

# Catalina 310

C310 Association  
 Technical Editor  
 Bill Lewis  
 11900 Stradford Wood  
 Roswell, GA 30076  
 (678) 366-7906  
 wol1@yahoo.com



## A New Year

It's the start of a new year and by now the hectic holiday time is but a found memory. I want to take a moment to encourage you, the readers of the Mainsheet, to feel free to send your inquiries as well as your input to me for use in the Technical Section. If you have made some upgrades to your boat or found and fixed a problem this is the opportunity for everyone to benefit from your knowledge. I particularly appreciate the input as I am running out of projects to perform on my boat, I guess I will have to just go sailing.

## Battery Retrofit

There has been a fair amount of discussion lately about replacing batteries on the C310. I suppose that the batteries are getting old enough to warrant the necessity of replacement. The C310 comes stock with two 12-volt batteries that are charged by both the 120-volt powered automatic charger and the engine's alternator.

When analyzing a replacement for my batteries I went to the local battery supplier and engaged him in a discussion of the pros and cons of the various battery types. He pointed out that the way batteries are used, or abused as the case may be, on a sailboat is a cycle of deeply discharging the batteries and then charging them up to capacity. The cranking power for the engine should ideally come from a dedicated third starting battery with a high amperage output and less concern for deep cycling.

I was not up for adding a starting battery; cost, space, weight and contentment with the existing set-up being just a few of the reasons not to pursue this change. The recommendation was to switch to four 6-volt golf cart batteries. If you think about it the golf cart uses a battery in such a way that it deeply discharges the battery with each use and then is recharged to full capacity multiple times everyday. In order to work in a 12-volt system it is necessary to pair the 6-volt batteries in series. Convinced that this was the right way to go I purchased 4 Trojan

105 Mileage Masters and set about the task of installing the new batteries.

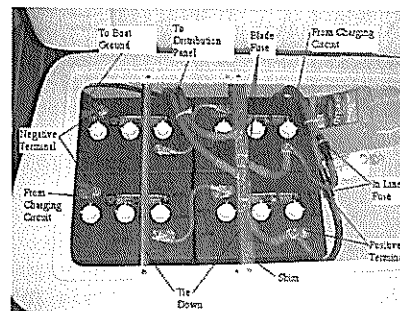
The first things you will find is that the Trojans are slightly taller and, when set end-to-end, slightly longer than the stock batteries. If it were easy it would not be a boating project! Remove the existing batteries being careful to note which wires are which. The two # 6 red wires connected directly to the two positive terminals are coming from the charging circuit (these will have an enclosed in line fuse). There will be two # 1/0 red wires connected to the positive terminals as jumpers to the blade fuses feeding the 12-volt distribution panel. From the other side of the blade fuse will be 2 # 1/0 red wires routed to the 12-volt panel. On the starboard side will be a single # 6 black wire connected directly to the negative terminal and coming from the charging circuit. There will be a # 6 black wire that is connected directly to the other negative terminal coming from the common ground for the boats electrical system. There is a # 6 black wire that connects the two negative battery terminals to complete the system. This all sounds complicated, but you will not be disconnecting the other end of these wires, nor will you have to trace or reroute them. Simply label them and verify that all systems are turned off prior to removing the wires.

Once the old batteries are disconnected remove the blade fuses from the battery tie down and set them aside for reuse upon reinstallation of the Trojans. Remove the battery tie downs and set them aside for reuse later. With all the wires and tie downs cleared from the opening lift the old batteries out and send them back to the battery shop for recycling. With the batteries out you will have exposed the fiberglass pan in which the batteries sit. Remove this pan by removing the four screws that hold it in place. You will recall that our new batteries are slightly longer than the originals. In order to accommodate the new battery it will be necessary to elongate this fiberglass pan.

Take the pan back to your workshop and cut the pan in half, front to back. Measure the length of your new 6-volt batteries; this will be the new length of your battery pan. I set up a wood jig to support the pan halves such that they created a sufficiently long pan to accommodate the new battery length. I mixed up some resin and laid up a couple layers of fiberglass

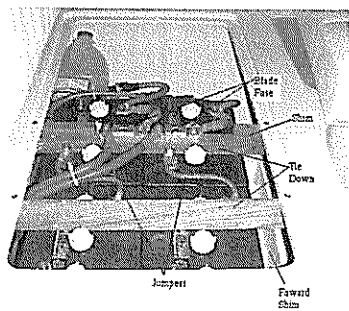
on the inside and a couple layers of fiberglass on the under side to fill the gap. Once cure I sanded the glass smooth and painted it white to match the original color.

With my properly sized pan I was now ready for reinstallation of the pan and batteries. Place the pan back into the compartment from which it came. The original starboard screw holes should line up on the starboard side and the screws can be reset. The port screw holes will have moved to the port side by an inch or so and will have to be redrilled. Be careful to check the depth available in the support structure, drilling a hole all the way through your hull would make this job even harder, not to mention the embarrassment. Screw in the port screws to complete the pan installation. I seated the pan in some 4200 to fill any voids between the pan and the support structure below and provide a solid platform.



The new batteries need to go in with the proper orientation. All batteries will set with the positive terminal to port. Being narrower than the original batteries it will be necessary to place a spacer or shim on the forward side of the batteries in the pan. I used one of the original tie down pieces laid on its short side. The new tie downs were fabricated from teak. The starboard tie down is a 3/4" x 1 1/2" piece that spans from one side of the open to the other and is fastened in place using the original screws and holes in the settee. The port tie down is fabricated from a 3/4" x 1" piece that is laid on its 1" side and spans from one side of the opening to the other. This is shimmed on top at each end with a short piece of 3/4" x 1" teak leaving room to install the blade fuses on the tie down. New holes will need to be drilled and counter sunk into the settee to attach the port tie down.

With the batteries in place the wiring begins. You will need to purchase two # 6 jumper wires approximately 8" long and connect them from



the positive terminal of the starboard battery to the negative terminal of the port battery. By doing this you have now put the batteries in series and effectively created two 12-volt battery banks. The rest of the connections will be identical to the original connections. All positive connections will be made to the port most positive terminal and all negative connections will be made to the starboard most negative terminals. With all connections made verify that the fuses are in good working order by testing their continuity. Energize the 120-volt for shore power and then the 12-volt charging system. Verify that the charger is charging and allow the batteries to be brought to a full charge.

In terms of maintenance it is critical that the battery water be kept above the level of the lead plates inside the battery and that the terminals are kept clean and free from corrosion build up. In terms of use it is good to keep a load on the batteries if you will be keeping them on an automatic charger while at the dock. I leave the refrigerator running at all times. This puts a load on the batteries and allows the charger to do its job without there being a danger of boiling the batteries by over charging.

## Catalina MAINSHEET

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Jim Holder  
830 Willow Lake  
Evans, GA 30809  
Ph & Fx (706) 651-0533  
jholder@mainsheet.net

### From the Internet

I was rigging the boat today and the Garhauer double block fastened to the traveler is two parts held together with 2 allen head cap screws (bolts). They were backed out about 1/8" on my boat. All have been plied with Lock-Tite and properly tightened. Someone last year warned about the shackle, which is just fastened with a thumbscrew, working loose, but I had no idea that these blocks had a bolt on trunion.

I had not checked it and mine came loose about four months into sailing the boat last year. I also noticed the allen head screws on my cabin top line clutches were in various states of working loose. To get to those you will need to cut down an allen wrench to fit it between the clutches. —Paul Oliva, *Time & Tide - San Francisco - CA, Hull #179*

I want to order a PYI PSS shaft seal and want to double check the shaft size and stern tube diameter. Is it a 1-inch shaft and 1 1/2 inch stern tube? Have any of you done your own install and if so, how was it? My engine mechanic says it will take him about 2 hours. It will take me at least twice as long plus several trips to the hardware store plus at least one trip to the chiropractor. Getting old is tough! —Bob James, *Winter Dream'n, Hull # 118*

Bob, it was a cakewalk, but then I did it on receipt of the brand new boat at the dealers. It is the 1" x 1 1/2" model. The stern tube OD is 1 5/8" but the rubber stretches easily, just make sure things are smooth so you do not nick the bellows.

Your biggest problem will likely be removing the coupling and cleaning the shaft. There are 2 set screws, one under the other in two locations, which attach the coupling to the shaft. Make sure you check that there isn't one setscrew left buried inside the coupling or you will damage the boat and yourself trying to move it. If you slide the shaft back through the packing gland and put some 3/4" washers between the engine and shaft, then tighten the coupling bolts you should push the shaft out of the coupling. Lots of penetrating oil and some heat if you need it.


Two hours sounds fair, it took me about an hour with everything pristine. You will need allen wrenches for the set screws, plumbers roll of crocus cloth or fine sandpaper (waterproof if doing this in the water), rags to stuff in around the shaft while you clean up the shaft for the o-rings, dishwashing soap to lubricate the shaft and o-rings, and miscellaneous solvents and scrapers for the accumulated crud.

Do not forget to burp the seal after launch or you will run it dry and damage it very quickly. The instructions are very comprehensive. Do not apply excessive pressure on anything, if it does not move easily determine why it is resisting and change your approach.

The downside of the mechanical seal (of which the PSS is one) is that it is more fragile than the old tried and true shaft packing. It leaves the seal at the mercy of the knowledge of the owner and his boat yard. The seal is a carbon face running against a stainless steel seal face and it requires water for lubrication. It will not leak, but at launch each spring it has to be burped, all the air must be vented by pulling the seal back from the face and venting the trapped air. The carbon face is just that, carbon, and can fracture if smacked (removing the prop using a hammer). This will result in failure of the seal and a lot of water in the boat. The rubber bellows, which creates the pressure required to seal the faces, is much lighter than the standard shaft log and if it tears, a lot of water can get into the boat in a short period of time. A properly maintained mechanical seal will last almost forever, an abused standard packing gland will last almost forever, but a neglected mechanical seal may fail quickly. No manufacturer would willingly jump into the potential liability. —Peter Sandford, *For Pete's Sake - OYS, Oakville, ON, Hull # 147*

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 Roswell, GA 30076  
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 wolf@yahoo.com



## It's A Better Idea in Control

We sail with the factory dodger since it extends our sailing season by a month at either end and it can make even summer outings more pleasant and comfortable when the elements conspire. The dodger made the traveller controls on our boat less than perfect. Under heavy load, the upwind traveller line is so heavily loaded that in order to release it from the cam cleat it must be pulled up at such an angle that it has actually left burn marks on the dodger windows. I single-hand a lot and the inability to release the traveller is intolerable, especially with the mainsheet control in a jam cleat on the cabin top.

The solution to line control comes from Spinlock. Their PX cleats, mounted on the cabin top, are perfect solutions for both the traveller and mainsheet. The PX308 is for lines 3 – 8 mm. This brings the traveller control inside the dodger and makes it simple and easy to operate either right at the bulkhead or from the helm. A tug upward and they release completely, a tug down and they latch securely. The PX308 is a tight fit for the traveller lines, but allows free passage of the lines once you manage to get them run through. The PX812, for lines 8-12 mm, brings much better control to the mainsheet. Again, a tug up and it releases, a tug down and it locks. You cannot lead the mainsheet to a winch, but sailed properly you should not have to. The factory jam cleat did not allow winching either, at least not transferring back to the jam cleat after winching.

Installation was a snap. The sheet stoppers on the cabin top are mounted into a moulded in aluminium plate. This plate extends close enough to the edge of the raised mounting platform to secure the new cleats. I removed the mainsheet jam cleat, countersunk the existing holes, gooped up a pair of shorter 1/4-20 screws with 3M 4200 and tightening them down just below flush. I then placed the PX812 pretty much in the same location as the original cleat, drilled new holes for 1/4-20 x



2" machine screws (being very careful to not drill deeper than the original jam cleat screws), and then tapped the aluminium plate. I countersunk these holes to hold sealant as an informal O-ring and liberally buttered the bottom of the cleat with 4200. I set it in place, ensuring that as I tightened the screws, the sealant oozed out all around. A bit of clean up and I was ready to repeat the process for the smaller PX308's.



Placement of the starboard traveller cleat was dictated by how close I dared go to the edge of that invisible aluminium plate and minimizing interference with the new mainsheet cleat. Using the same mounting procedure for the 10-24 x 2" machine screws I mounted them. Finally I removed the cam cleats from the traveller end plates and ran the lines through the new cleats. All of the crew have commented on how much of an improvement the new cleats are. With their low cost they are about the biggest bang for the buck I have yet encountered sailing. —Peter Sanford, Hull # 147, For Pete's Sake

## Foredeck Safety

Going forward to the foredeck under sail can be risky. You normally wear a harness and you clip on to a jackline. You typically clip on to the opposite side of the deck you plan to work on, but if you are knocked off balance by a wave and fall over the lifelines getting back on the boat can be problematic. In December of 2002 in



the ARC, a rally for cruisers racing across the Atlantic from Las Palmas to St. Lucia, two brothers were sailing when one fell off the boat while working on the foredeck. He was hooked on to the jackline but his brother could not get him back on board, the boat was dragging him. If the line is short you might be left hanging over the side and there might not be enough time attach the spare halyard and winch you up. This was a tragic event that might have been avoided if the following procedure was used.

The system is to use the spinnaker halyard or a spare halyard and a second harness line to keep you on the boat. First pre-measure the halyard by going forward with your harness on.

Adjust the length so you can move around the foredeck but when you lean over the lifeline you are prevented from falling by the halyard. Attach the halyard to the lifeline or another point so it is always ready. Adjust the length of both harness lines so you can move from side to side.

When necessary to go forward and attach the jib halyard to your harness and clip one harness line to the port jackline and one to the starboard jackline. Your crew can then adjust the Jib halyard as you move around the deck as necessary. With the 2 harness lines attached you have 3 attachment points keeping you on the boat in rough seas. If you are single handling, using this system secures you to the boat and assures your safety. The jib halyard alone will keep you from going overboard and should allow you to move around if the wind is light and the sea flat.

Practicing with this system sailing in light winds will give you confidence when going forward in a rough weather. —Roger Marshutz, Hull #164, Zepher

### I Found It

It is not so much that I found it, but more about how I found it. I have heard from many of you that you suffer from a mysterious leaking of coolant from your engine. There is much speculation as to where it is coming from, but I have not heard any definitive answers. I have suffered from the same affliction, so today instead of sailing in the bright sunshine and lively breeze I spent the day wrapped around my engine. The good news is that I found and fixed the leak.

My approach was simple and systematic, I started by cleaning and drying the engine and engine compart-

ment. I used spray bottle with a mixture of water and dish soap, a toothbrush and a bag of rags. With everything dry I removed the exhaust riser cap a checked it's ability to hold pressure. For this you will need a cooling system pressure-checking device. I bought a Stant on Ebay for about \$40.00 dollars delivered. The cap pasted the test holding steady at 14 lbs of pressure.

I topped up the coolant in the system, but did not put any in the overflow reservoir. I attached the pressure-checking device and pumped it up to the recommended 14 lbs of pressure. As suspected there was a slow drop in pressure as the coolant leaked out. Now comes the fun part as you wrap yourself around the engine inspecting all surfaces for fresh squeezed antifreeze. I kept the pressure pumped up and continued the search tracing all of the hoses and checking all of the connections. And there it was, glistening like limejuice in my margarita, right there on the aft port casting that rests on the engine mount. Now standing on my head and pulling aside another hose for a better look, I found the leak. It was seeping from the hose connection at the aft inboard side of the exhaust riser. This is the 1" hose that connects the riser and the heat exchanger. I resituated the hose clamp and tightened it down. No more leak.

Now I found it hard to believe that all of these engines leak from the same location, but the process is sound and should assure your success in finding the leak. A side note; some people have discovered that the plastic expansion tank and/or tube tend to crack and leak, but that would be too easy. —Bill Lewis, Hull #73, Allez-y!

All of us have been plagued with the vibration associated with the C310 Universal 25XPBC engine. What follows is a communication that I received from Mr. Joyce, Service Manager at Westerbeke/Universal. We know this information already, but he does include some additional thoughts that I was not aware of. He addresses antifreeze leaks (I have another one on SAY LIN) and also talks about the flexible coupling. Hope that this information is valuable to you.

Hello Mr. De Armond,

"Sorry that I missed you at the Atlantic City Show.

The only vibration issue I have had with the M25XPB was when the unit is idled at TOO LOW A SPEED. When this is done the engine becomes very unstable. Idle speed is between 1000 and 1200 RPMs.

Another area that can contribute to engine vibration is when the RPM is above the idle speed range is if the engine is positioned too high up on the adjusting studs of the isolators. When positioned high up on these threaded studs the engine will move about and produce vibration. What I call the STILT AFFECT.

To locate a coolant leak it is best to use a radiator pressure tester and connect it onto the exhaust manifold filler neck in place of the pressure cap. Pressurize the cooling system to 15 psi and find the leak.

A flexible coupling is a good add on. However, if the vibration issue is the result of low idle speed or the engine positioned high up on the isolators, these issues should be addressed first.

The flexible coupling should take the place of the existing solid coupling. I would not think it would add to the protrusion of the shaft on the outside of the hull."

*Before spring commissioning take another look at these concerns. Address them, make the necessary changes, and then enjoy another great sailing season on a truly terrific boat. All the best—and great sailing. —Jerry De Armond, C310 Association Editor SAY LIN, C310 #175*

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C320 Association  
Technical Editor  
Rod Boer  
2630 Horsham Rd.  
Halboro, PA 19040  
(215) 675-8286  
Rod.Boer@verizon.net



**Rig Tune and  
Sail Selection for  
Catalina 320.**

**Quantum Sails Mark  
Yeager's article  
(submitted for the  
C320 Tech section)  
can be found in the  
feature section and  
the C320 Association  
section of this issue**

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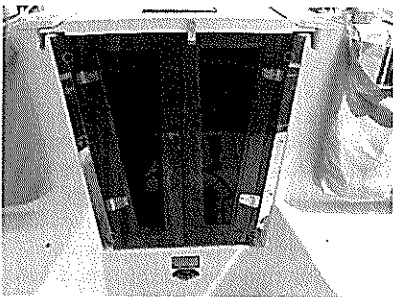
C310 Association  
 Technical Editor  
 Bill Lewis  
 514 Genevieve Avenue  
 Huntington Beach, CA 92648  
 (714) 960-5367  
 wol1@yahoo.com



*Let's begin with Reid Williamson's improvements. —Bill*

## Companionway Doors

After living with our 310 for a while it became apparent that the hatch boards were not the best way to close off the cabin so I decided that it was time to try a different approach. I had seen ads from a company that builds companionway doors, but after checking the company's web site I found that the prices were way to steep so I decided to make a set of doors myself. I built a prototype set out of oak because it is far less expensive than teak and we wanted to see how they would work and look on the boat. We loved them but I was not wild about the look of oak so early this summer I decided to rebuild the doors out of teak.



Depending on one's woodworking skills I would suggest making a prototype out of inexpensive wood like pine before making the doors out of teak or another expensive wood. That way you can make mistakes on the prototype and not worry about it. Make a template by tracing the outline of your hatch boards on a sheet of cardboard. This is a handy guide while building the doors. Just remember that the template is just a guide and the actual measurements need to come from the companionway opening on your boat.

The tools I used to construct the doors were a table saw equipped with a good miter gauge, dado blades for the table saw, a router, a biscuit cutter, a random orbital sander and lots of clamps.

I started by purchasing teak at a local lumberyard that stocks exotic wood. The teak came in boards 1 inch thick and 18" wide x 36" long. I ripped

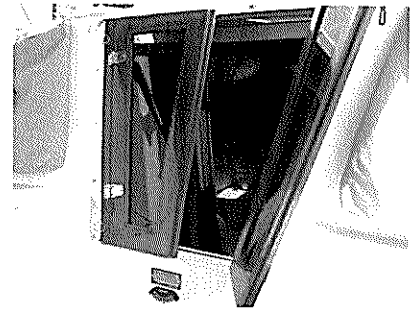
6 pieces 2-1/2 inches wide 2 pieces 3 inches wide and 2 pieces 1-1/2 inch wide. I cut the stock a little longer than the finished height of the doors to allow for errors and to allow for a 12-degree back bevel on the top of the doors to match the back slope at the top of the doors toward the bow of the boat. The 3-inch pieces form the center section of the doors and are wider to allow for a 1/2 inch shiplap joint. The remaining 2-1/2 inch pieces are used to construct the top and side rails. The 1-1/2 inch pieces are used to form the hinge post. In addition to the 1/2 inch shiplap in the center section there is also a 1/4 shiplap in the hinge post and corresponding door edge.

The top of the doors must be beveled back at 12 degrees to allow the sliding hatch to close completely. The center section of each door is made of 1/4 inch Plexiglas that I purchased at a local glass shop. I traced the shape I wanted and added an extra 1/2 inch on all sides to fit in a milled slot in the rails. I installed the Plexiglas in a 1/4 inch wide X 1/2 inch deep groove that I routed out on the inside edge of each rail. The Plexiglas is secured in the slots with silicon caulk. The rails are joined with double biscuits secured with West Systems 2 part epoxy thickened with teak saw dust.

To match the companionway opening it is necessary to build the doors with a 12 degree angle from top to bottom giving the doors a squared off triangular shape. To do this it is necessary to cut the frame pieces on the outside of the door at 12 degrees. The tops and bottoms of the vertical pieces also have to have a corresponding 12-degree angle. The over all height of the doors, at least on my boat, is 275/8 inches. The overall width at the top is 31 inches and at the bottom they are 18 inches wide. That includes 1-1/2 inches for each hinge rail or post.

The hinge posts fit in the slots for the hatch boards and are attached by drilling a hole through the post into the fiberglass and installing clevis pins. The pins fit snugly, hold the door tightly and are easy to remove if you need to take the doors off. I moved the locking hasp to the center so it would line up with the vertical frame pieces. The horizontal member is too narrow to attach the hasp.

The doors were varnished with 8 coats of Epifanes high gloss clear varnish. I found the trick to getting a good finish is to thin the first coat 50%, thin the second coat 25% and thin the remaining coats at least 5%. A light



sanding between coats is necessary. The project took about 6 weeks working on it in my spare time but they could easily be built in a weekend. —Reid Williamson, *Perfect Match*, Hull # 237

## Goodie Bag

Bill:

I realize that this is not high tech but the goodie bag is sure nice to have. A few months ago Catalinas of Santa Monica brought their boats to the public docks at Marina Del Rey. Gerry Douglas was there on his boat. I noticed he had 2 similar bags. So I ordered Sunbrella fabric and used my wife's sewing machine to make my bag. The last time I tried sewing on a machine I did a bad job trying to hem a pair of pants. My cost was about \$15 for the fabric. I checked the price with a canvas maker and he wanted \$100 to make a similar bag. Here are the details for construction.

Purchase one yard of Sunbrella fabric from a company found on the Internet. There are a number of outlets including West Marine. The fabric should cost about \$15 per yard.

Arrange on the fabric the things you want to put in the bag to determine the size of the goodie bag. Leave 1 inch all round the perimeter of the fabric for a hem. Cut the fabric and fold the hem under, pin and sew.

Determine the depth you need for each of your items and cut a long piece of Sunbrella fabric leaving about 1 inch all round top left and bottom for a hem. Then pin and sew the hem at the top. Don't hem the left or right end or bottom. Pin and sew the hem on left end of the fabric to the back leaving 2 inches at the bottom for a hem. Lay your items one at a time on the large piece of fabric and pin the front fabric to the back leaving sufficient room for the item to slip in and out of the pocket. Do that with all of your items working across the back fabric and gathering the front fabric into pleats for the pockets. Pin each pocket to the back fabric and pin the right end leaving 1 inch for the hem,