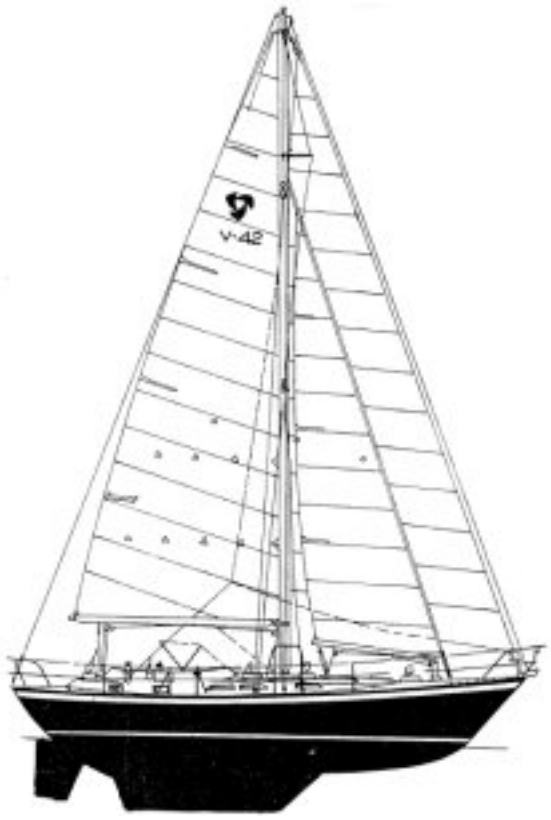
OPERATIONS AND MAINTENANCE MANUAL

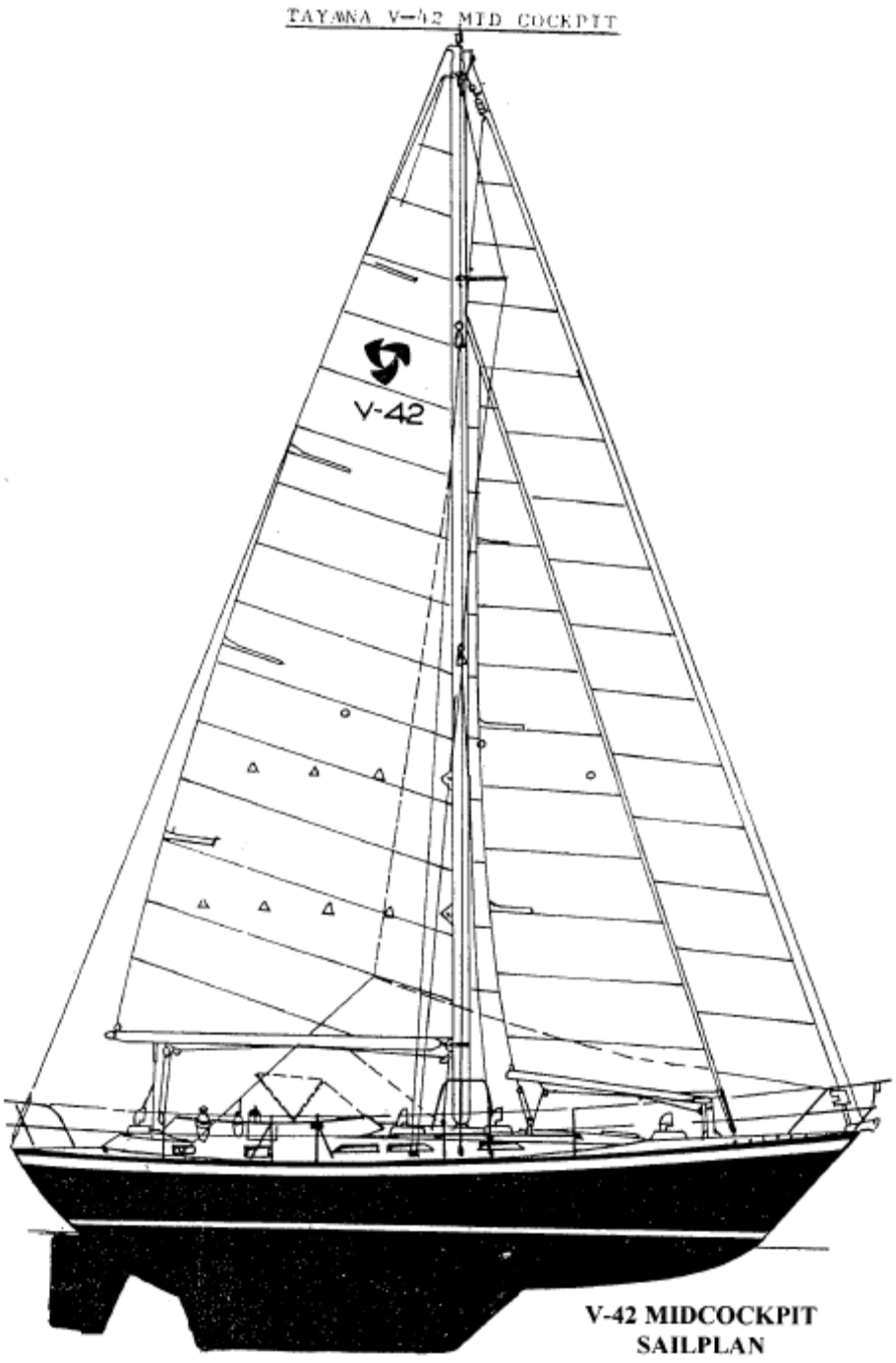
TAYANA VANCOUVER 42



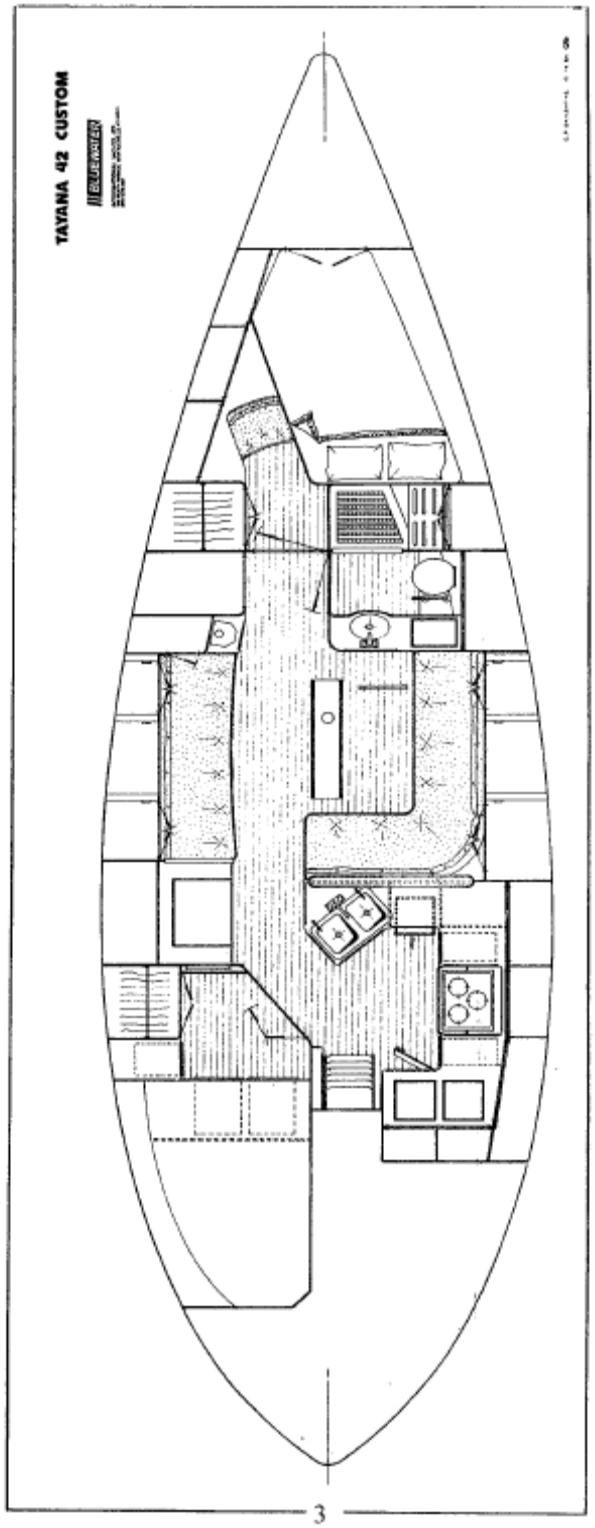
TAYANA

OWNERS GROUP

Tayana V-42 Center Cockpit Sailplan



Tayana V-42 Aft Cockpit Interior Layout



V-42 AFT COCKPIT
TYPICAL INTERIOR LAYOUT

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CHAPTER I: INTRODUCTION

Congratulations on your selection of a Tayana Vancouver 42 cruising yacht. There is no better yacht in her size on the market. With care and proper maintenance she will not only prove to be an excellent investment, but she will take you cruising anywhere in the world safely and comfortably. This is being proven daily as owners take their V-42s the world over. Ocean crossings by V-42s are routine. Circumnavigations have been reported. By the same token, over a hundred of these yachts are the primary homes of their owners.

The object of this Owners Manual/Operations and Maintenance Manual is to guide you in providing proper care and maintenance to your yacht, and thereby, help you know your yacht better. Really, it isn't hard, and it can be fun! Your V-42 has been designed and built with maintenance in mind. Machinery, pumps, glands, seacocks, etc., have been installed to ensure full and easy access. Where simplicity and adequate function do not conflict, the simpler equipment and its placement has been chosen. In a few cases, custom interiors have complicated some equipment installations, but you will find that adequate access and straight-forward installations have alleviated the potential for problems.

In the various sections which follow, you will find discussions of materials and construction, hull maintenance, rigging and sails, machinery, electrical systems, and plumbing. Remember however, that it is a Tayana Vancouver 42 manual, it is not a general maintenance manual. It is not designed to replace the manufacturers equipment manuals provided with your equipment. In fact, should you find that there is a conflict between this manual and your manufacturer's instruction book, the latter should take precedence.

This manual should serve as a centerpiece for your operation and maintenance documentation. It might be more serviceable when you place it in a three ring binder together with other manuals and operational data such as pertinent radio frequencies, contact information for various maintenance facilities, and other data on your specific boat.

For those who have purchased an older boat and find some of the information lacking, there are many avenues to replace this information. Your boat may have many new installations not developed when the boat was built. Again, for these equipments, you must refer to the manuals provided with the equipment.

Also, remember as you read/use this book that it was developed using a standard V-42 as its model. Therefore, there may be items which are different on your boat from that referenced herein. It would be wise for you to indicate the differences directly in the manual when you receive it. If you have had to develop drawings (electrical or plumbing for example) which you find helpful, please pass them on to TOG for distribution to other owners.

Finally, this manual was developed by TOG members who own V-42s, who maintain them and sail them. It was developed for many owners who felt that they needed a little help in working with their new boat. The final caveat from the Owners Group is that we are not responsible for the content of this manual or for any results that may arise from following the information provided in this manual.

CHAPTER II: SPECIFICATIONS

Four models of the Vancouver yachts were built by Ta Yang: After Cockpit, Trunk Cabin, Center Cockpit and Pilot House. All these were cutter rigged.

A. General Design Specifications

Length overall	41' 9"
Length on deck	40' 2"
Length at waterline	33' 0"
Beam	12' 6"
Draft	5' 10"
Displacement (unloaded)	29,147 lbs.
Ballast	11,800 lbs.
Sail area	

Main - 407 ft.sq. Staysail - 255 ft.sq. Yankee - 493 ft.sq.

Engine options:
- Perkins 4-108
- Yanmar 3QM30
- Yanmar 4JHE

Fuel tankage (standard)	120 gallons in two black iron tanks
Water tankage (standard)	140 gallons in two stainless steel tanks
Vertical clearance	60' 10" Mast height above L.W.L.

B. Serial Numbers

It is a wise idea to place the serial numbers of the boat and its major equipments in this place where it is available for replacement parts or determining equipment warranties.

Hull number _____

Documentation number _____

Engine serial number _____

Hot water heater serial number _____

Stove serial number _____

Battery charger serial number _____

_____

C. Materials

A few words about materials are called for because of the many questions people ask about the quality of the metals, woods and plastics used in Far East built yachts. In the early years of their building, there were some building challenges that had to be overcome. But Ta Yang overcame them as they developed. They have matured to be one of the finest boat builders of the 21st century.

The resins used in the construction of Tayana yachts have evolved as has their technology. These polyesters were purchased in the United States or Japan where the leading resins are developed. Their quality equals or exceeds that of resins used in nearly every U.S. or European yard. Those resins used in post 1985 boats were isophthalic gel to resist blistering and those in 1992 and later used vinylester resin which is in use today (2006) and is purported to be the leading resin for yachts because it is considered to be the most moisture resistant..

Fiberglass is primarily purchased from the U.S., although some are purchased from Japan and Europe. Most glass structures are made from 1.5 ounce mat and 24 ounce woven roving in alternating layers.

Various core materials are used. If cored hulls are ordered, the material is usually Airex™. Kleegecell foam was used in 1982. This plastic material is light and highly resistant to moisture. It is also an effective insulator. The decks of Tayana yachts are generally cored with wood blocks cut into two inch squares and formed into core "mats" to isolate moisture problems, much as Balsa is used. It is heavier than either Balsa or Airex, but it is cheaper than either and tolerates fastenings better. Where there is to be a heavy installation of some type, such as a winch or windlass, the core material is usually a solid plywood sheet covered on both sides by a heavy fiberglass laminate.

1. Teak.

Teak is obtained from several sources. The most common, at this writing, appears to be Burma. The demand for teak is sufficiently high that properly cured teak is virtually impossible to find. It has been reported to us that the teak obtained by TaYang is generally two to three years old when purchased. This teak is then cut into planks and stored in a drying yard for a period of months. It is dried further in a kiln before it is used on a yacht. Optimally, teak would be aged for seven to eight years before use and kilns would not be used.

Curing cracks have occasionally been a problem in yachts with solid teak tables or desk tops. Where this has occurred, the tops have been replaced. On the whole, however, the teak has been surprisingly good, and in applications such as ceiling and decks, it is almost problem-free. (See Section V for proper maintenance care.)

2. Plywood

Plywood is the core material used in interior bulkheads, soles, and tops as well as for certain structural applications. TaYang does use marine plywood. The glues used between the plywood is waterproof. There have been few plywood problems

when owner maintenance has been reasonable.

3. Stainless Steel

Type 304 stainless steel is most common in yachts whether built in the Far East or elsewhere, and that is what TaYang generally uses. Type 316 stainless steel is the best for yacht application but it is considerably more expensive than type 304. There is little difference in strength between them, but type 304 can tend to show corrosion which while generally-harmless, is irritating

4. Bronze

Bronze fittings used on Tayana yachts are made in Taiwan. Tests by an independent laboratory showed that the bronze used is of good marine alloy and grade. The bronze castings are C86800 (55Cu, 37Zn, 3Ni, 2Fe, 3Mn alloy while such items as turnbuckle barrels are C19000 alloy (98-7Cu, 1.1Ni, 0.25P).

5. Iron

TaYang uses black iron in fuel tanks and cast iron ballast. This is important because iron is less susceptible to corrosion than is the steel that is occasionally used by some builders in place of iron. TaYang does paint the iron with a good quality red lead primer to extend the life of the tank.

D. Construction

Your Tayana 42 has been constructed of the finest materials, using the best techniques, and it exceeds the specifications laid down by any of the most accepted standards-setting agencies. The fiberglass schedule for the hull is shown in Figure II-1. Layup is done in a single mold by hand using polyester resin.

The large female mold is separated longitudinally for cleaning and mold preparation. The gelcoat is sprayed in and the first glass layer is laid up. The mold is then joined and all the remaining layups are done in the assembled mold. While the hull is still in the mold, bulkheads are installed and the hull is allowed to cure. The deck is laid up in much the same way except that a core of wood is used in those deck areas which will generally be required to support loads such as decks and cabin top.

Ballast is made of a single casting of cast iron. The ballast casting is lowered into the keel cavity and is fully encapsulated to become part of the hull. The deck and hull are joined by one of the strongest methods in the industry. A diagram of the deck to hull joint is shown in Figure II-2. Assembling the hull and deck is one of the most critical operations in the yacht's construction. The

Figure-II-1: Fiberglass Layout Schedule

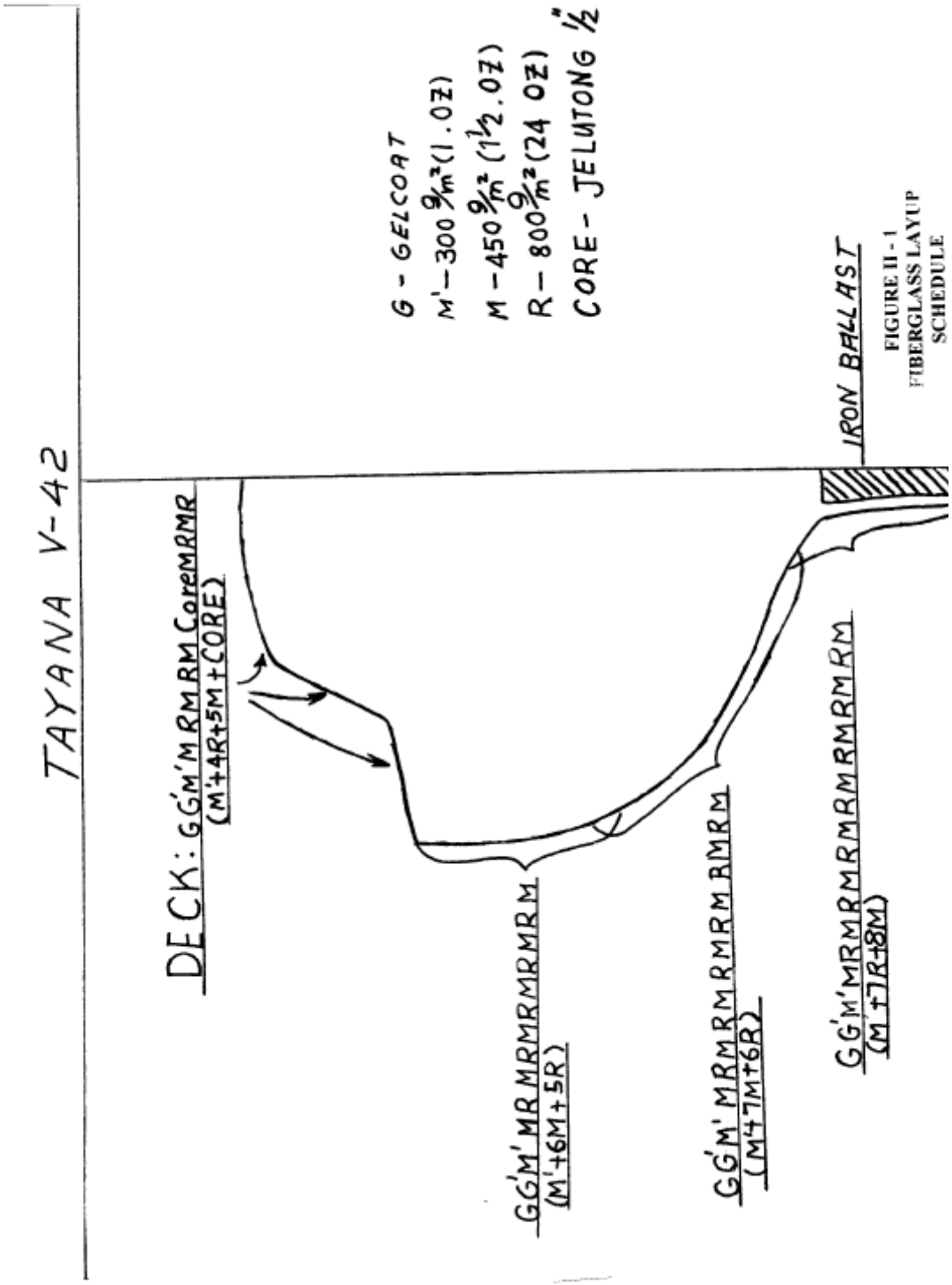
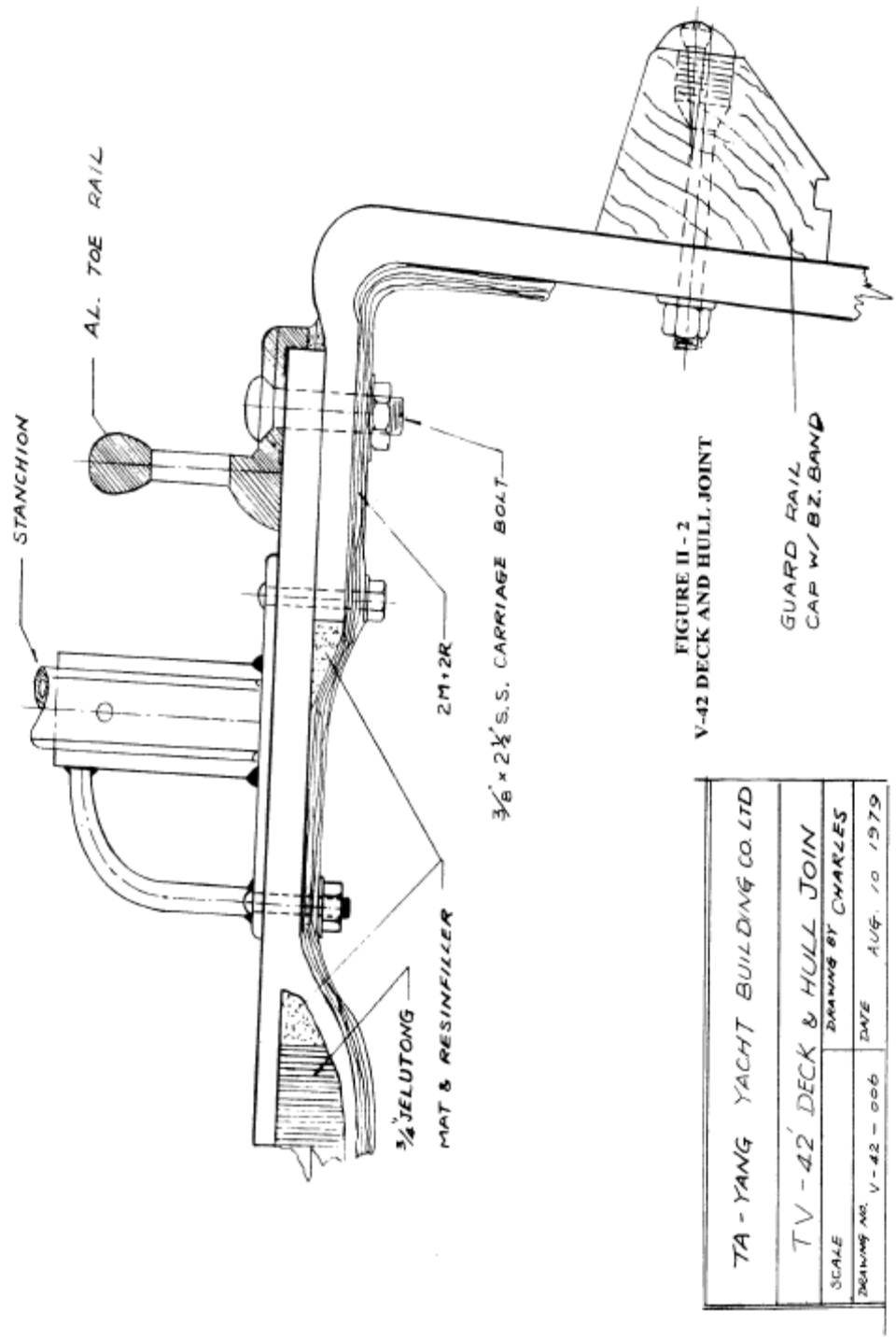


Figure II-2: V-42 Deck and Hull Joint



deck is lifted by a crane above the hull. The joint is prepared with 5200 epoxy compound and the deck is then set onto the hull. The joint is then bolted together using stainless steel-bolts on varying centers depending on the curve of the hull at the various points. Once the joining has been accomplished, the joint is fiberglassed as shown in the figure. The result is a single piece, extremely strong hull with a rigidly curved hollow beam in the form of a bulwark running nearly the entire length of the yacht.

Once these critical operations have been finished to the satisfaction of the company engineers, exterior trim is installed and the work on the accommodations is undertaken. A team of the world's finest boat carpenters and finishers takes over the yacht and frames in the interior cabinets and bunks, as shown on the plans. This work is done with extreme care and attention to detail. Framing is actually glassed into the hull and becomes an integral part of it. As a result, the quality and livability of the accommodations is largely a function of how well the framers do their job. Cabinets, doors, drawers, and the like are done by cabinet makers in a specialty shop to the order of the production foremen. TaYang engineers closely supervise every step to insure that dimensions are met and proper installation is made. The result is a yacht whose strength and beauty are second to none and whose accommodations precisely fit the needs of its new owner.

The aluminum spars supplied are ordered from overseas suppliers- Taiwan has no extrusion capability at this writing. Generally, the suppliers have been ISOMAT of France and YACHT SPAR out of New Zealand. ISOMAT masts are received already anodized and are not necessarily painted. YACHT SPARS are painted at the yard and the color can be selected by the buyer. TaYang uses a primer and polyurethane for this. Aluminum spars are also being imported from Japan. These are painted by the spar manufacturer.

Standing rigging is assembled at the yard using Japanese stainless steel cable and Taiwanese-made turnbuckles and swage end fittings. A crew at the factory sets up the spars and all of the rigging is fitted to each yacht. This is an important factor in cutting down the number of modifications which might have to be done in the U.S. Similarly, pulpit, lifelines, stanchions, and bowsprit are all installed to insure proper fit. The stanchions and pulpits are among the industry’s best.

The final step is packing the yacht for shipment. Spars, rigging, and any projecting assemblies are all disassembled and packed either in the hull, or, in the case of the masts, into special boxes. On the shipping date, the yacht is loaded onto a lowboy and taken to the huge port city of Kaohsiung where it is loaded aboard one of the many container carriers which operate between Taiwan and the United States.

E. Procedures for Documentation

Documentation must be accomplished with the United States Coast Guard in the United States or with the governing agency in the country where your vessel is to be registered. We suggest you contact the Documentation office nearest you for full details, forms, instructions, duties and customs

fees, call the Coast Guard at 1-800-799-8362 or visit their internet site at www.uscg.gov .

The following notes and references are made for your information and convenience. They should in no way be construed as complete and detailed instructions:

USCG Documentation Procedures

Pleasure Class: Under 20 tons requires a Yacht License. Twenty tons and over requires a certificate of Enrollment and a Yacht License.

Application for Admeasurement requires a Builder's Certificate issued by the builder on the prescribed Coast Guard form. This certificate will be retained by the Coast Guard with certified copies available to the owner.

Admeasurement The admeasurer uses data in the Builder's Certificate (BC) to compute net tonnage.
Gross Tonnage = 1/2 (LBD/100)
Net Tonnage = 0.9 (Gross Tonnage)
where: L = Length, B = Breadth, and D = Depth

Official Number - After admeasurement, your certificate of tonnage, application is made for an official number. Title and mortgage papers are required.

Additional Forms which may be needed include:
Applications for number
Declaration of Ownership and/or Extent of interest
Identification of Owner's or Existing Mortgages
Declaration of No Foreign Interest involved
Declaration of Master of Vessel
Declaration No freight or Commercial Passengers to be Carried on Board.
Designated Home Port-Licensing Office.
Designated Hailing Port-Berth Marking Certificate

CHAPTER III:
COMMISSIONING AND DECOMMISSIONING

A. Initial Commissioning

The initial commissioning of your yacht is essentially the owner's responsibility. However, the dealer may provide you with this service or recommend a yard which is competent in commissioning Tayana yachts. The initial commissioning is extremely important. In addition to putting the yacht into service, the following functions are also served: shipping damage is revealed. The trucking company is liable for shipping damage, however, they require prompt notification of any claims against them; part shortages are revealed, Tayana boxes the loose gear and provides a packing list, but occasionally errors are made; and quality defects are revealed. Any damage at the destination should be listed on the order receipt or bill of lading. Your yacht is thoroughly checked at the plant. The quality program for each yacht includes a water drench test, functional testing of all systems, and visual checks of the entire yacht. However, overseas and overland travel often causes leaks and other problems which are difficult to detect by visual inspections alone. Engine delivery check-out service is performed at the factory. However, the engine and the alignment of the power transmission system should be re-checked after the yacht is launched.

The following functions should be performed during the initial commissioning. Detailed procedures are described in their respective sections of this manual, and should be reviewed before initiating commissioning.

1. Inspect hull, deck, rudder, propeller and shaft and spar for shipping damage.

2. Inventory all loose gear and report shortages or damaged parts.

3. Your yacht may have been partially winterized for winter shipment. Drain plugs will be found in a bag in one of the lockers. Replace all drain plugs.

4. Install through-hull fittings for owner and/or dealer supplied equipment.

5. Prepare and paint bottom. All residues resulting from lay up and construction of hull must be removed using a wax remover to ensure barrier and/or anti-foulant will adhere. For maximum anti-fouling life, a full second coat of bottom paint is recommended.

6. Check continuity of zincs on shaft and keel. Continuity with all underwater fittings should also be checked with a VOM meter.

7. Check, tighten hose clamps on all underwater fittings, and make sure they=re all double clamped.

8. Remove compass, or binnacle plate and tighten all bolts on shift and throttle linkages.

9. Launch and inspect all underwater fittings for leaks.

10. Fill fuel, water, and propane tanks and search for leaks. Ensure that there are no leaks in propane tank storage compartment. Adding water to compartment and looking for leaks may be necessary.

11. Install pulpits, stanchions, lifeline lines, safety lifeline ends and gates.

12. Install standing and running rigging on mast.

13. Install antennas and other electronics on masthead. Check mast wiring and lights.
14. Step mast, set up and adjust rig, pin and tape all turnbuckles, check halyards.

15. Reeve sheets, bend on and hoist sails, furl sails.

16. Align engine to .002" max. clearance.

17. Check oil and water level in engine.

18. Complete installation of owner or dealer supplied equipment.

19. Check battery condition and recharge if necessary.

20. Check engine operation.

Note: Carefully read your engine manual before operating your engine. Do not let the engine idle for an extended period during break-in period.

21. Check operation of all systems and equipment.

22. Check all doors and drawers for proper movement and secure latching.

23. Water test decks, fittings, and ports and search for leaks.

24. Sea trial under power and sail.

25. Re-check for leaks in interior plumbing systems (fuel, water, and waste) and exterior hardware.

26. Clean interior and exterior of yacht thoroughly.

B. Receiving and Commissioning Check List

The next few pages provide you with a checklist to inspect and commission Tayana yachts. Completing this checklist will provide you with a "condition report" of the boat before and after initial commissioning.

Receiving and commissioning check list
(For owner's records)

Comments:

Names of company and individuals involved in commissioning:

Sea trials conducted by:

Compass swung by:

Engine start-up by:

Electronics checked by:

Delivery Inspection

	YES	NO	CORRECTED
Boat properly cradled			
Spars properly cradled			
Free of sideswipe damage			
Companionway seals unbroken			
Absence of exterior hardware theft			
Loose gear inventory complete			
Propeller secured properly			
Rudder moves freely			
Prop shaft turns freely			
All below waterline fastenings are tight			
All plumbing thru-hulls connected and securely fastened			
All thru-hull valves cycled and shut			

Launching Inspection

	YES	NO	CORRECTED
Boat properly slung during launch			
No damage during launch			
Thru-hull fittings leak-free			
Rudder bearing leak-free			
Shaft packing nuts adjust to 1 drop/30 seconds with engine off but newer dripless packing do not drip.			
Thru-hull valves, connecting hoses and plumbing leak-free with valves open			

Engine Installation

	YES	NO	CORRECTED
All mounting bolts tight			
Engine aligned to .002 max. clearance			
Coupling bolts tight			
Shaft set screw tight and secured with safety wire			
Crankcase oil level full			
Transmission gear box oil level full			
Throttle/shift linkage secure			
Engine stop connection secure			
Drain plugs installed and petcocks closed			

Lifelines, Pulpits and Stanchions

	YES	NO	CORRECTED
Pulpits and stanchions secure			
Lifelines properly tensioned			
Lifeline end fittings safety-wired			
Gates function properly			
Lifeline wires free of physical damage			

Spars and Standing Rigging (Pre-stepped)

	YES	NO	CORRECTED
Mast free of physical damage			
Rigging free of physical damage			
Mast wiring and lights functional			
Masthead pins secured			
Spreaders fit and properly secured			
Standing rigging, topping lift properly fastened to spar and			

pinned, and all fasteners tight			
Halyards installed			

Spars and Rigging (After-stepped)

	YES	NO	CORRECTED
Standing rigging adjusted			
Turnbuckles pinned and taped			
Roller furling systems properly assembled			
Spreader angle corrected			
Mast rake correct			
Winches run free			
Sails fit and furl freely			
Sheets installed and functional			
Halyards function properly			
Mast boot installed (if required)			
Mast lights operational			

Steering Inspection

	YES	NO	CORRECTED
Wheel rotates easily and uniformly, and steering cables properly tensioned			
Compass swung			
No unusual pump noise. (if hydraulic)			
Connections at rudder post tight			

Fresh Water System

	YES	NO	CORRECTED
Cold water runs freely from all faucets			
Hot water runs freely from all faucets			

Hand/foot pump operational			
Shower operates properly			
Electric pump shuts off, w/faucets closed			
Plumbing system free of leaks			

Marine Toilet and Waste Lines

	YES	NO	CORRECTED
Marine toilet operates properly			
Marine toilet free of leaks			
Sinks drain properly and no leaks			
Shower drains properly and no leaks			
Ice box drain functions properly			
Cockpit drains function properly			

Bilge Pump

	YES	NO	CORRECTED
Electric bilge pump operates in manual setting			
Electric bilge pump operates in automatic setting (if installed)			
Manual bilge pump operates properly			

Other Systems & Equipment

	YES	NO	CORRECTED
Stove operates properly			
Engine room blower operates properly			
All dealer or owner installed electronics operate properly			
Emergency tiller operates properly			
All deck mounted winches operate properly			

Anchor rollers rotate smoothly and shaft properly secured			
All deck blocks rotate smoothly			
All port lights and hatches operate correctly; port screens present			

Check Joiner Work

	YES	NO	CORRECTED
All drawers pull smoothly and latch in closed position			
All drawers open smoothly and latch in closed position			
Sole drop-ins fit properly			
Berth access panels fit properly			

Water Test Deck

	YES	NO	CORRECTED
All fasteners tight			
Port lights free of leaks			
Port light drains function properly			
Hatches free of leaks			
Toe rail free of leaks			
Other deck hardware free of leaks			
Cockpit drains operate properly			

Coast Guard Required Safety Gear

	YES	NO	CORRECTED
Life jackets (PFDs)--number, size & type required			
Fire extinguishers--number required and mounted			
Visual distress signals (VDS)--three day/night			
Sound producing devices--horn and bell (7.9")			
Oil pollution placard			

Garbage placard/Waste Management Plan			
Marine sanitation device (MSD) (type I, II or III)			
Copy of Navigation Rules			

Registration/documentation

	YES	NO	CORRECTED
State registration certificate on board			
State numbers affixed properly			
And/Or Certificate of Documentation on board			
Vessel name and hailing port 4" in height			
Documentation number permanently fixed on interior			

Sea Trials

	YES	NO	CORRECTED
Engine, engine controls, engine instruments, and drive train operate properly			
Steering system operates properly			
All sail handling gear operates properly			
All sails OK			
No excessive weather or lee helm			
Mast tuned under sail			
Compass swung			
All electronics operate properly			

Notes on Weather and Sea Conditions:

C. Owner Commissioning

Whether you are receiving your Tayana Vancouver 42 new, or purchasing a previously owned yacht, the following discussions regarding commissioning are pertinent to becoming acquainted with the boat. There are a couple of very significant advantages that accrue to the owner who commissions his/her own yacht:

1. A significant monetary savings may result if the owner assembles the yacht and makes it ready for sailing, depending on his skill and experience.

2. The owner will learn the yacht from top to bottom and will benefit greatly from the confidence and practical knowledge that can be used to solve problems in the future.

In addition, there will be increased pride of ownership and a greater tendency to stay on top of necessary care and maintenance which will pay great dividends over the long run.

As you can imagine, there are a few disadvantages:

It does require some experience and a level of skill that is above that of the average homeowner who does some of his own home maintenance. Commissioning is not merely an assembly job. It requires time, probably more than if a commercial yard does the work. Also, one must find a yard that allows owners to work on their own yachts. This is not always easy. Some yards will allow one to do certain things while demanding that certain work and materials be supplied by the yard. This not unreasonable requirement can obviate quickly many of the savings which one might have expected by doing their own commissioning. The commissioning list shown here outlines what is required to commission yachts. You will note that it does not include the installation of such extras as instruments, radios, refrigeration, air conditioning, and similar extras that are normally purchased separately. The list only includes those operations that are required to make the basic yacht ready to sail.

Tools required are generally pretty basic. A good carpenter's tool chest of hand tools (hammer, pliers, rulers, screw drivers, etc.), adjustable wrenches between 1/4" and 1-1/4", a set of box and open end wrenches between 10 and 22 millimeters, an electrical tool box including wire strippers and solder less connectors and terminals, a mechanic's tool box including a feeler gauge, channel locks, and a set of socket wrench's sized above, and a selection of stainless steel fasteners. Also very useful are a portable workbench like the workmate, a 3/8" variable speed electric drill, hole saws, soldering iron with plastic cutter, materials for splicing and whipping line, and a plastic covered notebook.

Most of the items on the commissioning list are pretty self-explanatory. Nevertheless, it would be useful to comment on certain items that seem to be most difficult for people who have never commissioned a yacht before:

General. It is important to check the inventory very carefully. Look in every nook and cranny. The factory is usually very careful and packs all that is supposed to come with the yacht. However, the

workmen who do the packing are skilled at putting things where nobody would think to look. Parts have been discovered several months after the yacht was delivered, and the owners thought they knew every locker in it.

Rigging. You may find that some sail cutting may be necessary as indicated in the list. You will be expected to make arrangements for and pay for such things as adapting the sails to roller furling, and purchase the running rigging.

Electrical System. Make sure that the bonding wires with green insulation are connected to all metal parts such as chainplates, through-hulls, and tanks. Also, be sure to put a zinc on the shaft as this is not done at the factory. A 1 1/4" shaft zinc is required and the width may have to be cut down about 1/8" to fit on the exposed portion of shaft.

Plumbing System. The most critical item is the installation of a propane system if this is part of commissioning on your particular yacht. This system must be done correctly to insure safety. If you are unsure, it would be best to hire professional help.

Machinery System. Most people have never aligned an engine and this is apt to be the most difficult problem. Here again, if one cannot do the alignment with confidence, professional help should be obtained. The yacht's power train will not be warranted if it is found that a failure was due to misalignment.

Miscellaneous Checks and Installations. The most common question is what constitutes minor damage and blemishes. A general rule that is loosely applied is that if the damage were too small to be economically reported to an insurance company it would be repaired as part of the commissioning at no extra cost. Commissioners build this potential extra work into their estimates for commissioning. Some examples of work which would be expected of the commissioning crews (and the owner/commissioner) would be repair of gelcoat scratches, small (say a few inches) gelcoat chips, teak damage which might require minor scarfing, varnish scratches which require revarnishing of say 10 square feet, refinishing minor-scrapes and blemishes on a spar finish. Things that would be beyond commissioning and should be covered by the dealer would include structural damage, major dents in spars, blemishes that require a major refinishing job such as repainting the deck. Note that these are examples only- each situation would have to be dealt with in a case by case basis.

Sea Trials. A sea trial should be done with dealer personnel aboard. The commissioning job will be inspected, all systems will be tested, and if the work is deemed satisfactory the warranty coverage will be undertaken. If some item(s) are not done properly, the warranty will not apply until satisfactory adjustments are made.

D. Decommissioning for Storage (Winterizing)

Winterizing consists of removing gear and equipment that may be damaged, removing liquids that may freeze, thorough cleaning of the yacht, and protecting the yacht from the elements. Procedures for winterizing are described below:

1. Drain fresh water system

a. Open faucets and run pump until water flow stops.

b. Disconnect hoses at pump and use air pressure to blow out water in low spots.

c. Remove drain plug on bottom fitting of water heater.

d. Pump hand pump until water flow stops.

e. Leave all faucet valves in open position.

NOTE: Non-toxic anti-freeze for fresh water systems is available from many marine supply stores. This is recommended, since it will protect the system from any accumulations of water that were missed in the draining operations. Disconnect hot water heater in and out hoses and install a length of hose between the two ends. Disconnect hose on top of water tank that goes to pump. Make up an extension hose and put end in non-toxic anti-freeze container. Pump anti-freeze through hot and cold water systems.

2. Head and holding tanks

a. Winterize head by following the procedure given in the manufacturer's manual. Empty holding tank and rinse with fresh water and pump out again.

3. Thru-hulls

a. For in-water storage, all thru-hull valves, except cockpit scupper valves, should be closed. Put anti-freeze in cockpit scupper hoses so they don't freeze.

b. For out-of-water storage, leave valves open.

4. Engine

Follow the procedures outlined in your engine operating manual. Generally, these will include:

a. Engine coolant. Two acceptable methods of winterizing the engine cooling system are:

(1) Complete drainage which involves closing thru hulls, removing all drain plugs

on the engine and muffler, and opening drain petcocks per manufacturer's instruction. Store with expansion tank cap off and salt water pump cover loose.

(2) Anti-freeze method which includes system to be drained as per instructions above. Close petcocks and replace drain plugs. Disconnect intake side of raw water pump hose and feed it into a bucket of premixed anti-freeze solution. Run engine until anti-freeze is discharged from the exhaust and then shut the engine off. Finally, fill the fresh water cooling system with anti-freeze mixture.

b. Drain and clean engine seawater strainer and leave top loose.

c. Check water separators in fuel system for water accumulation. Drain as needed.

d. Check engine handbook for further "lay-up"- details.

Note: Failure to adhere to the manual can affect your engine warranty.

5. Clean yacht interior

a. Clean and drain bilges.

b. Remove all perishables.

c. Wash out and dry refrigerators and/or ice boxes. Leave lids off and/or doors open. Empty all compartments, drawers.

d Clean hanging lockers and leave compartments open.

e. Clean all interior surfaces.

f. Clean and apply spray lubricant to steering units, engine coupling, hose clamps, rudder packing glands, shaft log packing gland, gate valves, and throttle/shift controls.

6. Remove the following gear:

a. Electronics. Store at home or send out for any professional attention that may be required.

b. Compass.

c. Cushions, seat backs, carpet, curtains, towels, etc. Store in dry area to prevent mildew.

d. Interior light bulbs. Spray sockets and bases with WD-40 or CRC 6-66 to prevent corrosion.

e. Batteries. Store in warm, dry location. Check condition periodically and slow charge as required.

f. Sails. Wash and let dry thoroughly. Store in dry area.

7. Drain shower pan and clean strainer.

8. Wash exterior. Polish, wash, and lubricate metal deck hardware.

9. Clean and preserve spars. Lubricate winches and sheaves. Inspect for any damage.

10. Clean standing rigging and inspect for damage.

11. Review all optional equipment manuals. Follow any winterizing procedures given. Generators, air-conditioning systems, and some refrigeration systems are among those systems which require winterizing.

12. If boat is hauled, clean and inspect bottom thoroughly. Pay particular attention to signs of structural damage to glass, rudder operation, gudgeon weldment and fasteners, electronic senders, thru-hulls, propeller, and zincs.

NOTE: If you are uncertain as to where to place the lifting straps, you may wish to disconnect the prop shaft coupling prior to hauling the yacht, and follow hauling instructions in this manual. Generally most yards are familiar with the location of the lifting straps and the keel cut out, so that they will not try to haul on the prop shaft.

NOTE: It is a good practice to record items that were given attention and any defects found during decommissioning. This list will be valuable to you when recommissioning in the spring.

13. You may wish to use deck covers and/or various devices available to prevent ice formation around a yacht stored in the water. These will provide additional protection to the yacht during the winter months. Consult your local marina for information and sources of this equipment.

E. Recommissioning after Lay-up

Recommissioning after lay-up is somewhat less involved than the initial commissioning. The following steps are suggested:

1. Check notes on decommissioning and make any necessary repairs

2. Check operation of all thru-hulls before launching boat.

3. Apply anti-fouling bottom paint. Add zincs, if required and check continuity.

4. Clean exterior of boat thoroughly.

5. Re-install charged batteries, checking terminals for correct polarity.

6. Launch, step spar (if unstepped), connect rigging, bend on sails. Check all components prior to re-installing them.

7. Reconnect coupling and check engine alignment.

8. If engine was drained, replace all drain plugs, tighten caps, and shut drain cocks. Fill and bleed engine cooling system.

9. Fill fuel tank. Bleed engine fuel system per instructions in engine manual.

10. Replace hot water heater plug and reconnect water line at pump. Flush the fresh water system, then fill the water tanks.

11. Clean and inspect engine and engine room equipment. Check oil levels throughout.

12. Clean interior thoroughly.

13. Check operation of all systems.

14. Install cushions, carpet, electronics, and other loose gear removed during winterizing.

15. Sea trial.

NOTE: The check list provided in Section III-A will be a useful reference for the yacht's condition after recommissioning.

CHAPTER IV:
OPERATING PROCEDURES

A. Sailing the Tayana Vancouver 42

Most people have learned to sail on sloops, and they don't realize that sailing a cutter is somewhat different. Let's look at how one sets the sails on the Tayana 42 cutter. As the sails fill and you are on or near the proper course, set the jib or Yankee so that it fills and is almost, but not quite, on the point of luffing. You will note that the set of the jib affects the flow of air to the staysail. Once the jib has the proper shape and set, set the staysail in essentially the same manner – that is, let it out until it just starts to luff, and then pull it in until it stops. Finally set the mainsail again set it at the point where it just stops luffing. The rules for sail shape apply to your cutter just as they do to a sloop. Generally speaking, the higher the wind the flatter the sails. Shaping your sails for wind conditions and getting the most from your yacht is one of the peculiar pleasures which sailors find in the sport. As the wind rises to about 18 knots, you are likely to get better performance if you take a reef in the main. Your yacht has been set up for jiffy or slab reefing. When you reef, it is best to loose your sheet somewhat to get pressure off the sail (do not simply let it fly), raise the end of the boom with the topping lift, pull the clew reefing line tight until the first reef point at the leech becomes the clew. Then loose the halyard and pull the reef point on the luff down to the reefing hook.

When the wind gets between 22 and 25 knots, you will probably feel the need for a second reef in the main. Remember, if you think you should reef – then reef! A third reef point is a good modification to any cruising main. Note: On many of the Tayana 42 mains, the sail was made too long, and the boom will hit on the gallows when sheeted hard on the wind. This usually needs reduction of the foot. Cut up approximately 4" at the leach, tapering to 0" at the tack. As the wind increases, if you are sailing relatively close to the wind, it is better to remove the staysail first and leave the jib flying; if, on the other hand, you are on a broad reach, it is better to remove the jib and proceed under main and staysail. Remember, you cannot sail a cutter well under mainsail alone. The position of the mast generally prevents good balance and weather helm can make the yacht unmanageable. The Tayana 42 will balance, however, under staysail alone, and the yacht will do very well in 40 knots or so of wind with the staysail alone drawing.

Generally a sail inventory includes a light weather sail such as a three-quarter ounce cruising spinnaker, spanker, or whatever name you prefer for such a sail. This sail will add greatly to your pleasure and boat speed in light winds – say up to 12 knots. At greater wind speeds, working sails do fine. A Genoa is great for close wind work, but it is very bulky and difficult to stow. You will find that the Tayana 42 has an amazing turn of speed under almost any wind conditions. You are going to surprise a lot of people out there when you go sailing by them. You will find that tacking is easy, and there is really no excuse for getting into irons even in light breezes. When you tack allow the yacht to go well through the wind – get her going off the wind and gradually bring her up close. You will find that you will tack through 90 degrees with working sails in breezes of eight knots or more.

B. Tuning the Spars and Rigging

Tuning is probably the most difficult yet perhaps a more enjoyable part of sailing. Remember, just as a car runs badly with a poorly tuned engine, your yacht will never perform to her potential unless you learn to tune her rigging and spars. Forget all of those rules of thumb which say that the mast must be raked so much, the boom should be horizontal, the shrouds should sound a perfect G when snapped with the thumb and forefinger, or any of the dozens of others which are still current. Tuning is correct when the yacht sails up to her full performance and is comfortable and easy to handle. There are no other criteria.

Let us presume that your yacht is commissioned and essentially ready for sailing. The first task is to set up your rigging and mast. Using the forestay and the backstay, take all of the rake out of the mast; it should be vertical. With that accomplished, make sure the mast is not leaning to port or starboard. Use the upper shrouds to correct this, if necessary. Now tighten the upper shrouds and the fore and back stays until looking up the mast sail slot you see the first hint of an '"S" bend. Loosen the upper shrouds until the "S" bend just disappears—there will still be a simple bend. Using the intermediates and lowers, make the mast perfectly straight. The side to side alignment may be accomplished by a halyard to the deck at each side at equal length to the same spot. Check to see that the mastt is perpendicular to the deck. The shrouds and stays then will be properly tensioned and your rigging and spars are now ready for a sail.

NOTE: Most Tayana 42's do not come with intermediate aft shrouds and they are a good addition for offshore work. Another good addition is a hydraulic backstay to reduce sag going to weather. It also gives you the ability to release tension easily off wind or in the slip.

C. Tuning Under Sail

Try to make your first tuning sail in a breeze of ten to twelve knots. Put the yacht hard on the wind with sails sheeted hard in. Look up the mast and see if there are any bends or curves – there shouldn't be. If you see a lateral bend, use the shrouds to straighten the mast. After a few tacks your mast will remain straight. Next put the yacht on a close reach, say 60 degrees from the apparent wind and test your helm for weather helm. You should have either a neutral helm or a very light weather helm. Remember, if you have anything other than a light helm in light to medium weather, helm can get out of hand when the wind really freshens. If you find "excessive" weather helm, rake your mast more forward using the forestay and backstay. When the feel of the helm is satisfactory, your mast is probably at or close to its optimum raked position; you should not worry if the mast rake is actually forward rather than aft. It is important to note that weather helm is essentially a function of the position of the center of effort relative to the position of the center of lateral resistance. While the position of the center of effort can be moved by raking the mast, it is also moved by the set and shape of the sails. As you tune your yacht, you will come to "feel" the differences your adjustments make, and with patience, you will get to know when you have hit that combination of mast position and sail set that makes her perform best. There are several good books on the market that describe tuning in great detail; they are well worth the investment.

Once your yacht has been tuned close to the wind and on a few reaches, you are pretty well finished. You will find that she goes well down wind and should have an acceptable helm on all points of sail. As you gain experience, you will find yourself doing more and more fine tuning. It will pay off in fast passages and bets at the yacht club bar.

NOTE: You may find that when heeling hard to starboard on a port tack, water comes into the aft locker (on some configurations) through the locker drain and into the forward anchor locker through drain, possibly getting the berth wet. The fix is one-way check valves at both locations.

D. Handling Under Power

The Tayana 42 is a fast yacht under power. Given a clean bottom and propeller, reasonable loading and no big seas, the yacht will go over seven knots with its standard Yanmar 4JHE diesel. You will find she has little tendency to "hobby horse" and your engine will take her out of those difficult rough inlets that can actually stop lesser yachts.

Backing under power is a challenge and takes practice. The yacht tends to back to port, and one must take this tendency into account. Foremost, always start backing with the rudder amidships. One way to back, if there is room, is to get some backing way on her, put the transmission into neutral and steer back with the rudder. In closer quarters be prepared to "kick" the stern by putting the yacht into forward, putting the rudder hard to port, and throttling the engine to full speed. You will find that this tends to push the stern to starboard; when you are headed properly again go back into reverse. It is a good idea to take your yacht out around a buoy and practice maneuvering. The buoy gives you a reference to measure what your yacht is doing, and the open water insures that you don't run into anything.

NOTE: A feathering prop is a good addition to your 42. Although expensive, it gives faster sailing speeds while feathered and more stopping power in reverse.

1. Pre-Starting Check-Off

It is advisable to use a pre-start checklist, as even the most experienced skipper can overlook an important detail that may evolve into an unpleasant or costly mishap. The checklist will vary, as each owner may have optional equipment that will require attention at this time. The following items are offered to help you develop your own checklist:

a. Check fuel level.
b. Open fuel shut-off valve.
c. Check engine and transmission oil.
d. Check for signs of fuel or oil leakage.
e. Check engine coolant level.
f. Open seawater intake to engine.
g. Check bilge, shaft log area.
h. Check battery switch ON.
i. Turn on "blower".

2. Starting Procedures
a. Release shaft lock, if so equipped.
b. Set controls in neutral.
c. Advance throttle slightly – approximately 1/4.
d. Turn ignition switch to ON and operate "starter".
***NOTE*:** Some engines are equipped with "pre-heat". Check engine manual for instructions.
e. Operate engine about 1000 rpm. Check immediately for oil pressure reading.
f. Check for water discharge.
g. Check ammeter for "charge" indication.
h. Allow engine to reach normal operating temperature and observe any tendency to continue to rise.
i. A final visual check of the engine room is recommended, as the engine is warming up.
j. Check forward and reverse operation at idle speed before casting off lines.

3. Engine Operation
a. Run engine at speeds as recommended in engine manual. Always reduce engine rpm to "idle" before shifting, and make throttle adjustments gradually.
b. Observe engine instruments periodically.
c. Avoid long periods of maximum rpm, as well as extended "idle" periods. Always run engine long enough to reach normal operating temperature, as short runs cause excess engine deposits and sludge formation in oil.
d. Become familiar with the sound of your engine at its cruising speeds, and note any vibration characteristics. When an abnormal sound or vibration occurs, reduce rpm and make a quick check of instruments and conditions. Have problem checked as soon as possible.
e. Observe ammeter readings periodically; and as battery becomes charged (low charge rate), you may switch over to the alternate or house battery.
CAUTION: Do not turn the battery switch to OFF position while engine is running. To do so may damage voltage regulators and possibly destroy diode rectifier in the alternator. It is advisable to reduce rpm to idle if possible while switching batteries to prevent an unnecessary surge on the system. The alternator should not be charging at maximum for long periods of time. If this occurs, it is advisable to allow a cooling off period at 10-minute intervals, switching to the "charged" battery or operating at lower rpm's.

4. Engine Shut-Down
a. Allow the engine to idle for a few minutes before stopping, and check instruments for proper readings.
b. Push STOP control and hold until engine stops.
c. Turn ignition switch and blower switch OFF.
d. Close fuel valve and seacock if boat is to be left unattended.
e. Visually check engine room and bilges for leakage.
NOTE: Check engine "hours" for maintenance scheduling. Read and use your engine manual. Maintain an engine /maintenance log.

E. Fuel System

Tankage consists of two 60-gallon carbon steel tanks located beneath the cabin sole just aft of the water tanks. On some models, up to 3 tanks may be installed to accommodate design changes in the interior. Valves are located above the port tank to control the fuel supply to the engine. Some center cockpit models have a "U" shaped tank around the mast/compression post. Figure IV - 1 shows a representative fuel supply plumbing diagram. Figure IV - 2 is a plumbing diagram for all fluids, and Figure IV - 3 is a representative tankage diagram.

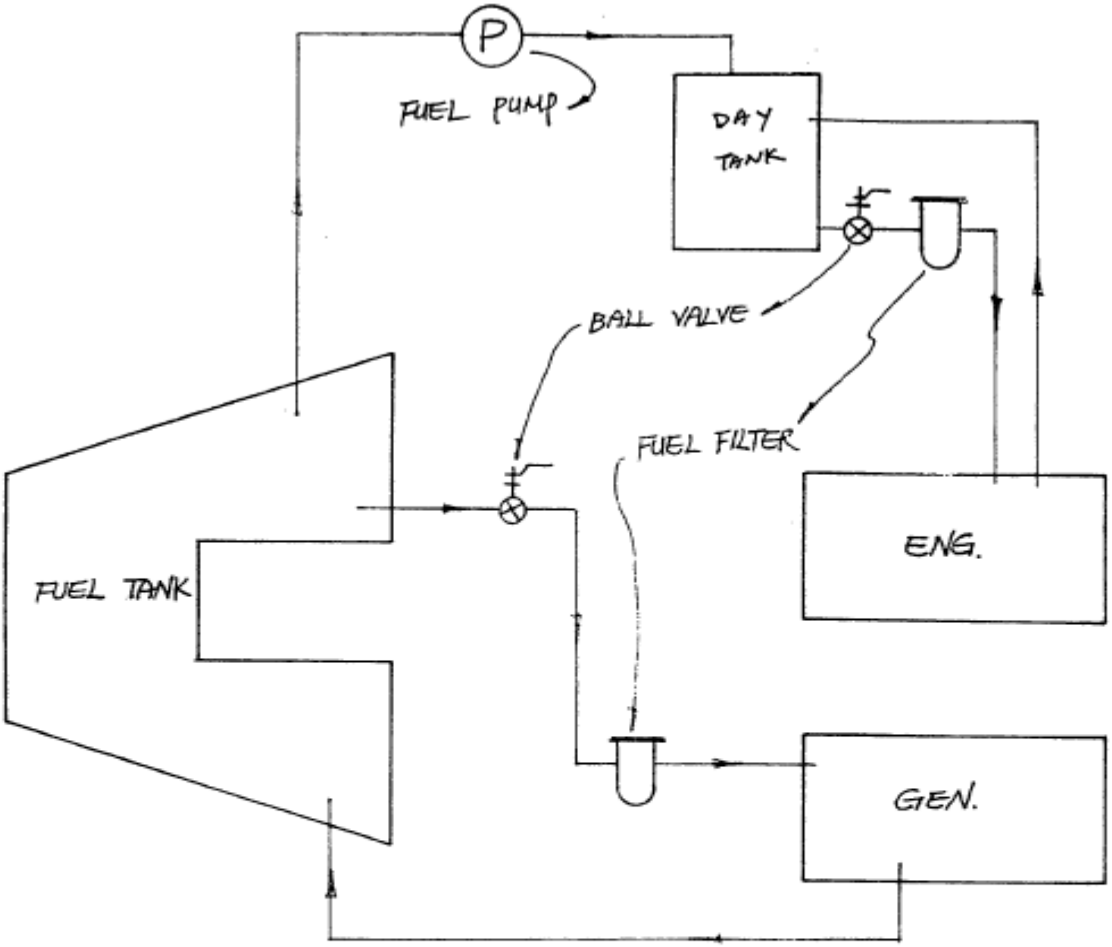
NOTE: Valve handles parallel to the line are ON, and at right angles are OFF.) A primary fuel filter/water separator (such as the Racor 500) should be placed in the fuel line between the tanks and the secondary fuel filter at the engine. Later engines may have this as a standard installation. Installation of a vacuum gauge at the primary filter can be useful to determine when to replace the filter element. Check periodically for water accumulation at this point by removing bottom plug and draining into a container. Replace the element at least once each season, or as required by manufacturer's recommendations. There is also a final fuel filter in the engine itself, and it should be changed at intervals specified in your engine manual.

A biocide (such as Biobor) to prevent the growth of algae should be added to the fuel whenever fuel is added to the tanks. An 8-inch port in the top of each tank provides access for cleaning or repair/replacement of the fuel gauge sending units if installed. A dipstick is also located in each tank, but they are not calibrated. Access to the port dipstick may not be available due to the floorboards in some configurations, but a deck plate can be installed to allow access. The fuel tank and fill deck-plate are electrically bonded to the main ground at the engine. Although diesel fuel is considered relatively safe, safe fueling practices are always recommended:

1. Turn off heaters and galley equipment.
2. Extinguish all cigarettes, pipes, etc.
3. Stop engine and turn battery switch to OFF.
4. Close all hatches and ports to prevent entry of fumes.
5. Do not attempt to take on fuel in rough water or inclement weather, as water might enter through the deck plate.
6. Avoid fueling after dark or in poorly lit areas.
7. Maintain continuous contact between the nozzle and the deck plate fitting to eliminate the possibility of static electric discharge while filling.
8. Take on only gallonage anticipated by the fuel gauge. Do not overfill to point where fuel remains in fill hose.
9. Wipe up or wash down spills after replacing and tightening deck plate cap.
10. Open all hatches, air bilges, and operate blower before starting engine or re-lighting galley stove. Turn batteries ON.
11. See engine manual for "bleeding" procedures.

NOTE: Acquire your fuel from a reliable source. A diesel engine requires clean fuel; water and dirt are the engine's worst enemy. Keep a clean and tight fuel system, and you will have a most reliable engine.

Figure IV-1: Fuel Supply Plumbing



TAYANA-42 NO.185 FUEL SPLY PLUMBING

FIGURE 1V - 1
FUEL SUPPLY PLUMBING DIAGRAM

Figure IV-2: Fluid Plumbing System

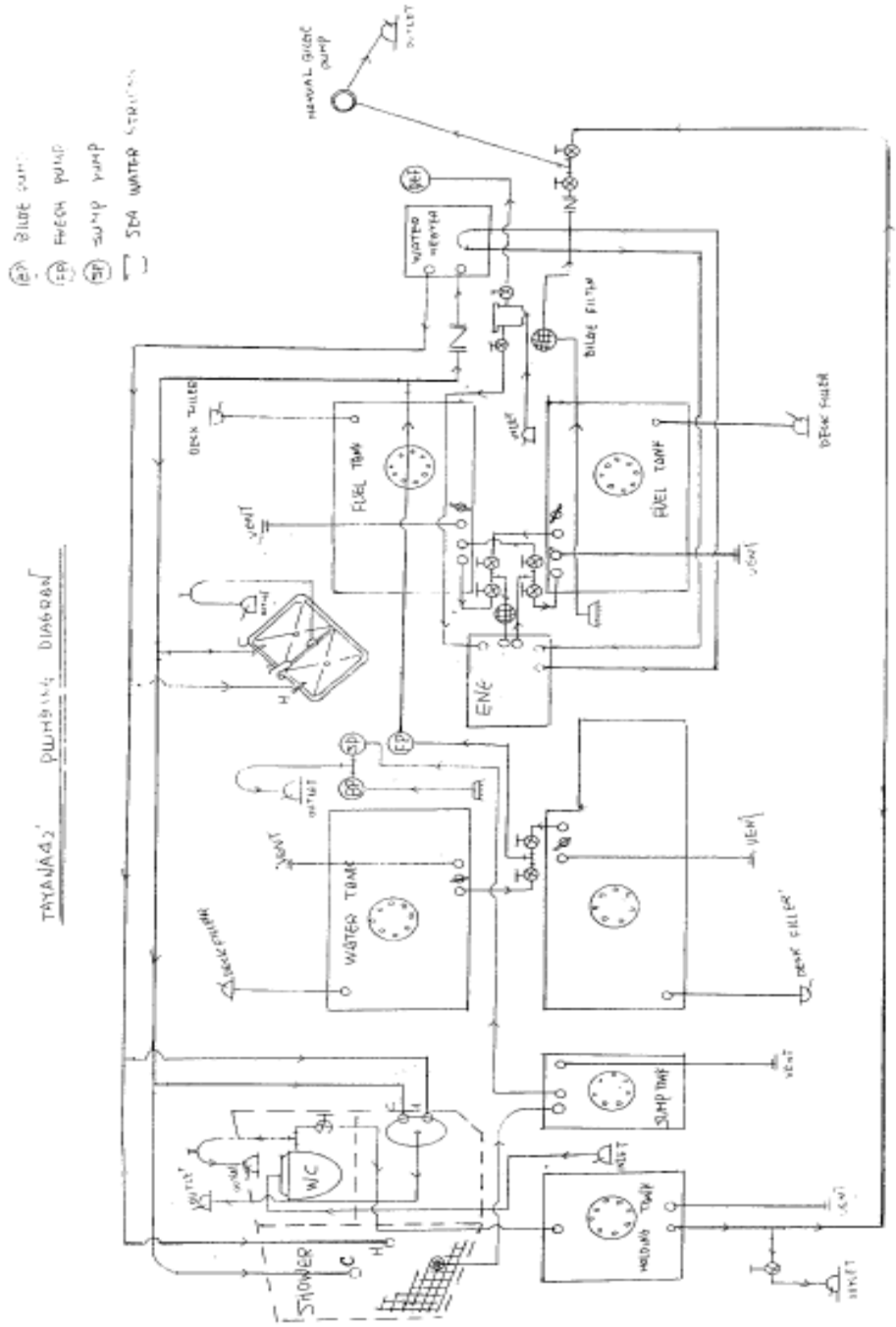
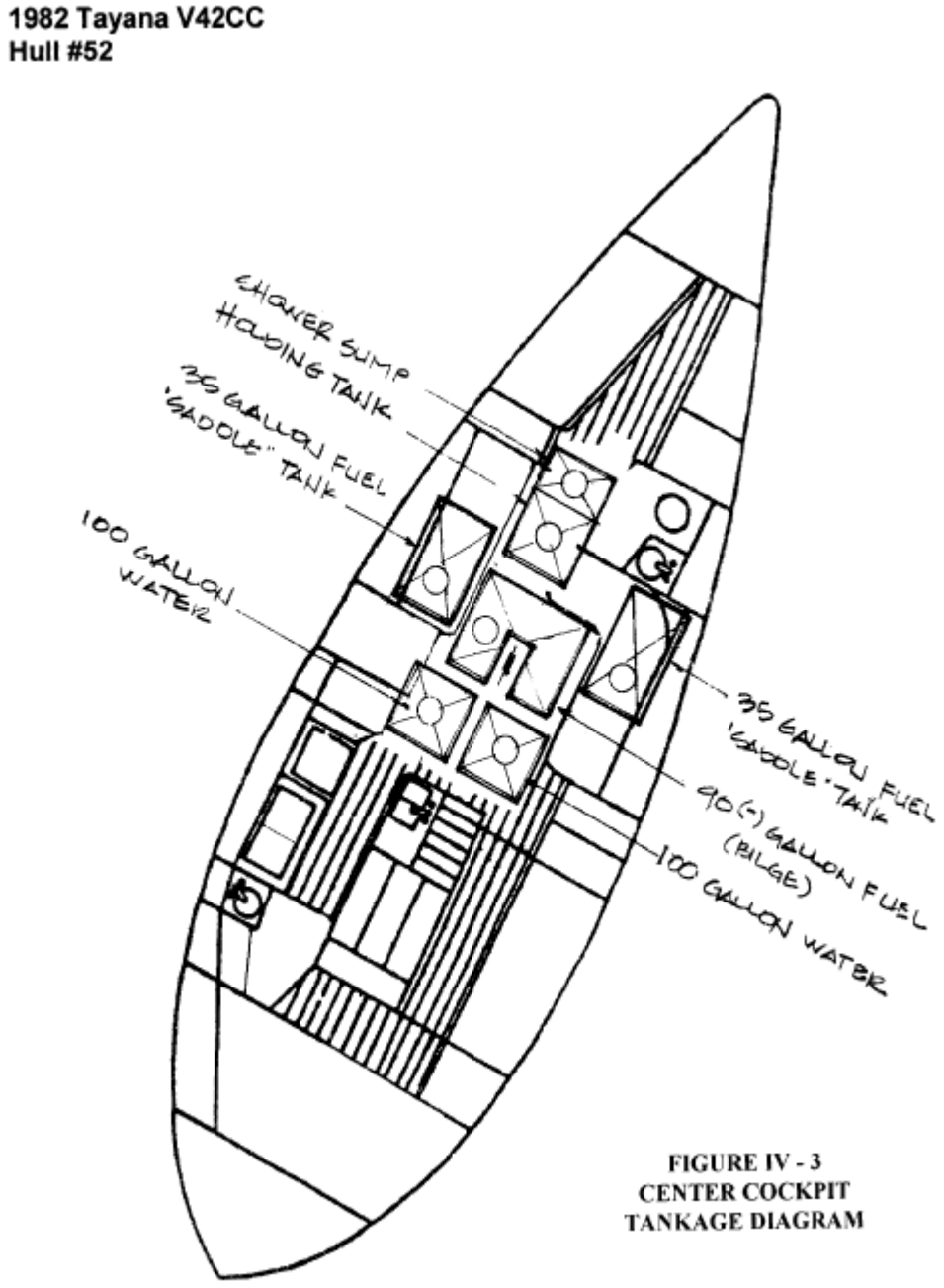


FIGURE IV - 2
FLUID PLUMBING SYSTEM

Figure IV-3: Center Cockpit Tankage Diagram



F. Electrical System

You will operate two different electrical systems on your Tayana 42 – a direct current (DC) system which is the primary electrical system and an alternating current system (AC) which is used primarily at a dock. Neither of the systems is difficult to use, but certain important rules must be followed.

1. The DC Electrical System

The primary source of electrical DC power is the storage battery(s). It is important to remember that storage batteries are not the unlimited source of power to which one is accustomed in the home. While a battery is rechargeable, one can only take out of it what one has put into it. Thus, it is important to keep track of how much charging is done and how much current is drawn by the various DC accessories. When the engine is running, accessories are not likely to draw enough to run down a battery; the engine charge will maintain battery charge level. Under sail, however, lights, instruments, autopilots, and other such wonderful devices can bring a battery to its knees in relatively quick time. This is especially true with the refrigeration system if yours is run off the battery. Figure IV – 4 shows a typical electrical power system.

a. The Energy Audit System

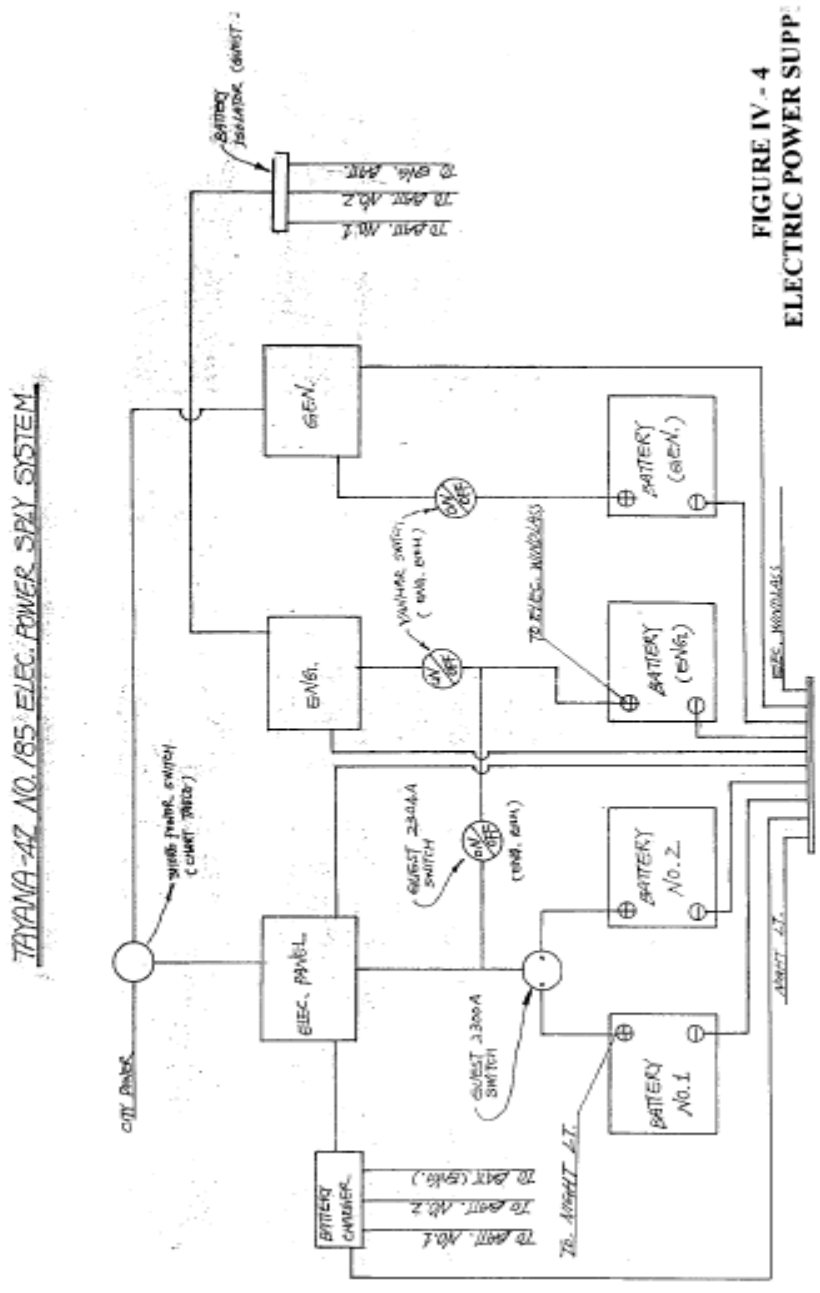
The best system which we know to help you use your power wisely is the DC energy audit. Make a list of every DC electrical device, which you have on board. Determine from markings on the equipment or from equipment handbooks how many amperes each device draws in normal operation. Add al1 of the amperes together and you wi11 see how much total current would be drawn if al1 devices were operated at one time.

Table IV-1 on page 37 will help you make such an audit for your yacht. Your battery(s) are rated by ampere-hours. For example, a standard battery, which comes with the Tayana 42 is rated at 120 ampere-hours. Theoretically, this means that the battery will provide one ampere 120 hours or 120 amperes for one hour. As with most things the theoretical capacity and the actual usable capacity are quite different. In the case of a wet cel1 battery one should plan on a maximum capacity of 50 percent of the rated capacity. Thus, your standard battery wi11 provide you with about 60 ampere hours.

On your electrical control board you wi11 find a DC ammeter which shows the number of amperes which are being drawn from the battery at any particular time. It is easy to see that if your ammeter shows 10 amperes for one hour, you will have drawn a total of 10 ampere-hours from your battery(s). Let's look at a practical example of how you can use your electrical audit and ammeter to know when recharge is going to be required. Let us say that you are sailing overnight and that you have just turned on your running lights and compass lights. The battery(s) are fully charged. You note that the ammeter shows 5 ampere draw. It is 2000 hours. At 0600 the next morning the sun rises and you shut off the running lights. The draw is now zero--nothing else is running. You have drawn the amazing total of 50 ampere hours (5 amps x 10 hours). If you had a single battery with 60 ampere-hours usable capacity could you now start your engine? Yes, you could. A starter requires about 60 amperes to turn over a diesel engine. If it takes one minute to

turn over the engine before start (an unusual situation), you can see that starting would, in effect, require one ampere-hour.

Figure IV-4: Electrical Power Supply



You must remember that much more than your running lights are apt to come on during the night. The electric bilge pump may come on; the pressure water pump may come on; you may be using an electric autopilot; you may require deck floodlights; somebody may play the stereo. All

of these devices may require so much power that you end up with insufficient charge to turn your engine over. When charging gel batteries, ensure that your charging rate is within the parameters of the battery manufacturer. The charging rate for at least one make is no more than 14 amps.

NOTE: Do not switch battery switch to the OFF position with engine running The BOTH position is intended for emergency or extended engine cranking ability. Ordinarily, one should charge one battery at a time while the engine is running. Continuous running in the BOTH position when the batteries are in a low state of charge, can cause an overload and possible damage to the engine alternator.

b. Electrical Panel

The AC-DC breaker panel is generally located in the navigator's station. This panel is equipped with high quality circuit breakers. On most panels, the DC circuit breaker is wired to an indicator light to show at a glance if the circuit is on. The DC indicator lights are solid state light emitting diodes, which require very little current draw. The DC ammeter monitors the amount of current being drawn from the battery, and the DC voltmeter gives an indication of the battery's condition. You must operate the battery test switch to get a battery condition reading. These voltage readings may be interpreted as follows:

	BATTERY READING	BATTERY CONDITION
Engine OFF and electrical system under minimal or no load	below 11 volts	Very Low
	11-12 volts	Low
	12-13 volts	Well Charged
Engine Running Fast Idle or above	13 – 13.5 volts	Low Charge Rate
	13.5 – 15.5 volts	Normal Charge Rate
	15.5 or higher	Excessive voltage (Voltage regulator defective. Replace or adjust)

The voltage readings should be taken in either battery position, not in BOTH position.

The voltage readings should be taken in either battery position, not in BOTH position. Start your engine using the battery with highest charge and allow time for the battery to return to its full charge state before putting it on reserve. When switching over to the other battery, be sure not to switch through the OFF position. This would damage the regulator and possibly the alternator diodes. The BOTH position is for emergency or extended cranking periods and should not be used to charge two batteries at the same time. This could overload the charging circuit if the batteries are low.

TABLE IV – 1: Direct Current Energy Audit

Direct Current Energy Audit

DEVICE	VOLTAGE	CURRENT DRAW
TOTAL DC CURRENT DRAW		

NOTE: Recommended additions would be larger capacity alternator and regulator as well as a larger bank of deep cycle batteries to handle anticipated needs. Remember you must adjust regulator charging voltage to the proper level, depending on battery type. Also you should have a monitor to keep track of amp hours used or put back in bank. It is preferable to separate the start and the house batteries, with the start battery not of the deep cycle type.

c. Engine Control Panel

The engine control panel incorporates a visual warning system, which is activated by the engine oil pressure, electrical charge and temperature sensor switches. The oil pressure light will operate each time the engine is started until oil pressure builds up. It gives a constant check on the operation of the system. The other lights will light when the engine key is turned on, and they will go off as soon as the engine starts.

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2. The Alternating Current System

The alternating current system is essentially an auxiliary power system, which is activated through a shore power cord attached to a dockside power source. Some yachts also have an on-board 110-volt AC generator that provides power while underway. The AC system that comes with the yacht is a three-wire shore grounded. The shore power inlet is rated at 30 amperes and is generally mounted on the aft, outer face of the coaming. For operating procedures for installed AC generators, consult your owner's manual.

a. The AC Electrical Control Panel

The AC electrical control panel is a part of the ships electrical panel partly described on the previous page. On it is located the main circuit breaker for the AC system. Each AC circuit is protected by a double pole breaker, which breaks both sides of the circuit when it is tripped. For reasons of safety, it is recommended that all appliances used aboard be equipped with a three-wire grounded cord.

b. Hot Water Heater

The hot water heater is connected to a breaker on this panel. Some heaters have a high temperature re-set button built into the heater. Before applying power to the water heater, always be sure the heater has been filled by turning on one of the hot water faucets long enough to get a steady flow. An empty hot water heater may burn out the heating element before the temperature re-set button can break the circuit.

c. Shore Power Connecting Procedure

The proper-procedure for connecting shore power to the boat safely is as follows:

1. Turn ship's main breaker to OFF
2. Turn receptacle on dock to OFF, if possible
3. Connect cable to power inlet on boat first, (to prevent handling a "live" powerline and possibly coming in contact with water)
4. Route the cable in such a way as to prevent strain on either connector, allowing for the rise and fall of the tide, and to prevent chafing
5. Connect to dockside receptacle and turn shore switch on
6. Turn on ship's main breaker

d. Disconnect Procedure

1. Turn off ship's main breaker.
2. Turn off dockside power and disconnect cord.
3. Replace all weather-tight caps on receptacles.

CAUTION: The owner must be aware of the hazards of using high voltage AC aboard ship, and should maintain this system in safe condition. (See Section V). Don't take chances handling AC equipment in wet weather or while washing down topsides. Caution guests and children about hazards, and do not use any equipment that does not function properly or is suspected of being defective.

e. Battery Charger Option

The battery charger, or converter as it is also referred to, is connected to the feed or "output" side of the main battery switch. This allows you to select either or both batteries to be put "on the line" for charging when the engine is at rest. It also insures that, when the battery switch is OFF, all circuits are positively disconnected from the batteries during an emergency shutdown. Do not turn the battery charger on when the battery switch is in the OFF position. This could possibly feed the ship's circuits without the back-up support of the batteries. It could also cause premature failure of electrical equipment in the boat and if the regulator section of the charger should fail, allow high voltage into the system. The battery charger has an automatic cut-off circuit, which is wired to the engine electrical system. Whenever the engine is started, the charger will shut off and allow the engine-driven alternator to take over, returning to service when the engine is stopped (if the charger is powered by either a generator or shore power). The charger is protected by internally mounted fuses on the AC and DC circuits, as well as the main circuit breaker on the AC panel. Be sure all the related circuits are OFF when opening the charger cabinet for service. The charger is an air-cooled unit with louvers on top and bottom. Care must be taken not to restrict the ventilation provided, nor allow small tools or hardware to fall into the charger while performing maintenance work. If left on at the pier, the battery charger should cut off automatically when the batteries are fully charged, but many do not.

G. The Plumbing Systems

Your yacht has several plumbing and sanitation systems which, while easy to operate, require some care to avoid spills or the pumping of waste overboard when that is not the intention. Figure IV - 5 shows a V-42 fresh water system. Figures IV - 2 and 3 are also pertinent. Figure IV - 6 shows a typical waste water plumbing system and Figure IV - 7 shows a partial plumbing system for a V-42 CC two head system.

1. The Fresh Water System

Tankage consists of two 70-gallon stainless steel tanks located beneath the cabin sole in the main cabin. Valves are located above the port tank to control the water supply to the electric water

Figure IV-5: Fresh Water System

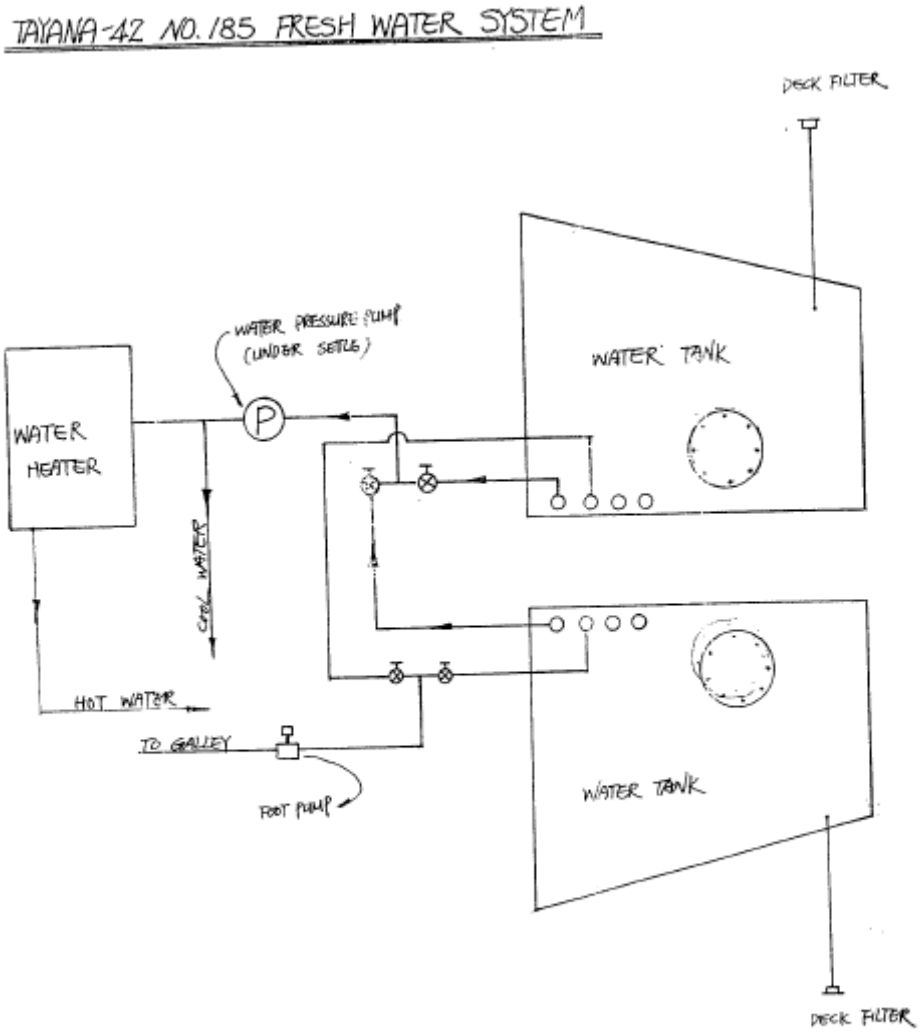


FIGURE IV - 5
FRESH WATER SYSTEM

pump and the foot pump for the galley sink. Dipsticks are also located in each tank. As the electric fresh water pump generally gets a lot of usage and will eventually fail, a spare can save the day when you must have that hot shower. Installation of an accumulator tank (perhaps beneath the galley sink) can reduce cycling of the pump to prolong its life. One to two ounces of unscented chlorine bleach (such as Clorox) can be added to every 60 gallons of water to prevent the growth of algae. Your yacht is equipped with a full pressure fresh water system for both hot and cold water. It allows you to draw fresh water in the same way and with the same convenience you have become used to in the home. But there is a disadvantage to this – you will have a tendency to use your water as you do in the home and this is generally wasteful. At home this waste translates into bigger water bills. In a yacht at sea such waste can lead to real trouble. Training yourself and your crew to conserve water is absolutely essential. If you find you have trouble doing so, you may find

it worth while installing, if you have not already done so, a manual water system. The manual system requires hand or foot pumping, and it invariably results in better water conservation.

2. Bilge Pumps

The Tayana 42 is equipped with two bilge pumps – one electrical and one hand operated. Both of these pumps should be checked every day that the yacht is sailed. The electrical bilge pump is by PAR and is located in the same compartment as the fresh water pump. The intake hose goes down past the engine and into the bilge sump below the engine. The pump outlet is just above the water line on the side of the yacht. The most common failure is a dirty pick-up screen. This may be cleaned simply by pulling the intake hose up from the sump and removing the dirt. A few failures because of dirt in the bilge will probably result in a greater effort to keep the bilges clean and sweet. There may be an in-line filter close to the pump that should also be cleaned. The hand bilge pump is generally located in the cockpit. The hand bilge pump serves two purposes – it pumps the bilge and it pumps the holding tank. By following the intake line from the pump, one will come to a set of two valves. With one valve closed and the other open, you can see that the pump clears the bilge. By reversing the closure of the valves the pump clears the holding tank. A little experimenting will show you the proper valve operation.
NOTE: A second electric bilge pump is a wise addition.

3. Holding Tank

Your 42 has a holding tank system which is legal anywhere. The toilet may be pumped either into the holding tank or overboard directly. The waste holding tank is a 35-gallon fiberglass tank located beneath the cabin sole in the vicinity of the head. The 1 ½ inch outlet hose from the tank tees to the deck pump-out fitting, and the manual bilge pump is located in the cockpit. A valve beneath the cockpit switches the intake to the manual bilge pump from the bilge water to the holding tank. A small diameter vent hose leads to an outlet on the port side of the hull just below the toe rail. This vent line must be open (not clogged) in order to pump waste into, or out of, the tank. An 8 inch port in the top of the tank provides access should you need to work on the tank (e.g., to replace the stainless steel outlet fitting). When winterizing the holding tank, after pumping out the waste, pump ethylene glycol antifreeze (not the pink or blue propylene glycol antifreeze, as this type of antifreeze can damage the flexible valves and seal in the head) into the tank through the head.

Figure IV-6: Waste Water Plumbing System

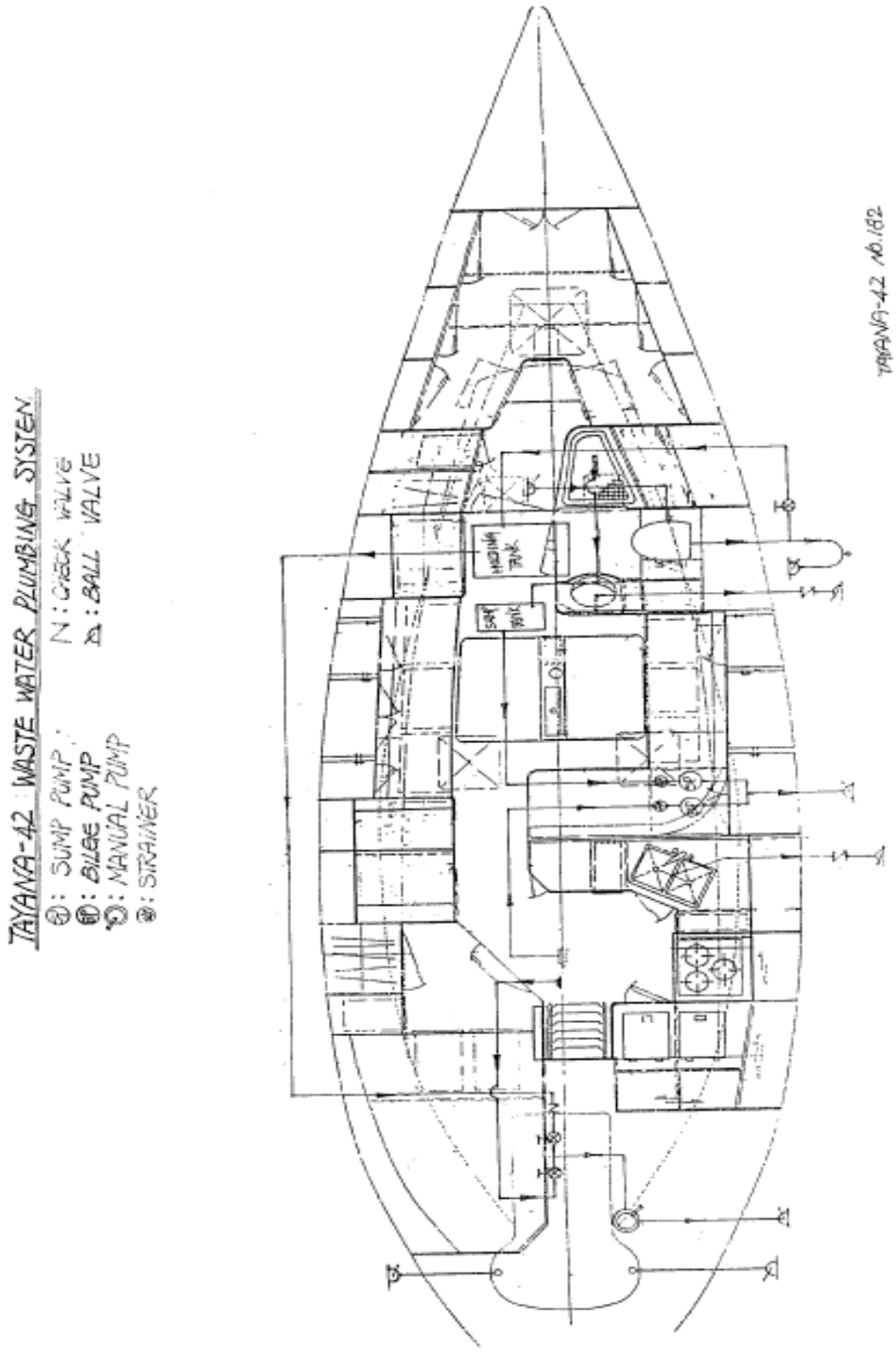


FIGURE IV - 6
WASTE WATER PLUMBING SYSTEM

4. Toilet

The toilet is one of the standard U.S. makes which uses seawater for flushing. The intake and discharge are both below the water line. The intake is well forward of the discharge opening. Each opening is protected by a through-hull fitting. The discharge line has a loop, and its through-hull

Figure IV-7: Partial Plumbing Layout

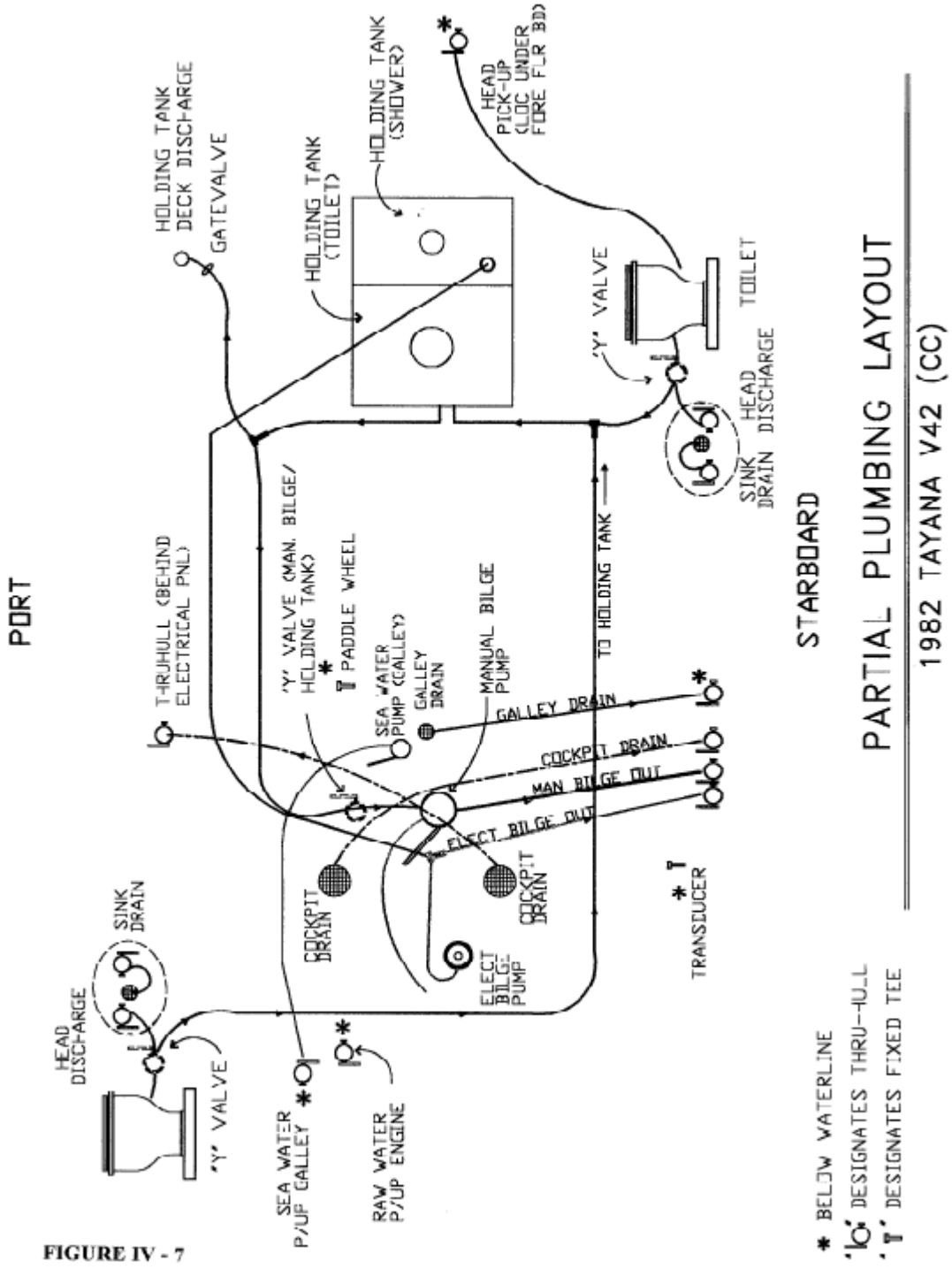


FIGURE IV - 7

seacock is kept open, except when the boat is unattended. By opening/closing valves located on either side of a "TEE" commonly referred to as the “Y valve” in the discharge line, effluent can be sent overboard or to the holding tank. Ensure that you are complying with the Coast Guard requirements for your area.
NOTE: Before shifting to the holding tank, close the overboard discharge valve and then open the holding tank line valve.

The sequence for operating the toilet is as follows:
1. Pump, slowly, until bowl is nearly exhausted. Normally this will require three to six pumps.
2. Open the intake through-hull fitting located just outboard beside the seat.
3. Flush completely by pumping at least thirty times.
4. Close the intake through-hull fitting.
5. Pump to nearly exhaust the bowl. This will take about five or six full strokes.
CAUTION: Do not leave the intake valve open. The valves in the pump may have a slight leak-through, and the bowl may overflow with seawater.

H. The Propane System

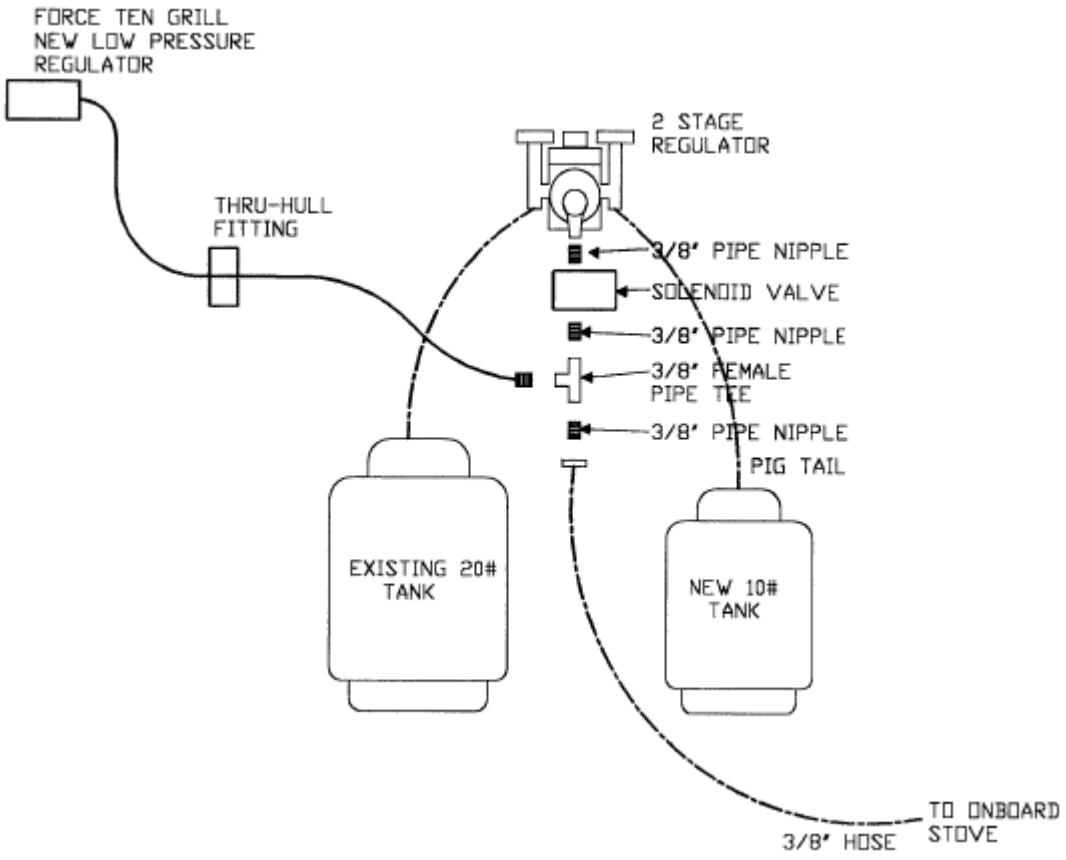
A normal propane system on your Tayana 42 consists of two 20-pound tanks located in the propane locker in the cockpit that has an overboard drain for fumes, A regulator for pressure regulation, a manifold to switch between tanks, and a solenoid to remotely shut off the gas flow to the galley are also located in the locker. The gas line to the stove in the galley should be inspected regularly and chafe protection should be used where the line runs through the bulkheads. Make sure there is a proper flexible hose from the solid gas line to the stove to allow the stove to gimbal freely.

To light the stove:
1. Check that burners are OFF.
2. Open the tank valve.
3. Switch solenoid to ON to allow the flow of propane to the stove.
4. Light the stove

To shut off the stove:
1. **Always first shut off solenoid** to allow gas in line to burn out.
2. When flame on burner goes out, shut burners off.
3. Close tank valves.
CAUTION: Propane is heavier than air and will settle in the bilge in the event of a leak, so maintain the system carefully, as a fire or explosion at sea would be a bad day. The purchase of a propane alarm to place in the bilge may be a wise investment.

A typical propane system diagram is shown in Figure IV – 8

Figure IV-8: Propane System



1982 TAYANA

FIGURE IV - 8
TYPICAL PROPANE SYSTEM

CHAPTER V
MAINTENANCE AND MAINTENANCE PROCEDURES

Maintenance of your yacht is covered in literally hundreds of books, magazine articles and manufacturer's instruction books and manuals. This manual can not even list all of these resources because new and better resources are printed almost daily. It is the responsibility of the owner to search out the technical world and find those specific instructions and procedures with which the owner feels comfortable. This chapter hopefully will provide the basis for proper maintenance procedures and routines that will keep the yacht in good condition. Few persons today are under any illusion that a fiberglass yacht is "maintenance free". As a matter of fact, from the standpoint of cosmetics alone, a fiberglass hull requires nearly as much time to care for as a wooden hull of similar size. Washing, waxing, and touching up little nicks and scrapes are time consuming and demanding tasks which must be done consistently, if the yacht is to retain its new look.

The advantages of fiberglass lies in areas other than cosmetics - strength, for example. Fiberglass reinforced plastics (FRP) are among the strongest boat building materials ever developed. Even a moderately well built FRP yacht will be stronger and more endurable than the best wooden built a few decades ago. In addition, fiberglass is impervious to most of the ills that can be disastrous in other materials: it doesn't oxidize like steel; it isn't affected by electrolysis like aluminum; it doesn't rot like wood; and it is not affected by a variety of sea life, such as worms. While it can be damaged by physical impact and the resin will burn, neglect of surface damage generally does not result in more serious deterioration, as it would in a steel or wooden hull.

A. Hull

Normal periodic maintenance consists of waxing the hull with any of several good fiberglass or automobile waxes on the market today. Waxing should be done from the shear down to and including the waterline stripe. Wax should not be put over the bottom paint that may be at or above the normal trim waterline of the yacht. If the gelcoat is older and wax doesn't seem to accomplish renewing the appearance, there are some newer fiberglass finish restorers on the market such as "New Glass" or "Polyglas". These products may be a problem if you ever want to paint the fiberglass.

Note: From several of our dealers comes the advice that boats need to be hauled regularly in order that they may dry out. This is especially true of boats in fresh water as it is more soluble.

Generally, if customers purchase a boat with a white hull, little dings and scrapes do not show up as badly as they do on a colored hull and one is not under as much pressure to make immediate repairs. Scrapes and scratches in white gelcoat are relatively easy to repair. There are several gelcoat repair kits on the market which will do a fine job, if the directions are followed closely. TaYang has provided a package of gelcoat when new. Bigger gouges can be filled with either polyester or epoxy putties before the gelcoat repair system is used. Colored gelcoat presents the additional problem of color matching. Again, there are several systems on the market that will make it possible to match the original gelcoat color. Remember that dark colors tend to be hotter in the tropics.

Blisters are a continuing topic with respect to fiberglass hulls. Whether or not they appear depends on a myriad of variables. But they can and will develop blisters if they remain in the water too long. If they do, deal with them early. One of the vinylester epoxy bottom jobs being performed in the Chesapeake Bay in the early 80s has left hull #107's bottom, baby bottom smooth ever since. When you haul out, keep an eye out for the first little pinhead blisters. These are normally only in the gelcoat. It is easier to deal with these than wait until larger, deeper blisters begin to appear. The softer bottom paints that slough off (Micron, CSC, etc.) are easy to prep for a new paint job when you haul every 1-3 years, depending on where you live and whether you like to race or not. Some of the harder bottom paints (Trinidad types) that accumulate over time do better at repelling heavy barnacle growth in some geographical regions. Ask around before you buy your next choice of paints. Usually three gallons will cover a V-42 bottom with 2 to 2 ½ coats, if you roll it on. It is a good idea to inspect the bottom periodically. In areas such as the Chesapeake Bay, groundings are generally not serious as the muddy bottom is unlikely to do any serious damage. However, in the Caribbean and Northwest cruising areas, for example, groundings on rock and coral are a different matter. If possible, the hull should be inspected immediately after a hard grounding on rock or coral. If deep scrapes are found or if the fiberglass has actually been crushed or distorted, the yacht should be hauled at your earliest convenience and the damaged fiberglass repaired. While we do not wish to exaggerate the potential for water to soak into the damaged surface, the possibility is there, and immediate repair is very important to limit the area of potential water saturation.

Your Tayana 42 comes with a heavy rub rail which bolted and/or glued to the side with either a bronze or stainless steel striker to protect the sides. It is a thing of beauty when properly maintained and a wise investment that will take a great deal of the abuse which otherwise would have to be absorbed by the hull. The rub rail is very often neglected during cleaning. It should be cleaned, sanded, and preserved in the same manner as other teak on the yacht. (See discussion below.)

B. The Deck and Cabin Top

The deck and cabin top of the Tayana 42 is molded in essentially the same manner as the hull - in a one piece mold following the fiberglass. When the deck is removed from the mold, most of the teak trim is installed before the deck and hull are joined. Teak decks, teak facings on the cabin, and teak in the cockpit are all installed before the deck is joined to the hull. The fiberglass of the deck and the cabin are cleaned and maintained in the same manner as the hull. Any one of several good cleaners and waxes will tend to help keep colors bright and new looking. The big job will be teak maintenance. In the old days, teak decks were maintained with a holystone and salt water. The holystone was a large piece of pumice rock that was rubbed across the deck to clean and polish wood. When done regularly, the teak was kept a beautiful silvery color which was quite striking when contrasted with the painted surfaces and natural wood colors. The salt water helped keep the teak in good shape because salt would be left in the wood as the water evaporated. Because the salt was slightly hygroscopic (attracts moisture), the teak did not dry out rapidly. Of course, wetting and cleaning had to be done daily if the deck was to be kept in the best condition. Not many people are going to holystone their teak daily in this day and age, although

cleaning would be highly recommended. Most people seem to prefer the deep brown of newly oiled preserved teak.

There are several products on the market that make it possible to keep the beautiful brown of teak without a great deal of heavy labor. Cleaners are strong and corrosive and must be used infrequently and with great care. Washing and leaving the decks natural is always an option if its condition is monitored frequently. When you receive your yacht, the teak will have been cleaned and will be relatively dry. It should be cleaned with common washing soda that one can obtain in the laundry section of any well-stocked grocery store. Washing soda is an excellent cleaner and has a tendency to bleach the wood somewhat. It will not damage paint or gelcoat, unlike some teak cleaning products, although it should be thoroughly cleaned off. Use about one cup of washing soda in a bucket of water (more soda if the deck is really dirty). Scrub the teak with the soda solution using one of the many plastic non-abrasive scrubbing pads or a soft brush across the grain until the wood is thoroughly cleaned. Then rinse thoroughly and let dry. Avoid using deck or scrub brushes, as these tend to damage the softer parts of the grain and leave the teak rough.

The number of teak oils and preservatives on the market is virtually endless. The best are those that contain a minimum of varnish. Such oils do not leave quite as brilliant a finish, but they last almost as long, and they age more gracefully. If one wishes to maintain the brilliant teak brown, he will have to clean and reoil every four to six weeks in tropical areas; somewhat less frequently is higher latitudes. Use a non-skid finish, such as Semco, etc., on areas where standing or gaining a purchase on a line is necessary. Other finishes which are very popular include Cetol and Armada, and those with long lasting eurethanes such as Honey Teak and Bristol Finish. The polysulfide products that are used to caulk the teak decks merit some special consideration. Certain of the more corrosive teak cleaners and at least one teak oil product can damage polysulfide. As mentioned above, corrosive teak cleaners should be used infrequently and the directions should be very carefully followed. These compounds should be washed off completely and as soon as the directions permit, even if the product is advertised as not hurting caulking compounds. On the other hand, teak oils that can soften polysulfide should never be used. One of these oils is reputed to be a widely advertised two part product.

The polysulfide caulking is relatively easy to maintain and repair. The most common problem is that the caulking pulls away from the teak and breaks the seal. When this happens, it does little good to try to fill the resulting space with more polysulfide because the new material will adhere neither to the old polysulfide nor to the teak. The old polysulfide should be completely removed and then the teak should be primed with the primer recommended by the manufacturer. Once the primer has dried, the space should be filled with fresh polysulfide – leave a bead that is higher than the surrounding wood. It will take several days for the polysulfide to cure. Note that moisture tends to increase the rate of curing, and it is a good idea to keep the caulking damp. Once cured, the caulking can be sanded off flush leaving a practically invisible repair. When deck screw plugs come off, check the screw for tightness and replace the plugs to inhibit the incursion of moisture.

C. Interior Woodwork

Interior woodwork is generally solid teak staving or teak faced plywood panel. Both of these are maintained in the same manner if they are unvarnished or natural. If you have ordered your yacht

with natural wood which you wish to keep light, it is best to finish the teak with a light wax. The process is simple. The wood should be thoroughly cleaned – start with a vacuum cleaner to remove all of the dust and loose dirt; then use a damp cloth with no soap; follow this with a solvent wash to eliminate any excessive surface oils; then spread on the wax according to manufacturer's directions. Any of the light furniture waxes can be used for this application. Some people have had excellent results using bowling alley wax. This wax takes a longer time to apply, but it is tougher than most liquid waxes and requires less maintenance. If you want your interior teak to be a little darker and to take on the patina of fine furniture, one can use oils rather than wax. Cleaning should be accomplished as described above and then the wood should be covered with lemon oil or such commercial products as Scott's Liquid Gold or Sheila Shine. The latter two products have an oil base that soaks into the surface of the wood and a wax that fuses to the surface and provides a protective coating that is almost permanent. The oil does darken the wood somewhat. If your yacht has a varnished interior, you will find that maintenance is much like keeping furniture looking nice. You will clean the surface with water and mild soap solutions and "dust" using one of the many dusting products available at the local supermarket.

A lemon oil finish restores luster to both gloss and satin varnished surfaces. The sole merits special consideration. Obviously, one cannot use ordinary waxes – they would ruin footing. If the sole is left natural, it should be cleaned as described above and covered with Liquid Gold or Sheila Shine. These products protect the surface but do not seem to leave the sole slippery when wet. If the sole is varnished with a satin coating, it will be a little more slippery, but may be all right. If it is too slippery when wet, it can be coated with polyurethane – this product is not at all slippery when wet. The directions for preparing the surface should be followed religiously, as polyurethane is generally not compatible with other types of varnish. Murphy's Oil Soap, now available in spray form, is excellent for cleaning either finished teak or the sole.

Bronze presents a special cleaning problem. Ordinary metal cleaners will not clean or polish bronze. Brass cleaners, for example, will not touch the green corrosion that disfigures bronze ports. An excellent product is Amway metal cleaner. It is an excellent general metal and bronze cleaner to have aboard for both interior and exterior use. In the case of bronze, once the metal is cleaned and polished, it may be coated with a spray wax such as the Amway colorless shoe polish.

D. Spars, Rigging, and Sails

The primary means of propulsion is the sailing rig, yet it is sometimes the most neglected. This is probably because it is very reliable and because most people believe they have an intuitive understanding of it and neglect it through misplaced familiarity. However, maintenance is vital. Failure of your rig can be far more catastrophic than engine failure – one doesn't merely lose power; he may sustain damage to the yacht and injury to personnel.

1. Spars

The Tayana 42 normally is equipped with an aluminum, deck-stepped mast. The primary advantage of aluminum spars is the reduction in maintenance. One should not conclude, however, that aluminum spars are maintenance free. Like fiberglass, aluminum requires frequent and conscientious care, if its appearance is to be maintained. Again, as with fiberglass,

if damage to finished does occur, one is not quite so pressed to get a repair done because further deterioration is not likely.

The aluminum spars with a Tayana 42 may be finished either by anodizing or painting. Anodizing is a process by which a protective coating is formed that is superior to paint. It is done in a special bath before any of the fittings have been installed. Anodizing cannot be renewed by the yacht owner. Generally, painted spars are finished with a polyurethane, a very hard, color-fast paint. Maintenance consists of monitoring the condition of the mast for scrapes and gouges and repainting them when they occur. A small spray can of automobile finish is very handy for this purpose. Simply remove the damaged paint, then sand lightly with about a 300 grit wet or dry sandpaper, and spray on the new finish.

Aside from physical damage owing to impact or scraping, the greatest cause of damage on an aluminum spar is galvanic corrosion. Any non-aluminum fitting that is bolted, screwed, or riveted to an aluminum spar must be bedded to prevent electrolytic corrosion. The bedding acts as an electrical insulator. If dissimilar metals are not isolated from the aluminum, one will soon find that the aluminum pits and forms a fine powder. This is irreversible damage which must be avoided at all costs. If it is discovered, the fitting or fastener around the corroded area should be removed and reinsulated with a bedding compound or a sheet insulation, such as neoprene or rubber. The pitted area may be filled with epoxy or polyester putty before repainting, but this is only cosmetic – the putty will not restore the lost strength in the damaged area.

One must consider that an aluminum mast that has been badly dented is no longer safe. Dents that are half an inch or more in depth and which have a diameter of a third or more of the spar constitute a serious weak point. If the spar is put under serious stress at that point, the chances are that the section may collapse. If you should find a dent that large, contact a professional yacht rigger for advice.

Mast spreaders are particularly critical to the health of your rig. They allow the long upper shrouds to take up the loads that are transmitted to the upper part of the mast during sailing. As a result, they are under tremendous compression. It is particularly critical that they be examined regularly to see that there is no distortion or cracking. The outer tips of the spreaders should be raised above the spreader base so that the compression load is transmitted down the spreader to the mast and not at an angle which would tend to force the spreader to bend under load.

V-42s are rigged with two sets of spreaders. The upper set includes a distinctive semi-circular lightweight aluminum jumper strut that replaces running backstays. When pulling the mast, use caution to not damage this jumper strut. Make sure the fasteners are coated with anti-corrosive compound.

2. Standing Rigging

Standing rigging is made up of stainless steel cable with various attachment fittings of chromed bronze and stainless steel. The wire used is 1/4 or 5/6 inch 1x19 wire. Either size cable is sufficiently strong to bear the rig under winds of hurricane strength. The 1x19 refers to

the winding of 19 single strands of wire to make the cable. This winding makes the cable stiff and strong, but it would be unsatisfactory if it were required to run through blocks or go around sharp corners.

Most Tayana 42s are delivered with swaged fittings. Swaging is a process that actually squeezes a hollow cylinder onto the cable. The process was developed for the aircraft industry, and the strength of the joint is nearly as great as the tensile strength of the cable. Watch for cracks in these fittings over time, especially in the tropics.

Some 42s have been delivered with the wedge type fittings that are most often known by the trade names Sta-Lok or Norseman. These fittings get their strength from a conical bronze core that is forced against the cable within the fitting. It too, is stronger than the tensile strength of the cable. It has the added advantage that it can be installed by the owner with two common adjustable wrenches. It must be remembered, however, that the wedging cones are not reusable and extras should be carried at sea.

Turnbuckles are generally chromed-bronze cylindrical type. They are made to be set up with two wrenches – one to hold the cable and one to turn the turnbuckle itself.

Standing rigging should be inspected regularly. And remember, it does one no good to simply inspect the bottom fitting and ignore those up on the mast.

The most common failure is cracked swage fittings. All attachment fittings should be carefully examined at least once a month. Look at them closely. Sometimes the cracks are hard to see. If
in doubt, carefully spray the fitting with a dye penetrant. The dye goes into a crack readily and shows it clearly. Such dyes are available at better equipped marine stores and industrial supply houses. If such is not available, carefully spray the fitting with a can of red paint and then wipe the paint off quickly with a hard cloth. If there is a crack, the paint will get into it and show up when the paint on the fitting is removed. Any crack is bad, but not a cause for panic. As a rule of thumb, if a crack is less than the wire diameter, the strength of the swage is probably not yet seriously compromised and replacement can be delayed, but monitor it carefully.

3. Sails

Sails that are delivered with your yacht are very high quality and well cut. The subject of sails is worth a book in itself so the discussion here will be short.

The greatest enemy of your sails is the ultraviolet in sunlight. You have sail covers – use them religiously. Sails that are stored under cover will last three or four times longer than sails that are simply furled on the spars and exposed to the sun.

It is also important to inspect your sails regularly for broken stitching and tears. These should be repaired immediately because they can result in catastrophic sail damage in a short time. Sails should not be cleaned in a commercial type washer. Rather, it is better to lay them out on a flat surface, like a lawn, and use a soft brush, mild washing detergent, and cool water. Once

the dirt is off, rinse with a hose and be sure to get the salt off at the same time. As a matter of fact, it isn't a bad idea to pull your sails up at the dock a few times a year and rinse them off with fresh water. Once in a while you may find some mildew on your sails. This can be cleaned off by a solution of chlorine bleach and water. For example, about two tablespoons of Clorox in a gallon of water will clean up most cases of mildew and if rinsing is done immediately, no harm should be done to the sails.

4. Running Rigging

Tayana 42s generally are equipped with low stretch, dacron running rigging. While wire halyards do not stretch as much as dacron, they are more difficult to maintain and tend to damage the mast finish.

Running rigging is subject to three sources of deterioration – wear, chafing, and ultraviolet light. Care on the part of the owner can minimize these to the extent that the rigging should last three to five years without giving any trouble. Wear can be reduced by making sure that turning blocks and fairleads are kept clean and that the sheaves in blocks turn freely. It is also important that lines be properly coiled and stowed so that crew members are not walking or sitting on them. Chafe requires that the line be protected at chafing points. For example, it is not unusual for the jib sheets to chafe on the upper shrouds. If sheets are against wire for any period of time, cover the sheet at that point with some type of protection such as tape. It will pay off. Protecting the dacron line from ultraviolet is as important as protecting sails. Unfortunately, it is next to impossible to protect halyards, but sheets can be stowed under sail covers or they can be removed and stowed below. Running rigging can be periodically cleaned with fresh water and a mild detergent. Soaking in a bucket with fabric softener, such as Downy, will soften the lines (never use laundry soap).

5. Winches

Winches are among the most important and sophisticated mechanical devices aboard your boat. Without them it would take ten big Swedes to operate a Tayana 42; with them the yacht can be sailed anywhere by husband and wife. Winches are the most handy source of power aboard the yacht – you can set big sails, raise anchor, rescue a man overboard, or lift an engine, all by using your winches properly. When you consider all the things you can do with these wonderful machines, think back on your high school physics classes. Mechanical advantage is the product of the mechanical advantage of the tackle and the mechanical advantage of the winch. Thus if you are lifting the 400 pound engine out of the yacht using your four part vang and you lead the vang to a winch with a mechanical advantage of 10, you can lift the engine with a force of only 10 pounds!

In spite of the importance of the winch to the proper operation of the yacht, it may be one of the most neglected items aboard. The average sailor seldom takes his winches apart for lubrication and maintenance. How often you take your winch apart and lubricate it in accordance with the manual that has been supplied, will depend on where you live and how you use your boat. And while you have it apart, check the mounting bolts; they should be tight and solid. If you find any sign of corrosion, owing to galvanic action, renew the insulation material.

Tayana 42s come with either Barlow, Barient or Lewmar winches. You will find diagrams and exploded views of both of these in the package of materials that came with the yacht. If your yacht does not have these owners pamphlets, check with another owner and make copies.

6. Blocks

Your yacht may have been delivered with original blocks made with teak cheeks and roller bearings. Under normal sailing conditions they will last five to ten years. Maintenance is easy. They should be washed with fresh water a couple of times a year and the teak should get essentially the same treatment as teak elsewhere on the yacht. The ferrous chloride that tends to develop on the 304 stainless steel should be cleaned off with soap and a plastic scrub pad. Nothing else is required. Most boats are equipped with more modern blocks, such as Harken, Lewmar, Ronstan or Schaefer, follow the maintenance directions provided with them. With any, keeping them clean and lubricated is key.

E. Auxiliary Engines and Related Systems

1. Engine

Your Tayana 42 may have been delivered with a Yanmar series or a Perkins diesel. A very small percentage have some other make engine. The discussion that follows applies to any diesel auxiliary which may be installed. Specific procedures for service and maintenance are found in your engine manufacturer's handbook, and they should be followed religiously. Remember, your engine is like a dog. It thrives on attention and dies quickly of neglect. A small diesel that is run regularly, serviced faithfully, and cleaned consistently should last thousands of hours before major maintenance is required. Think about that. If you treat your engine right, you may never have to buy a new one! Ignore your engine – think about it only when you need it – and you will find yourself spending from $5,000 to $15,000 to replace it.

a. Installation

Your engine has been installed by highly experienced mechanics using the best materials. The mounts are bolted to a glassed foundation to provide stability and quiet operation. The engine mounts themselves are of the flexible type to help eliminate vibration in the hull. The propeller shaft is 1-1/4 inch stainless steel that is connected to the transmission by a flexible coupling. The shaft goes through a bronze shaft log and gland to a cutlass bearing mounted in a bronze casting outside of the hull. The standard propeller is a three bladed bronze wheel generally 18 inches in diameter with a 12 to 14 inch pitch. The exhaust system is of the wet type – that is water is injected into the gas stream and ejected through a muffler and check valve. This system is common on sailing yachts because the water cools the exhaust fumes thus cutting down the heat radiated into the engine spaces and eliminating fire hazards. As can been seen in the figure, a siphoning break must be installed to prevent water from backing through the system and into the engine. Newer Tayana 42s have exhaust systems made primarily from plastic (ABS) mufflers and neoprene reinforced hoses. Older yachts have stainless steel systems composed of an expansion (bellows) exhaust pipe, jacketed pipe, stainless steel water locks and mufflers, neoprene hoses, and a bronze check valve. These latter systems are quite satisfactory, but they are not as durable

nor are they as easy to maintain as the new systems. Certainly with the older muffler systems they should be watched carefully for the formation of cracks.

The standard equipped fuel tanks are of black iron construction and are mounted low in the hull, port and starboard, aft of the fresh water tanks. They are baffled and have large manholes for access. Each has a dipstick for checking fuel quantity. Copper fuel lines leading to the engine from each tank have selector/cutoff valves that are tagged and identified. Both tanks may be use simultaneously or as selected. It is an extremely good idea to insure that at least one readily accessible Racor type fuel filter/water separator is installed into the fuel prior to the main engine fuel filter. An electric fuel pump might be another option to consider in order to facilitate bleeding and priming the fuel system. The relatively large quantity of fuel stored in your V-42's tank and the relatively low consumption rates by the very economical Yanmar type engines today, make it imperative that you pay very close attention to your fuel and fuel system cleanliness. Dirty fuel and clogged filters may cause engine stoppages, which occur in rough conditions when you most count on your normally reliable engine's output. Keeping tanks full will inhibit the condensation of unwanted water in your tanks which facilitate the growth of slime or fungus; use fungicide additives when refueling. And consider "polishing" your fuel every couple of seasons or replacing it if you do not use your boat often enough to turn over the fuel in your tanks. You may wish to install a fuel filtering system that would accomplish the same purpose, such as a Racor-type. You may need to clean your tanks after a number of years; it could be an inexpensive maintenance job that will help keep your engine running properly.

Raw water for cooling is taken in through a seacock generally located behind the engine. This line and peacock is tagged clearly at the factory as are all other lines, wires, and cables. If not, trace these lines and retag them now. Doing it later in the dark , in rough conditions is not fun. The raw water intake line passes through a large filter prior to the engine. This filter has a see-through type inspection plate and should be checked often, if you are in debris, jelly fish, or other dirty water conditions. Cooling water is led to the heat exchanger and then into the exhaust system for discharge overboard with the engine exhaust. When starting your diesel engine, listen for the splashing exhaust water. The raw water peacock must be open prior to engine starting!

b. Maintenance

Please consult your engine manuals for detailed procedures concerning operation and maintenance. You should have the basic operations manual which also includes simplified maintenance procedures, however, you should also obtain your particular engine's service manual. This manual typically is a much more detailed description of how the engine operates and includes detailed exploded views of all pertinent parts of your engine to include parts numbers. Yanmar, for example, has a new owner's engine orientation course that lasts two days and you normally go home with a copy of the service manual and a much fuller understanding of how to operate and maintain your boat's diesel engine. The engine manuals must be followed exactly to obtain maximum engine life and to keep your warranty in effect. The following sections summarize the maintenance requirements described in the manual and are intended as general information only.

(1) Break-in Period

During the first fifty hours of operation, the engine should not be run at maximum rpm. Run the engine at a variety of RPMS, but do not let it idle for extended periods. At fifty hours, the following service should be performed.

(a) Change engine oil and filter.
(b) Tighten cylinder head nuts in correct sequence to correct torque.
(c) Re-set valve clearances and check oil feed to rockers.
(d) Check belt tension.
(e) Check all external nuts, set screws, etc. for tightness.
(f) Check shaft coupling alignment.
(g) Check fuel, oil, and coolant levels and look for leaks.
(h) Adjust idle speed, if necessary.

(2) Before Each Outing
(a) Check coolant level.
(b) Check engine oil level.
(c) Check transmission oil level.
(d) Look for evidence of leaks under engine.
(e) Check belts.

(3) Every 150 hours or Three Months (which ever occurs first)
(a) Change engine oil and filter.
(b) Check drive belt tensions.
(c) Clean air intake.
(d) Clean motor trap.
(e) Look for evidence of leaks.

(4) Every 450 hours or 12 Months (which ever occurs first)
(a) All steps under item (3) above.
(b) Change final fuel filter element.
(c) Check hoses and clips.
(d) Drain and clean fuel tank.
(e) Change gear box oil.
(f) Service atomizers.
(g) Flush and change engine coolant.

(5) Every 2400 hours
(a) Have an authorized engine mechanic examine and service proprietary equipment, such as starter, generator, etc.
(b) Adjust valve tip clearances.
(c) Replace heat exchangers when in salt water.

(6) Bleeding the Fuel System
If you are a first time diesel owner, this is not a trivial operation. It is one you should become familiar with. Thus the diesel orientation course!

(a) Check fuel tank shut-off to be ON.
(b) Check fuel filter for sediment or water by opening drain plug on bottom. Replace plug.
(c) Follow routing of hoses from fuel filter to engine lift pump, inspecting hoses as you go. On the engine pump, you will find a lever that allows you to manually operate the diaphragm inside, against spring tension. It may be necessary to turn the engine over with the starter slightly to allow the pump arm to relax against the camshaft. This allows more stroke with the manual lever you are operating.
(d) Follow the fuel line from the pump to the engine fuel filter and locate the vent plug on top. Loosen plug two or three turns.
(e) It is advisable to have some large rags on hand to catch oil that will be expelled from this point in the course of bleeding.
(f) Begin operating the manual lever. This may take several minutes as the filters will need to fill up (as well as the lines). Operate the manual lever until fuel flows freely from the filter plug with no signs of air bubbles.
(g) Loosen the bleed screws on the injection pump.
(h) Operate pump again until fuel flows freely with no air bubbles.
(i) Re-tighten the vents beginning with the lowest point (the filter, the head locking screw, and the governor vent screw). Wipe up any spills at this time.
(j) Slacken the union nut at the injection nozzles.
(k) Move throttle to full rpm and check to see if the "stop" control is in the RUN position.
(l) Crank engine with starter motor until fuel flows from each injector.
NOTE: Do not run starter motor continuously. It normally takes 30 to 60 seconds of cranking to completely bleed the injector lines. 20 seconds of cranking with about a two-minute rest between periods will be easier on the starter, motor, and battery than steady cranking. Cranking the engine for long periods may hydro-lock water into the engine cylinders.
(m) Re-tighten injector lines; wipe spills.
(n) Re-set throttle position and proceed with normal start-up.
(o) Allow sufficient running time to recharge battery.
HINT: Very often Yanmar engines can be bled simply by loosening the bleed screw on top of the engine oil filter and the bleed screw on top of the injection pump. Try it.

2. Drive Train

a. **Engine Alignment**

The propeller shaft of the V-42 is 1-1/4 inch diameter stainless steel. The shaft is checked for accuracy initially at the factory during installation and is carefully aligned to the engine with the hull being properly supported and level. At this time, the shaft log and bearing is bonded to the hull penetration. The coupling to the engine is checked again for alignment by the commissioning team prior to delivery of the boat.

This alignment check should be made periodically, since the action of a rough sea could possibly change the shape of a bolt enough to disturb engine alignment. If, after the first rough water experience, the alignment has not changed, it is usually only necessary to make the check once per season. This is extremely important.

The alignment is considered acceptable if there is a gap less than .005 inches per inch of face diameter of the coupling (.002 for a four inch coupling, .0025 for a five inch coupling). The feeler gauge is inserted between the flanges at four points 90 degrees apart. Then check again keeping the engine coupling stationary and rotating the shaft coupling 90 degrees at a time. This checks the squareness of the coupling face to the shaft centerline. The engine alignment is adjusted by raising and lowering the adjusting nuts at each mount. To make lateral adjustment, loosen the mounting pad screws that anchor the engine to the bed. You will note there are slots in the mount pad which allow a reasonable amount of adjustment side-to-side.

After adjusting and re-tightening all mount screws and lock nuts, double check the alignment.

In the absence of a feeler gauge, the alignment can be checked fairly accurately with a strip of paper. Insert the paper between the two halves of the outer flange and rotate both together 360 degrees. The paper should remain in place through the complete turn.

b. Transmission

Periodically check the oil level in the transmission and inspect the control cables for signs of damage, chafing, corrosion, or loose fasteners. Lubricate the moving parts with spray lubricant or light grease.

c. Stuffing Box

The gland (stuffing box) should be tightened at least once per month to see that no more than one or two drops per minute flow in. If new packing is required, packing materials can be purchased at any marine supply. Repacking requires about ten inches of 3/16 inch material. (There is some discussion about what size and how long - Another said 1/4 inch and three 6" turns.) Remove the nuts from the two retaining bolts that hold the collar in place. Pull the collar up the shaft toward the engine. Water will flow in, but should be easily controlled by your automatic bilge pump or the electric bilge pump. Remove any old packing material with a hooked piece of coat hanger. Wrap the new packing material around the shaft just in front of the gland. Pull the collar down the shaft so that it tends to push the new packing material into the gland. Using the nuts on the retaining bolts, force the packing material evenly into the gland and tighten until there is a water flow of only about one drop per minute. Then install and tighten the locking nuts, as you would tighten the nuts on an auto wheel, tightening nuts on opposite sides a turn at a time after they are finger tight.

Incidentally, the rudder has a packing gland/stuffing box too. It should be checked for leaks as well as the steering quadrant, in general, as long as you have crawled back into that part of the boat! Consider replacing the rudder's packing every ten years or so. Check and grease the steering quadrant pulleys and cables annually. If you are fortunate, your stuffing box may be of the PYI type which is the accordion rubber appearing shaft seal which requires much less maintenance. Most boats delivered within the last ten years or so have been fitted with this type. Check your instruction book for details on it.

d. Cutlass Bearing

The cutlass bearing is mounted in a bronze casting which is designed to allow full flow of water throughout the length of the bearing. This is important because the cutlass is water lubricated.

A cutlass bearing should last several years. When the bearing is new, the shaft will be tight and no lateral movement will be apparent when trying to push the shaft side to side. As the bearing wears, one can move the shaft slightly from side to side or up and down. Once that lateral movement is more than about 1/16 inch, the bearing should be changed. This may be caused by engine mount failure.

Changing the bearing is a major maintenance job and might be best left to the professional yacht mechanic. It requires that the boat be hauled. The shaft must be removed by loosening the coupling set screws and pulling the shaft back through the gland. The four nuts on the bearings' casting retaining bolts are removed. The casting itself is threaded to the shaft log. Therefore, one must screw the shaft log out from the casting. Once the casting is removed, it is a simple matter to drive out the cutlass. It is not always necessary to remove the cutlass bearing casting. After the shaft is removed, the bearing can sometimes be drawn from the casting. One technique is to saw a small section out of the bearing so that it can be compressed and drawn. One must use an unframed hacksaw and be careful to saw only the bearing.

F. Electrical Systems

As mentioned in Section IV, the Tayana 42 has two standard electrical systems , a 12 volt DC system that gets its power from batteries and the engine alternator, and a 110 volt AC system that is powered through the shore power cable or with an outboard generator.

1. The 12 Volt DC System

The primary source of 12 volt power is the battery bank that comes with the yacht. The battery(s) are used both to start the engine and to provide the various electrical equipment on the yacht with power. The battery(s) are charged by the engine-mounted alternator or by a battery charger (converter) that is connected to a 110 volt power source. Cruising yachts may also use wind driven DC generators as well as solar cell panels to keep the house batteries charged without running the engine.

Battery maintenance is simple, but demanding. You should check your battery water at least once a month whether you have sailed the yacht or not. This is particularly important if you have a 110 volt converter or battery charger in operation. The electrolyte (acid) level should be maintained to cover the plates in the battery. It is best to use distilled water in your battery(s), but that is not totally necessary. Clean, drinkable water can be used, if distilled water is not available, but never use salt water. Excessive need of water is an indication that the charging rate is too high. A check of the charging voltage should not read over 15 volts. Should you spill electrolyte from the battery, it should be neutralized with baking soda.

Remember, battery electrolyte is sulfuric acid which is very corrosive. It will eat into your skin, wood, cloth, and some metals. Don't neglect a spill. If it gets on your skin, wash it off immediately with soap and water. One other battery maintenance point is the two poles. Make sure connections are clean and tight. A thin layer of grease will help keep battery connections clear of corrosion.

The use of a hydrometer is an inexpensive and accurate measure of the battery's condition. Specific gravity measurements of the electrolytes should read between 1.275 and 4.280 on a normally charged battery. All cells should read relatively equal; any one cell that has a noticeably low reading is an indication of a bad cell and the battery should be replaced.

a. Electrical Panel

The electrical distribution panel controls all of the 12 volt electrical circuits in your yacht. You will note that it has both a battery condition meter and an ammeter. The battery condition meter tells you the measured state of the charge existing in your batteries; the ammeter tells you how may amperes are being use at any instant of time. The various circuits go through the circuit breakers on the board. These circuit breakers act as both a switch and as an overload protection device.

There is very little maintenance necessary on the panel. Open the door and look at the back of the panel. You will see colored wires, which go to the various electrical devices. The colors allow you to find the same wires throughout the yacht. The panel should be kept dry at all costs. If a circuit breaker trips and cuts the circuit, there is an overload condition. This is usually because there is a short circuit. Always attempt to discover what caused the circuit breaker to trip before depending on that circuit again.

b. Master Battery Switch

All Tayana yachts come with a two position battery switch. This switch allows you to put one battery at a time into the circuit or to use both batteries (banks) at once. It is a make-before-break switch so one can select batteries at will while the engine is running; however, you must not put the switch in or through the OFF position with the engine on, as damage to the alternator may result. Similarly, choke the engine to stop it; then turn off the ignition switch. There is little that the owner can do to maintain the master battery switch other than to keep it clean.

c. Alternator, Engine Mounted

A critical point in the DC electrical system is the alternator. Its job is to maintain the battery's charge and cover the demands on the electrical system while the engine is running. The alternator converts mechanical energy into electrical energy, and the drive belt is its only link. Normally this is the only periodic attention the alternator needs. With the engine stopped, the drive pulley on the alternator should not be able to be turn by hand. Belt tension may seem tight enough, but the pulley may still slip if the belt is glazed or oily. When checking or tightening the alternator and it connections, it is advisable to turn off the battery switch. This prevents accidental "shorting" of the output terminal which is "live" even when the engine is at rest.

NOTE: Many boats will have "upgraded" alternator systems in order to more quickly charge the larger banks of batteries used on cruising boats. These systems will have their own unique wiring diagrams.

d. Electrical Starter

The engine starter motor is the most demanding load that will be placed on the electrical system and is not fused or protected by an overload device. Therefore, it is wise to make periodic checks on the connections at the starter and solenoid switch for tightness and cleanliness. Do not allow tools or other metal objects to come into contact with these connections while the battery is on.

e. Wire Runs

Wiring in your yacht is generally carried through wiring conduits. These conduits protect the wires from wear or impact. The color code used is shown in Table V-1. Where wiring is exposed, it should be checked to see that it is clear of potential harm. Terminal blocks and other exposed wire termination points should be sprayed with WD-40 or similar moisture eliminating product. It is very important to note that you should never, repeat never, disconnect wiring or plumbing for that matter without drawing your own schematic of how they were installed first. Also, make sure each line is tagged using waterproof labels. Trying to reconnect later will be your worst nightmare come true, if you do not! It is very convenient to keep a "smart book" with all these schematics, part numbers, phone numbers, addresses, etc. This book will become increasingly important over the years! For example, when you replace the anchor light bulb, write down the type in your smart book, so you don't have to go up again later just to see what type you have to buy.

2. The 110 Volt AC System

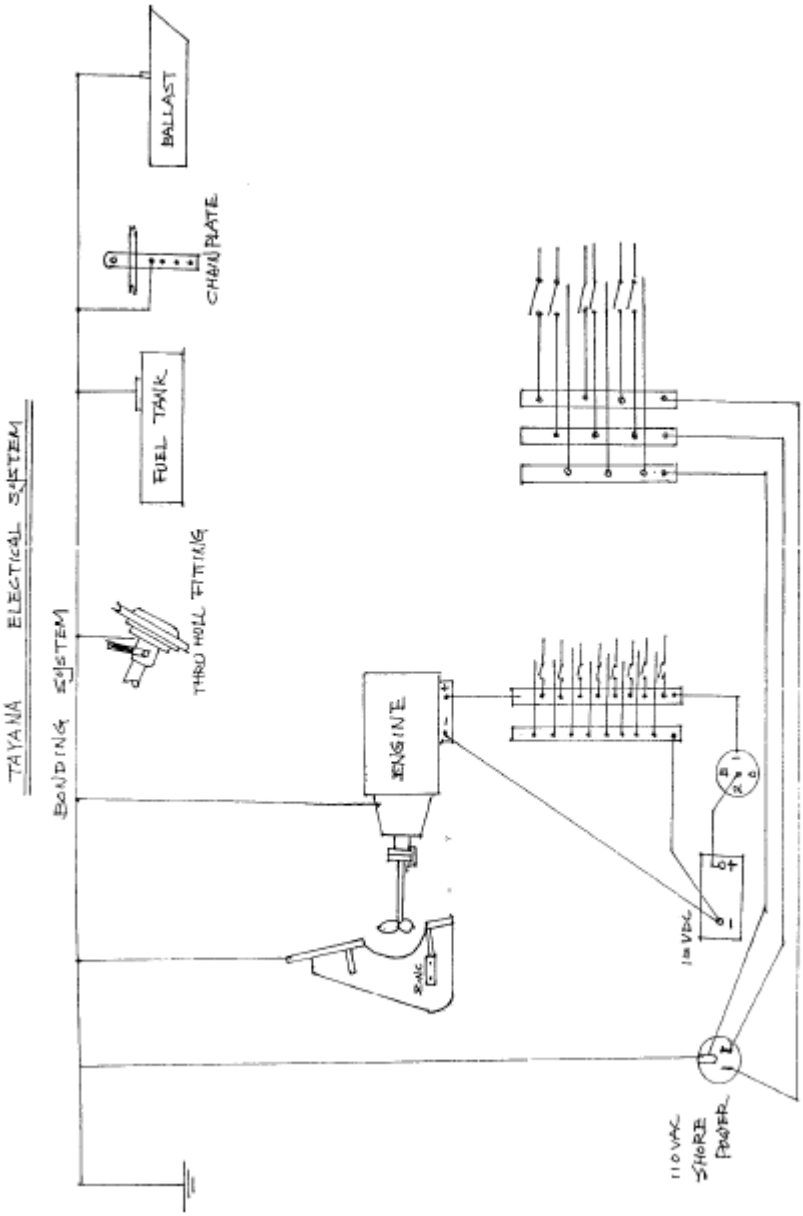
The 110 volt AC electrical system is connected to the shore power system. Its functions are primarily water, heat, battery charge, power outlets, and sometimes refrigeration and air conditioning. The service capacity is thirty amperes and the system is protected to that level. There is little maintenance that the average owner should do. Whenever working on the back of the panel, it is wise to shut down 110 power. Remember, a yacht is a damp environment, and this tends to increase the dangers of electric power. The 110 volt system is grounded in the yacht and this ground should remain. Remember – AC circuits and electricity can be lethal!

3. Protective Systems

Your yacht is bonded to help prevent galvanic corrosion. All metal parts of the yacht that might come in contact with salt water are bonded by electrical wires with green insulation in order to provide a low resistance electrical path for stray currents. Thus, there is a reduced likelihood of current running through the salt water "electrolyte" and destroying the metal parts. The bonding system should be checked to make sure that all of the connections are good and clean. Incidentally, it appears that this bonding also helps keep your boat a less inviting target for lightning when sitting in the water. A typical electrical bonding system is shown in Figure V - 1.

Sacrificial zincs are or should be bolted onto each side of your keel just forward of the shaft and or on your rudder. These rectangular zincs are unique and referred to as “Tayana” or “Taiwan” zincs. West Marine and other major boat stores sell this type of zinc. A 1-1/4 inch donut zinc is also installed on the propeller shaft.. You should check zincs frequently at first to see how fast the metal is sacrificed. You will then have some ideas of how often they must be replaced. It is not a bad idea to have a separate zinc clipped to a shroud and hung over the side while at the dock. This will save your installed zincs and offer some extra protection. To be effective, of course, it must be clipped to a metal part that is wired into the bonding system. If your boat uses a ‘shaft damper’, a brush must be installed to arc the engine block to the metal shaft.

Figure V-1: Electrical Bonding System



It might be well to note here that there may be zincs in the cooling system of your engine. (Many Yanmar's do not, but the Yanmar 3MQ30 does.) Also some refrigeration systems also have zincs in their cooling systems. These also must be checked and replaced as they are sacrificed. Refer to the engine manual for their location.

G. Plumbing and Sanitation Systems

Plumbing and sanitation systems are generally very reliable and require relatively little maintenance. A program of inspections will usually prevent most problems from developing. The critical points in the systems are the pumps; everything else is pretty simple and reliable.

1. The Fresh Water System

The heart of the pressure water-system on the Tayana 42 is the PAR medium duty diaphragm pump. This pump is generally located in a compartment along with the electric bilge pump and the shower sump pump (an option). It can be recognized by the pressure switch located on side. You will find a manufacturer's parts list and a description of the pump among the papers delivered to you with the yacht.

These pumps are highly reliable and will operate several years without any real maintenance requirement. If an occasion arises where a pump fails to operate, one should first check the pressure switch. This simple switch can accumulate dirt and not turn the pump on. If this should happen, turn off the power to the pressure water system, remove the pressure switch from the pump, and remove the switch housing. If the switch is dirty, carefully clean out the accumulation, reassemble the switch and try the system. If this does not solve the problem, you probably have a defective switch and it should be replaced. Two other common faults can cause the pump to malfunction – a broken belt, which is immediately obvious, or defective diaphragms. To check the diaphragms, remove the four screws in the top of the pump housing and carefully lift the top off. You will see two diaphragms; examine each. If they are defective, it will be obvious; they will have holes or they will be out of the diaphragm frame. Defective diaphragms should be replaced. PAR does produce rebuild kits for these pumps. While it is not a bad idea to have a rebuild kit, the most common requirement will be for a pressure switch, diaphragms, and belts. Before going on a long cruise, take a spare pump! Maintenance of the fresh water system requires little more than tightening the hose clamps to prevent leaks. If your pressure pump comes on at intervals when there is no demand, there is almost certainly a leak that is allowing the pressure within the system to drop. Inspection will almost invariably show that there is a loose connection and air is getting into the lines. Again, tightening the clamps will normally solve the problem. Have some extra clamps and hose before going on a long cruise.

Your hot water system is based on a ten gallon hot water heater, usually made by American Appliance, Inc. It has both an electrical heating element and a heat exchanger which gets hot water from the engine. It requires very little maintenance beyond keeping it clean and all connections tight. The hot water heater will last at least five years. The most likely failure is the electrical heating element. If this should happen, a new element may be obtained from almost any camping supply store and it is a simple matter to install.

2. Bilge Pumping System

The Tayana 42 is equipped with a minimum of two bilge pumps – one electrical and one hand operated. Both of these pumps should be checked every day that the yacht is sailed. The electrical bilge pump is by PAR and is located in the same compartment as the fresh water pump. The intake hose goes down past the engine and into the bilge sump below the engine. The pump outlet is just above the water line on the side of the yacht. The most common problem is a dirty filter next to the pump or a dirty pick-up screen. This may be cleaned simply by cleaning the filter or pulling the suction hose up from the sump and removing the dirt. Any effort to keep the bilge clean and sweet will pay off. The V-42 aft cockpit model has a deep sump and will easily have room for an automatic bilge pump. A top of-the-line automatic bilge pump should be your boat's single most important investment. Reliable, dependable automatic bilge pump operation is imperative! If your boat did not come with one, get one installed as soon as practical.

The hand bilge pump is generally located next to the helmsman or may be under the cabin sole. Usually a gusher type, the hand bilge pump serves two purposes – it pumps the bilge and it pumps the holding tank. By following the intake line from the pump aft, one will come to a set of two valves. With one valve closed and the other open, you can see that the pump clears the bilge. By reversing the closure of the valves, the pump clears the holding tank. A little experimenting will show you the proper valve operation.

If equipped with a Yanmar 3QM30, there may be another bilge pump mounted on the engine. This pump is continuously operating when the engine is running. If your engine has such a pump, it is important to remember that the bilge is constantly being cleared and a leak might not be apparent by simply looking into the bilge to see if there is water. We are told that the piping on some of these pumps have been modified to provide cooling water to other auxiliaries such as refrigeration systems.

3. Sanitation System

a. Holding Tank

Your V-42 has a holding tank system which is legal anywhere. The toilet may be pumped either into the holding tank or overboard directly. If the holding tank is used, it may be cleared either through an on-deck fitting or by the use of the bilge pump, as described above.

The holding tank is located forward between the water tanks. It should be kept clean by pumping clear water into it periodically and using any of the deodorizers found on the market. Many boats are installing their own upgraded marine sanitation systems. Add these schematics to your "Smart Book".

b. The Toilet

The toilet is one of the standard U.S. makes using seawater for flushing. The normal maintenance is of the pump. Head manufacturers all produce pump rebuild kits and you should have one aboard at all times. Probably the dirtiest job afloat is cleaning a plugged head outlet line. The toilet may become plugged for a variety of reasons. Most commonly, a toy, tampon, or too

much toilet paper is forced into the outlet line; it plugs or jams around one of the sharp bends that is part of the outlet line. There is little to do other than break the line at one of the joints and use a plumbers snake to clear the blockage. This type of blockage is best prevented by a good Captain's briefing to all new guests prior to departure from the dock. A prominent death threat signed by the Captain and taped on the lid of head will remind your guests of the unique nature of the "Marine Head" which is not a common household toilet.

Toilet operation and maintenance in salt water is enhanced by the periodic use (every three months or so) of a cup of Muriatic acid poured down the toilet. The acid chemically removes the calcium deposits that slowly choke off your outlet lines. A cup of cooking oil will lubricate nicely your marine head's seals and allow it to work smoothly. Keep your head clean. Take care of it. I have never seen a business in the yellow pages that does marine head cleaning or fixing....one day....sooner or later....have fun!

c. Sinks

The galley and head sinks work the same. They are drained straight overboard through a check valve and through-hull. If the sinks refuse to drain, it is generally because the check valve is stuck. Look at the drain hose and you will see a bronze cylinder with a hexagonal fitting on top. A sharp tap will usually free the valve. If this fails, remove the hex fitting and clear the valve.

END

Enjoy your yacht!