and stability compared to her original incarnation.

The C&C 27 Mk III is a full 1,900 pounds (25 percent) lighter than the Sabre 28. On a similar waterline length, this results in an extremely low displacement/length (D/L) ratio of 206 compared to the heavier 253 and 278 for the Spirit and Sabre respectively. This lighter displacement, combined with essentially the same sail areas, is also dramatically evident in the very high sail area/displacement (SA/D) ratio of a whopping 19.1 for the C&C, compared to still sprightly figures of 16.1 and 16.6 for the Spirit and Sabre.

Note also the conflict within C&C at the time between the high-aspect-ratio

	Spirit 28	Sabre 28 Mk I	C&C 27 Mk III
LOA	28' 0"	28'0"	27' 10"
LWL	23' 0"	22' 10"	22' 10"
Beam	10' 0"	9' 2"	9' 2"
Draft	4' 9"	4' 4"	4' 9"
Displacement	6,900 lb	7,400 lb	5,500 lb
Ballast	2,900 lb	2,900 lb	2,116 lb
LOA/LWL	1.22	1.23	1.22
Beam/LWL	.43	.40	.40
Disp./LWL	253	278	206
Bal./disp.	.42	.39	.38
Sail Area (100%)	365 sq. ft.	393 sq. ft.	372 sq. ft.
SA/disp.	16.1	16.6	19.1
Capsize number	2.1	1.9	2.1
Comfort ratio	20.1	24.4	18.1
Year first built	1979	1971	1974
Designer	Robert Finch	Roger Hewson	C&C Design
Builder	Glastron	Sabre Yachts	C&C Yachts

rudder and the moderately swept keel. The Sabre, too, retains some keel sweep, but the Spirit, introduced in 1979, incorporates the more vertical keel first championed by Doug Peterson. Note also that the lighter displacement of the C&C is achieved to a large extent with a ballast keel that's almost 800 pounds lighter — 25 percent — than that on the Spirit and that on the Sabre.

Therefore, looking at the high SA/D ratio, low D/L ratios, and the lighter ballast weight (even though the ballast ratio is still 38 percent), it is obvious that the C&C Mk III would be on the tender side upwind or reaching in any sort of breeze, which is borne out in the real world. However, her light-air performance would be exceptional.

These three boats illustrate how, at this stage in production boatbuilding, the "yacht club racer" has evolved into a common type. I touched on this in an earlier design comparison, but we see it again here with masthead-rigged fin-keelers with detached rudders. The Sabre is almost there with a pronounced skeg and "horn" rudder. They would improve her tracking but reduce her maneuverability compared to the Spirit and C&C.

Of particular note, too, is the adoption of "ribbon" mainsails with large overlapping headsails, as promoted by the IOR. This may have produced a fast lower-rating boat with large spinnakers, but it did not produce a boat that was easy to sail shorthanded, especially when tacking or shortening sail. In that respect, smaller jibs on fractional rigs are superior, especially in combination with asymmetrical spinnakers flown off retractable bowsprits!

The capsize numbers come out in favor of the Sabre with her heavier displacement and narrow beam, but none of these boats are far off the norm in that respect, especially for boats of this vintage.

All three of these boats look good to my eye, but please forgive me if, even 45 years after its introduction, I show a little favoritism toward the C&C 27.

Rob Mazza is a Good Old Boat *contributing editor who, in his long career with C&C and in other design offices, designed many boats that are now good and old.*

Selectable fuel filters

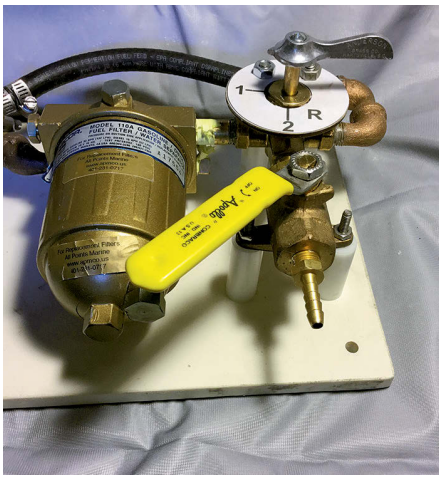
Insurance against the 0-dark-thirty cartridge change

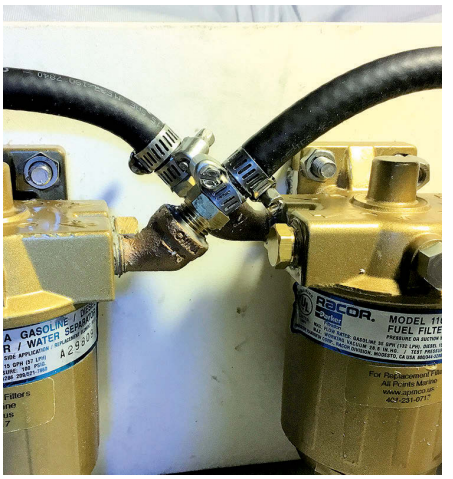
BY PAUL ESTERLE

I well remember the first time I had to change a diesel fuel filter under duress. We were on our first trip away from the dock in our 35-foot new-to-us Columbia 10.7, our first boat with a diesel auxiliary. She had been sitting unused for a couple of years, long enough for the fuel tank to grow a good crop of diesel bugs. The sea was a little boisterous.

A few miles from the dock, the filter clogged and the diesel began to die. Between the tank and the engine was an old Racor filter with a cantankerous O-ring seal. With my head down in the engine compartment and the boat bobbing and adrift, I struggled to get the new filter element in place and the O-ring to seal. From that day on, I lusted for a dual-filter setup that would allow me to switch easily to a clean fuel filter while leaving the clogged one for me to change at my leisure.

I checked many marine stores and catalogs looking for such a beast. All I found were dual-filter systems that could pass 60 to 100 gallons per hour (gph) at prices upwards of $1,500. These were way too rich for my blood and overkill for my little ½-gph Yanmar.





Paul's filter assembly is compact to fit in his boat's small engine space, top of page. The inlet side is on the right, the outlet on the left, and the selector valves are set to use filter 1, isolating filter 2 for changing. The shut-off valve (yellow handle), at left, is mounted on stand-offs, as are the other valves. The selector valve on the outlet side, at center. All hose connections are double-clamped, at right.

Parallel-path filters

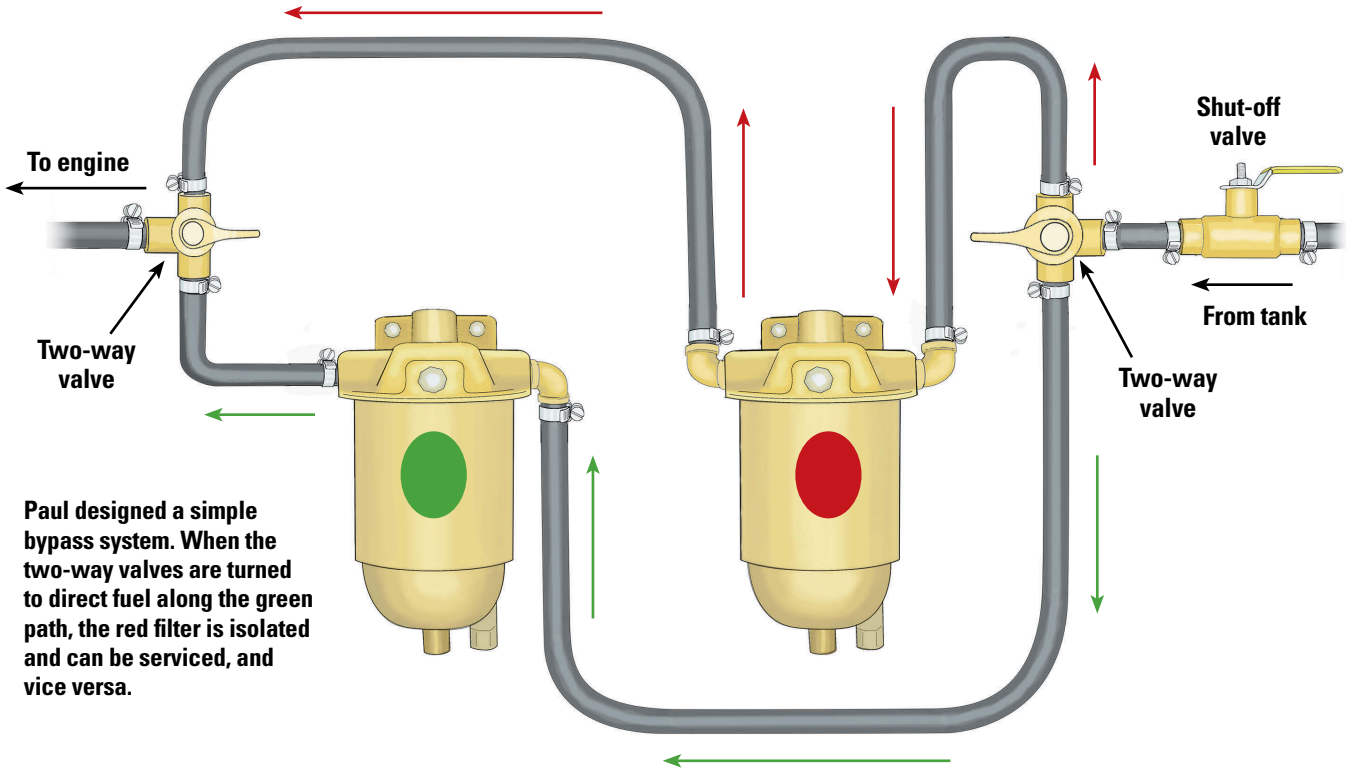


ILLUSTRATION BY FRITZ SEEGERS

Paul designed a simple bypass system. When the two-way valves are turned to direct fuel along the green path, the red filter is isolated and can be serviced, and vice versa.

If I wanted a dual-filter unit, I would have to build it myself.

Parts and placement

I started by looking at individual diesel fuel filters. I wanted the smallest and least expensive one I could find that had enough flow capacity, and ended up with the diminutive Racor 110A diesel/gasoline fuel filter and water separator, rated at 15 gph for diesel and 35 gph for gasoline. It's possibly overkill for my little Yanmar, but it's compact.

The next step was to develop a block diagram so I could figure out how the filter unit would work and to identify the components I would need. After drawing several scenarios, each requiring different numbers of components, I came up with a design that required two 2-way fuel-selector valves, a ball valve, a handful of plumbing fittings, and fuel hose.

Having settled on the design, I began to source the parts I needed. I learned that it pays to spend some time online researching the best prices. For example, the list price on a Racor 110A is around $155; I purchased mine for $95 from an online diesel-parts supplier. I rounded up the rest of the fittings only after visiting several marine stores, as many of them didn't stock the fittings I needed in the quantities I needed.

Assembly

After I'd acquired all the pieces, I trial-fitted them in various ways in search of a compact assembly that would fit in the limited amount of space in my engine compartment. I could have used solid pipe to make all the connections, but I realized it would be a difficult task to get all the fittings uniformly tight and leak-proof, so I made some of the connections with hose.

Once I'd settled on a trial assembly and determined the final size of the unit, I could select a mounting board. I chose ½-inch-thick StarBoard because it's sturdy enough to hold the components, it can be cut and drilled like wood, and it is impervious to water and fuel. I cut a piece 8 inches wide by 16 inches long and drilled a ¼-inch-diameter hole in each corner for screw-mounting the unit to a bulkhead in the engine compartment. I bolted each filter directly to the board with two 5/16-inch flat-head machine screws, countersinking their heads into the back of the board so I could mount the board flush to the engine room bulkhead.

Bolting the filters directly to the backboard left the selector valves and shut-off valve standing proud of the mounting board. To provide proper support, the attachment bolts would have to run through stand-offs, and that posed a bit of a problem. I tried using nylon stand-offs from the specialty hardware drawers in my local home-improvement store, but the selection was limited. I tried stacking stand-offs of various lengths together and shimming them with washers, but I could never get them quite right and was concerned about stressing the valves or their connections. I finally bit the bullet and purchased a length of acetal-resin tube from McMaster-Carr so I could cut stand-offs to the exact lengths I needed.

Valve settings

To test the assembled components, I removed the drain plugs from the filters and slipped a short piece of hose over the inlet fitting. By blowing

through the hose, I was able to determine how to set the selector valves to direct the flow through one filter or the other. I didn't get the flow right the first time, and had to reassemble one of the filter setups and reorient the selector valve to correct the direction of flow.

Prior to testing the unit, I bolted blank dial faces to the selector valves. Once I was certain of the correlation between the direction of each valve handle and the direction of fuel flow, I marked the faces accordingly, then drew them on my computer and glued the printout to a thin piece of plywood. A couple of coats of epoxy waterproofed the dials. They are held in place with the machine screws that attach the valves to the board.

Plumbing and proofing

After bolting the filter/valve units to the backboard, I connected them with Coast Guard-rated fuel hose. Fuel hose can have one of four ratings: A1, A2, B1, and B2. To be on the safe side, I used A1 hose, which is the highest-rated and can be used above or below deck. The latest version of A1 hose is labeled A1-15. The hose barbs of the pipe-to-hose fittings were long enough for me to double-clamp the hose connections. When double clamping a hose, it is important that both clamps ride fully on the barbs. If the barb is too short, the second hose clamp can cut the hose where it's not supported by the barb. By the way, I used only marine-rated all-stainless-steel hose clamps.

It's important to use a thread sealant on the threaded components. I used yellow fuel-rated Teflon tape on my initial assembly of the filter/valve unit. When I disassembled the joints on discovering I had the selector valve the wrong way around, I found stray bits of Teflon tape inside the joints. At that point, I switched to Permatex Aviation Form-A-Gasket No. 3 Sealant, a liquid thread sealant that my online search indicated was highly recommended.

With the unit completely assembled it was time to test it. Before mounting the board on the bulkhead, I made temporary connections to the fuel inlet and outlet and ran the engine with the assembly sitting in a pan, to catch any leaks rather than put fuel in the bilge.

My dual switchable filters give me peace of mind from knowing I won't be powerless for long should a filter ever become clogged from dirty fuel.

Paul Esterle has been boating since the early 1960s. Starting out with a wooden Sunfish, he graduated to stripper canoes and sailing wooden Folkboats on Lake Erie. Paul is currently based at the head of Chesapeake Bay, where he works on and sails his small fleet of classic plastic sailboats.

Deodorizing the head

Make holding-tank chemistry work in your favor

BY DREW FRYE

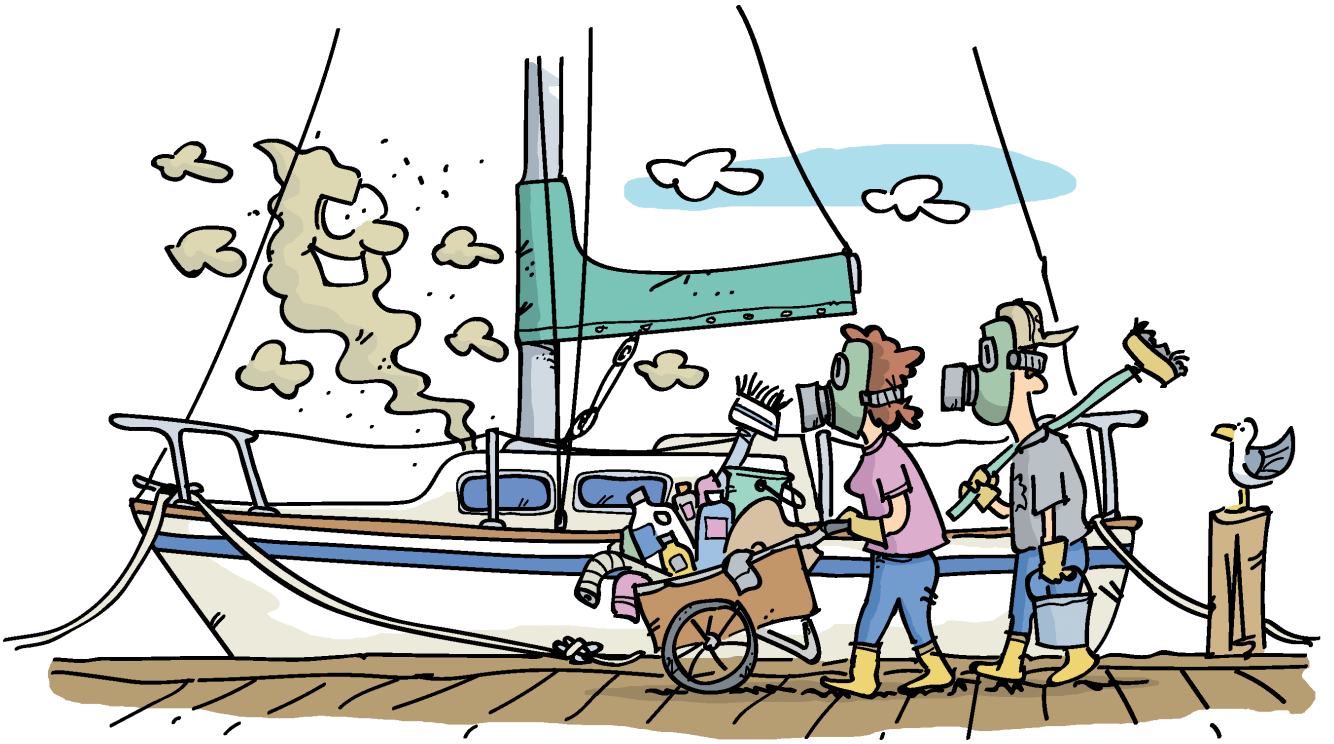


ILLUSTRATION BY TOM PAYNE

You've polished the gelcoat, cleaned the seat covers, and put out matching towels, and yet when guests visit the head, their reaction is still "ew . . ." It's not a basket of fruit. So you bleach and scrub with products that claim to remove every odor, but odors keep coming back. That's when it's time to get to the root of the problem.

I've struggled with sanitation systems on new-to-me boats and I've gone further than most, experimenting with hoses, chemicals, and simple design changes. (In fact, for four years I kept five matching holding tanks in my backyard, along with an assortment of hoses, treatments, filters, and vents, as part of my research for a *Practical Sailor* article.) In the end, I've learned that heads can be dependable, robust, and odor-free, but only if all of the parts are optimized and work together. Don't settle for good enough, aim for best.

Sources of odor

While the offending odorous chemicals are mostly produced and contained in the holding tank, they can escape by paths anywhere in the system.

Surface contamination – Scrub the head clean and watch for any return of staining. Are there leaks? I secure every hose connection with double clamps opposed to each other (the screw heads facing opposite directions) and ensure that the clamps are tightened around the barb rather than hanging off the end. Examine all flanged connections, including the joker valve, to check that they are tightened evenly and not cocked to one side. Look for signs of leaking around shaft seals. Post a sign suggesting male guests sit down in rough conditions so they won't miss their target.

Caulking around hoses where they pass through a bulkhead will prevent chafe.

Chafe – Take a close look at where hoses pass through bulkheads. The first time I replaced sanitation hoses I found one that had chafed through on the sharp edge of a balsa-cored bulkhead, resulting in a slow leak, a phantom odor, and rot in the balsa core. To prevent chafe, I now drill oversize holes for hoses and apply polyurethane caulk from both sides of the holes to cushion the hose or prevent it from moving.

Inadequate flushing – It's tempting to stretch pump-out intervals by

Trying all kinds of hoses in his head, Drew had water hose on the left, Trident 102 on the right, and Shields Poly-X in the center.

minimizing the amount of water used to flush. Bad idea. Inadequate flushing can leave waste sitting in a hose, increasing the likelihood that odorous gases will permeate the hose or bubble back past the joker valve and into the bowl. Flushing with too little water also leads to scale formation in the head, joker valve, and hose, particularly when urine left in these areas reacts with calcium in the seawater. Finally, difficult pump-outs, and even clogs, are more likely when the ratio of solids to wastewater is too high. Sanitation systems rely on excess water to liquefy the waste so it will flow. After each use (even number 1), it's best to flush the head with enough water to move all the waste to the tank and pump the bowl dry, leaving just a small amount of water in the hose, held back by the joker valve and serving as an odor block.

Permeation

The time-honored procedure for evaluating whether a hose has become permeated — or a tank for that matter — is to wipe the surface with a warm washcloth and to smell the washcloth. Simply sniffing the hose also works, assuming there are no leaks and that you first give the hose a few weeks from the last good scrubbing for gases to permeate it. Yet another method is to wrap the suspect hose tightly in aluminum foil for a few days, and then smell under the foil. A quick temporary trick for eliminating permeation stink is to wrap the offending hose smoothly and evenly with aluminum-foil duct tape. But at the end of the day, a permeated hose (and any white marine sanitation hose more than 10 years old has probably become permeated) is due for replacement.

Replacing hose

I'm a firm believer in fixing things, whenever possible, so that I don't have to fix them ever again, or at least not for a very long time. I've used all sorts of hoses over the years and I've reached a few general conclusions regarding what works and what doesn't.

Avoid clear vinyl hose, even for vent lines; it will become permeated within a few months and is prone to kinking, compromising the vent. The builder of my boat used clear vinyl hose for the vent and it had become well and truly permeated. I replaced it with more of the same hose and it failed again by the end of that summer. Now I use generic white sanitation hose for vents.

Other hoses to avoid are common water-service hoses; stink will permeate even the best-quality heater hoses within a few years. I've used all sorts of hoses on boats, often side-by-side, and have a few recommendations.

- *Trident 101/102*. A very heavy-duty and durable sanitation hose; I have not heard reports of permeation or other failure. The 101 is black, the 102 is white, and both are solid choices. The downsides of the 101 are that it is a stiff hose, it's slightly larger in outside diameter than white sanitation hose, and the rough outer surface is prone to mildew and can be difficult to clean.
- *Raritan Sani/Flex Odor Shield.* With a slim profile and superior flexibility,

Tips for installing hose

–DF

- Where possible, replace standard hose fittings with sanitation-hose fittings, which are smooth, not barbed and, though slightly smaller in diameter, are secure when double-clamped. Aboard a boat (outside fuel systems) a seacock is the only place for a barbed fitting.
- Warm the work area. In cool off-season air temperatures, hoses become stiff, which can turn a reasonable job into an awful job. I run a space heater for a while to get everything toasty warm.
- Lubricant can ease the task if a hose seems willing to slide onto the barb but needs a little encouragement. Avoid petroleum products as they react with the materials used in most sanitation hoses, in some cases dramatically. Specifically, any hose with a liner that is butyl or ethylene propylene diene monomer (EPDM) rubber-based must never be lubricated with petroleum products. Fortunately, a glycerin-based lubricant (such as K-Y Jelly) can be safely used with any hose type and will dry out over time, resulting in a good connection.
- Rubber-faced gloves really help with grip and can prevent busted knuckles. A hose-removal hook can help too.
- White sanitation hoses are quite stiff. If lubrication isn't enough, heat the ends to soften them. I like dunking the ends in near-boiling water for about 20 seconds, which heats them completely without any risk of damage, although I do take precautions to avoid dumping the hot water into my lap when working in tight spaces. A hair dryer can be somewhat effective and heat guns will certainly do the job, although there is risk of scorching the hose.
- I never heat a hose for the purpose of making it more flexible for bends; the hose will either be damaged or later collapse. A better solution — and this is true for all hose installations — is to install a 90-degree elbow.

this hose can snake anywhere a hose needs to go, but its flexibility means it can kink. Where more than gentle pressure is required to make a turn, install a 90-degree PVC elbow. Easy to slide onto sanitation barbs, this hose is a pleasure to work with.

• *Shields Poly-X.* The most expensive and perhaps best sanitation hose, it comes with a lifetime anti-permeation warranty that you won't need. It is of medium stiffness and external diameter, installs easily, and the slick surface is easy to clean.

• *Dometic Odorsafe Plus.* An upgraded white sanitation hose, it has considerably greater permeation resistance than generic white sanitation hose and the surface is reasonably easy to clean. However, it is a stiff bear to install and doesn't like fitting over standard hose barbs at all.

There are other products out there, some of them considerably less expensive, but don't waste your time unless you like doing messy jobs over (and over). I've done that for you.

Attacking stink at the source

While the waste in the system has a certain foulness of its own, it gets worse over time in an inadequately vented tank that contains waste and salt water. This is because the bacteria in the tank, once they have consumed most of the oxygen, begin converting common sulfates to sulfides. At that point, even the best efforts to contain the hydrogen sulfide and the organosulfer thiol compounds that give aged waste its bite are destined to fail. At high concentrations, only tiny amounts of these gases need sneak out of the vent or bubble up into the bowl to be noticeable.

The solution is to either eliminate the sulfate or keep the chemistry under control by maintaining a constant supply of oxygen to the bacteria in the tank. In other words, make sure the airspace in the tank is regularly exchanged with outside air, such as by running a relatively straight oversized vent hose. While the same ventilation is indicated for boats operating in and flushing with fresh water, the concentration of sulfates in, say, the Great Lakes, is 100 times lower than it is in seawater. This means that the odiferous consequences are not as dire for sailors on inland lakes or rivers.

To test your flushing water, fill an empty drinking-water bottle with seawater, close it, and leave it in a dark corner for a few days. Then pop the top and discover that it now smells awful. This is because the salty-smelling seawater you used to fill the water bottle was filled with living things that first consumed the free oxygen in the water and then oxidized the sulfate in the seawater to sulfides.

This same process goes on in the inlet pipe to your head. This is why, when you flush the toilet for the first time after having been away from the boat, you notice a foul smell as soon as you pump the handle and draw that stale seawater into the bowl. The solution? Flush the toilet with fresh water before leaving the boat for more than a day. This can be done with a showerhead or a jug. A more permanent solution is to tee the sink drain into the head inlet, with a valve upstream of the tee. That gives you the option of closing the intake seacock and pulling clean tap water from the sink.

Still unpleasant? The fresh water at my home marina is sufficiently high in sulfate to stink when stored or used in a head. Accordingly, I have found that a few squirts from a spray bottle filled with a 4:1 dilution of holding-tank treatment chemical does the trick. Additionally, a few spritzes in the bowl for the final freshwater flush will provide the necessary extra oxygen in the bowl and up the discharge hose. What is not consumed will be moved to the holding tank, where it will provide treatment. Two holding-tank treatments that have a pleasant smell are Forespar Refresh (my favorite) and Camco TST Ultra Concentrated.

ILLUSTRATION BY TOM PAYNE

Basics not to be overlooked or forgotten –DF

I've found it helpful to post advice in the head, since many guests don't like discussing the subject. In addition to head-specific operating instructions, try to remember the following:

- Use appropriate toilet paper. There's no need to pay a premium for specialized marine or RV paper from your local chandler; any single-ply store-bought toilet paper should work fine. Test a candidate tissue by soaking a few squares in warm water for a few minutes and then stirring gently with a stick. The paper should fall apart into pulp in a few seconds.
- Never flush facial tissue or paper towels. Anything that can survive a trip through the laundry in your pocket is not going to fall apart in the holding tank. Don't keep it in the head compartment.
- Annual disassembly and lubrication with grease is the best way to keep your head pump operating effectively. You can keep the pump lubricated by periodically adding vegetable oil to the bowl before flushing. Shore-based sewage ordinances restrict oil and grease to 100 ppm because of problems with clogging collection pipes, so don't overdo it. I've done studies with holding tanks and chemicals, and the only holding tanks I've seen that accumulated sludge or had gunk sticking to the walls were those that contained vegetable oil used to lubricate the pump. Moderation is the key. A good rule of thumb is no more than 1 teaspoon per full tank. Olive oil and canola oil cause the least damage to joker valves and other neoprene pump components.

Scale Control

For those of us who sail in seawater, the formation of scale on the insides of head valves and hoses is a common condition. Seawater is nearly saturated with calcium and carbonate ions, and these readily react with chemicals in urine to create rock-hard scale deposits. Scale formation can be inhibited by occasionally flushing vinegar (or another weak acid) down the toilet and allowing it to soak in the hoses for an hour before flushing it through. Stronger acids (muriatic or commercial scale removers) can eat thicker deposits, though success is usually limited and mechanical means will be needed (take the hoses off and beat them on the ground). But all of this can be avoided by flushing with enough water to move all waste through the hoses and into the tank before it has a chance to react with the seawater. This simple practice can generally limit scaling to the point where hoses are replaced during maintenance before it becomes an issue.

Chemical treatment

For a long time, treatments for holding tanks were made from harsh chemicals intended to sterilize the holding tank. This approach was never very effective at controlling odor, as confirmed by countless unspeakably foul portable toilets and holding tanks.

A far better approach, incorporated in all successful modern tank treatments, is to encourage the existing bacteria to operate in an aerobic manner, naturally preventing the conversion of sulfate into sulfide. Some products claim to introduce beneficial live cultures or enzymes, but the workhorse products simply contain sodium nitrate. The nitrate performs as an alternate oxygen source, more easily accessed than sulfate. With proper dosage, nearly all odor is eliminated. Popular products include Odorlos, Camco TST Ultra, and Forespar Refresh, though anything with nitrate at the top of the ingredients list should work. Flush the recommended amount through the head after every pump-out.

A spritz of holding-tank treatment before a final freshwater flush helps abate odors.

Ventilation

The most accessible source of oxygen is the air around us. Unfortunately, the most common vent size is ⅝-inch, and the routing is often less than optimal. For oxygen to reach the tank, there must be free flow within the hose. This requires a hose with a minimum inside diameter of ¾ inch (1 to 1¼ inch is better) and a maximum run of about 4 feet, routed on a gentle slope with no loops. Finally, the vent must be cleanable, to avoid pump-out problems. A blocked vent can result in a collapsed or exploded tank, although the more common problems are difficulty pumping the head, a geyser when the deck cap is removed, and waste and foul bubbles being forced past the joker valve and back into the head bowl.

Those nifty little screened fuel-tank vents that are sometimes installed on holding tanks are a huge mistake. While they keep insects out of the pipe, they prevent cleaning and inhibit good ventilation. The vent should always be fitted at the center of the top of the tank, a location that offers the best protection from getting clogged by tank contents on either tack and when pitching. Of course, every effort should be made to empty the holding tank before it gets filled because, once it's filled, waste is likely to back up into the vent line no matter where it's located. Finally, it is good practice to back flush the vent every few pump-outs to ensure the hose is clear.

There are systems available that use a small compressor to force small amounts of air into the bottom of the holding tank. Although effective, they are not worthwhile aboard smaller boats due to their power demand and complexity.

Resources

Sanitary hose

Dometic Odorsafe Plus
Available from marine and big-box stores

Raritan Sani/Flex Odor Shield
raritaneng.com

Shields Poly-X
Available at marine stores and suppliers

Trident 101 (black) and 102 (white)
tridentmarine.com

Holding tank treatments with nitrate

Camco TST Ultra Concentrated
www.camco.net

Forespar EcoTankPRO (item No. 770350)
www.forespar.com

Odorlos tank treatment
Available at marine, RV, and big-box stores

Vent filters

Big Orange Original, Big Orange OEM
bigorangefilter.com

Vent filters

Sometimes the holding tank vents to an unfortunate location, such as upstream of opening cabin portlights. In these cases, a carbon vent filter might be

A filter (white cylinder) will freshen vented air but needs a bypass for protection.

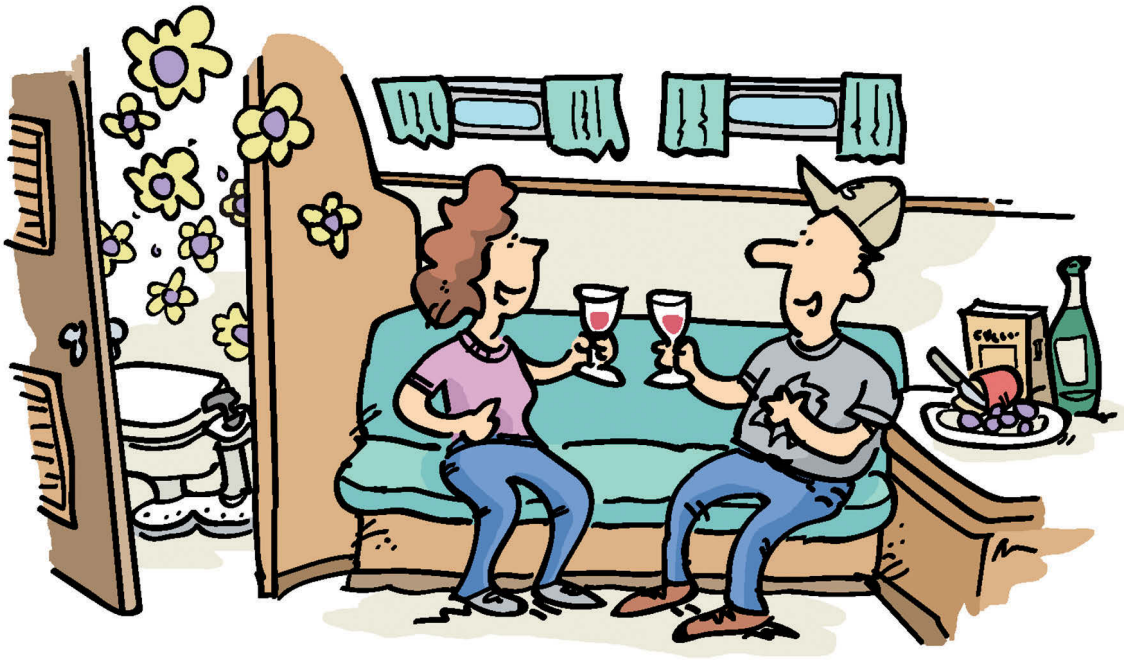


ILLUSTRATION BY TOM PAYNE

necessary. Of course, an undesirable and unavoidable consequence of using a vent filter is that it will reduce ventilation in the tank, so regular chemical treatment will be imperative to prevent the anaerobic activity that results in worsening odors that may find their way into the boat.

I installed a carbon vent line filter on *Shoal Survivor*. Because carbon filters are vulnerable to clogging with waste and soaking with seawater (potentially ruining them in a single incident), I installed my filter at a high point in the boat and isolated it from the holding tank using a bypass. (For one take on this, see "Holding-Tank Vent Filter," page 24 –*Eds.*)

I've used a number of filter brands over the years. I made the one I use on *Shoal Survivor* from common PVC pipe and fittings and a bit of foam, but I can recommend the Dometic Sealand ECO as a single-use carbon-filled tube (often sold as part of a complete tank system). Big Orange sells two models I recommend, the Big Orange Original, which contains nearly twice as much carbon as standard carbon-filled tubes, and the Big Orange OEM, which matches the physical dimensions of the common Dometic filter. Both Big Orange units have integral vacuum breaks to prevent tank collapse during pump-out and are refillable with fresh carbon when spent, promising a very long and economical lifespan. Big Orange sells refill carbon, but bulk carbon from an aquarium store works fine.

Use every weapon

As always, a belt-and-suspenders approach yields the most robust result. Maximize ventilation so that bacteria in the tank have every opportunity to use air as a source of oxygen in place of sulfate. Consider increasing the size of the vent hose and relocating it if need be. Use a nitrate-based holding-tank treatment. While you're at it, spritz a little holding-tank treatment into the bowl; this will treat the bowl and waste piping, trickle into the holding tank, and freshen the compartment. A freshwater flush can reduce odors in both the bowl and the holding tank, though how effective this is depends on the freshwater source. With fewer odor-causing chemicals in the tank and hoses, permeation-resistant materials have a good chance of being permeation-proof for the long haul. Making sure all of the parts and practices work together will ensure long-term reliability.

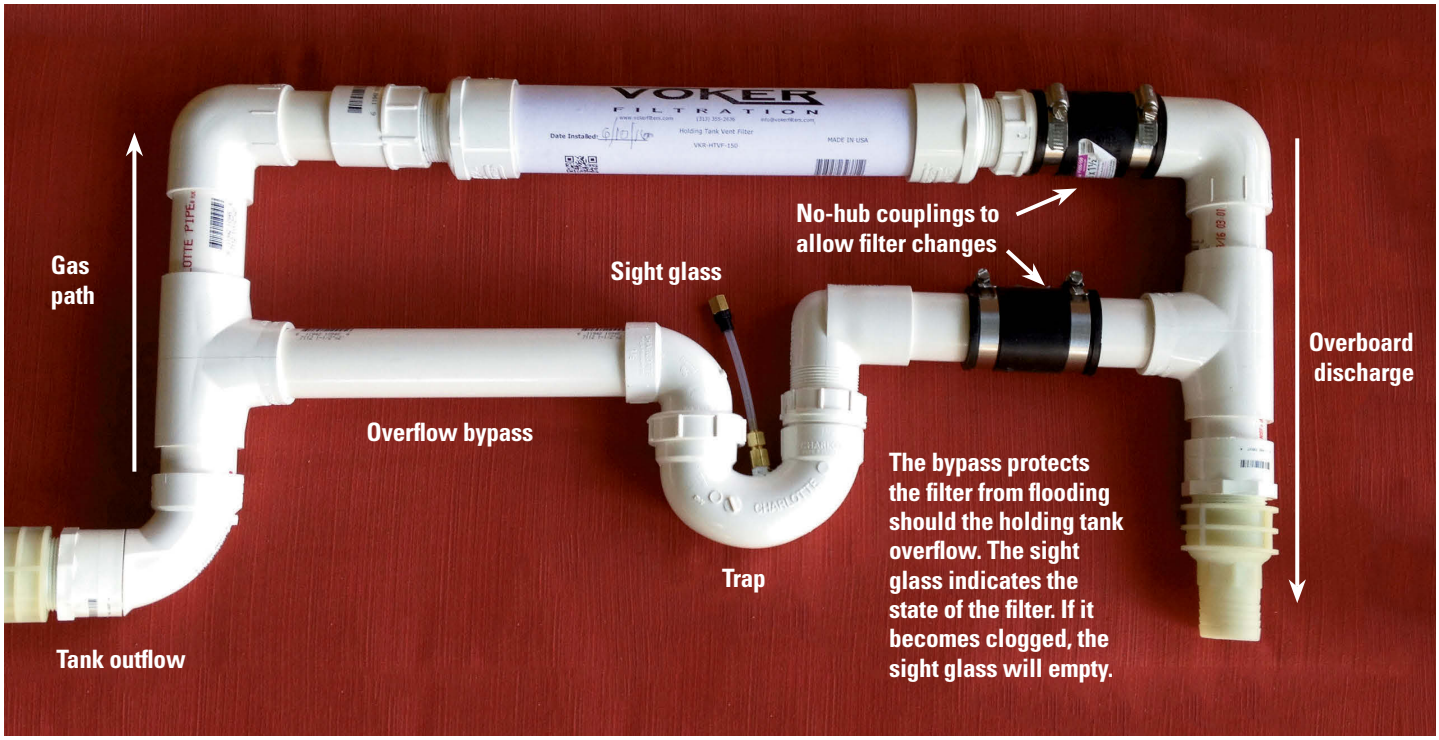
Will your boat's head ever be as fresh as a bathroom in your home? It's more compact but, with attention to detail in both design and operation, you can keep your guests focused on the lovely scenery, instead of the realities of sanitation.

Drew Frye cruises Chesapeake Bay and the mid-Atlantic coast aboard his 34-foot catamaran Shoal Survivor, *searching for out-of-the-way corners known only to locals. A chemical engineer by training, and a 40-year climber and 30-year sailor by inclination, he brings a mix of experiences to solving boating problems and writing about them.*

Holding-tank vent filter

It removes the aroma before it can envelop you

BY ALAN WILSON



Ah, the holding tank, that place where we store our waste until we can find a pump-out station. In a perfect world, a marine holding tank will hold the waste in an environment where helpful bacteria and oxygen digest it into a non-toxic low-odor liquid. But holding tanks are small, and don't allow the bacteria enough time to do their job — a family on a weekend outing might easily fill a 30-gallon tank — so the contents never lose their redolence.

Our boat, a 1997 Packet Cat, has a single 30-gallon aluminum tank that receives waste from two heads. All the hoses connected to the tank, including the vent line, are 1½-inches in diameter and are of the highest quality I could find, the least likely to become permeated. To me, they're worth the extra cost because they're effective; we don't suffer with head smell down below. Topsides, well, that's another story.

With every flush, the unmistakable aroma discharged from the vent made us retch, or at least scrunch up our noses. At times, depending on the strength and direction of the wind, the stench dissipated quickly. But when conditions were not favorable, the unpleasantness lingered . . . until I solved the problem.

In theory, a well-ventilated tank that contains aerobic bacteria will produce no noxious fumes. But, as noted above, even in a system that's well-designed and well-maintained, if nature lacks the time to perform its function, that odor is the result. So, what can be done?

Looking for solutions

For many sailors, the answer is holding-tank additives, which fall into several categories: enzymes to boost digestion, deodorants, and surfactants that disperse fats and solids. Holding tanks can benefit from any of these additives, but each has shortcomings. Enzymes promise no odors, but need time to work on the waste. Deodorants are very harsh chemical compounds with toxic side effects and their own recognizable smells. Surfactants may keep the tank's interior clean, but they do nothing to eliminate odor.

Others tackle the problem by relocating the holding-tank vent discharge in the hope that airflow around the boat will carry the problem away. But airflow around a boat is never constant, changing with the wind's direction and strength and the boat's heading and speed. Some builders have located the vent discharge on the transom, but many hull designs tend to generate an airflow eddy back there while under way, a low-pressure area that can cause the smell to follow the boat for miles; think of a station wagon's dirty rear window. And on quiet nights with little or no breeze,

odors often dissipate slowly, seeming to envelope the boat in a cloud no matter where the vent discharge is located.

I needed a solution that would work all the time, no matter the state of the aerobic condition of the tank or the vent discharge location. That solution was an adsorptive filter in the vent line.

Filter facts

An adsorptive filter contains a medium, usually charcoal, that traps odor-causing gas molecules on its surface. Every flush sends water and other material into the holding tank. The gases thus displaced from the tank pass through the filter, which removes the offending molecules. The result is no more foul tank odors on quiet nights on the hook or while in the marina.

To remain effective, the filter and its medium must remain dry. In fact, if the filter housing should fill with liquid, due to backup from an over-filled tank or spillage when a sailboat heels, the vent line will become blocked and no air will pass in or out of the tank. The result is bad, bad news. Without the ability to vent, the holding tank and connecting hoses will become pressurized. Think about a hose popping off a fitting. At pump-out time, waste would overflow the deck fitting, and a blocked vent line could lead to a vacuum in the tank, and possibly to the collapse of the tank and hoses and damage to head valves.

Bearing in mind these cautionary notes, I decided on the vent filter because of the way we use our boat and the reported success of these filters in removing the offending aromas.

The installation

To prevent liquids from reaching the filter, I designed a system with a bypass plumbed into the 1½-inch vent line. Having a vent line this large was both good and bad. Good because there is excellent air movement in and out of the system, bad because of the space 1½-inch marine sanitation hose takes up.

My first attempt at fitting the filter and bypass was good in theory, but my execution was poor and the system was leak-prone and ineffective. I created two paths for air to move into or out of the tank. One path was through the filter. The other was a waste overflow line with a water trap intended to keep tank gases from escaping the tank, in the same way the trap under a kitchen sink keeps sewer gases from entering a home.

My second attempt was a leak-free success. In the center of the trap, I included a sight glass through which I could monitor the water level in the overflow bypass. I also added two no-hub couplings to make changing the filter element easy.

The filter is an off-the-shelf charcoal-filled chamber and features threaded end caps that accept adaptors for hose — in my case the couplings — or PVC slip joints.

Four months after I installed our system, the difference in air quality around our boat was still remarkable — the odors were gone. I pump our tank regularly and after each pump-out I flush the system with clear water as a rinse. I then remove the cap on the sight glass and pour approximately one cup of water into the trap. We've had no problems with a blocked filter because, if the tank overflows, all the liquid passes to the vent discharge via the lower bypass loop.

I'll add that, because our boat is a catamaran, heeling is minimal, so I was able to assemble our filter system athwartships. For monohulls, I recommend a fore-and-aft orientation.

I'll also add that the suction pumps used by pump-out stations will pull the water out of the trap. The sight glass I installed, as well as providing a ready measure of this water level, has another benefit. Should the filter ever become restricted, operating the head normally will push the water out of the trap and overboard through the vent. So seeing the trap full of water reassures me that the filter is not clogged.

While we do still use an enzyme additive in our system to help dissolve the toilet paper and to keep the tank free of buildup, we have no need for deodorants. Aboard our boat, the noxious gases that form in our tank are removed before they ever reach our noses.

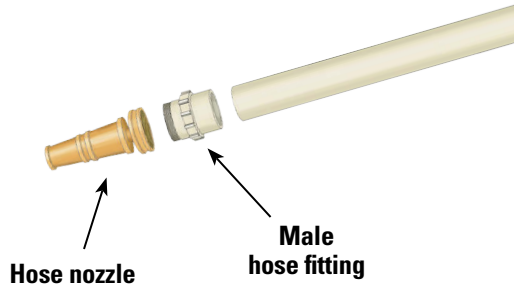
On his catamaran, Alan found a large-enough space to fit his vent system athwartships, where he also had access for checking the sight glass and changing the filter.

Alan Wilson began boating in childhood in wooden-hulled skiffs and lobster boats off the New England coast. He holds a U.S. Coast Guard Vessel Master's Rating for Steam, Motor, and Auxiliary Sail. As a freelance writer, he has had several articles published on navigation and boat maintenance. He enjoys boating on Biscayne Bay and in the Florida Keys and the Bahamas.

Banish anchor-borne

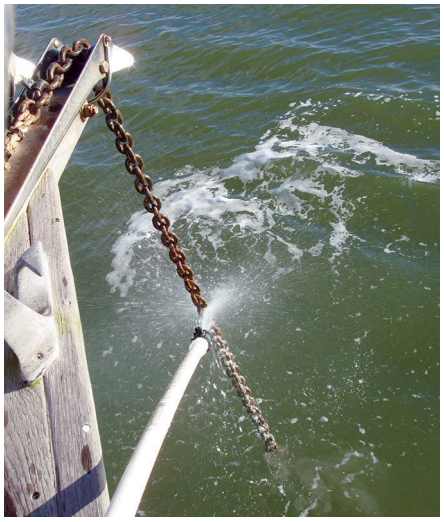
Jet it off with a homemade washdown wand

BY JIM SHELL



Dirty rode in an anchor locker can make a mess and get to smelling pretty foul. A clean rode is especially desirable when an anchor locker is open to a boat's bilge or cabin. In pursuit of clean rode, I long used a hose attached to a washdown pump in my attempts to rinse off the mud, but I couldn't get the nozzle very close to the muddy rode even when reaching out over the pulpit. The process was slow and the result was often mediocre.

I was recently on an online boating site where someone recommended a wand-like nozzle extension that he'd bought and attached to his boat's washdown hose. The individual reported that, when standing at the pulpit with the wand, he could direct the water stream right at the rode and anchor and more effectively wash the mud and muck away.

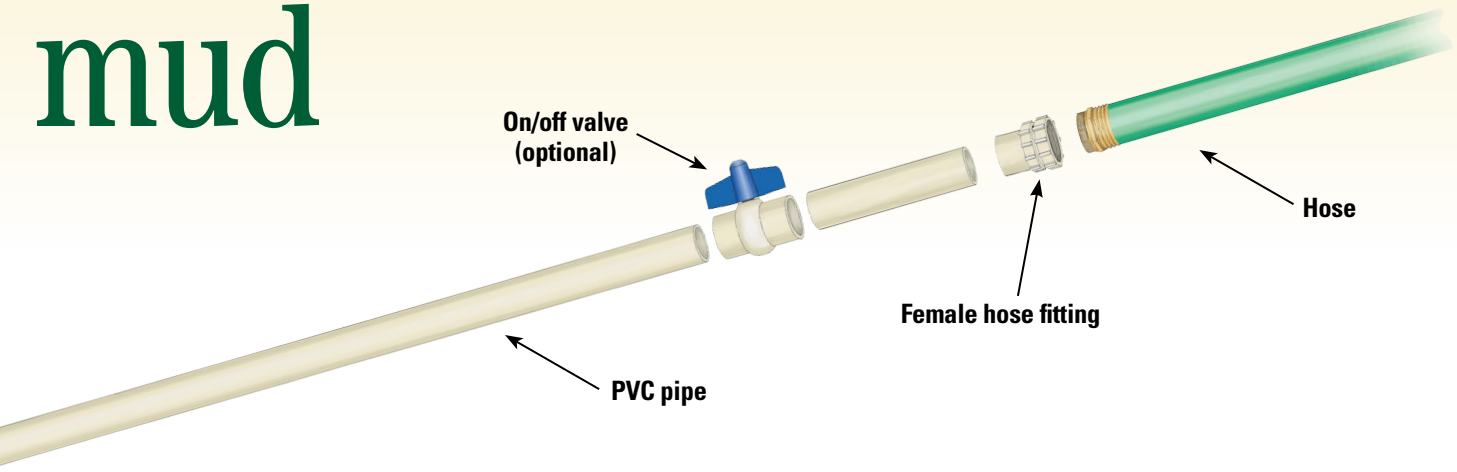


This was certainly something to consider, and the recommended device was not expensive, about $20. However, after rummaging through the odds and ends of my "pack rat pile," I was

Jim looks very comfortable aiming his magic de-mudder at his anchor while in position to operate the windless with one hand, top of page. If he needs both hands on the windlass as, say, in deeper water, he can take a break, rinse the chain from roller to waterline, haul, and repeat, at left.

ILLUSTRATION BY FRITZ SEEGERS

mud



able to assemble a similar device using mostly items I already had on hand. Alternatively, I could have constructed the same thing for $5 to $8 using parts from a hardware store.

I started with a 4-foot length of ½-inch PVC pipe. (This can be whatever length is needed to get the spray head inches from the muddy rode and anchor.) Using PVC cement, I attached a standard ¾-inch PVC female hose fitting to one end, for the hose, and the male version to the other end, for a twist-type nozzle. Adding a PVC on/off valve is a nice-to-have, but not totally necessary, feature.

Our washdown hose is connected to a 12-volt Jabsco PAR-MAX 4 diaphragm pump that draws from a tee off the raw-water intake between the strainer and the marine head. Water is delivered to a hose fitting on the deck near the windlass. While kneeling to operate our manual Sea Tiger windlass, I'm able to use my new washdown nozzle extension, aiming the spray at the chain or anchor while it's still a foot or so below the bow roller. In the past, using a regular hose and nozzle, I ended up washing mud off the chain as it came up over the bow roller, getting a lot of mud on deck. No more.

Jim Shell and his wife, Barbara, sail their Pearson 365 ketch Phantom *off the Texas coast.*

Early-onset boat fever

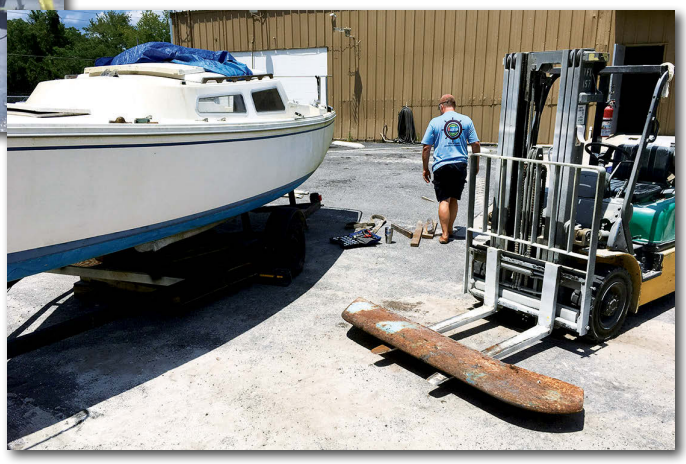
A high-schooler falls for a derelict in the woods

BY KEN BILLING

Do you remember when you were younger, before you'd been thrown a few surprises and knocked around a bit by life? Back then, possibilities seemed unlimited and opportunities just lay waiting to be tackled. Most of us were braver then — we didn't know what we didn't know, for sure, but we had enough ambition and enthusiasm to take on almost anything.

I write a popular blog about restoring and improving small sailboats in general, and about restoring my 1981 Catalina 22 swing-keel in particular. I frequently receive email from readers. Often they are from middle-aged men who are just now seeking a bit of adventure in their lives. Last summer, I got an email from a reader who stood out from the others.

It wasn't gold 17-year-old Chipper found in them thar woods but a jewel of a sailboat camouflaged under layers of tree trash and a coat of mold, above. With the help of friends and a dad with resources, he erected a gantry, lifted the boat onto a Craigslist trailer, and took it to his dad's shop . He then set about cleaning her, at left, and working on her from keel, below, to cabin, facing page.



Lawrence "Chipper" Stempkowski III is a 17-year-old who lives in Altamonte Springs, Florida, near Orlando. Chipper, an Eagle Scout, is a lifeguard and sailing instructor at his local Boy Scout camp, Camp La-No-Che.

One day, while exploring the camp's graveyard of unused boats, Chipper discovered a derelict 1984 swing-keel Catalina 22 sitting on the ground amid some trees. It had been abandoned five years earlier and was now covered with debris and nearly full of rainwater. The trailer had long before been repurposed elsewhere.

Now, I know that I'd have looked at the same boat and muttered something like, "You couldn't pay me enough to take that home and make it seaworthy again." But I didn't get a letter from a kid who saw that boat and muttered what I'd have muttered. "I instantly loved her," Chipper wrote, "and I wanted to live aboard a sailboat."

While his friends played Pokémon Go, Chipper made weekend trips to inspect, drain, and cover *Double Deuce*. He pestered the sailing program director until he finally told Chipper that if he could find a way to remove the Catalina 22, he could have it. Within a month, Chipper bought a used trailer he found on Craigslist.

With help from his supportive dad and a couple of friends, Chipper erected scaffolding and beams over his boat. Then, with the aid of winches and slings, he and his crew hoisted her onto the trailer. "From there, we had to pull her out of the trees and into the field," he says. "While she was trailered about 50 feet, I sat in the cockpit imagining the day she'll be in the water."

The high-school student has since towed the boat home and removed the swing keel for sandblasting and refinishing in his dad's shop. He has upgraded the cabin with LED lights, refurbished and relocated the switch panel, added a stern pulpit, refinished the storage-locker covers, and made a new saloon tabletop with an inlaid checkerboard. He's currently working on upgrading the rest of the electrical system and plans to paint the topsides, add lifelines, and replace the outboard motor mount. As it is for many of us, Chipper's biggest challenge is running out of time in the day before he runs out of work he wants to do on his boat.

The early Catalina 22s are sought after by racers because of their light weight and thin keels. I asked Chipper whether he has plans to race *Double Deuce*. "I've looked into joining the local sailing club and entering her in their regatta. But before I do anything like that, I want to sail her on my own for a while to get used to her."

When I asked him if he had any advice for other young sailors following in his wake, he said, "I would recommend that anyone wanting to get into sailing buy a boat that needs some work. Because of the work *Double Deuce* needed, I have learned so much, not just about sailing but about fiberglass work, electrical, and general boat repairs — knowledge that will be invaluable if there is ever a problem on board."

Chipper's short-range plans are to sail *Double Deuce* on on Florida's Lake Monroe and Lake Norris, and the Intracoastal Waterway. I don't think Chipper's going to wait for middle age to pursue adventure in his life.

Ken "$tingy" Billing is the owner of The $tingy Sailor *website (https://stingysailor.com) that features DIY projects for Catalina 22s and other small sailboats. He and his wife, Patty, live in north Idaho and sail their 1981 C-22 #10330 on some of the many lakes in the region.*

Drawbridge poker

Don't leave anything to chance

BY JILL AND RUDY SECHEZ

During the seasonal cruiser migration along the Atlantic Intracoastal Waterway (AICW), it is quite common to see boats bottle-necked before a drawbridge, circling like goldfish in a bowl. This is especially the case at drawbridges that open on restricted schedules. When transiting a series of bridges, these cruisers seem to race away from one bridge only to resume their restless circling maneuver at the next.

Thus, for many boaters, drawbridges are a nuisance. But others, who travel with a more sedate mind-set, do their best to accept, and even enjoy, the delays that drawbridges create. We're among the latter group; we putter along, take in the sights, and find drawbridges, well . . . kinda cool. Rather than a hindrance, they are structures worthy of study — all that concrete and steel being moved by complex mechanisms.

Although many drawbridges are being replaced by high-span fixed bridges, there are still plenty of them around, and a good variety, some with quaint tender houses or quirky draw-tenders that can make a drawbridge encounter rather interesting. An example is a bridge we traverse when we roam the lesser-traveled southern rim of Lake Okeechobee, Florida.

To request an opening for this swing bridge, we first put a call through to the adjacent fish camp to reach the drawtender. Eventually, the drawtender will mosey out and walk across the bridge, completing the preparatory bridge-opening chores as he goes. Then, sticking a long pole into a fitting, perhaps with a grunt from the effort, he'll begin to push. Walking in a slow circle, he turns a small gear that drives a bigger gear that swings the bridge. As it nears the open position, he uses the same mechanism to slow the bridge's motion until it comes to a halt. Once we've passed, he reverses the process to close the bridge . . . slow, simple and, for the most part, painless — at least for us.

Drawbridge variants

The swing bridge is only one of the types of drawbridges we come across. A drawbridge is any bridge that has a span that can be moved to allow or deny passage across or beneath it. Early examples were the bridges over castle moats that could be raised to provide a measure of protection for the castle's inhabitants. Pontoon bridges are chronicled in ancient China, so it would appear that movable bridges are not a modern invention.

Swing bridge – A swing bridge rotates at its center so that, when open, the swinging span has turned 90 degrees from its closed position. Boats may pass through the opening on either side of the bridge's center, though passage through some bridges is limited to one side only. Vertical clearance is never a problem, but horizontal clearance may be limited should the bridge not swing completely open.

Bascule bridge – The type of draw-bridge most commonly encountered on the AICW, the bascule bridge operates with a counterbalance. The bridge span (or spans — some bridges have two leaves that meet in the center) pivots upward until it stops at a near-vertical position. Not all bascule bridges are

completely vertical when open, and sometimes only one leaf will open. In these situations, the vessel's helmsman must be careful to direct the boat through the open portion that allows sufficient vertical clearance.

Lift bridge – On a lift bridge, the draw span remains horizontal and is raised vertically by cables in towers at each end. Vertical clearance under a lift bridge is limited, making it essential to determine ahead of time, from a chart or other source, whether that clearance is adequate for the vessel.

Pontoon bridge – In this less-common type of drawbridge, a floating span is moved between the open and closed positions with cables. Vessels should not attempt to pass through the bridge while it is opening or closing because the cables pose a hazard. When the floating span stops moving, the cables drop to the bottom. Pontoon bridges have unlimited vertical clearance.

Drawbridge regulations

There is no worldwide standard for drawbridge operations, so it is incumbent upon mariners to become familiar with the regulations that apply to drawbridges where they're operating. Regulations govern the signals or methods to be used to request an opening and the lighting configurations each type of bridge is required to display in hours of darkness.

In the U.S., bridges operate under rules promulgated by the Department of Homeland Security under 33 Code of Federal Regulations 114-118, and 33 CFR 117 is specific to drawbridge operation (see "Extracts from 33 CFR 117," page 32). While much of this information can also be found in the *United States Coast Pilot* (see "Resources," page 34), it is dispersed across various chapters and time-consuming to locate. To avoid problems, mariners should plan well ahead when making passages in areas where they will encounter bridges.

Requesting an opening

When in contact with a drawbridge, if you ask if the drawtender will "open on demand," don't be surprised if the response is "no, we open on request!"

By far, the method most often used is to hail the drawtender via VHF channel 16. Many bridges are also assigned a working channel, usually VHF13, but it can vary from region to region and even from bridge to bridge. Both channels might be posted on the bridge (and, for some bridges, in Appendix A of 33 CFR 117).

Another way to request an opening is to make the approved sound signal.

Contact by phone is a possibility if a phone number for the drawtender is available — it is sometimes posted on the bridge. Phone numbers for some bridges are listed in the *Coast Pilot* or in cruising guides for the region.

GOOD OLD PHOTO BY JEREMY MCGEARY, RENDERED BY NANCY KOUCKY

The Ortega River Bridge in Jacksonville, Florida, facing page, is a classic double-leaf bascule bridge. Important information is posted on the tender house. Snowbirds running the AICW face a gauntlet of lift bridges and swing bridges on Norfolk's Elizabeth River, this page.

Extracts from 33 CFR 117

• 117.5 When the drawbridge must open.
Except as otherwise authorized or required by this part, drawbridges must open promptly and fully for the passage of vessels when a request or signal to open is given in accordance with this subpart.

• 117.11 Unnecessary opening of the draw.
No vessel owner or operator shall –
(a) Signal a drawbridge to open if the vertical clearance is sufficient to allow the vessel, after all lowerable nonstructural vessel appurtenances that are not essential to navigation have been lowered, to safely pass under the drawbridge in the closed position; or
(b) Signal a drawbridge to open for any purpose other than to pass through the drawbridge opening.

• 117.15 Signals.
(a)General.
(1) The operator of each vessel requesting a drawbridge open shall signal the drawtender and the drawtender shall acknowledge that signal. The signal shall be repeated until acknowledged in some manner by the drawtender before proceeding.
(2) The signals used to request the opening of the draw and to acknowledge that request shall be sound signals, visual signals, or radiotelephone communications described in this subpart.
(3) Any of the means of signaling described in this subpart sufficient to alert the party being signaled may be used.
(b)Sound signals.
(1) Sound signals shall be made by whistle, horn, megaphone, hailer, or other device capable of producing the described signals loud enough to be heard by the drawtender.
(2) As used in this section, "prolonged blast" means a blast of four to six seconds duration and "short blast" means a blast of approximately one second duration.
(3) The sound signal to request the opening of a draw is one prolonged blast followed by one short blast sounded not more than three seconds after the prolonged blast. For vessels required to be passed through a draw during a scheduled closure period, the sound signal to request the opening of the draw during that period is five short blasts sounded in rapid succession.
(4) When the draw can be opened immediately, the sound signal to acknowledge a request to open the draw is one prolonged blast followed by one short blast sounded not more than 30 seconds after the requesting signal.
(5) When the draw cannot be opened immediately, or is open and shall be closed promptly, the sound signal to acknowledge a request to open the draw is five short blasts sounded in rapid succession not more than 30 seconds after the vessel's opening signal. The signal shall be repeated until acknowledged in some manner by the requesting vessel.
(d)Radiotelephone communications.
(1) Radiotelephones may be used to communicate the same information provided by sound and visual signals.
(2) The vessel and the drawtender shall monitor the frequency used until the vessel has cleared the draw.
(3) When radiotelephone contact cannot be initiated or maintained, sound or visual signals under this section shall be used.

• 117.17 Signaling for contiguous drawbridges.
When a vessel must past two or more drawbridges close together, the opening signal is given for the first bridge. After acknowledgment from the first bridge that it will promptly open, the opening signal is given for the second bridge, and so on until all bridges that the vessel must pass have been given the opening signal and have acknowledged that they will open promptly.

• 117.19 Signaling when two or more vessels are approaching a drawbridge.
When two or more vessels are approaching the same drawbridge at the same time, or nearly the same time, whether from the same or opposite directions, each vessel shall signal independently for the opening of the draw and the drawtender shall reply in turn to the signal of each vessel. The drawtender need not reply to signals by vessels accumulated at the bridge for passage during a scheduled open period.

• 117.21 Signaling for an opened drawbridge.
When a vessel approaches a drawbridge with the draw in the open position, the vessel shall give the opening signal. If no acknowledgment is received within 30 seconds, the vessel may proceed, with caution, through the open draw.

• 117.31 Drawbridge operations for emergency vehicles and emergency vessels.
(a) Upon receiving notification that an emergency vehicle is responding to an emergency situation, a drawtender must make all reasonable efforts to have the drawspan closed at the time the emergency vehicle arrives.
(b) When a drawtender receives notice, or a proper signal as provided in §117.15 of this part, the drawtender shall take all reasonable measures to have the draw opened, regardless of the operating schedule of the draw, for passage of the following, provided this opening does not conflict with local emergency management procedures which have been approved by the cognizant Coast Guard Captain of the Port:
(1) Federal, State, and local government vessels used for public safety;
(2) Vessels in distress where a delay would endanger life or property;
(3) Commercial vessels engaged in rescue or emergency salvage operations; and
(4) Vessels seeking shelter from severe weather.

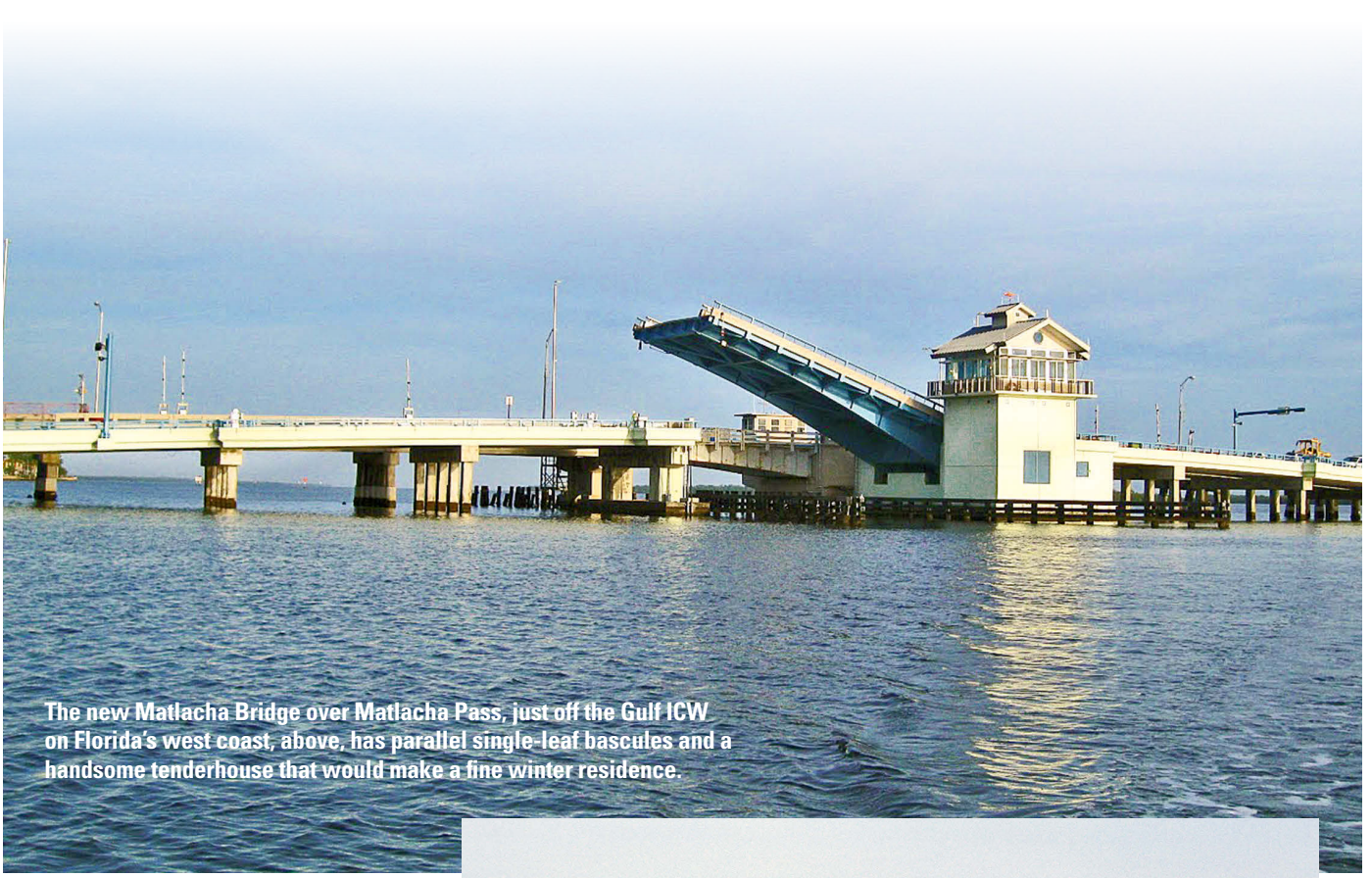


PHOTO BY GREGG MCKEE

The new Matlacha Bridge over Matlacha Pass, just off the Gulf ICW on Florida's west coast, above, has parallel single-leaf bascules and a handsome tenderhouse that would make a fine winter residence.

PHOTO BY JEREMY MCGEARY

Flag or light signals, while authorized under 33 CFR 117, are seldom used to request an opening.

Although drawbridges that open upon request (as opposed to drawbridges that open on a schedule) are generally required to open promptly upon receiving a proper signal from a vessel, there are exceptions to this rule. Some bridges remain closed during sustained winds of 34 knots or more, railroad bridges will not open when a train is due, and road bridges will remain closed to allow emergency vehicles to pass.

Adequate clearance

Maybe this is a good place to state the obvious: vessel operators should not try to pass through the navigable span unless they are sure that the clearance, both in height and breadth, is adequate.

The clearances of navigable spans are printed on charts and in the *Coast Pilot*. In regions where water levels can vary, you should check the clearance gauge affixed to the bridge that indicates the actual distance between the water and the "lowest steel" in the

PHOTO BY MARCIE CONNELLY-LYNN

The Sunset Beach pontoon bridge in North Carolina, center right, the last on the AICW, was replaced in 2012 by a high rise. Swing bridges are a common sight, at right. This one is at Fernandina Beach, Florida.

PHOTO BY RON ABFALTER

Mariners must be watchful for hazards, like this side-tow, above, when in the vicinity of bridges. Crowds of boats in a hurry to pass through the bridge across Pine River Channel between Round Lake and Lake Michigan often create their own problems, above right. Construction is usually accompanied by work vessels, at right.

bridge's closed position. There may also be a notice affixed to the bridge indicating any additional height in the area of "higher steel" in the navigable span. However, no given clearances include any fixtures hanging below the "steel," such as lights, signs, or items used during construction or maintenance.

If the bridge has a limited vertical clearance when open, this too will be posted on the bridge fender.

Hazards

Be alert to hazards around bridges. Watch for the effects of wind, current, and wakes and be prepared to react immediately to maneuvers by other boats or even the unexpected closing of a bridge.

Maintain a sharp lookout when approaching a bridge that is undergoing construction or maintenance, as this is often performed with the help of workboats, tugs, and barges that might make unpredictable maneuvers or restrict the width of the navigable span. It's good practice, when approaching such a situation, to slow down and signal one long blast to alert those in the area, just as you would when leaving a berth or when entering a blind bend. Don't rely on a broadcast on the VHF radio.

Passage with a sail hoisted is prohibited at some drawbridges, and those specific bridges are noted in the

Resources

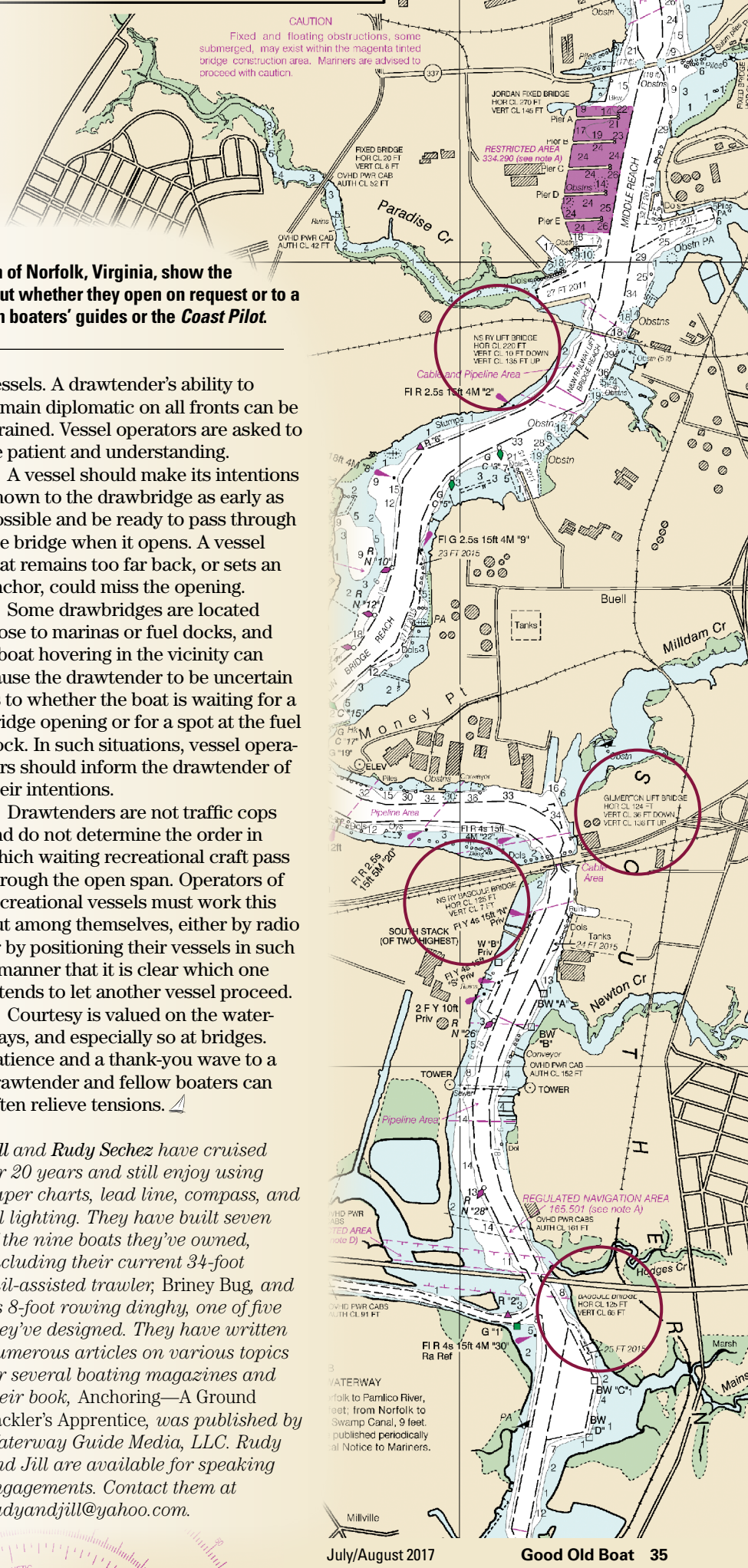
United States Coast Pilot covers the entire U.S. coast from Maine to Alaska in nine volumes, each of which can be downloaded in its entirety or by chapter.

Coast Pilot 4 - 48th Edition, 2016, covers the Atlantic coast from Cape Henry, Virginia, to Key West, Florida. Chapter 12 covers the AICW from Norfolk, Virginia, to Key West and includes details of bridges along the route: www.nauticalcharts.noaa.gov

Waterway Guide publishes editions covering regions from the Great Lakes via the Northeast to Texas. Navigation updates by region can be found under the Waterway Explorer tab: www.waterwayguide.com

The ICW Planning Guide lists bridges along with contact numbers and opening schedules: www.icwplanningguide.com/Pages/ACICW-Bridges.aspx

33 CFR 117, Drawbridge Operation Regulations, can be read or downloaded at the Cornell University Law School site: www.law.cornell.edu/cfr/text/33/part-117



NOAA charts, like this one of the AICW just south of Norfolk, Virginia, show the characteristics of bridges but no information about whether they open on request or to a schedule. That information must be obtained from boaters' guides or the *Coast Pilot*.

CHART COURTESY OF NOAA

Coast Pilot. Some drawtenders may choose to restrict passage by a boat under sail, even when it is not specifically disallowed.

Appropriate conduct

Be aware of other bridge protocols and courtesies in addition to the signals for requesting an opening.

While passing through a drawbridge, proceed at the slowest speed that allows you to maintain steerageway.

If a drawbridge displays lights to indicate when boats should (green) or should not (red) proceed through the draw, heed them. These lights are distinct from those that indicate whether the bridge is closed or fully opened, or indicate the bridge's lateral and vertical margins.

Although it's a requirement that drawtenders precede actions with appropriate signals, they do not always meet it. Be on the lookout in case a drawtender takes an action without preceding it with a signal.

Be especially alert in waters affected by current, whether river or tidal. Only on the Great Lakes, Western Rivers, and certain other rivers does a downbound vessel with a following current have the right of way over an upbound vessel. Elsewhere, if you are upbound, giving way to downbound vessels might be the more prudent or courteous action to take.

Advice from a drawtender

One of a drawtender's biggest challenges is coordinating passage of a tug and barge combination while keeping pleasure craft at bay. Except for pleasure craft *in extremis*, priority for passage through a bridge span is given to government, military, commercial, and emergency vessels.

Drawbridges within metropolitan and tourist areas have significant foot traffic, and it can take time to clear pedestrians from the span so it can be opened. Motorists may become impatient, as may folks on waiting vessels. A drawtender's ability to remain diplomatic on all fronts can be strained. Vessel operators are asked to be patient and understanding.

A vessel should make its intentions known to the drawbridge as early as possible and be ready to pass through the bridge when it opens. A vessel that remains too far back, or sets an anchor, could miss the opening.

Some drawbridges are located close to marinas or fuel docks, and a boat hovering in the vicinity can cause the drawtender to be uncertain as to whether the boat is waiting for a bridge opening or for a spot at the fuel dock. In such situations, vessel operators should inform the drawtender of their intentions.

Drawtenders are not traffic cops and do not determine the order in which waiting recreational craft pass through the open span. Operators of recreational vessels must work this out among themselves, either by radio or by positioning their vessels in such a manner that it is clear which one intends to let another vessel proceed.

Courtesy is valued on the waterways, and especially so at bridges. Patience and a thank-you wave to a drawtender and fellow boaters can often relieve tensions.

*Jill and **Rudy Sechez** have cruised for 20 years and still enjoy using paper charts, lead line, compass, and oil lighting. They have built seven of the nine boats they've owned, including their current 34-foot sail-assisted trawler,* Briney Bug, *and its 8-foot rowing dinghy, one of five they've designed. They have written numerous articles on various topics for several boating magazines and their book,* Anchoring—A Ground Tackler's Apprentice, *was published by Waterway Guide Media, LLC. Rudy and Jill are available for speaking engagements. Contact them at rudyandjill@yahoo.com.*

Chuck Paine gives voice

A good old yacht designer on good old boats

BY JEREMY MCGEARY

One of the best pieces of advice Chuck Paine ever took — from a friend who had been there — was to *not* go to MIT and study naval architecture. Not if he wanted to design sailboats, that is. And that was all Chuck had wanted to do since the age of 7, when his mother would sometimes leave him and his twin brother, Art, at "daycare" in Wharton's Shipyard, not far from their home in Jamestown, Rhode Island.

Naval architecture, his friend told him, is about bulk carriers and battleships. Everything a designer needed to know about the "yachty" parts of a boat — hull shape, weight, ballast, sail plan — could be found in a few "standard" books, including *Skene's Elements of Yacht Design*. So Chuck majored in mechanical engineering at Brown University and drew boats in his spare time. (He likes to tell people his real major was sailing, and his arch rival was his twin, who sailed for the University of Rhode Island.)

Engineering turned out to be a smart choice for a yacht designer making his debut in the 1970s, when Chuck's keel-to-mast-truck competence and eye for a sweet line earned him the patronage of Morris Yachts, Cabo Rico Yachts, and a host of clients worldwide for build plans and one-off designs. Even in the mid-20th century, a boat's scantlings — the dimensions of its structural members — were largely rule of thumb or rule of experience. "All those beautiful Herreshoff designs I ogled at Wharton's and the Round House Shipyard in Jamestown were built of wood, many of them by the Herreshoff yard, just up Narragansett Bay in Bristol," says Chuck. "But when I began my career as a yacht designer, the boats were being built of this new material called fiberglass. I couldn't just select the size of the frames and thickness of planking by referring to Herreshoff's rules for wooden yachts, which were printed in *Skene's*. That's where my engineering background became very useful."

On the subject of whether early fiberglass boats were overbuilt because nobody knew how strong the material was or how long it would last, "I can answer that," Chuck says. "In 1960, the naval architectural firm Gibbs & Cox published a design manual for Owens Corning, a manufacturer of fiberglass. They did extensive testing and developed a formula

Chuck Paine, at left, built his modified Herreshoff 12½ *Amelia*, the blue boat, above, in his own shop after the 2008 recession sank his business. She is here about to pass *Petunia*, Chuck's own H 12½.

PHOTOGRAPHY BY ART PAINE

A longtime admirer of the great Nat Herreshoff's designs, Chuck is sometimes asked to improve on one by applying knowledge and materials acquired over the past 100 years. *Bella Luna* is Chuck's "perfected" version of *Alerion,* which Nat designed for his own use.

for hull-laminate thickness based on hull length. For a 30-foot boat, the result was a thickness of about ⅜ inch for the topsides. Bottom laminates would be 10 percent thicker, and it was assumed that all interior structures were solidly glassed to the hull.

"Gibbs & Cox also examined the loss of laminate strength due to water absorption. I saw that, over a long, long time, the loss leveled out at about 10 percent, so at Paine Designs, we accounted for that when designing laminates. When you hear people say they have pulled an inch-thick plug from the bottom when installing a new through-hull in one of those older boats, it's very likely that the boat was built in a split mold and the two sides were taped together with an additional laminate equal to that of the hull. That would make sense to me."

While the Gibbs & Cox "rule" was a good starting point, for Chuck it was too blunt an instrument, especially when laminating materials and methods were advancing rapidly. From the firm's beginnings until the late 1980s and the 1990s, C.W. Paine Yacht Designs did all the laminate engineering work for most of its customers.

When, in 1986, the American Bureau of Shipping (ABS) introduced a scantling rule for fiberglass yachts, Chuck designed to that. "It's a proper engineering approach using panel strength, framing strength, and flexural limits, the same type of system you could use to design an airplane. Plus, it was recognized by insurance companies. Of course, we continued to engineer everything that the ABS guidance didn't cover." And as sailboats and their systems became more complex, Chuck filled his design office with engineers.

Beginning in 1997, the European Union introduced a whole sheaf of standards for recreational craft, including scantlings. "The philosophy was similar to that behind ABS," Chuck says. "I've sailed on a few of the boats that have come out of Europe and I don't think the hulls are going to break. I'll hold my peace on some other aspects."

Where all this is leading, of course, is to what Chuck Paine thinks about the value of investing in old fiberglass sailboats. He expresses his views very clearly in his new self-published book, *The Boats I've Loved*, in which he describes 20 boats built to his designs plus the boat love of his life, *Petunia*, his 80-year-old Herreshoff 12½. He also describes his lowly upbringing in Rhode Island and the turns of fortune that got him out on the water and into a career designing sailboats and, later, powerboats.

While Chuck's views, as expressed in his book and in a recent interview, might not align in all respects with those of a mainstream good old boater, his insights and experience are valuable. He is all for someone investing time and money in an older boat if they keep a clear eye on how that boat will be used. "I had a 38-foot boat for a long time, *Jessica*, she's in the book. I designed her for my father-in-law. She was a lovely boat to sail but, truth is, when she came into my hands, I didn't use her enough. I have had the most fun sailing my 12½ I've owned since 1972. I can go down to the dock, put up the sails, and off I go in just minutes. Other boats might be faster, but she'll stand up to almost anything. Plus, she is absolutely beautiful to look at. That, to me, is so important."

That beauty, characteristic of most of Nat Herreshoff's designs, had a lasting influence on Chuck's own design

PHOTO BY JEREMY MCGEARY

***Seabird* is an example of the Frances, one of Chuck's most popular designs ever. It has a worldwide following.**

aesthetic. He began his professional life as a yacht designer working for Dick Carter in the early 1970s, tweaking bumps and hollows in hulls to make fast raceboats look slow to the International Offshore Rule (IOR). When the oil embargo of 1973 deflated the Carter bubble, Chuck set off on his own path where, while heeding the desire for speed but rejecting the type-forming inherent in the IOR, he could design boats with the same purity of lines as Herreshoff's creations. He could draw spoon bows, canoe sterns, keel-hung rudders, and all manner of other features that the IOR discouraged and make Chuck's designs distinctly different from those of most of his contemporaries.

Chuck recommends seekers of good old boats look at his designs — why not? — because many were built by high-end companies like Morris Yachts that used high-quality materials and fittings. He's not the one selling the boats but, like any artist, he wants to see his creations pass into the hands of another generation that will appreciate them.

"Many of the boats you see lying around in boatyards have perfectly good hulls. If you avoid cored hulls, that is. When a hull is being laid up in a mold, voids can be introduced where the core, usually square blocks on a scrim, is puttied against the outer skin. These voids are invisible to the laminator, but can become a pathway for water to migrate if it penetrates the outer skin, say, where a through-hull is installed. We know what happens to balsa, and freeze-thaw cycles can cause foam cores to delaminate.

"When it comes to the rest of the boat, the value depends to some extent on the standards of the builder," Chuck says. "But all boats have components — stainless-steel standing rigging and chainplates, engines, and seacocks to name a few — that have finite lives and are expensive to replace."

Now that he's retired (well, in theory; he still keeps his designer's hand in, mostly with smaller boats and updates to some of his more popular older designs), Chuck draws on a lifetime of sailing and designing boats big and small when offering his views about good old boats.

"If you want an older boat you can fit out to take you anywhere, you have lots of options. They all require work and money, but less money than a new boat. If you simply like to sail a bigger boat from time to time, charter. You can do that anywhere in the world and, when the charter ends, you step off and leave the maintenance behind. Back home, get yourself a Cape Dory Typhoon, or a Doughdish, or something a little larger — there are thousands out there. Pretty her up with lots of varnished teak and go sailing whenever you want to."

Jeremy McGeary is Good Old Boat*'s senior editor. He has parlayed a couple of years as a charter yacht skipper and a decade or so designing sailboats into a career shifting commas and untangling dangling modifiers.*

Clutter-free fishing

The Cuban yo-yo takes up no space yet hauls in dinner

BY DREW FRYE

I'm a fishing sailor. Fishing passes the time during periods of light winds, and there is no finer dining than on a fish that stopped flopping an hour ago. Unfortunately, ours is the typical cruising boat, crammed full of the stuff of cruising and with a cockpit that is crowded with the running and standing rigging with which the typical fishing boat doesn't contend. Adding rods and other fishing gear that would allow us to fish as we sail isn't reasonable, and so we've adopted a much simpler, more compact method.

We fish with a yo-yo, actually several yo-yos. This hand-line option dispenses with rods altogether and is made practical by a simple plastic spool, the Cuban yo-yo. I discovered this device a while back on a business trip to Florida, where it's found in every bait-and-tackle shop. Although it looks like some sort of toy to the untrained eye, I've landed striped bass up to 40 inches and 25 pounds with a yo-yo with no more effort than I'd need with a trolling rod. The beauty of the system is that I can keep a half-dozen yo-yos fully rigged and ready to go in a 2-gallon bucket.

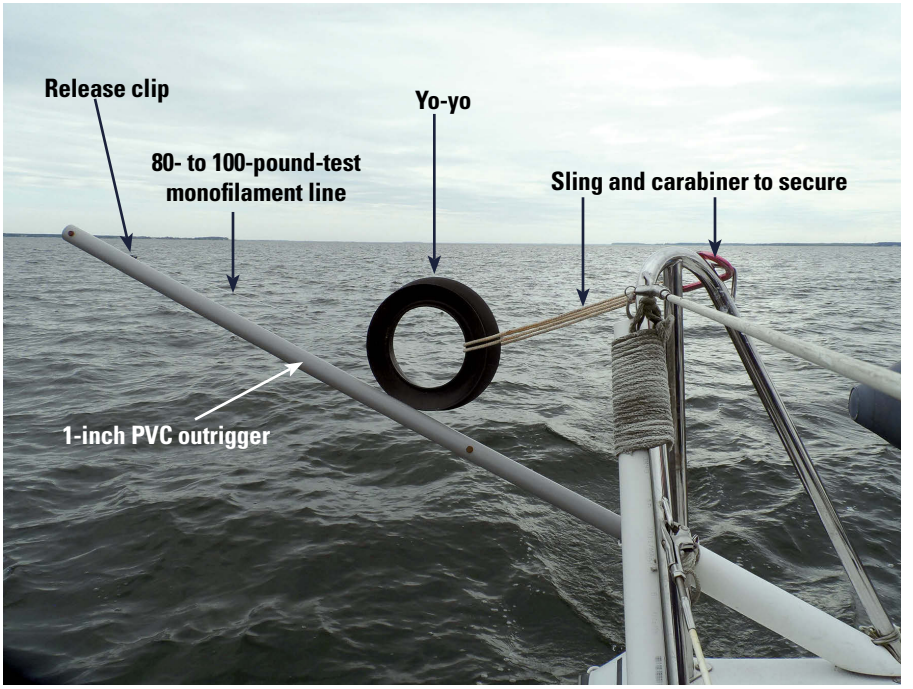
Drew caught this bluefish with an 8-inch yo-yo, main photo. He keeps several yo-yos rigged so he's ready to go after whatever fish are running that day, above.

Yo-yo fishing

While the Cuban yo-yo rig varies according to region and the fish being pursued, I can describe the setup that I like to use for going after bluefish and striped bass on the East Coast and Chesapeake Bay.

Size – Yo-yos come in 6-inch and 8-inch diameters. I use the 8-inch version as it works best with the heavy line and large lures I prefer for trolling.

Line – I use 150 to 250 feet of 80-pound-test monofilament and secure it to the spool with a spool knot or halyard knot. This line is strong enough for big bluefish and striped bass and has enough stretch to manage even the most vicious strike. Some folks suggest adding a bungee cord to absorb the impact, but since the line will stretch 15 to 25 feet on a serious strike, the additional two feet of stretch afforded by a bungee



Fishing at Anchor –DF

I also use the yo-yo to still fish. Still fishing is fishing reduced to its origins — me and the fish, mano-a-mano.

A close examination of the yo-yo reveals two vital details: the lip is lower on one side than the other and there is a ring all the way around the inside that provides a secure grip. For still fishing, I reduce the line to 25-to 40-pounds test and replace the trolling sinker and lure with any common bottom-

fishing rig. To cast, I let out about 3 feet of line, pinch the line against the yo-yo with one finger, whirl it overhead like a sling shot and, at the time I release it, aim the low side of the reel at the target, just like the spool of a spinning rod. The line spirals off in the same manner. Setting the hook and fighting the fish are more delicate, as I don't have the length of the pole working for me. I've done this a few times, just for the fun of it, but I also carry two light-tackle rods with 10-pound line for still fishing.

doesn't warrant the complexity it adds to the rig.

Anchoring – I attach the yo-yo to the boat with a loop tied from 4 feet of parachute cord and clipped to the stern rail with a carabiner.

Release – To detect a strike, I like to rig the line to a flat-line release clip (like an adjustable clothespin) for the lines along the stern rail, and to outrigger clips for the lines on the outriggers. To use a flat-line clip, I pull up a loop of line and place it in the clip. I find that the loop gives a clean release. If I simply place the line in the clip, it may just slide along without releasing. When a fish strikes, there is a snap from the clip and considerable clatter as the yo-yo bangs on the rail. When using the outrigger clips, I simply lead the line through the clip.

Spacing – Rigs should be at least 6 feet apart to prevent tangling when the fish starts to zig and zag. We typically rig one on each corner of the stern. If seriously engaged in fishing, we can tow as many as five, aided by the 16-foot beam of our catamaran and our two 5-foot outriggers.

Outriggers – I use outriggers to allow me to troll with a couple of additional lines. Outriggers can be made simply with a 6-foot length of 1-inch PVC conduit and a release clip at the tip. Besides allowing me to tow additional lines, outriggers also serve to keep those lures out of the wake of the boat, which seems to help.

Sinkers – Striped bass (also known as rockfish) run a little deep, bluefish more shallow, and some game fish very near the surface. Using lead torpedo weights, I vary the weight from 1 to 5 ounces, depending on what I'm after.

Leader – I add another 15 feet of the same line between the sinker and the lure as a leader.

Lure – Of course, the lure I use depends on the fish, but spoons, jigs with soft shads (for striped bass), hose eels (for bluefish), and squid (for mahi-mahi, tuna, and the like) are popular.

Speed – I will either vary the speed depending on what I'm after, or change what I'm going after based on how fast we're sailing. The 3- to 5-knot range is good for striped bass and 7 to 10 knots is better for fast game fish.

Where – Local knowledge rules. Drop-offs in depths from 20 to 40 feet, away from fish traps and crab pots, are a starting point.

Technique

To avoid tangles, I make long slow turns when towing more than one line.

Drew's outriggers are electrical conduit with outrigger clips at the tips, upper left, and held in PVC pipe lashed to the pulpits, lower left. A fine striper caught on a yo-yo, below.

When a fish strikes, I slow the boat to 2 to 3 knots to make retrieval easier, but I do not stop the boat. Because a yo-yo doesn't provide the perpetual tension of a bent rod, it's prone to allowing slack in the line that may allow the fish to throw the hook. The steady forward motion of the boat keeps the line taut and is a good substitute for rod bend. Forward motion also keeps the fish straight astern, reducing the chance that it will tangle the other lines. I always wait a few minutes for a fish to tire before I begin to haul it in; an energetic fish can throw the hook.

While a net or gaff might be useful for truly spirited fish, I simply haul fish on board using the yo-yo. I use my right hand to work the yo-yo in a steady figure-eight motion, like winding in a kite, taking the full weight of the fish while I use my left hand only to guide the line. I never haul the line hand-over-hand, but let the yo-yo do the work of holding the weight. That prevents tangles, and I avoid getting a tangled mess of line in the cockpit.

Although I nearly always wear gloves while sailing, I retrieve fish without them. Without gloves, I feel I have better control. Glove seams catch on the line and I have found there is little risk of cutting my hand, even with a large fish.

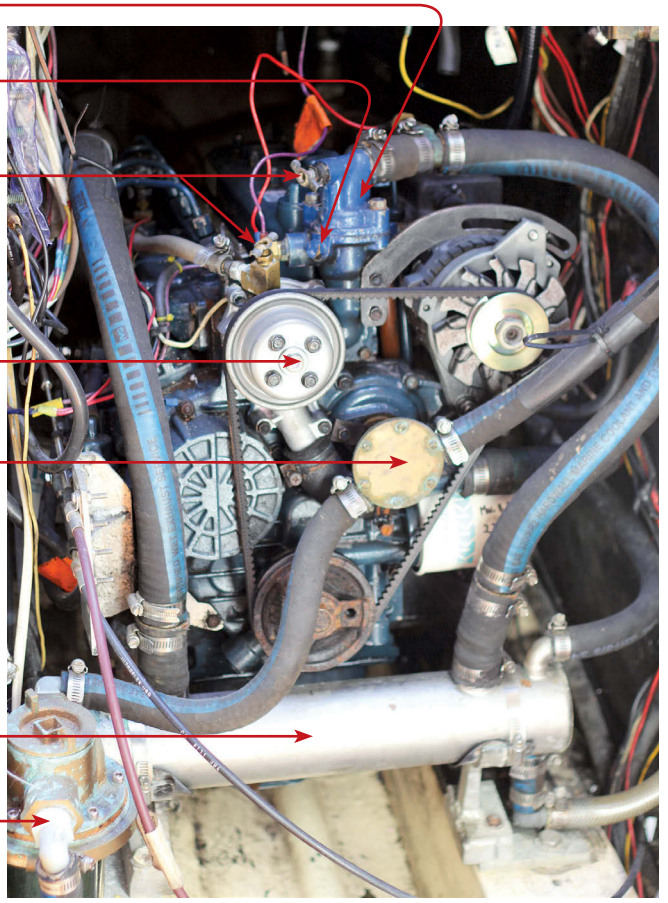
For reasons I don't fully understand, I catch far more fish under sail than under power, something that doesn't seem to affect most fishermen. Perhaps it's the higher pitch of my small outboard compared to the low rumble of a big diesel running at idle. But I consider that a good thing — one more reason to sail and enjoy the quiet, while waiting for the snap and clatter that announces my Cuban yo-yo has done its job.

Drew Frye's bio can be seen on page 23.

First things last

The riddle of the "overheating" engine

BY ROBIN URQUHART



It was a beautiful summer's day and we were heading out for a two-week cruise. Our first leg was 26 miles across the Strait of Georgia. An hour into the trip we noticed that the engine temperature was higher than normal. Halfway across the Strait we were running over 200°F and had to reduce power. I went below to check the most common causes: raw-water blockage, coolant leak, or lack of oil pressure.

Everything checked out fine and we saw no smoke coming from the engine, so we continued on our way. But something was amiss.

The 30-horsepower marinized Kubota engine on our 1979 Dufour 35 had always run a bit hot. The previous owner told us it was happiest at 190°F and 1,800 rpm, even though the manual specified an operating temperature of 170°F at 2,400 rpm. We didn't know any better, so we shrugged and bought the boat. A month later, the engine temperature was above 200°F.

After two years, thousands of dollars, and hundreds of man hours, I discovered the problem. The fix cost $20 and took 5 minutes. My search for the cause took me through every conceivable engine system. In many ways it was a boon, as I found a different problem everywhere I looked, but not the one responsible for the overly high engine temperature readings. Not until the very end.

What follows is my account of the search. I learned things that I found difficult to find in the Kubota service manuals, or by talking to mechanics, or through online searches. I tried to be systematic in both my approach and in the telling in the hope that others can use the information and perhaps avoid some of the pitfalls I encountered.

In my search for the cause of the overheating problem, I began with the raw-water system.

Raw-water system

The most common cause of engine overheating is inadequate raw-water flow. I wish I'd had the foresight to determine the rate at which water exited with the exhaust prior to encountering the problem. We did not have such a baseline so, to establish one, I measured the amount of water coming out of the exhaust outlet. I then checked each component of the system to ensure that there were no constrictions or other issues.

The raw-water loop has many components: through-hull inlet, strainer, pump and impeller, heat exchanger, and exhaust mixer. I checked each of these components in turn, starting at the through-hull and working my way to the exhaust mixer.

The through-hull had been recently replaced and there was no visible growth restricting the water flow. I detached the inlet hose from the strainer, opened the through-hull, and water poured in, which was a good sign. Next, I checked the strainer and found no obstructions there. Moving on, I examined the weep holes on the Jabsco water pump and then took the faceplate off to inspect the impeller. The face of the impeller looked fine and I removed the impeller from the pump housing and examined the fins for cracks, bending each one in turn. It looked great, but had I seen any deformation, cracking, or other visible anomaly, I'd have replaced the impeller. And if a fin had broken off, it would have been sucked into the rest of the system to be lodged someplace and I'd have had to track it down.

After the pump, I examined the heat exchanger, where I saw calcification had begun to narrow the passages in the tubes. I took it to a radiator shop and they charged me $50 to submerge it in an acid bath until it was clean. Last in the raw-water system, I removed

First suspect of many that can cause raw-water blockages, the strainer was clean.

the exhaust mixer, which is a common cause of flow restriction. I blew out some black dust, but saw no evidence of carbonization, rust, or any other potential source of blockages.

After putting the raw-water system back together, I noticed a slightly improved flow rate, but we still had the same elevated engine temperature. I thought that perhaps the coolant wasn't flowing efficiently, and that became the next target.

Coolant loop

The coolant loop is similarly comprised of various elements, namely the coolant reservoir, thermostat, heat exchanger, and the freshwater (coolant) pump.

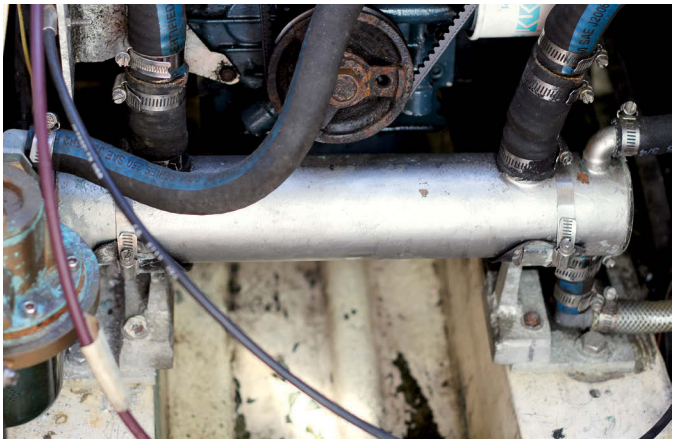
I decided it was also a good idea to check the coolant ratio and the coolant-temperature sending unit. Upon examining the coolant loop, I found a number of small issues.

The level of coolant in the coolant reservoir was normal. I donned protective clothing and gloves and goggles and, with the engine running and at operating temperature, I opened the petcocks at the pump and thermostat, draining a bit of hot coolant into a small cup. I quickly got a good idea of the coolant flow rate. As with the raw water, I wished I'd determined a baseline coolant flow rate beforehand.

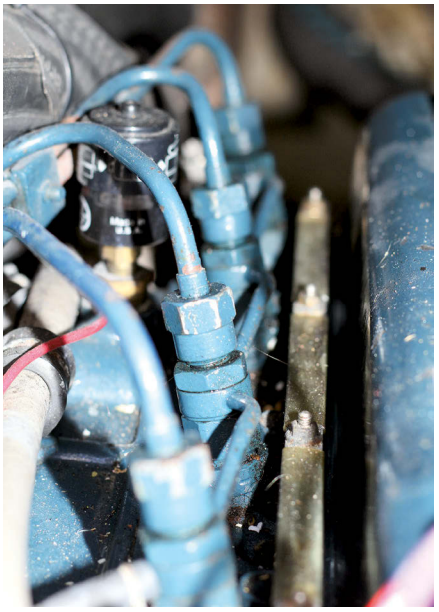
Due to the risk of freezing in the Pacific Northwest, our engine coolant was 50:50 ethylene glycol and water. Thinking that higher summertime water temperatures might be part of the problem, I changed the ratio to 30:70 ethylene glycol to water, which is the recommended minimum ethylene glycol content for engine coolant. Ethylene glycol has a lower specific heat (capacity to absorb heat) than water, so more water means more heat absorption. If the coolant ratio is unknown, it can be determined using a device that measures the specific gravity of the coolant, similar to a battery tester, and can be bought for less than $20 at most automotive stores.

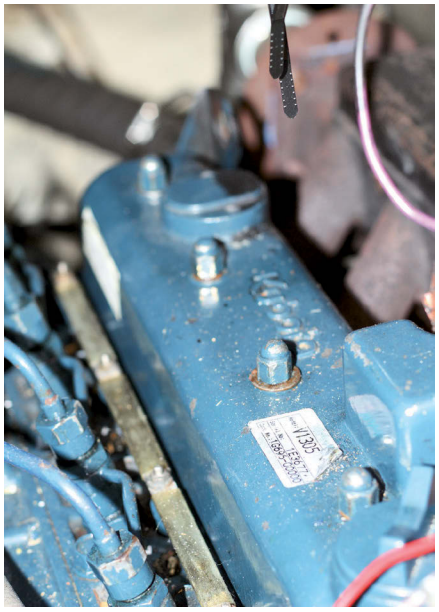
After draining the coolant so I could send the heat exchanger for cleaning, I removed the thermostat and verified that it was functioning correctly by placing it in a pot of water on the stove and noting its action at specific temperatures. I should have checked the sending unit at this time as well but, foolishly, I didn't. I also examined the coolant side of the heat exchanger for any signs of damage or blockage. Lastly, I checked the freshwater pump, which had visible discoloration around the weep hole, indicating a failed mechanical seal. I disassembled the pump and found the shaft to be scored from the failed seal, which meant I needed a replacement pump.

After putting the coolant system back together and adding the new coolant mixture, we found that the engine temperature was still above 200°F at cruising rpm. Assured that the raw-water and coolant systems were functioning properly, my next step was to make sure the engine wasn't overloaded.



Either side of the heat exchanger, above left, can become blocked. The coolant side was clean and an acid bath removed calcification in the raw-water side. The thermostat, upper right, opened and closed on cue, and Robin replaced the coolant pump, above right.





A misfiring engine can lead to overheating. Robin tested each injector in turn, above left, and all were working. Next in line, the valves, under the valve cover, center, needed some adjustment. The loosened oil fill cap did not blow out with the engine idling, above right.

Engine overload

Common causes of engine overload are a fouled propeller, a rough hull surface, auxiliary equipment (any equipment that loads the engine, either directly as engine-driven or indirectly via the alternator, including watermakers, refrigeration, and radar), adverse conditions, or an oversized propeller.

The boat had been out of the water recently and the hull sanded and painted. The propeller wasn't fouled. We have very little auxiliary equipment, but I turned it all off, just to make sure that it wasn't contributing to the problem. Even with the equipment off, the temperature was unaffected. The high temperature would occur even when on a flat calm sea, so adverse conditions weren't to blame.

We checked the propeller using an online propeller calculator and discovered it was twice the recommended size; no wonder we could reach hull speed well below cruising rpm. After much research, we purchased and installed a used propeller of the correct diameter and pitch. The difference was immediate and dropped the temperature down to under 200 degrees at cruising rpm, but not to the 170 degrees that it should have been according to the engine manual and thermostat.

If the engine was no longer overloaded, perhaps it wasn't running efficiently. A misfiring cylinder, worn piston rings, faulty injectors, or malfunctioning valves can cause all sorts of problems, overheating being one of them.

Valves, injectors, and cylinders

Cylinder misfiring is usually rhythmic and the result of a bad injector. The easiest way to check the injectors is to start the engine and then test each injector in turn by loosening the nut that connects the high-pressure fuel line to the top of the injector until fuel seeps out. If the engine vibration or pitch changes, then that injector was working. If there is no discernible

Checklist for an overheating engine –RU

INITIAL CHECKS

Raw-water flow
- Check raw-water flow rate.

Coolant leak
- Check coolant level/leaks.

Oil-pressure drop
- Check oil pressure and oil level.

Dummy check
- Check temperature of engine with an infrared thermometer!

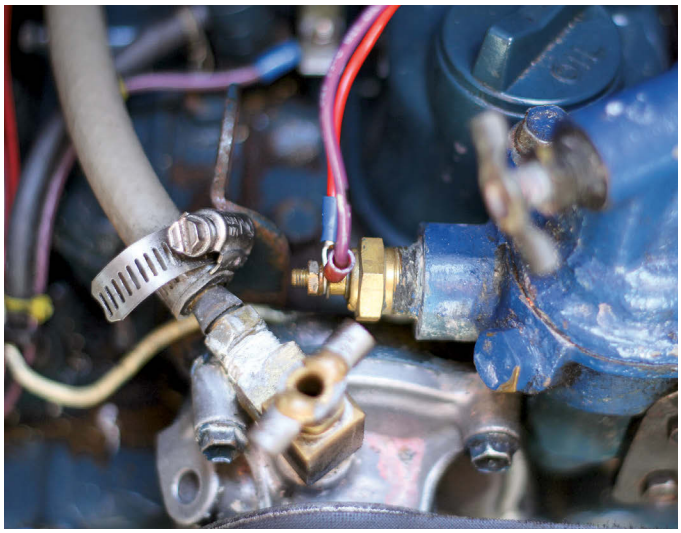
SYSTEMATIC CHECKS

Raw water system
- Check through-hull for obstructions.
- Check strainer for obstructions.
- Check water-pump weep holes.
- Check water-pump impeller.
- Check heat exchanger for obstructions or calcification.
- Check exhaust mixer.

Coolant loop
- Check level in coolant reservoir.
- Open coolant petcock while engine is running and . . .
- Check for air lock.
- Check flow rate.
- Check coolant ratio.
- Check thermostat.
- Check sender unit/temperature gauge.
- Check freshwater pump weep holes.

Engine overload
- Check for fouled propeller.
- Check for extremely rough/fouled hull surface.
- Check for adverse conditions.
- Check for auxiliary-equipment power draw.
- Check for oversized propeller.

Valves, injectors, cylinders
- Loosen and tighten the injector nut for each cylinder in turn and check for vibration change.
- Check crankcase breather tube.
- Loosen oil cap and check for blowby.
- Check valve spacing.



After examining all the usual suspects that might cause *MonArk*'s engine to overheat, Robin resorted to an infrared thermometer, at left, which reported that the engine was not, in fact, overheating. The temperature sending unit, at right, was perpetrating a fraud.

change in the sound of the engine, then there is a problem with that injector.

Another worthwhile check is the crankcase breather tube. Worn piston rings can cause excessive blow-by and increase the pressure in the crankcase. A cup or water bottle cut in half and placed under the breather tube will catch any oil that spurts out. A very small amount of oil is normal, but any more could indicate worn piston rings. If, while the engine is running at idle, the oil fill cap is loosened all the way but not removed, it should bounce around in its hole but not get blown off. If it won't stay in the hole, that's another potential indicator of piston-ring wear.

Our cylinders were all working well, so on to the valves. After removing the valve cover, I used a feeler gauge. Valves have a very small operational tolerance (thousandths of an inch) and I found that two of ours were out of tolerance by a large margin. I also examined the valve seats and they looked clean and undamaged. While adjusting the valves may have improved the engine's efficiency, it unfortunately did not solve the overheating issue.

Verify the temperature

The test we did last was the test we should have done first: verify that the engine was, in fact, overheating. Most of us rely on a temperature gauge and a sending unit to determine the engine's water (coolant) temperature. We were assured by professionals time and again that sending units and gauges almost never fail. The operative word proved to be *almost*.

The easiest way to check the engine's temperature independent of the sending unit and gauge is to use an infrared thermometer, also known as a temperature gun. It uses a laser beam to measure the amount of heat energy that a surface emits. The beam widens as it gets farther from the barrel of the temperature gun; different guns have different ranges. I hold the thermometer 6 inches from whatever I am measuring to isolate that particular element. The measurement is most accurate on dark surfaces that don't reflect the beam. Coloring shiny surfaces with a black marker or engine paint will improve readings.

I first measured the thermostat housing, and was surprised to see that it registered only 175°F on the infrared thermometer, while the temperature gauge for the engine read 195°F. Eager to verify the reading on the infrared thermometer, I measured the temperatures of a boiling pot of water, my partner's tongue, the refrigerator, and a book at ambient temperature. It checked out fine.

I next aimed the thermometer at the heat exchanger inlet and outlet. I anticipated a 10 to 20°F drop in temperature across the heat exchanger, where heat is removed by the raw water. There was a temperature drop — from 170°F to 155°F. Then I took the temperature of the sending unit. It, too, was 170°F, and I felt my heart hit the floor. *The engine was not overheating!* Sickened and, at the same time, elated, I set about determining whether it was the sending unit or the gauge at fault.

Sending units are devices called thermistors. When an electrical current is sent through a thermistor, its resistance to the current changes proportionally with the temperature. Sending units have known resistances at certain temperatures, so it is a matter of getting the sending unit to temperature and then measuring the resistance by touching the leads of a multimeter to the base and to the contact of the sender. The resistance of our sending unit did not match its specifications, verifying that it was indeed malfunctioning.

Problem solved

I replaced the temperature sending unit and, just to be sure, the temperature gauge. During our first foray out of the harbor at cruising rpm, the engine pegged at 175°F. But it seemed to take a long time to get up to temperature. Because it's not good for a diesel to run cool, it can't be good that it's a little slow getting warmed up. Hmmmm… maybe I should look into it.

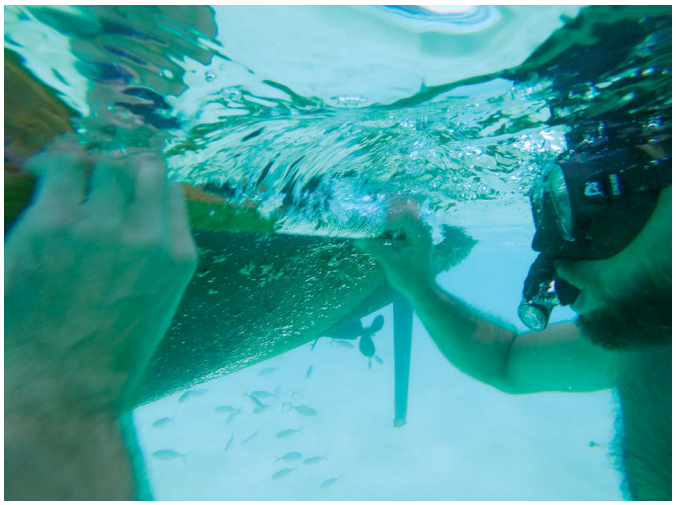
Robin Urquhart's master's degree in building engineering and his skills as a diesel mechanic have been severely tested since he and his partner (now wife!), Fiona McGlynn, headed south from Vancouver on MonArk, *their good old 1979 Dufour 35. In May of this year, they arrived in the Marquesas Islands after a "beautiful" passage from Mexico. Check out their blog at youngandsalty.com, where they reach out to younger sailors who share a passion for good old boats.*

Facing up to bottom cleaning

Keep ahead of it and never look back

BY FIONA MCGLYNN

We'd neglected the bottom of our boat for a month and the warm Mexican waters had transformed our sleek hull into a furry ecosystem teeming with life. My partner, Robin, had begun naming the fish living underneath *MonArk*, our Dufour 35. Presumably, they'd mistaken us for a benevolent barnacle-encrusted whale, or worse, a coral reef! It was time to clean the hull.



An audience of small fishes watches (probably expecting a meal) as Robin removes growth from *MonArk*'s bottom, at top. Fiona holds on with a toilet plunger while scrubbing, at left. Their tool of choice for heavy fouling is a wooden block, above.

We've learned over time that cleaning the bottom makes a real difference when it comes to boat speed, boathandling, and ensuring the lasting value of our floating home. A fouled bottom causes drag, which results in increased fuel consumption when under power and lower speeds under power or sail. This matters as much to cruisers as it does to racers, particularly when the speed reduction is factored over hundreds or thousands of miles.

Believe it or not, heavy fouling can actually cause a boat to sit lower in the water. After we clean the bottom, we notice an improvement in our boat's motion through the water and she is more responsive to the helm.

Another reason to keep the bottom clean is that growth left unchecked for long periods can damage the hull. The "glue" produced by fouling organisms clinging to the hull can damage both wood and fiberglass.

While scrubbing the bottom remains my least-favorite boat chore, I've discovered it's possible to drastically reduce the effort it takes and the time we spend in the water by using the right tools and techniques. The first time we cleaned the bottom it took us close to 4 man hours; we've since got it down to less than 1 man hour. Today, it's quite easy for us to maintain a clean bottom, and *MonArk* is no longer mistaken for a fish haven.

Families of foulers

Learning about the nature of the organisms that foul *MonArk*'s hull and the mechanisms of different antifouling paints has helped us refine our technique.

Marine biologists estimate that there are more than 4,000 known fouling species! They can be broken down into three principal groups: animals, weeds, and slime.

Animals include barnacles, mollusks, hydroids, and tube worms. They release millions of microscopic larvae into the water, all of which move around in currents, always looking to attach themselves to stationary objects.

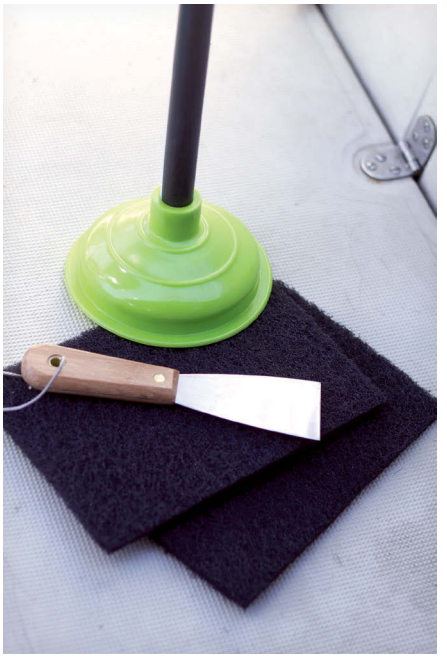
Weeds have varying characteristics. Many common seaweeds will simply fall off the boat as soon as it moves, while others, like brown weed, are more resilient and can withstand high boat speeds.

Slime is comprised of billions of single-cell algae that produce a syrupy medium in which to settle. Once established, they provide an ideal settling ground for more algae. Coatings can grow quite quickly and remain on the hull as it moves through the water.

As we sail from place to place, we've noticed the stuff we find growing on *MonArk*'s hull varies considerably. Differences in water quality and temperature result in different species of fouling. Factors like nearby population centers, inflows from rivers and streams, the speed of currents, and the amount of sunlight affect the types and degrees of fouling in a region.

Antifouling paints

Antifouling paints are made from a combination of four primary ingredients: biocide (repels living organisms), resin (holds the product together), solvent (dictates application characteristics and cleanup methods), and pigment (determines color and viscosity). Whether an antifouling is soft (intended to ablate, erode, or slough off) or hard is determined by the type, combination, and quantity of resin used in the mix. When cleaning a boat's underwater surfaces, it's important to match the method to the type of antifouling on the hull.



Key tools are toilet plunger, a putty knife for unprotected metal, and scrub pads.

Ablative antifouling paint sloughs away over time, dissolving as water passes over the boat, taking any growth with it and revealing a fresh layer of biocide on the clean surface. Scrubbing ablative paint releases high concentrations of toxic material and drastically shortens the lifespan of the paint. It's best to gently sweep away fouling with a soft cloth and avoid creating colored clouds of bottom paint. If the growth over an ablative paint does not release easily, it's likely adhering directly to the bare hull, which means it's time to haul out and repaint.

Hard paints dry to a hard, burnishable, and porous surface. They're chemically designed to leach biocide on contact with water to prevent fouling growth. Hard paint may be scrubbed more aggressively than ablative paint, but it's still important to use the least-abrasive material that is effective at removing the growth.

Fouling on the propeller can impair its efficiency and the boat's motoring speed.

Bear in mind that scrubbing antifouling releases toxic material and, for that reason, many locales do not allow in-the-water bottom cleaning.

Tools, gear, and tricks

Over time, we've learned that varying degrees of fouling and different areas of the boat require us to have a variety of tools at our disposal when cleaning *MonArk*'s bottom.

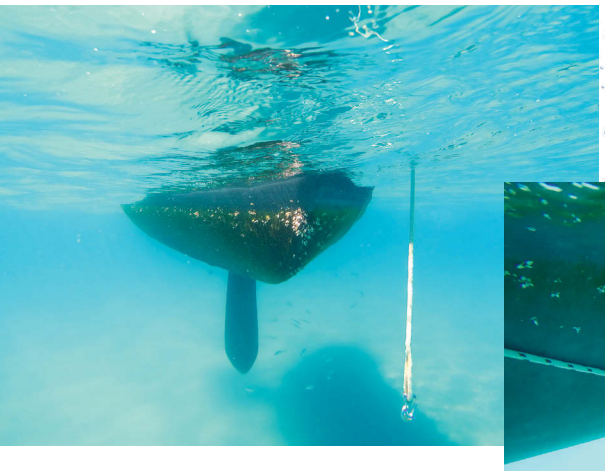
Snorkeling gear – In addition to a snorkel, mask, and fins, I sometimes wear a wetsuit and weight belt. Nothing is more exhausting than trying to keep myself submerged when scrubbing a few feet underwater, so attaining neutral buoyancy is helpful. Before going in, I always prime the inside of my mask with a dime-sized dollop of baby shampoo to prevent fogging.

Work gloves – I wear leather work gloves to keep me from bashing my knuckles or cutting myself on barnacles as I clean.

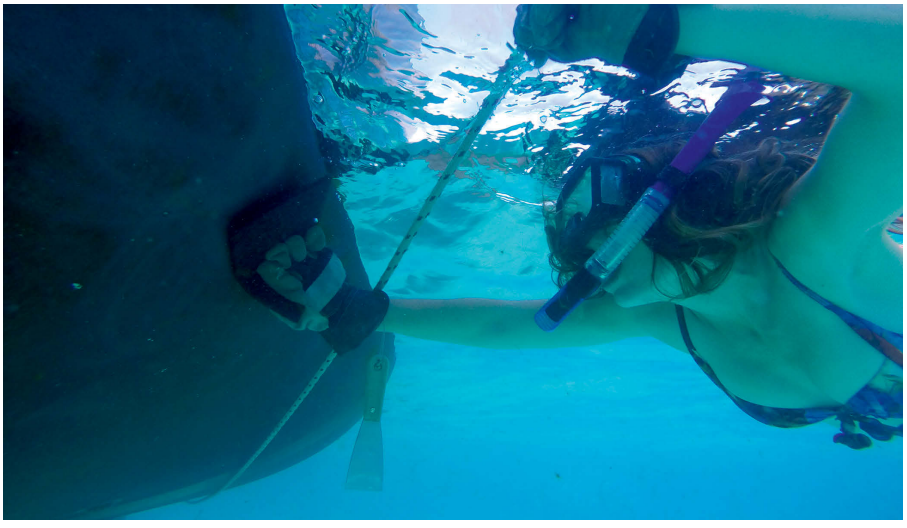
Plunger – Underwater, I'm weightless, so I use a toilet plunger to hold myself next to the hull while I scrub.

Hardwood scraper – We have a 2-foot length of 1 x 2-inch hardwood that we run against the hull to scrape and knock away the majority of growth quickly before moving on to . . .

Sponge, scrubbing pad, and brush – On light growth, we start with a sponge. If that's ineffective, we'll use a scrubbing pad or even a firm-bristled scrubbing brush. Whichever tool it is, I use one with the largest surface area practicable so I can cover more of the bottom in fewer strokes. We often use 3M Doodlebug Scrubbing Pads, which we can find at most chandleries.



A line run from the bow, above, close to the intersection of the hull and keel, and to the opposite stern quarter, is a very helpful handhold.



Putty knife – I use a regular metal putty knife to scrape tough barnacles and hard growth from unprotected metal such as the prop, the shaft, and the screen on the cooling-water intake for the engine.

Long skinny screwdriver – Small clams and other hard growth often make their homes in the narrow through-hull passages. When I see a through-hull is obstructed, I carefully ream out the offending growth with a screwdriver.

Wire brush – Sacrificial anodes (zincs) are critical to protecting underwater metal from stray currents but are effective only when they're clean. Growth will form on an anode that is not very active. The surface of an active anode accumulates a layer of oxide that looks like a white deposit. Anything on the surface of an anode, whether marine growth or oxide, will make it less effective and should be cleaned off. A wire brush is an ideal tool for this.

Line – To save energy and make it easier to apply pressure as we clean, Robin and I will sometimes use a line to grab onto and hold ourselves in place and against the boat. We run an old line, approximately a boat length and a half long, from the bow, down one side of the boat so it lies close to where the keel meets the hull, and make it fast at the stern on the other side of the boat.

Scuba or hookah gear – After I earned my scuba certification, cleaning the boat became physically easier. Not having to hold my breath or swim up for air conserves a great deal of energy. When I use the dive gear to clean the bottom, Robin will always spot me from the boat or join me in the water as a buddy diver for safety's sake.

A cleaning routine

Because working in the water is tiring, we have developed a process for cleaning the bottom that is dependable and efficent.

Assess the growth – Before donning my snorkel and fins, I want to know what I'm dealing with. Is it merely a green film, or are there barnacles and weeds? In warmer waters, we often swim and snorkel around the boat at anchor, so I usually have a good idea of when it's time to clean and what I'm facing.

Check the conditions – Before I commit to cleaning the bottom, I take note of currents, swell, traffic, and weather. I try to avoid hull cleaning in areas with a lot of traffic, as *MonArk*'s hull, suddenly rocking in a large ill-timed wake from a passing boat, can deliver a nasty knock to the head. Murky low-visibility water is another reason to postpone a cleaning. Visibility is restricted enough when I'm wearing a mask, but when the water is dark or dirty, cleaning the bottom is even more difficult. Even in clear water, the difference in underwater visibility between the sunny side of the boat and the shady side is significant. While I avoid working in strong currents, I find I can sometimes use a weak current to help me work my way down the length of the boat as I clean.

Lay out the tools – I never get in the water without first laying out — on the dock, swim platform, or dinghy — all the bottom-cleaning tools I might need where I can reach them from in the water. Where it makes sense, I tie string wristlets onto tools so I can loop them around my hands and not make unintended gifts to Poseidon.

Clean the waterline – Growth is often concentrated at the waterline, where it receives the most sunlight. Tackling this area from the dinghy can save me a good deal of energy, especially

when the water is cold. I simply pull myself in the dinghy around the boat, cleaning the waterline as I go.

Critical areas first – Often, I find I can spend only an hour in the water before I get too cold or too tired to continue, which makes it important to prioritize. Growth on the propeller and rudder has a greater impact on a boat's speed and responsiveness than fouling on other submerged areas. I always start with our running gear.

From soft to abrasive – As I work my way around the rest of the boat, I start by running the piece of 1 x 2 hardwood lengthwise down the sides of the hull to quickly remove large areas of growth. I then move on to sweeping with the sponge and, if necessary, more aggressive tools like the pads, brush, and putty knife. By always using the least-aggressive means needed to remove growth, we're preserving our paint and limiting the amount of biocide released into the sea.

Take a break – If growth is heavy, we'll opt to break up the cleaning into multiple sessions. Between the cold, exertion, and swallowing a bit of seawater, it's very easy to become exhausted or disoriented. It's better to start with 15- to 30-minute sessions and not overdo it.

Don't wait too long – The best way to keep bottom growth at bay is to clean frequently. Ideally, the growth would be no more than we can easily wipe away with a sponge. Frequency will differ by region (the warmer the climate, the faster stuff grows), paint condition and type (ablatives stay cleaner longer), and how the boat is used (boats that don't move accumulate more growth).

Over time, we've been able to dramatically reduce the time and effort we spend cleaning the hull, and that leaves us with more opportunities to use our snorkeling gear to explore more scenic aquatic habitats!

Fiona McGlynn, a Good Old Boat *contributing editor, is cruising with her (now!) husband, Robin Urquhart, on their 35-foot Dufour,* MonArk. *Follow them as they explore the Pacific Ocean and check out their "cruising through the lens the of thirty-somethings" blog, youngandsalty.com.*

A former pro's favorite tool

– Michael Robertson

I spent a couple of years in my 20s working full-time cleaning boat bottoms in California's Ventura Harbor and Channel Islands Harbor. I cleaned sailboat hulls and power-boat hulls, some with soft paint, some with hard. It was the most physically exhausting work I've ever done, but two things made it possible for me to clean three to five boats a day: air from a hookah hose and a glazier's two-fingered suction cup.

Today, I clean the bottom of my family's Fuji 40, *Del Viento*, without the luxury of a hookah hose to breathe from. Surfacing regularly doesn't keep me from doing a good job, but it makes the work more difficult and slows me down. But I won't try to clean the bottom without my glazier's two-fingered suction cup. It attaches readily, providing a perfect handhold, then releases with just the flip of a thumb. The cups are widely available online; I've found the best prices at ABC Window Cleaning Supply (window-cleaning-supply.com/suction-cup-grabber-two-finger-grabber).

From the bounding


Lucidity bathed in blue


Reese and a really BIG starfish

Reentry after cruising has its ups and downs

BY BUTCH EVANS

Not too long ago, we returned from our longest sailing adventure to date, almost a year of cruising from Tennessee to the Bahamas aboard *Lucidity*, our 38-foot sailboat. A year with more *pura vida* packed into it than several years of "normal" life that preceded it. We met more people, had more adventures, and learned more in that year than in the previous decade. We lived the dream, we made the leap, we took the plunge. It was awesome.

We have so many memories.

I miss the sailing. I miss standing watch on a beautiful day as the boat creams along on an infinite sea under an infinite sky. I miss the complete and total awareness of the world that I experience only while immersed in a natural setting.

I miss the color. Sailing in the Bahamas on a sunny day is to experience a vibrancy of color as if under the influence of psychotropic mushrooms. The blues are laser-like, the whites are born of supernovas, and every sunrise turns the ocean into molten gold. Below the water, crystalline shafts of sunlight paint the reefs with neon and turn snorkeling into a psychedelic experience.

I miss the people. One of our major pleasures when cruising is the tendency to encounter eccentric people who live vivid lives and who spin endlessly colorful stories. Listening to their tales of high adventure has ruined me forever for regular conversation. How can I now pretend to be interested in someone's thoughts about a TV show or opinions about a sporting event? I had little patience for that sort of thing before we left; now those exchanges immediately send me off daydreaming.

I miss my connection with the natural rhythms of nature. To live in the city is to subjugate myself to the clock. While cruising, I was open to the wheel in the sky. Ancient cycles moved within me like the ocean's currents: slow, immutable, satisfying.

Sailing is, in many ways, like farming — my first occupation. I spent all of each day supporting the infrastructure of that lifestyle, moving within its gentle but inviolate limits. Just as when cruising, time is different on a farm; farmers move to the seasons, not to hours on a clock.

I miss the time with my family. For almost a year, we lived and worked as a team; every decision was communal and every experience shared. My wife and I spent all day with our little boy, and we found the magic in our relationship that allowed us to live together on a 38-foot boat, all day, every day. It wasn't always easy, but it was all rewarding. Now back in "reality," we pass


Reese finds a Pirate ship . . . needs a bit of work

main to Main Street

by each other on the way to work and school. We spend less time together than we spend with our co-workers.

Several aspects of reentry were unexpected. Of those, some were positive, some negative. When I walked into our garage for the first time, I was surprised to see that it alone has more living space than the boat. That first night back home in bed, I delighted in falling asleep free of worrying that the house might drag anchor.

We were aboard long enough to (mostly) forget what land life is like. I'd forgotten the awful grayness of the city and the impossible moral choices it forces upon its inhabitants. The press of humanity in a large city — with all the noise, commotion, and meaningless fury — boils constantly like an overlooked kettle. So much energy dissipating with so little effect.

Watching the "all terror, all the time" news programming, I remember why I didn't watch it before. Just about every channel seems to be devoid of informational content. I am quite sure the television sucks intelligence out of me as I watch. Even the entertainment value is diminished by show after show in which human beings are made to suffer in one creative way after another. The contrast between an evening in front of the TV and an evening at anchor in the Bahamas is, to paraphrase Mark Twain, "the difference between the lightning and the lightning bug."

Reentry into the real world was more of an adjustment than I anticipated. The harried activity leading up to our departure was bookended upon our return by the thud of "normal" life asserting itself.

Civilization. Who needs it?

Apparently, I do.

Walking through the doors of our public library, I was greeted by the wonderful aroma of towering stacks of old books. I felt the power of all those stories and all that knowledge emanating like warm sunlight. I'm a two- to three-book-a-week person and, in my view, libraries are humanity's single most outstanding accomplishment, and perhaps the only worthwhile way the government spends our tax money. I didn't realize how much I'd missed them.

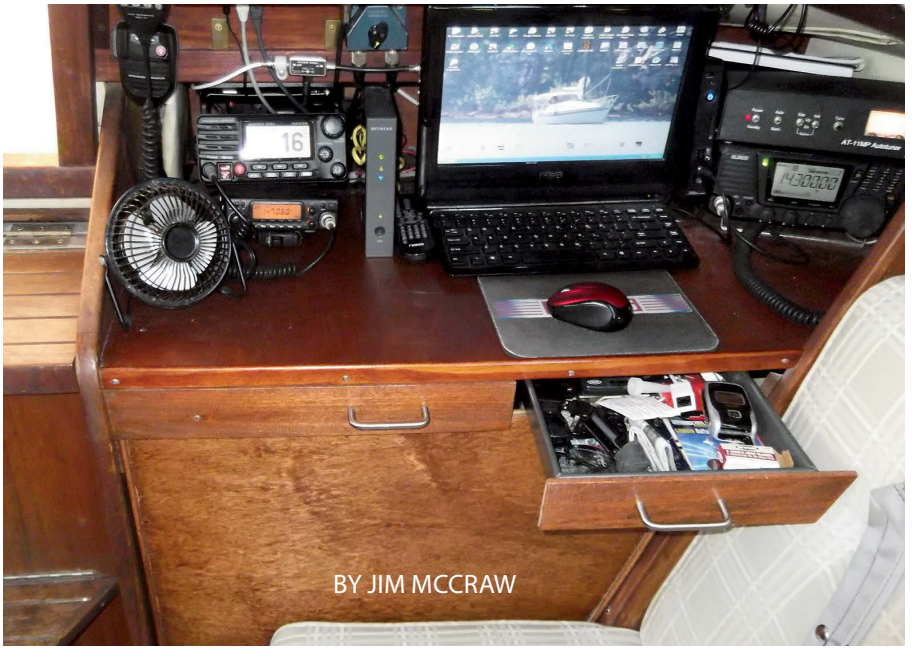
Reentry has given me the opportunity to pursue interests other than sailing, and to enjoy perks such as bike paths, unlimited hot water, friends, and extended family. These rewards have helped balance the difficulty of transition. Like in all of life, the yin and the yang.

Modern society clings to me like spider webs during a morning walk in the woods, and the more I pull the more it stretches to retain its hold. But I remain a sailor, and the immutable pull of the sea moves within me like the tides.

I'll be back.

Butch Evans was raised in Kansas, fell in love with the sea the first time he saw it, and promptly spent all his time and energy working to get out of sight of land. Sailing an Island Packet 38 for almost 10 years (including from Knoxville, Tennessee, to the Bahamas) satisfied much, but not all, of that desire. Currently landlocked while enjoying living near the Smoky Mountains, Butch is hard at work scheming ways to get back out there.

From quarter berth to nav station



BY JIM MCCRAW

A home for electronics hides clutter from view

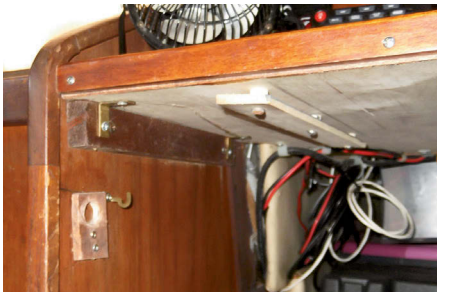
After purchasing my Spirit 28 sailboat, *Wastin' Time* (see the Review Boat, page 8), in 2009, I began looking for a suitable space inside where I could build a nav station. I'm an amateur radio operator (KB0SI) and wanted a place for my HF SSB radio and VHF ham radios. I also was thinking about installing an onboard computer system and a Wi-Fi setup with a wireless router to give me access to the internet. Searching on the internet gave me some ideas for how and where to install the gear, and I decided that the space on the port side above the quarter berth would be the best location.

I fashioned the tabletop and the bulkhead behind it out of ½-inch birch plywood from a local big-box store, using many cardboard templates to help me cut the pieces to conform to the hull shape. On the bulkhead, I mounted a fuse block with spade connectors for 12-volt power, two through-bulkhead coax connectors for HF and VHF antennas, and robust red/black binding posts for 12-volt power. I also added a fiddle at the front of the table to prevent items from rolling off.

Upon completing the main part of the nav table, I decided to install shallow drawers underneath. I first looked at office-desk center drawers. They were too expensive and didn't look the part, but my wife found some rectangular cake pans at Walmart that looked promising. I made glides for them from ¼ x 2-inch strips of wood and small plastic spacers. I fitted wooden strips to the drawer fronts, stained and varnished everything to closely match *Wastin' Time*'s interior colors, and fitted metal drawer pulls.

With the table installed, I noticed that I could still see the sailbags, tools, and other items stored in the quarter berth. It was a bit of a mess, so I hid it behind a curtain hung on a tension rod. I then hit upon the idea of making a folding chart table to conceal the storage area and make the nav station look more finished.

Again, I used ½-inch birch plywood with a fiddle and stained and varnished it to match the nav station top. For the pivot for the chart table, I used a ½-inch aluminum tube held in a large metal wire clamp on one side and a ½-inch hole in the wood on the other. A tension spring keeps the tube pulled tight to one side. I also made a pop-up adjustable folding leg on the back side of the table. This allows the chart table to fold out horizontally, and I can remove it to allow access to the items stored in the former quarter berth.



Jim's nav station/radio shack, at left, occupies what was once the head of the quarter berth. He installed a bulkhead for radios and electronics and a fold-up desk, at top. His baking-pan drawers, center above, are hung on wooden glides, above.

Jim McCraw and his wife, Linda, became interested in sailing while watching sailboat racing from their duplex home in Marsh Harbor, Abaco, Bahamas. They purchased their first sailboat, a 1983 Gloucester 23, in 2007. Two years later, looking for standing headroom and a diesel engine, they purchased their 1981 Spirit 28, Wastin' Time, *and now sail and race her on Lake Stockton, Missouri. Jim enjoys making his own upgrades.*

A tiller pilot gets a booster seat

BY CLIFF MOORE

Now it's on the level, it's a straight steerer

Pelorus, my AMF Paceship 26, sustained a bit of damage in her brush with Hurricane Joaquin in 2015. In the spring of 2016, I rebuilt the rudder, repaired the transom and, in the process, raised the tiller a little so it wouldn't rub on the top of the transom when it's hard over. When I took *Pelorus* sailing, I found that, except when the tiller was hard to port, the Autohelm 2000 push/pull autopilot was no longer anywhere close to level. This diminished the ability of the autopilot — an essential piece of gear for a singlehanded sailor — to work as designed and steer a straight line. Worse, on occasions when I found it necessary to quickly disengage the autopilot and steer by hand, the ball on the tiller pin would lock up in the socket in the autopilot arm, making it difficult to physically disconnect them.

I had long ago installed a bracket on the underside of the tiller to keep the autopilot level, but it was no longer low enough. It was clear that, to level the autopilot, I needed to raise the other end that was mounted on the starboard cockpit seat.

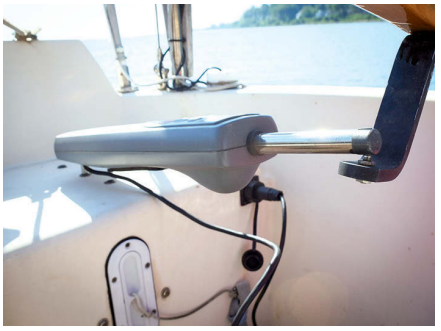
The autopilot manufacturer sells a riser that would elevate the autopilot enough to bring it level with the tiller bracket, but it's pricey for what it is and not really useful for my boat — and I might have needed three of them. I had, over time, installed in the cockpit seat three of the sockets provided by the maker to receive the autopilot's mounting pin. The sockets were in a line. The center one was the most useful, but I used the outboard and inboard sockets to compensate for extreme weather helm on either tack. Also, I'd epoxied them into the deck and they were in for life. I had to come up with my own solution.

Happily, I had a nice piece of 4/4 teak. I cut three pieces, glued them together with epoxy, and pinned them with two 2-inch stainless-steel screws. (Because the autopilot has a built-in compass, I tested the screws to make sure they were non-magnetic — you can never be sure with stainless steel.)

I drilled a shallow ¾-inch-diameter recess in the bottom of the block to go over the heads of the sockets, which are about ¼ inch proud, and allow my riser to sit flush on the seat. In the center of the recess, I drilled a ⅜-inch-diameter hole all the way through the block. Next, I cut a length of ⅜-inch bronze rod that happened to be threaded at one end and ran it, thread side up, halfway up the hole in the block, where I bedded it in epoxy — the threads enhance the grip. The rod extends from the bottom of the block and fully engages the socket. I attached a bronze plate, with a ⅜-inch hole in the center, to the top of the block to offset any wear from the autopilot pivot pin.

My new riser supports the Autohelm without wobbling, and I can easily shift it from one hole to another.

Cliff Moore's first boat was a Kool Cigarettes foam dinghy with no rudder or sail. Many years and many boats later, he's sailing Pelorus*, a 26-foot AMF Paceship 26 he acquired and rebuilt after Hurricane Bob trashed it in 1991. He is the editor of a community newspaper.*



Cliff's booster block restored the autopilot arm to level, main picture, which it had not been before, second from top. He made the block from teak, middle above, and epoxied a pin into it to engage the sockets in the cockpit seat. The hole in the top accepts the autopilot pivot pin, above.

Softer cabin lighting

A mirror warms the ambience of a harsh LED

BY CLIFF MOORE

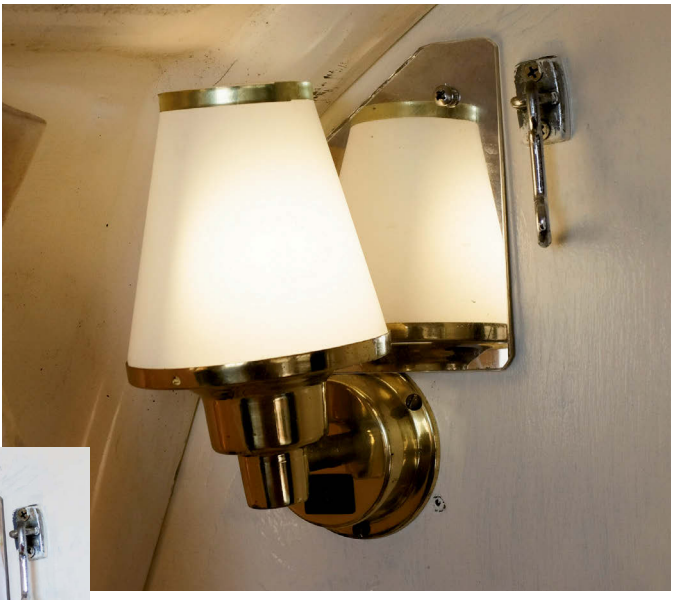
After replacing with LEDs all of the old-style incandescent bulbs in the cabin lights aboard *Pelorus*, my AMF Paceship 26, I started to wonder if there was a way to improve the quality of the light they shed. The new LEDs were putting out plenty of light, and the color was warm enough, but the overall quality of the light was unpleasant.

Artificial light (any light that doesn't come from the sun) can be characterized by three qualities: intensity, color, and relative contrast. Intensity is the amount of light that falls on a surface. Color is often perceived and referred to as warm or cold, its temperature measured in degrees Kelvin. LEDs have come a long way in recent years and are now available in color temperatures that are indistinguishable from traditional warm incandescent light.

Neither color nor intensity were the problem with my new LEDs. Rather, it is the third quality, relative contrast, that made the light they shed appear harsh.

High-contrast light is the result of light emitted from a point source, a single identifiable localized source. A spotlight is a good example. Or, dangle a 60-watt bulb from your bedroom ceiling and you have unpleasant point-source lighting. Point-source light is harsh and creates deep shadows.

Unfortunately, in the small cabin of a boat, it's difficult to avoid point-source lighting and therefore difficult to prevent the resulting harshness. Because LED arrays are inherently more directional than incandescent lights, switching to LED lights only exacerbates the condition, as I learned.



A mirror behind a cabin light is attractive in daylight, at left, and softens the light when it's lit, above.

Looking through photos of colonial-era homes, I noticed in some of the photos mirrored surfaces behind wall-mounted candle sconces. These mirrors no doubt increased the intensity of the relatively dim candlelight, but I realized that, by reflecting the light from the rear of the candle flame and bouncing it both forward and a bit to the sides, the mirror was serving also to broaden and diffuse the point source, in effect softening the light.

To test my theory, I cut a piece of mirrored Mylar plastic to fit the space behind the lamp and installed it flush against the bulkhead. The difference was dramatic. Now, with this single lamp, I can read at the cabin table in lower-contrast light that is soft and without glare.

Cliff Moore's bio can be found on page 53.

***Springtide*, pictured here in Casco Bay, Maine, is a 1980 Pearson 36 Pilothouse owned by John and Regina Ballinger. Only 30 or so pilothouse versions were built, based on the Pearson 365 hull. Interestingly, John races with the designer's son, Bill Shaw Jr. Send michael_r@goodoldboat.com your favorite boating photo and it might wind up here. If it does, we'll send you a *Good Old Boat* ball cap or T-shirt.**

continued from page 7

Missing Columbia?

In his "A Brief History of Columbia Yachts," (May 2017), Dan Spurr listed the Columbias designed by Alan Payne but omitted the Columbia 9.6. I'll add that Dan's book, *Heart of Glass*, was the go-to history source when I started the Dolphin 24 website (dolphin24.org).

I read *Good Old Boat* in the evenings just as I am going off to sleep. It takes me a few days to get through, but it's earned a place on my bedside nightstand among those books and magazines I am fully committed to read.

–Ron Breault, Old Lyme, Conn.

Pictured aboard Ron Breault's Columbia 9.6, *Marbles*, circa the late 1970s, are his young son, Mike, and daughter, Nicole. Both are now adults and, well … very, very good sailors. Both are International 420 dinghy National Champions, former Collegiate All Americans, and former Yale University Co-ed Fleet captains. Nicole has won the U.S. Women's Match Racing Championships for the past two years. Ron says that, when he races his own boat and they join him aboard, "Nicole drives, Mike is in the middle as tactician and sheet trimmer, and yours truly is ballast, sandwich maker, and foredeck guy."

Dan Spurr responds

I didn't mention the 9.6 or the 11.8 because, at least according to some sources, such as the *BUC Research Used Boat Price Guide*, those models did not convey to Aura. Also, Sailboatdata.com, a usually reliable databank of sailboat models, lists the last 9.6 built as 1979, before Columbia sold some of its molds to Aura. In any case, those were interesting and fairly well-built boats. And thanks for the nice words about *Heart of Glass*, my imperfect but honest attempt to document the history of fiberglass boatbuilding.

–Dan Spurr, *Good Old Boat* research editor

Jobs for a skinny camera

I wanted to cut a hole through the headliner in the aft cabin in hopes of finding useable storage space under the cockpit coaming. I was hesitant to make the cut through the liner without knowing if there was enough space behind the liner to make the effort worthwhile. Feeling around and attempting to peek up through the winch headliner access was getting me nowhere closer to cutting fiberglass.

My boat neighbor Captain Ron came up with the idea of sticking a camera phone up through the 6-inch access panel and taking some pictures. Sure enough, I got enough good shots to verify what I needed to know before cutting into the liner.

Since then, I've been able to sneak the phone under the floor pan on several occasions to locate open cable and plumbing runs and a better route for the shower drain hose.

–Joe Rosenfeld, Potsdam, N.Y.

Boats for Sale

Islander 29
1967. Well maintained in good cond. Bristol brightwork. Raised dinette saloon w/ample storage throughout. New interior and cockpit cushions. New holding tank system. FWC A4 w/electronic ignition runs well. Vapor and high-water alarms. ProFurl RF, 3 anchors, 2 Plastimo cockpit compasses, Datamarine D/S, 3 bilge pumps, 2 VHF radios, new stereo, Raymarine GPS. Many extras! Beverly, MA. $11,000.
Dean Gibbons
989-362-1016
deangibbons67@gmail.com
islander29.tumblr.com

O'Day 26
1985. Refurbished, w/trailer. Yanmar 10-hp. New: AP, shorepower/charger, batteries, cabin sole, privacy door. WS, Garhauer coachroof traveler, all lines led aft. New radio and antenna, new wiring throughout, and more. Naples, FL. $10,900.
djl6
814-777-7211
djl6@psu.edu
For more photos:
http://tinyurl.com/GOB-classified

Seafarer 31
1968 Bill Tripp design. *Trilogy* of Rockland, ME. Cruise ready. A master cabinetmaker's boat. A classic inside and out. Solent-type rig, furler, and headstay, inner cutter sail, spinnaker in sock, red canvas dodger/awning. 200W solar 400-AH battery, inverter, hot showers, microwave, fridge, AP, cabin heater, Corian counters. 15-hp OB in lazarette. Rockland, ME. $20,000.
D.T. Lewis
603-669-7937
dtlewistrilogy@gmail.com

Chris-Craft Apache 37
1967 Sparkman & Stephens-designed sloop. Yanmar 3YM 30 diesel w/125 hrs. RF headsail and FB main. Aft-led halyards. Awlgrip hull and deck. Quick little boat. Norfolk, VA. $28,000.
George Wigfall
757-486-0022
gwigfall2@cox.net

Gulfstream 30
Classic beautiful Sparkman & Stephens design built at Landing Boat School. Documented with USCG. One-inch mahogany planking. Full lead keel with rudder, tiller steering. Westerbeke 18-hp diesel. Includes new dodger, sun shade, 4 sails, cabin and cockpit cushions. Oriental, NC. $38,000.
Richard Lothrop
ruleda4@gmail.com

Cabo Rico 38
1984. Handsome, classic design by Bill Crealock. Cruising cutter, full keel, protected rudder. Heavily built ocean cruiser. Fresh water since 2004. Good, clean cond. Professionally restored hull. Deck recaulked. New bowsprit. New main, Genoa, spinnaker, staysail, running rigging. Many reviews including in *Good Old Boat*, May/June 2012. West Michigan location. Stored inside. $95,900.
Warren Fritz
269-345-8004
jubilate38@gmail.com

CS 27
A sturdy well-maintained cruising boat. Sleeps 4 comfortably, standing cabin headroom. Fully equipped galley, propane stove, icebox. Yanmar 8-hp. Multiple sails, gennaker, RF. Rigged for singlehanded sailing, 2-speed winches. Compass, VHF, 2 anchors, fenders, PFDs. Mast supports/cradle. Motivated seller! Sadly, work travel won't allow enough time to enjoy her properly. Lake Simcoe, Ontario. $9,900.
Todd Patterson
416-898-0261
pattersons@rogers.com

Menger Cat 19
1995. Nice catboat, lightly used by a string of senior mariners. Includes Yanmar, depth, 2 mainsails, cockpit cushions, stove, Porta Potti, etc. Lots of stuff included. In the water and ready to go. Original EZ Loader trailer in decent shape (not registered) is free if desired. New River, Jacksonville, NC. $12,000.
Dale Weston
910-455-9916
majortest@earthlink.net

Willard 30
1995. Custom-built downeast-type trawler. To step aboard is to return to an era when naval design featured rugged construction and traditional layout. Interior is light, airy, and uncluttered. Salty looking with bronze opening ports and cowl vents and stabilizer poles w/ paravanes. Heavy displacement, 2,500 lb encapsulated lead ballast. Extra fiberglass in bilge provides great stability. Mechanicals all modern. Dinghy included. Long Island, NY. $69,000.
Andrew Galasso
631-722-3400
Andrew@lighthousemarina.com

Cape Dory 27
1980. Nice freshwater boat. Tides Marine Strong Track. New sails, sailcover, running rigging. Garhaeur rigid vang and traveler, Yanmar YSM8, full winter cover, Airhead composting toilet. Creve Coeur, MO. $21,000.
Tim Roberts
314-469-6861
CapeDory185@gmail.com

Most of our classified ads appear on the
GOOD OLD BOAT
website:
www.goodoldboat.com/resources_for_sailors/sailing_classifieds/

Sea Sprite 33
1984. This is not your father's Sea Sprite. *Panache* has been featured in 2 episodes on PBS. Relaunched in '07 after $200,000+ keel-up restoration with more upgrades every year since. New Awlgrip Timeless Green hull paint in '15. Brightwork refreshed every year, fresh bottom paint '16. Butterfly hatches added '14. This full-keel vessel backs like a dream with its powerful bow thruster. Manitowoc/Kenosha, WI. $99,500 OBO.

Richard Charette
847-867-8296
richchar96@gmail.com
www.panachesailboat.com

Cheoy Lee Clipper 36
Second owners of this gorgeous boat, we have owned and loved her for 15 years. Everything you need to live aboard and cruise anywhere in the world. We have maintained her ourselves over the years and everything is in perfect working condition. The equipment, hardware, and spares are worth the asking price. It's like we're throwing the boat in for free. Any and all reasonable offers entertained. San Carlos, Mexico. $21,000.

Jamie Sibley
315-921-8133
tiger37373@gmail.com
www.flying-cloud.org

C&C 26
1979 Classic C&C, *Encounter*. Great sailer, good sails, RF, Yanmar diesel, wheel steering, older electronics, deck recored. Steel cradle, inside heated storage. Good old boat ready to go sailing. North MI. $8,500.

Jake Bishop
352-259-0705 or 231-838-1511
jjdbishop@gmail.com

Westerly Tiger 25
1969. Well-maintained, fin-keeled sloop, hull #90. 7-hp Volvo MD1 diesel. Awlgrip '04. FB main, Genoa, working, No 2 jib, spinnaker, whisker pole, Furlex furler, Evo ST 30 chrome sheet winches. Numerous electrical upgrades to hull, mast, control panel, and starter/generator circuits. GPS/plotter/sounder, VHF, and AP. Forward cabin w/enclosed head. Propane stove, enlarged icebox, and modified dinette converts to double berth. Steel cradle and much more. Dollar Bay, MI. $9,750.

Jim Spence
spencetimes2@gmail.com

Classic 42' wooden yawl
1964 Sanderling International 800. Robert Henry design custom built by Jon de Dood in Germany. Completely rebuilt with new cabins, interior, new decks, and major hull work completed in '00 and maintained in great condition. Enclosed center cockpit w/hard dodger and bimini make her the perfect cruising yacht. New Beta 50-hp engine '14. All systems replaced: electrical, plumbing, electronics. Watermaker, and solar panels. Well equipped for immediate cruising by her new owners. West Bath, ME. $67,500.

Robert Deans
207-389-6180
sanderling2000@yahoo.com
www.robinhoodyachts.com

Montgomery 23
1978. Fast, seakindly boat. 3,600lb, LOA 23'0" LWL 21'10", beam 8'0", draft <3' CB down, 4' CB up. Tan lapstrake hull, dual-axle trailer. Sails 4-yrs old, CDI RF. Newer 9.9-hp Yamaha OB w/ elec start. Custom cover, bimini, re-covered cushions interior and cockpit, all Sunbrella. Good headroom. Factory interior w/ lots of teak and varnish. Propane 2-burner range, sink. Porta potty but holding tank still installed. Exc sailaway cond. Deale, MD. $14,900.

Robbin Roddewig
703-980-1353
robbin.roddewig@verizon.net

O'Day 272 LE
1987. Wax and bottom paint and ready to splash. New 130 headsail and RF in '14, mainsail in good shape. New Nexus D/S '15. 2 new Group 27 batteries '14. Westerbeke 10/2 diesel in good cond, alternator rebuilt '14. Manual main traveler replaced with line control version. 2nd parallel Racor diesel fuel filter added. Got a new old boat, so this one's gotta go! Brookhaven, NY. $10,000.

Mickstr66
Mickstr66@yahoo.com

Bruce Roberts 34
1986. Freshwater boat, fully prepared for offshore. Strong C-flex hull, rigid dodger, new 2 x 250W solar panels. Mast, boom, all standing rigging, mainsail replaced in '05 refit. Everything else replaced during total refit in '13-'16. Because of changed travel plans, we are buying a larger boat. Whitby, Ontario. $49,000.

Anton Pachkine
416-275-8495
forceanboats@gmail.com
www.mistyblueii.com

Allied Chance 30/30
1972. New 30-hp diesel, RF, new sails and halyards, vg cond. Baltimore, MD. $18,500.

Ted Diehl
443-690-7893
baron9292@gmail.com

Matilda 20
Beam 7'10", draft 9" board up, 4' down. 105' main, 95' jib, 180 genoa. One owner. Garage kept. Freshwater only. Pristine, near-new cond. Very nice interior. New Suzuki 6-hp, new Unifoil rudder. Featured in *Good Old Boat* Nov '14. Trailer has new wheels and tires. Easily towed w/Subaru Outback. Chattanooga, TN. $6,000.

Brooks Northern
423-870-3331
northernbc@epbfi.com

Seidelmann 245
True K/CB yacht w/cast-lead keel and FRP swing CB. LOA 24'2", draft board up 1'11", board down 4'6". Two RF jibs, lightly used 2-yr-old main, sail cover. 2-yr-old Yamaha 4-stroke. Tandem trailer, jack stands. Porta potty, anchors, stove, D/fishfinder, swim ladder, and more. Ocean View, DE. $6,500.

Hugh MacRae
302-539-2644
capthugh72@gmail.com

Boats for Sale, cont

Grampian 26
1973. Carefully maintained for the last 20 years. New Beta Marine Diesel 26 (w/200 hrs), new Vetus wet exhaust and 3-blade prop. Upgraded electronics and batteries. Dodger and bimini. 4 anchors, 3 sails. Very roomy, high cabin w/long cockpit. Wiarton Marina, Wiarton, Ontario. $16,000.
Andrezij Kesik
519-913-1705
akesik79@gmail.com

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Season after sweet season

A fellow sailor's life viewed with a little envy

BY DON DAVIES

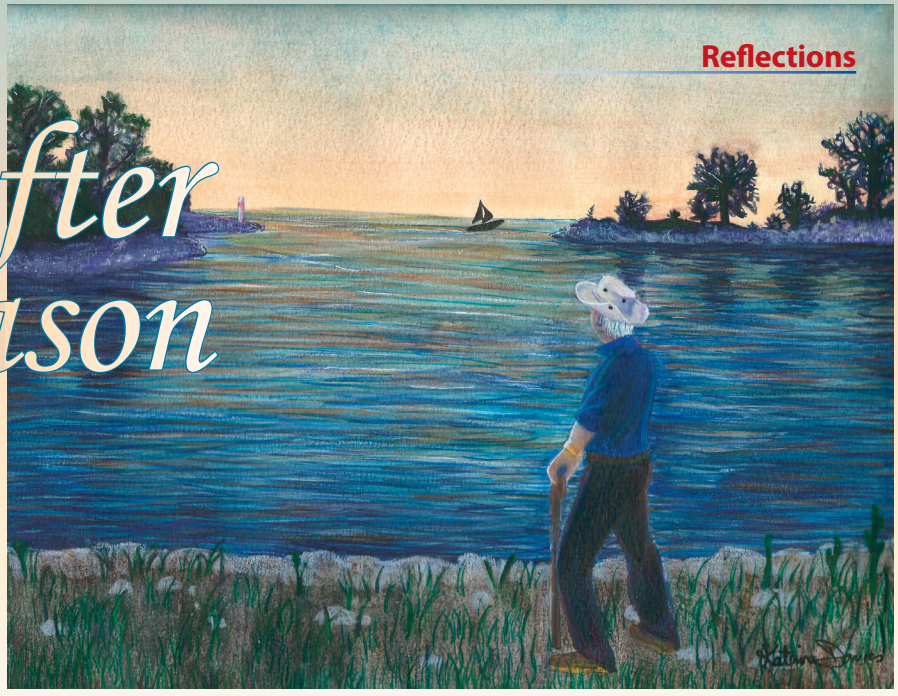

ILLUSTRATION BY KATERINA DAVIES

I was shocked when I saw her standing there . . . stark . . . alone . . . desolate . . . a solitary silhouette against a blazing sunset. We'd begun at six that morning with a yard full of shiny hulls perched eagerly atop precarious cradles awaiting their turn to splash into the arms of mother harbor. Now this one stood alone; the only one denied the spring of cool water beneath her hull.

Her name was *Maj II*. While boats always look different out of the water, I recognized her because I'd watched her leave the harbor a great many times, often chugging into a turbulent raining torrent to be tossed from one white cap to another, her skipper clinging determinedly to tiller and lifeline.

Wally was a sailor by choice, but not by trade. He'd spent most of his working years in the Northern Canadian bush searching for oil . . . or gold . . . or some other precious commodity. He was gone almost nine months every year, camping out on his own, moving from one expectation to another, and reporting his hunches to the large resource companies that coveted his talents. His life was self-reliance. With a canoe, a rifle, a fishing rod, and a few luxuries such as butter and flour, he'd be flown into a harsh environment, hundreds — sometimes thousands — of miles from human habitation. To Wally it was the Garden of Eden. There was water, game, fish, and nature's beauty: the verdant forests, the Northern Lights, the trill of the birds, the chatter of chipmunks, and the howling of wolves.

Upon retirement, he left one paradise for another. A comfortable home with his wife, reconnecting with children who'd grown up without him and with grandchildren who reveled in his stories of the wilderness. And, every summer, there was *Maj II*. She was a sturdy little ship, but otherwise quite unremarkable, as I suppose was Wally at first glance. Nothing fancy here. An aging gentleman, strong and stocky with a slight limp to his gait. Whenever I heard the chugging of that little engine, I'd leave whatever I was doing to stand waiting for him at the dock. I soon found that wasn't necessary. While not as agile as he had been, he made up for it with a calm, deliberate docking strategy. At precisely the right moment, the tiny outboard would be reversed, revved, and the boathook would snake out for the spring line and bring it into the cockpit. In one smooth motion it was clicked onto the toe rail and *Maj II* would glide to a gentle, controlled halt.

After a while, I found myself meeting him at the dock solely in the hope he'd have time for an adult beverage and a bit of conversation. Such a life he'd lived. So comfortable with who he was and what he'd accomplished. There was no need to impress the elk, bears, beavers, and hawks. When in their domain he'd become one of them. Now back in a less-civilized world, he remained steadfast in his quest for inner peace and the joy of living his days as he chose.

Sometimes there'd be doctors' appointments, grandchildren's birthdays, or school events, but most days, regardless of weather, Wally and *Maj II* would chug along the end of the docks toward the gap and out onto the lake. He saw each opportunity to loose the lines and leave shore as a privilege not to be wasted. In a driving rain, he'd simply put on foul weather gear and tug on the cord of that old engine to bring it to life. He recognized why some might embrace modern conveniences such as roller furling, main furling, GPS, and self-tailing winches, but to him the beauty was to keep it pure, to do the work, respect the traditions. How many times I watched him disappear into a mist mere yards from shore, fearing for his safe return . . . and always the afternoon would bring the chugging of that little engine and a very tired, but contented, Wally and *Maj II*.

Now *Maj II* stands alone in the dusk awaiting her fate and a new owner. To each of us this time will come, the time when we are no longer able to seek the solitude of the open waters, the joy of a brisk wind, the satisfaction of facing the elements, and then returning safely to shore, tired but fulfilled, with a sense of the purpose of life that escapes so many.

It's easy to feel remorse for Wally, who will sail no more, but we should save our tears for the many others who squander the opportunities and sit ashore while the wind blows and the sea beckons. Wally understood the sweetness of the seasons and he wasted none of them.

Don Davies, after a lengthy career as an advertising copywriter, marketing consultant, and speechwriter, turned his attention to film scripts, novels, magazine articles, and grandchildren. He lives with his wife, Jacqueline, in Toronto and sails his good old Grampian 30 on Lake Ontario. His website is www.dbdavies.com. Don's granddaughter, Katerina Davies, made the illustration.

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