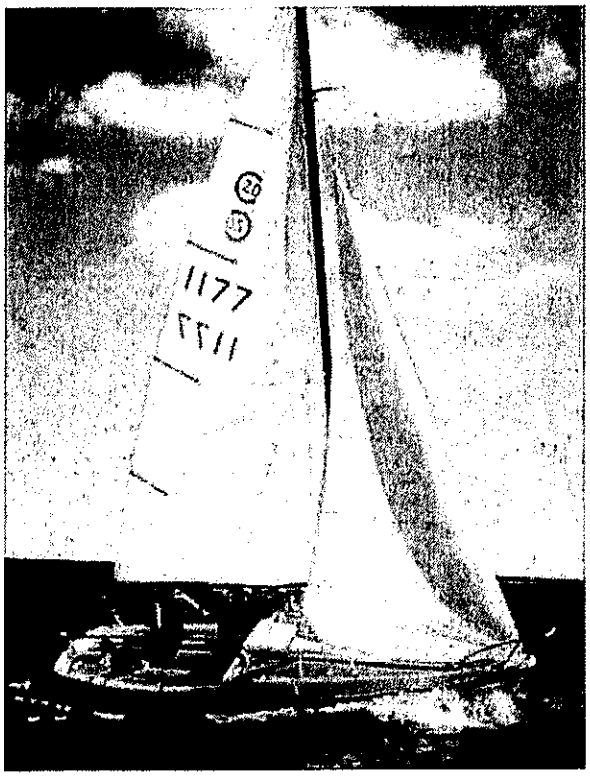
Cal-20 Fleet 7

Boat Maintenance and everything you always wanted to know



Presented by: Steve Rander

Boat Maintenance and everything you always wanted to know about your Cal-20

Structure of a Cal-20

The Cal-20 is made up of basically three fiberglass parts bonded together with multiple pieces of plywood bonded or mechanically fastened to support the fiberglass parts and keep the whole box section from twisting.

The hull liner is bonded in place and has flanges to take the plywood bunk tops and bulkheads which in turn are tabbed to the hull.

There are additional transverse bulkheads forward forming a chain locker and forward bunk support. There have been three different interior arrangements over the years the most notable difference is that the early Cal-20's had a full main bulkhead and later boats had posts to support the deck beam.

This structure is more complex then it first appears and relies on the sum of its parts to properly carry and transfer the dynamic sailing loads. Failure of any of the components may not appear to make any difference but it does. Loose bunk tops or bulkheads allow the box like structure to twist while sailing. This twisting may mean that your hull shape may not be optimal or the rig may be sagging and not developing the power it should.

Checking the structure:

Look for rotten plywood throughout the boat and replace it as soon as time and money will allow.

Look for loose tabbing on bunks and bulkheads where they meet the hull (even the one under the bunk) repair loose tabbing by removing the old, sanding both the plywood and hull surface with 80 grit and the bonding new tabbing (usually 3 laminates of 6oz fiberglass cloth) back in place with epoxy. Don't forget to look on the back side to see if the object you are bonding wasn't bonded on both sides.

Look for cracks in the liner and if found grind back and repair the laminate. Look to see if the cracked liner doesn't need some additional reinforcement. Check the deck in way of hardware and especially chain plate areas for rotten wood in both the deck and hardware backing blocks.

If things are really shot plan for a big winter project but in the mean time do an area repair in the high load areas.

Check the rudder attachments to the hull to be sure that their backing blocks are good and the bolts are not loose (Mine have a tendency to work loose).

Check for cracks in the deck along side the main hatch runners. These cracks often are structural and allow water to migrate to the 1X2 that the hatch track screws into causing it to rot out.
See diagram pg.40

Look and see if there is a piece of plywood under the cockpit (between it and the hull or liner) giving it support. If not you run the risk of having cracks form in the corners of the companionway cutout. This missing piece of plywood will also allow the deck to flex when sailing meaning the Headstay tension will constantly change.

The Cal-20 came from the builder with two lower shrouds and what was thought to be a robust rig. We have over the years worked to get more performance from our boats and have changed things from what the original builder had in mind.

The first thing we did was remove the forward lower shrouds so the jib would move easier across the deck as we tacked.
The next thing we did was to add a split backstay and an adjustment tackle And now we have loosened up the rig so we can move the center of effort forward and aft as we change directions from up wind to down wind.

All of these changes have come at a price and the price is that we are loading parts of the boat beyond what they were designed for.

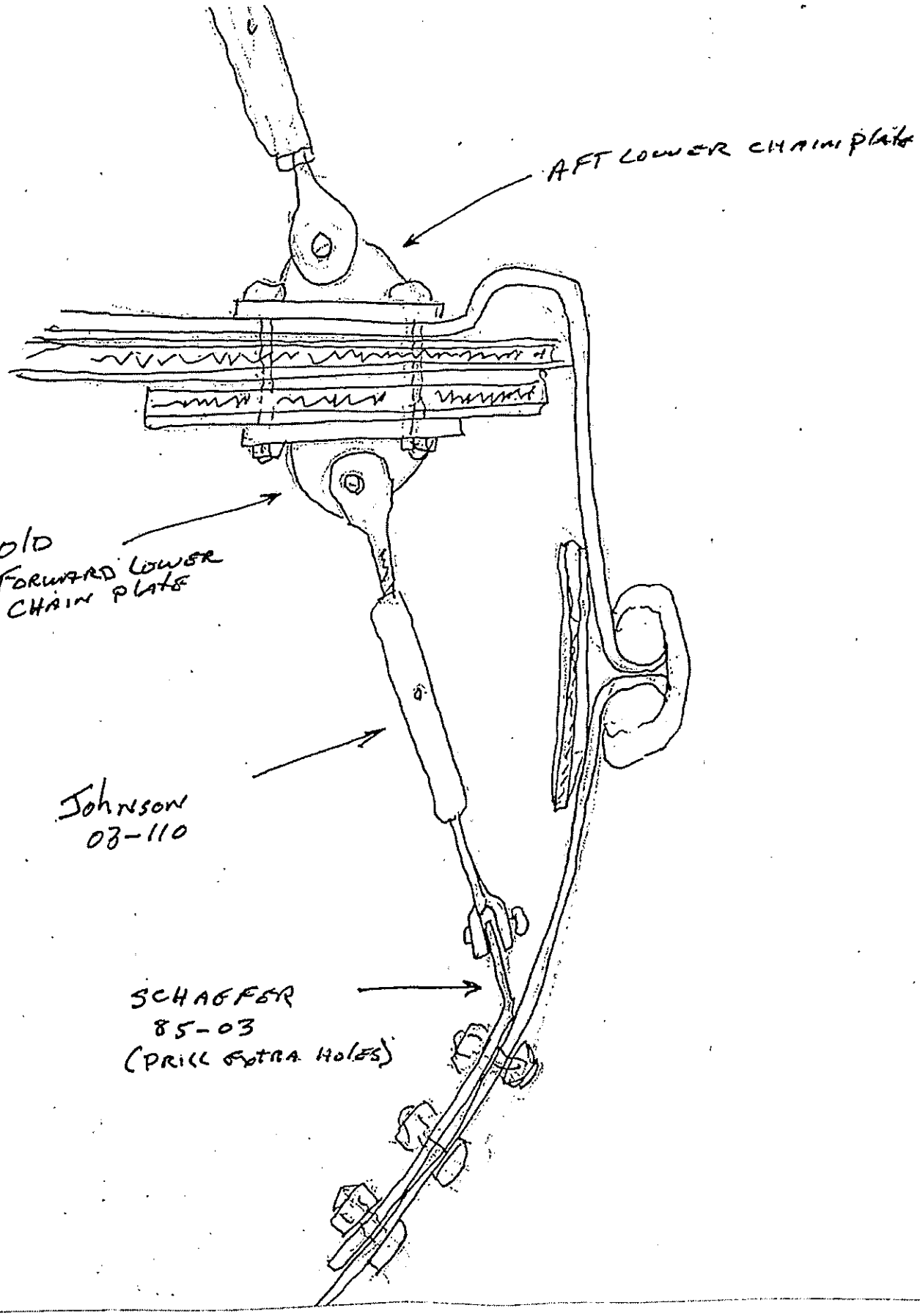
To keep our boats together in one piece we have to upgrade the strength of the attachment points that hold our rig up.

The first is the aft lower shroud attachment point. This can be done by removing the bronze casting from the deck that the forward lower use to attach to and bolting it on the underside of the deck to the aft lower shroud attachment point. Next get a ¼" turnbuckle and a small chain plate and attach them to the underside and bolt the chain plate through the hull side.
See diagram for chain plate pg.4

The next is the Headstay. It turns out that we can put so much tension on the Headstay with the backstay adjuster that it is possible to literally pull the deck off the hull.

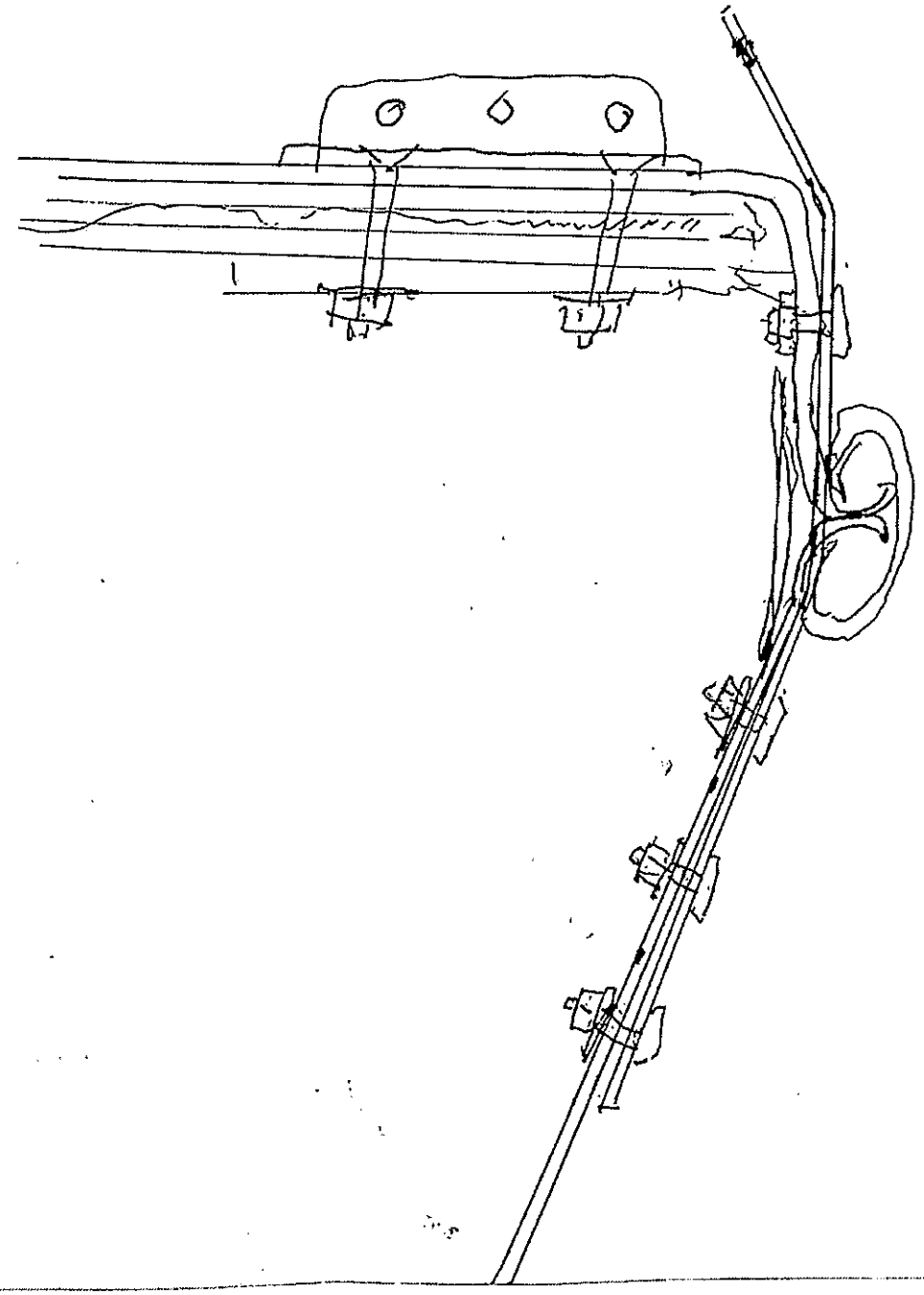
The fix is easy, just attach a chain plate to the bow so that some of the bolts go through the hull and attach the Headstay to that chain plate instead of the bronze deck fitting.
See diagram pg. 5

Reinforcing your aft lower chainplate



Use old forward chainplate casting installed below the deck and bolted to the aft casting.
Attach a turnbuckle to a chainplate and bolt it through the hull.

Adding new Headstay chainplate



Use a drill bit to cut a slot at the bow behind rub rail and slip new chainplate in. Bolt it securely to the bow.

Keel Bolts and Keel Fairing

Let's start with the bolts, if the keel is in good condition or you don't want to deal with it at this time the bolts can be removed one at a time while the boat is on the hard.
If the nuts are very rusty (probably why you want to replace them) it is unlikely they will come off and it will take a die grinder and cut off wheel to make a slice down one side. You can then place a cold chisel in the slit and break the nut into two halves. If you are unsuccessful have fun cutting the other side of the nut.
Once the nut is off you can pound the bolt down and out the bottom. Some fairing putty will most likely come with it.
If I am just replacing the bolts and not taking the keel loose for some reason you can take a little caulking cotton and wrap it around the shank of the new 5/8" 316 stainless steel flathead bolt and smear Life caulk around it and the hole before tightening the nut.

When you have done them all check to see that they are all close to the same tightness, how tight? 150 foot pounds should be enough (a 50 pound pull on a 3' breaker bar).

If this is all you are doing check the fairing around the keel and repair as needed remembering it is ok to fair it into the hull both fore and aft but not side to side. You may only put a ¼" radius at the sides.

Keel Fairing

Keel fairing can be nothing more then chipping a few spots and puttying in a few divots. For this epoxy putty is the best. If you are only dealing with a little rust try Pettit Rust Loc Primer. Remove any flaking rust and apply three or more coats following the directions on the can.

Major keel work is an undertaking and ask around before you start it. It is best saved for a winter project if you wish to sail in the summer.
Remove the keel and take it to a sand blaster. Have it blasted to bare metal (I am reluctant to say grey metal as some of our keels will have holes blown through them before they get to that point. Once blasted take it your work place immediately and epoxy coat the whole thing. Once the epoxy "B" stages lay it down on one side and smear epoxy putty on one side making it a pretty as you can. Grind down the surface when cured and finish the rough fairing. Sand again and roll the keel over. This side will need a sanding before coating then smear your putty on this side. Let cure, sand and putty again. Sand it again then stand it up and finish and fairing before you bolt it back on the boat.

Bolting the keel back on.

Check that the keel is straight front to back (some aren't) Adjust the bolt holes if needed. Check to see that the keel is not angled to the port or starboard side when it is bolted up and the boat is supported level side to side (may require washers placed under the flange between the hull and keel. If this is the case there is only one way to put the keel back on and that is with epoxy). If you need to epoxy it on come see me first and let's talk.
If the keel is going back on with Life Caulk just be sure and use enough, I still like a little cotton on the bolt shanks. Clean up all the extra caulk and then putty in the fairing remembering not to fair the sides.

Cal-20 Mast and Rigging

What mast and boom are on my boat?
A good rule of thumb is that hulls 70-340 had Spar Craft masts and booms and all others had Jensen masts and booms. The Jensen mast is 2 5/8"x 4" and the booms were 2 3/8"x 3 ½". Some early boats had tapered masts, those which came with them could use them until they failed but could not replace them. No other boats are allowed to use tapered masts.

The original mast basses were two piece cast aluminum with an aft hinge pin. The failure of these basses when mast rocking became popular lead to the rocking mast basses.

All rigging wire should be inspected often it is 1/8" stainless 1x19 wire with swaged end terminals. Great care should be exercised when stepping masts to be sure that the turn buckles are faced aft before raising the mast. Be carful about snagging wires while stepping.

If any wire end should look corroded or have a broken strand at the swag Or a kink in the wire it must be replaced before sailing again.
The same goes for bent turnbuckles. DO NOT STRIGHTEN A BENT TURNBUCKLE. Bent turnbuckles must be replaced.

All split rings or cotter pins should be tapped to prevent being snagged and pulled out by some sheet line.

Most everyone has eliminated the forward lower shrouds to make tacking easier. Due to this change the aft lower shroud attachment to the deck must be reinforced (see sketches).

The addition of a split backstay will give the racer much better control of the Headstay tension but it also means that the Headstay attachment to the bow must be reinforced (see sketches).

Putting a split backstay on is a simple matter of installing an extra chainplate on the stern and having the backstay cut and re-swaged by your local rigger. How high to cut it and what to use as a tackle is subjective (note not higher the 10' above the deck) so look around at other boats.

The whole mast rocking, loose rig thing started in California where the Cal-20's race without spinnakers. It improves both up and down wind performance and has been adopted here in Portland as the thing to do. With that said be aware that it does increase the load in every part of the standing rigging when it shock loads. Take care to secure your rig when you leave the dock so it is not banging around. It is also a good idea to try and reduce the shocks when sailing and crossing a motor boat wake.

Boom vangs can be of any configuration as long as they don't hold the boom up (No Kicker style vangs). The Cal-20 boom has so little extension beyond the measurement band the one needs to either rig an internal multi part purchases or side blocks at the end of the boom.

We find ourselves utilizing the Cunningham, outhaul, Vang, sheet and backstay to shape main as well as the backstay, halyard and sheets to control the jib so take the time to be sure all is in good working order and easy to reach.

How loose should the rig be? See rig adjustment at the dock for a starting place.

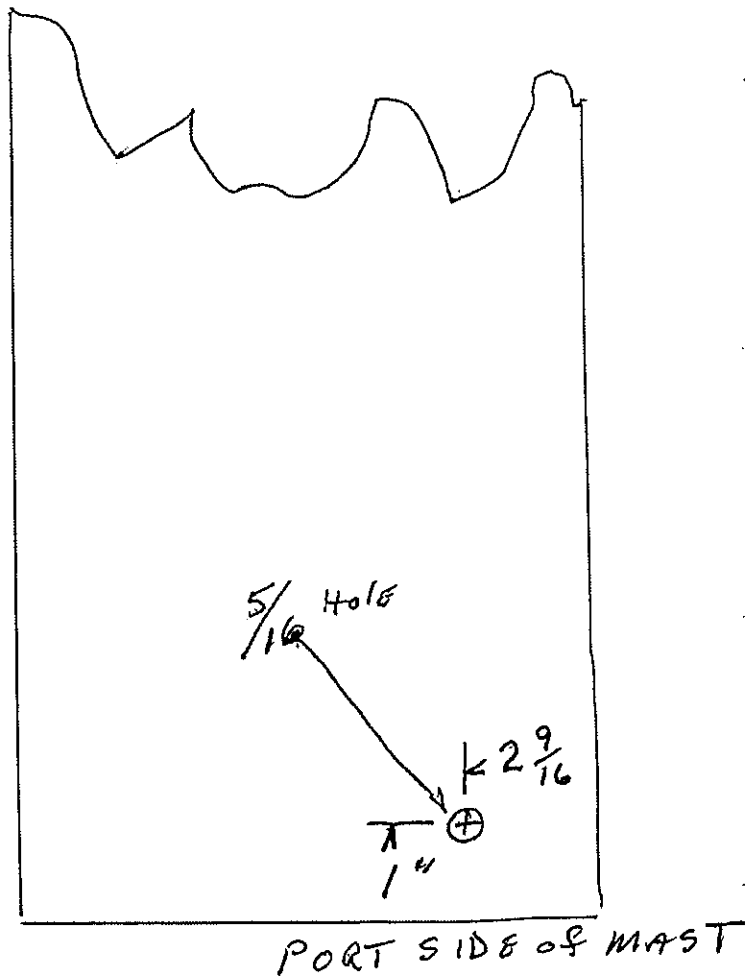
Most important and most overlooked is to PRE FLIGHT your boat before going sailing each time. Look at or touch every cotter pin, clevis pin, and shackle. Trace the standing and running rigging with your eyes to be sure that all is in order. By taking the time to do this you will be assured of having a great sail without fire drills or failures.

Drilling hinge pin location for Rocking mast step

Drill a 5/16" hole.

The C/L of the hole for the pin is 1" up from the bottom of the mast and 2 9/16" forward of the edge of the luff groove.

The hinge pin must be parallel to the spreaders and perpendicular to the mast head. Adjust for any twist in the mast if necessary.



Rig Adjustment at the dock

Most Cal-20's are setting up their rigs so that they can rake aft up wind and rock forward down wind.

Start with the rig loose enough and with enough toggles in the Headstay to allow the measurements in the drawing to be reached 28' +/- 1" from the upper black band to the top of the transom.

Allow enough slack in the adjustable backstay to allow 29" 5" +/- 1" when the rig is shoved forward.

Now adjust the uppers and aft lowers evenly on both sides of the boat so that when measured out from the mast parallel with the water 5' above the deck you can deflect the uppers out to 18" and the lowers out to 21". The jumpers should be adjusted to be slack (IE no load on them).

Please note: While this allows the rig to move forward and aft when it is sighted up from the bottom and the boat is under sail it should still be straight side to side but have a slight curve fore and aft.

Sailing a Cal with this rig configuration may place higher stress loads on the rigging then would a normally snug rig so take extra care to inspect wire ends, turnbuckles, clevis and cotter pins. Tape things to prevent snags or items coming loose. Don't fail to inspect under tape for wire failures.

When sailing in light air with motor boat chop it may be prudent to tighten things up to prevent the rig from slamming.

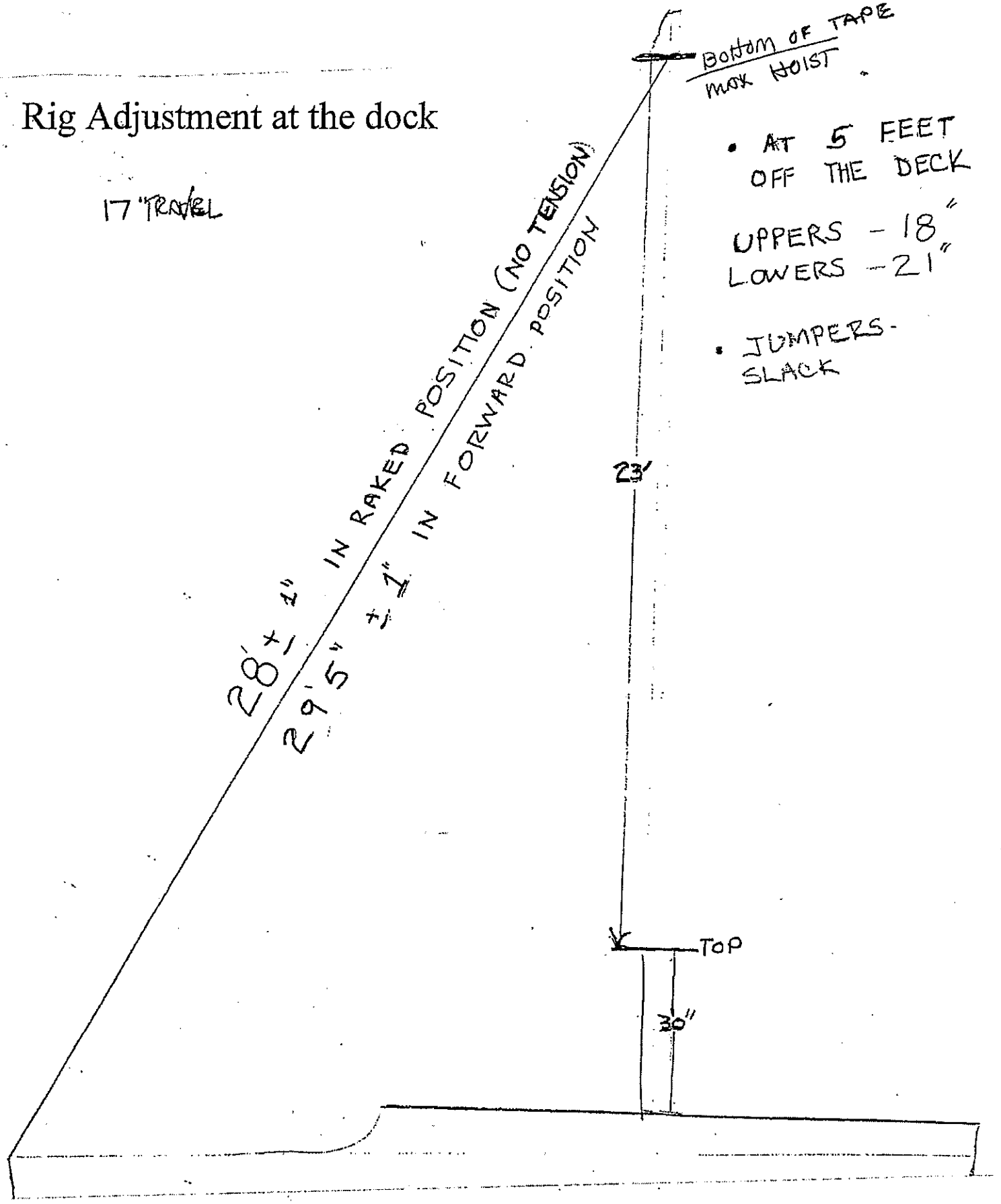
Shock cords or line can be used to prevent the rig from slamming while the boat is tied to the dock.

It also may be prudent to sail with the rig tightened up in heavy conditions.

These instructions are not an endorsement of the loose rig they are only given as an approximation of what other Cal -20 sailors are doing.

As skipper you are responsible for the safety and security of your crew and vessel.

Rig Adjustment at the dock



Going Faster

Bottom preparation is one of the major ways you can make your boat go faster right after learning to sail better, owning new sails and being first over the start line.
Bottom preparation can take as little or as much time as you can put into it but trust me every hour you put into your bottom will pay off on the race course.
I will start with the idea that you are a top notch sailor and are going out to win the nationals.
Take the rig out of the boat, take the keel off and roll the boat over so you can work on the bottom by pushing down not up.
Take all the paint off and fix any and all blisters by grinding them out and epoxy/glass repairing them.
Now take a 1x4 about 6 feet long and put some 80 grit sand paper on it (this comes in rolls with sticky on the back) and sand the bottom front to back. You will find that a couple blocks of wood glued to the back so you can hold on easier will help as will knee pads. It is also a good idea to lightly spray a little black lacquer on before you start to sand.
What you should see if the bottom was perfect is all the black gets sanded off and the bottom is smooth with no bumps or dips. Trust me this won't be the case. So mark the dips with a felt pen by outlining them sand the black out of the dips and mix up some epoxy and micro spheres into putty and fill all the hollows. Use a wide sheet rock knife or a piece of metal if you need something longer. Go home and have a beer then come back the next morning and spray a little black tracer again and sand. When you have come back about six days or so things might be getting close so you will move to an acceptable under water primer and apply a few coats. Now you get to sand with 120 grit paper. When things have gotten to the point that you can come out in the dark and shine one light on the bottom and move it here and there and like what you see you are ready to turn it right side up and put it back together.

The keel was touched on lightly under Keel bolts pg 6 but it will need a similar treatment as the bottom of the hull. Keep in mind that there are limits under the rules as to how thick you can make the keel so when you are all done be sure that at no point is it thicker then 1 ½".

The Rudder is the only thing left in contact with the water so if you are not using one of the fiberglass rudders but a wood one you must be sure that your rudder profile will fit the Cal-20 shape. There is some variation allowed and you will need to cut your blank out to the profile that you feel is best (I like the one that has the least amount of sweep back as the helm feel is lighter). Now you can proceed to shape the foil you like but again there is a maximum thickness when finished which is 2 ¼" and a minimum weight of 255 lbs. When you get all done be sure you have epoxy and glass coated the rudder so it won't absorb water and never leave it in the water when not sailing.

All that is left to talk about is the bottom paint. If you are headed to the nationals or are 100% into racing then the answer is NO BOTTOM PAINT.

The bottom should have been worked down with multiple coats of epoxy primer and sanded to ever finer grit until now you are down around 400 or 600 grit and all the scratches follow the flow of the water meaning none go the wrong way.

If you are not that zealous a smooth bottom with no bumps or blisters and a prep sanding of 120 grit in a fore to aft direction and VC17 or SR21 applied will be your fastest bottom.

The next fastest is a smooth bottom with no blisters or ruff spots and what ever paint you are using (if not one of the two above) applied as smoothly as possible and perhaps a light sanding with wet paper.

Now that you have the underwater part of the boat is in perfect shape we need to look at the sails.

If they are old they are slow and that can get to the point that if they are a few hard races old they are slow which is why there are rules as to how often you can buy new sails. So the best answer is to take the very best care of the sails you have. Use the newest ones you have on race day and use the older ones for practice. Remember you can only have one set on board when you race.
I will not go into sail set as there is lots of information around on that subject.

I will mention however that if the controls for adjusting the shape of your sails are not convenient and easy to reach fix the problems and move the controls so you can adjust them easily.

Just imagine that you are trapped to leeward at the start line and need to power up and pull a bit ahead and then alter the shape so that you are now pointing better then the boat above you as you pull ahead (now you get why controls are important).

Most all of us here have adapted the rocking mast and that is covered under Rig Adjustment pg.11

Knot meters and depth sounders. Any thing that you put thru the hull that protrudes into the flow of water will slow you down.

Should you put a knot meter in or not? If you do be sure that the housing does not stick down. Make a recess in the hull bottom so that when the thru hull is installed it can be faired in completely and only the impeller sticks down.

While a knot meter may be a great tool to help tune your speed another boat beside you is a better tool. So get your head out of the knot meter and look at the boats around you.

Depth sounders in Cal-20's should never be put thru the hull but glued to the inside with silicone. They will read just fine as long as you didn't glue it on top of a void in your laminate.

The only time I have found one of value racing a Cal is on the long distance races and then only of marginal help. It was better to look at the beach I was sailing next to and judge the slope and if the beach was curving out into the water ahead.

Speed Trap AKA Outboard Well

Here is one of the reasons that some Cal's go faster then others and why we pull our boats out over the winter so we can work on them a bit.

The photo on the next page shows a poorly fitting bottom plate on my outboard well. The little (no matter how small) lip hanging down catches water and creates drag.

The easiest way to fix this is to first be sure the plate is in with the right end forward (I have an arrow drawn on the inside in felt tip marker).
If it is in right and a bit of lip is hanging down take a hand saw and cut the bond loose between the wooden frame on the inside and the fiberglass bottom plate. It may take a couple cuts to create a bit of a gap. Mix up some epoxy putty and squeeze it into the gap. Clamp the gap closed until the epoxy cures.

Larger problems may take more drastic action like a total rebuild. There are only three things to remember in your zealous quest for the perfect motor well cover.
1) The cover must be removable without tools and it must pass water IE water poured in the well must flow out the bottom.
2) When you get all done with your creation the bottom plate can not be thicker then 3".
3) You can not caulk the plate in place or putty up all the seams so it can't be pushed out.

What ever you do to make your plate fit better will improve your performance.

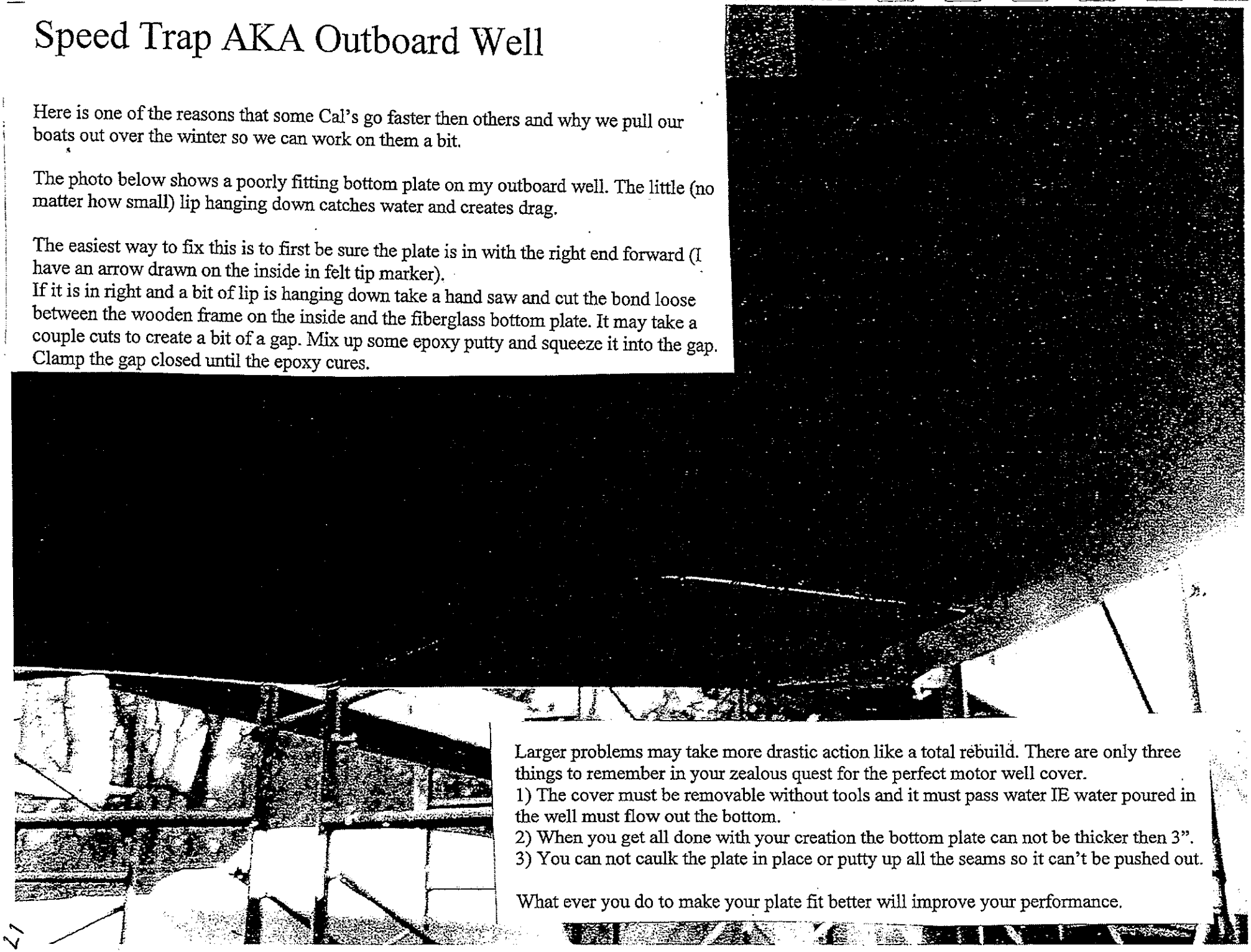
When the perfect the motor plate is done you should not be able to see any difference in the bottom shape, only a thin line around the outer edge perhaps the thickness of a pencil line. This plate must be easily removable and it must drain water because if it doesn't all your work will be for not as some measurer will not let you pass inspection. By the way I hope you did this work while you had the hull upside down.

Speed Trap AKA Outboard Well

Here is one of the reasons that some Cal's go faster then others and why we pull our boats out over the winter so we can work on them a bit.

The photo below shows a poorly fitting bottom plate on my outboard well. The little (no matter how small) lip hanging down catches water and creates drag.

The easiest way to fix this is to first be sure the plate is in with the right end forward (I have an arrow drawn on the inside in felt tip marker).
If it is in right and a bit of lip is hanging down take a hand saw and cut the bond loose between the wooden frame on the inside and the fiberglass bottom plate. It may take a couple cuts to create a bit of a gap. Mix up some epoxy putty and squeeze it into the gap. Clamp the gap closed until the epoxy cures.



Larger problems may take more drastic action like a total rebuild. There are only three things to remember in your zealous quest for the perfect motor well cover.
1) The cover must be removable without tools and it must pass water IE water poured in the well must flow out the bottom.
2) When you get all done with your creation the bottom plate can not be thicker then 3".
3) You can not caulk the plate in place or putty up all the seams so it can't be pushed out.

What ever you do to make your plate fit better will improve your performance.

Required Safety Equipment and Gear On Board

We race Cal-20's here on the river in OCSA sanctioned races and as such utilize their Sailing Instructions and course charts. Additionally we are required to comply with the Bylaws of the Cal-20 Fleet and Local Fleet 7 bylaws. PIYA regulations and USCG requirements must also be met.

The following is a synapses of all the requirements and spell out what must be on board to legally race. There are a couple conflicts in the regulations which are spelled out at the bottom of the next page and which regulation takes precedence. The pages that follow are the complete rules and regulations.

Cal-20 By-Laws Require:

1. Sails for Class racing shall be limited to a mainsail and a class jib. The cloth weight shall not be less than three ounces.

SAFETY EQUIPMENT

1. All required government safety equipment must be carried. This includes a Type 1, 2 or 3 life preserver for each person; a bell, whistle or a horn; one throw-able Type 4 life preserver; and one fire extinguisher (if an engine or fuel is carried).
2. Suitable ground tackle must be carried on board at all times. The minimum allowable ground tackle is an 8-pound Danforth anchor or its equivalent, with 10 feet of 3/16 inch chain and 100 feet of 3/8 inch nylon line.

Cal-20 Fleet 7 Additional By-Laws Require:

1. Sails, Spinnaker equal to PHRF Standard size and not lighter then 3/4oz nylon (.05 poly is approved)
2. Spinnaker pole of 7'4" inside jaw to inside jaw
3. Class whisker pole may be used with jib only
4. Outboard engine meeting the requirements of PIYA Cat III.

OCSA Safety Requires:

1. All Boats comply with USCG requirements for recreational boating.
2. All Boats comply with PIYA category IV regulations
3. Sail numbers required on Main Sail and Spinnaker
4. Navigation lights after sunset

PIYA category IV requires:

1. Soft wood plugs for any below water opening attached with short cord.
2. Adequate paddle(s) or oars
3. A commercially manufactured anchor, 150' of line and ½ the boat length of chain.
4. Yachts name on all float-able safety gear.
5. Navigation lights after sunset
6. A Bailer, bucket or bilge pump.

7. A flotation device with a whistle, reflective tape and the ships or crews name for every person on board.
8. Engine, tanks, vents, batteries, etc. meet USCG requirements.
9. A signed copy of the PIYA regulations on board.

USCG requires:

1. State registration
2. State numbers and sticker
3. Life jacket for all on board
4. Type IV throw-able device
5. Three day/night flares
6. Ventilation for areas which hold fuel tanks
7. One B-1 fire extinguisher
8. A whistle or horn
9. Navigation lights after sunset
10. A type I, II, III MSD if a toilet is installed.

The only conflicting requirements I have found are the old Cal-20 requirement for 100 ft of anchor line and PIYA's requirement of 150' (150' takes precedence)

The PIYA requirement for paddle(s) or oars in Cat IV and the Requirement for outboard in Cat III and Cal-20 Fleet 7 By-Laws (outboard takes precedence)

Class Association

"One Design sailing for everyone. . ."

Cal20 Bylaws and Constitution

By-Laws

ARTICLE I - ELIGIBILITY

1. A Cal 20 is eligible to compete in one-design competition only if it has a valid Class measurement certificate and races in the configuration of that certificate, has been properly registered, and is owned by an Active or a Special Member of the Association.
2. Skippers in one-design Class races shall be Active or Special Members of the Association. The skipper must be the helmsperson in Class Championship qualifying regattas.
3. All members of the crew must be Corinthians.

Back to Top

ARTICLE II - SANCTIONED EVENTS & HONOR AWARDS

1. Any series for a Cal 20 Championship territorially greater than one Fleet, or events for perpetual or semi-perpetual trophies, must be sanctioned by the Fleet in whose water the event is held.
2. The Executive Committee may outlaw any event for cause.
3. One HONOR AWARD chevron may be displayed on the mainsail representing the skipper's highest achievement within the Class.
   a. The following chevron colors signify:
      Gold: Class Championship
      Red: District Championship
      Black: Fleet Championship
   b. Honor awards are presented to the skipper, not to the boat. They shall be retained by the skipper for use on any Cal 20 that he or she may sail while a member of the association.

Back to Top

ARTICLE III - CLASS CHAMPIONSHIP

1. The Cal 20 Class Championship shall be held annually to determine the champion of the Cal 20 Class. The Cal 20 Class Champion Perpetual Trophy shall be held by the winning Fleet or Unattached Member until the next Class Championship series, subject to the approval of the Executive Committee.
2. The Class Championship regatta is an open event until such time as the Governing Board deems it necessary to make it a restricted event. The Governing Board shall set the method of determining qualifications for the right to enter the regatta.
    a. The allocation for each Fleet will be based on the number of Cal 20s owned by Active Members in the Fleet. The Governing Board shall announce the allocations, if any, on or before May 1 of each year.
    b. In order to qualify for the Class Championship, the skipper/helmsperson must be an Active member who has owned 1/3 of a Cal-20 for at least three months. With prior approval from the Class Championship Committee, a skipper who qualifies may sail a Cal-20 other than the boat in which he or she qualified.
3. Each Cal 20 must be certified as eligible by the Measurement Committee and the Secretary of the Association prior to the first race. The Race Committee or the Measurement Committee may require a re-measurement of the hull, spars or sails at any time prior to the trophy presentation.
4. The Cal 20 Board of Directors will schedule the venues for Class Championship regattas after carefully evaluating locations that will best help the development of the Cal 20 Class and of individual fleets within the Class, and will provide enjoyable and fair racing to the members of the Association.
5. The responsibility for arranging and providing proper facilities, entertainment, prizes, etc. shall rest with the Fleet on whose waters the series is held. In this regard the host Fleet shall be guided by the Governing Board and the Class Championship Committee.
6. To qualify as a Class Championship, the series must have at least three completed races. There will be seven races and no Ã¢â‚¬Â"throw out.Ã¢â‚¬Â□
7. Total crew for each boat in Class Championship competition is limited to a maximum of four persons and a minimum of two. Children under twelve years old are not counted as crew.
8. No Cal 20 shall be prevented from entering a re-sail of any uncompleted race for any cause arising out of an incomplete race.

Back to Top

ARTICLE IV - SPECIFICATIONS

1. The official number allocated to each Cal 20, shall be permanently molded or stenciled in legible numbers in a visible place on an interior surface of the hull.
2. HULL:
    a. Construction of all hulls shall be of molded fiberglass in or over an approved mold manufactured by Jensen-Wenke or its successors. Hull shape or hull-stiffening modifications are not allowed except as necessary for repairs. In those cases, proof of return to a pre-repair condition shall be certified and approved by the local Fleet measurer.
    b. Because of the assumed impact on boat speed, any strengthening or stiffening below the waterline shall be disallowed except where absolutely necessary to preserve integrity. Limited strengthening above the waterline which does not affect boat speed (such as mast support members or hatchway corners) may be approved by the local measurer if it's deemed necessary to preserve the integrity of the boat.
    c. A single fore and aft stringer may be installed on each side of the bow to reduce bow deflection (oil-canning). The stringers must be located inside the hull, horizontally, halfway between the forepeak berth and the deck. The stringer must terminate before the mast step deck beam or the bulkhead. It may be wood, foam or PVC material and must be bonded to the hull. The maximum profile dimension of the stringer cannot exceed two inches.
    d. Major repairs above or below the waterline must not exceed the original strength or stiffness, or lighten the boat from its pre-repair condition. Such repairs are to be made with similar materials when possible, i.e. resin for resin, wood for wood of similar density, weight, strength and stiffness. Polyester resin may be replaced with epoxy resin. When original materials, replacement parts or their equivalents are not available for timely refurbishment or repair, a member may petition the Chief Measurer for permission to use substitute parts or materials.
    e. A single cockpit support connecting the cockpit floor to the cabin sole pan may be installed to prevent cockpit corner cracking.
    f. The use of carbon fiber and other "hi-tech" materials to provide equal or increased stiffness with a decrease in weight is strictly prohibited.
    g. Strengthening the upper and/or lower gudgeon fastenings with a backing plate, or a backing block mounted on the interior side of the transom, shall not be construed as a stiffening modification, and need not be approved by the local Fleet Measurer.
3. MOTOR WELL:
    a. Cockpit drainage through the motor well is required for all boats. Taping-over, glassing-in or sealing the motor well in any form is prohibited. The motor well must be self-draining and the well plug removable from the cockpit. The thickness of the plug is limited to 3 inches. Any attempt to fill the well with foam is illegal.
    b. Boats not equipped with a motor well by the builder shall carry 20 pounds of ballast weight in the location of the missing motor well. Adequate cockpit drainage is required.
4. KEEL:
    a. The leading and trailing edges of the mounting flange may be faired into the hull. A .25 inch fillet is allowed between the sides of the flange and the hull.
    b. The vertical fin may not be altered from the original factory profile. It may be faired, but

26

the maximum thickness shall not exceed 1.5 inches. Maximum profile cord lengths:
6 inches down from flange: 49.750 inches
12 inches down from flange: 47.750 inches
18 inches down from flange: 45.625 inches.

c. The bulb may be faired but not altered in shape.

5. RUDDER:
   a. The rudder must weigh at least 25 pounds with gudgeons, and have a maximum thickness of no more than 2.25 inches.
   b. The rudder profile shape must be maintained as delivered from the boat's builder. The "origin" point for the rudder profile control dimensions is on the rudder's in-the-water leading edge or its continuation. This point is established by intersecting the rudder's leading edge with a perpendicular line to the bottom of the transom's center line. The first axis is established by connecting the origin with the tangent point between the arc of the leading edge and the circular arc of the bottom of the rudder. The second axis is established by a line through the origin, perpendicular to the first axis. Chord lengths are measured between the leading edge and the trailing edge perpendicular to the first axis. The bottom of the rudder is defined as a line tangent to the circular arc at the bottom of the rudder and parallel to the second axis. The chord length along the second axis shall be 13.5 inches, plus or minus 1 inch. The chord length 18 inches above the bottom of the rudder shall be 16.75 inches, plus or minus 2 inches. The depth as measured from the origin to the bottom of the rudder along a line parallel to the first axis shall be 31 inches plus or minus 1 inch. The trailing edge must be convex. The lower curve shall be a 7-inch minimum radius circular arc tangent to both the leading and trailing in-the-water edges. The aft rake, measured from a point 18 inches above the bottom of the rudder, shall be 5.5 inches, plus or minus 2 inches from a point aft of the distance measured from a straight line from the transom.
6. HATCHES: All hatches must be carried on board while racing. The main hatch slider and crib board must be constructed of wood, fiberglass or plastic. The main hatch slider must be carried in place and there may not be any fastened obstruction that limits the horizontal opening of the hatch to less than 16 inches. The cockpit lazarette hatch must be hinged and functional.

Back to Top

ARTICLE V - INTERPRETATION OF SPECIFICATIONS

1. Specifications, however complete, cannot anticipate every situation that may arise. If a point is not covered, or governed by the dictates of common sense, a ruling must be obtained from the Measurement Committee. In interpreting any point not covered, or words of obscure meaning, the Measurement Committee will consider the intended meaning rather than any technical mis-construction that may be derived from the wording. Rulings shall be based on the principle to maintain the Cal 20 as designed by C. William Lapworth, built by Jensen-Wenke or its successors, and configured as allowed by the Association Bylaws.
2. Questions regarding the interpretation of Bylaw restrictions, specifications, or the legality of anything about the boat, rigging, sails or equipment, shall be referred in writing to the Chief Measurer. The Measurement Committee shall make a prompt decision which shall be published in the following issue of the Association newsletter.
3. Rulings and decisions made by the Measurement Committee during the preceding 12 months shall be submitted to the membership for ratification by April 1 each year. Partners in a boat must vote as a single entity-one vote per boat. Returned ballots must be postmarked prior to May 15 to be counted in the tally. If ratified by a simple majority of the votes cast, these rulings shall be added to the Bylaws. If rejected, they become null and void effective July 1 or at the Class Championships-whichever comes first. Rulings made by the Measurement Committee after April 1 become effective immediately after the Class Championship.

Back to Top

ARTICLE VI - MEASUREMENTS AND CERTIFICATES

1. A Cal 20 must have a valid measurement certificate that is no more than two years old to compete in any sanctioned one-design event. Any subsequent measurement supersedes all previous certificates.
2. Fleet Measurers shall be elected by their respective Fleets and shall derive their authority from the Chief Measurer. Measurers shall not measure their own boats.
3. A new measurement certificate may be required if alterations or repairs affect more than half of the hull, or are extensive enough to warrant a re-measurement in the opinion of the Measurement Committee.
4. WAIVERS: A boat that does not measure within stated specifications due to factory tolerances may petition for a waiver. Only "as-built" variations that are not correctable in a reasonable and practical manner are eligible. The measurer may use any means to verify the need for a waiver, including disassembly or drilling, with any cost borne by the petitioner. Such waivers shall relieve only the subject tolerance and shall not permit broader modification. Waivers shall be requested by the appropriate Fleet Measurer, approved by a majority of Fleet Captains, and issued by the Association Measurer. Waivers may be subject to yearly review when so requested by any three Fleet Captains.
5. Reasonable grounds must be shown before a Cal 20 with a valid measurement certificate can be subject to a re-measurement or a protest of measurements. Each measurement protest of a certified Cal 20 must include a $15.00 filing fee, which is returnable if the protest is sustained. A Cal 20 is always subject to re-measurement by order of the Governing Board, Measurement Committee, or the Class Championship Committee, in which case the filing fee does not apply.

Back to Top

ARTICLE VII - MINIMUM WEIGHT AND BALLAST

1. All boats shall weigh a minimum of 2040 pounds with only the required equipment on board. For the purposes of this article, a Cal 20 consists of a hull and deck (including items permanently bonded or affixed to them), cast iron keel, standing rigging, running rigging, rub rails, rudder, tiller and spars. All items included in the minimum weight must be carried aboard while racing.
2. The minimum weight must also include:
   a. Safety equipment of Article XIII Ã¢â‚¬â€œ Section 1.
   b. Main hatch slider and crib boards.
   c. Berth drop boards (3/8" plywood).
   d. Lifting sling (If the lifting sling is not carried while racing, the scale should be "zeroed-out" to exclude the weight of the sling during the measurement process.)
   e. Anchor, chain, and rode.
3. BALLAST: Any boat weighing less than 2040 pounds in measurement trim shall add ballast to bring the boat up to the minimum weight. Ballast is defined as materials serving no useful purpose aboard a Cal 20 other than dead weight. However, all or part of the ballast may be comprised of an engine and fuel. Also, a battery, not including cable ties or supports, and/or a portable marine head may be used as ballast. Required ballast weight, if any, shall be listed on each measurement certificate. Ballast shall not be moved while racing, and its removal shall void the certificate.

Back to Top

ARTICLE VIII - SPARS

1. The mast and boom shall both be made of oval, hollow extruded marine grade aluminum. The wall thickness must be uniform for the full length of the extrusion. Redistributing or reducing weight is not allowed but internal reinforcement is permitted in the bottom 9 feet of the mast section and reasonable boom reinforcement is allowed in the area surrounding the boom vang connection.
2. Only boats that came from the builder with a tapered mast as original equipment are allowed to have a tapered mast (hull numbers 1-124). If the original mast is replaced for any reason, it shall be replaced with a non-tapered mast in accordance with class rules.
3. The minimum oval mast shape is 2.5 inches by 3.875 inches. Approved mast sections are:
   ZEPHYR #3
   SPARCRAFT S-104
   JENSON 2.5" X 3.875"
4. The minimum allowable boom circumference is 7.0 inches.
5. Visible bands of a contrasting color shall be affixed to the mast and boom.
   a. The distance from the top edge of the bottom mast band to the bottom edge of the top mast band shall not exceed 23 feet 0 inches.
   b. The top edge of the bottom mast band shall not be more than 30 inches above the deck.
   c. The distance from the aft edge of the mast to the forward edge of the boom band shall not exceed 10 feet, 0 inches.
   d. Non-standard mast or boom configurations or controls are not allowed. This includes, but is not limited to, coring or cutting holes in the spars for the purpose of reducing weight, permanently bent spars, rotating masts and spar bending devices.

Back to Top

ARTICLE IX - STANDING RIGGING

1. Standing rigging shall be essentially as shown on the plans. No changes to the standing rigging are permitted except:
   a. An adjustable backstay is allowed.
   b. Forward lower shrouds are optional.
   c. Turnbuckles may be added above the spreaders to adjust the jumper shrouds.
2. Standing rigging shall be stranded stainless steel wire. Minimum shroud and headstay wire size 3 millimeters (slightly larger than 1/8 inch). The minimum size for backstay and jumper wires is 3/32 of an inch.
3. The spreaders shall not be less than 30 inches long, measured from the mast to the inner edge of the shroud.
4. The headstay may be attached to a "bow tang" or steel strap, through-bolted to the bow, rather than to the stock plate on the foredeck, if the "J" measurement is not greater nor less than 7 feet, 4 inches (+1 inch or -0.5 inch). If the Cal 20 does not have a bow tang, the "J" measurement shall be as delivered from the builder.
5. The load of the aft lower shrouds may be transferred to the main hull through the standard deck fitting and through-deck fittings to an interior chainplate via a turnbuckle, cable and/or tang.
6. The backstay must be attached to the transom and may be split, up to a distance of ten feet above the deck, to permit a symmetrical arrangement.
7. Internal mast tangs for the shrouds, headstay or backstay are not allowed.

Back to Top

ARTICLE X - RUNNING RIGGING

1. The mainsheet must be rigged as specified on the plans at all times. The quarter blocks must always be used in a normal manner, fastened to the top surface of the cockpit coaming. The blocks must be positioned aft of a line projected from the vertical surface of the cockpit seat. A double-ended continuous mainsheet or "head knocker" may be used if the mainsheet bridle system remains basically unchanged. Mainsheet travelers or other systems that control the boom or provide additional leverage are not allowed.
2. There are no restrictions on jib sheeting systems.
3. Downhaul devices on or near the tack of the jib are not allowed.
4. Halyards must run externally along the mast. Halyard locks located above the gooseneck are not allowed.
5. Any form of boom vang is permitted, as long as it is not capable of supporting or lifting the boom.

Back to Top

ARTICLE XI - SAILS

1. Sails for Class racing shall be limited to a mainsail and a class jib. The cloth weight shall not be less than three ounces.
2. SAIL LIMITATIONS
   a. The purchase and measurement of sails shall be limited to one suit per boat in each calendar year. During the first calendar year of class competition, one additional suit of sails is allowed. In the event of a legal sale of a Cal 20 in its entirety, it's considered that the boat is newly registered and thus in its first calendar year of competition, which permits the purchase of an additional suit of sails.
   b. In the case of loss or damage to sails, the owner may petition the Executive Committee for permission to purchase a replacement sail or sails. The owner may also petition the local Fleet to use sails to complete a regatta when damage or loss has occurred.
   c. A Cal 20 which crosses 36 degrees North Latitude or 135 degrees West Longitude in either direction to compete in the Class Championship may acquire an additional suit of sails for that purpose.
   d. Fleets shall be responsible for making suitable provisions to govern use of sails in local races.
   e. All sails shall be measured and stamped prior to use. They shall be stamped on the starboard tack of the sail by the Fleet Measurer with the official Cal 20 stamp. The Fleet Measurer shall include his initials within the insignia, plus the date the sail was measured, date of acquisition, and the hull number. The Chief Measurer shall issue these stamps to all certified Fleet Measurers. Sails which are not stamped, and have the proper information recorded, shall be considered illegal. The Fleet Measurer shall also keep a record of this data.
   f. The Cal 20 sail insignia shall be a 15 inch (outside diameter) letter "C" of a two-inch strip width. It shall contain the number "20" in figures 6 inches high and one inch wide. The insignia shall be placed on both sides of the mainsail between the two upper battens. The Cal 20 hull number or USSA sail number shall appear on both sides of the mainsail below the Class insignia in numerals at least 10 inches high.
3. SAIL MEASUREMENTS
   a. All sail measurements shall be made with the sail stretched sufficiently to remove wrinkles.
   b. It is the intent of all sail measurements to prohibit any abnormalities or gadgets intended to increase sail area, such as an indentation on the leech at the point of girth measurement. Any deviation from this stated intention shall be cause for disqualification.
4. MAINSAIL -- The following rules apply to all mainsails used in competition after January 1, 1999.
   a. While racing, the mainsail shall not be stretched beyond the inner edges of the mast or boom bands.
   b. The leech dimension, measured in a straight line from the head point to the clew point, shall not exceed 24 feet, 10 inches.
   c. Girth measurements shall be measured as the shortest possible straight-line distance swung across the mainsail. They shall not exceed the following measurements when taken from the outer edge of the boltrope to the edge of the leech:
      1/4 Girth: 8 feet, 7 inches
      1/2 Girth: 6 feet, 5.5 inches
      3/4 Girth: 3 feet, 9 inches
   d. Leech Measurement points:
      i. The head point is the intersection of the luff at the outer edge of the bolt rope (extended if necessary) with the highest point of the sail, measured 90 degrees to the luff.
      ii. The clew point is the intersection of the foot and the leech, each extended if necessary.
      iii. The leech half point is found by folding the head point to the clew point and applying equal tension to the two halves of the leech. The quarter and three-quarter points are found by folding the clew point and the head point to the leech half-point and applying equal tension.
      iv. Locating a corner measuring point may require the extension of the line of the edges of the sail adjacent to that point. Placing a batten along the edge can often help establish this extension.
      v. The position of leech points may be affected by hallows. Where a hallow of more than 3/8 of an inch exits in the vicinity of a measurement point, the sail shall be flattened in that area and the hallow bridged by a straight line. A batten may be useful in establishing that straight line.
   e. The head shall have a maximum width of 4.75 inches measured perpendicular to the luff or its extension, including the bolt rope and headboard. The headboard must not exceed 3.625 inches.
   f. Upper and lower battens shall not exceed 24 inches. The two intermediate battens shall

24

not exceed 26.5 inches.
   g. The use of shock cord, or any similar device in place of or in addition to the normal mainsail bolt rope is prohibited.
   h. The cunningham hole shall not be more than 9 inches from the tack. This is measured from the bottom edge of the cunningham grommet to the bottom edge of the foot bolt rope.
   i. An adjustable leech cord to control the leech of the main is permitted.
   j. Loose footed mainsails are not allowed.
5. CLASS JIB
   a. The mid-girth of the jib, measured from the mid-points of the luff and leech, shall not exceed 50% of the length of the foot, and any other intermediate girth do not exceed a value similarly proportional to its distance from the head of the sail.
   b. The maximum width of the head shall not exceed 2 inches. The head shall be construed as a line projected perpendicular from the luff to the bearing point of the head ring to the leech.
   c. The luff, measured from the head of the sail to the bottom of the sail at the tack, shall not exceed 20 feet, 2.25 inches.
   d. The leech, measured from the head of the sail to the bottom of the sail at the clew, shall not exceed 18 feet, 2.25 inches.
   e. Maximum luff length is 20 feet, 6 inches, from the bottom of sail at the tack to the intersection of the projected luff line with the projected leech line.
   f. The luff-to-clew dimension (LP), from the edge of the sail at the clew to the edge of the sail at the luff, measured perpendicular to the luff, shall not exceed 8 feet, 5 inches.
   g. The foot roach shall not exceed 10 inches measured from the edge of the sail to a straight line between the tack and clew intersection, and must follow a fair curve.
   h. The jib shall be attached to the forestay with hanks not closer than 12 inches and not further apart than 60 inches. If cloth hanks are fitted, they shall not be wider than 1.5 inches. The use of zipper luffs or other techniques to fully enclose the headstay shall not be permitted.
   i. The jib leech may be supported by a maximum of three equally spaced battens, each with a length of not more than 12 inches.
   j. The leech of the jib may not be convex.
   k. Adjustable leech and foot cords are permitted.

Back to Top

ARTICLE XII - RACING RULES

1. All Cal 20 one-design races shall be governed by the Racing Rules of Sailing (RRS), including the US Sailing prescriptions. If the RRS conflict with Association rules, the latter shall prevail. Local Fleet rules shall not apply in Inter-Fleet races.
2. The 720-degree turn penalty as described in the RRS will apply to all regattas unless otherwise specified by the Class Association.
3. WHISKER POLE:
   a. Maximum lengthÂ8 feet, 6 inches including fittings.
   b. When set, the whisker pole shall only be connected to the mast and jib.
   c. Equipment or rigging to control whisker pole movement is not allowed. Whisker pole launchers are not allowed.
4. Kelp cutters/pushers are not allowed.
5. During a race, neither the headstay, shrouds, nor jumpers shall be adjusted. The use of any device, including the crew's hands or bodies, to change the tension on the shrouds is prohibited.
6. Hiking straps are not allowed. The crew's use of any rope, wire, handhold or special device, other than the jib sheet and/or main sheet (held solely in the crew's hand) for the purpose of supporting the crew's weight outboard, is prohibited. Footrests placed inside the cockpit are permitted.
7. No person's torso may extend below the rub rail or its imaginary extension parallel to the horizon.
8. The headsail may not be changed during a race, but it may be dropped for the purpose of de-powering.
9. Electronic devices that can combine information from two or more sources, compare mathematical information or have a memory are not permitted.
10. Adjusting the backstay is permitted at any time.
11. There shall be no penalty less than disqualification for any proven violation of a published Association rule. This penalty is obligatory. The responsibility of knowing the rules rests with the member.
12. A transom mounted batten or "backstay whip" to hold the backstay away for the boom while jibbing is permitted.
13. An adjustable mast step that allows variations of the "J" measurement is not allowed.
14. Shaving or rounding the leading edge of the mast base to facilitate rocking the mast forward is allowed.

Back to Top

ARTICLE XIII - SAFETY EQUIPMENT

1. All required government safety equipment must be carried. This includes a Type 1, 2 or 3 life preserver for each person; a bell, whistle or a horn; one throw-able Type 4 life preserver; and one fire extinguisher (if an engine or fuel is carried).
2. Suitable ground tackle must be carried on board at all times. The minimum allowable ground tackle is an 8-pound Danforth anchor or its equivalent, with 10 feet of 3/16 inch chain and 100 feet of 3/8 inch nylon line.

Back to Top

Constitution

ARTICLE I - NAME AND OBJECTIVE

The name shall be the California 20 Class Association, hereafter referred to as the Cal 20 Association. Its objective shall be to promote Cal 20 racing under the rules of this Association, and to vigorously protect the one-design features of the Cal 20 as designed by C. William Lapworth, built by Jensen-Wenke or its successors, and configured as allowed by the Association Bylaws.

Back to Top

ARTICLE II - POLICY

1. To cooperate with other yachting organizations.
2. To insist on strict observance of the Association rules.
3. To promote fair competition in Cal 20s so the skill of the skipper and crew will be rewarded. Everything in the Specifications, Constitution and Bylaws is intended to foster racing in boats that are one-design in all critical areas, such as hulls, foils, weight and sail plan.
4. To keep the cost of acquisition and upkeep of Cal 20s within modest limits without sacrificing high standards of performance and seaworthiness.

Back to Top

ARTICLE III - JURISDICTION

The Association has jurisdiction over all Cal 20 Class competition. Its rules govern all Cal 20 one-design races regardless of by whom they are conducted. Its Constitution and Bylaws are binding upon all members and Fleets, and all registered Cal 20s must conform to the Specifications and Rules.

Back to Top

ARTICLE IV - FLEET ORGANIZATIONS

1. Each Fleet is a territorial unit open to all eligible persons within that geographical area. Fleets elect their own officers, which must include a Fleet Captain, Fleet Secretary and a Fleet Measurer. The Fleet is self-governing in all local matters not conflicting with Association rules.
2. The annual meeting of each Fleet shall not be later than December first of each year and the results of the election of Fleet officers shall be filed with the Association within two weeks thereof.
3. Three or more owners representing three or more Cal 20s outside the territory of a chartered Fleet may charter a new Fleet upon application to the Governing Board. All of the applicants must be members of the Association.
4. Fleet charters may be granted or suspended by the Governing Board. Charters may be revoked for failing to maintain the minimum number of members and/or the minimum number of Cal 20s as required by section 3 above, or for other cause. Revocation of Fleet charters shall take place at the Association's annual meeting.

Back to Top

ARTICLE V - MEMBERSHIP

1. An ACTIVE Member has the privileges of holding office, voting and may skipper a Cal 20 in sanctioned races. He or she must be a Corinthian and at least a one third owner of a Cal 20. Active Membership is extended to the spouse and immediate dependent family members. A Cal 20 skipper shall join the Association through a Fleet on whose waters he or she normally sails. Active Membership is retained until the end of the year in which he or she ceases to own a Cal 20.
2. An UNATTACHED Member must meet all the requirements for Active Membership except that he or she is not within the territory of a chartered Fleet. Unattached Members are entitled to all privileges of Active Members except Fleet representation. Unattached Membership is not offered to Cal 20 owners in a locality in which there are three or more Cal 20s in close enough proximity to permit racing together.
3. An ASSOCIATE Member is a Corinthian who regularly crews on a Cal 20 but is not a Cal 20 owner. He or she cannot vote, hold office or represent the Fleet as a skipper, but may as a crew.
4. A SUSTAINING Member is usually a non-owner of a Cal 20, who joins the Association because of an interest in the welfare of the class. He or she may not vote, hold office, or represent a Fleet.
5. A SPECIAL Member may skipper a Cal 20 in sanctioned races even though he or she is not an owner of a Cal 20. These memberships are granted individually at the sole discretion of the Association's Board of Directors to people from non-profit organizations who use Cal 20s for community betterment programs. The Board of Directors may rescind a special membership at any time.
6. A member cannot belong to more than one Fleet, nor can a Cal 20 be registered in more than one Fleet.

Back to Top

ARTICLE VI - DUES

1. 1. Cal 20 Association dues shall be fixed by the Constitution. The dues for a calendar year shall be:
   Active Members: $25.00 per year.
   Unattached Members: $20.00 per year.
   Associate Members: $20.00 per year.
   Sustaining Members: $20.00 per year.
   Special Members Complimentary
2. Fleet dues are optional and shall be fixed, collected and retained by the Fleet.
3. Both Association and Fleet dues must be paid for a member to be in good standing of either organization. Dues are payable in January, collected by the Fleet Secretaries and forwarded to the Association.
4. The Fleet Secretary shall maintain a record of each Cal 20 within the Fleet, showing hull number, name, and ownership.

Back to Top

ARTICLE VII - OBLIGATIONS

The Association shall not be liable for any debts contracted by its Fleets or officers other than expenditures authorized by the budget or upon written order of the President or Secretary.

Back to Top

ARTICLE VIII - EXECUTIVE OFFICERS

1. The Association's Executive Officers shall be elected by a mailed ballot and serve for one year from October 1 to September 30.
2. The PRESIDENT is the chief executive and shall preside at meetings, serve as chairman of the Executive Committee and the Governing Board, rule on procedures and jurisdictions, summarize decisions, appoint special committees and authorize the payment of all bills.
3. The VICE-PRESIDENT shall officiate in the absence of the President.
4. The SECOND VICE-PRESIDENT shall officiate in the absence of the President and the Vice President and shall edit the Association's official publication.
5. The SECRETARY shall handle all correspondence, record the minutes of meetings, maintain an accurate and up-to-date record of all members, Fleets and registered Cal 20s, and perform all duties pertaining to this office. The Secretary shall maintain the master copy of the Constitution and Bylaws, revise and update these documents by October 1 of each year and distribute copies to the membership as soon as possible thereafter.
6. The TREASURER shall deposit funds in the depository approved by the Executive Committee, keep the Association's financial books and securities, and disburse funds only on the order of the President.
7. The CHIEF MEASURER shall accept or reject all measurement certificates and shall issue duplicate certificates when appropriate. He or she shall have the prerogative to delegate the above authority and duties to Fleet Measurers. The Chief Measurer shall serve as chairman of the Measurement Committee and have the authority to interpret the Bylaws regarding measurement issues, and the duty to do so when requested in writing by an Association member. These duties pertain only to Cal 20 one-design racingÂnot racing under handicap rules.
8. The immediate PAST PRESIDENT of the Association is a member of the Board of Governors for the 12 months following his or her term as President.

Back to Top

ARTICLE IX - STANDING COMMITTEES

1. The GOVERNING BOARD shall serve for one year, October 1 to September 30, and shall consist of the Executive Officers of the Association and the Fleet Captains. The President shall be Chairman of the Governing Board. A majority vote shall decide all issues. The Governing Board shall interpret the Constitution and Bylaws, conduct all business, set dues, determine policy of the Association and adjudicate Constitutional disputes. It has the power to enforce its decisions by suspensions of individual members or entire Fleets. Its rulings are final and binding.
2. The EXECUTIVE COMMITTEE is appointed by the Governing Board and is empowered to act for the Governing Board in matters requiring prompt action and personal discussion. The Executive Committee shall consist of the President and two or more Governing Board members. The President shall serve as chairman. The Executive Committee shall render final decisions on appeals from race committees, sanction or ban races or other activities, determine the eligibility of committees, grant charters, create or alter territorial limits, fill vacancies in office subject to ratification by the Governing Board in case such vacancies are being filled by a member or members of the Executive Committee, impeach Fleet and Association officers subject to ratification by three quarters of the Governing Board when a Governing Board officer is involved, suspend any member guilty of a gross violation of rules or unsportsmanlike conduct for a period not exceeding its term in office, and approve the purchase and sale of securities and depositories. The Executive Committee is empowered to simplify, clarify or correct the language of any article of the Constitution or Bylaws if the intent or purpose remains unchanged.

3. The CLASS CHAMPIONSHIP COMMITTEE shall make arrangements for the annual Class Championship series. It will be appointed by the President at the time he or she assumes office. It shall have a minimum of five members including at least three members of the Governing Board plus the Fleet Captain of the host Fleet.
4. The BUDGET COMMITTEE shall consist of President, Secretary and Treasurer of the Association. This Committee shall prepare a budget for the ensuing year, which when approved by the Governing Board shall be published.
5. The MEASUREMENT COMMITTEE shall be appointed by and serve at the direction of the Chief Measurer, assist in the duties of the Chief Measurer and rule on measurement inquiries and protests.

Back to Top

ARTICLE X - ASSOCIATION MEETINGS

1. If possible, an ANNUAL MEETING shall be held in conjunction with the Class Championship regatta.
2. SPECIAL MEETINGS must be held when ordered by the Governing Board or upon demand in writing by 25 percent of the Fleets. At a special meeting, no business can be transacted other than the stated purpose for that meeting.
3. QUORUM: One half of the Fleets in good standing constitute a quorum at Association meetings. If a quorum exists at roll call, it exists throughout the meeting.

Back to Top

ARTICLE XI - VOTING

1. Written ballots will be mailed in June to all Association Active Members as of June 1. This ballot will allow members to vote for the Association officers for the following year and on proposed changes to the Cal 20 Constitution or Bylaws, if any. Partners in a boat must vote as a single entity-one vote per boat. Returned ballots must be postmarked prior to September 1 to be counted in the tally. A simple majority of the votes cast is required to change the Constitution or Bylaws, and those changes become effective on October 1.
2. Nominations for the Association's Executive Officers may be made in two ways:
   a. The Association President shall appoint a nominating committee which will present a slate of officers prior to June 1 for inclusion on the ballot.
   b. Any Active Member of the Association may nominate a willing Regular Member, including himself or herself, for any office. Such nominations must be sent to the Secretary of the Association prior to June 1 for inclusion on the ballot.
3. Proposed changes to the Cal 20 Constitution or Bylaws may come from two sources:
   a. Changes recommended by the Cal 20 Association's Governing Board.
   b. Changes recommended by a referendum signed by no less than 10 Active Members of the Cal 20 Association. Such a referendum must be submitted to the Association Secretary prior to June 1.

Back to Top

ARTICLE XII - IMPEACHMENT

A member may be expelled only by a three-fourths majority vote at a sanctioned association meeting.

Back to Top

CAL 20 FLEET 7
ADDITIONAL BY-LAWS FOR SAILING ON THE COLUMBIA RIVER

Spinnakers

1. Spinnaker pole to be 7'4" from inside jaw to inside jaw.
2. Spinnaker area shall be equal to PHRF standard.
   A. "LLS" is the greatest length of spinnaker luff and leach as measured around the edge of the sail.
   B. "G" is the maximum spinnaker girth.
   C. I= 22'0" J= 7'4" LLS= 22'0" G= 13'2"
3. Spinnakers shall be not less then ¾ oz. nylon or .5 poly.
4. Spinnaker halyard shives shall be attached to the tang on the jumper strut base.
5. A whisker pole may be used but only as defined in article XI, 3. of the national by-laws.

Motors

1. Motors will be carried on board during races.
2. Motors shall meet the requirements set out in PIYA category III.
3. Boats sailing one design in a series where PHRF ratings are used to determine an overall place will all be rated as if the motor is used in the well and removed from the well and stored in the locker when racing.
4. Motors may be used on the transom or in the well.

Sails

1. Definition of a suit of sails for fleet 7 shall be one spinnaker, one class jib, one class mainsail.
2. Roller furling equipment on the forestay is not allowed.
3. A boat after placing first or second in a series or regatta must have their sails measured. All other boats are encouraged to have their sails measured as soon as possible.

Modifications

1. Modifications to boats are not allowed, boats that were modified prior to purchases by others may be allowed to race.
2. The local fleet measurers committee may be asked to give a ruling disallowing modified boats from racing if the modifications appear to give an unfair advantage.

Measurement Protests

1. Reasonable grounds must be shown before a measurement protest is accepted.
2. A measurement protest must be in writing and accompanied with a $20.00 filing fee payable to the Cal-20 Fleet 7. The fee is returnable if the protest is sustained.
3. Costs incurred to measure for the protest shall be borne by the petitioner.

PACIFIC INTERNATIONAL
YACHTING ASSOCIATION

Effective MARCH 1, 2013

SPECIAL REGULATIONS GOVERNING MINIMUM EQUIPMENT AND ACCOMMODATIONS STANDARDS

TO ALL RACING SKIPPERS:
Member clubs of this regional authority have subscribed to the following category system. Circle the symbol for each item applying to your yacht. Sign the certificate and keep on your yacht at all times. It is the responsibility of skipper/owner and crew to maintain and operate the boat to at least these standards during racing.
All equipment required in this certificate shall be operable throughout the race. Where spare equipment is required, the operation of it along with the main item is required at the start.
The words "Coast Guard" mean that the appropriate U.S. or Canadian Coast Guard current minimum requirement or approval applies.
The safety of a yacht and her crew is the sole and inescapable responsibility of the person in charge who must ensure that the yacht is seaworthy and manned by an experienced crew with sufficient ability and experience to face bad weather. S/he must be satisfied as to the soundness of hull, spars, rigging, sails and all gear. S/he must ensure that all safety equipment meet these regulations, is properly maintained and stowed and that the crew knows where it is kept and how it is to be used.
Safety at sea must be an ongoing concern for skipper and crew. Practice, education, and experience all contribute to safe racing.
At least several crew, plus skipper should understand the equipment in this certificate and be able to operate it satisfactorily.

Purpose: To establish minimum specifications for construction, equipment and accommodations to provide safe and equitable racing in our region.

Changes for 2013: The following rules were changed- 1.2, 1.3, 2.2, 2.3, 3.3, 3.4, 3.8, 3.9, 3.10, 3.16(all parts), 3.17, 3.25, 4.3, 5.2, 5.3a, 5.3b, 5.4, 5.6, 5.7, 5.8, 5.9, 6.1, 6.2a&b, 6.3, 6.4, 6.5, 6.6, 6.7, 7.2a&b, 9.3. Note: some of these changes were deletions

Category Descriptions: These regulations shall be mandatory for PIYA sponsored events and are recommended for all events in the area. Each race sponsor is responsible for specifying the category of vessels eligible for its races. These are minimum requirements and the final onus for the level of equipment rests upon the skipper of each vessel.

Category 0: Yachts capable of extended offshore races, such as Victoria-Maui. It is recommended that ISAF/ORC Category 0 and I special regulations be utilized (available through CYA and USSA) for such races which do not already have equivalent specific construction, equipment, and accommodation requirements. Yachts meeting all ISAF/ORC Category and I requirements shall be considered eligible for PIYA Category I, II, and III races, provided they meet the minimum requirement of sections 4.0, 6.0 and 7.0 below.

Category I: Yachts capable of racing exposed waters where the vessel must be self-sufficient and capable of enduring heavy weather. Yachts meeting Category I requirements shall also be considered eligible for Category II and III races.

Category II: Yachts capable of racing in semi-protected waters, day or night, where heavy weather may be encountered. Yachts meeting Category II requirements shall also be considered eligible for Category III races.

Category III: Yachts capable of racing protected waters primarily in daylight.

Category IV: Open centerboard, dinghy, and open or partially decked keel boats racing in protected waters during daylight with rescue boat(s) in attendance.

Category Specifications:
Symbols: R - Required
A - Advisable
N - Not Required / Not Applicable
* - Likely candidate for upgrading at future date

1.0 Hull.

I	II	III	IV		
R	R	R	N	1.1	Mono-Hull, shall be self-righting and strongly built. Multihull; shall be strongly built, with positive buoyancy situated so that the boat will float reasonably level in the event of hulls flooding.
R	N	N	N	1.1a	Limit of Positive Stability not less than 110 degrees.
R	R	N	N	1.1b	Limit of Positive Stability not less than 100 degrees.
R	R	R	N	1.1c	Limit of Positive Stability not less than 95 degrees.
R	R	R	N	1.1d	Yachts with movable ballast shall meet the above requirements in all conditions of ballasting for the category of race they are competing in, and shall not heel more than 10 degrees with ballast in least favorable condition. (Yacht shall be in sailing condition, no crew aboard).

R	R	A	A	1.2	Readily accessible, positive mechanical closure provided for all through-hull openings below the load waterline (LWL) except shafts and measuring devices. Sea cocks or valves shall be permanently installed on all through-hull openings below the waterline except integral deck scuppers, speed indicators, depth finders and the like; however a means of closing such openings shall be provided.
R	R	R	R	1.3	Soft wooden plugs to close all through-hull openings, attached to their respective through-hull fittings by a short cord.
R	R	N	N	1.4	Minimum average freeboard at ends of LWL equals 5% of LOA, but not less than 2.2 feet (to deck at side).

2.0 Decks and Cabins

I	II	III	IV		
R	R	R	N	2.1	Strong, capable of withstanding pooping or knockdown.
R	R	A	N	2.2	Hatches or ports permanently fastened to yacht and capable of being solidly secured, essentially leak-proof. Hatch boards, whether or not in position in the hatchway shall be secured to the boat (e.g. by a lanyard) for the duration of the race to prevent their being lost overboard
R	R	A	N	2.3	Companionway(s) capable of being blocked off to main deck level, solid, essentially leak-proof and rigidly secured, if not permanent.
R	R	A	N	2.4	Companionway(s) above deck level well fastened and essentially leak-proof when closed.
R	R	N	N	2.5	Where windows exceed two sq. ft. in area or where the least dimension exceeds 9 inches, covers of strength equal to 3/8" plywood shall be carried aboard for all such windows. One set will serve either side of yacht.
R	R	N	N	2.6	Cockpit drains having a combined effective cross sectional area of one square inch per eight square feet of cockpit sole area. Any raised area in the cockpit less than one foot in height shall be considered as part of the sole area. Plugs may be used to prevent inflow but shall be readily removable.
R	R	N	N	2.7	Entire cockpit to be solid, watertight strongly fastened and/or sealed. Weather-tight seat hatches are acceptable only if capable of being secured when closed
R	R	N	N	2.8	Cockpit volume for cockpits not open to the sea, including any flood-able motor wells and/or compartments, to lowest points of coaming over which water can adequately escape, not to exceed .08 x LOA x Max. Beam x Freeboard aft. Cockpit sole at least .02 x LWL above LWL. For multihulls, the beam is taken as the sum of the beams of the hulls only.

3.0 Ship's Gear

I	II	III	IV		
R	A	N	N	3.1	Separate emergency steering apparatus adequate to steer boat in event of loss of rudder. An inspector may require that the apparatus be demonstrated.
N	N	N	R	3.2	Adequate paddle(s) or oars.
R	R	R	R	3.3	A commercially manufactured anchor which meets the anchor manufacturer's recommendations based on the specifications of the vessel, and dedicated suitable rode which is at least 150' in length which includes at least one half boat length of suitable chain.
R	A	N	N	3.4	Additional anchor, chain and rode as in 3.3.
R	R	R	R	3.5	The yacht shall meet or exceed all Coast Guard requirements for equipment, machinery, and gear.
R	R	R	A	3.6	Means to sever standing rigging.
R	R	R	R	3.7	Yacht's name on float-able safety gear.
R	R	R	N	3.8	A radar reflector shall be displayed at all times at least 13 feet (4 meters) above the waterline. A 11" octahedral radar reflector or one of demonstrated equivalent performance shall be carried.
R	R	R	A	3.9	Non electronic, compass, strongly mounted.
R	R	A	N	3.10	Second compass.

R R R R 3.11 Navigation lights to be shown when conditions warrant, as required by the International Regulations for Preventing Collisions at Sea, mounted so that they will not be obscured.

R R A N 3.12 Spare running lights with separate power for night races.

R R A N 3.13 Radio capable of receiving weather bulletins in the race area.

R R R A 3.14a Radio transceiver with a minimum rated output power of 5 watts, capable of working the VHF/FM marine frequencies (156-158 MHz), may be a hand held

R R A A 3.14b An additional radio transceiver with a minimum rated output power of 6 watts, capable of working the VHF/FM marine frequencies (156-158 MHz). Provisions for emergency antenna must be made regardless of primary antenna location.

R A* A N 3.14c VHF shall provide 25w RF output power and include a masthead antenna, with no more than 40% power loss between transmitter and masthead antenna.
Refer to: ISAF Offshore Special Regulations*, 2012-2013 edition: Para 3.29.1.b for additional info.

R R R N 3.15 Depth sounder or lead line.

R R A N 3.16 Lifelines shall be installed as stated in this paragraph to meet installation requirements in 3.16a and 3.16b, Lifelines (including lower and upper lines) shall not sag more than 4" under a 5lb. load applied halfway between the stanchions. For purposes of measuring lifeline sag, any elastic tensioning mechanism shall be released prior to measurement.
Lifelines shall be affixed to the bow pulpit or terminate at, or pass through, adequately braced stanchions 2' above the working deck, set inside of and overlapping the bow pulpit, provided that the gap between the upper lifeline and the bow pulpit shall not exceed 12 inches.
An opening in the bow pulpit is permitted of up to 14.17 inches (360mm), measured between the pulpit and any other fixed part of the boat. (*See ISAF OSR 3.14.3a for figure).
Stanchions shall not be angled outboard at more than 10 degrees from vertical from a point 2" (50mm) above the deck to head measured perpendicular to the yacht's centerline.
If the stern pulpit is not continuous around the stern, lifelines as stated in 3.16 may be used provided that no vertical opening may exceed 15" (0.4 m).
Pulpit bases shall be securely attached to the deck with bolts, welds, or other equally strong structure.
Maximum spacing between lifeline supports (e.g. stanchions) is 87"
Carbon fiber is not permitted in pulpits, stanchions or lifelines.

Lifeline Minimum Diameters, Required Materials, Specifications:

a) Lifelines shall be of stranded stainless wire or single-braid UHMWPE (e.g. Dyneema®) with spliced terminations
b) The minimum diameter of lifelines shall be as stated in Table 3.16, below.
c) Stainless steel wire shall be uncoated and used without close-fitting sleeving. Temporary sleeving may be fitted provided it can be removed for regular inspection.
d) When stainless steel is used, Grade 316 is recommended.
e) When Dyneema® rope is used, Grade SK75 or higher is recommended.
f) A taut lanyard of synthetic rope may be used to secure lifelines provided the gap it closes does not exceed 150mm (6"). This lanyard shall be replaced at least annually.
h) All wire, Dyneema® rope, fittings anchorage points, fixtures and lanyards shall comprise a lifeline enclosure system which has at all points at least the breaking strength of the required lifeline.

TABLE 3.16

LOA	Wire- Min. Diameter	Rope-Min. Diameter
Under 8.5M (28ft)	3mm (1/8")	4mm (5/32")
8.5M to 13M	4mm (5/32")	5mm (3/16")
Over 13M (43ft)	5mm (3/16")	6mm (1/4")

R R R N 3.16a Boats over 28' shall have at least two lifelines with 24" minimum height above deck, maximum vertical gap of 15", fixed bow pulpit (within safe working distance of the jib tack) and stern pulpit. Upper rails shall be at the same height as the upper lifeline and shall be continuous around the bow and stern

R R R N 3.16b Boats 28' and under must have at least one lifeline with 18" minimum height above deck, a maximum vertical gap of 18" (a taller enclosure requires second lifeline which shall comply with 3.16a), fixed bow pulpit (within safe working distance of the jib tack) and stern pulpit.

R R A N 3.16c Multihulls: Catamarans shall have netting between the hulls at least as far forward as the jib stay. Trimarans shall have a bow pulpit and netting forward extending from the pulpit to the cross-arm at a point at least 3 feet from the main hull. Otherwise, requirements stated above in 3.16 and 3.16a or 3.16b shall apply depending on boat LOA.

N	N	R	N	3.17	For boats wishing to race in a category III event which do not comply with 3.16 they may be allowed to race provided all crew members wear personal flotation from the time of their warning signal until after they have finished.
R	R	A	N	3.18	Jack-lines with a minimum breaking strength of 4,500 pounds (2040 kg) shall be fitted on each side from cockpit to bow such that crew can clip on before leaving the cockpit. Jack-lines shall be attached to fittings at least equal to the full strength of the attached jack-line. All multihulls shall have attachment points for safety harnesses in such numbers and places, that any point on deck may be reached with the harness lanyard attached.
R	R	R	A	3.19	First aid supplies and manual with guidance for treatment of seasickness, pain, hemorrhage, skin injuries, injured parts, hypothermia, and maintenance of breathing.
R	R	R	N	3.20	Adequate permanently installed manual bilge pump, operable with all cockpit seats, hatches, and companionways closed and at all reasonable angles of heel. For multihulls under 35′ LOA, an adequate tethered bilge pump may be substituted for a fixed pump.
R	R	A	N	3.21	Second adequate bilge pump.
R	R	R	R	3.22	Bailer or bucket. Note: for Category IV, R is amplified by the following: suitable bailer or manual pump, (suction self-bailers not satisfactory). Exception: Category IV yachts with properly designed, completely self-draining cockpits and hulls, need not carry a bailer or pump.
R	R	R	A	3.23	Two operable flashlights or hand lanterns
R	R	A	N	3.24	Electronic position finding devices such as GPS.
R	R	A	N	3.25	Current, non-electronic, government issued (NOAA, etc.) charts for racing area to be on board. Government issued Notice's to Mariners should be consulted for recent changes.
R	R	R	N	3.26	Heaving line, 50′ minimum length; "throwing sock" type recommended.

4.0 Living Accommodations

I	II	III	IV		
R	R	A	N	4.1	Properly secured marine toilet, or other suitable device, with positive closure method for any through-hull connections other than vents
R	R	N	N	4.2	Securely installed water tank or tanks.
R	R	N	N	4.3	Cooking Facilities
R	R	N	N	4.4	Permanent interior berths shall be provided (may be transom, pipe or convertible from seat cushions); cockpit seats or other outside areas are not included.
R	R	A	A	4.5	All ship's gear, ballast, batteries, and other items which could cause bodily injury shall be securely fastened.

5.0 Life Saving Equipment

I	II	III	IV		
R	R	R	R	5.1	Flotation device with whistle and retro reflective for each crew member readily available. Water ski belts are not adequate. The name of the yacht or wearer shall be clearly marked on each floatation device.
R	R	R	N	5.2	For night races, a personal strobe light to be worn by each crew member.
R	R	A	A	5.3a	Life-jackets shall be fitted with either: a crotch or thigh strap(s) or full safety harness in accordance with ISO-1240. Any crotch/thigh strap(s) shall be strong enough to support the wearer being lifted from the water.
R	A*	A	A	5.3b	For races after dark: Life-jackets which provide at least 33.7lbs (150N) of buoyancy, intended to be worn over the shoulders (no belt packs), meeting either Coast Guard or ISO specifications
R	R	A	N	5.4	Safety snap-on line and harness for each crew member. The assembly shall be ready for immediate use. Load bearing components, including attachment fittings, shall withstand a static load of at least 700 kilograms (1540 lbs.) The safety line shall attach to the harness at chest level and the harness shall support the upper back. A means of quick release of the tether from the harness under load shall be provided
R	R	R	N	5.5	High visibility lifebuoy (horseshoe or ring type), large enough to slip into, with bright water light, drogue, and whistle attached, mounted ready for instant use. The water light may be omitted for daylight races.

R	R	A	N	5.6	Flagpole which must float upright with high visibility 15"x15" flag, top of flag to be 6 ft. above water. The pole is to be attached to 5.5 above to form one ring-light-drogue-flagpole assembly ready for instant overboard release. The Switlik MOM8-A and MOM 9 (MOB) systems are approved as an alternate if maintained in accord with manufacturer's requirements and installed to meet the above instant release requirement.
R	R	A	N	5.7	Additional lifebuoy with whistle or LifeSling without drogue (or equal recovery device of floatable type) mounted, ready for instant use.
R	R	R	N	5.8	Coast Guard approved flares within their expiration date, minimum of four. Recommend aerial type, meeting SOLAS requirements.
R	A	N	N	5.9	Adequate life raft(s) designed for life saving with designed capacity for containing entire crew. The raft shall be capable of being carried to the lifelines within15 seconds. If inflatable, it is recommended that it have two parallel buoyancy compartments. The raft must have been inspected within two years with written certification and be equipped for both manual and automatic inflation. Raft must be equipped with drogue and painter. As an approved alternate to the life raft, a boat may be equipped with survival suits for each person aboard for whom life raft capacity is not provided. The suit shall be a universal size suitable for donning over regular clothing for keeping the wearer dry and afloat, shall be coverall type and shall include in its construction closed cell foam insulation designed to ensure survival from hypothermia of the wearer for a minimum of 3 hours when floating in 54°F water. The suit(s) may be stowed below decks but readily accessible to the companionway. Suit(s) shall be government approved for survival usage.

6.0 Auxiliary Power

I	II	III	IV		
R	R	R	N	6.1	Auxiliary Power, capable of moving yacht at a speed (knots) equal to the square root of the water line length (ft.) in calm conditions
R	R	A	N	6.2a	All fuel tanks with proper venting securely fastened and with fuel capacity for 6 hours at above speed (6.1).
N	N	R	N	6.2b	All fuel tanks with proper venting securely fastened and with fuel capacity for 3 hours at above speed (6.1).
R	R	R	R	6.3	Engine installation, fill pipes, tanks, vents, carburetors, batteries, etc., to meet Coast Guard requirements.
R	R	R	N	6.4	Outboard motor and fuel installation shall be the approximate equivalent of an inboard installation in respect to ventilation, safety and ease of use and sea worthiness. Specific requirements are as follows:
R	R	R	N		a) Motor shall be permanently attached to hull or transom or inboard well, ready for immediate use at all times while the boat is racing.
R	R	R	N		b) Mounting shall be such that motor can be quickly and easily inserted into the water and operated during severe sea and wind conditions.
R	R	A	N	6.5	Motor well, if used, to be watertight to level of deck or cockpit, or in watertight compartment.

7.0 Spars and Rigging

I	II	III	IV		
R	R	R	N	7.1	Spars, rigging, gear and fittings, must be capable of withstanding heavy weather.
R	R	A	N	7.2a	Yachts must be equipped with mainsail reefing and a heavy weather jib. Yachts carrying only one sail (e.g. catboats) shall be equipped with a storm-sail having a maximum area of not more than 25% of the mainsail area and shall be of a weight of material at least equal to that of the mainsail.
R	A	A	N	7.2b	The method of setting the storm-sail must not depend on use of the mainsail track or groove. Sail must be attached to the mast at or near the head and tack. Lace loops are specifically prohibited. A second halyard must be rigged and available.
R	A	N	N	7.3	Storm jib of area not exceeding 5% of the yacht's I dimension squared
R	R	R	N	7.4	Halyards shall be capable of quick release. Masthead halyard locks, if used, shall be capable of quick release from deck level.
R	R	A	N	7.5	A sleeve-type jib that requires stay release to allow dousing or removal is prohibited unless there is an alternate stay set.

8.0 **Identification**

I	II	III	IV		
R	R	R	N	8.1	Sail numbers, letters and emblems as to design shall conform to ISAF Rule 77, except that national letters are not required. Numbers shall be obtained as follows: (1) In U.S., from PIYA P. O. Box 523 Olympia, WA 98507 Phone: (360) 754-7506 E-mail: jan@piyasailing.com (2) In Canada, from B.C. Sailing 304 1367 West Broadway Vancouver, B.C. V6H 4A9 Phone: (604) 737-3126
N	N	N	R	8.2	Identification for Category IV shall be as required by Class or Fleet rules.

9.0 **Enforcement**

I	II	III	IV		
				9.1	Requests for interpretation of these requirements may be referred by any member club to the PIYA Technical and Inspection Committee.
R	R	R	R	9.2	Category certificates are to be completed and signed annually by owner and kept on board.
R	R	R	R	9.3	A yacht may be inspected at any time. If she does not comply with these Special Regulations she may be subject to protest by the Race Committee or by other competitors and suffer such penalty as may be prescribed by the racing rules, the notice of race, or by the sponsoring organization. Refusal to allow inspection shall be cause for disqualification. ISAF Offshore Special Regulations(OSR) edition 2012/13 may be found on line at: http://www.sailing.org/documents/special-regs.php

2013 Certification of Category

I hereby certify that my yacht meets the category requirements as indicated above, for the race(s) it is sailing.

Skipper (please print clearly.) _____

_____

Yacht Name_____

Sail No._____

Club _____

Signature & Date _____

QUICK REFERENCE CHART

Equipment	Requirement	Vessel Length (in feet) <16	16<26	26<40	40<65	Page
Certificate of Number (State Registration)	All undocumented vessels equipped with propulsion machinery must be state registered. Certificate of Number must be on board when the vessel is in use. Note that some states require all vessels to be registered.	X	X	X	X	5
State Numbering	(a) Plain block letters/numbers, not less than 3 inches in height, must be affixed on each side of the forward half of the vessel, in a contrasting color to the background, and read from left to right. (b) State validation sticker(s) must be affixed within 6 inches of the registration number. Note: check with your local boating agency for specific state requirements.	X	X	X	X	5
Certificate of Documentation	Applies only to "Documented" vessels: (a) Original and current certificate must be on board. (b) Vessel name/hailing port must be marked on exterior part of hull in letters not less than 4 inches in height. (c) Official Number must be permanently affixed on interior structure in numbers not less than 3 inches in height.		X	X	X	6
Life Jackets	(a) One Type I, II, III, or V wearable life jacket for each person on board. Must be U.S. Coast Guard-approved. (b) In addition, must carry one Type IV throwable device.	X	X X	X X	X X	9
Visual Distress Signals (VDS)	(a) One electric distress light, or three combination day/night red flares. Note: only required to be carried on board when the vessel is operating between sunset and sunrise. (b) Three combination day/night red flares – hand-held, meteor, or parachute-type, or one orange distress flag, or one electric distress light, or three hand-held or floating orange smoke signals and one electric distress light.	X X	 X	 X	 X	17
Fire Extinguishers	(a) One B-I (when enclosed compartment). (b) One B-II or two B-I. Note: fixed system equals one B-I. (c) One B-II and one B-I, or three B-I. Note: fixed system equals one B-I.	X	X	 X	 X	21
Ventilation	(a) All vessels built after April 25, 1940 that are gasoline-fueled with enclosed engine and/or fuel tank compartments must have natural ventilation (at least two ducts fitted with cowls). (b) In addition, a vessel built after July 31, 1980 must have a rated power exhaust blower.	X	X	X	X	23
Sound Producing Devices	(a) A vessel of less than 39.4 feet (12 meters) must, at a minimum, have some means of making an efficient sound signal – i.e., handheld air horn, athletic whistle. A human voice/sound is not acceptable. (b) A vessel 39.4 feet (12 meters) or greater, must have a sound-signaling appliance capable of producing an efficient sound signal, audible for 1/2 mile, with a 4- to 6-second duration.	X	X	X X	 X	25
Backfire Flame Arrestor	Required on gasoline engines installed after April 25, 1940, except outboard motors.	X	X	X	X	25
Navigational Lights	Required to be displayed from sunset to sunrise and in areas of restricted visibility.	X	X	X	X	27
Oil Pollution Placard	(a) Placard must be at least 5 by 8 inches and made of durable material. (b) Placard must be posted in each machinery space or at the bilge control station.			X	X	32
Garbage Placard	(a) Placard must be at least 4 by 9 inches and made of durable material. (b) Displayed in a conspicuous place notifying all on board of the discharge restrictions.			X	X	34
Marine Sanitation Devices	If there is an installed toilet, the vessel must have an operable MSD Type I, II, or III.	X	X	X	X	35
Navigation Rules (Inland Only)	The operator of a vessel 39 .4 feet (12 meters) or greater while operating on U.S. inland waters must have on board a copy of these rules.			X	X	36

My Cal Has Water In Side

The sources of water inside a cal just like any other boat are endless.
Some are obvious like water running down the inside of the hull at a window or piece of deck hardware.
Others are less obvious like the bottom rudder bolts or the laminations around the outboard trunk. The keel bolts are a possibility but then so is the main hatch, fore hatch and seat hatch. What about those cracks where the cockpit sides meet the cockpit seats or along the main hatch runners? These are all possibilities.

How do I stop the water from getting in? First you have to identify the source.
You must dry the boat completely and that may take putting your crew on deck next to the starboard shroud and healing the boat over a bit bow down and moping water out from under the forward bunk or out from under the cabin side bunks. Water will also find its way in between the hull liner and the hull so it is not easy to get it dry but you must.

Start at the top and work your way down. Are there any deck fittings that are leaking? If so fix them by removing them and then re-bedding them. See the U-Tube links on page 51.
How about the windows? Seethe comments on page 39.

Now let's look at the cracks along the main hatch runners and the ones in the cockpit. These two sets of cracks are caused from stress and many do not actually leak but if the stainless hatch slides are loose odds are the fasteners or cracks are leaking. Smearing some caulk on them might help for a day or two but they will need to be ground back about a half inch on each side and a bit of fiberglass and epoxy used to fix them (be neat as these are hard areas to detail. See pg 40

The fore deck hatch if it is original will be leaking where it is screwed to the deck but also in the joints in the corners. Remove it, clean it up and take it apart. Then glue it back together again. Be sure to put some cellophane package tape on the deck in the corners and lay out some protection on the bunk as you will want to re-glue this frame in place so it will fit when you are done. When the glue has cured pop it off and then bed it in Life caulk.

The main hatch might have cracks in the bottom corners (check that there is a support under the cockpit see photos pg 49)
If there are cracks in the corners remove the wood edging, grind a taper in the laminate and put some fiberglass and epoxy to fill up the taper. Now bed the wood trim back in place. Be particular about the bottom piece as water likes to run down the drop board and find its way in the corners.

The cockpit seat hatch has problems of its own. The first is that there is no drip lip on the edges of the hatch lid so water likes to run right around and drip inside. Yes a gasket on the lip of the cutout will help but it really needs a drip lip see pg 41.

We are now inside and you are going to have to crawl (slither) back with your flash light and get all the way back so you can see the rudder bolts. Have someone else stand at the back of the cockpit so they are under water. Give it a few minutes and if they leak you will need to remove the fitting and bolts (either 3 friends on the foredeck while you do this or get it back on the trailer) When you do bed the fitting and bolts be sure there is a backing block on the inside of something like ½" plywood about 3"x6" and fender washers. If you don't want to crawl back there in a few weeks use nylock nuts.

Now before you slither out of that little hole you are in look at the bottom of the motor well. Look all the way around it as they leak at the base sometimes. If it is leaking mark the area and haul the boat to do a fiberglass / epoxy repair. Look and see if the cockpit drain you put in from the front right corner of the cockpit is leaking. If so fix it. See pg 43

The next things to look for are any old thru hulls. If there are any get rid of them see pg 42. Yes this needs to be done out of the water. If you have a knot meter or depth sounder that goes through the hull check to se if they are leaking.

The only other sources of leaks (as long as you don't have hull damage) are the keel bolts. While checking the keel bolts don't jump to the conclusion that they are leaking just because there is water in the bilge. I now you have dried everything and you set there and watch water seems to ooze up around the bolts. That does not mean they are leaking it may only mean that you still have water trapped between the liner and the hull. Heal the boat over and check under the bunks. Do it to both sides and the bow down and then

stern down and only then suspect the bolts. If I have fixed everything else so I know no water is coming in I might go away for a day and then mop out the bilge again and recheck.

Window leaks

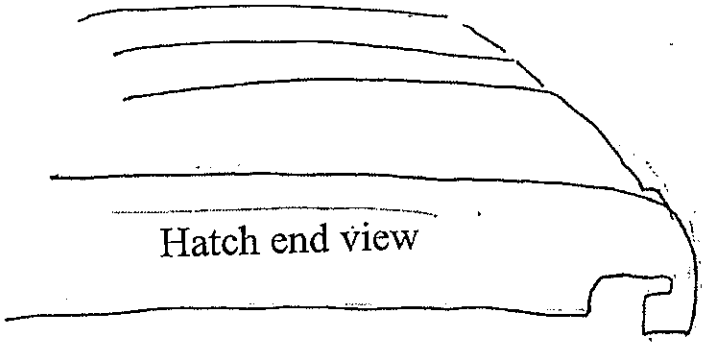
Cal-20's have had two different windows from the factory over the years of production. The first was a metal framed glass window. Window leaks were from two sources on these windows. The first was a failure of the bedding compound. Simply remove the screws on the inside and have someone catch the port as you push it out from the inside. Clean the frame and cabin side up with a putty knife and solvent. Bed the port back in place with widow caulk, Life caulk or foam tape. DO NOT USE 3M 5200 to bed windows or hardware.

The second leak source was a failure of the gasket in the window frame itself. The frame can be taken apart and the gasket replaced with caulk.

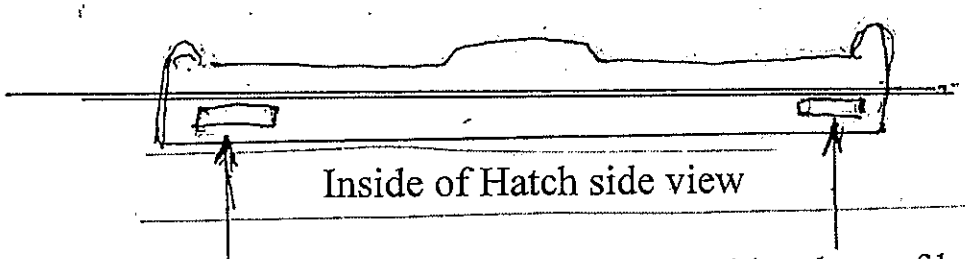
The second window used in the Cal's was a plastic window made by GO Industries. The only leaks associated with these windows is a bedding failure so simply remove the windows, clean them up and bed them again with Lifeseal. Do not use any other sealant on these windows.

If you have broken windows or just want new ones (they are lighter then glass ones) the Go Industries windows are still made and they will fit in any Cal 20. The windows are made by Mark Plastics in Corona, Ca.

Sliding Hatch

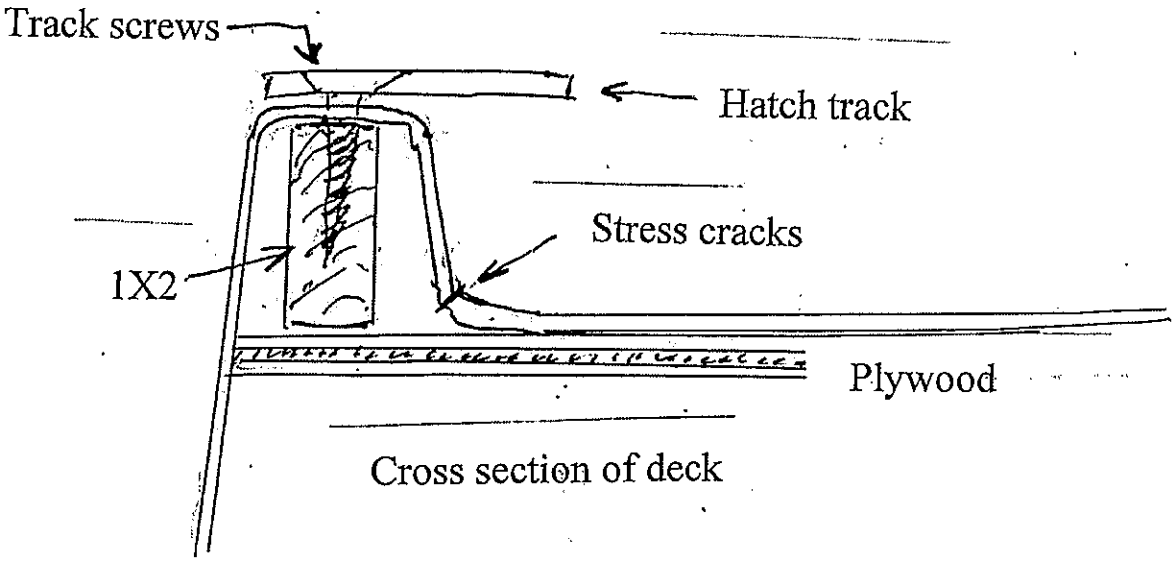


Hatch end view



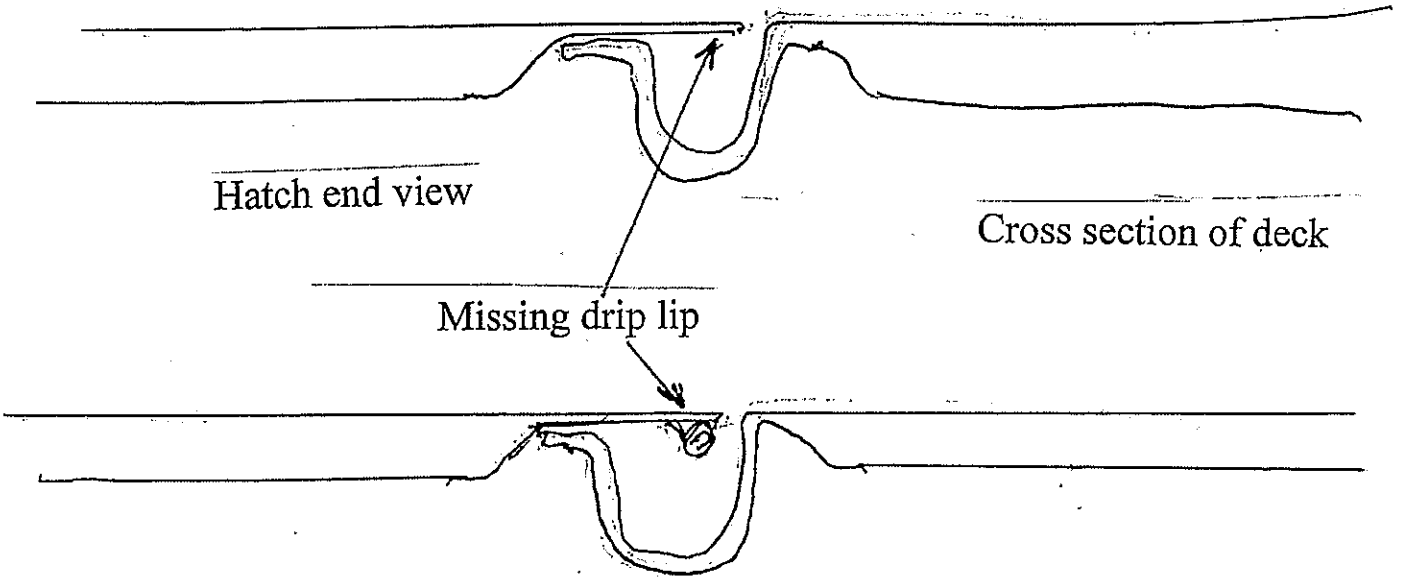
Inside of Hatch side view

2 pieces of wood epoxied onto inside edges of hatch under track



Cross section of deck

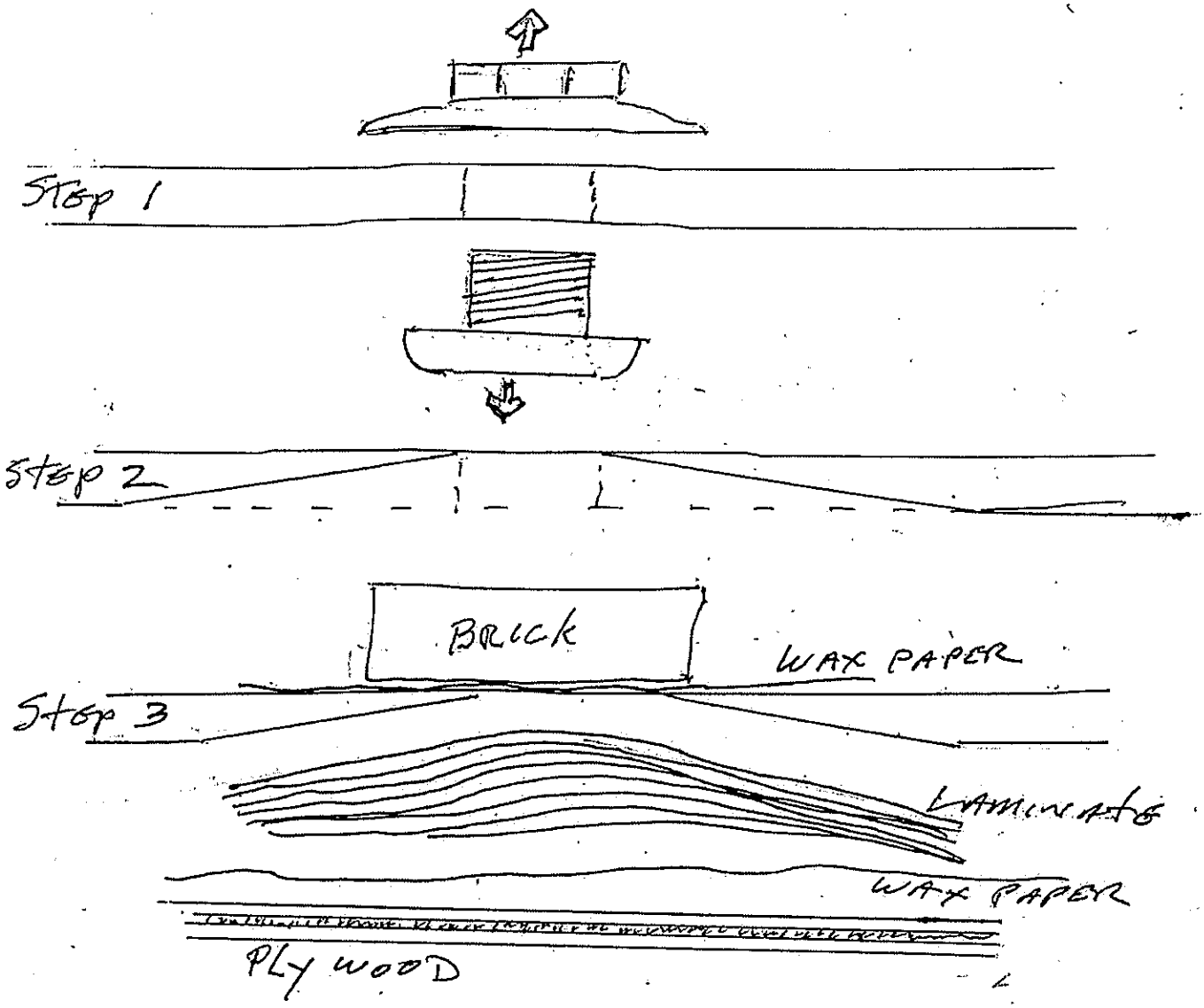
Seat Hatch



Make drip lip by epoxy coating ¼" Dacron line in place and back fill with epoxy putty.

Note on old fore hatches:
Repair original fore deck hatch by removing it, taking it apart and then gluing it back together. Bed it back down with Life caulk.

Old Thru Hulls

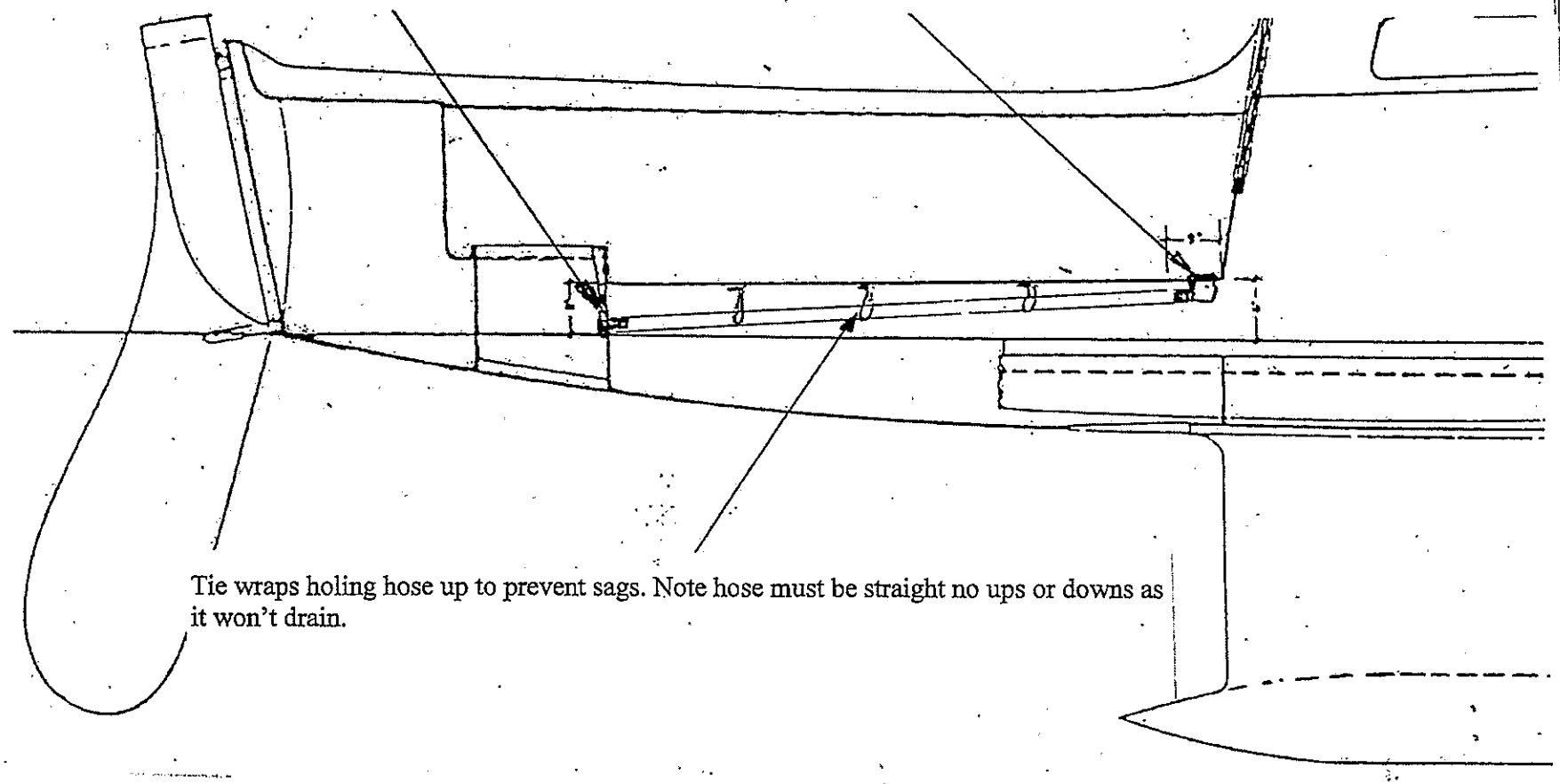


Removing old thru hulls:
After removing old thru hulls grind back a taper of about 2-3" all around from the outside. Place a piece of wax paper on the inside with a brick (or equal) on top of the hole. Cut a bunch of 6oz fiberglass cloth into circles and wet those all out with epoxy one on top of the other. Put the whole pile on at once and place another piece of wax paper on the area and place a scrap of plywood (or equal) over the whole mess and support it with a stick until the epoxy cures. Grind the area smooth and epoxy putty if required. Note: The finished pile of glass should equal the thickness of the hull.

Installing extra cockpit drain

Forespar Marelon barbed thru hull installed just above the waterline in outboard well.
FORSP# 906026 WM# 209486

Shurflo sink drain installed in front right corner of cockpit.
S00-0101-UP-R WM# 9379926



Tie wraps holing hose up to prevent sags. Note hose must be straight no ups or downs as it won't drain.

Gel Coat, Crazing Cracks, Blisters and Fiberglass Repair

Gel coat is nothing more then polyester resin with talc and pigments added, it has no reinforcement and tends to be brittle. When the hulls, decks and liners are made they are built in a female mold. The gel coat is sprayed in first and to get good coverage in all the corners it often becomes thicker in spots then it should. This extra thickness is one of the reasons that gel coat cracks. For years these cracks have been called crazing cracks and owners have been told they are non structural. This may not be true in all cases.

The cracks that most concern us are the ones along the sides of the cockpit seats, companionway slider tracks and the bottom corners of the cockpit or companionway.

If any of these cracks are leaking water they should be repaired. Repairs amount to grinding away the surrounding area of the crack and laminating fiberglass across the crack to bridge the weak spot. Once repaired paint or gel coat can be used to replace the color.

Blisters are caused by the fact that the hulls are laminated of polyester resin as is the gel coat. The molecular make up of polyester resin is a loose structure which will allow water vapor transfer.

Here is how it happens, water vapor penetrates the gel coat and laminate until it finds an air bubble or pocket. It may be that it finds a bit of dirt or contaminate, maybe some extra Cobalt or MEKP (used to promote and cause the cure of the resin to take place). When the moisture finds any of these defects it will form a gas pocket due to a reaction with the defect and a blister is formed.

When blisters are small they are nothing more then a nuisance and tend to degrade performance by disturbing the water flow past the hull. When they get big they can start to be structural.

What is small and what is big and how do I fix them? Small is anything from the size of a pencil eraser to the size of a quarter and big is any thing larger.

Repairs can be as simple as taking a small grinder to the bottom and grinding out each blister. This can be tedious work if there are a lot as you

must grind a little dish into the hull so that the blister is all gone. In the case of small blisters an epoxy putty can be used to fill the areas back up to smooth. Larger areas may need fiberglass laminated to rebuild the strength of the hull.

In extreme cases the entire gel coat is removed, the hull is allowed to dry out and then a barrier coat is applied after the blisters have been repaired.

Fiberglass repair is not hard if the project is small, repairs to hulls after a port/starboard collision is another matter and best left to the professionals.

Small fiberglass repair consists of analyzing why it is required in the first place. The cracks at the bottom of the companionway opening caused because there was no support under the cockpit will not stay repaired if the cockpit is not supported so analyze the cause before you repair.

The fiberglass must be ground away into a taper on each side of the defect. The rule of thumb is the taper should be 20/1 or 40/1 in high load areas. What this means is the defect in a ¼" thick hull will require a repair area of 5-10" on each side of the defect. Care should be exercised to replace the laminate with a similar laminate to what is being removed. In short you can not expect to replace woven roving with a repair of mat.

Wood Rot

All of the flat panels in or Cal-20's are stiffened with marine plywood. Long time contamination with moisture will cause it to rot. Take a look at the deck around the lower shroud chain plate attachments as they are often in the worse condition. If the backing block (another piece of plywood) is rotten the deck is probably rotten as well.

Let's assume this is your only rot problem. It is possible to remove the deck fitting, pry off the backing plate and then tap around the underside of the deck with a small hammer and listen. The areas that are rotten will sound dead (like you have just tapped on a book and opposed to tapping on your desk). Mark the area with a marker pen and cut the plywood out using a chisel and hammer. Do a neat job of it and if when you are done the area is small (less the 4-6 square inches) cut a new piece of plywood to fit the hole and glue it in with epoxy.

At this point you have eliminated the rot and replaced it with a filler block. You need to now replace the backing block which will have to be thicker and bigger then the old one as you are trying to spread the load. I would use a piece of ½" plywood about 8"x12" or bigger if necessary.

If your repair cut out area was larger you will need to grind or cut a taper in the deck plywood and grind a taper on the plywood you are going to put back forming a scarf like you would in fiberglass repair except that it only needs to be a 12/1 taper.

If the deck in your boat is in very bad condition you will need to plan for a winter of it and take the keel off and roll the boat upside down. Strip out all the plywood and glue in new. Come talk with me if you plan on this project as there are some helpful hints.

You now know why it is important to fix leaks and to keep water out of the boat. It is also important to provide ventilation so moisture in the boat will dissipate.

One side note here and that is when storing your boat out of the water in the winter time be sure to not tarp it down tight but provide ventilation. Also the boat will need to be stored slightly bow down so that water will not collect on the cockpit seats and flow into the seat hatch.

Painting Your Cal-20

Painting is all about preparation, the better the preparation the better the job will be.

There was a long discussion earlier on bottom preparation for racing and the bottom paint is applied with a thin foam roller to keep the film thickness thin.

Painting the hull sides of your Cal or new stripes are similar to doing the bottom except that the sand paper used to prepare the surface is 220-320 grit. If you are going to paint the hull sides take the rub rail off first so you will have a professional looking job. Mask out what you don't want painted and do the job early in the day before the breeze comes up. We here at Schooner creek paint in a heated indoor spray area with filtered ventilation. We spray the paint to give a perfect finish. DO NOT Spray at home.
There is a nice video of rolling and tipping on U-tube see pg. 51

To do the nonskid areas of the deck be sure you get all wax or other contaminates cleaned first, then sand or scotch-bright all the surfaces to be painted to break any shine. Then do your final masking and clean up before painting. I have found it best if you are going to add some type of nonskid material to the paint DON'T. Take the can of particles and punch a bunch of holes in the top like a salt shaker, roll your paint on and while it is still wet shake the particles on. Do a good job of getting more on then can absorb into the paint. Come back the next day and vacuum up all the extra and then roll on another coat of paint. It will look great.

Outboards

I am no expert on outboards but here is what I have learned over the years.
Buy the lightest motor for the power requirements you need.
The Cal-20 can be pushed along nicely with a 3hp short shaft outboard if you are using the well.
If you are mounting the motor on the transom be sure to put a big backing block on the inside and watch where you mount the bracket (check with other owners).

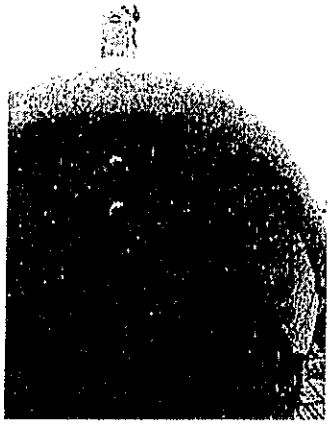
The trick with using the well is getting the motor and motor plate in and out and keeping the water in the well from swamping the cockpit while motoring.

The trick of motor in and out is most of the forward way must be stopped before the change. The same goes for putting in the plate. I have an arrow on the inside of my plate to tell me which way is forward. When I go to put it in I shove it down with the front edge up until the last second when I pull up quickly on the line between the plate and top cover. If you have ever done other you may have had a very exciting moment while the plate was trying to pull you down and through the motor well.

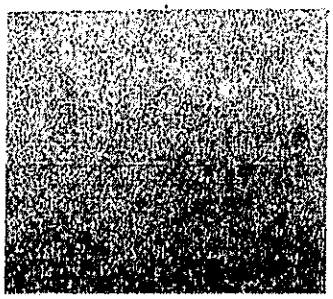
Just remember to slow the boat up when taking the plate in or out.
As for keeping the water from sloshing up into the cockpit the best solution I have found is a piece of 3-4" foam rubber cut just larger then the hole in the well with a "V" notch cut half way into the back of the foam so you can pull it around the motor as you shove it into the hole. The foam does a great job of stopping the water and is easy to deal with when storing the engine.

When ever you are going to put the engine back into the locker be sure that you have shut the fuel off, closed the vent and run the engine to get rid of any fuel still in the carburetor.

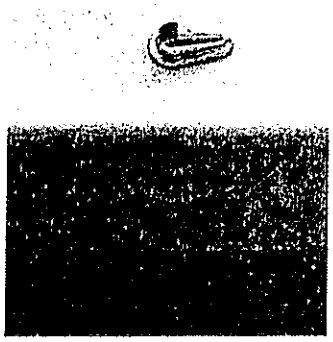
Watch your fuel to oil mix carefully if you have an old two stroke and carry spare spark plugs and wrench. Better yet change a plug once before going out this spring just so you know how to do it and have all the tools you need.
When putting the boat away for the winter drain the fuel from the tank and put in new fuel in the spring.



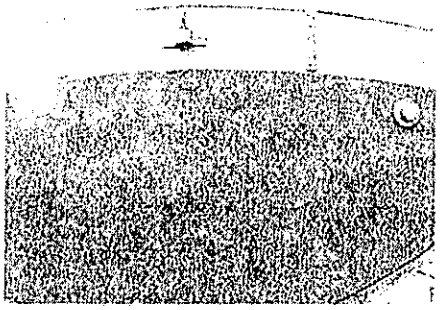
New Headstay chainplate



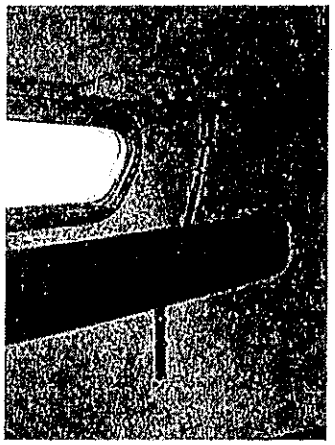
Aft lower bolts



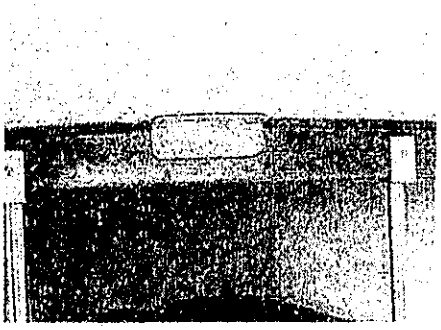
Port Running Light



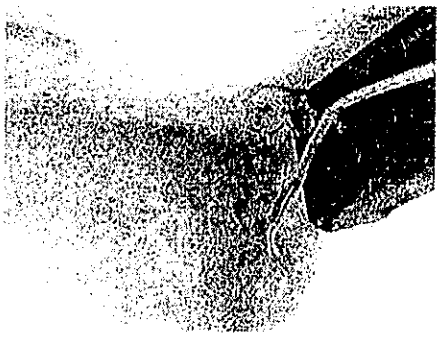
Backstay chainplates & Steam Light



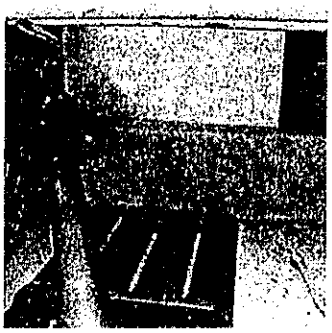
Aft Lower Chainplate



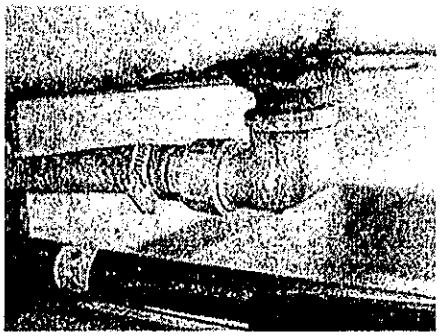
Mast step suport



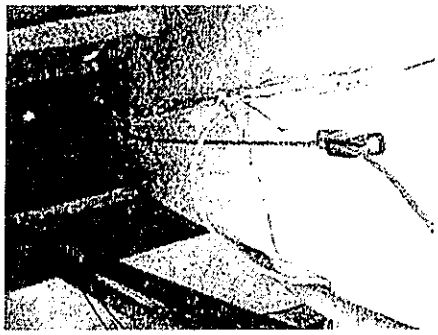
Upper shroud chainplate



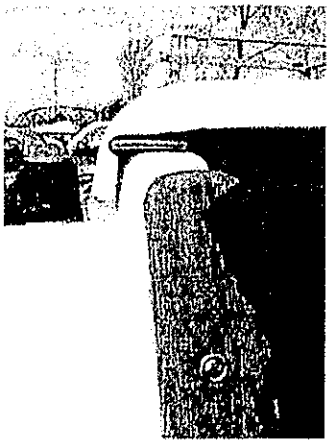
Cockpit support



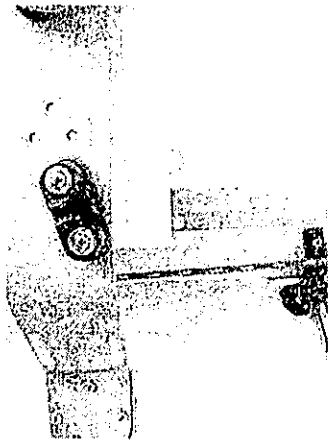
Forward cockpit drain



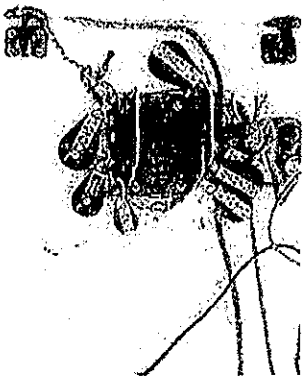
Seat locker lock



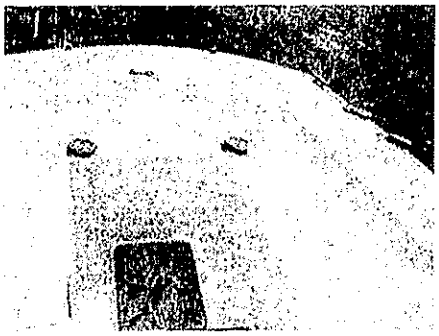
Detail of sliding hatch



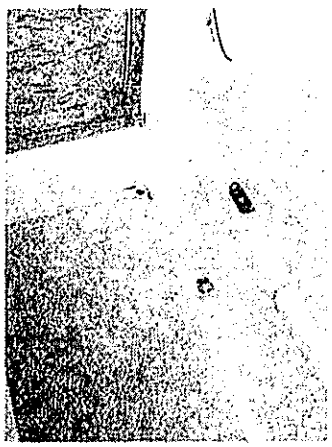
Note hole in track for lock



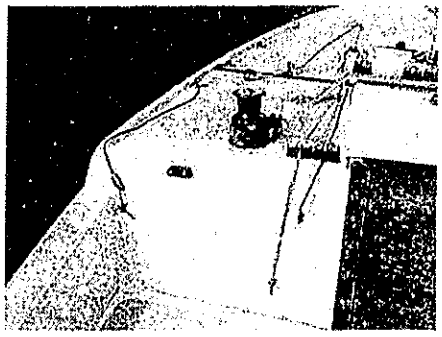
Mast organiser and rocking base



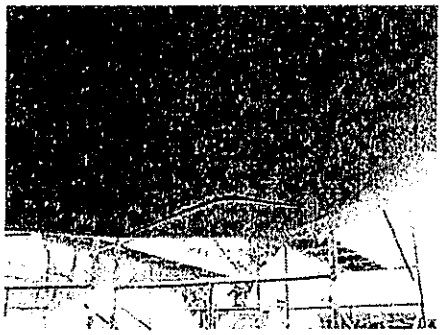
Turning blocks for double ended mainsheet



Turning block and cam cleat for m...



Transverce jib track & twinger



Speed Brake

Internet links and U-tube demonstrations

http://www.youtube.com/watch?v=Gjyzc4c9JnE Painting by Rolling and tipping

http://www.sealsspars.com/index.html Steve Seals site for parts

http://www.pbase.com/mainecruising/rebedding_hardware&page=1 Bedding hardware to prevent leaks

http://express27.org/articles/stoppingleaks Stopping leaks

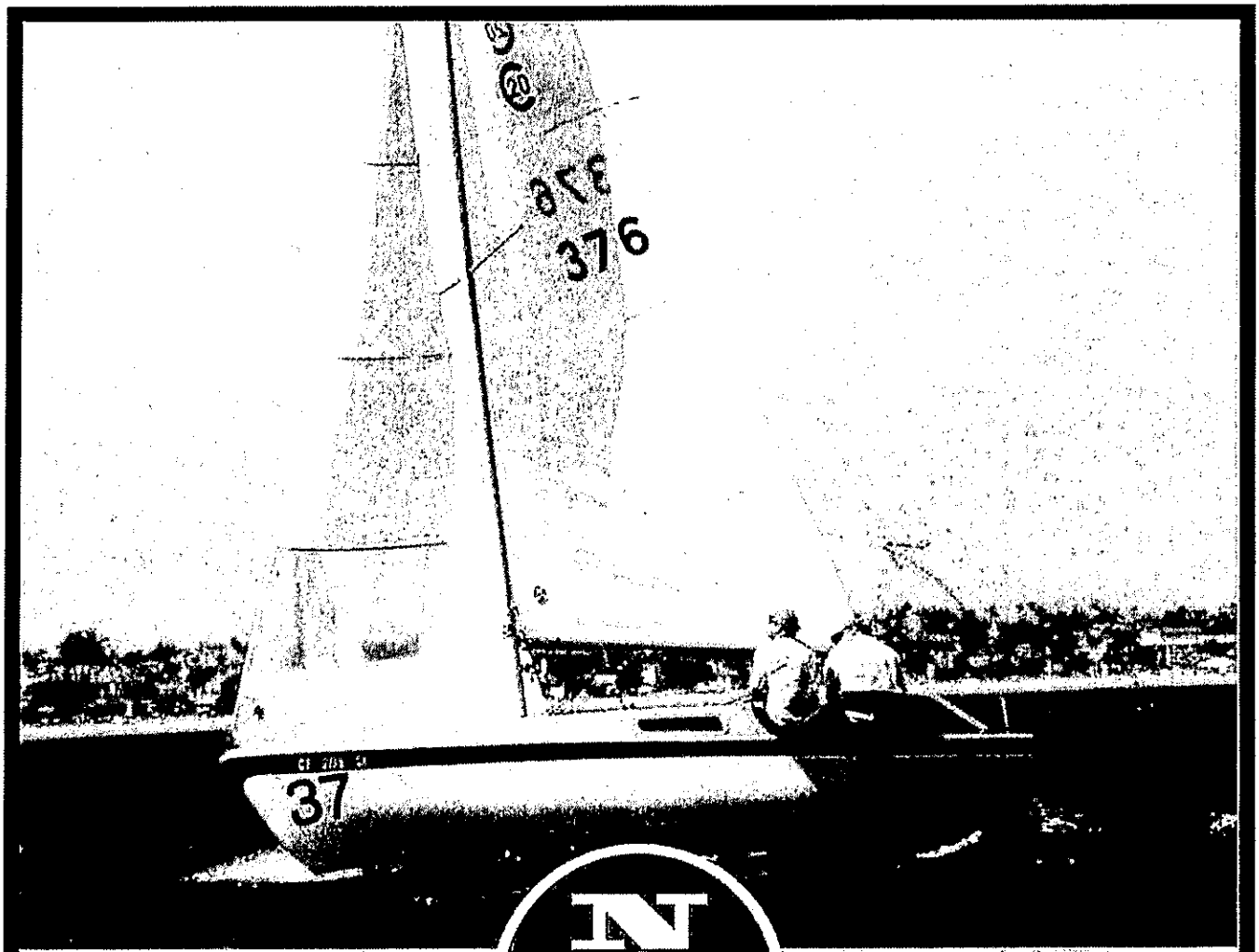
http://www.youtube.com/watch?v=SsoKAHU5xUw Fiberglass repair

http://www.westsystem.com/ss/fast-blister-repair-with-six1/ Blister repair

http://www.cal20.com/ClassAssociation/Bylaws/tabid/63/Default.aspx Cal-20 By-Laws

http://www.bassboatcentral.com/2strokecare.htm 2 stroke outboard care

http://sailingvoyage.com/photos/index.php/Cal-20-Restoration Restoration of a Cal-20



NORTH SAILS

One Design

For any question you may have on tuning your Cal 20 for speed, contact our Cal 20 expert listed below:

ONE DESIGN WEST
Chris Snow
619 226 1415
F 619 224 7018
chris@od.northsails.com

Cal 20 Tuning Guide

NORTH SAILS

Cal 20 Tuning Guide

The following tuning guide is meant to be a good starting point in setting up your rig and sails. We are trying to achieve a setup that is fast in all conditions. Your new North Sails are designed for all around sailing performance.

MAST RAKE AND SHROUD TENSION

The Cal 20 sails best with one or two degrees aft mast rake. This cannot be measured in the usual way (measuring from the top of the mast to the center of the transom) because the factory stepped the masts in different fore and aft positions. Most boats do not have enough range in their headstay turnbuckle to let their mast rake aft sufficiently. Usually a toggle must be added.

The next step is to make sure the mast is straight sideways. Mark your main halyard and swing it from one side of the hull to the other. Now tighten your jumpers so the tip is straight with no backstay pressure (this requires the jumpers to be tuned fairly tightly).

The side shrouds are adjusted while sailing to windward. The mast should be straight in winds below 3 knots. As the wind increases, it should start moving aft and slightly to leeward in a nice even bend. To achieve this, the aft shrouds should be loose to allow the mast tip to go forward when sailing downwind. The upper shrouds should be tighter to keep the mast in column.

Sighting up the aft mast groove with sail pressure on the rig and making slight adjustments to the turnbuckles is the easiest way to obtain the results desired.

BACKSTAY

The backstay adjuster should be tightened just enough to keep the headstay from sagging more than ¾". This requires constant attention. Too much backstay tension tends to pull the mast tip too far aft.

BOOM VANG

The boom vang bends the lower part of the mast allowing the main to be flattened. Note: Watch to see that the leech of the main has a free exit and is not hooking to windward. Remember to ease the boom vang after rounding the windward mark because considerable stress is put on the middle of the boom when the sheet tension is released.

LUFF TENSION

Both main and jib should have just enough tension to maintain maximum draft position as follows:

Main 50% aft of the mast
Jib 35% - 40% aft of the headstay

Don't over-stretch the sail! Too much luff tension moves the draft forward, which is very slow.

BARBER HAULER – JIB SHEET

Probably the most controversial adjustment on a Cal 20 is the barber hauler or jib traveler positioning. We have prepared a chart to give you a good starting point for different wind and water conditions. The percentages relate to how far inboard from the outer rail to the hatch the positioning should be.

Wind	Water Conditions	Barber Hauler Position
0-5	smooth	90% inboard
0-5	rough	75% inboard
6-11	smooth	95% inboard
6-11	rough	85% inboard
12-15	smooth	95% inboard
12-15	rough	85% inboard
16-21	smooth	75% inboard
16-21	rough	50% inboard

REMEMBER

When in doubt let it out.

MAINSHEET TENSION

Since a Cal 20 does not have a traveler, we have not been able to use the top batten or the top telltale in the conventional way. (Meaning the top batten parallel to the boom and the top telltale flowing nicely.) A good starting guide:

Very light winds
boom is 3" in from corner of transom

Light to medium
boom is 12" in from corner of transom

Medium to medium heavy
boom is 16" in from corner of transom

Be sure to watch the leech is not hooking to windward due to excessive boom vang or mainsheet tension. Also, mainsheet must be eased when the boat heels more than 15 degrees. A Cal 20 must be sailed "on her feet".

OUTHAUL

Since the Cal 20 tack position varies as much as 3", it is impossible to formulate dimensions the clew should be from the band. Generally Cal 20 sailors carry the outhaul too tight in light and medium winds and too loose in heavier breezes.

Downwind Sail Trim

A few tips that will be helpful:

>> Ease backstay and jib halyard so they match each other. Backstay will have to be tightened before jibing so it will not collide with the boom.

>> Try to balance crew weight so there is a neutral helm.

>> Watch that the boom vang is not on tight enough to hook the leech to windward.

>> Keep crew weight as low as possible to avoid pitching from side to side.

Sail Care

Rolling your sails is very important, not just because they will last longer, but also to avoid getting permanent wrinkles. Rinse sails with tap water to remove salt and keep out of hot enclosed areas.

Thanks for buying North Sails and we hope that the above hints will help you win more races.

Contact North Sails

For tuning information and complete details on how to setup your Cal 20 sails contact the North Cal 20 experts listed on the cover of this guide.

Good Sailing!

NORTH SAILS

NORTH SAILS ONE DESIGN
QUALITY CONTROL CHECK

Cal 20

MAINSAIL		JIB		SPINNAKER	
Corners		Corners		Corners	
Cunningham		Leech Cords		Numbers	
Numbers		Luff Hanks		North Logo	
Battens		Foot Line		Bag	
Leech Telltale		Telltales			
Insignia		North Logo			
North Logo		Bag			
Bag					

Checked by: _____

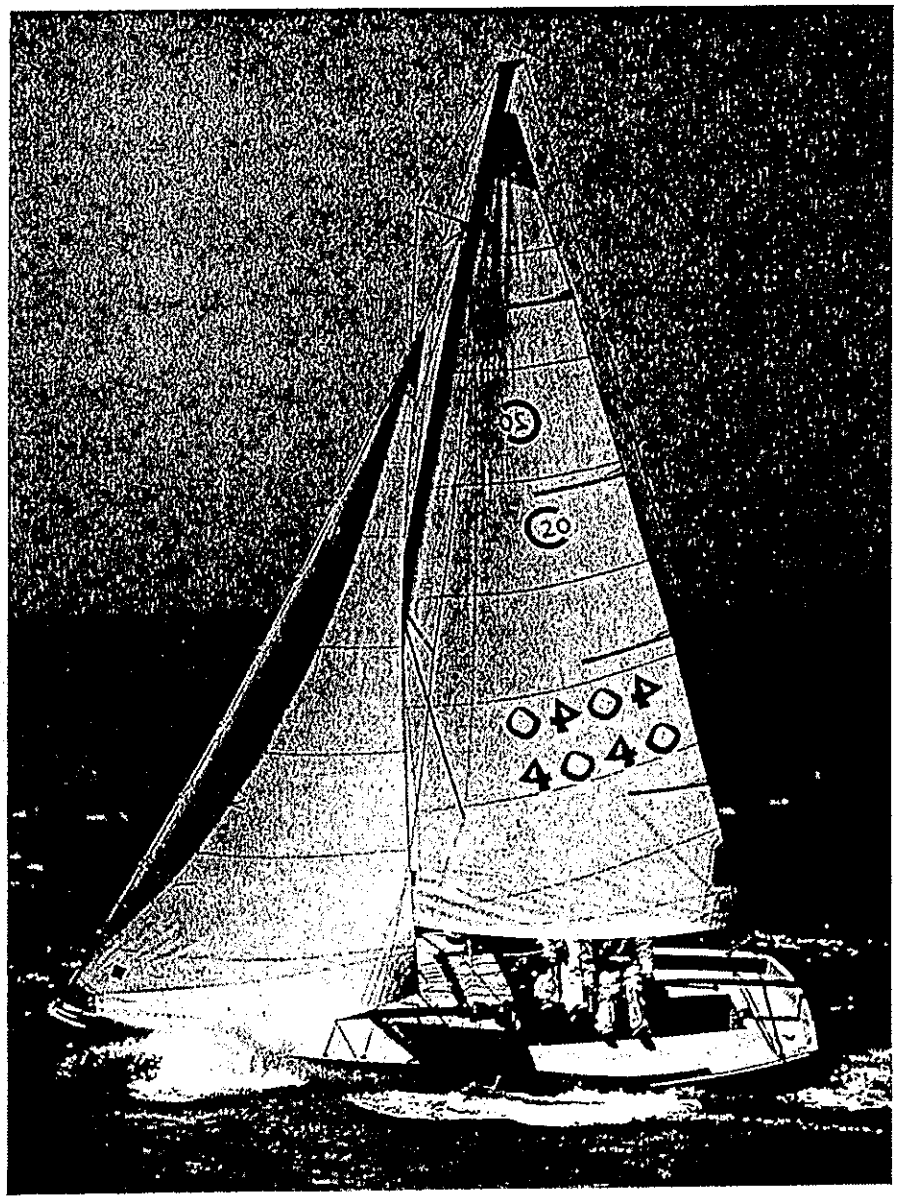
Date: ____ / ____ / ____

55

A CLASSY TWENTY-FOOTER

by Steve Seal

Photo by Diane Beeston



The Cal 20 was designed by C. William Lapworth in 1960 and went into production in 1961. She is still being built. The Cal 20 is one of the most successful of the Cal line of fiberglass sailboats, if not one of the most successful sailboats around today. There have been almost 2,000 boats built; most of the production occurred throughout the 60's when the Jensen Marine Factory in Costa Mesa, California was turning out as many as one boat a day! (There is another Jensen factory in Marlboro, New Jersey.)

A Cal 20 is a flush deck light displacement fiberglass sloop. Her specifications are: LOA:20'0" LWL:18'0" Beam:7'0" Draft:3'4" Sail Area: 196 sq. ft. Displacement: 1,950 lbs. Ballast: 850 to 900 lbs. The cockpit is nearly 8' long and is self-bailing. Below she has four bunks, a head and storage bins. For her 20' length, she is one of the most practical boats imaginable.

She became known as a stiff and lively performer that could be cruised or raced anywhere, either trans-Atlantic or to Hawaii.

Cal 20's were and, relatively speaking, still are inexpensive to buy, own and maintain. The base price was $3,200 throughout most of the 60's which put her within reach of just about everyone. With the advent of expensive fiberglass resin vis à vis the fuel crisis of 1973, and the new I.O.R. rule, Cal 20's gained rapidly in popularity. A lot of people wanted an active, simple, inexpensive, one design class boat that wasn't going to be outdated by the next measurement rule change. Now the resale value of a good clean Cal 20 is up to what the same boat might have cost new 10 years ago.

Cal 20's caught on quickly in many areas across the country. Today there are approximately twenty-five active Cal 20 fleets in the National Association; fleets from California to the East Coast, Hawaii, on various lakes, and a fleet in Canada. Cal 20's have always been actively raced, and, with the large number of boats around and the strong fleet associations, the racing is very competitive.

The National Association holds the annual National Championship Regatta. Held in quite a few different areas, this regatta is limited to the

sixty top Cal 20 skippers from the various fleets across the country. To be able to sail in the National Championships a skipper must first qualify within his or her own local fleet.

The 1977 Nationals will be held on San Francisco Bay. San Francisco is known throughout the world as a heavy weather area. Indeed it is! You can count on the wind on most summer afternoons being upwards of 20 knots. A Cal 20 does quite well on the windy Bay, as it is a stiff boat with a relatively short rig.

Racing a Cal 20 on the Bay requires some modifications to the boat and good strong rigging, easily workable by the crew. I have been rigging the 20 since 1970 when I bought my first, "Tour Jete". "4040", my second 20 was purchased in late 1974. She is a 1967 model, hull No. 1197. The boat spent the winter of 1975 on her trailer in my back yard while I contemplated and assembled her rigging. "4040" represents my latest thinking on how to fit out and rig a Cal 20 for class racing without spinnaker gear, the way the boats are raced in the National Championships. Much of the rigging on "4040" evolved from my experiences over the years, as I rigged and sailed more and more of the staunch little boats.

When a Cal 20 comes from the factory, she has many inherent strong qualities and a few characteristics which, for lack of a better word, I call "weak"; these show up after racing the boat (particularly on the Bay). One of the best qualities about the boat is her large cockpit, which is nearly 8' long and self-bailing. This makes her a very good day sailer as well as a comfortable boat to race. When day sailing or cruising, four people in the large cockpit is quite comfortable. When racing, the crew doesn't have to leave the cockpit to get their weight in the right place because the right place for crew weight is at the forward end of the Cal 20 cockpit, by the bulkhead, where the crew naturally ends up. This "built-in" accommodation makes a Cal 20 a much more comfortable boat to race than many other boats around today. The only exception occurs when the boat is raced by four people. The fourth person is usually in the way and is often sent below deck. In most areas Cal 20's are raced by 2 or 3 people, so this is only a problem on windy S.F. Bay where a fourth person is nearly always carried for the added weight on the weather side.

Let's talk about those "weak" spots that are aggravated by the harsh conditions of the Bay. The most glaring is the spreader brackets, the U-shaped stainless steel clips that hold the spreaders to the mast. The stock brackets are a bit light, and fail after a few years of hard use. I make (and sell all over the country) a heavy duty spreader bracket (See photo.) The design is relatively the same, but of heavier stock. Other weak areas are the headstay fitting and the aft lower chainplates. These chainplates are only supported by the deck of the boat and though the design is sound, tend to weaken with years of racing. Both problem areas are relatively easy to fix or reinforce. The headstay can be attached to a stainless steel strap or tang, fastened directly to the hull of the boat, at the bow (See photo). The aft lower chainplates can be supported from below decks inside the boat with the addition of custom chainplates and turnbuckles. (I have kits for both of these areas that can be easily installed.) These modifications were taken care of on "4040" before we started racing her on the Bay.

Custom rigging is added to a boat to enable the crew sailing her to set the sails quickly and easily under ever changing conditions. At the same time, the crew shouldn't have to move their weight around very much which is a problem on any small, light boat. On a Cal 20 if anyone has to leave the cockpit to do anything, the boat slows down dramatically. This is why all lines are led aft to cam cleats on the black anodized aluminum bridge. Having all the rigging adjustable from this central area of the boat enables the crew to make small adjustments to the rigging without having to move their weight around very much. The reduction in energy required to get the rigging adjusted, coupled with the fact that the crew isn't constantly having to shift their weight, means that the sails will be kept in better trim and the boat will be going faster more of the time. Having good rigging that is easy to work, and that works well, makes sailing, and especially racing, that much more enjoyable. You tend to learn faster how a sail should look in varying wind conditions and you tend to do what needs to be done, instead of putting it off and hoping that conditions will change. We on "4040" can do everything from the cockpit. We can reef the main in a matter of seconds, even if it is blowing 30!

The power ratios on the gear are high. The boom vang is 8 to 1. The outhaul is 8 to 1. The jib halyard adjuster is 5 to 1. The cunningham downhaul and the main halyard adjuster are 4 to 1. On the windy Bay these power ratios are none too much.

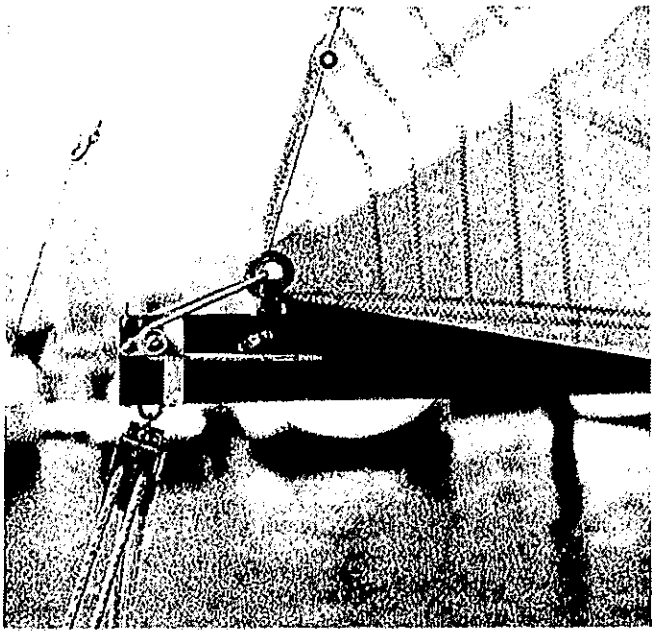
One of the most recent changes on my boat was going to swivel cam cleats on the highly used gear on the bridge. The three mainsail control cams on the center line of the bridge i.e. vang, cunningham downhaul and outhaul are all led through swivel cam cleats. So is the jib halyard adjuster. This makes it easier for the crew to adjust these highly used items from almost anywhere in the cockpit.

Weather sheeting the jib sheets also helps to eliminate the crew having to shift their weight. Being able to sheet in the jib on the weather side of the boat, to the weather winch, enables the crew to keep the jib in good trim at all times, and their weight in the right position.

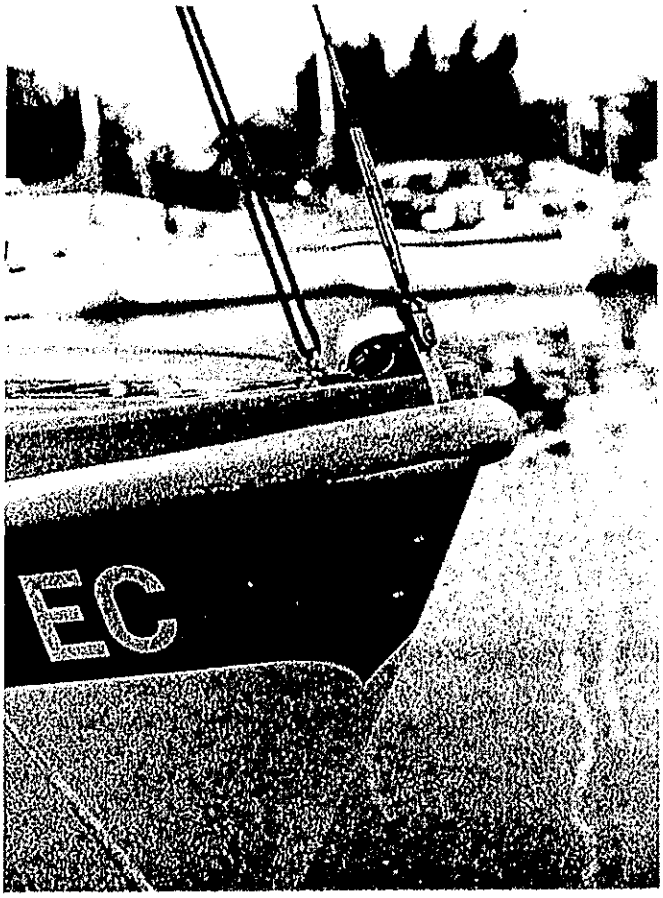
The barney post puts the mainsheet swivel cam cleat where either the skipper or the crew can reach the mainsheet easily while facing forward.

As you can tell, a lot of forethought and careful planning went into the preparation of Cal 20 "4040". All in all, everything has worked out very well, and I'm very happy with the boat.

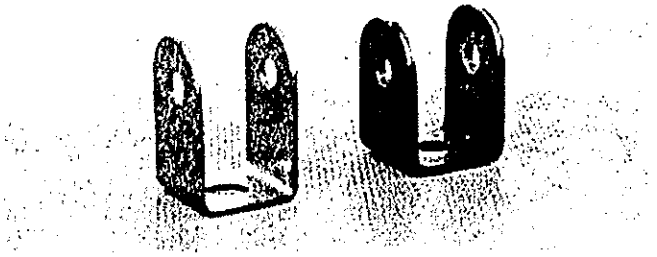
We have had pretty good luck with "4040", but have yet to win a National Championship. In 1975 we managed a 2nd place to Ted Rust, our old Bay nemesis. We're going to give it another try in '77. With some good sailing, a little bit of luck, Ted Rust and the rest of the 60 boat fleet willing, we're hoping to have a crack at it!



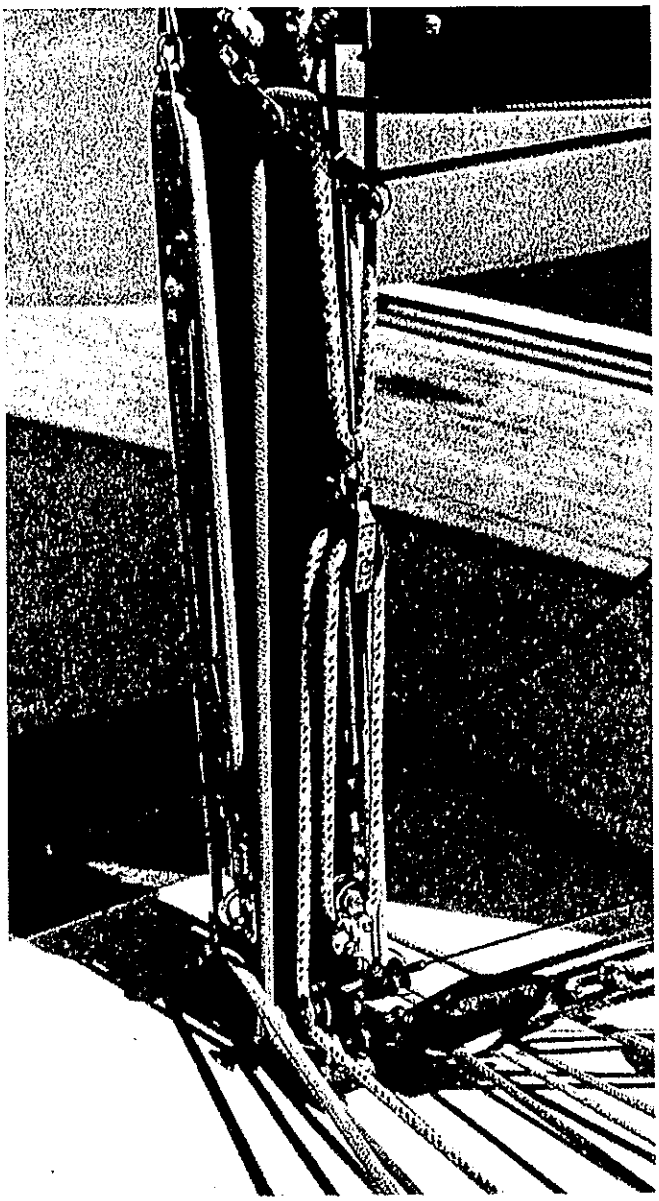
OUTHAUL
The Outhaul is led inside the boom to a tackle system at the gooseneck end. The tail exits the boom after going through the tackle system. From there it goes down to the base of the mast and ends up on a swivel cam on the bridge.



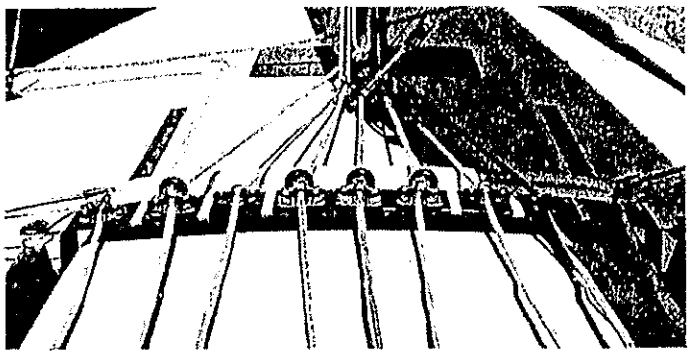
BOW TANG
The Bow Tang transmits the headstay loads directly into the hull. The headstay is usually attached to the deck plate, which puts the headstay loading into the deck. This is usually **not** *a problem, but as the boats age and are sailed hard, this can develop into a weakness.*



SPREADER BRACKETS
The "weakest" area of a Cal 20 rig is the spreader brackets. An original spreader bracket is on the left. One of Seal's heavy duty spreader brackets is on the right. After a few years of hard use the original spread brackets tend to fail. There has never been a failure of a H.D. bracket, making them a must for Cal 20's, especially on S.F. Bay.

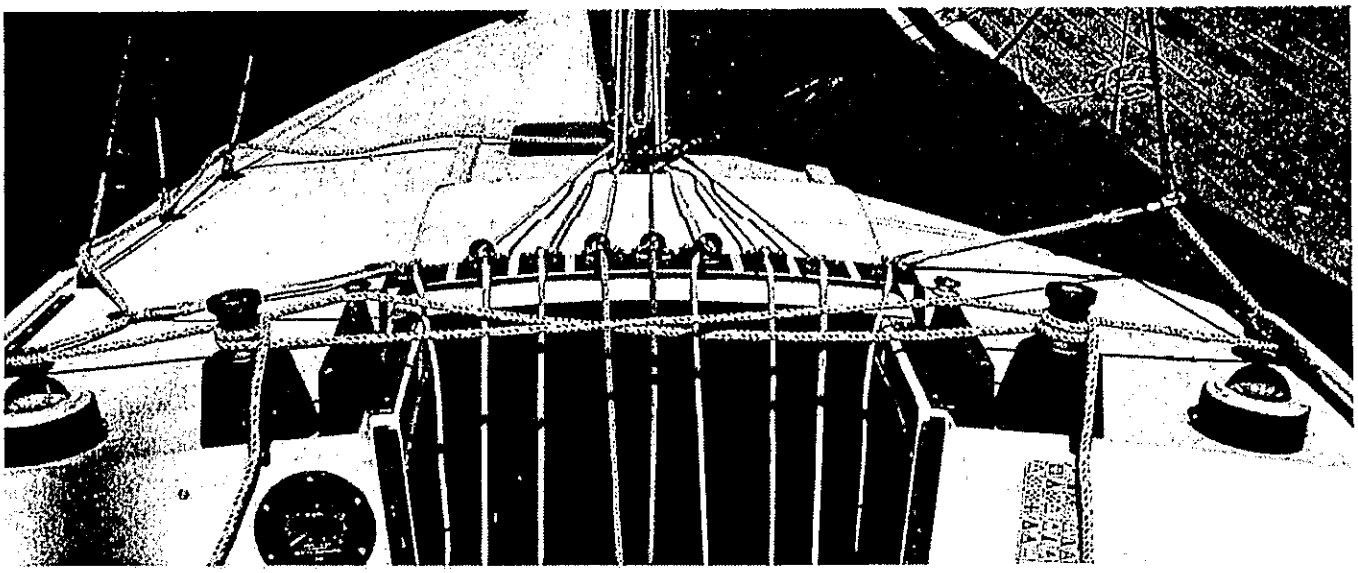


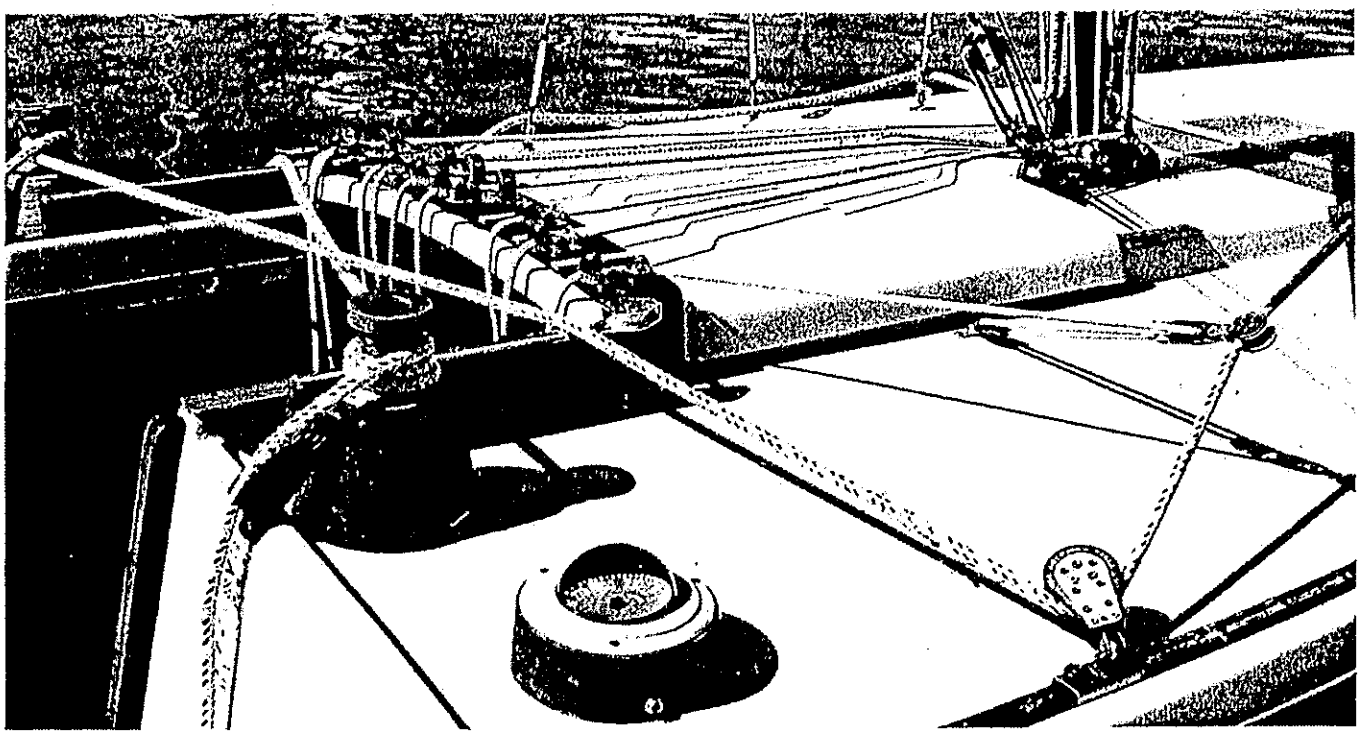
BASE OF MAST
All the gear at the base of the mast is laid out very carefully so that all the lines lead fair at all times. The 5 to 1 jib halyard adjustor is on the port side of the mast. The 4 to 1 Cunningham downhaul is at the back of the mast, above the vang.



THE BRIDGE

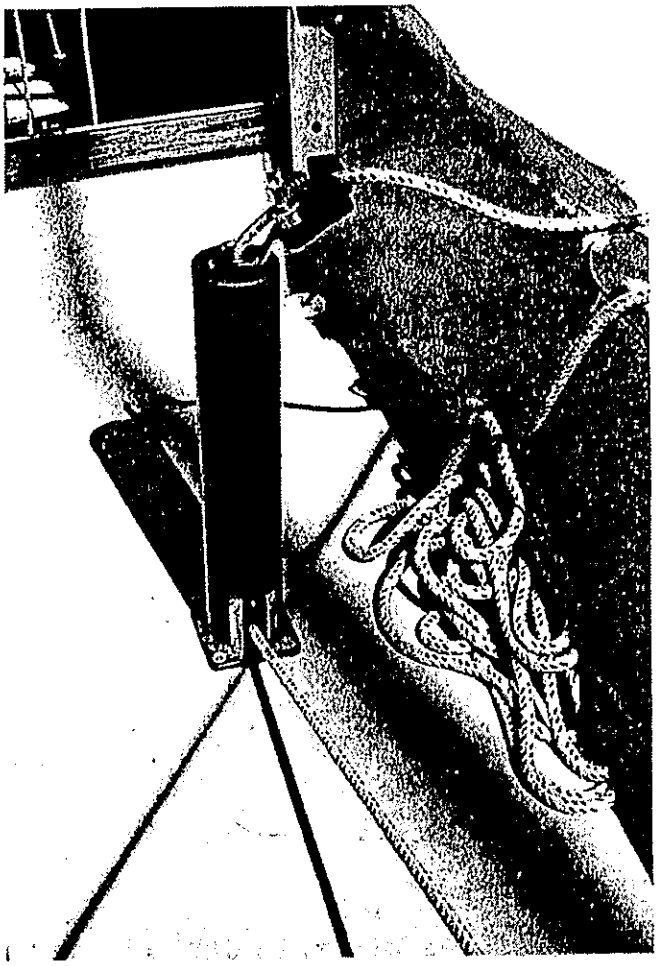
*Everything is placed on the bridge in a workable, logical manner. The three swivel cam cleats in the middle of the bridge are the **mainsail** control lines. The **Boom Vang** is the middle one of these three cams. To the left is the **Cunningham Downhaul.** To the right is the **Outhaul.** These are the three lines that are most used on the bridge, so they are all led through swivel cams. To the right and the left of this group of swivel cams are the 2 **reefing** lines, the **clew reef** to the left and the **tack reef** to the right. To the left of the clew reefing line is the Jib Halyard swivel cam cleat. This is also a heavily used line, so it leads to a swivel cam. To the right of the tack reefing line is the Main Halyard. In the two corners of the bridge are the Barber Haulers. Every "system" is bracketed on the bridge with yellow tape and the cams are labeled, to help show the sectional divisions on the bridge.*



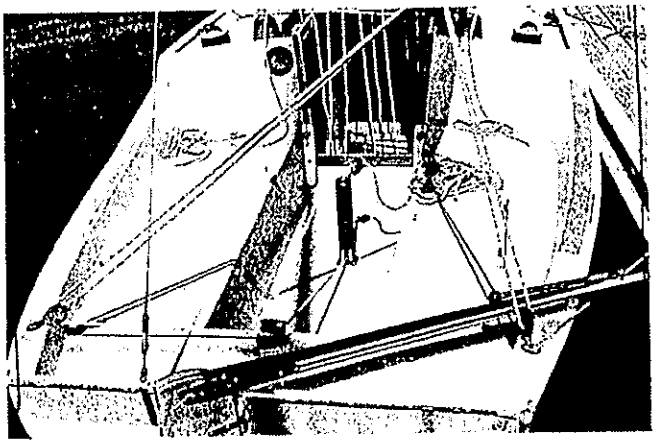


WEATHER SHEETING

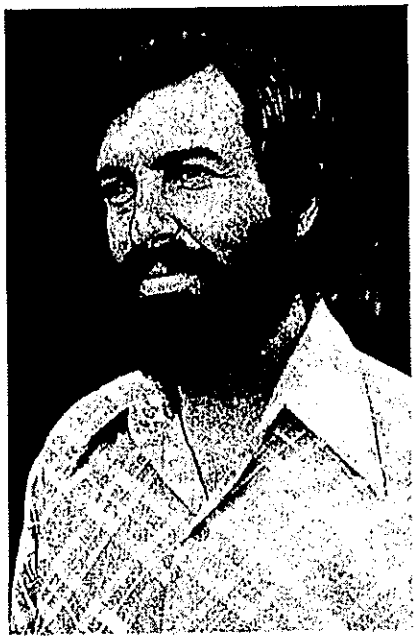
*The jib sheets can be led conventionally to the winch on the leeward side of the boat, or they can be led across the cabin top to the winch on the weather side of the boat. This is called **weather sheeting.** Weather sheeting allows the crew to stay on the high side where their weight is most effective and allows them to keep the jib in perfect trim in the process. The sheet runners and cheek blocks on the two sides of the sliding hatch and the high pyramid teak winch pads allow the system to work efficiently, whether the sliding hatch is open or closed. Note convenient placement of clamcleats.*



BARNEY POST
The Barney Post puts the mainsheet cam cleat in a much better position. Originally this cleat was aft, under the tiller, on the seat, where the turning block is now. That placement put the cam cleat in back of the crew in a difficult place to get to. With the cam cleat on the Barney Post, either the skipper or the crew can work the mainsheet easily, while facing forward.



COCKPIT
For her size, a Cal 20 has a huge cockpit. This makes her a very comfortable boat to day sail or to race. Note the barney post mainsheet rig. (The double turning block on the seat is for a still experimental heavy weather system, that is not yet set up.)



Steve Seal is an independent Sailboat Rigger based in Alameda, California. He is originally from Southern California, raised in Newport Beach where he learned how to sail in the 1950's (before L.A. discovered Newport). After two years of college he went to work for Columbia Yachts in Costa Mesa as their rigger. After a year at Columbia he went to work for Jensen Marine (Cal Boats) where he worked as their rigger for four years. In 1969 Steve moved to the San Francisco Bay Area and started his own sailboat rigging service. He bought his first Cal 20 in 1970 which launched his career in the class. Since then he has worked on literally hundreds of Cal 20's as well as many other types and classes of sailboats, specializing in the 20 to 30 foot range.

His racing record in the Cal 20 class includes Y.R.A. championships in San Francisco Bay for the years 1971, 1972, 1973, and 1975, and S.Y.R.A. championships in 1975 and 1976.

photos by Linn Lee

The Cal 20
A pocket cruiser that also suits th

You know which pocket . . . it's that little one in the front of your jeans . . .

by John Vigor

One has to wonder why that extraordinary adventurer, Webb Chiles, chose an open 18-footer like the Drascombe Lugger to sail single-handed three-quarters of the way around the world when he could have done it more safely, in far more comfort, and more cheaply in a used Cal 20.

The Cal 20 is essentially a dinghy with a lid on. She handles like a dinghy; she's light on the helm and very responsive. But she has a heavy ballast keel that makes her very stiff and safe at sea, and her cockpit is self-bailing. She's sparsely appointed down below, to say the least, but she does have four bunks — two of which are 6 feet 6 inches long — and the cabin provides a dry, sheltered, comfortable place to sleep. That's a big step up from a Drascombe Lugger.

Better yet, the Cal 20 is cheap. Nearly 2,000 of them were built by Jensen Marine, of Costa Mesa, Calif., between 1961 and 1974, and the vast majority are still going strong. Some are going stronger than others, of course, but you should be able to buy a Cal 20 in excellent condition for $4,000 to $5,000 and a fixer-upper for about $2,000. Parts are still available, and racing fleets are still active on the West Coast, in the Great Lakes, and in Hawaii.

You'd have to be young and carefree to sail around the world in a Cal 20, but you wouldn't have to be foolhardy. Although she's basically a club racer/cruiser designed for nothing more than short coastal trips, she doesn't need major modification for long-distance voyaging. She has earned a reputation for seaworthiness that is the envy of the owners of many larger, more expensive craft. George Cadwalader and his crew, Duncan Spencer, crossed the North Atlantic in one, sailing from Newport, Rhode Island, to Crookhaven, Ireland. Kun Poi Chin sailed his Cal 20, *Chalupa*, from San Francisco to Hawaii in the early 1980s.

The one thing she doesn't have is room. She is the pocket they were talking about when they invented the phrase "pocket cruiser." It's the little pocket in the front of your jeans, the one that fills up with pennies, fluff, and paper clips. Like many other boats of her size, she's little more than a floating fiberglass pup tent — except that if you're willing to put up with a little discomfort, the Cal 20 has the thrilling ability to whisk you away over the blue oceans to magical tropical islands and palm-fringed beaches.

Basic design

One of the wonderful things about a small boat like the Cal 20 is that everything is so manageable. The sails are small, the anchor is light, and you can anti-foul the bottom in an hour. You never seem to suffer from that dreadful feeling that creeps up on you sometimes in bigger boats, that everything is just too overwhelming.

C. William "Bill" Lapworth designed her specifically for sailors moving up from Lightnings and small dinghies. She had to be agile, like a dinghy, but she had to be big enough for weekend cruising for a couple, and possibly two small kids as well. She also had to be fast enough for weekend racing, so Lapworth stuck a 900-pound bulb-style ballast keel on the bottom, much like that on the Star Class. It's made of cast iron. *(Photo on Page 11.)*

Her overhangs are commendably short, which gives her the most interior room possible for her length, and her

Kelly O'Neil

Steve Rander's Cal 20,* Reality Check, *started the Portland Cal 20 fleet. Steve bought the boat when it was to be scrapped by a fellow who wanted just the mast. Steve gave him another mast in exchange and went on to start something big in Portland* (see Page 10). *In the photo at left, Steve's at the helm, Lynne Hemmert is adjusting the spinnaker, and Todd Johnson is hidden from view.

61

s the pocket

Although this pocket cruiser is meant for cruising (note the palm trees behind Bandini Mountain*) this photo from Doug McLean is the only photographic evidence we have of its ability to cruise. As Cal 20 National Class President, Doug gets many photos from sailors. This one is from Mark Gollison. His crewmember is listed only as Walley.*

accommodations also benefit from the raised foredeck, a very sensible idea that adds strength to the hull/deck unit. It's tricky to design a raised foredeck that looks right and doesn't destroy the pretty line of the sheer, but Bill Lapworth managed it very well here.

Her hull is solid GRP with no coring, but the deck is of composite construction and has a plywood core, which means problems of rot and delamination if water ever manages to seep in around a poorly caulked deck fitting. The Cal 20's rudder, hanging dinghy-style from the transom on pintles and gudgeons, is about as rudimentary as they come, but its simplicity and accessibility would be strong factors in its favor if repairs were ever needed. In fact, it's one of the few rudders you could remove, repair, and replace at sea.

She has a daysailer cockpit an 8-foot-long affair that seats four in comfort for short periods. Its volume needs to be reduced for ocean voyaging and there are several ways to do this. You could, for example, make the well narrower with plywood panels. You might also use plywood to form a box at one end or the other, and gain more stowage area at the same time. But one of the best solutions was discovered by Kun Poi Chin, who simply stored his life raft in the cockpit. That reduced its volume by about 40 percent.

The cockpit coamings, incidentally, are uncomfortable to lean back against. They are too low to provide good support for your back. But few problems are insoluble, it seems. If your boat has lifelines, a roller cushion fitted around the stainless steel wire could be the answer. Some owners have increased the comfort level by fitting stainless steel side railings to rest their upper bodies against.

At the aft end of the cockpit, a well for an outboard motor protrudes up for a couple of inches from the sole, sealed top and bottom with removable hatches. If you remove the hatches, you have a hole in the bottom of the boat that is less than hydrodynamically perfect. It creates swirls and eddies that slow the boat down. It also allows water to slop into the cockpit in rough following seas. But at the same time it forms a huge and really efficient cockpit drain. If you're going deepsea with this little boat, you might want to do exactly what Kun Poi Chin did. He left the bottom of the well open, but drilled holes in the top hatch and placed it back on. This stopped most of the slop splashing into the cockpit, and still acted as a drain that Chin regarded as very efficient.

The standard outboard is a 6-hp model and probably the most convenient place for it, if you're going to use the well as a permanent drain in this fashion, is on the transom. In fact, however, the boat is so small that you can sail her almost anywhere, and a pair of 8-foot oars will move you around the marina or anchorage.

Accommodations

To maintain her speed and nippy performance, she had to be kept light, so practically no furniture was built into the fiberglass cave below, apart from a V-berth up forward and two settee berths. Shelves and storage compartments sit at the head of the settee berths, with just enough space for a camp stove on one side and a breadboard on the other. There's a head compartment aft of the V-berths, big enough for a pump-through toilet. But finding space for the legally required holding tank is such a problem that most owners will opt for a portable potty, or the bucket-and-chuck-it system at sea and the bucket-and-bag-it system in port.

Like any boat of its size and shape, the Cal 20 does not aspire to the luxury of a well to collect bilge water and keep it away from everything else in the cabin. Any water that finds its way aboard will slosh to and fro across the sole and, if it isn't removed quickly, everything down below will soon be sodden. This means that clothes and important documents should be kept in watertight containers, just in case.

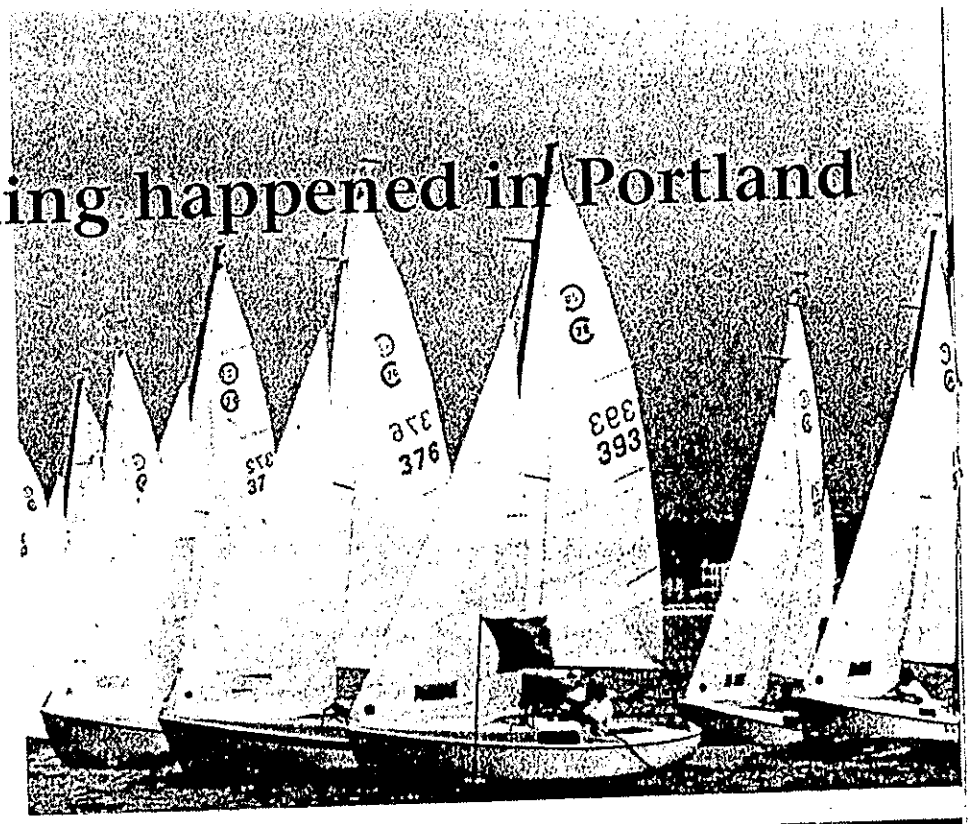
The original boats were supplied with a flush-through toilet between the berths in the forepeak. But current legislation calls for holding tanks to be fitted to fixed toilets, and there is simply no space for a tank of any reasonable size in a Cal 20. So most owners have thrown out the original

Resources for Cal 20 owners

Cal 20 Website — http://www.cal20.com
Cal Website — http://www.bright.net/~go2erie/
Cal Email Discussion List — http://www.sailnet.com/list/cal/index.htm
Seal's Spars and Rigging — 510-521-7730, http://members.aol.com/sealsspars

62

A funny thing happened in Portland



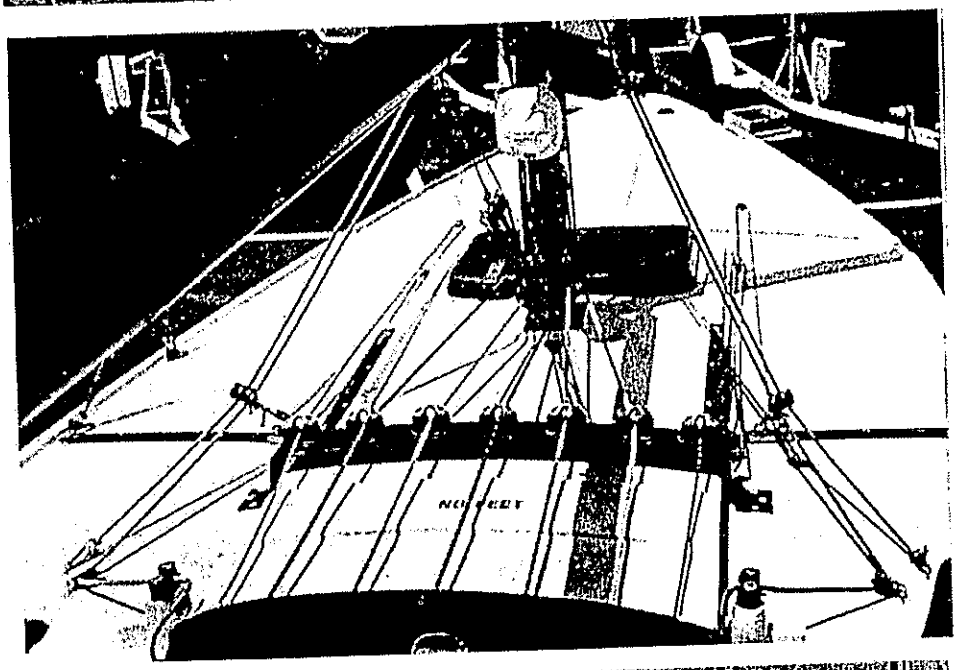
There used to be a Cal 20 fleet in Portland, Ore., years ago, but, as has happened in many other areas, the boats became semi-derelict and used for little more than an occasional daysail.

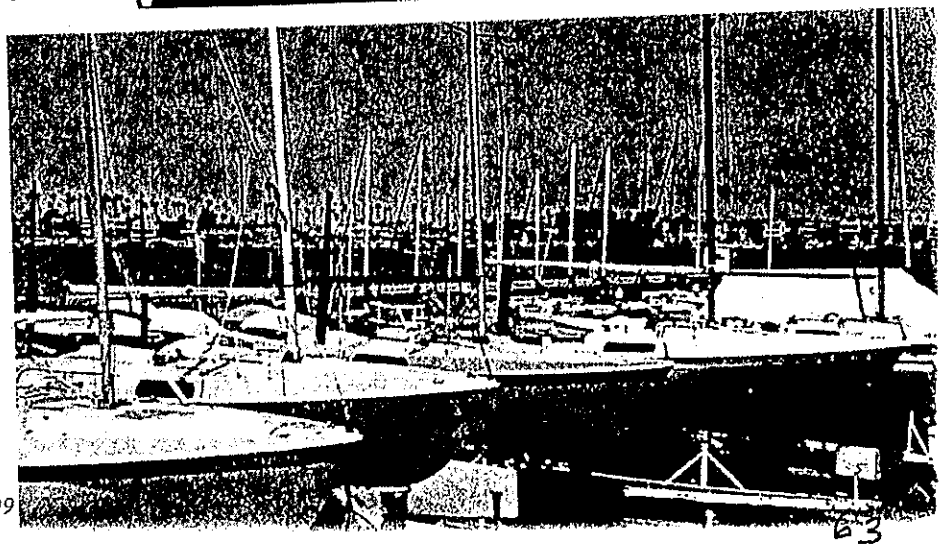
Not so anymore. Two seasons ago Steve Rander of Schooner Creek Boat Works in Portland traded a bent mast for a Cal 20, cleaned the boat up and raced it under PHRF to win the overall performance trophy. He had so much fun he found another Cal 20 for his wife, Nancy. Then yet another appeared and so it went: a Cal 20 fleet was born. More old Cal 20s were located; lots of effort went into upgrading the boats and the whole approach to fleet organization.

Moorings were found so members of the fleet could moor together (yes, this fleet is wet-sailed, what else in Portland?). The fleet also passed a local variance allowing the use of spinnakers.

The Cal 20 fleet works at promoting sailing and their organization by taking new sailors out sailing, making a visible showing at the Portland Boat Show, offering the boats for Sail Education Week (SEW sponsored by CYC and SYSCO), and lingering at the finish of races to cheer on other finishers.

The fleet motto: "If it's fun you want, get a Cal 20." Now almost two years old, the fleet already has 35 members and a waiting list of people looking for boats. To contact fleet members, email fastboat@teleport.com or call 503-735-0569.





While Portland has a growing racing fleet, southern California (the birthplace of the Cal 20) has the largest fleets. The photo from Doug McLean at top shows Fleet One action. The two photos below come from Glenn Selvin of the Alamitos Bay Yacht Club in Long Beach where Cal 20 Fleet One will be hosting the 1999 class championships. Selvin says, "For an inexpensive boat to buy and rebuild . . . these boats can't be beat."

toilet and replaced it with a portable toilet. This allows them to glass over the two thru-hulls the original toilet needed and reduce the number of holes in the hull.

The rig

You could hardly design a simpler rig than this. The Cal 20 is a sloop with 196 square feet of sail area, a Bermudian mainsail, and a 7/8ths foretriangle to hang the jib from. No great strains here; but remember, this is a small boat, and a third row of reef points in the mainsail is a good idea for offshore work. The spars are anodized aluminum. The standard stays and shrouds were designed for daysailing. If you're taking a Cal 20 to sea, you should replace them with ones at least a size bigger all around.

Incidentally, be sure to check out the original spreader brackets for cracks or other signs of deterioration. They're the weakest part of the rig, according to Steve Seal, an Alameda, Calif., sparmaker and supplier of rigging parts for several makes of sailboats. He carries spare parts for the Cal 20. *(See resources section on Page 9.)*

Performance

With 46 percent of her nominal displacement low down on her keel, the Cal 20 is a stiff little boat. In fact, she has built a reputation in San Francisco for being able to carry full working sail downwind in 30 knots. Her stiffness means she works to windward at a minimal angle of heel, which is less tiring on the crew but harder on the rigging — hence the need to upgrade the stays and shrouds for ocean work.

She's no flier, of course. She couldn't be, with only 18 feet of waterline length on a full displacement hull, but she has earned a respectable PHRF rating of 264 on the Northern California PHRF list. The ubiquitous Catalina 22 with a swing keel rates 270 on the same list.

For a small boat, she's fairly dry. Her ample freeboard, combined with the raised foredeck, takes care of a lot of the spray. But dryness is comparative, of course, and no boat of this size can truly be called dry when beating to windward in the open sea in heavy weather. Nevertheless, her reputation for seaworthiness is well earned.

As the windspeed rises, she tends to develop some weather helm, which can be cured by reefing the mainsail and keeping the working jib flying as long as possible. When it's time to change down to a storm jib, it's time to take in another reef in the mainsail, too. Excessive heeling in this boat is the major cause of weather helm, and sailing her more upright is the key to control, so in really heavy weather a third row of reef points for the mainsail is a good idea. Downwind, though, she really shows her stiffness, and racing Cal 20s often carry their spinnakers long after other classes have doused theirs.

Known Weaknesses

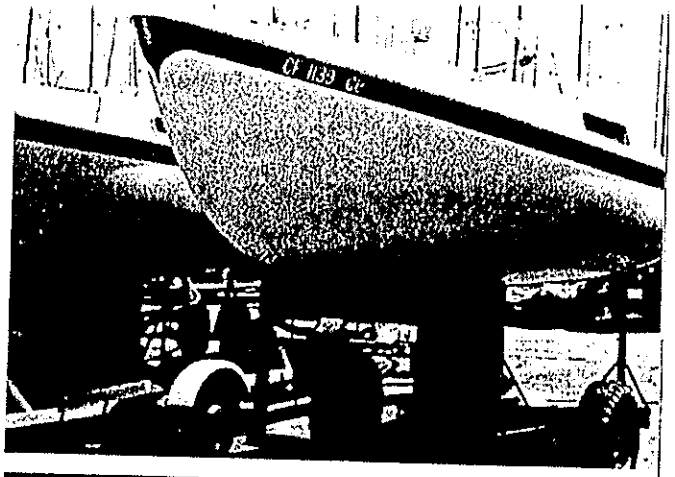
- Check the foredeck for rot of the plywood core and separation of the fiberglass layers, inside and outside, from the core. Water seeping into the plywood over the years will eventually soften the plywood and cause delamination. It's not easy to fix.
- The original spreader brackets have been known to crack.
- Excessive lee helm or weather helm is sometimes caused by a badly cast or slightly misaligned keel. Some owners have gone to the trouble of fairing out the keel to improve its performance; and re-aligning the keel is not a big job, but it's one you would rather not have to do in the first place.
- Some boats that have been raced hard have managed to loosen the deck attachment points for the forestay and the aft lower shrouds. Check them carefully, and beef them up if necessary.

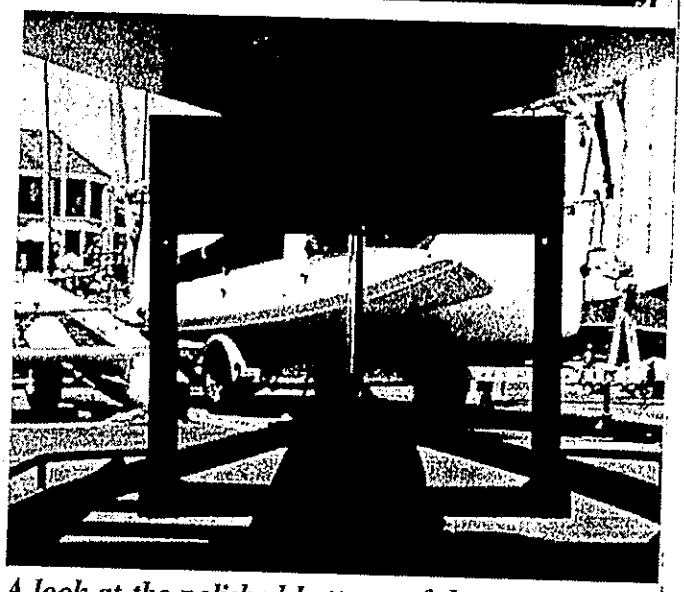
Owner's opinion

If you're planning to cross an ocean in a Cal 20, you'd do well to contact *Cruising World* (401-847-1588) and ask for a copy of an article called "Expand Your Pocket Cruiser's Horizons," by Kun Poi Chin. It appeared in the September, 1985, issue. Your local library may also be able to help you locate the article.

As we've already mentioned, Chin sailed his Cal 20, *Chalupa*, from San Francisco to Hawaii in the early 1980s. He weathered six days and nights of gales during the 20-day trip, and went on to cruise more than 1,000 miles among the Hawaiian islands without major problems. He did, however, beef up the original hull before he left. For a start, he glassed in a full-length internal stringer of wood and foam from bow to stern on either side of the hull. He replaced the portlights with 1/8-inch Lexan and through-bolted them.

He stiffened the bulkhead under the mast and installed new keel bolts





A look at the polished bottoms of the serious racers tells the tale. Glenn Selvin's* Sore Subject, *a 1964 Cal 20, and others in Fleet One show their owners' love of speed.

69

THE CAL TEAM

JACK JENSEN

The motivating force behind the success of Cal boats is Jack Jensen, President of Jensen Marine Corp. Any weekend you're apt to find Jack sailing the Catalina Channel in his Cal 34 "Allegre" or racing on another Cal boat in local regattas. You'll also find him at the big ones—Transpac, Bermuda, etc. Practicing, racing, continually observing the many details that make a boat go, combining his observations with his engineering training, and incorporating them into Cal boats is Jack Jensen's life and love. No wonder Cal boats win.

BILL LAPWORTH

From racing catboats on the Detroit River at age 12 to designing Cal boats, Bill Lapworth has inadvertantly made himself famous. The years he spent racing small boats influenced his design concepts—his preference for light displacement. But when asked why he settled on light displacement design he answered, "Money. The cost factor meant a lot, and light displacement construction is generally less expensive."

The success of his early light displacement designs, which include the L 36 and the first Cal boat, the Cal 24, led to the design of the triumphant Cal 40—2 time SORC, Transpac and Bermuda Race winner. An active racer, in great demand as helmsman and crew, Bill is constantly testing his designs and theories. Combine design knowledge and actual experience with a creative mind and you have a naval architect whose success is legendary. Fortunately, he continues—on his most successful family of designs, Cal boats.

Above, a page from an old Jensen Marine brochure, with special thanks to Chris Ackerman.

In short

Cal 20

Designer: C. William Lapworth (1961)
LOA: 20 feet 0 inches
LWL: 18 feet 0 inches
Beam: 7 feet 0 inches
Draft: 3 feet 4 inches
Displacement: 1,950 pounds
Sail area: 196 square feet
Ballast: 900-pound cast-iron bulb
Spars: Aluminum
Auxiliary: 6-hp outboard
Designed as: Daysailer, racer, coastal cruiser

with extra-large washers. He also replaced the rudder with a stronger one with heftier pintles and gudgeons, and he anchored the aft lower shrouds and the forestay more securely. Chin carried no engine. He relied on a pair of 8-foot oars for auxiliary power.

He summarized his Cal 20 adventure this way: "Taking a small boat, designed for coastal sailing, on the ocean required some compromises. I accepted that. But after a year of cruising, I do not think that I could find another boat of the same size that would provide me with all the fun and joy of cruising at such an affordable price."

Voyaging in small craft, he added, might not be for everyone, but if you want to do it badly enough, it's definitely possible. And the key is simple: "An attitude of how little one needs, rather than how much one wants, is required."

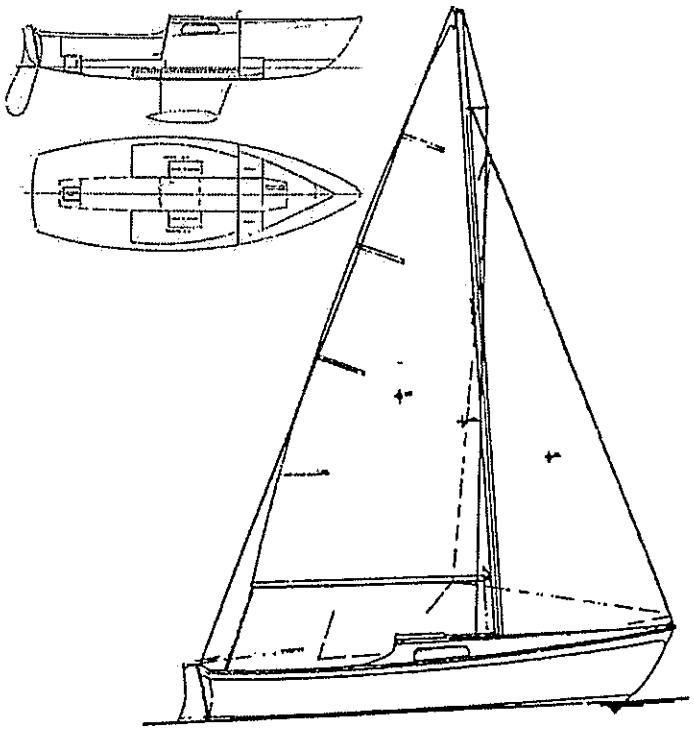
Conclusion

Kun Poi Chin pretty much said it all. If you're adventurous and filled with a passion for cruising, you can do it very cheaply in reasonable safety with a bit of planning and a lot of caution. You can do it in a Cal 20. Voyaging in a boat as small as this comes at the expense of physical comfort, of course, and it requires commonsense planning of your route. But the rewards are great. The experience will breed confidence, independence, and abilities that will serve you well for the rest of your life.

John's new book, Twenty Small Sailboats to Take You Anywhere, *to be published by Paradise Cay (800-736-4509) later this year, will be available on* Good Old Boat's *bookshelf.*

In comparison

- **Safety-at-sea factor:** 5 (Rated out of 10, with 10 being the safest.)
- **Speed rating:** PHRF 264. Not bad for her size and weight.
- **Ocean comfort level:** No comfort whatsoever, but she can accommodate two adults with their elbows in each other's faces. A good candidate for singlehanding.



CAL-20 THE MEMSAHIB #1549.

CALIFORNIA 20 CLASS ASSOCIATION

OWNER'S MANUAL

MARCH 1, 1989

ASSOCIATION OFFICERS

President — Dave Schutte [Fleet 4]
Vice President — Mel D. Alstead [Fleet 18]
Newsletter Editor — Richard C. Ryan [Fleet 17]
Secretary — Gurden Hutchins [Fleet 3]
Treasurer — Steve Shaw [Fleet 1]
Measurer — Bill Schopp [Fleet 4]

This Owner's Manual is being mailed to all 1989 paid up members of the association as an additional benefit of their membership. It is for the exclusive use of association members. Additional copies may be obtained by any member in good standing by mailing $5.00 [five dollars] along with their name, address and fleet number to the national treasurer. [See page 2 of the latest newsletter for address.] The manual is prepunched for your convenience in inserting in a loose leaf folder which could hold additional reference material and future additions to the manual.

WE DREW UPON VARIOUS SOURCES OF INFORMATION INCLUDING NATIONAL AND FLEET LITERATURE AS WELL AS THE MANUFACTURER'S LITERATURE. WE TRIED TO INSURE THE ACCURACY AND APPROPRIATENESS OF THE MATERIAL BUT NO WARRANTY SHOULD BE IMPLIED. EACH OWNER IS CAUTIONED TO DOUBLE CHECK AND TO USE HIS OWN DISCRETION BEFORE USING ANY OF THE SUGGESTIONS OR RECOMMENDATIONS.

GORDON G. BROWN, JR.
PAUL C. MERRILL, JR.
EDITORS

CAL 20
OWNER'S MANUAL

SECTION ONE

CAL 20 SPECIFICATIONS AND WHERE TO OBTAIN PARTS:

I. GENERAL DESCRIPTION

DESIGNED BY	C. Wm. Lapworth
DESIGNED TO PLEASE	the yachtsman who wants a spacious, seaworthy, low maintenance boat
	the man who races
	the family that day sails
	the family that likes a week-end cruise
	the sunbather who will enjoy the wide flat surfaces
	the man who would rather sail than maintain a boat
	the discriminating yachtsman who demands more boat for less money
DESIGN INCLUDES	self-bailing cockpit
	outboard well
	hinged mast step
	provision for head
DESIGNED TO MEET	M.O.R.C. specifications

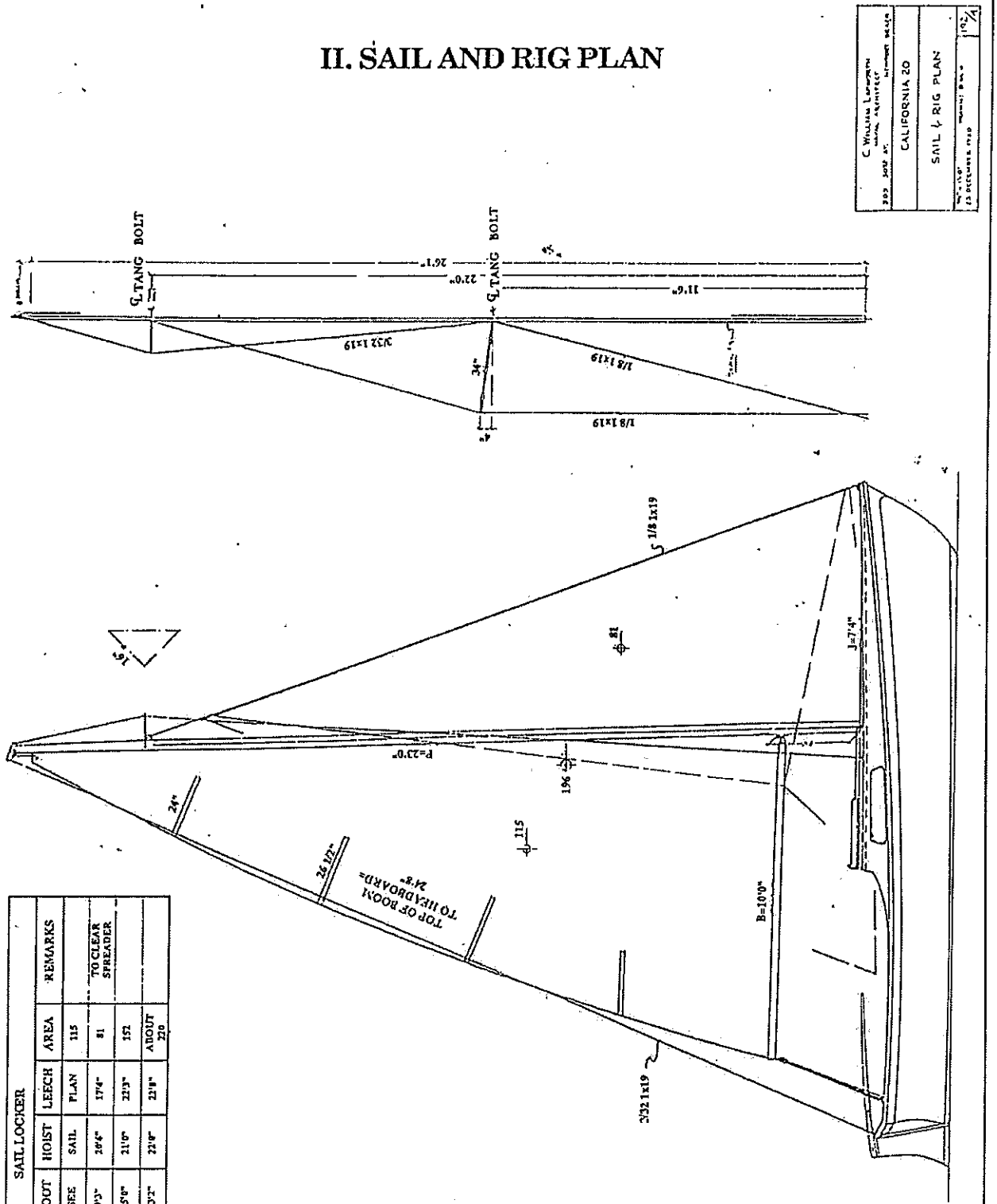
SPECIFICATIONS

L.O.A.	20'	Sail Area	196#
L.W.L.	18'	Displacement	1600#
Beam	7'	Ballast	900#
Draft	3' 4"		

CONSTRUCTION

HULL	one piece molded fiberglass
DECK	one piece molded fiberglass
MAST and BOOM	light-weight aluminum alloy with roller reefing
STANDING RIGGING	stainless steel swaged fittings
RUNNING RIGGING	dacron
TURNBUCKLES	stainless steel

II. SAIL AND RIG PLAN

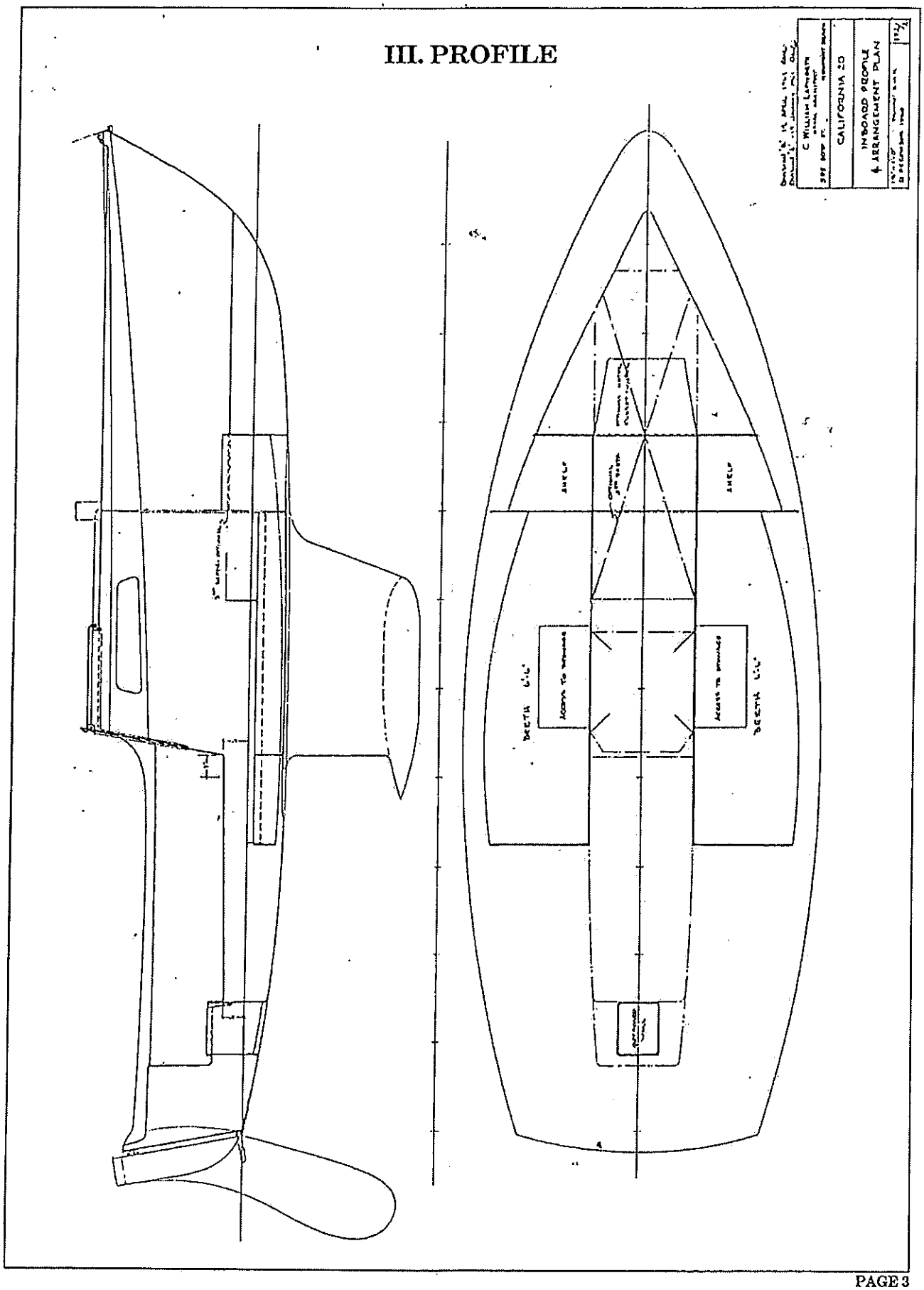


SAIL LOCKER

SAIL	WEIGHT	FOOT	HOIST	LEECH	AREA	REMARKS
MAIN	5 oz. D*	SEE	SAIL	PLAN	115	
WORKING JIB	4 oz. D*	9'3"	20'6"	17'4"	81	TO CLEAR SPREADER
GENOA	2.5 oz.D*	15'0"	21'0"	22'3"	152	
SPINNAKER	.75 oz. N*	13'2"	22'0"	22'8"	ABOUT 220	

*D=Dacron
*N=Nylon

III. PROFILE



71

V. MEASUREMENT CERTIFICATE

DATE: _____

CAL 20 SAIL MEASUREMENT CERTIFICATE

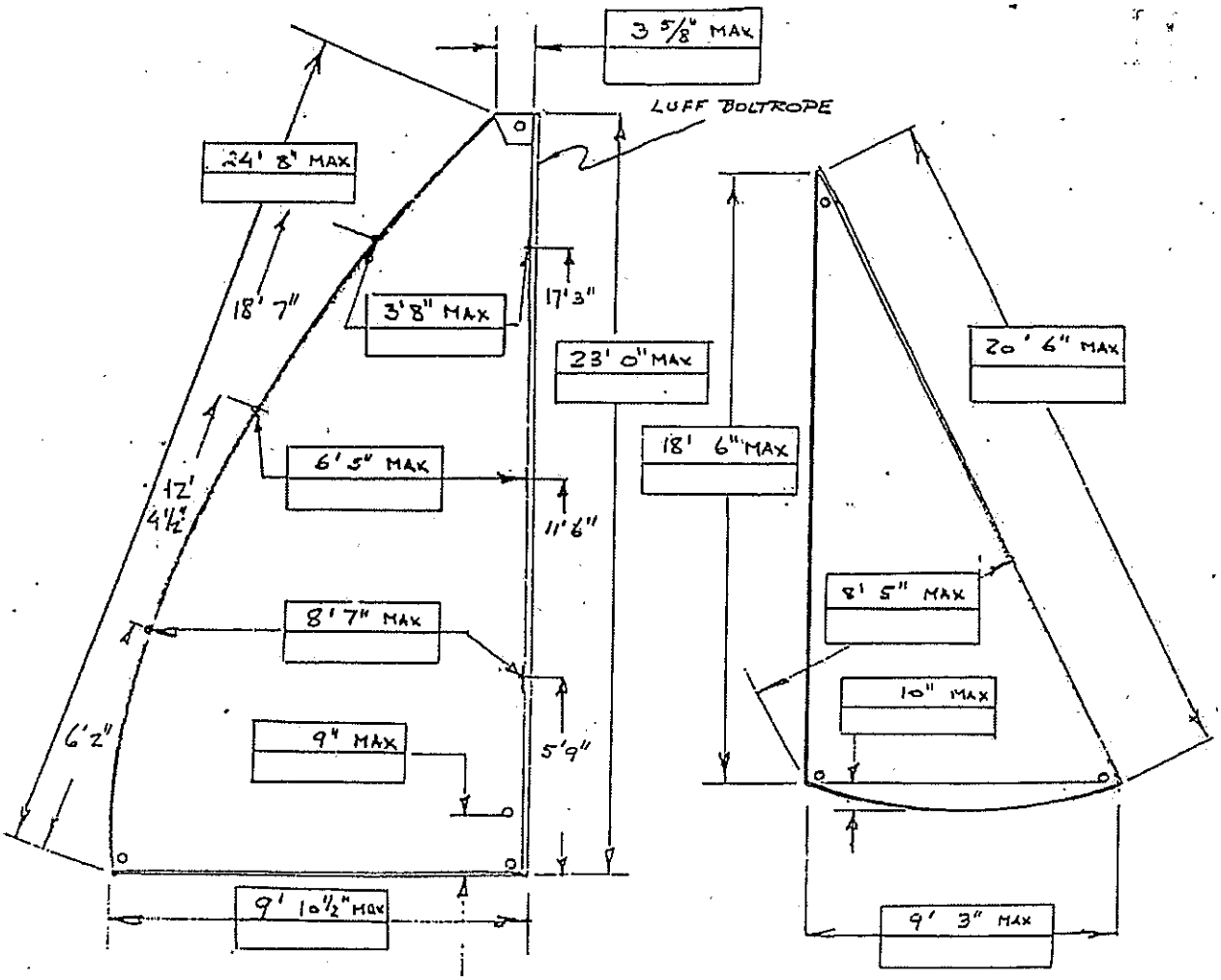
OWNER: _____ SAIL MAKE: _____

BOAT NAME: _____

SAIL #: _____ C20 INSIGNIA AND

FLEET: _____ SAIL # IN SAIL

DATE PURCHASED: _____ YES NO



BATTENS

#1	#2	#3	#4
24" MAX	26½" MAX	26½" MAX	24" MAX

MEASURER: _____

OWNER: _____

72

VI. HULL & EQUIPMENT CERTIFICATE

Fleet_____ Date_____

CAL-20 HULL & EQUIPMENT CERTIFICATE

HULL #: _____ OWNER: _____

RIGGING:

Bands	Bands Min. 1/2" Wide _____	Mastbands 23' 0" Max	_____
	Boomband 10' 0" Max from Aft Edge of Mast		_____
Spreader	Spreader Length 30" Min.		_____
Shrouds	Shrouds Length (Slack Removable by Turnbuckle)		_____
WH'pole	Whiskerpole Length Max. 8' 6"		_____

HULL:

Motorwell	Plug Removable _____	Well Drains	_____
	Plug Max 3" Thick _____	No Foam	_____
Keel	Max Web Thickness 1 1/2"		_____
Rudder	Max Thickness 2 1/4" _____	Mat'l Mahogany	_____
	Not Mahogany or All Painted		
	If Not Mahogany or All Painted, Min Wt. 25 lbs.		_____ lbs.
Hull Repair	Major Repairwork, Describe:		

EQUIPMENT:

Head	No Head _____	Ballast 31 lbs. at Head loc.	_____
	Head Not Cer. _____	Weight _____lbs. Extra Ballast	_____lbs.
	Ceramic _____	Describe Ballast:	
Motor	Motor & Gas tank _____	Weight _____lbs. Extra Ballast	_____ lbs.
	No Motor & Gas tank _____	Ballast 65 lbs.	_____
	Describe Ballast and Location:		
Ground Tackle	Anchor _____ 10 ft. 3/16 chain _____	100 ft. 3/8 line	_____
Safety Equip.	Fire Ext. _____	Bell, Horn or Whistle	_____
	Life Vests (1 per person) _____	Flares Kit	_____
	Throwable Life Pres. (1) _____		

Measurer _____

Owner _____

CAL 20
OWNER'S MANUAL

SECTION TWO

RIGGING YOUR CAL 20:

I. RIGGING YOUR CAL-20

A. JIB HALYARD
1. Attach jib halyard block to forward side of mast at headstay fitting with stainless steel shackle provided
2. Use hole closest to mast.
3. Attach halyard block so that the shackle end leads from the forward side of the block.
4. Secure shackle end and line end of halyard on the port side cleat at the base of the mast.

B. MAIN HALYARD
1. Run main halyard over both small sheaves at the mast head.
2. Arrange so that shackle end of the wire halyard leads down groove side of mast.
3. Secure shackle end and line end of halyard on the starboard side cleat at the base of the mast.

C. JUMPERS
1. Place jaws over holes on forward side of masthead fitting (see 1). Refer to the Rigging Diagram in the Appendix for number identification.
2. Secure jaws on other ends to tangs at spreader fittings (see 2).
3. Insert jumper strut tubes (see 3).
4. Insert adjusting bolt into spreader bar, threaded ends are now placed in ends of tubes (see 4). (slotted ends out, nuts on outside).
5. Place jumper wires in slots and tape or wire in place.
6. Adjust the nuts for no slack when mast is straight.

D. AFTER LOWER SHROUDS
1. Connect jaws to tangs at spreaders (see 5).

E. FORWARD LOWER SHROUDS
1. Connect jaws to tangs at spreaders (see 6).

F. SPREADERS
1. Place over sleaves (see 7).
2. Rotate and adjust until holes line up.
3. Insert cotter pins.
4. Rotate complete assembly until slots open aft.

G. MAIN SHROUDS
1. Connect jaws to tangs at headstay fittings (see 8).
2. Place shrouds in slot in end of spreaders, tighten screw and tape.

H. BACKSTAY
1. Connect eye to masthead fitting (see 9).

I. HEADSTAY
1. Connect jaw to headstay fitting (see 10).
2. Use hole above halyard block.

J. TURNBUCKLES
1. Place 1/4"x 28 stainless steel nut on all threaded rigging ends.
2. Connect a turnbuckle to each threaded end (see 11, 12, 13, 14 and 15) and adjust each end with 1/4" in barrel.

K. STEPPING MAST
1. Lay mast on boat, the masthead, aft, groove down.
2. Connect backstay (see 15) after lowers (see 14) and one main shroud (see 13).
3. Support mast with a person aft in cockpit.
4. Place foot of mast on step.
   a. Insert bolt

5. Push mast up.
   a. Man in cockpit works forward
   b. Man on cabin top pushes it on up to vertical position
   c. Watch carefully for fouled rigging
6. Connect headstay (see 11).
   a. Relax
7. Connect remaining main shroud (see 13).
8. Connect forward lowers (see 12).

L. ADJUSTING
1. Adjust headstay and backstay for equal adjustment on turnbuckles.
   a. Fairly tight
2. Adjust main shrouds for equal adjustment
   a. Take the slack out
3. Adjust forward lowers same tightness as "mains".
4. Adjust after lowers slightly looser than "mains".
5. Secure all turnbuckles.

M. BOOM
1. Slip goose neck in groove.
2. Attach after end to backstay.

II. RIGGING THE BOAT FOR SAILING

A. MAIN SAIL
1. Rig main sheet (becket — boom block — quarter block — boom block — becket block — cleat).
2. Slide foot of sail in groove on boom.
   a. Secure tack
   b. Rig outhaul through clew — through large holes — through clew — and around boom.
3. Battens, thin side in first.
4. Hoist sail in groove
   a. Securing halyard on starboard side
5. Adjust downhaul cleat.

B. JIB
1. Fasten tack.
2. Clip on headstay.
3. Splice or tie sheet to clew
   a. 20' each side
   b. Lead outside stays

With the sails bent on and sheets rove, we should pause prior to sailing and consider the maintenance of your CAL-20. Much of the maintenance is visual but it IS IMPORTANT. The results will be a more pleasant sail and prolonged future enjoyment of your yacht.

III. EQUIPMENT MAINTENANCE

A. SPARS

The finish of natural aluminum is protected against corrosion by a thin, transparent film of aluminum oxide. Dust, dirt, smoke, salt and traffic fumes will adhere to this film, making the surface dull and unsightly. Coating the new surfaces with a good paste wax like Vista or Simonize, will help protect the aluminum oxide from foreign matter. If the surface has become tarnished, any high grade cleaner — wax — polish (Collinite #34 or #38 for example) will restore the original sheen. Heavier pitting can be removed by wet-sanding with #600 paper prior to polishing and waxing. You need not worry about sanding, cleaning or polishing destroying the aluminum oxide film as it reforms or "heals" immediately.

Painted spars may require a touch-up in areas of chafe. Use the same or compatable paints for this job. Epoxy is applied at the factory. "Rust-Oleum", in spray cans, is an excellent touch-up paint.

If spars are black anodized, hose down portions subject to salt water spray after each sail.

B. RIGGING

Clean rigging means clean sails. A quick trip aloft with damp rags takes care of this problem. While aloft, check the entire rig for loose screws, nuts, bolts, cotter pins and chafe which may have resulted from hard sailing. Spreader tips well taped? Periodic inspection of the rig from aloft is your best insurance against rigging and spar failure. Keeping halyards tied away from the mast stops the annoying dockside clanking and saves the mast finish.

Salt water will gradually stiffen dacron line. Hosing with fresh water or soaking in warm soapy water will make the line soft and flexible again. Keep coiled and stowed in a dry spot below.

C. HARDWARE

Many materials are used, all of which clean well with fresh water and a chamois. Winches must be kept clean and well oiled (Lubriplate is excellent unless the manufacturer recommends otherwise) as do all turnbuckles, track slides, sheaves and shackles. The chrome and stainless steel brighten up with the chamois while a good automotive chrome cleaner or mild kitchen abrasive like Comet takes care of the tarnished spots.

IV. SPECIFICATIONS FOR RIGGING AND GEAR

STANDING RIGGING

1 - Headstay - 1/8" 1x19 s/s x 22' 7 3/4", Fork & 1/4" Thd. Shank
1 - Backstay - 3/32" 1x19 s/s x 29' 2 1/2", Marine Eye & 1/4" Thd. Shank
1 - Boom Lift - 3/32" 7x19 s/s x 1' 3", Nico-Sleeve & Snap Hook @ 5' 4"
2 - Jumpers - 3/32" 1x19 s/s x 14' 11 1/2", Fork each end
2 - Uppers - 1/8" 1x19 s/s x 21' 11", Fork & 1/4" Thd. Shank
2 - Fwd. Lowers - 1/8" 1x19 s/s x 11' 3 1/2", Fork & 1/4" Thd. Shank
2 - Aft. Lowers - 1/8" 1x19 s/s x 11' 4 1/2", Fork & 1/4" Thd. Shank
1 - Lifting - 5/16" 7x19 s/s x (2) Legs 4' 0" & 4'6"
Slings - (4) Nicopress Thimbles and (1) 5/8" Galv. Pear Link

NOTE:
1) All dimensions center eye to eye or end of Thd. Shank.
2) Insulated Backstay: Keep insulators as far apart as possible.
3) CAL-20 Extra Heavy Rig for Hawaii: Increase by one size.

RUNNING RIGGING

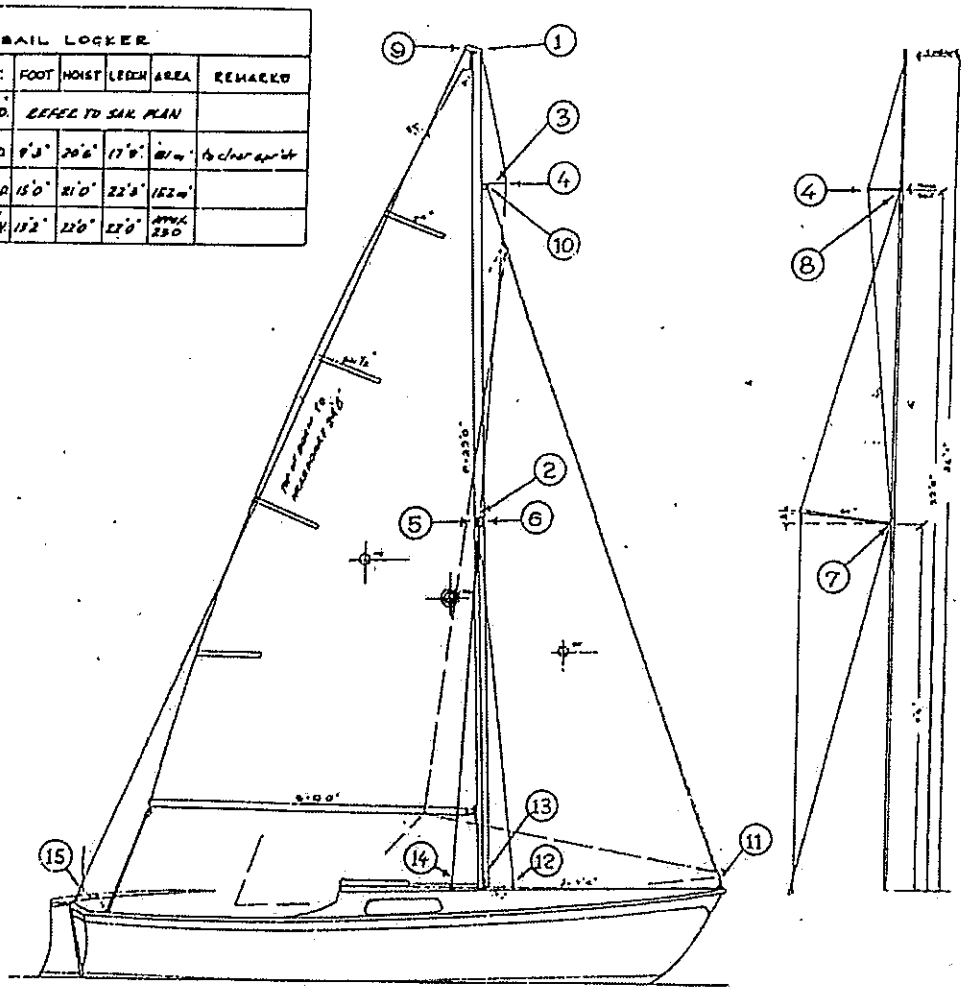
1 - Main Halyard - 1/8" 7x19 s/s x 25' 7" Wire Rope
1 - Jib Halyard - 1/8" 7x19 s/s x 21' 7" Wire Rope
1 - Main Halyard Tail - 1/4" x 30' Dacron Yacht Braid
1 - Jib Halyard Tail - 1/4" x 24' Dacron Yacht Braid
1 - Main Sheet - 5/16" x 60' Dacron Yacht Braid
2 - Jib Sheets - 5/16" x 20' Dacron Yacht Braid
1 - Down Haul - 1/4" x 4' Dacron Yacht Braid
1 - Out Haul - 1/8" x 4' Dacron Yacht Braid
1 - Motor Well Line - 1/4" x 5' Dacron Yacht Braid
2 - Genoa Sheets - 5/16" x 28' Dacron Yacht Braid

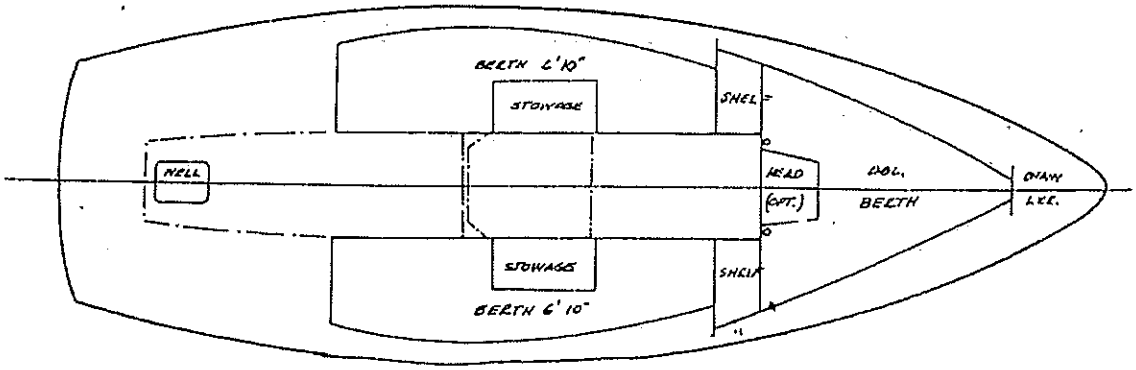
SPINNAKER GEAR

1 - Spinnaker Halyard - 1/4" x 55' Dacron Yacht Braid
2 - Spinnaker Sheets - 1/4" x 30' Dacron Yacht Braid
1 - Topping Life - 1/4" x 25' Dacron Yacht Braid
1 - Foreguy - 1/4" x 20' Dacron Yacht Braid

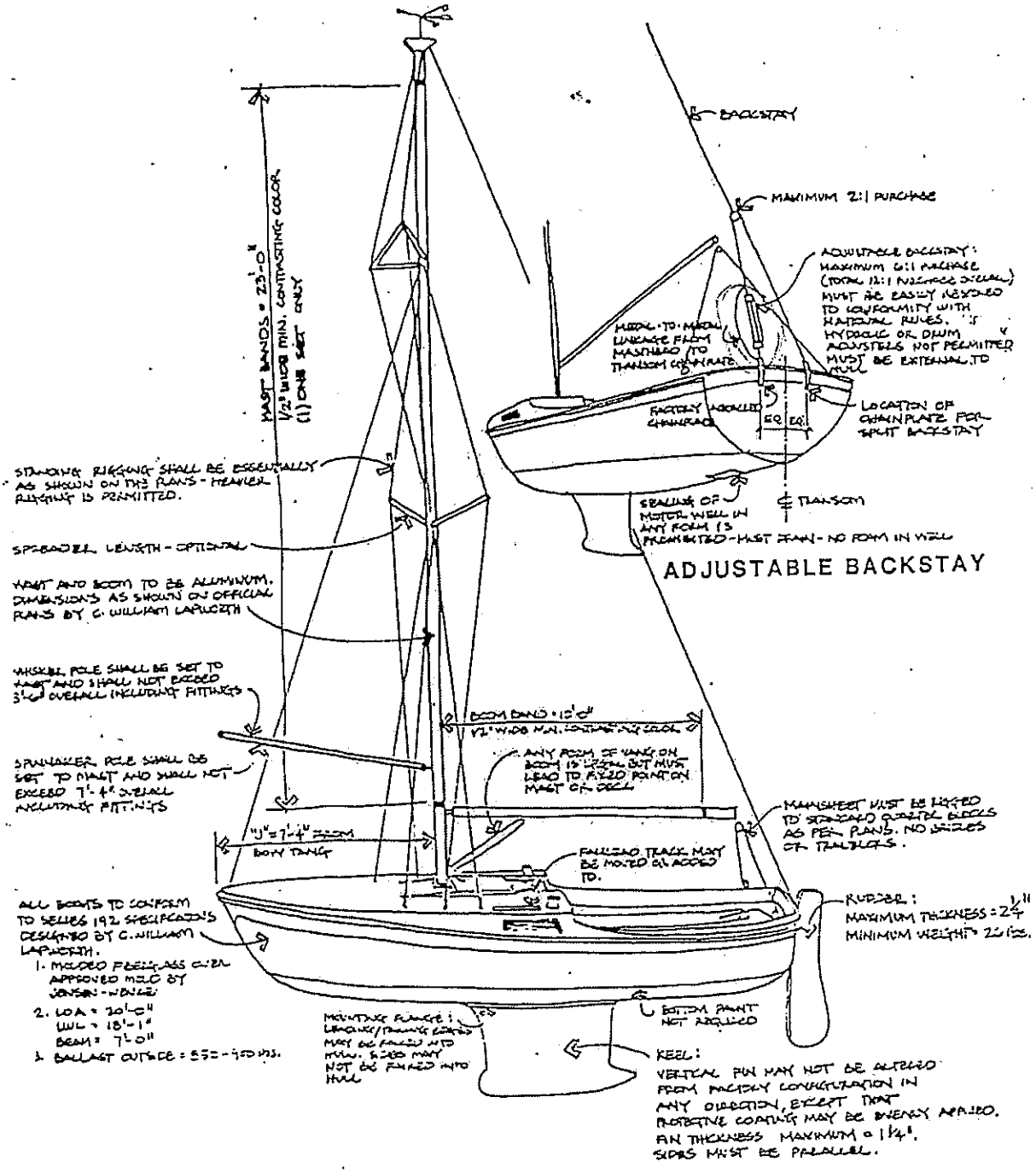
V. CALIFORNIA 20 SCHEMATIC

SAIL LOCKER						
SAIL	WT.	FOOT	HOIST	LEECH	AREA	REMARKS
MAIN	5 oz D.	REFER TO SAIL PLAN				
WORKING JIB	4 oz D	9'3"	20'6"	17'9"	81 sq'	to clear sprit
GENOA	2 5 oz D	15'0"	21'0"	22'3"	152 sq'	
SPINNAKER	1/4 oz K	13'2"	22'0"	22'0"	APPROX 250	



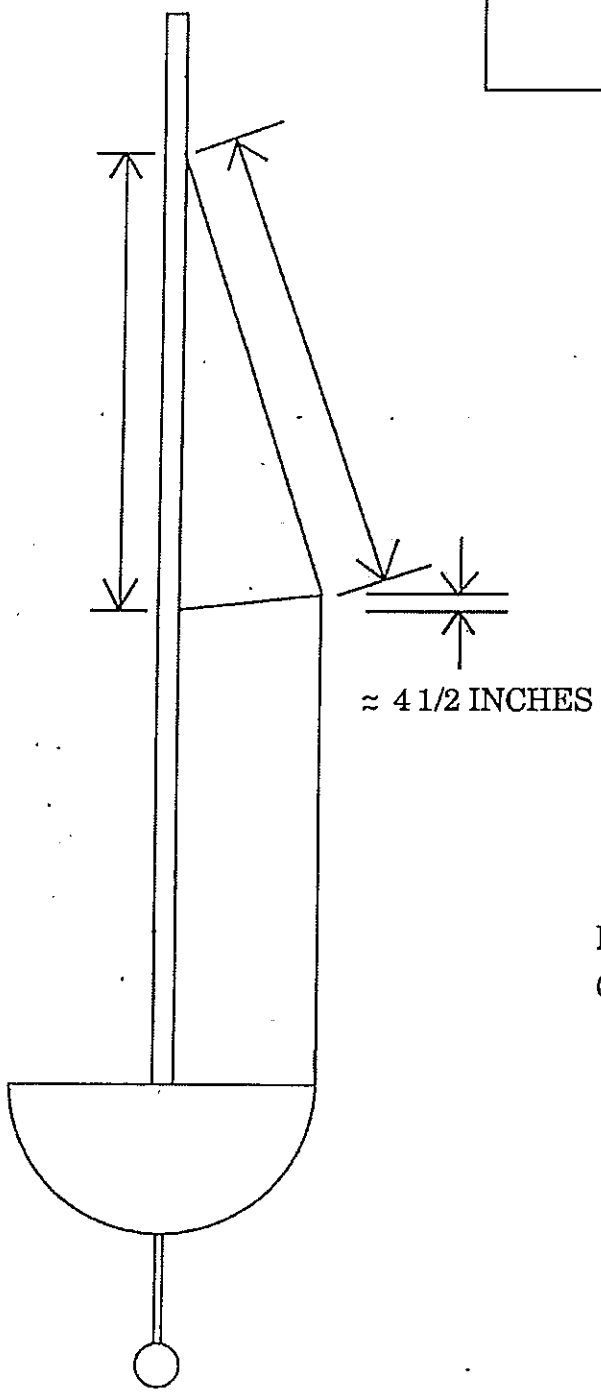


VI. SPARS AND RIGGING SPECIFICATIONS



VI. SPARS AND RIGGING SPECIFICATIONS

CORRECT POSITIONING
OF
CAL 20 SPREADERS



- MAKE DIMENSION B EQUAL TO DIMENSION A. [EASIEST WAY TO DO THIS IS TO HOLD UPPER SHROUD PARALLEL TO MAST]
- THIS RESULTS IN THE SPREADER ANGLING UP ABOUT 4 1/2 INCHES

NOTE: LOCKWIRE SHROUD CAREFULLY TO SPREADER

CAL 20
OWNER'S MANUAL
SECTION THREE
PREPARATION OF THE CAL 20 FOR RACING AND CRUISING:

8L

I. RACING

An attraction of the Cal 20 is that it can be raced with very little extra equipment; class racing rules prohibit changing sails, the use of spinnakers and genoas, adjusting standing rigging during a race, and sealing the motor well. Moreover, to prevent undue advantage for purely racing boards, the class requires that boats without heads and motors carry compensating weight (see by laws). But there is, of course, some gear that is desirable to make a good showing at racing, and considerable care and maintenance of the boat. Almost any Cal 20, regardless of age or present condition, can be made to do well in racing; indeed, there is a popular school of thought that older boats may be potentially faster.

A. TUNING

Tuning your Cal 20 is perhaps the task of first importance in preparation for racing. Volumes have been written on this topic and most offer reliable guidance, but nothing is better for fine tuning your boat than a pacing session with other Cal 20s.

Short tests of three to five minutes in close proximity of another Cal 20 are usually enough to identify any differences in boat speed and, in the case of a beat to weather, pointing ability. After each of these short tests, one of the boats should make an adjustment intended to improve performance, while the other should make no changes; the latter boat acts as a reference base on which to judge effectiveness of any change made on the boat being tested. These tests should be made within five to ten boat lengths of the other boat, taking care that one boat is not blanketing the other. Whereas most tuning is done on the wind, reaching and running tests should not be neglected.

Knotmeters and time-trial testing alone is one way to tune, but the accuracy of this kind of test is at very best 1%. On the other hand, pacing with another boat can easily uncover differences of 1/4% to 1/2% in a very short time.

Perhaps the easiest path to awareness and knowledge of the Cal 20s fine points is available from speakers at our fleet meetings and from members (e.g., at the post-race "Ale and Alibis" sessions).

B. PREPARATION

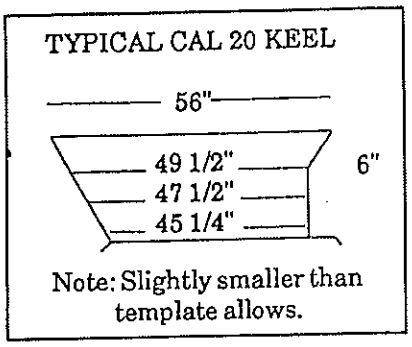
Boat Bottom

Some skippers have said that next in importance to the nut at the end of the tiller is the condition of the boat bottom. Trying to race a boat with a dirty or rough bottom is a hopeless task, unless the competition is really inept. One solution is to have a very smoothly sanded bottom paint job, or not paint at all. No paint means you must either dry store your boat, get a boat bath (or hull tank) or have a bottom cleaning once a week. The latter is not very satisfactory during the summer months, as coral can built up on the bottom in two days when the weather is warm (the water temperature is above 64° F).

Boats which are dry sailed (stored out of water) have a significant advantage because their bottoms are clean and easily worked on. For a Cal 20 which remains in the water — even with a boat bath — an occasional cleaning is desirable.

Keel Shape

The cast iron keel of our yachts has been the despair of more than one skipper. Castings are rough and irregular by nature, and iron rusts. Thanks to modern technology (specifically, polyester resins and putty), help is near at hand.



Keel: The leading and trailing edges of the keel mounting flange may be faired into the hull. Any boats with the latter will be allowed only if the work was completed before November 24, 1963. A 1/4" fillet is allowed between the sides of the flange and hull on all other boats. The leading and trailing edges of the vertical fin may be smoothed or faired and must not exceed the inside dimensions of the official template. The cord lengths are

(maximum dimensions of template): 6" down from flange 49 3/4"; 12" down from flange 47 3/4"; 18" down from flange 45 5/8". The vertical fin of the keel may not be altered from its factory configuration of the keel. Maximum thickness of the fin shall be no greater than 1 1/2". The ball may also be faired and smoothed, but not altered in shape.

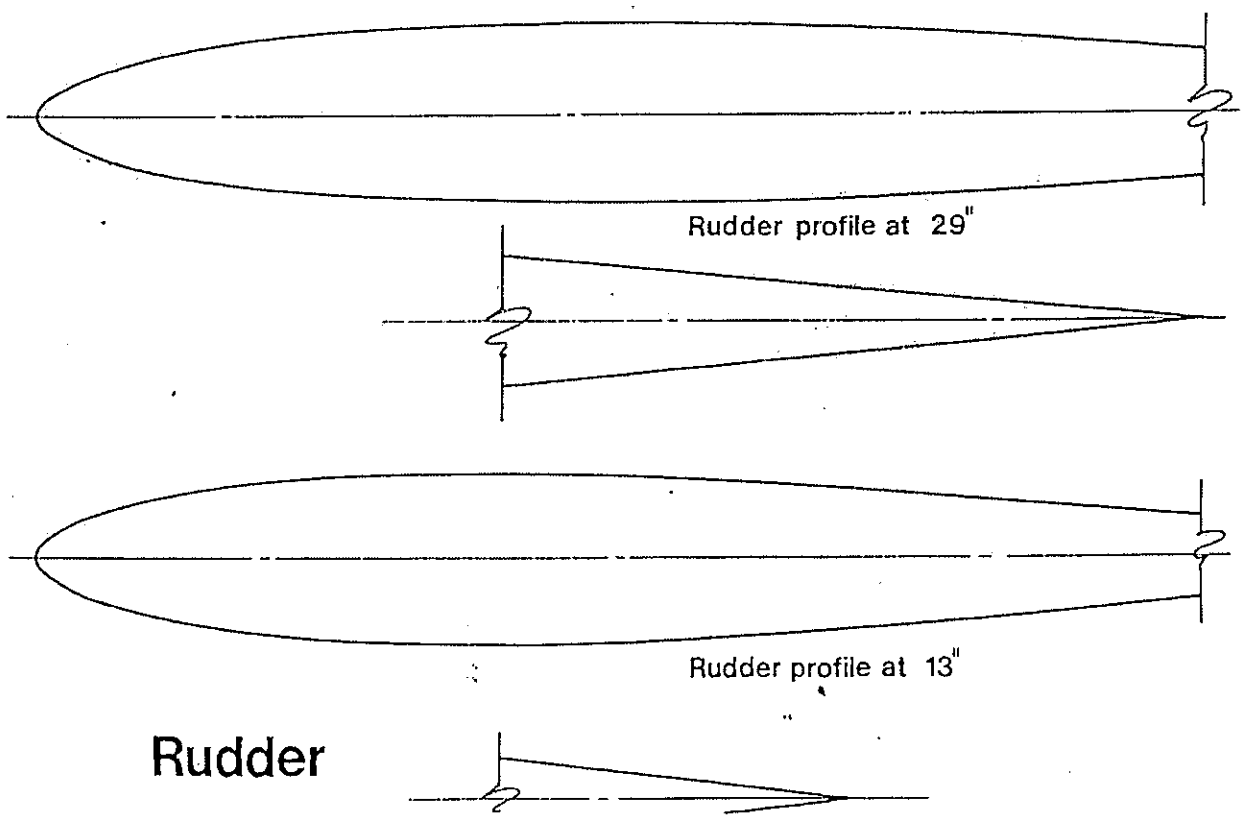
Rudder Shape

Rudder: The rudder profile shape must be maintained as it came from the factory. If rudders are other than factory type natural mahogany they must weigh at least 25 lbs. with gudgeons. The maximum rudder thickness is 2 1/4".

The stock Cal 20 rudder cross-sectional shape, as delivered from the factory, leaves much to be desired from the standpoint of racing performance. Typically, the cross-section is a flat plank bevelled at the leading and trailing edges. Hydrodynamic drag is higher than necessary and "lift" (i.e., side force developed in steering) is less than for other available cross-sections.

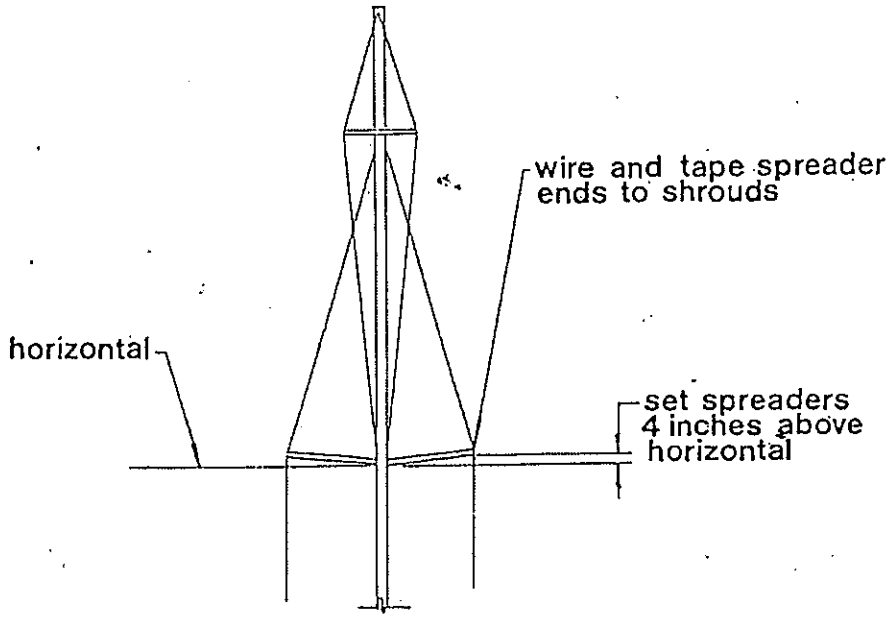
Fortunately, the remedy is both easily accomplished and legal within class rules. The Bylaws permit changing the cross-section shape but prohibit changing the profile dimensions.

To achieve reasonable lift and a reduction in drag, it will suffice to reshape the cross-section from the waterline down, and any conventional symmetrical airfoil shape (e.g., NACA 0010) by removing material in the aft 50% to 60% of chord and slightly building up the thickness from the leading edge to approximately 25% chord. Templates are available in the Marina Del Rey fleet to guide the do-it-yourself enthusiast. Normally, the above modification is finished with a covering of glass cloth and resin from the tip to at least half-way between the hinge points, to strengthen the rudder. (Water soaked rudders have been known to warp, split or break; the glassing job should protect the immersed portion of the rudder from these hazards.) See drawing.



Rudder

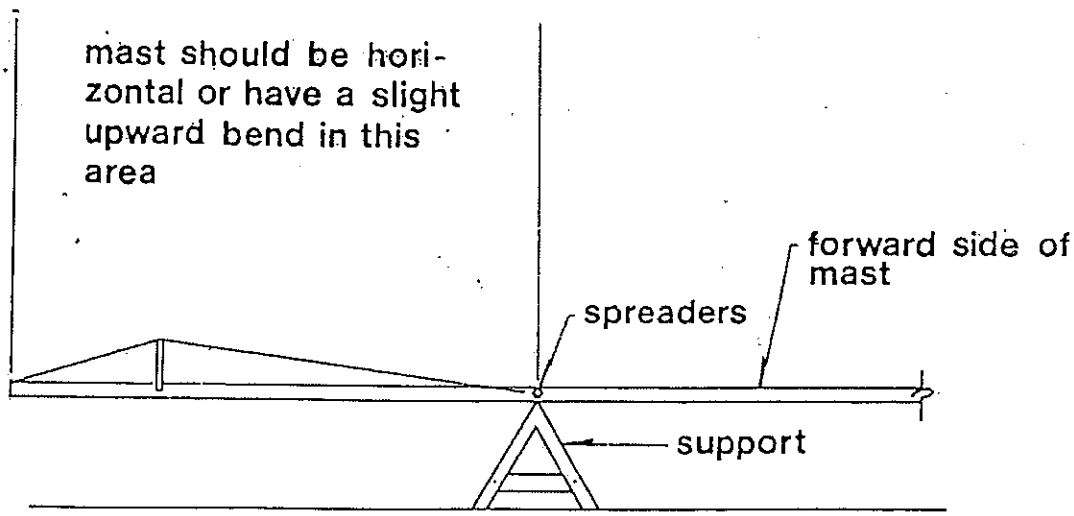
When setting up your spreaders, be sure to have the outboard tips 4" higher than the inboard (next to mast); securely wire and tape the outboard ends of the spreaders to the upper shrouds to avoid slippage. Failure to do so is one of the quickest, surest ways to break your mast. See drawing.



SPREADER ADJUSTMENT

Jumpers

Jumper tension should be established in accordance with mast bend and sail shape requirements of your particular mainsail. In the absence of other information, set the tension so that the mast, when supported at the spreaders, in a horizontal position with the forward side up, is straight or has a slight upward bend from the spreaders to the top of the mast. See drawing.



JUMPER ADJUSTMENT

Sighting Lines

Sighting lines are lines (which can be either painted or made of narrow plastic tape) on the side of the cockpit, placed approximately athwartship and at 45° ahead of and behind the abeam direction. Their use and layout is described fully in Stanley Ogilvy's book on sailboat racing.

An athwartships line such as the cockpit bulkhead is used in estimating when to tack to lay a mark. The 45° lines are used to estimate whether one is ahead of or behind another boat when beating to windward. (For example, "Can I cross X's bow if I go on the port tack?")

Negative Equipment

Fixed weight hurts boat speed. The higher the weight, or the nearer the weight is to the ends of the boat, the worse the effect. Under this heading of negative equipment is included a wide variety of things: radios (which are also distracting), sleeping bags, bathing suits, foul weather gear, spare anchors, television sets, stereo sets, large motors, spare mooring lines, dishes, silverware, pots and pans, soap, wax, boat bath pills, rags, towels, spare provisions, water, cases of beer, cockpit awnings, cockpit cushions, extra tanks and gasoline, stoves and fuel, iceboxes, anchor chain (but an anchor, ten feet of chain, and 100 feet of nylon rope are required), storage batteries for running lights (flash-light battery lights are cheaper and adequate), forward bunk cushions, curtains. Most people accumulate an astonishing amount of gear on the boat. Tools are important, for instance, but only a small number of tools and spare parts are reasonably required.

A ruthless house-cleaning and continual alertness are the only cures. Most of this equipment can be kept ashore while racing and loaded on the boat for cruising — and will be in better condition for it.

Keel Bolts

The Cal 20 keel bolts should be checked for corrosion at least once a year. If your bolts have gone unchecked for any great length of time, you stand the risk of having your keel fall off. When installing new bolts, be sure to check with some of the more experienced members in the fleet for advice on how to cut down on corrosion, such as heavy coating with sealant, painting, glassing over, etc.

C. EQUIPMENT

Compass

Courses for Cal 20s are long enough and visibility of marks and other "landmarks" poor enough, that a compass is extremely important for navigating on the race course as well as for detecting wind shifts and planning tactics.

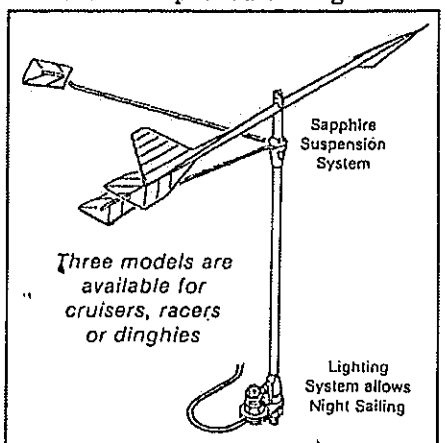
Telltails

These are indispensable aids for racing. Most frequently used are the yarns (or ribbons) near the jib luff used during upwind work. A minimum of three are required and should be located 8" to 12" from the leading edge. The lower telltail should be about three to four feet above the tack, the middle one seven to eight feet, and the upper telltail five to six feet from the head. Similar yarns near the jib leech are increasingly recognized as important to a proper set of the jib on a reach. Several more sophisticated jib systems have been suggested in recent years (reference: articles in Sail magazine by Arvel E. Gentry), and are worthy of consideration by the avid racer.

The mainsail set, both on a beat and while reaching, can be facilitated and/or improved through use of yarn telltails, particularly near the leech.

Wind Indicator at Masthead

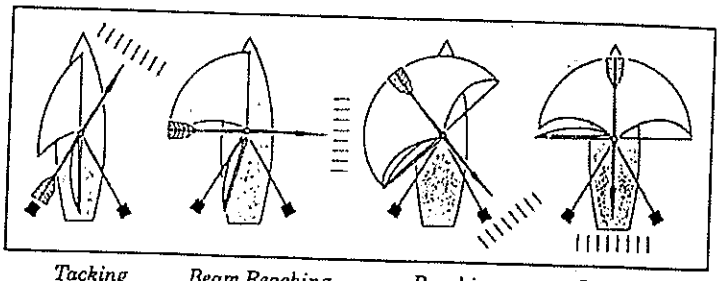
Wind direction indicators are precision instruments designed specifically to provide the helmsman with accurate information of the apparent wind direction. For racers, this means steering the boat for optimal performance in all wind conditions, plus proper sail setting and trimming. For cruisers, wind direction indicators provide timely wind information resulting in simpler, safer sailing. A useful learning tool for beginners as well.



Sample Windex Wind Direction Indicator

Each wind direction indicator consists of a moving vane and two fixed reference tabs. The balanced vane has low inertia, a large fin area and low-friction suspension.

Fixed reference tabs are set at the proper angle to correspond to the apparent wind direction for starboard and port tacking. The design of the reference tabs makes it easy to read the relative wind direction as accurately as ±1° under tacking conditions, where precise information is most essential for optimum performance. There is no parallax error.



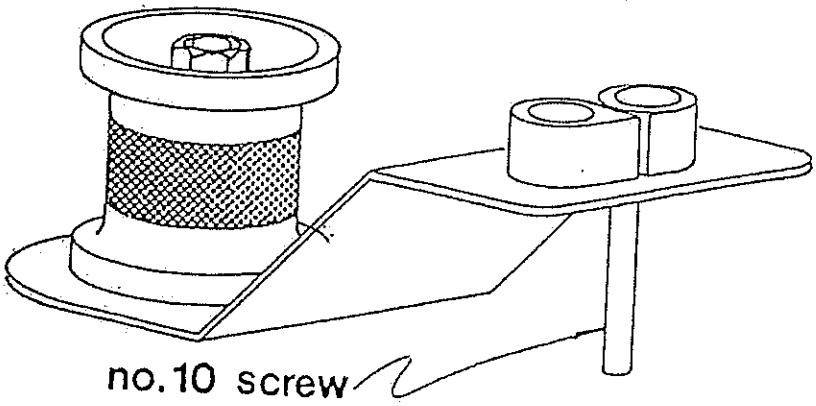
Vane positions at different apparent wind directions

Wind Direction Indicators are designed to be mounted on mastheads. Mounting instructions are provided with each of the models and list various methods for attaching to masts. Also provided are instructions for setting the correct angle of the reference tabs for optimum performance under tacking conditions.

Jib Leads

The jib lead for beating to windward is inside the upper shrouds and outside the lowers. Some skippers prefer to lead the sheets outside the forward lower shroud only, and inside the other two shrouds. On a reach, the sheets should be outside all shrouds to achieve the optimum sail shape. Thus, when on a reach, the crew reaches forward of the upper (i.e., middle) shroud and leads the sheet outside the upper and aft lower shrouds to a hook (or snatch block) on the rail. This hook is normally placed on the track about half way between the aft lower and the cockpit bulkhead; experimentation will be necessary to find the best hook position for your particular jib.

To return to a beat only requires taking the sheet out of the hook, and trimming the sheet.



Jib Sheet Cleat

The cleat platform on the jib sheet winch tends to bend up and forward under heavy load. This can be cured by adding a #10 screw through the platform (under the cleat) and bolting it through the deck.

Inside Tracks and Barber Haulers

Racing experience has demonstrated the advantage of sheeting the jib, when on a beat, closer to the centerline than is possible by use of the fairlead mounted on the standard track which is on the rail. Two means of leading the jib to an inside position have been tried and found satisfactory — inside tracks and barber haulers.

Inside tracks are normally mounted on the deck roughly 6" and 15" inboard of the rail and in a fore-and-aft direction. The jib sheet fairlead is mounted to the track appropriate to the wind conditions. A variant of this system, known as the "H track", involves the stock track on the gunwale and only one new fore-and-aft inside track attached to the deck. An additional transverse track bridges between these two tracks on each end of which is mounted a slider car. The transverse track can be positioned forward or aft as required, and the jib sheet fairlead, mounted on this track, can be positioned inboard/outboard at any position. It is this infinitely variable feature that appeals to its advocates.

The awning is fastened to the boat at five places; the forward corners are tied to the upper shrouds; the aft corners to the aft mooring cleats; the center of the aft end to the end of the boom. Light ropes permanently fastened to the awning would be convenient. Additional ties to stretch the awning on the whisker pole also should be provided. A side seam at the aft end to go around the whisker pole is a good idea, and the awning could also be made in the shape of a trapezoid for more shade.

Wind Break

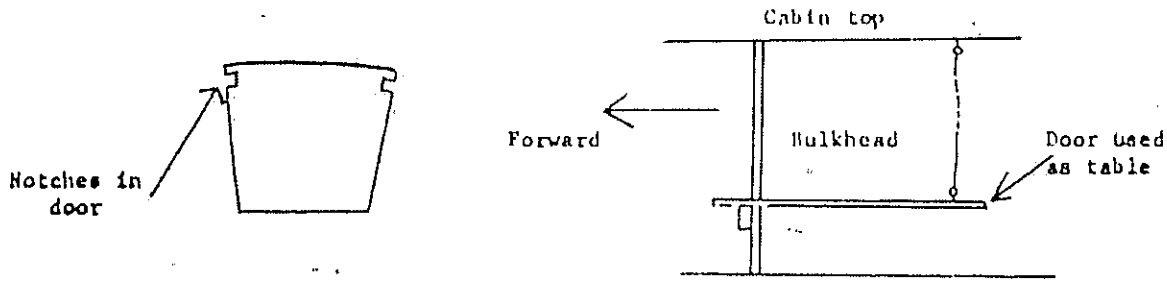
For the evening hours, when a chill wind may come up, a wind break is a useful accessory. This device is about two feet wide and seven feet long, and is attached by light line to the shrouds at deck level just forward of the mast. Some Cal 20 owners use the cabin floor rug for this purpose. This double-duty application is especially appropriate because the dimensions work out just right and the stiffness of rug material is helpful.

Stoves

Stoves can run a gamut of complexity, depending on one's taste. Canned-heat (Sterno) is satisfactory, but rather primitive. It will boil a pot of water in about five minutes. There are gasoline and bottled-gas camping stoves, which present some additional safety hazards, in comparison to the various "marine" alcohol stoves. Cooking under way is seldom desirable for the kind of cruising likely with a Cal 20. It is relatively easy to provide a sandwich lunch and a thermos of coffee and cold snacks in case of a long trip.

Table

A good table arrangement, and one which presents no additional stowage problem, is to use the companionway door as a table. It can be notched to fit the cabin bulkhead and supported by blocks on the bulkhead or by a cord to the cabin top.



III. NAVIGATION EQUIPMENT

It is easily possible to get into trouble due to poor navigation, when more than three miles from home, mostly because of fog — even in the nearly ideal conditions which prevail locally.

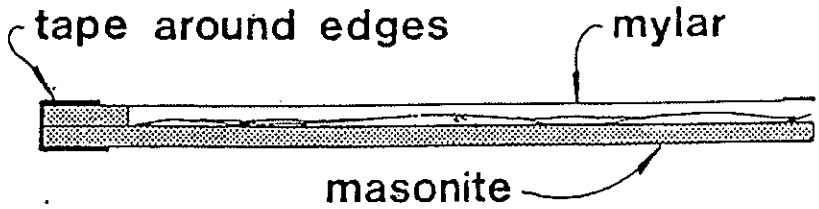
For local cruising to Catalina and other islands along the coast, a compass, charts, and an RDF are the minimum desirable navigation equipment. Many people do cruise to Catalina without an RDF in the summertime. Additional useful items are a hand bearing compass (which also may serve as a spare in case of damage) and a knotmeter (speedometer). But none of these items is useful unless used, and used properly.

Compass

The compass should be checked for deviations and adjusted (compensated), or a deviation table made. Individual compasses vary, as well as boats. Perhaps the orientation of the keel when cast in the foundry has something to do with the differences in deviation among boats. To check for deviations requires that the boat be pointed in different known directions so that the compass error can be found. There is nothing mysterious about the process, although it requires some time and effort. Refer to Chapman's for an explanation of procedures to do the job yourself — or hire a local expert. Known directions can be found by consulting a chart: for instance, the Main Channel of Marina Del Rey is true north/south (note: not magnetic north/south). Then other known directions can be found by the use of a chart or a pelorus or equivalent.

Charts

Charts are one of the best bargains available, and there is no reason for not having the most detailed and up-to-date charts available for the areas visited. Stowage represents some problem, however, especially if they are kept rolled. A satisfactory solution for storage, working space, and protection of charts from the weather is a case made of 1/8" piece of masonite, about 18" x 24", with a masonite strip around three sides, and covered with a frosted Mylar plastic sheet which can be written on. A section of this is shown below:



Along the open side, the plastic cover is reinforced with tape or a piece of wire and tape. The charts are folded, stored, and used in this device, which thus also serves the purpose of a chart table. The whole works can be stowed under a bunk cushion. The plastic cover protects the charts from spray when in the cockpit and can be written on and easily erased.

The principal limitation of the charts is that only a few of the available radio stations for RDF use are shown on them. Most marine radio dealers have an up-to-date listing of station locations, and these should be entered on the charts, together with their operating frequency.

Hand Bearing Compass

This is a hand-held compass with sights and a prism which enables one to take quite accurate bearings on visible landmarks. It is a great aid to precise navigation when the visibility is good, but of course, is of little value when the need is greatest — in poor visibility. But it is useful nonetheless, because through its use in good weather, one can deduce one's speed under various wind and power conditions. It also constitutes a spare compass.

Knotmeters (Speedometers)

Knotmeters can eliminate — or at least reduce — guesswork as to speed, and hence vastly improve the accuracy of dead-reckoning. But they usually require calibration and should be checked rather carefully. Some skippers have also found knotmeters useful for racing preparation (e.g. tuning).

IV. CAL 20 MOTORS: PROBLEMS & SOLUTIONS

The Cal 20 motor well location is very convenient, but it has (in common with every other location) some drawbacks: the motor tends to make more noise and fumes than one in an outboard (e.g., on the transom) location; the well, if opened when going over about two knots, tends to scoop water into the cockpit, which can be disconcerting the first time; and standard motors when running in the well, tend to set up an oscillation of water into and out of the well with a period of roughly two to three seconds. Under some conditions, this can result in water gushing out of the well into the cockpit. See "Installing and Removing the Motor Under Way".

The well location has the important advantages that the motor is not exposed to "drowning" by following seas, cannot slip overboard during installation, and is much easier to install and remove than is the case with transom mounting.

Amount of Use

One season's intensive use of the boat involves about twenty hours motor use. Some avid cruisers have used theirs much more, of course. This use has largely been on Catalina trips. The usual summer weather is a calm morning with wind picking up around 11 or 12 o'clock. Catalina is far enough (32 n. mi. from Del Rey entrance to Emerald Bay) that it is desirable to get an early start in order to reach Catalina before dark — or before good anchorages are gone. Use of the motor is therefore highly convenient in such a situation. When the wind picks up, the motor should be removed from the well

II. PREVENTATIVE MAINTENANCE CHECK LIST [Continued]

Component/ Date Inspected	Inspection Frequency	Detection	Prevention
Keel Bolts Inspected: / / / /	One Year	Remove bolt, inspect for rust damage	Replace damaged bolts; install bolts with quality corrosion protection [e.g., Rustoleum--before dry, and sealing ring of caulking compound at base of bolt head.
Spreader Brackets Inspected: / / / /	One Year	Remove brackets and inspect for cracking	Install brackets made of thick stainless steel than factory brackets [1/16th inch min., 3/32 preferred].
Mast [at Hounds] Inspected: / / / /	Two Years	Remove spreader brackets and tangs which support jumper and lower shroud cables; Look for corrosion of Mast.	Remove corrosion; paint locall with rustoleum; install thin plastic washer [e.g. off of a dish soap container] between mast and tangs.
Standing Rigging Inspected: / / / /	One Year	1] Run finger along cable to detect any broken fibers [e.g. "hooks"] 2] Carefully inspect cable at each swaging.	Replace suspect rigging.
Forestay Attachment Fitting [at Mast] Inspected: / / / /	Two Years	Inspect for wear and/or cracking.	Replace if damaged.

be led forward where it can be easily changed.

4. OUTHAUL. To control flatness of the lower section of your main, you need a minimum of 3 : 1 mechanical advantage. Ideally, a series of blocks can be used inside the boom and led to a cam cleat on the boom or on the deck.

5. BOOM VANG. To control main leach tension, your vang should have a minimum of 8 : 1 mechanical advantage. It should be fastened to a strap at the base of the mast and to the boom 42 inches aft of the goose neck.

6. CUNNINGHAM. You need 4 : 1 mechanical advantage to provide luff tensions and shape to the lower part of the main.

7. HALYARD TENSION FOR THE MAIN AND JIB. To position the draft of your sails you need to be able to use a winch to adjust halyard tension. Alternatively, a series of blocks may be used.

8. BARBER HAULERS. If you use fore and aft tracks for your jib fair leads, it is advisable to have some way to adjust your jib lead position athwart ships. Barber haulers will allow you to adjust the angle of your jib leads to wind strength and your sailing angle.

B. SPINNAKER CONTROL LINES.

1. SHEETS AND GUYS. These must be lead aft to a turning block at the back of the cockpit that then leads the lines forward to a winch and cam cleat. Alternatively, you can eliminate the use of the winch by using ratchet blocks and cam cleats..

2. TOPPING LIFT.. This line lifts the pole. It must attach below the head stay and should be led aft to a cam cleat near the cockpit.

3. FOREGUY. This is used to keep your pole from rising too high. It is led to the base of the mast and then back to a cockpit cam cleat. Alternatively, you can use twings that also help give contol and shape to the spinnaker.

4. MAST TRACK. This track, with an adjustable car, controls the height of the inboard end of the pole.

If you prepare your boat following these suggestions, you will have a boat that is as fast as any boat in the fleet.

Once you are going fast, it will be up to you to make sure you are going fast in the right direction. Remember, a missed wind shift can negate fast sails and the best preparations.