

Catalina 470

C470 Association Technical Editor

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Beckoning, #76



Bill Martinelli, C 470 Commodore, has been making modifications to S/V Voyager Hull #11:

Modifications to S/V Voyager Hull #11

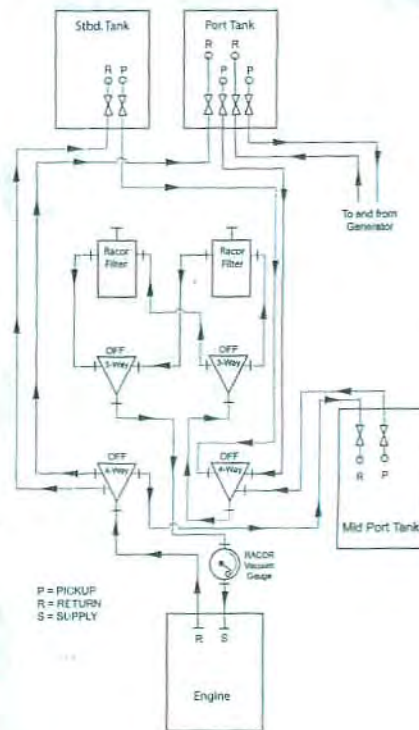
I have been slowly adding equipment to Voyager to make her into a self-sufficient cruising boat. This has prompted a number of people to ask me where we are planning to go and for this I don't have an answer. I don't have a schedule, a time line or an itinerary. This must mean I have a good start on having a cruising mentality.

My big problem is going to be where to put stuff on the boat so I have deleted things so I can add things. Three water tanks have gone overboard. The space from the 15 gallon tank got turned into our wine cellar. The 61 gallon port tank was replaced with a 61 gallon fuel tank.

The 28 gallon tank under the galley sole was removed and turned into a storage area. The tank in this area measures 32 inches in length by 26 inches wide by 12 inches at it's deepest. Because Catalina needed to be able to get the tank into the hull this was the maximum length the tank could measure. When you remove the tank you will find that the area actually is 54 inches in length and goes all the way aft to the bulkhead between the galley and the aft stateroom.



Fuel Panel



Fuel System outlined

SUPPLEMENT TO CATALINA MAINSHEET MAGAZINE

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Catalina Mainsheet is published quarterly by Eagle Ltd., 830 Willow Lake, Evans, GA 30809 • Phone&Fax (706) 651-0533 • jholder@mainsheet.net. For advertising information, contact Jim Holder, Eagle Ltd. For subscription information see page 64.

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One hatch

I removed the rubber decked sole and sub-floor. Once these were removed I added a panel port to starboard to keep things away from the sea cocks. I also add a panel fore to aft to contain stored items. I cut two hatches into the sole and added the same hatch lifts used throughout the boat.

Removal of the three tanks may sound a bit extreme but here is my reasoning. The two tanks remaining give me 87 gallons of water. I have installed a water maker that produces 17 gallons per hour or 408 gallons per day. I don't plan on running it all day but two to three hours is reasonable. Yes this uses battery power but I have a 7.6kw generator to recharge the batteries. My mentality is if you don't use it you lose it and this applies to everything on a boat. If you use it all the time it will work better and last longer than if you leave it idle for months at a time. So running the generator doesn't bother me.

But let's take a worse case scenario, I am going to make one of the longest passages in the Pacific. This is from the Galapagos Islands to the Marquesas Islands, about a three week trip. We leave port and three days out the water-



Storage



Two hatches

maker quits. At this point I would turn around and go back to port, but let's say we are five days out and decide to continue. Assuming you make water every day to fill the tanks and you noticed the watermaker wasn't working after you used 10 gallons of water that leaves you 77 gallons. I have found I can get all but about five gallons out of the two tanks so that leaves me 72 gallons usable. A crew of four amounts to one gallon per crew member for 18 days. At this rate not counting any other liquids on board we'll be in port two days before we run out of water. Of course once you discover you can't make water all use of fresh water stops!

With the changes in tanks we now have almost 150 gallons of fuel on board. This is all fine and good as long as you can use it. Catalina uses a filtering system in which each tank has its own Racor filter. What I like is redundant filters, that is multiple filters that are used on all tanks. Here is how it works; all supply and return lines go to either 3-way or 4-way valves. If you have two fuel tanks you use four 3-way valves and if you have three tanks you use two 3-way valves and two 4-way valves. Now my boat has three tanks and two Racor filters and that is what I will use as an example.

All three tanks feed to the three inlet ports of a 4-way valve, the outlet port feeds to an additional 3-way valve. This 3-way valve has two outlet ports, each of these go to the inlet ports of my two Racor filters. The two outlets from the filters go to the inlet ports of a second 3-way valve. The outlet port goes to the supply line of the engine. In this supply line there is a tee fitting, in which is mounted a Racor vacuum gauge to monitor the condition of the filters. The return line from the engine goes to the inlet port of a second 4-way valve and the three outlet ports go to back to the tanks.

This is the way it works, on the feed and return 4-way valves you choose the tank you wish to feed from and return to, same as the standard Catalina installation. On my boat this is from port or starboard aft tanks or from the mid port tank, and just as you can with the stock setup you can feed from one and return to a different one. The main difference is the two other 3-way valves. They let you choose which filter you wish to use, in my case I have labeled them #1 and #2. When you start off with clean filters you start with #1. When making a long or rough passage I can check the vacuum gauge to see if a filter is starting to block up. Generally the gauge will show almost if not zero vacuum, if it is reading a high amount of vacuum all I have to do is turn both 3-way valves to filter #2 and the gauge will drop to zero. You don't have to stop the engine and it will never miss a beat. Now we can keep motoring along and if I am really concerned I can open up #1 and slap a new filter element into it. Later if you want to switch back to #1 do it with the engine running at cruising speed and any air will bypass the injectors and go to the return lines and into the tank, again without the engine missing a beat. I have rigged this system on a number of boats both sail and power over the years and it works every time. When you first run the engine after changing filters, the vacuum will show higher amounts of vacuum because of the air trapped in the lines or filters. As the air dissipates, the vacuum will read lower and lower until almost zero, again running without missing a beat. Without the gauge you wouldn't even know the air was there.

One of the last things I want to have to do is change filters in the middle of a rough passage and smell diesel fuel for hours afterwards. That is probably one of the best ways to make your crew toss their cookies. —Bill Martinelli, C 470 Commodore

Note from Catalina Yachts: The builder's intention in the design of the 470 fuel system was to provide the ultimate redundancy of two completely independent fuel systems. —Gerry Douglas

Installation of a Raritan Lectra/San MSD type I device system

I took delivery of S/V Onward, C470-126, in August 2003 to become my home as a liveaboard in Annapolis MD. On the advice of a good friend, Steve Floyd (Cygnus, C470-54), I

elected to install a number of boat systems myself to achieve efficient use of space and to have first-hand experience with the systems. One of these systems was a Raritan Lectra/San Type I Marine Sanitation Device.

The benefit of a Type I sanitation device is that the waste stream is macerated and disinfected allowing direct overboard discharge in all but EPA designated No Discharge Zones. During each flush cycle, an electrolytic process acts on the salt and water in the waste stream to create a disinfectant (hypochlorous acid). This kills bacteria and viruses in the flow-through system's two internal processing compartments. The waste flows into the bottom of the first where it is macerated and the disinfecting process begins. With following flushes, it is displaced to the second and is discharged on subsequent cycles.

If the water does not have a high enough salt concentration, additional salt can be added with each flush manually (2 to 4 ounces of table salt) or automatically from a salt water concentrate tank with pump.

I installed the Lectra/San under the berth in the forward stateroom to service the forward head. (The unit could also handle the rear head if the waste line were run to it.) The installation was fairly simple and straightforward given Catalina's basic structural and system designs: there is a large volume to work with; the structural grid of the boat is accessible to install support for the unit; and there is ready access to the waste lines and through-hull valves.

The first step was to purchase strips of 0.5 in. x 3 in. aluminum from a local metal supply to bridge the bilge where the forward waste tank and through-hull valves are located. The strips were laid out transverse to the centerline on top of the longitudinal structural grid stringers at about 14 and 31in. from the salon bulkhead. Two additional



Fig 2 LectraSan Unit

strips were bolted to these parallel to the hull to create a support structure for the Lectra/San as shown in Figure 1. The unit was located in the back outside corner of the compartment as shown in Figure 2. I placed it inside a plastic storage container to prevent a minor leak from going directly into the bilge (there have been no leaks from the sealed unit to date). The unit was strapped in place against the salon bulkhead with a 0.75 x 0.063 in. strip of aluminum formed into a U around its perimeter.

I used the waste line from the head Y valve to the existing anti-siphon loop. A new, longer waste hose connected from the loop to the intake port of the Lectra/San. A waste line was then connected from the unit's discharge port through a new anti-siphon loop (because the unit is slightly below the water line) to the discharge through-hull valve. The loop was mounted behind the port hull liner up above the water line using an aluminum bracket. Double hose clamps were used at each connector.

I connected the other leg of the Y valve to the existing macerator pump and through-hull valve. I probably will never use this back up but the pump



Fig 3 LectraSan Installation

was already there for direct discharge from the forward waste tank.

Two 6-volt golf cart batteries connected in series were mounted in a Blue Seas plastic battery box fastened to the transverse aluminum strips, Figure 3. Connection to the Lectra/San was made using 6 AWG wire, a disconnect switch and a 60 A fuse in the positive line. Lines, 6 AWG, were run to the main charger to maintain this battery which also powers the bow thruster.

The electronic control panel was mounted on the stern bulhead of the forward head compartment next to the Y-valve handle (Figure 4). To make it easy to mount, a 1-in. hole for the cable and modular connector was drilled. The control panel was then mounted by backing it with a piece of 0.25 in. rubber (from a mouse pad) and screwing directly to the bulkhead.

After each use the toilet is flushed and the Lectra/San activated by pushing the button on the control panel. Salt can be if the water salinity is low. I have elected to add table salt to the bowl before flushing; this avoids having deal with a tank of concentrated brine in the bilge.

Because the forward waste tank had never been used, I converted it to potable water storage by connecting it into the water manifold. -Joe Rocchio, S/V Onward #126

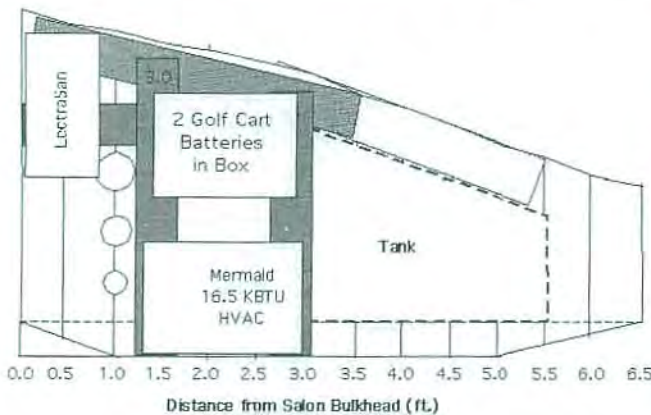


Fig 1 LectraSan Layout Plan



Fig 4 LectraSan Control