F32 Newsletter

The Journal of the Freedom 32 Sailing Yacht Vol. 2 No. 1 September/october 1987

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F32 STARTS ITS SECOND YEAR

Final Answers to Last Knotty Problems Anticipated - But More "Audience Participation" Needed

This is the first issue of F32's second year of publication. It marks the passing of the halfway point in the two year task I set myself over a year ago, and will hopefully see the beginning of some fundamental changes in the amount of owner participation in F32 and in the activities it seeks to promote.

When F32 was started the usual step of creating an organization first (an owner's association), which would then have a newsletter, was considered and discarded. My primary goal was to disseminate information within a group that at that time appeared to consist of a lot of individuals standing substantially isolated from each other, experiencing what in most cases turned out to be common problems that would benefit from the group's collective knowledge, if it could be shared. It appeared to be a communications problem (like nearly all problems) first and foremost, not an organizational one. So F32 was started with an incomplete owner's list and quickly (to my gratification) grew to encompass nearly three quarters of all F32 owners. It filled an obvious need for information and cohesiveness within what will always be a small (96 boats) group that has purchased an unusual, innovative hi-tech vessel that turned out to have a production run of less than three years.

The lack of an owner's organization was not a problem to me, at least until I started thinking harder about it. It was not required in order for information to be passed; all that was needed there was

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OVERHEATING: THE PLOT THICKENS

"Chocolate Pudding" Found In Heat Exchangers

Is The Water Heater Trying To Cool The Engine?

Some recent efforts by TPI and Mack Boring to discover the cause of the F32's cruise speed overheating appear to be bearing fruit. A complete answer and method of correction have not yet been announced, however. The overheat alarm in most F32s will come on if the boat is operated in excess of 2800 rpm for more than an hour. In some boats the "bogy speed" is as low as 2400 rpm.

During the summer and early fall, Mack Boring's Pat Donovan went to work in earnest on two F32s resident at the Bend Boat Basin in Portsmouth, RI. Both boats would alarm at 2400-2500 rpm. Donovan started in on the raw water side of the cooling system, checking and replacing as he went. The sea water inlet was checked for obstructions, and the inlet hose length shortened to the minimum possible. The salt water pump was replaced and its drive belt checked. None of this helped, but it was noted that while there was plenty of salt water going through the engine's heat exchanger, the temperature of the spent cooling water coming out the exhaust pipe appeared suspiciously cold when measured with a pyrometer. Testing under load was accomplished by securely tying the boats at their slips and then running the engines in forward gear.

Going on the suspicion that the hot water heater- which has been accused of being the culprit before- was somehow causing the heatup (see sidebar), Pat then disconnected the engine fresh water hoses that supply heat to the water heater, and screwed pipe plugs into their fitting holes, which are located in the thermostat housing (outlet) and fresh water pump (inlet). The water heater was now completely removed from the system, and another

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Subscriptions

F32 is published every odd numbered month for a total of 6 issues/year. Subscriptions are $18.00 per year; additional subscriptions mailed to crew (owner must pay) are $15.00 per year. A subscription form is part of the last page of this newsletter; please supply data for crew subscriptions on a separate sheet.

The Freedom 32 Newsletter ("F32") was inspired by the interest demonstrated at the Freedom Rendezvous held at Newport in June 1986, and by the obvious benefits that would be gained by the exchange of information between owners concerning the maintenance and operation of the boats. F32's prime mission is the publication, in detail, of information concerning the correction of deficiencies and the institution of improvements to F32s, and will rely primarily on reader supplied articles and information in this area. It will also carry articles on the operation of boat systems, the cruising and racing of F32's, social events, raftups, factory advisories, interviews, owner profiles, classified ads, and anything else deemed of specific interest to F32 owners and crews. All F32 author and editorial efforts are unpaid. Break-even revenues equal approximately 70 paid subscriptions, so your support as a subscriber is solicited and greatly appreciated. Direct operating costs include appromixately 70 complimentary copies to be sent to major yachting magazines, Tillotson-Pearson Corporation, and other organizations worth lobbying.

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the newsletter. And a non-organization suited my personal style. I hate committees and have always admired workers as opposed to talkers, so it seemed that the most effective thing to do was to get to the communications, which turned out to be the crying need, and let the organization develop or not, as the group saw fit. For the moment, anarchy worked just fine. During the first year we covered a host of boat problems, providing answers when possible while generally assuring people that they were not alone in their experiences. TPI concluded that some problems that appeared isolated were in fact general, and they have recognized some responsibility in seeing them corrected. (The overheating and fuel tank problems continue as the most important tasks in this area still to be resolved). We had a resoundingly successful owner's meeting and symposium last spring, and we've exchanged ideas and cruising experiences. For myself, F32 was an answer to a perceived need in an area in which I have an enormous amount of interest and a desire to provide a useful service while being recognized by my peers. It also posed a real life opportunity to force the improvement of my expository writing while meeting some very nice people and coping with the realities of deadlines (please don't laugh), costs, layout, getting folks to send money, and so on. It's been a wonderful growth experience which I strongly recommend- hopefully, to my successor. Which leads me back to the previously mentioned passage of the halfway point in the task I set myself.

My commitment to F32 from the outset, was two years. I felt that that would be enough to get it rolling, and to adequately cover the most important improvement areas that were on my mind from the start. I also knew it was going to be an awful lot of work, and that two years would be as much as I could reasonably be expected to maintain my interest and energy. The work part has in fact proved to be even more than anticipated, as there has been so much to cover that the anticipated 6-10 page issues have turned to 12 pages (and in one case, 24). And, while the valued contributions of Messrs. McCrea, Phelps, Weigel, Morrison, Finch, and Lopata have helped flesh out F32 with other, much appreciated styles,

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test run was made. The overheat alarm came on again, and the water heater was discarded- for the moment, anyway- as a suspect in the case.

With the water heater out of the picture and the salt water system apparently working great guns, Donovan then tackled the last suspects- the engine fresh water system and its heat exchanger. Pay dirt was quickly hit when the exchanger showed up with its little cooling tubes all covered with "chocolate pudding." No one knows what it is, or how come it's there. It occurs on the fresh water side of the system, and has been discovered on every exchanger opened up so far. It covers each tube (to the extent that one can see; most of the exchanger's innards are not visible) with a 1/32"-1/16" thickness, creating an insulating layer while adding drag to the flow of fresh water around the cooling tubes, which have cold salt water flowing within them. Both the insulation and the drag decrease the exchanger's ability to transfer heat from the fresh water to the salt water, which is what it's supposed to do.

The rest of the fresh water system checked out fine. The exchanger was cleaned out in a hot automotive degreasing tank, and reinstalled. After carefully refilling the 50-50 antifreeze mixture, fingers were crossed, the engine restarted, and pulled up to 3000 rpm. The exhaust water temperature was measured with the pyrometer, and found to be 37F hotter than before. Clearly, the heat exchanger was working a lot better.

An hour later, still 3000 rpm, still no overheat alarm.

WE GOT IT!

The water heater was reconnected, and the fresh water system filled again. Engine on, back to 3000 rpm.

Twenty minutes later, on goes the overheat alarm.

WE DON'T GOT IT.

But we got part of it.

In actual fact, one of the two boats worked on would run indefinitely at 3000 rpm with the heater connected.

The glare of suspicion was now focused once again upon the water heater. Replay statements concerning water heater made over last two years: "The water heater has to be no higher than the engine," Yanmar/Mack Boring (unrealistic; there has to be a better answer), "We put header (surge) tanks above the heater in all our boats, you have to do it" (Don Margraf, Cruising World Yachts, Alameda). Many people: "You're going to get air in the system, and it's going to collect at the highest point".

Last March I had a nice conversation with Mr. Ron Schaper, of Sen-Dure, Bay Shore, NY, a major maker of marine cooling system products. The water heater/surge tank problem was very familiar, he said. His suggested solution was a cylindrical tank, 3-4" wide and 12-14" long vertically mounted, "about as high as you can reasonably get; at least half of it should be above the exchanger level in the heater". The water from the engine enters about an inch down from the top of the surge tank, and water to the heater exchanger inlet goes out the bottom. The tank facilitates deaeration of the water, and also serves as an expansion tank (it is nominally about half filled- but always above the heat exchanger level).

So the "bubble" is "it" once again, even though no one has ever seen it. Margraf mentioned to me that, without surge tanks, they had filled engine water by undoing the hoses from the water heater exchanger, filling the exchanger and hoses, and putting everything back together while gushing over in order to eliminate bubbles. The assumption is that the bubble is "creating resistance"- restricting flow- and causing the system to overheat. But, the more I think about that theory, the less I understand it.

The engine's heat exchanger works in this manner: cold salt water is pumped directly to a heat exchanger that has 24 tubes longitudinally placed within it. The salt water travels through a batch of 8 of the tubes, reverses course to come back through another batch of 8, and reverses a final time to travel the last group of 8 to the aft end of the exchanger, out, up to the anti-syphon valve tucked way up to starboard of the starboard galley sink, and then back down to the mixing elbow in the exhaust line, where it mixes with and helps cool the exhaust. This cold salt water flow is completely unregulated- it passes through without any flow modification from thermostats, zincs, or any else. The faster the pump goes, the more water pumps thru, up to its 1600 liter per hour rating (3600 rpm). If there's some heat to be absorbed in the exchanger as it does its back-

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stories, and points of view, the greatest part of F32 continues to be written by myself. The title "editor" is in this case an assumed sobriquet. "Writer/Copy boy" is more truly descriptive. It's still worth it, and please do not interpret my comments as bitching. How does one predict how a newsletter will work out? F32 will be published by me for the next year, and hopefully by my replacement after that. But for the latter continuation to occur I think a few changes must start taking place now.

Jumping in and starting F32 as (essentially) a one man show was apparently the easy and obvious thing to do last year. What I think I failed to realize is that people tend to be reticent to become part of such an effort, as they perceive it as someone else's thing, in which they don't have equal standing. Passive support (subscriptions) has not been lacking, but active contributions to F32 have not been frequent. As long as it arrived in the mail- even late - the great majority of subscribers has been content to read, but not to write. Now this is not a big problem for an editor who wants to write a whole newsletter every two months, but it is unlikely that anyone that interested and energetic will present themselves to continue F32 next September. Our prospective editor will more likely expect to do more editing and less writing than I do, which means that he or she will require more articles from the group, and other sources. And it appears that in order to create an environment in which people are willing to contribute, they must feel that they have recognition, status, and equal standing within the tribe. In short, our little group probably needs some formal organizing, so we all know where we stand. It should happen soon, so as to set the stage for the continuation of the newsletter- and other F32 functions- upon my retirement as editor in the fall. We must, alas, retreat from anarchy. But wasn't it fun belonging to a non-organization?

The proposed organization will probably come into existence at our winter meeting, the date for which will be announced in the November issue. Meanwhile, your editor will be actively engaged in attempting to broaden the base of F32's contributors and also trying to convince people that they should volunteer for office, the Cruise Committee, etc. Wife Sandi, who is sort of a dynamo and new president of the Massachusetts American Choral Directors Association, insists that "volunteers" can't be got by appealing to them via the printed word- "you've got to call them on the phone!" So watch out- that ring may be me!

Finally, over the last year I have received casual clippings, snapshots, and notes from several of you. Some of these never got into print, usually because of perceived space limitations. I understand now that I probably should not have let these omissions happen, no matter what, and I want to apologize to those who went to the trouble to write but never saw their contributions mentioned in F32. In fact, I'm going back through the files to see about incorporating some of those notes into this and future issues. Try me again!

Don Peaslee

COMBATING MAST TWISTING: AN EXPENSIVE MODIFICATION THAT DIDN'T WORK

In order to get Indolence's ever-twisting mast to stay still we last June pulled the mas and installed a stainless steel step weldment and hose-covered control bolt as described in the May-June issue of F32. The mast butt was liberally waxed before reinstallation so t the epoxy putty we were using to fill the step to butt gap would not stick the mast and step together. The boat was relaunched and raced to Halifax, and, with the mast staying put, I had the pleasure of using accurate windpoint infor mation from the masthead sensor for the first time since the boat was commissioned in 1985.

Then, during a 20 knot day in Vineyard Sound in late August, the mast "broke loose" and twisted again. I hadn't thought it possible, but if enough torque was put on it the mast would now twist about 9 degrees in either direction. The hose surrounding the bolt would evidently compress agaist the weldment enough for this much twist to take place. The wax was probably providing the lubrication to help facilitate the twisting.

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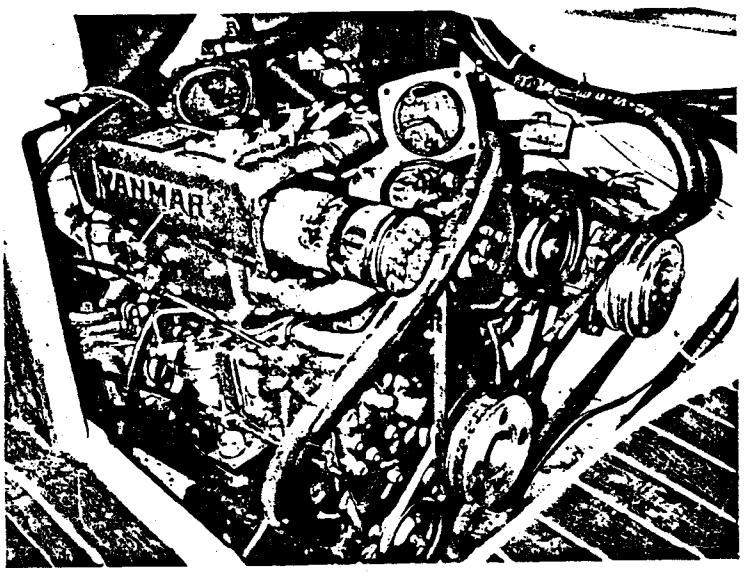
and-forth reciprocation, it takes it. It doesn't care if the engine's dead cold or steaming hot- it's just passin' through.

All the regulation is in the fresh water side of the system, and the manner in which the water heater is fed is of interest here. When the engine is started from cold its thermostat is closed, keeping water from flowing to the engine heat exchanger to be cooled. The closed thermostat has opened a "bypass" passage, however, that lets water flow directly from the cylinder head to the water pump, which pumps it directly back through the engine again. With nothing to cool it this circulated water quickly warms, until at 160F the thermostat starts to open, letting water flow to the exchanger. The bypass starts to close as the thermostat starts to open, until at 185F the thermostat is open all the way, and the bypass is fully closed. All of the hot water flowing out of the engine is now being directed to the heat exchanger, and none of it is being bypassed.

Except, of course, the hot water that's going to the heater. There is a fitting near the top of the thermostat housing, from which flows the uncooled hot water that heats the domestic hot water. The flow rate of this batch of hot water is not known- it may be substantially regulated by the water pump, as the heater hot water return line goes to the suction side of the water pump. Anyway, of the hot water coming out of the engine, some goes to the engine's heat exchanger to be cooled, and some goes to the heater heat exchanger to heat up shower water.



Here is the heat exchanger, pulled partly forward out of the tank. The exchanger ends are posed on the water pump and tank.

Now let's think about the water heater. From cold, it too acts as a heat exchanger for the engine. Its 6 gallons of cool, domestic fresh water sucks heat out of the engine hot water- but at a decreasing rate, as the domestic hot water heats up. When the domestic hot water's temperature gets up near that of the engine's hot water, there isn't much exchanging going on in the heater's heat exchanger, and the water returning to the engine is nearly as hot as it was when it left. That water then goes right back through the engine, even though it hasn't been cooled. So the situation that exists, once a boat has been operated at cruising speed for a while, is that the engine is operating two "cooling loops"- one through the engine's heat exchanger, where some cooling is happening, and one through the water heater, where very little cooling of the engine water is taking place.

Back to our test results. The boat ran at 3000 rpm for an hour without the heater, but only 20 minutes with it. Now if the "resistance" of the heater- by a bubble, or for any other reason- is the problem, why would removing the heater improve the situation- which it did? Plugging the outlet and inlet holes is about the most resistive thing you could do. Why didn't we overheat then?

Well, the only thing we know for sure is that, with no heater in the circuit, the bypass closed, and the thermostat open, all the hot engine water had to go through the heat exchanger. And this operation mode was successful for both boats.

Suppose a situation developed in which the resistance to flow increased in the fresh water side of the engine's heat exchanger, but did not increase proportionally in the water heater exchanger- quite the opposite of the "bubble" theory. What would happen? I think the answer is that the percentage of water flowing in the uncooled loop would become a larger percentage of the total flow. And the total flow would probably drop.

The engine exchanger is probably partially plugged with the chocolate goo on most of the boats as of this moment, and otherwise even under the best of circumstances is probably going to develop some flow resistance due

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The Overheat Problem As A Red Herring:

The Original Air Bubble/Temperature Sender Theory

For some months it was felt that the "overheat" was bogus, and could be cured by correcting a suspected air bubble that lurked within the heater's engine fresh hot water supply line.

The theory was this: an air bubble develops within the engine fresh water line, high up in the water heater's heat exchanger.* The pressure of the water, as the engine is run faster, pushes the air bubble down the return line from the heater, until it arrives as a bubble around the end of the temperature sending unit. Without water around its sensing element, the sender is heated higher than the actual water temperature by the hot metal housing it is screwed into, and then goes off, creating a false overheat alarm.

There are a couple of problems with this. First, the fresh water return line from the heater goes to the fresh water pump, not to the thermostat housing, where the temperature sensor is. Second, let's assume that the bubble does nonetheless get down and through the pump, from where it roars off through the engine block, finally emerging from the front of cylinder head into the thermostat housing, where the sensor is. Why would it then hang around the sensor, when it could quickly get higher (which it wants very much to do) by simply heading out the fresh water to heater supply line hole, which is adjacent to the sensor?

At any rate, Donovan's experiments quickly dispelled any notions that the problem was not a de facto overheat situation. Whether there actually is a bubble, and if there is, whether it's actually a problem, are questions not yet answered.

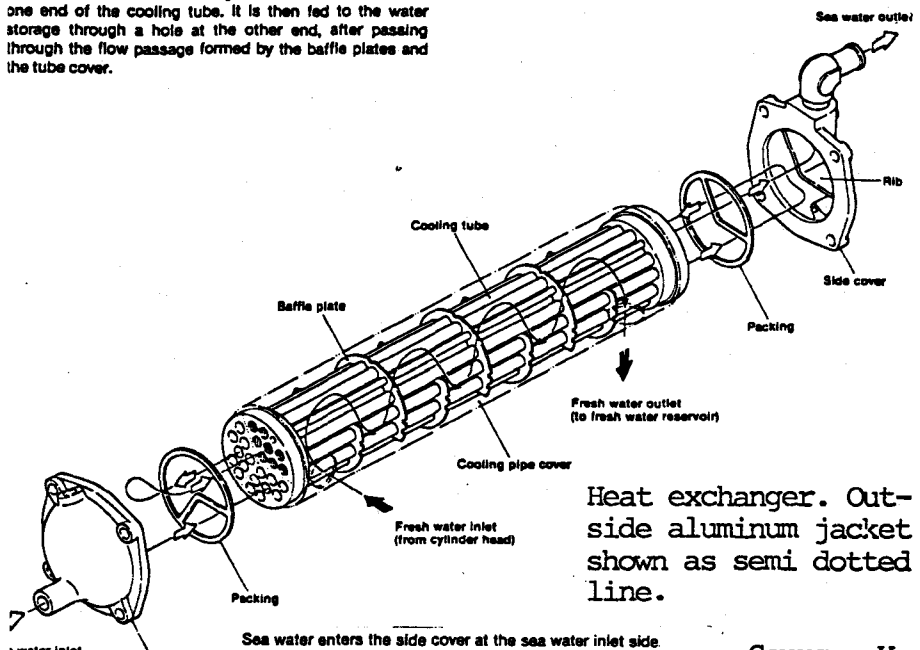
* Remember, the system has two heat exchangers. One is in the engine (cold sea water absorbs heat from engine "fresh water" 50-50 antifreeze mixture). The second heat exchanger is in the water heater, where the "fresh water" from the engine heats up your shower water.

Chapter 15 Cooling System
4. Heat Exchanger

SM/2GMF·3GMF·3HMF

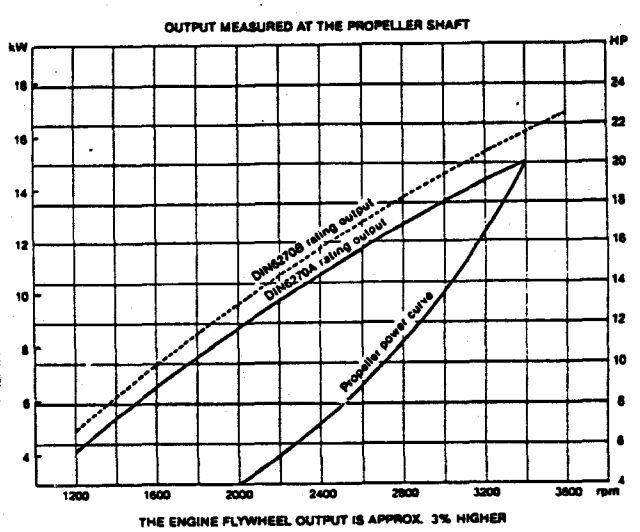
4-2. Water flow in water cooling tube

Fresh water enters the cooling tube from a hole drilled at one end of the cooling tube. It is then fed to the water storage through a hole at the other end, after passing through the flow passage formed by the baffle plates and the tube cover.



Sea water enters the side cover at the sea water inlet side, passes through 8 tubes guided by the side cover ribs and then enters the side cover at the sea water outlet side. Here it passes through another 8 tubes guided by side cover ribs, and returns to the side cover at the inlet side.
At the inlet side, it is guided by the remaining 8 tubes as at the outlet side, and then flows out to the mixing elbow from the outlet connection via the side cover at the outlet side.

Heat exchanger. Outside aluminum jacket shown as semi dotted line.



Horsepower available at full throttle, and horsepower required by a representative propellor.

Source: Yanmar Service Manual

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to deposits settling out around its 8 internal baffles. As for the water heater exchanger, I don't know of one that's been examined, or compared to new. It sure does make hot water.

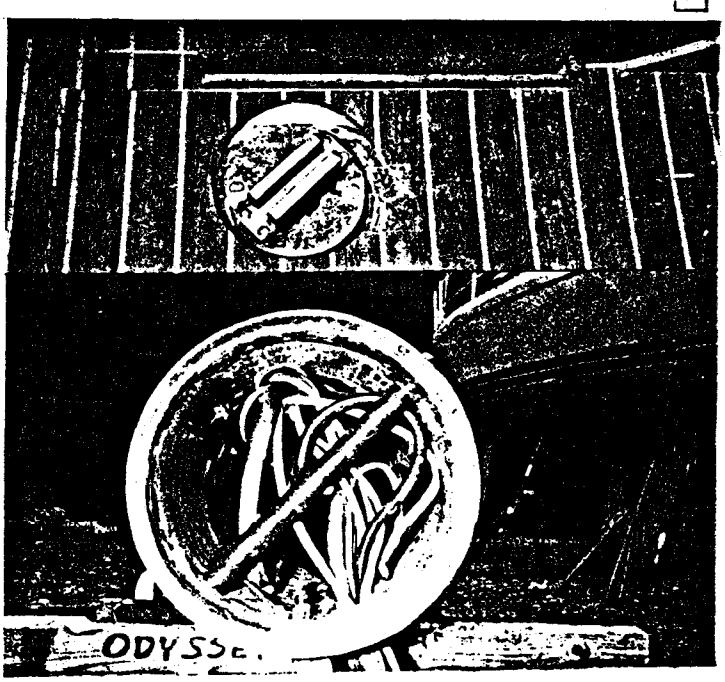
It's to be noted that there appears to be no automatic reduction of the engine hot water supply to the heater once the domestic water is up to temperature. The water heater is no longer helping materially in cooling the engine water, but the system continues to route hot water to it. It might be a good thing at that point if more of that water was routed through the engine exchanger. One way to try doing this, un-automatically and just to see if there's really anything in this thesis, is to put a simple valve somewhere in the engine fresh water line to the heater. Shutting, or partially shutting the valve should force more water to go through the engine's exchanger. One could experiment with it and see if it eliminates the alarm, or affects the revs at which the alarm comes on. I'd try it on my boat but I'm hauled. It's a cheap and easy experiment- could one of you more temperately located souls try it, and call me with the results? You can do your bit for F32 and your fellow owners. And the sooner the better, as I'd like to report results in the next issue.

TPI has meanwhile received a batch of surge tanks and should be testing one on our subject boat as this is being written. I hope it works. Whether it does or not, it's certainly the right way to fill and maintain the fresh water system. A surge tank was tried on the other of the two boats before it had its exchanger cleaned, and it didn't help. But this is also the boat that will now run at 3000 with its exchanger clean and the heater hooked up- so the surge tank fix may already be a fact. But we'd like to see some more successful operating experiences before breaking out the champagne. Perhaps you Florida guys can prove things out this winter.

As to the heat exchanger cleanout: Donovan and I pulled them out. He cleaned his in an automotive solvent washer; mine was done at a radiator shop, using muriatic acid (sparingly). The goo came out in small pieces; an in-place flush using an automotive flushing agent might work. While the stuff looked like a lot, it didn't weigh much- the cleaned out converter weighed 2 oz. less than it did before cleaning (3 lbs 7 oz.). Pat has sent a sample of the goo back to Yanmar for identification and comment. Another diesel company had a goo problem once that was traced to the use of straight ethylene glycol in the engines instead of a 50-50 mixture. But we don't know what their goo looked like, let alone whether the Yanmars were serviced with 50-50 or not.

In the course of going through the Service Manual for information on this subject, I unearthed the following additional tidbits and reminders: the system (less the water heater exchanger and hoses) holds 3.4 liters. Fresh water for cooling is okay, but don't forget rust inhibitor and water pump lubricant. The water temperature switch should be brown (for fresh water), it snaps o at 228F, off at 205F. Also, Yanmar recommend that you idle the engine for 10 (!) minutes prior to shutting down. "If the engine is stopped while hot, the hot fresh water will cause the temperature in the heat exchanger pipe to rise, causing a build-up of calcium deposits in the pipe and a drop in the coolin effect."

Finally, although the problem has been downplayed by some who maintain that 2800 rpm is plenty of power anyway, a look at the powe graph supplied by Yanmar indicates that the alarm comes on when the engine is putting out about 11 horsepower- the amount required by the propeller at 2800 rpm. This is a little over half its steady state rating (the engine can put out 17HP at 2800, but needs a 17HP load to do it). That last 9HP we're not able to use may not do much for the boat's hull speed, but can help a lot when powering at less than hull speed against strong winds and steep chop.

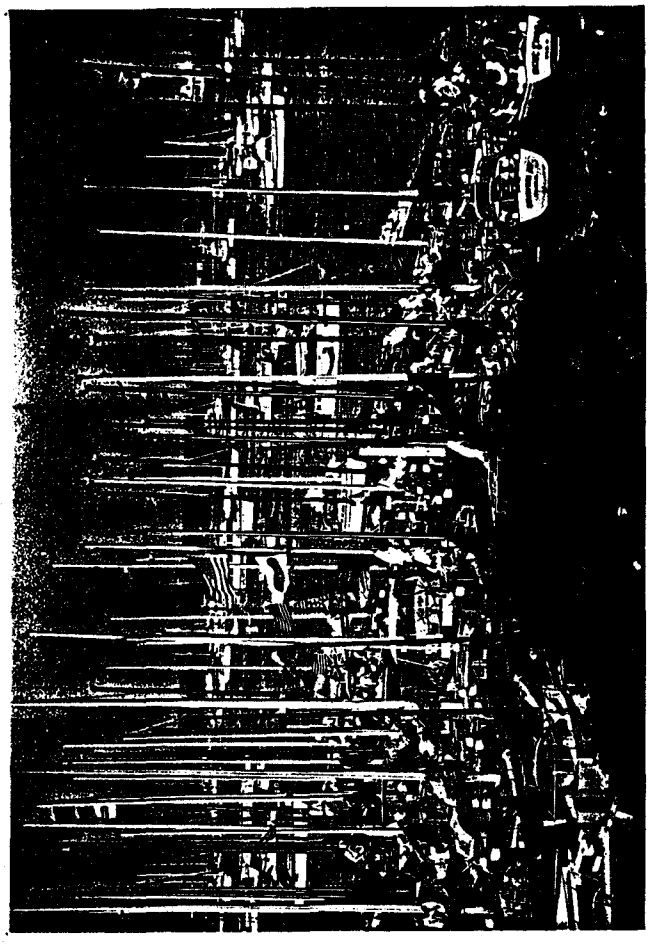


The weldment and bolt mast locating system- which didn't work. Story, p. 4.

MAST cont. from p. 4

After thinking it over I decided that the only option left, short of going to the work and expense of pulling and restepping the mast again, was to twist the mast straight and pour polyester resin down into the step. To hell with the niceties. If the mast and step are now stuck together we'll break them loose by rocking the mast when pulling it, whenever we do it next. I only hope they are stuck together, lest that wax continues to do its job too well and the mast still twists!

Meanwhile, F32's advice to owners with mast noise and twisting problems is to forget about installing the weldment, and don't worry about a goo'd mast and step sticking to each other (TPI doesn't). Tape your mast to step crack, pour in a pint of polyester, and be done with it. Cost: about a half hour and $5.00. ❑



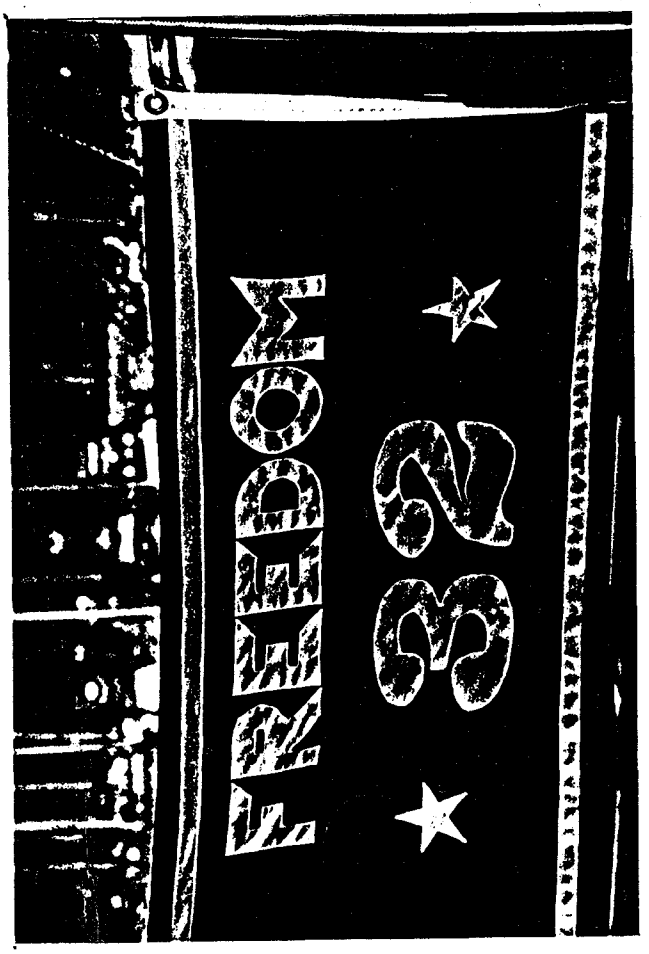
A thicket of masts at Block Island- with no shrouds to hold them up!

'88 RENDEZVOUS DATES ANNOUNCED

Three Days Prior to 4th of July Suggested, "Mini-Cruise" Proposed

Freedom Yachts has tentatively selected Friday thru Sunday, July 1-3, as dates for next years' Rendezvous, and has also proposed an alternative to the "fixed base" type of rendezvous previously held at Newport and Block Island. "The idea is to start out from Newport and sail to Block Island" explained Freedom's Paul Petronello. Next day we could go to Cuttyhunk, and the last day, say, to Tabor Academy in Marion, on Buzzards Bay. We could have point-to-point races for those who wanted to, and the rest could cruise. Doing the mini-cruise would add a change of scene each day and make the rendezvous more feasible for owners based north of the Cape Cod Canal to attend, as they would end up optimally positioned for their trip home on the 4th. We wouldn't be able to put on as many shore functions and meals, but the cruise idea sounds like fun, with a lot going on". It could also constitute the last days of a possible F32 cruise that started the previous weekend.

"The mini-cruise idea isn't firm, and we can probably do another Block Island rendezvous if that's what people would prefer' said Petronello. He is sounding out people on their preferences and will probably finalize plans by the end of the year. Paul, and F32, are interested in hearing from owners. His number is (401) 683-3500. ❑



Rally 'round the flag-! This beautiful banner was gotten for our '87 non-cruise; will preside over

Florida Owner Describes Water Priming Experiences

Anti-Syphon Valves, Silicone Goo and Air Leaks Contribute to Problems

Plus Diesel Fuel in the Water Supply?

Some time ago F32 got a phone call from Kurt Spaugh of Ft. Lauderdale, owner of F32 #32 Rockhopper. Kurt and Lynn have spent a lot of time on their boat, and recently moved aboard. They have also started a boat cushion and canvas business which they wanted to let F32 know about.

But the main subject of Kurt's call was the F32's water system. Having read of my (and other's) struggles with it, he felt that he had a few pieces of information that might prove of interest. It soon became obvious that he probably knows more about the system- and its peculiarities- than anybody.

"My problems started with delivery of the boat, and still aren't completely resolved. Getting either tank to prime was very difficult, and I frequently experienced flow problems once they did prime. Nothing was really improved until I started tearing the piping apart to try and solve the flow problems. This revealed a lot of silicone blobs within the tubing. The blobs would move around with the flow and hang up at the connections and other tight spots. The blockages would come and go, which made the diagnosis very difficult." Spaugh's system had been assembled with silicone at most of the connections, and it had gotten into the tubing. "It's not necessary if the tubing and hardware are correctly sized, and won't stick to the plastic connections anyway," he said. Use of the goo was probably prompted by the necessity for something to shim the water pump nipples, which are usually too small for the tubing used, and will leak air and water. Indo had this problem; we located the correct nipple after a while spent looking.

"We went through every piece of tubing on the boat and got all the goo out. It helped, but did not cure, our priming and flow problems. We did discover that operating the hand pump, for some reason, aided the priming process. The tank switchover valve turned out to be a doozy, too. When cleaning the goo out of it, I noted that its 3 assembly screws are also its mounting screws. It's cost effective, but try as we might, we could not keep air from leaking into the valve housing, which as you know just about kills the pump's ability to suck priming water from the tanks."

Spaugh finally gave up on the plastic switchover valve and sweated up a proper copper manifold with regular water stopcocks. It worked fine. But his water problems still weren't over (and aren't yet). "The one-way PAR valves that are supposed to keep the cold and hot water from backflowing within the system have an awful lot of flow resistance, which doesn't help priming or faucet pressure. They also aren't consistent in manufacture; I recently had the opportunity to surreptitiously check several of them by blowing through them. No two were alike, and the worst was about 5 times harder to blow through than the easiest. And of course, they don't do what they're supposed to do; hot water routinely gets back into the cold water lines, which supposedly can't happen."

Meanwhile, Kurt is looking around for a high-quality, cigar shaped one-way valve which he has been assured will work right. But he doesn't know its maker, so it's sort of a blind quest.

Before Spaugh got really familiar with the water system, he had an occurrence that really had him shaking his head for a while. He lost prime on the diesel returning from the Bahamas across the Gulf Stream, and spilled some fuel oil into the bilge while bleeding the fuel system. A day or two later he got a diesel oil taste in his drinking water! "It took a while to figure it out, but here's what happened. The vent line for the water tank had been cut so long it dangled down into the bilge. When we pumped water from the tank the vent line sucked bilge water- along with some of the spilled diesel- into the water tank."

Yecch. A dispersant and some heavy flushing cleaned up the tank, fortunately. And the tank vents have now been cut off so they can't syphon.

Taking stock of this information, that suggests that there may be obstruction and air leaks on the suction side, and perhaps excessive resistance on the pressure side- Indo will start next season with a pet cock plumbed into the pressure line right after the pump. When priming we'll open it to assure there's no excessive resistance on the pressure side (you close it when water squirts out- the pump is then primed). If it works, fine; if it

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Bermuda Contenders Cope With Heavy Weather, Fatigue and Equipment Problems

But Months of Boat Preparation, Practice Sails and Nautilus Workouts Pay Off

The Saturday, June 13 start of the Survival Tech Bermuda 1-2 Race featured a healthy breeze that promised to blow the fleet out to blue water in short order. But the weather gods decided to remind everyday who was in charge by quickly shutting off the air, and the racers soon found themselves bound for Brenton Reef at a fast drift. "At this point the well rounded caliber of the competitors, and their philosophic attitude towards the race, their fellow entrants, and themselves- was well demonstrated by the sight of Ray Renaud, last year's class winner, hauling in an impressive looking bluefish. He was roundly cheered" said F32 skipper Peter McCrea. "Patrick Mouligne, who won in the other F32, has a picture of it".

Patrick, Peter, F33 skipper Mike Chramiec, and Stellar 30 pilot Jim Kyle had agreed to maintain a radio net if possible during the race, and had intensively charted the locations of several Gulf Stream eddies in the days just prior to the start. Successful use of the eddies to get a boost on the route to Bermuda is critical to success in any race there from the east coast, and their locations were carefully stored as waypoints in the boats' loran sets. "Unlike the Marion-Bermuda Race, which penalizes even occasional use of loran, the Bermuda 1-2 allows unlimited use, and it was of profound value. Not only were we able to find nearly all the eddies we looked for, we also could read out ground speed versus water speed while in them" said McCrea. "We held the 9960.1.4 chain until about halfway to Bermuda, and then selected the Nantucket slave (9960.2.4) when Caribou started to get weak. I was able to get reliable lat/longs all the way into St. Georges, but it was necessary to ignore occasional obvious errors created due to noise. The computed information - course, speed, etc. - stopped being reliable some time prior to Bermuda. I never turned the set off, and have serious reservations about its ability to acquire good position data from cold that far out." The loran data was always checked against a running DR in order to guard against an undetected loran error, which could be very serious when nearing the reefs around the island.

The rhumb line course to Bermuda is 162° magnetic, for 635 NM. But the group's general strategy was to get substantially west of the line in order to miss a large, contrary eddy, and then converge to Bermuda. This required about 175° magnetic, which could not initially be fetched on starboard as the wind built following the post-start lull. By evening the wind had gone around far enough for westing to commence on a tight reach. The trip to Bermuda would be done entirely reaching on the starboard tack, and in conditions of wind strength and direction that would preclude the use of spinnakers and staysails while providing skippers with frequent opportunities to reef mains and douse jibs.

Early Sunday morning McCrea was trying to get some sleep below, while conscious of the wind gradually building on deck. "Suddenly there was a hell of a bang, and I found myself scrambling up the companionway with adrenalin coming out my ears. I looked forward and abeam- nothing. Then I peered aft, and just disappearing in the gloom was one of those tall, radar-reflectored offshore lobster buoys. It was the only thing in the whole damned ocean, and I'd hit it."

By noon Sunday- about 24 hours out- the weather conditions that were to dominate the race had settled in in earnest. It was blowing over 20, and would not blow any less all the way to St. George's. Seas were beginning to build that would ultimately routinely sweep decks and cockpits with green water while slamming around the boats as if they were

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doesn't we'll have to tear into the suction side, as Kurt did.

And if anyone else has further information on the priming and pressure problems- please give us a call! (617-944-8158).

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bumper cars. Double reefed mains were frequently required, particularly when the boats were on autopilot. The worst came when many of the boats were crossing the Gulf Stream: a 35-40 knot gale, and seas "somewhat reminiscent in shape to those described in the '79 Fastnet Race, but fortunately not quite as big". Below decks was the only dry place on the boats, and that frequently was only relative. The motion was quite violent, and skippers were later seen in Bermuda comparing bruises. McCrea sailed two days without his jib, and spent most of his time below. "When the weather was really heavy I would feel truly sorry for anyone who had to be out in the cockpit" he said.

Mouligne sailed with his in-built Autohelm 5000 and had nothing but praise for it. McCrea brought two Autohelm 3000s but needed only one, although he spent a couple of very intensive minutes one night in the cockpit, 30 knot winds and breaking waves all around him. "The autopilot belt was slipping badly and had to be replaced, which requires removing the steering wheel. I had to wait my moment (at 6 knots), set up the wheel brake, whip off the wheel and old belt, slip a new one over the steering shaft, get the wheel back on and regain control in time to keep from rounding up or jibing" he said. "You can bet that the job had my complete, focused attention!"

Both skippers used their autopilots "most of the time. You can usually gain about a half knot by hand steering; and a knot and a half if the boat is surfing. But how long can you keep it up?" said Mouligne. To keep matters in hand both skippers quieted down the reaching oscillations of the autopilot by sailing at one more reef than they would have if they were at the helm, and carefully adjusted sail trim to put the least load on the autopilot. They both feel that overloading the autopilot has been a factor in the problems experienced by some solo skippers. Peter used the wind vane on his autohelm to steer the boat when tight reaching, as a small change in the wind's direction could cause the boat to get too close to the wind and slow drastically if steered by the compass. He had modified the wind vane's mount prior to the race in order to make it work correctly. It is 4 1/2' above the stern rail, and is cocked forward into the wind in order to keep the strut vortex from affecting the vane. Both boats reached with prevented mainsails. McCrea ran a "trip line" from the vang to the cockpit so that the main could be relieved if the wind got behind it, causing the boat to round up and broach. It never happened. Chancy looking reaching and sea combinations were avoided, and not much broad reaching was experienced.

The westing course- up to 200°- was maintained until they were between 60 and 80 NM west of the rhumb line. From there the boats bore off to hopefully play the favorabl eddies. To maintain course in the stream and its eddies often required boat headings greatly different from the course made good- sometimes as great as 45°. Favorable boosts of nearly 3 knots were recorded. While it wa obviously a rough trip, it would also be a fast one. Surfing speeds approached 11 knots on one occasion, and Patrick once averaged 8 knots for 6 hours.

The effect of solid water on deck was greatly alleviated by McCrea's PVC pipe "jib raiser," which keeps the furled jib off the deck and lets water run underneath it. Both he and Patrick used it, and they also tied th spinnaker and its "sock" up to the spinnaker yard for the same reason.

Peace of mind regarding large vessels wa abetted by Peter's combi radar detector/ direction finder, which sounds a signal when detecting ship radar and is then used as a hand held RDF to locate the ship. It was used, too.

Another point that Peter commented on during F32's interview was the angle of the reef points in the main relative to the boom. In beam to broad reaching in a seaway the F32 will sometimes roll a fair way to leeward, with the boom end getting close to the water and occasionally dipping. Under heavy conditions with a preventer bent it is possible fo the boom to break under load- it hits the water, but cannot move backwards due to the preventer, and fractures near the preventer bail. This happened to an F32 some years ago while surfing in Gulf Stream seas. By anglin the reef points higher at the leech than at the luff, the boom, under reefed sail, is higher off the water than usual. Peter's reefs had been done this way, adding a measur of confidence under heavy reaching conditions

(Due to space limitations this article will conclude in the November/December issue. -Ed.)

In the November Issue.....

We Talk, In Detail, About the Fuel Tank Air-In-The-Line Problem.....

Report On The Proved Success, We Hope, of the Overheat Correction Measures....

Go Through the Results, Finally, of Last Spring's Owner Survey.....

plus The High Seas Adventures of Patrick & Peter (Conclusion)

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