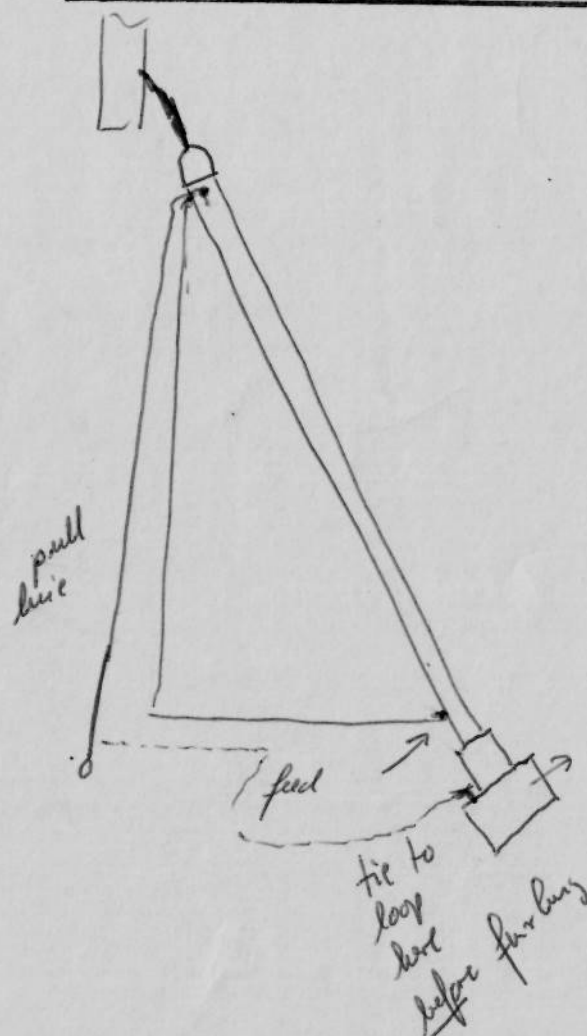
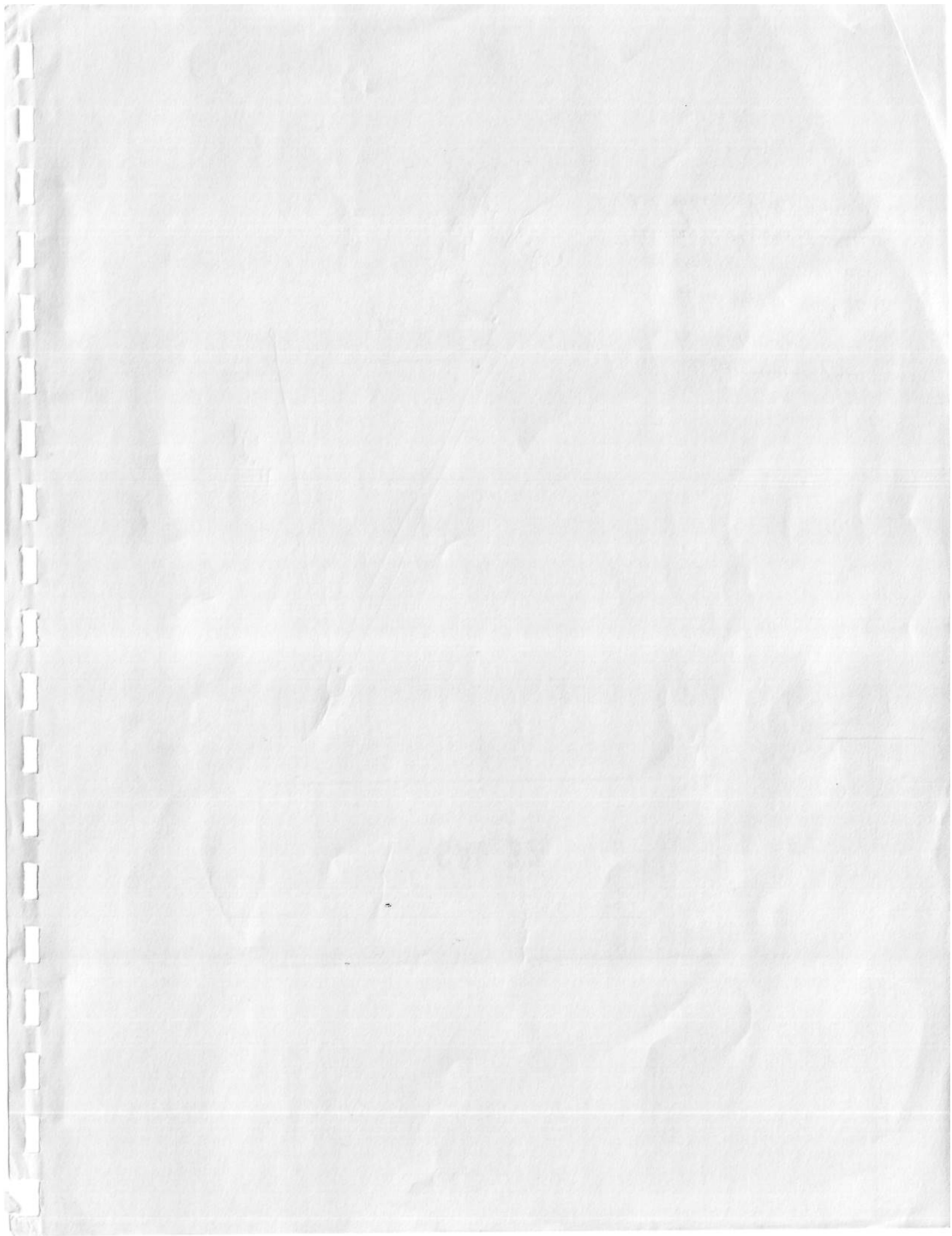


CAL 22



could be far extra turns in pull with line
add extra rope to pull line as it will pull up all the way to the mast where we take out the fishing job



CAL 22

YACHT'S NAME

HOME PORT

REGISTRATION NO.

OWNER'S NAME & ADDRESS

RADIO CALL NUMBER

SAIL NO.

HULL IDENTIFICATION NO.

KEY NO'S.

ENGINE SERIAL NO.

C O N T E N T S

IMPORTANT SAFETY INFORMATION

LIMITED 1-YEAR WARRANTY/LIMITED 30-DAY WARRANTY FOR COMMERCIAL
USE

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- Dealer's Responsibilities
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C O N T E N T S

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IMPORTANT SAFETY INFORMATION

Sailing is wonderful recreation, but it is important that you take certain simple safety precautions.

The following are some of the more important boating safety precautions. We discuss most more fully later on in this booklet, but put them here for your quick review.

1. **Learn To Be A Good Sailor.** It takes time and, often, thorough instruction to learn to be both a safe and effective sailor. Unless you have already received instruction, you should attend the classes in your area or take a home study "Skipper's Course." Write your nearest Coast Guard or local U.S. Power Squadron office for further informaton.

2. **Danger of Lightning and Electrical Power Lines.** If your boat is struck by lightning or if the mast or rigging makes contact with an electrical power line, you may be seriously burned or killed. Even though your Cal boat has a lightning ground system which complies with industry standards, this still **may not** protect you if lightning should strike the boat and **will not** protect you if the mast hits an overhead power line. To best protect yourselves from these hazards:

(a) check the weather forecast before going sailing; if thunderstorms or lightning is predicted, do not go out.

(b) if you are out and find that lightning is present in your area, stay as far as possible away from the mast, boom, standing rigging, and all other metallic objects. These are all electrical conductors, which will carry electric current and cause severe shock, injury or death. Seek shelter as soon as possible.

(c) when launching your boat, stepping the mast, and when sailing, be very careful not to allow the mast or rigging to touch any overhead wire. **Beware of all overhead wires;** high-voltage power transmission lines are usually not insulated and frequently look very similar to overhead telephone lines, yet they carry lethal currents. Consult nautical charts for the areas where you are sailing to make sure that there are no electrical lines which are hanging low enough that they might touch your mast or rigging. Know how the top of your mast stands from the water so that you will know whether you will pass safely beneath electrical power lines.

3. **Safety Accessories:** Never use your boat without carrying all of the required safety accessories, such as fire extinguisher, distress signaling equipment, and personal flotation devices.

4. **Float Plan; Weather.** Leave a float plan (giving details on where you are going, with whom and when you plan to be back) so that you can be located and so that someone will know if you are overdue and be able to start a search for you. Carefully check the weather before you go out and periodically during your sail. No matter how well designed any boat is, there are weather conditions which it cannot withstand. While your boat has been designed to be self-righting under most circumstances, this does **not** mean that your boat will always right itself if capsized. Wet sails or rough weather conditions might even prevent you from manually uprighting it. Under normal circumstances your boat will not sink if capsized as long as you have closed and battened down all the hatches and other openings; however, in rough weather or unusual circumstances it could sink. Furthermore, if the boat is swamped and even if you do manage to get it to float upright, exposure to cold water for even a few minutes or to warm water for a longer period of time can cause hypothermia (a decrease in the body's temperature) and be fatal. Make sure you know what weather conditions you are going to encounter, and that you are well trained in bad-weather seamanship in case the weather changes unexpectedly.

5. **Refueling.** Exercise extreme care when refueling your boat. (See Fueling Procedure. You could cause an explosion or fire, which could badly burn or kill you. Be sure to exhaust all fuel vapors and personally sniff to make sure there is no odor or fuel in bilge and engine areas before starting your engine. Never take a lighted match or work with an open flame (for example, a blow torch) in or around the fuel storage compartment, because even a low level of vapors may be present and catch on fire or explode. Clean up all fuel spills immediately.

6. **110-Volt Shore Power.** If you hook up to shore power, make sure the polarity-warning light and buzzer are not signaling. If they do, disconnect power immediately! This indicates that the polarity of the power cord is reversed and you could get an electrical shock that would burn or kill you.

CAL
LIMITED 1-YEAR WARRANTY
Limited 30-Day Warranty For Commercial Use

Lear Siegler Marine warrants each new Cal boat manufactured by it to be free from defects in material and workmanship, under normal noncommercial use and service, for a period of 1 year after commissioning by the original retail customer, but in no event later than two years from the date of shipment by Lear Siegler Marine, subject to the terms and conditions stated below.

- 1) **WARRANTOR.** This warranty is granted by Lear Siegler Marine, a Lear Siegler Company, 848 Airport Road, Fall River, Massachusetts 02720-4793.
- 2) **PARTIES TO WHOM WARRANTY IS EXTENDED.** This warranty shall extend to any buyer (other than for purposes of resale or use in the ordinary course of the buyer's business), and any noncommercial transferee to whom such product is transferred during the warranty period and who normally uses it for personal, family or household purposes. For Cal boats used commercially, this warranty also extends but it expires thirty (30) days after commissioning by the original purchaser.
- 3) **PARTS COVERED.** All parts manufactured by Lear Siegler Marine, including the hull, deck, and cabinetry are covered by this warranty; the installation work performed by Lear Siegler Marine on components not manufactured by it, is also covered by this warranty.
- 4) **PARTS NOT COVERED.** The following parts are not covered by this warranty:
 - a) masts, plywood, teak, external finishes (which include paint and gelcoat), and upholstery; and
 - b) engines, toilets, stoves, refrigerators, batteries, ignition systems, lighting devices, blowers, propellers, and other parts and equipment manufactured by others.Lear Siegler Marine will forward the owner warranties, if any, extended by other manufacturers.
- 5) **REMEDY.** If within the applicable warranty period any part or installation work covered by this warranty proves to be defective in material or workmanship, then Lear Siegler Marine shall, at its sole option, repair or replace the defective part. Parts and labor shall be at the expense of Lear Siegler Marine, but not transportation costs.
- 6) **PROCEDURE FOR OBTAINING PERFORMANCE UNDER THIS WARRANTY.** In order to obtain performance of the obligations under this warranty, the owner must promptly (within thirty days of discovery of the defect) notify Lear Siegler Marine or an authorized Cal service center of the defect, and at Lear Siegler Marine's or the authorized Cal service center's direction, return the defective part or product to be repaired or replaced under this warranty to an authorized Cal service center. If repair or replacement by an authorized Cal service center is determined by Lear Siegler Marine to be impractical, the owner shall return the defective part or product to Lear Siegler Marine. All transportation costs to and from the authorized Cal service center or Lear Siegler Marine, and all haul-out, launching and rigging costs, will be at the expense of the owner.
- 7) **DESIGN CHANGES.** Lear Siegler Marine reserves the right to make changes in the design or material of its products without incurring any obligation to incorporate such changes in any product previously manufactured or advertised.
- 8) **ENTIRE WARRANTY.** This warranty may be altered only in writing signed by an officer of Lear Siegler Marine. It may not be altered or extended orally or in writing by any other person.
- 9) **EXCLUSIONS AND IMPLIED WARRANTIES.** This warranty does not extend to any defect due to the negligence of others, failure to operate or maintain the product in accordance with the operation and maintenance instructions furnished with each new product, unreasonable use, accidents, alterations, or ordinary wear and tear. **IMPLIED WARRANTIES, INCLUDING THOSE OF MERCHANTABILITY, AND FITNESS, ARISING UNDER STATE LAW, ARE LIMITED IN DURATION TO THE DURATION OF THIS EXPRESS WARRANTY, WHERE SUCH LIMITATION IS PERMITTED. LEAR SIEGLER MARINE SHALL NOT BE RESPONSIBLE FOR LOSS OF USE OF ANY PRODUCTS, LOSS OF TIME, INCONVENIENCE, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES WITH RESPECT TO BUSINESS OR PROPERTY, WHETHER AS A RESULT OF BREACH OF WARRANTY, NEGLIGENCE OR OTHERWISE.** Some states do not allow (a) limitations on how long an implied warranty lasts or (b) the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not be applicable. This warranty gives the owner specific legal rights, and there may also be other rights which vary from state to state.

C O N G R A T U L A T I O N S

In choosing your new yacht from the CAL line, you have selected one of the best values in today's sailboat market. The design and construction of this yacht reflect years of experience and knowledge gained in the building of over 10,000 boats during the past 25 years.

Your boat was designed by C. R. Hunt Associates, from whose design boards came the 12 meter Easterner, the Concordial Yawl, the 110 and 210, Bertram and Boston Whaler powerboats, as well as the O'Day 22-39 and the Cal 24, 33, and 44. This design team is well known for their excellent performing cruising yachts, and we feel they have maintained their high standards in the CAL 22.

The use of aluminum, stainless steel, teak wood, and fiberglass all combine to produce a yacht that has much lower maintenance requirements than those in the past. However, it is vital that the necessary maintenance procedures be performed faithfully.

This manual is designed to familiarize you with your boat. The location and function of each system onboard will be outlined to help make any adjustments or maintenance procedures more easily undertaken.

Lear Siegler Marine reserves the right to change specifications without notice, and this manual may not reflect all such changes. Since we are always striving to improve our product, modification and improvements are constantly in process; and, therefore, it is possible that your boat may contain features different from

those enumerated in this manual. It is impractical to revise this manual for each such modification. It is our policy to make improvements whenever it is appropriate without waiting for corresponding updates in our manual. Please contact your dealer, if you have any questions.

Full information on optional equipment may not be contained herein. Contact the option manufacturer or your CAL boat dealer for more information. All parts orders must be placed through your local CAL dealer, in order to insure that the correct parts arrive. Also, certain situations may arise where we may refer you to a local ships' store or parts' manufacturer for hardware. This will be to insure you the fastest service possible.

BE SURE TO READ AND UNDERSTAND THIS MANUAL AND ALL OTHERS INCLUDED WITH YOUR BOAT BEFORE OPERATING ANY OF THE BOAT'S SYSTEMS.

In addition to information contained in this manual, there are certain federal, state, and local regulations pertaining to safe and legal operation of pleasure craft that you should familiarize yourself with. Local governmental agencies and boating groups can help you become aware of these regulations. Additionally, be sure to read and understand the accompanying Safety Information Sheet.

Have Fun, and Good Sailing!

LEAR SIEGLER MARINE

CAL BOATS

C A L 2 2

STANDARD BOAT DIMENSIONS

LOA	22.0'	6.71 Meters
LWL	19.58	5.96 Meters
Beam	7.75'	2.36 Meters
Draft	3.50'	1.06 Meters
Ballast	775 Lbs.	349 Kilograms
Displacement	2,100 Lbs.	955 Kilograms

SAIL AREA

I = 24.58'		7.5 Meters
J = 8.42'		2.6 Meters
P = 25.83'		7.9 Meters
E = 9.25'		2.8 Meters
Main	119.5 Sq. Ft.	11.1 Sq. Meters
130% Genoa	157.7 Sq. Ft.	14.6 Sq. Meters
Total	277.2 Sq. Ft.	25.7 Sq. Meters

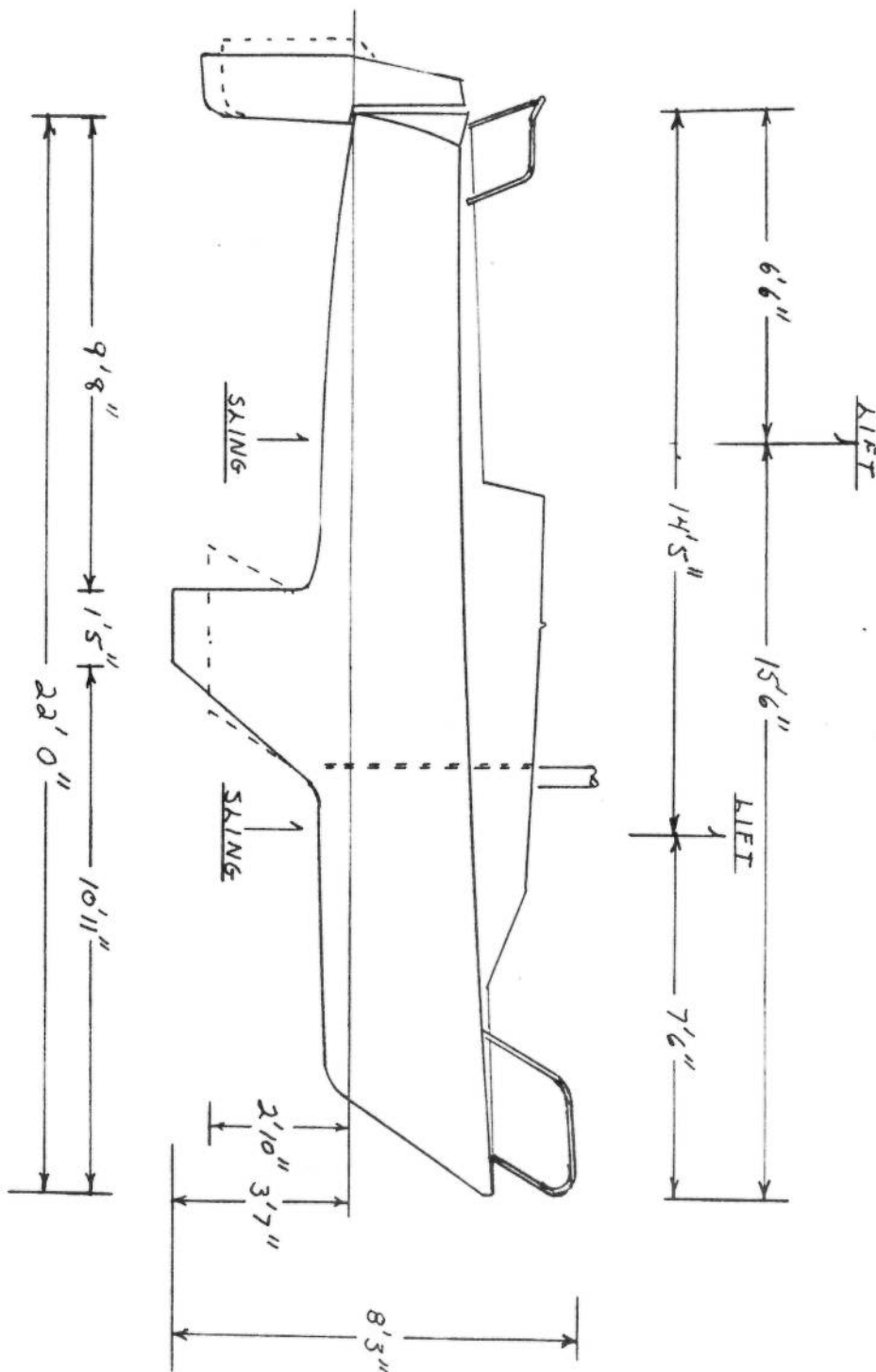
Mast Height above DWL	32.6 Ft.	9.88 Meters
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MISCELLANEOUS

Berths	4
Icebox Capacity (Optional)	48 Quarts
Fresh Water Capacity (Optional)	5 Gallons
Recommended Outboard Horsepower	4 - 8
Calculated Hull Speed	6 Knots

CONSTRUCTION

Hull	Molded Fiberglass with Coremat Coring
Deck	Molded Fiberglass with Balsa Core. High stress areas have the balsa core replaced with marine-grade plywood.



SAILPLAN DIMENSIONS

I — 24.58 P — 25.83
J — 8.42 E — 9.25

DESIGN NO CAL-22

CAL - 22

FOR LEAR SINGLE MARINE

PUBLICATION SAILPLAN

SCALE: 1/2" = 1'-0"

C. RAYMOND HUNT ASSOC'S., INC.

69 LONG WHARF

BOSTON, MA.

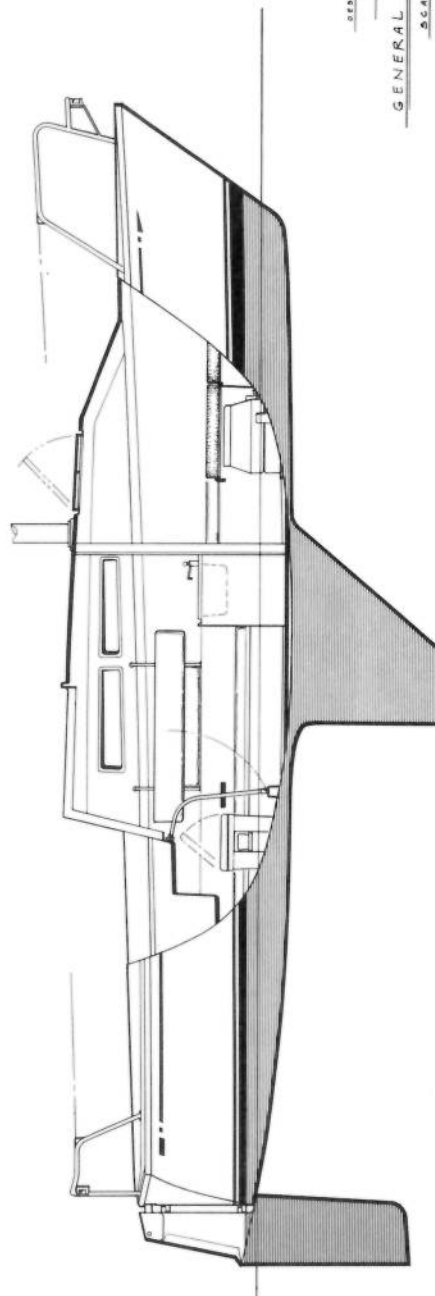
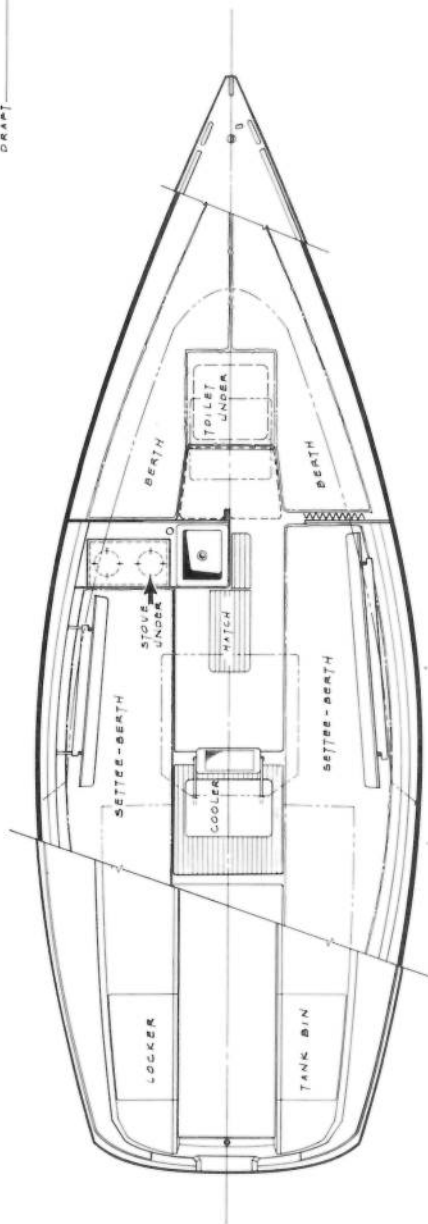
31 OCT. 1984

RGT



DIMENSIONS

L.O.A.	22'-0"
L.W.L.	19'-7"
BEAM	7'-10"
DRAFT	5'-3"



DESIGN NO. CAL. 11

CAL. 22

GENERAL ARRANGEMENT

SCALE: 1"=1'-0"

C. RAYMOND HUNT ASSOC. INC.
 51 LONG WHARF, BOSTON, MASS.
 NOVEMBER 1, 1964 J.M.W.

DEALER'S RESPONSIBILITIES

Your Cal boat dealer is a professional. He can provide you with the service and expertise that will help you to enjoy your Cal. Rely on him for assistance in selecting any additional equipment you may need and in seeing that it is properly installed.

The dealer has inspected the boat upon arrival at his yard. When the boat is commissioned, he will check all the systems and equipment and correct any problems that may arise. Should there be any defects covered by the Cal warranty, the dealer will correct them as soon as possible and file any warranty claims with Lear Siegler Marine. All warranty matters must be handled by an authorized Cal dealer.

Should you need any parts for your Cal product, contact your local dealer. He can obtain quick delivery from Cal. By utilizing his assistance, you can be assured of receiving the proper parts and of proper installation as well.

Lear Siegler Marine assumes no liability for damage incurred in transit.

OWNER'S RESPONSIBILITIES

Your Cal boat is covered by our Limited 1-Year Warranty for one year after commissioning by the original retail customer, but in no event later than two years from the date of shipment by Lear Siegler Marine. Always refer to our Limited Warranty for complete warranty information. Within 30 days of taking delivery of your boat, fill out the warranty registration card and return it to Lear Siegler Marine. The U. S. Coast Guard requires that all manufacturers keep records of people who have purchased their products. This is necessary in case a defect notification or product recall is needed. The only way Lear Siegler Marine can maintain these files is to have you send in the completed card. If you have any questions or comments, please include these with the card. We will get back to you.

When you sell your Cal product, please drop us a note with the hull number, your name, and the name and address of the new owner.

It is important that you contact your dealer as soon as possible when product defects are noted. This will assure prompt service and prevent the problem from worsening.

Thoroughly check your ship's paper file to insure that all manuals and warranties for your optional or additional equipment are provided.

SAFETY NOTE

NOTE: In the shoal draft version of the Cal 22, the draft is 2'10" and the rudder will be 2'9". Under certain loading or sailing conditions, the rudder may become the lowest point on the boat. EXTREME CARE must be taken under these conditions to avoid grounding or other impact, which could cause rudder damage.

FOR SAFE BOATING

(Reprinted by Permission of U.S. Coast Guard)

BE PREPARED

Take a Safe Boating Course from the Coast Guard. You can call 800-336-BOAT for information on courses in your area.

Carry all safety equipment required by Federal and State law. Federal requirements are discussed in "Federal Requirements for Recreational Boats" which can be acquired from U.S. Coast Guard, Office of Boating, Public, and Consumer Affairs, Washington, D.C., 20593. State requirements will come from your local State Boating Administration. The Coast Guard also recommends: a first-aid kit, a pump or bailer, a transistor or weather radio, extra fuel, a paddle, anchor and line, and extra drinking water, also, if not a requirement, flares.

Get a Coast Guard Auxiliary Courtesy Examination. This is a free, confidential, safety inspection. Call your local Coast Guard Auxiliary for details.

Be familiar with the use of distress signals and PFD's.

AVOID FIRES

Handle fuels carefully.

Read the engine owner's manual for proper fuel-system maintenance.

Inspect your engine's fuel system periodically.

Heed fire extinguisher regulations and keep them in good condition.

FOR SAFE BOATING - Continued

While refueling:

- a. Fill portable tanks on the dock.
- b. Tie the boat securely.
- c. Extinguish cigarettes and all flames on the boat. Turn off all engines and electrical equipment.
- d. Keep the hose nozzle in contact with the fuel can.
- e. Wipe up all fuel spillage.
- f. Ventilate the engine and fuel compartment.
- g. Check boat for fumes.

BEFORE GETTING UNDERWAY

Leave a float plan: An example of a float plan follows.

Check the weather: Do not venture out, if the weather threatens.

WHILE UNDERWAY

PFD's should be worn by children and non-swimmers at all times.

Everyone should wear them, if conditions become hazardous.

Do not operate a boat, if intoxicated, fatigued, or stressed.

These human factors cause 50% of all boating accidents.

Keep a good lookout: This is especially true of sailboats. Keep a watch to leeward under the headsail.

Keep away from swimmers, divers, and skiers.

Obey State and Federal laws. Know your local laws and "rules of the road".

FOR SAFE BOATING - Continued

Respect Bad Weather: Try to get to shore, if the weather turns bad. Get and carry a radio with a NOAA "weather band" on FM 162.40-162.55 MHZ.

IF TROUBLE OCCURS

Radio for help. Use the emergency VHF Channel; i.e., 156.8MHZ.

Put on PFD's immediately.

Stay with the boat. In cold water, huddle together to prevent hypothermia.

FLOAT PLAN

Make copies of this page and use one before each trip. Fill it out and leave it with a reliable person, who will notify the Coast Guard or other rescue organization, if you fail to return on time. DO NOT FORGET TO CANCEL THE FLOAT PLAN UPON YOUR RETURN.

FLOAT PLAN

1. Name of person reporting and telephone number _____

2. Description of Boat: Type _____ Hull Color _____
Deck Color _____ Stripe Color _____ Registration # _____
Length _____ Name _____
Make _____ Other Distinguishing Marks _____
3. Persons Aboard Number _____
Name _____ Age _____ Address & Phone _____
Name _____ Age _____ Address & Phone _____
Name _____ Age _____ Address & Phone _____
4. Engine Type _____ H.P. _____ Fuel Capacity _____
5. Safety Equipment: PFD's _____ Flares _____ Mirror _____
Flashlight _____ Food _____ Water _____ EPIRB _____
Raft or Dingy _____
6. Radio _____ Type _____ Frequencies _____
7. Trip Expectations: Leave at _____ From _____
Going to _____. Expect to return by _____
and in no event later than _____.
8. Automobile License No. _____ State _____
Color and Make of Car _____ Parked at _____
_____.
9. If not returned by _____, call the Coast Guard or _____

Phone Numbers _____

COMING ABOARD

HERE'S A CHECKLIST APPROACH FOR YOUR CREW:

- _____ Check bilge for excessive water.
- _____ Check weather conditions and tides.
- _____ Check food supply.
- _____ Foul weather gear.
- _____ Linen, sleeping bags.
- _____ Fuel.
- _____ Water.
- _____ Sun screens and sunglasses.
- _____ Tools.
- _____ Docking and anchor gear.
- _____ Check radio operations.
- _____ Navigation charts and instruments.
- _____ Float plans to a friend or Coast Guard.
- _____ Fuel for stove.
- _____ Cooking and eating utensils.
- _____ Check battery water level.
- _____ Oil level, tight V-belts.
- _____ Check for loose electrical connections on engine.
- _____ Secure tools or any loose equipment.
- _____ Doors and drawers secured.
- _____ Check steering lock-to-lock.
- _____ Check mast for rigging irregularities and tightness.
- _____ Halyards and sheets are clear and ready to run.
- _____ No lines or other obstructions near the propeller or bow.
- _____ Anchor ready to run.

COMING ABOARD - Continued

- _____ Check lifelines for tightness.
- _____ Turn on fuel and water lines.
- _____ Stow all loose gear.

GOING ASHORE

- _____ Sails dry and stowed.
- _____ Fuel lines and water lines turned off.
- _____ Bilge pumped dry.
- _____ Wallet, jewelry, and other valuables are not left onboard.
- _____ Battery switch off.
- _____ Charger on.
- _____ Hatches and ports locked.
- _____ Topsides clean.
- _____ Clean interior of food and rubbish.
- _____ Fenders in place.
- _____ Halyard secured away from mast.
- _____ Dock lines secured.
- _____ Loose gear stowed.
- _____ Sails furled and covered.
- _____ All covers in place.
- _____ Main companionway locked.
- _____ Check in with whomever kept your float plan.

GLOSSARY

AFT - In the neighborhood or direction of the stern.

BATTEN - A thin wooden or plastic strip placed in a pocket in the leech of a sail to help hold its form.

BLOCK - Pulley consisting of a frame in which is set one or more sheaves or rollers. Ropes are run over these rollers.

BOOM - Spar at the foot of the mainsail.

BOOM VANG - Tackle secured to the bottom of the boom about 3' aft of the gooseneck. The other block attaches to an eye at the base of the mast. The vang's purpose is to keep the boom steady and horizontal while sailing.

BOW - The forward part of a boat.

CENTERBOARD - A keel-like device that can be hoisted or lowered in a trunk that acts as a keel in shoal-draft boats.

CENTERBOARD PENDANT - Line used to raise and lower centerboard.

CHAINPLATES - Strips of metal fastened to the boat's hull, near the deck line to take the stress of stays.

CLEAT - A fitting to which ropes are made fast.

CLEVIS PIN - A small stainless steel pin that has a hole in one end for a cotter pin and is used to secure stays to chainplates and mast fittings.

CLEW - The aftermost lower corner of a sail.

COCKPIT - An open area lower than a boat's deck where the occupants sit.

COTTER PIN - A straight or circular split metal pin used to hold a clevis pin in place.

DOWNHAUL - A device used to tighten the luff of a sail.

FAIRLEAD - An eye used to lead line in the direction desired.

GLOSSARY - Continued

FOOT - The lower edge of a sail.

GOOSENECK - A metal device that secures the boom to the mast.

GUDGEON - A metal socket attached to the transom to receive the pintle of the rudder.

GUNWALES - The upper edge of a boat's side, where it meets the deck.

HALYARD - A line for hoisting (or raising) the sails.

HEAD - The upper corner of a sail.

HEADBOARD - The fitting at the head of a sail with a hole in it to receive the main halyard.

HEADSTAY - The foremost stay on a sailboat. A jib is set on a headstay.

HULL - Main body of a boat.

JIB - A triangular sail set forward of the mast.

JIB SNAPS - Small fittings that are attached to the luff of a jib, which secure the jib to the headstay.

JIBE - The action of the mainsail when shifting from one side of the boat to the other, when heading down wind.

LEECH - The after edge of a sail.

LEEWARD - Away from the wind.

LINE - The common expression for a rope in use.

LUFF - The forward edge of a sail.

MAINSAIL - The principal sail on the main mast.

MAINSHEET - The line used to trim a mainsail.

MAST - An aluminum tube designed to stand on end so as to support a boom, plus one or more sails.

MASTHEAD - The top of the mast.

GLOSSARY - Continued

MASTHEAD FITTING - The fitting at the top of the mast.

MAST STEP - A metal fitting that holds the base of the mast in position.

OUTHAUL - A line used to haul the clew of a sail out to the end of the boom.

PINTLES - Pins on the forward side of a boat's rudder, designed to rest in and pivot on the gudgeons secured to the transom.

PORT - The left side of a vessel facing forward.

REEFING - To reduce a sail by rolling or folding up part of it.

RIGGING - The wire supporting the spars is called standing rigging (stays or shrouds) and the ropes used in setting and trimming sails are known as running rigging (halyards and sheets).

RUDDER - A vertical plate attached to the stern of a boat, used in steering it.

SELF-RESCUING - A feature which enables the crew to right and sail away a boat which has capsized.

SHACKLE - A U-shaped piece of metal with a pin across the open ends.

SHEET - A rope used to trim a sail.

SHROUD - Same as a stay.

SLACK - The opposite of taut. Slack away or off - to pay out.

SLOOP - A one-masted vessel with two or more sails.

SPAR - A mast, a boom etc.

SPREADERS - Aluminum tubes that project from a mast in a traverse direction in order to keep a stay at proper tension and to help hold the mast erect.

GLOSSARY - Continued

STARBOARD - The right side of a boat, facing forward.

STAY - A length of wire used to support a spar.

STEMHEAD FITTING - The fitting nearest the bow on the deck where the headstay attaches.

STEP - To step a mast is to set it in position.

STERN - The after part of a boat.

TABERNACLE - A fitting designed so that the mast can be lowered when passing under obstructions; also facilitates stepping and unstepping the mast.

TACK - The lower forward corner of a sail.

TILLER - A piece of wood connected with the rudder head. By this the rudder is moved as desired.

TOPPING LIFT - A wire and/or rope that attaches to the top of the mast and fastens to the end of the boom. Its purpose is to hold the end of the boom up when the mainsail is lowered.

TRIM - To trim sails. To put them in correct relation to the wind by means of sheets.

TRUNK - A centerboard housing.

TURNBUCKLE - A device used to maintain correct tension on rigging.

WINDWARD - Toward the wind.

COMMISSIONING

Your CAL Yacht dealer will supervise the commissioning and testing of your new boat. His knowledge and experience will insure that all systems and components will function properly when the boat is delivered to you. Please be sure to go over all systems with him, so that you understand their operations and safety features.

We have included some guidelines and instructions in this section to aid you and your dealer.

PRE-LAUNCH CHECK LIST

1. All thru-hull hose clamps tightened. _____
2. Accessory thru-hulls installed and tightened. _____
3. Engine: Installed on bracket. Clamps tight. _____
4. Battery secure, filled, and charged. (Optional) _____
5. Rigging installed on spar; cotter pins spread
and taped. _____
6. Masthead sheaves free to rotate; lubricated. _____
7. All required safety equipment on board. _____

NOTE: THIS IS A BASIC PRE-LAUNCH CHECK LIST. THERE ARE MANY
OTHER ITEMS WHICH CAN AND SHOULD BE CHECKED BY THE
COMMISSIONING PERSONNEL.

POST-LAUNCH CHECK LIST

1. All thru-hulls water tight. _____
2. Engine: Operational. Proper fuel in tank. _____
3. Engine and gearbox levels checked. (Refer to
Engine Manual.) _____
4. Fuel tank filled and system checked for leaks. _____
5. Engine operates and passes water thru exhaust. _____
6. Engine controls operate correctly and checked
for tight nuts, bolts, and spread cotter pins. _____
7. Mast stepped and mast step pins installed. _____
8. Turnbuckles attached; cotter pins spread and
taped; rigging tuned. _____
9. Boom and running rigging installed. _____
10. Water tank filled. (Galley option only.) _____
11. Faucet works, and lines checked for leaks.
(Galley option only.) _____
12. Stove fuel tank filled; system checked for leaks.
(Galley option only.) _____
13. Electrical equipment operational. _____
14. Rudder installed and pinned. _____
15. Gudgeon and pintles greased. _____
16. Bilge free of water. _____
17. Toilets operational; hoses secure. (Optional.) _____
18. Deck hardware checked for leaks. _____
19. Recheck all thru-hulls and hose clamps. _____
20. Safety equipment aboard. _____
21. Warranties and manuals delivered to owner. _____
22. Warranty card sent to Lear Siegler Marine. _____

RIGGING AND STEPPING THE MAST

Rigging and stepping the mast is a relatively simple operation; but, if you are a novice, it is recommended that you go through the steps with your dealer before attempting it for the first time. You will need the following equipment to rig the mast:

1. Pair of pliers.
2. Medium screwdriver.
3. 4' monel or stainless seizing wire.
4. Roll of rigging tape.

RIGGING THE MAST

Open the rigging package and identify the various parts. They are labeled. First, attach the spreaders. They are fastened to the mast during shipment. They attach to either side of the mast about 1/2 way up and angle slightly aft. Slip the spreaders over the spreader fitting and put the bolt through. Be sure the nut is on the bottom. Tape the bolt and nut to prevent snagging. The upper shrouds attach to the tangs on each side of the mast at the masthead. Install the clevis pin with the cotter pin hole toward the mast. Insert the cotter pin and spread the pin open, so that it cannot fall out. Bring the uppers down over the spreader ends. Fasten the uppers to the spreader ends with monel or stainless seizing wire. Tape the spreader ends securely and install spreader boots to prevent chafe. Attach the lower shrouds to the tangs just under the spreaders. As with the uppers, install the clevis pin towards the mast and insert and spread the cotter pin. Attach the headstay to the tang about four feet from the masthead on the front of the mast. Install the clevis as per the other rigging.

RIGGING AND STEPPING THE MAST - Continued

RIGGING THE MAST - Continued

Attach the backstay to the aft side of the mast at the masthead. The backstay legs attach to the triangular plate on the backstay below the turnbuckle. Installation instructions for the jib furling gear are packed with the furling gear and are also in this owner's manual. Please follow the instructions carefully, and take NO SHORTCUTS.

STEPPING THE MAST

We recommend that at least two people be involved in stepping the mast. Place the mast on the deck of the boat with the bottom forward and the mast track down. Check and make sure all the shrouds and stays are untangled and free to run. Put padding under the spar to prevent it from marring the deck. Open the turnbuckles on the shrouds and stays to the one-half open position. Attach the lower end of the backstay legs to the chainplates located at each corner of the transom. Note: If you have a stern pulpit, be sure the legs pass under the stern pulpit rail and not over it.

Attach the upper shrouds and lower shrouds to the chainplates. The upper shroud goes to the forward end, and the lower shroud to the aft end of the loop. Do not attach the headstay with its furling gear yet. A tabernacle is provided on the cabin top of the CAL 22 for ease in stepping the mast. With the mast in the horizontal position and the main hatch closed, move the mast aft and insert the aft mast tabernacle pin and cotter pin. Next, check again to make sure the backstay and shrouds are attached and free. Now push up on the spar until the mast is in a vertical position.

RIGGING AND STEPPING THE MAST - Continued

STEPPING THE MAST - Continued

With one person holding the spar, attach the headstay to the forward hole in the stemhead fitting. Insert and bend over the cotter pin. Finally, insert the forward mast tabernacle pin. After all stays are securely attached with their cotter pins bent and the mast tabernacle pins are in and their pins secured, take the slack out of the rigging. Tighten the stays evenly, to ensure even pressure on the tabernacle pins in a fore and aft direction. The headstay, backstay, and upper shrouds should be hand tight.

CAUTION: IT IS IMPORTANT THAT YOU DO NOT OVERTIGHTEN THE RIGGING, AS HULL DAMAGE CAN RESULT.

After the stays have been adjusted, insert the cotter pins in the turnbuckle studs. Bend the cotter pins over and securely tape the pins to prevent them from catching on anything.

After a few sails, the rigging will probably stretch and need to be readjusted. This may occur several times before all the slack is out of the rigging.

Follow the instructions with the jib furler or in this manual for installation, rigging, and hoisting of sail or furler.

Tuning: Do not overtighten the stays as mainsheet tension will dictate tension on the headstay. While sailing, the leeward shrouds will go slack, due to mast bend, stretching, etc., so under no circumstances should you tighten them under sail - all adjustments should be made at the dock with the sails down.

RIGGING AND STEPPING THE MAST - Continued

WARNING: WHEN HAULING, LAUNCHING, AND SAILING NEAR LOW OVERHEAD WIRES, YOU MUST BE VERY CAREFUL THAT THE MAST NOT TOUCH THE WIRES. THE MAST AND/OR RIGGING COULD CONDUCT HIGH VOLTAGE ELECTRICITY TO THE PEOPLE ON BOARD AND CAUSE SEVERE BURNS OR DEATH.

ATTACHING THE BOOM

The boom should be attached to the mast by inserting the gooseneck slide into the mast track. The gooseneck is then held down by tying the downhaul line from the gooseneck to the cleat below. Support the aft end of the boom from the hook on the backstay.

Hang the small mainsheet block with the becket from the metal tang on the back of the boom. The mainsheet leads from the becket on this block down through the top sheave on the fiddle block that mounts on the traveler. Next, run the line back up through the boom block and then back down through the lower sheave on the fiddle block.

INSTALLING THE REEFING LINE

The continuous reefing line will enable one person to quickly and easily reef the mainsail for the CAL 22. The reef line is installed with the sail up, at the dock on a calm day! First, attach the reef line to the eye strap on the port side of the boom about 18" from the aft end. Next, run the reef line up and through the grommet in the leech of the sail about 3' up. Run the line down the starboard side of the sail and through the block on the starboard side of the boom (opposite the eye strap). Now run the line forward to the block at the gooseneck. Next, run the line

RIGGING AND STEPPING THE MAST - Continued

INSTALLING THE REEFING LINE - Continued

up the luff of the sail and through the "D" ring attached about 3' up. NOTE: Be sure to run the line through the "D" ring from the inside out, or excessive friction will result. Finally, run the line down through the cheek block on the mast base and back through the cam cleat on the aft starboard side of the cabin top.

TO REEF THE SAIL

You should reef the main whenever you become uncomfortable with the boat, or whenever heel is excessive. There is no set wind speed for reefing. Different sailors may reef at different times on the same boat. Also, just because other boats are, or are not, reefed is not necessarily what you should do. Common sense and a feel for your boat will dictate here.

IMPORTANT NOTE: You should practice reefing your boat many times at the dock and in calm waters ahead of any time that you might need to. When the wind is blowing hard is no time to be learning how to reef.

1. First, attach the aft end of the boom to the topping lift hook, or have someone support the boom. If the boom is not supported, it will fall when you release the halyard, and someone could be injured.
2. Start lowering the main halyard and, at the same time, pull in on the reefing line. Keep doing this until the sail has been pulled down to the boom as tightly as possible.

RIGGING AND STEPPING THE MAST - Continued

TO REEF THE SAIL - Continued

3. Tighten the halyard again.
4. It may be necessary to retension the luff of the sail with the sliding gooseneck.
5. When practical, tie up the loose portion of the sail with the small lines, through the grommets in the sail and under the boom.

THE FURLING GENOA

Instructions for installation, use, and care of your furling gear and 130% genoa are provided in your owner's packet, as well as elsewhere in this manual; however, we have a few other hints.

1. Always roll up the sail, so that the blue cover is on the outside. This cover helps prevent ultraviolet degradation of the sail.
2. Remove the sail and store below, when you know that you are leaving the boat for long periods. This prevents dirt, rain, etc., from accumulating in the sail.
3. Any time furling or unfurling is difficult, STOP and find out what is wrong. DO NOT force the system
4. When furling, furl beyond total sail wrap-up. Allow two or three wraps of the sheets. This will help prevent strong winds from getting inside the sail and pulling it out.
5. Be very careful to fully cleat the furling line, when the sail is fully or partially furled.

CHAINPLATES

The side rigging loads are transferred directly to the hull through stainless steel rods on each side of the boat. The rods are bolted to the chainplate "U" bolts under the deck and then bolted to the interior pan. Periodically, check the tightness of these bolts to prevent problems.

BOTTOM COATINGS

Since the beginning of the fiberglass boat building industry to the present day, all manufacturers have been plagued with the problem of occasional blistering on underwater surfaces. These blisters are caused by osmotic pressure of a solvent (water), which can pass through a membrane (the gelcoat) to reach a salt (a material which will dissolve in the solvent). This can occur at any time through any gelcoat finish. Much has been written in the past few years in trade journals, chemical journals, and in the general literature discussing this problem and suggesting possible solutions. Thus far, there has been no universally accepted reason as to why this occurs in some boats and not others, nor is there a totally accepted preventive cure or fix once blisters occur.

Although gelcoat surfaces are not covered under Lear Siegler Marine's Limited 1-Year Warranty, we feel that as a manufacturer we would like to assist our customers in finding a solution to this problem. The best available information seems to indicate that coating the boat's underwater surfaces with an impermeable epoxy coating will assist in the prevention of gelcoat blisters. This epoxy should be a type that is recommended by the manufacturer for underwater use, and should be done when the boat is new, if at all possible. A boat that has been in the water may also benefit from having this epoxy put on, but it is best to be done before the boat is first launched. One product that we know of is 404/414 Epoxy by International Paint Company.

BOTTOM COATINGS - Continued

Please note we mention this product only as a help. We do not specifically endorse this product, and recommend that you contact local representatives and make your own decision as to what product to use.

Finally, Lear Siegler Marine uses the finest available materials and the best available technique in the manufacture of their product.

Gelcoat blistering is a recognized fact of life in the marine fiberglass industry, the chances of which may be reduced by the use of an impermeable barrier coat on the bottom during the initial commissioning.

BOAT STORAGE

Whenever a boat is pulled from the water, for work or storage, care must be taken to provide adequate and proper support of the hull. This is especially true of fin-keel sailboats.

It is not recommended that the weight of the boat be rested solely on the keel. Because of the small area of the keel bottom, the localized loads on the hull in the area of the keel would be severe and could result in permanent damage to the shape or structure of the boat.

If poppets are used for support, they should be located so that the pads are under the bulkheads, berth fronts, or pan stringers, so that the load is disbursed (see Docking Plan). Failure to properly position the poppets could result in hull depression. Be sure to use an adequate number of supports, and locate them to prevent the boat from tipping fore or aft.

Additionally, when hauling the CAL 22, please be sure to refer to the Docking Plan for placement of straps, slings, etc.

Your CAL dealer has cradles available for purchase, which will fit your CAL exactly. It is recommended that this cradle be used whenever possible.

DANGER: WHEN YOU ARE HAULING, LAUNCHING, AND SAILING NEAR LOW OVERHEAD WIRES, YOU MUST BE VERY CAREFUL THAT THE MAST NOT TOUCH THE WIRES. THE MAST COULD CONDUCT HIGH VOLTAGE ELECTRICITY TO THE PEOPLE ON BOARD AND CAUSE SEVERE BURNS OR DEATH.

CONSTRUCTION DETAILS AND OPERATING INFORMATION

A. HULL

The hull is hand laid up in a large female mold, into which successive layers of material are laid. The mold can be rotated from side to side during the laminating process, allowing the workers to place the fiberglass more accurately and, also, to allow better resin penetration than would be possible with an upright mold.

The exterior of the boat is an isothphalic NPG gelcoat, which is sprayed into the mold after the stripe areas have been masked off. Next, the masking is removed and the stripe color is sprayed on. Next, layers of multidirectional glass fiber are laid into the mold to prevent pattern transfer from the successive layers of laminate. Coremat coring material is laid into the hull from the keel area to just below the sheerline. This coring increases structural strength, without adding excessive weight. The core also adds some insulating value to the hull. Finally, layers of multidirectional fiber and woven roving are applied until the correct layup thickness is attained. The thickness will vary, depending on loads applied and will increase from sheer to the keel area.

The interior pan acts as a structural reinforcing member for the hull. The pan is bonded to the hull in every conceivable place, in order to make the pan and hull act as a single unit. There are also special fiberglass floors added to the keel area to give as much strength as possible to this critical area.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

A. HULL - continued

There are special fiberglass bosses built into the port and starboard - to act as attachment points for the chainplate rods. These transfer the rigging loads to the hull, reducing strain on the deck and reducing the need for load-carrying bulkheads.

B. DECK

The deck is hand laid up, using glass strand fibers and woven roving. The deck is balsa cored for strength and weight reduction. In areas of high stress or compression, the balsa core is replaced with either plywood core, aluminum sheet, or solid glass. The nonskid area is molded in, and the deck is gelcoated as with the hull.

C. INTERIOR

The interior fabric liner provides both sound and thermal insulation, while adding good visual impact without the excess weight a rigid headliner would bring. The fabric is glued directly to the deck, and if an edge or seam becomes loose from catching on something, it can be easily re-glued. The fabric is treated for mildew resistance, but should be cleaned occasionally with a good upholstery cleaner. Check and make sure the cleaner is compatible by testing the fabric in an inconspicuous place before use. Also, application of "Scotchguard" in high-use areas will help keep it clean.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

C. INTERIOR - Continued

The bilge covers are varnished and should be revarnished each year. The remainder of the interior wood is oiled with teak oil, and a reapplication should be done each year.

D. KEEL

The keel is an external, bolted-on, lead casting. The keel is bolted on to an external stub, which is molded as part of the hull, with large stainless steel bolts. Between the keel and keel stub is an epoxy, which acts as a sealant and adhesive. The external lead keel is generally recognized as the best way of attaching ballast, in order to get the weight as low as possible. Also, an external lead keel provides much better impact resistance than either external iron or internal ballast of any type.

The keel-to-keel stub joint is carefully faired at the factory, and the keel is epoxy coated, but in time, the keel will work slightly, as the bolts stretch and a small crack may occur in the fairing at this joint. This is not a problem to worry about, providing no severe impact or grounding has occurred, and, providing that the keel bolts are kept tight.

E. RUDDER

The rudder of the CAL 22 is composed of a rigid, closed cell, polyurethane foam, which is coated with fiberglass and gel-coated. The polyurethane foam makes a strong, light-weight rudder that has positive buoyancy.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

E. RUDDER - Continued

There is additional information on the rudder, provided by the manufacturer, elsewhere in this booklet.

Care should be given when maneuvering the boat under outboard power, as certain combinations of rudder angle, outboard angle, and outboard height could result in contact between the outboard motor's propeller and the rudder. This contact could cause damage to either the rudder, outboard motor, or both.

F. PLUMBING AND ELECTRICAL

The water plumbing system comes with the optional galley and consists of a portable 5-gallon water tank with a hose from the galley sink pump. The tank should be removed for filling and should be thoroughly flushed before each fill. Due to the translucency of the water tank, algae may grow in it, if left for long periods. Frequent changes of water and flushing of the tank are recommended.

Careful checks should be made of all water connections each time you board or leave your boat. This is especially true of the sink drain system. Check all hoses and hose clamps for tightness. Make sure there are no leaks in the system.

The 12-volt electrical system is wired to the highest industry standards and should give little trouble, with only minor maintenance. You will need a 12-volt battery to power the system. This battery can be purchased from your CAL

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

F. PLUMBING AND ELECTRICAL - Continued

dealer and should be a marine "deep-cycle" type.

A marine "deep-cycle" battery is designed for an electrical system like the CAL 22's, where there is no engine charging system, and it has special posts. You should get a good 12-volt battery charger, and keep the battery well charged for safety's sake. Follow the charger's instructions carefully. You never know when you will be out after dark and will need your running lights.

The battery is to be installed in the supplied battery case under the front of the cockpit. The two electrical system wires should be attached to the posts; the red wire to the positive (+) side, and the black wire to the negative (-) side. The boat is wired with a negative ground, and this fact should be remembered when purchasing any electrical equipment.

The cabin and running lights are controlled by 15-amp, circuit breakers located on the panel on the aft cabin face. A check should be made of the running lights each time you take your boat out to make sure they are operable. Replace any burnt out bulbs immediately. If for some reason one of the circuit breakers shuts itself off, investigate the reason at once. Disconnect the battery, and check for shorts in the electrical system. Serious damage to your boat can result from failure to make repairs immediately.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

F. PLUMBING AND ELECTRICAL - Continued

Elsewhere in this book is a sheet on general battery care. Give your battery respect, as even a 12-volt system can cause shocks, sparks, and fires.

OVERHEAD POWER WIRES/LIGHTNING

Extreme caution should be used to avoid wires when raising or lowering the mast. SEVERE INJURY OR DEATH may result from having the mast touch an overhead power wire. Watch your charts carefully, and avoid any areas where power wires may hang over the water where you are sailing.

You should seek shelter in order to avoid electrical storms. If caught out during an electrical storm, avoid touching any metal objects, such as shrouds, stanchions, pulpits, etc., as they may attract lightning. There are many recommended systems for protecting your boat from lightning strikes, but WE DO NOT BELIEVE THAT ANY SYSTEM CAN OFFER COMPLETE PROTECTION FROM LIGHTNING. We, therefore, urge you to watch weather reports and learn to anticipate and avoid any electrical storms.

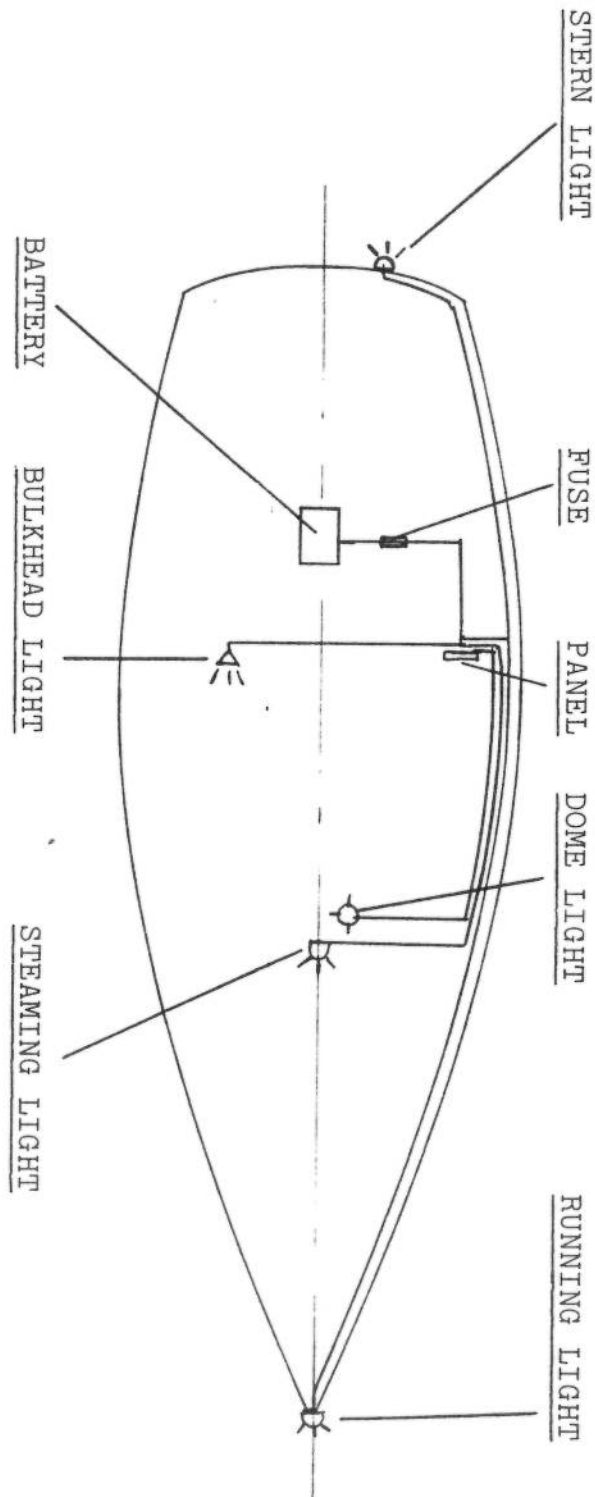
BY JPH DATE 3/20/85

SUBJECT CAL 22 ELECTRICAL SYSTEM

SHEET NO. 1 OF 1

CHNG. BY DATE

JOB NO.



CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

G. OUTBOARD ENGINE

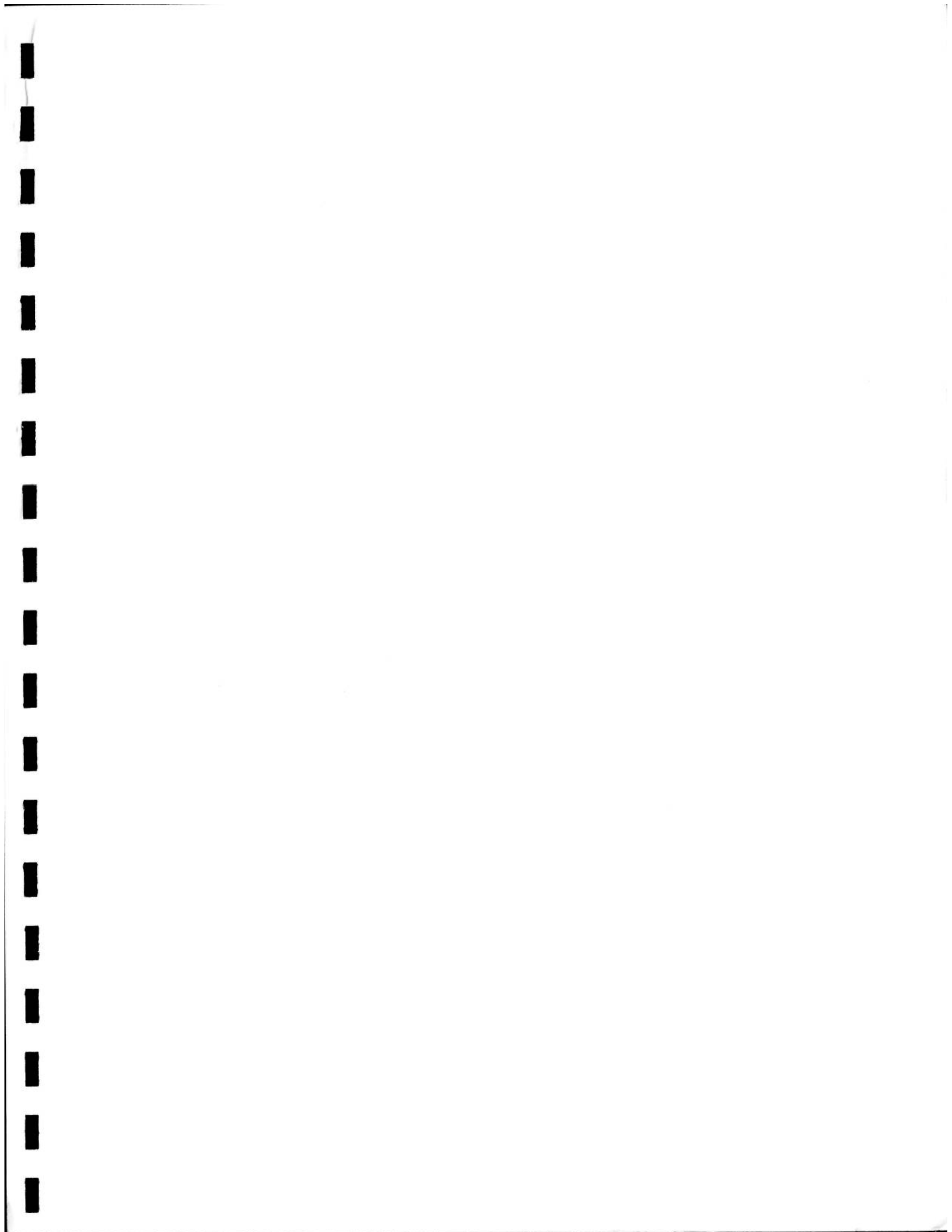
We recommend an engine of 4.5 - 8 HP for the CAL 22. Anything under 4.5 HP will not have sufficient power for adverse conditions.

The outboard is mounted on the bracket located on the starboard transom, and the gas tank should be placed in the vented locker provided in the cockpit on the starboard side.

DO NOT STORE ANY GASOLINE ANYWHERE INSIDE THE BOAT!

The outboard bracket can be adjusted up and down for best immersion of the outboard (see your outboard's owner's manual) and also adjusted for tilt for the best angle of attack for your boat and loading. The moving parts of the bracket should be lubricated frequently, as the unit is constantly exposed to salt water. Revarnish the bracket board frequently to prevent delamination.

Be careful during maneuvering, as under certain rudder and engine angles, the propeller could hit the rudder.



BASIC RULES FOR BATTERY CARE AND MAINTENANCE

- 1) Check liquid level in all cells once every week or two. Add water as required. Bring liquid level to 3/8 inch above top of separators. It is much better to add water in small amounts frequently, than to put too much in and flood out the electrolyte, thus causing damage to adjacent wiring and equipment, plus loss of acid.

Generally, the local drinking water in the United States is safe for use in batteries; but to be sure, check with your battery supplier.

Add water only. Add no battery dopes, special liquid, or powders. These are harmful or useless.

- 2) Before adding water, take a hydrometer reading of one cell. (Don't use same cell each time; change around). If above 1.225 Specific Gravity, battery is sufficiently charged. If below 1.225 Specific Gravity, remove battery for bench charge. If level is too low to read, add water and take hydrometer reading the next day.
- 3) After adding water, examine hold-downs. Make certain battery is secure. Hold-downs should make a snug fit, but not necessarily the tightest fit, or the container may be forced out of shape.

Examine cables and terminals for tightness, corrosion, and wear. Corrosion occurs from the spilled electrolyte getting on metal, other than lead. Lead does not corrode. To remove corrosion, scrape or brush it off. Then immerse the part in

BASIC RULES FOR BATTERY CARE AND MAINTENANCE - Continued

- 3) an alkaline solution, such as baking soda, in the proportions of one pound soda to a gallon of water. One can tell when all the electrolyte is neutralized by observing when the bubbling stops. Wash with water, dry, and apply a prepared grease available from battery dealers.
- 4) Examine battery for broken or cracked covers, case, and cracks in sealing compound. If any of the above defects are present, remove battery at once and have repaired. Acid loss from any of the above defects will shorten battery life. Acid escaping through cracked covers or sealing compound will cause corrosion of terminals, cables, carrier, and adjacent parts.
- 5) Batteries should be recharged, if hydrometer reading is below 1.225.
- 6) DO NOT LEAVE A BATTERY ON CHARGE FOR MORE THAN 48 HOURS. STOP CHARGE when two hydrometer readings recorded two hours apart show no increase, or when terminal voltage readings recorded two hours apart show no increase.

If there is no rise in voltage or specific gravity in a period of two hours, further charging is USELESS and MAY DAMAGE BATTERY BEYOND REPAIR. Have your supplier check battery for possible acid adjustment or repair.
- 7) On this bench recharge, the specific gravity is expected to read certain values before considered serviceable for continued use. The hydrometer reading should be above 1.260.

BASIC RULES FOR BATTERY CARE AND MAINTENANCE - Continued

- 7) The full charge gravity when new was 1.270 - 1.290. If battery does not register as above, have your battery supplier inspect it. He may be able to adjust acid or make repairs.
- 8) In cold weather, do not fill cells with water and let stand without running motor long enough to allow water to mix with acid, as freezing might occur.
- 9) Spare batteries should be recharged at least every 4 or 5 weeks, in order that the Specific Gravity may be maintained at 1.240 or above.
- 10) Use a battery with sufficient ability to carry the connected load.
- 11) Wash dirt and corrosion off top of battery to eliminate intercell discharge.
- 12) Neutralize corrosion in battery box by washing with solution of baking soda, as recommended in No. 3; rinse with water.
- 13) The amount of water which is needed by the different cells will be a clue to other problems. For example, if each week the water, which was put in the previous week has been used, it is reasonable to expect that too much charging current has passed through the battery; hence, the battery charger should be checked.

BASIC RULES FOR BATTERY CARE AND MAINTENANCE - Continued

All cells in the battery should take the same amount of water.

If one cell should take more than the others and does this each week, it would be expected that the container is leaking. Whether the leakage is through the bottom of the container, or from the sides of the container, can be determined by examination.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

H. HEAD SYSTEM (Optional)

The two optional head systems available for the CAL 22 are of the self-contained type. They carry their own water supply and can be emptied by either carrying the unit to a disposal area, or by having it pumped out at an authorized pump-out station. UNDER NO CONDITIONS should the waste be emptied into the water, as this is against Federal "No-Discharge" laws.

Follow the head directions as to operation of the individual unit. Be sure to use a holding tank chemical and to rinse the unit well after each emptying. Empty the unit frequently, even if it is not full, to prevent odors. Never leave the boat for an extended period without emptying the unit. Extreme cleanliness in and around the head will go a long way in eliminating odors.

I. HULL-TO-DECK JOINT

The CAL 22 hull-to-deck joint is a very effective, strong and trouble-free joint for a boat of this size. The deck has a downward-turned flange that goes over the top of the hull (as a coffee can lid goes over the can). The area under the lip is filled with a flexible bonding/sealant, and the hull/deck are mechanically fastened approximately every 9". The external aluminum gunwale guard holder is then fastened on in between each hull/deck joint fastener, giving a mechanical fastener approximately every 4.5". The fasteners are stainless steel screws, not aluminum "pop" rivets, as with some boats of this size. A black vinyl

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

I. HULL-TO-DECK JOINT - Continued

gunwale guard is then inserted into the aluminum holder. The gunwale guard and its aluminum holder are designed to absorb slight impacts without damage, but severe impacts should be inspected immediately. Care should be taken to avoid vertical impacts, as when the boat rolls next to a dock.

J. STEERING

The steering system for your CAL 22 is fairly simple, but will need some attention paid to it at certain points.

The rudder gudgeon and pintles should be lubricated frequently with a light coating of waterproof grease. The bolts and nuts for both the gudgeons and pintles should be checked frequently for tightness.

The rudder head assembly bolts should be checked before each sail, and the tiller pin inspected to be sure the tiller stays with the rudder.

The tiller should be revarnished at least once a year, and care should be taken when raising the tiller, as it may hit the traveler.

K. THRU HULLS

While there are no below the waterline thruhulls in the CAL 22, care should be taken wherever there is a hull penetration. This would be at the cockpit drain or the sink drain for the optional galley. The hose clamps for these thru hulls should be inspected frequently and checked for

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

K. THRU HULLS - Continued

tightness. Hoses leading from the thruhulls should be checked for deterioration or leaks frequently.

L. TRAILER BOW EYE

The CAL 22 is provided with a trailer bow eye to ease loading and unloading of the boat from a trailer. This bow eye is for this use only and is not for tying up the boat, mooring the boat, or towing the boat. Cleats are provided for tie-ups and mooring; and if it is necessary to tow, a bridle should be set up to the winches or to the mast base to ease the load.

M. SAIL CARE

The sails that are supplied with your CAL 22 are a mainsail with one reef and a 130% roller furling jib with blue cover. There are certain things that you can do to prolong your sails' life and to keep their shape.

Sails are cloth and should be protected from rubbing and chafe. This chafe frequently occurs on spreaders, shrouds, and lifelines. The areas where your sail might rub should be inspected frequently. The sails should be checked frequently for small rips or any stitching that appears loose. Sail tape, thread, and sailmakers' needles could prevent a major expense.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

M. SAIL CARE - Continued

Ultraviolet light can break down or degrade the sailcloth. After use, your sails should be furled or folded, and the mainsail should be covered with a sailcover. The furling jib should always be rolled up with the blue cover on the outside. Be sure to roll tightly, so that no "barber pole" striping occurs.

A mainsail cover can be obtained from your local CAL dealer. Furling or folding the sails will ensure that your sails retain their shape for as long as possible. When the mainsail is furled, the outhaul should be slacked and the battens removed. Also, before furling or folding, the sails should be washed with fresh water to remove salt crystals, which may cut the fibers. When leaving your boat for any great length of time, the sails should be removed, cleaned, folded, and stored in their bag.

N. INTERIOR MAINTENANCE

While your CAL Sailboat is designed to be as maintenance free as possible, there are certain chores which must be performed periodically, in order to keep the boat clean. Much of this work can be done in fairly short order and should be done on a bright, sunny day in order to ventilate the boat and air cushions, curtains, etc.

1. Curtain (Optional)

The curtain should be washed once or twice a year in order to prevent dirt and grease build up, which encourages mildew. The curtain can be easily removed for this purpose.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

N. INTERIOR MAINTENANCE - Continued

2. Synthetic Fabric Headliner

The headliner of your sailboat will collect cooking grease, smoke film, etc. It should be cleaned at least once a month with a fabric cleaner or upholstery shampoo. Any cleaner should be tested on an area of the headliner that cannot be seen, before general use. The fabric can be "Scotchguarded" after cleaning to further protect it, but be sure to ventilate the boat well and use appropriate precautions when "Scotchguarding."

3. Cushions

The interior cushions are made from several different fabrics and materials. Generally, any upholstery shampoo should be safe for cleaning, but as with the headliner, one should test an area on the cushion back before going ahead with the full cushion. DO NOT DRY CLEAN OR WASH. "Scotchguard" or other fabric protector is strongly recommended, when the cushions are new and after each cleaning. Be sure to "Scotchguard" in an open area.

4. Ports and Hatches

The ports and hatches in your CAL have aluminum frames and acrylic plastic inserts. The frames should be protected with a good metal polish and the acrylic "window" should be cleaned with warm, soapy water frequently. DO NOT use abrasive cleaners or solvents. A plastic

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

N. INTERIOR MAINTENANCE - Continued

4. Ports and Hatches - Continued

polish will help protect the ports. Severe scratching can sometimes be reduced with a light duty, automotive rubbing compound and polish.

Once a month the hatch gasket and gasket contact area should be cleaned thoroughly with soapy water and coated with a light coat of petroleum jelly or silicone spray. Oil the hinge and dog pins.

5. Ice Chest

Clean the ice chest after each use with a bleach and water mixture to prevent mildew. Also, leave the ice chest lid open when the ice chest is not in use to enable air to circulate.

DO NOT leave standing water in the ice chest, as it will promote mildew and accelerate smells.

6. Sink (Optional)

Stainless steel sink can be cleaned with any good stainless steel cleaner or with any nonabrasive cleaner. DO NOT use steel wool or bronze wool. A stainless polish will help prevent stains.

7. High-Pressure Laminate

The high-pressure laminate in the galley countertop can be cleaned with a good nonabrasive cleaner and a soft cloth. Be careful of adjacent teak surfaces. DO NOT set hot pots, plates, etc., directly on the countertop;

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

N. INTERIOR MAINTENANCE - Continued

7. High-Pressure Laminate - Continued

use a hot pad. Wipe up spills promptly.

8. Head (Optional)

The plastic cover, seat, and exterior of the head can be cleaned with warm water and soap. Keeping the head and head area scrupulously clean will prevent odors.

9. Stove (Optional)

The optional stove for the CAL 22 is a non-pressurized alcohol stove. The non-pressurized stove eliminates "flare-up" problems that can occur with pressure stoves. Read the instructions that come with the stove carefully before use - remember, any open flame in a boat is dangerous. Keep fire extinguishers handy while the stove is in use, and be sure all flammable items, i.e., curtains, clothing, etc., are far away from the flame. In a small boat it is often better to cook in the cockpit (away from the fuel tank!) to avoid smells. Remember alcohol fires can be put out with water.

10. Teak

Your interior teak was oiled at the factory. It should be cleaned and re-oiled at least once a year. Any good teak oil should be compatible, but test it in a small area before use. We do not recommend letting your teak "go natural," as this may lead to cracking of the wood.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

N. INTERIOR MAINTENANCE - Continued

10. Teak

When your teak starts to get gray and dirty it is the time to clean and re-oil. Be sure to wipe up any spilled or excess oil, as it may stain your gelcoat. BE SURE TO HAVE ADEQUATE VENTILATION, WHEN USING ANY CLEANERS, OILS, PAINTS, VARNISHES, ETC.

The bilge covers were varnished and should be re-varnished when any wear occurs.

11. Bilge

Care must be given not to sweep dirt, crumbs, etc., into the bilge. It will accumulate and smell. Some water may occur in the bilge, due to condensation against the hull, but it should be minimal. Any large accumulations of water should be checked quickly. Always keep the bilge dry and clean, which will prevent mildew.

12. General

When leaving the boat for any period of time, be sure to raise the covers of the lockers, prop up the cushions, leave doors open, and generally make all of the areas of the boat accessible to a smooth air flow. This will help prevent mildew and "musty" odors in a boat that is closed up for a long period.

When any deck fitting leaks are noted, they should be

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

N. INTERIOR MAINTENANCE - Continued

12. General - Continued

taken care of quickly. Removing, cleaning, and re-bedding the fitting should prevent leaking. Remember, as fittings work, and the sealant gets older, leaks will develop. Preventative maintenance will help prevent problems.

O. EXTERIOR MAINTENANCE

1. Gelcoat

The best thing that can be done for the gelcoat is to regularly wash it with detergent and water. Do not use an abrasive cleaner on gelcoat smooth surfaces, as it will scratch and dull them, and may scratch them enough to allow water, under which could cause a blister. Secondly, the hull and all smooth surfaces (not non-skid, or places where you might step) should be thoroughly waxed at least twice a year with a good fiberglass wax. Please note that if you use a silicone wax, it may make it very difficult to do good fiberglass gelcoat repairs or to paint the boat, as the silicone gets into the gelcoat and prevents adhesion of paints and gelcoat.

Gelcoat repair can be easily done by any owner, but good gelcoat repair requires an expert. We recommend that, unless you are very experienced in gelcoat repair, you leave these repairs to an expert. Your CAL dealer should be able to assist you in this. Remember, keep your boat clean and wax it twice a year, and you will prolong the life of your gelcoat.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

O. EXTERIOR MAINTENANCE - Continued

2. Mast and Boom

The mast and boom of your CAL 22 are made of high performance, marine aluminum. The spars are then anodized to protect them from corrosion. Due to this, halyards and lines should be kept from excessive slapping on the spars, as they could eventually wear off the anodizing.

The spars should have a coat of wax put on them before use (a good automotive wax will do). This will help protect the spar from weather, abrasion, etc. This coat of wax should be reapplied once a year.

Ideally, the spars should be removed from the boat once a year, so that close examination can be made of all fittings, tangs, sheaves, pins, etc. At this time, the spar should be waxed and all moving parts lubricated. Check carefully for worn parts and replace any worn or defective parts immediately.

3. Running and Standing Rigging

Your running rigging is made of low-stretch dacron line. The sheets, reef lines, and furling lines are also dacron. All this running rigging should be thoroughly inspected for chafe at least twice a year. This inspection is especially important on a jib halyard that is used for roller furling, as the halyard sits in the same place constantly, while the sail is hoisted.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

O. EXTERIOR MAINTENANCE - Continued

3. Running and Standing Rigging - Continued

All sheets and halyards should be washed once a year, which will prolong their life by removing dirt and salt from the fibers. The sheets and reef line should be coiled tightly and can be washed in a heavy-duty washing machine with mild soap. The halyards can be messengered (tie thin string to one end) and removed from the mast, coiled, and placed in a cloth bag and washed as the sheets.

The standing rigging should be inspected once a month. All swage fittings should be inspected for cracks, and the wires should be checked for broken strands. All cotter pins, clevis pins, and turnbuckles should be checked also. Remember, the standing rigging supports the mast and should be given careful attention.

See your furler's owners manual for maintenance information.

Turnbuckles should be checked to see that they have sufficient threads exposed and that cotter pins are in place and bent over. The cotter pins in the turnbuckles should be taped to prevent snagging. Additionally, the threads should be cleaned and lubricated once a year.

The spreaders should be checked to be certain that they both have the same angle. The inboard spreader fastenings

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

O. EXTERIOR MAINTENANCE - Continued

3. Running and Standing Rigging - Continued

should be checked and taped. The spreader tip should be securely seized to the shroud with stainless steel seizing wire and well protected with spreader boots.

Occasionally new rigging may develop a thin layer of rust near the swages. This is caused by impurities in the dies that form the wire adhering to the wire after the manufacturing process is completed. This oxidation will stop forming after two or three cleanings with a good stainless polish. One way to prevent rust around the swage fittings and to prolong the life of the swage fittings is to lightly heat up the swage fitting and to place a bar of beeswax on the wire - just above the fitting. As it melts, the beeswax will run into the swage and seal it.

Remember, ANY defect in standing or running rigging is cause for immediate replacement of that part.

4. Winches, Blocks, Tackles, Etc.

Winches should have a teardown and regreasing at least every six months. Follow the manufacturer's instructions, and only use a high-density winch grease. Check all winch bolts for tightness at least once a month. Hose off the winch with fresh water after each sail.

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

O. EXTERIOR MAINTENANCE - Continued

4. Winches, Blocks, Tackles, Etc. - Continued

Blocks and tackles should be rinsed weekly with fresh water and have a light spray with a silicone or teflon lubricant twice a year. Be sure to check bolt tightness on all blocks, especially turning blocks.

5. Lifelines, Stanchions, Bow and Stern Pulpits

Do not neglect the turnbuckles, clevis pins, cotter pins, and pelican hooks on the lifelines - check them weekly.

Be sure the turnbuckles and pelican hooks have enough thread, and that the pelican hooks are secure. Tape or seize the pelican hooks to prevent accidental opening.

The aft lifelines on the CAL 22 are nylon webbing strap, to provide comfort. The straps are tied to the stern pulpit with nylon whipping line, which allows adjustment of tension. This line should be checked frequently for chafe and replaced if it shows any sign of chafe. Also, the straps should be inspected frequently and replaced immediately, if any wear, cuts, tears, etc., occur.

It is not recommended that one hang fenders from the lifelines. A roll under a dock could put a severe enough strain on the fender to bend the stanchion.

Clean the stanchions and pulpits with soap and water periodically, and polish with a good stainless polish.

Occasionally, stainless hardware will show some rusting.

(See Section O 3.) A couple of polishings should eliminate

CONSTRUCTION DETAILS AND OPERATING INFORMATION - Continued

O. EXTERIOR MAINTENANCE - Continued

5. Lifelines, Stanchions, Bow and Stern Pulpits - Continued
all problems. Never use steel wool on stainless, as it will leave small pieces of steel, which may cause rusting.

Clean the lifeline with a good soap and water solution to maintain a white look. Be sure to tape any cotter pins at the bow end of the lifelines to prevent tearing of sails.

Check all pulpits and stanchions for security. Tighten bolts as necessary for security and to prevent leaks.

P. PERIODIC MAINTENANCE

The following list of items and their accompanying numbers is in no way intended to be all that should be done to your sailboat. This is only a suggested general list and is not intended to override the individual manufacturer's manual. It also is not arranged in any special order. The numbers are in numerical order and not in priority order. Some numbers and their meanings may also seem redundant and some have been mentioned previously, but we feel it is better to be redundant than lax.

ALWAYS FOLLOW THE OWNER'S MANUAL THAT COMES WITH THE ENGINES, HEADS, ETC.

PERIODIC MAINTENANCE

	End of First Week	Monthly	Winterizing	Remarks
Deck Fittings	2,5		1,4,5	
Rudder Blade		1	1	
Propeller		1	1, 4, 5	
Bilges	1	1	4,7	
Cockpit Drain Hoses	2	2,5	2,4,5,7	7 Some cockpit hoses have low points that hold water
Pumps	1	1,2,5	1,4,5,7,8	
Water Tanks	2	2	1,4,7	
Piping, Fresh Water	2	2	1,4,7	
Lighting			1,3,4	3=WD-40 or CRC
Battery	1	1,4	1,4,8	4=Clean with baking soda and water solution
Fuel Filter	1,5	1,5	1,5	Check engine owner's manual for further info.
Air Filter	1	1,5	1,5	" " " "
Engine Clamps	1,5	1,4,5	1,3,4,5	
Mast, Boom	1,3	1,3,4,5	1,3,4,5,6	
Standing Rigging	1,5	1,4	1,3,4,5,6	
Running Rigging	1	1,3,4	1,3,4,5,6	
Winches	1,5	1,3,4,5	1,3,4,5	
Hose Clamps	5	1,5	1,3,4,5	Do not overtighten

1. Check conditon
2. Check watertightness
3. Lubricate
4. Clean with fresh water

5. Check tightness
6. Grease
7. Drain and/or anti-freeze
8. Disconnect

PERIODIC MAINTENANCE - Continued

	End of First Week	Monthly	Winterizing	Remarks
Chainplates and Rods	1,2,5	1,2,4,5	1,2,4,5	Rebed at least twice a year
Tiller Strap, if applicable	1,3,5	1,3,4,5	1,3,4,5	
Bilges	Check daily - more often, if the boat is leaking			
Stoves, Alcohol	1,5	1,5	1,4,5	

1. Check condition
2. Check watertightness
3. Lubricate
4. Clean with fresh water

5. Check tightness
6. Grease
7. Drain and/or anti-freeze
8. Disconnect

FOSS FOAM, INC. // POLYURETHANE FOAM

YOUR FOSS FIBERGLASS & URETHANE RUDDER

The Foss Company has been producing sailboat rudders for over 20 years for most major boat companies. The fiberglass blade with its rigid urethane core makes an extremely strong, dependable rudder.

The near neutral buoyancy of your rudder helps the performance of your boat by reducing total weight, as well as reducing the moment of inertia in the stern. Near neutral buoyancy also is helpful, should the rudder ever need to be removed for steering system repairs. The boat does not need to be hauled out of the water to remove the rudder.

Tough fiberglass and urethane plastic used in the construction of your rudder is nearly indestructable. The urethane core is composed of a strong rigid closed cell urethane. Water, diesel solvents, or marine borers will not damage your rudder blade.

When you paint your rudder the first time, particular attention should be paid to the paint manufacturer's instructions for preparing the surface. Solvent washing is not enough. The rudder must be sanded heavily to remove a heavy coating of mold release. We recommend white paints be used. White is a popular color, as it is easy to see weeds and other debris which can catch on your rudder.

Surface repairs may be performed by cleaning, drying, and roughing up the damaged area and applying bondo or any similar filler with a putty knife. Should a small blister appear, it may be filled with resin or cut away and repaired. Once the patch has dried, it may be sanded smooth and painted directly with bottom paint or any coating you desire.

We do not recommend the use of dark colors on your rudder, as they generate heat when the boat is out of the water in the sun. Since the rudder is made of cellular material, this heat can cause dimensional changes and cosmetic damage. If the rudder is painted with a dark color, it should be shielded from the sun with a white wrapping when the boat is out of the water. The rudder warranty excludes damage caused by heat.

You should make periodic inspections of your rudder and look for possible damage from grounding or electrolysis.

REPRINTED FROM FOSS FOAM BULLETIN

Foss Foam, Inc.
4480 - 126th Ave. N.
Clearwater, FL 33520

RIGGING DIMENSIONS

The following table shows the critical dimensions and materials used for the standing and running rigging on your Cal yacht.

In the event you should need to replace any of the rigging, you can order the materials through your Cal dealer. If this is not convenient, this table will allow you or a local rigger to obtain the proper materials.

The standing rigging measurements are the overall length of the stay, from the center of the hole in the upper terminal to the end of the swaged stud. If using a different turnbuckle than supplied by Lear Siegler Marine, be sure to allow for possible length difference. We would strongly recommend actually measuring any standing rigging before replacing, to assure 100% accuracy.

All running rigging should be checked periodically for chafe or damage and replaced, when necessary. If excessive wear is noted on running rigging, check all blocks and sheaves to be sure they are free to rotate and are properly aligned.

All standing rigging should be inspected for cracks in the swages, proper installation or cotter pins, and wear on clevis pins.

Replace any damaged or suspect rigging.

As you may have noticed on some sailboats, the swaged ends of the shrouds will ooze rust, and in severe cases, the swage will split. One way to prevent this problem is to heat up the swaged section and place a bar of beeswax against the 1 x 19 stainless steel wire. As it melts, the beeswax will run into the swaged section, sealing it from the elements.

CAL 22

RUNNING RIGGING SPECIFICATIONS

Title	Size	Type	Length	A End	B End	Extra Info
Main Halyard	5/16"	XLS Blue Fleck	66'	93-42	Burn	One
Main Sheet	3/8"	XLS Blue Fleck	48'	Eye	Burn	One
Down Haul	1/4"	XLS	4'	Burn	Burn	One
Reef	3/8"	XLS Red Fleck	36'	Burn	Burn	One
Jib Sheet	3/8"	XLS Green Fleck	56'	WHIP	WHIP	One

CAL 22

STANDING RIGGING SPECIFICATIONS

Title	Qty.	Size/Const.	PCL	A End	B End	Extra
Head Stay	1	1/8 1 x 19	25' 4 3/8"	104-4	5850-1032	
Back Stay	1	1/8 1 x 19	25' 11 1/2"	104-4	5850-1032	Boom hanger at stud on B end
Back Stay Bridle	2	1/8 1 x 19	6' 0"			
Upper	2	1/8 1 x 19	24' 4 1/4"	AN667-4	5850-1032	
Lower	2	1/8 1 x 19	12' 8 3/4"	AN667-4	5850-1032	
Boom Hanger	1	1/8 7 x 7	16 1/4"	Bare	FIG 0 Snap	Length includes snap

NOTE: Shroud measurements are from senter of pin to end of stud.

SP JPF DATE 3/20/85

SUBJECT BOOM VANG CAL 22

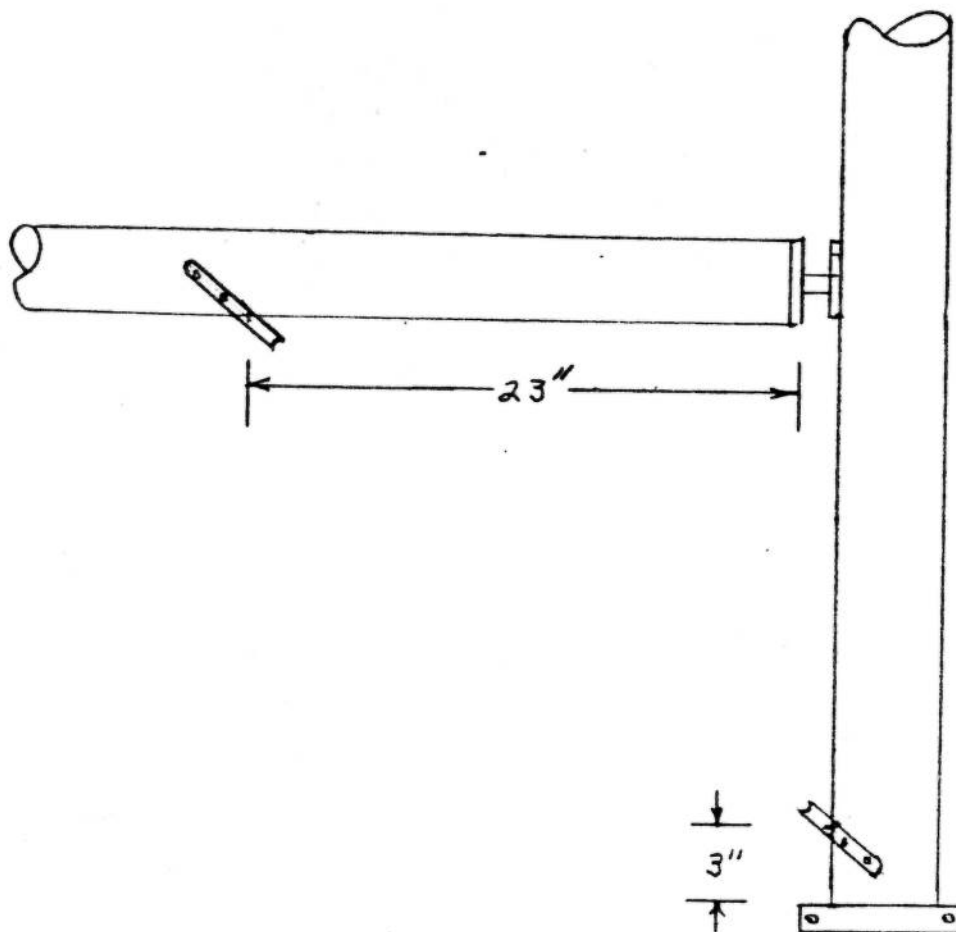
SHEET NO. 1 OF 1

CHG. NO. DATE

JOB NO.

PARTS:

- 1 ea. 35388 Vang w/blocks & line
- 2 ea. 35346 Boom bail
- 8 ea 60964 Screw, #10x $\frac{1}{2}$ " PHST S/S



INSTALLATION:

1. Place bails as shown. Make sure that bails will be in line with the pull from the vang.
2. Drill holes in mast & boom using a 9/64" drill bit. Attach with #10 screws provided.
3. Attach vang to bails. The self cleating block is normally attached to mast.

