Spa

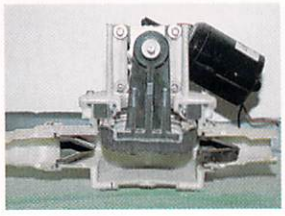
The Essential Spare Parts

STORY AND PHOTOGRAPHY
BY STEVE C. D'ANTONIO

In Part 1 of this two part series, we detailed engine and genset related spare parts. In Part 2, we'll move on to spares for the rest of the boat, including plumbing components, electrical items, running gear and spares for other systems.

The importance of spare parts for your vessel's vital systems has already been discussed in Part 1. Taking a cold shower because the hot water heater element has burned out is an inconvenience, while being swept onto a shoal because of engine failure caused by a failed raw-water pump or clogged fuel filter presents a much more serious problem. No one, however, wants to take a cold shower, and this



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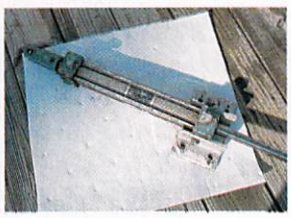
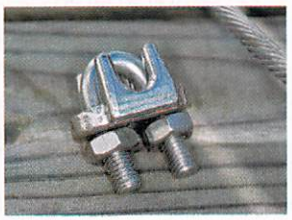
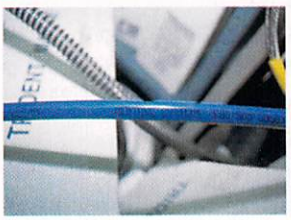
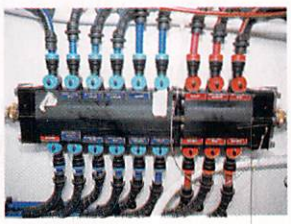
Locker For Trawler Cruisers – Part 2

event is as avoidable as most engine failures, provided the right spare parts are on hand.

Plumbing

Undeniably, the heart of your vessel's domestic or freshwater system is its pump. These pumps come in several varieties and capacities, along with a range of reliability and serviceability. Until a few years ago, most domestic water pumps utilized an electric motor that turned a gear, which in turn drove a cogged rubber belt that then drove a crankshaft, connecting rod and diaphragm. These rotary/reciprocal pumps are still available; they work well and are relatively easy to service. The latter fact is important, because they do require regular preventive maintenance if not repair. Buried

The last thing you want to discover while replacing a failed component is that the spare you dutifully obtained and have been carrying around for years isn't an exact replacement for the original item and as a result doesn't fit.

within these pumps are check valves and large bladder-type diaphragms. The check valves easily become fouled with even the smallest debris (for this reason, they should never be used without a strainer), while the diaphragms tend to dry rot with age, regardless of usage. Thus, if your vessel is equipped with one of these pumps, a rebuild/service kit is a mandatory item for the spares locker.

The newer rotary or swash plate pumps are smaller, lighter and usually more powerful than their belt driven cousins. They also incorporate check valves, which are equally susceptible to becoming clogged with debris, and as a result these pumps require service and spare parts as well. Prepackaged spare parts kits are available for most varieties of both pump models.

A final note on the topic of domestic water pumps: It is a foolish skipper indeed who sets off on an extended cruise without a spare domestic water pump pressure switch. These switches are notorious for failing, causing the pump to either not run at all, or preventing it from stopping at the preset 35 or 40psi. Yet, they are among the easiest of components to service on either of these pumps, requiring little more than an adjustable wrench or screwdriver and a wire cutter/crimper. Don't leave the dock without one.

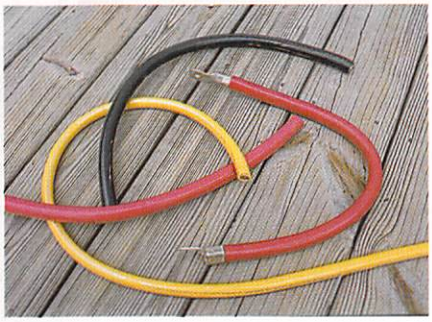
The remainder of the domestic water system consists of the aforementioned hot water heater, the actual plumbing itself, hoses, tubes or pipes and fixtures. All of these items will benefit from a carefully selected, relatively small contingent of spare parts.

The hot water heater's sole spare part consists of a heating element or elements (ensure that you obtain the correct voltage element when stocking up on spares; most are 120 volts, but others, particularly on larger vessels, are 240 volts) and perhaps a pressure relief valve. Cautious cruisers and service folks would insist, particularly for an item such as this, that the newly obtained element be installed immediately, while the original be retired as the "new" spare.

This line of reasoning holds true for many spare parts. The last thing you want to discover while replacing a failed component is that the spare you dutifully obtained and have been carrying around for years isn't an exact replacement for the original item and as a result doesn't fit. There are some components for which this philosophy holds true more than others; alternators, starters, belts and hot water heater elements are a few that may benefit from this approach. Bulbs for light fixtures, for example, probably wouldn't require this level of concern for direct replaceability, although it certainly wouldn't hurt.

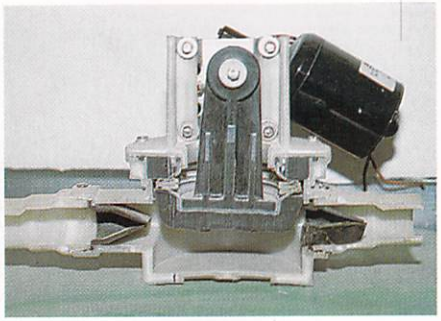
Polyethylene tubing and fittings used in proprietary "snap-together" plumbing systems, while extremely reliable, may be difficult to jury rig should a failure occur. The good news is, these parts are relatively inexpensive, and, as a result, it's not very painful to lay in a few spares even if the likelihood of their use is slim. A few lengths of the various sizes of tubing (there are sometimes two), a trunk line and branch circuits, and several termination ends and splice couplings are all that are required for these systems.

For conventionally plumbed vessels, a supply of hose, again in the various sizes used throughout the system, hose clamps and hose splice connectors are required. This final item, mentioned in Part 1 of this series and worth mentioning again, consists of a short brass or stainless steel plumbing fitting that is

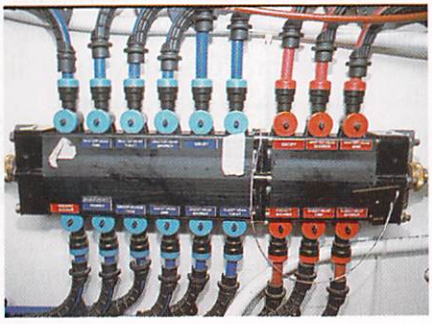


Because the terminals for these cables require special tools to install, it makes sense to carry a selection of pre-terminated, high amperage cables.

A selection of hoses in various diameters and configurations is a critical part of the spare parts kit.

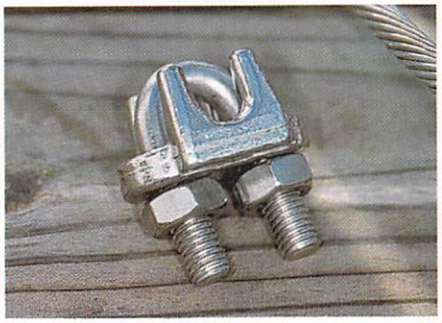


A cutaway view of a diaphragm-type sanitation pump. The duckbill valves, located in the inlet and outlet pipes, are clearly visible.

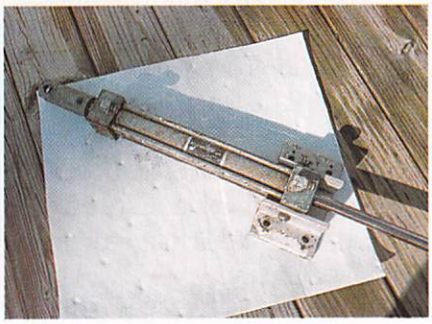


Proprietary polyethylene plumbing has been a boon to the marine industry, and it's being used more and more in both custom and production boats.

Polyethylene plumbing makes for reliable and neat potable water installations and is smart and easy to keep clean.



The versatile wire, or bulldog, clamp. Ensure that your primary and spare clamps are made of all stainless steel and that you know how to install them. The live portion of the cable should pass over the shoe and the dead or unloaded end of the cable passes clamp's hoop.



A spare hydraulic steering piston will afford those cruising far a field the greatest degree of mechanical independence.

Spare lengths of hydraulic hose, with couplings installed, are relatively inexpensive to have made and they require little in the way of storage space.

Hose menders are ideal for temporary repairs in fuel, domestic water and sanitation lines. They are available in both stainless steel and brass. The latter must never be used for seawater or below-the-water-line applications.

An average manual head rebuild kit. Ensure that you have at least one kit for each type of head aboard.

barbed on either end. It is ideal for temporarily repairing everything from domestic water lines to fuel lines and is available in sizes from 1/4 to 3 inches.

Proper operation of the head and related sanitation system, as far as some trawler cruisers are concerned, ranks second in importance only to the propulsion system. Others may declare that it is of primary importance, taking precedence even over the engine. Into whichever camp you may fall, there's no denying that proper operation of this system is vitally important. Don't get caught with your pants down on this one; make sure that you have at least one rebuild kit for each type of head aboard. Some "professional" cruisers and chartered vessels go so far as to keep on hand a completely rebuilt or new spare head, less the china bowl, stowed away in the recesses of the lazarette or other out-of-the-way locker, ready for an immediate swap should one of these vital pieces of equipment fail.

For the rest of us, a rebuild kit and toolbox will have to suffice. Most manual and electric heads are well served by their manufacturers, who provide complete prepackaged spare parts kits with clearly written instructions that contain nearly everything needed for a complete overhaul of the system. If you've never done this before, my advice is as follows: Add to the spare parts kit rubber gloves and bleach. Then, rebuild one of your heads before it fails. The familiarity you will gain in doing this is invaluable. Additionally, in doing this you will quickly be able to determine what tools you need and what vital spare part the "all-inclusive" rebuild kit is missing. You'll also gain a thorough understanding of what a properly operating head looks like; thus, when it comes time to rebuild an inoperative head, you'll know what looks right and what doesn't.

Vacuum operated heads from several different manufacturers have gained wide popularity in the recreational marine market, and with good reason. These systems are not only simpler and more reliable in design, but they also require a miniscule quantity of water for the flushing process. As a result, where an 80-gallon holding tank was once required, a 25-gallon tank is now ample.

As good as these systems are, however, they too require spare parts and occasional service. The usual items requiring repair or replacement include the gasket between the porcelain bowl and the pedal equipped valve base, the diaphragm vacuum and discharge pumps, and the vacuum switch.

The gasket replacement is a job that requires less than half an hour and could

The electrical spares complement should consist of, among other things, an assortment of fuses; critical light bulbs, such as those used for navigation lights; and small gauge "primary" wire.

easily be performed by a mechanically inclined 11-year-old. It's very straightforward, and the gaskets are easily obtainable from the head's manufacturer or dealer. Check the ball valve for scoring when you replace the gasket. If the valve face is damaged, the new gasket will not work for long. Rebuilding the diaphragm pump is a bit more difficult, but only because of the likelihood of poor access. These pumps are quite simple, serviceable parts consisting of only twin duckbill valves, a single diaphragm and an electric motor. In actuality, the part that is most likely to fail, at least for the waste discharge pump, is the duckbill valve. This invariably occurs for the sole reason that the pump is inadvertently operated against a closed seacock. Once that happens, the valves become inverted, necessitating their replacement and disassembly of the pump.

Adhesive, sealant, hose clamps, plumbing fittings and electrical terminals all should have their place in your spare parts locker.

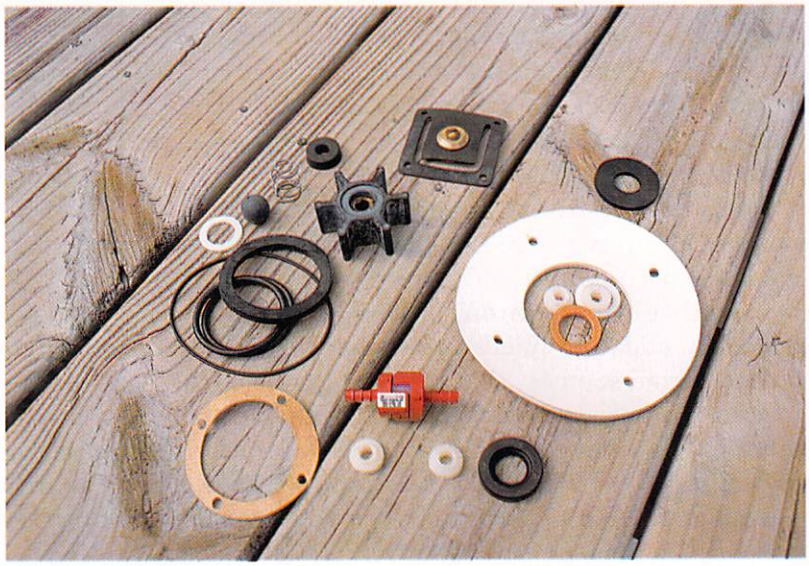
The final component that is likely to require a spare part and service within the vacuum-type sanitation system is the vacuum sensor switch. This device triggers the vacuum pump each time the head is flushed, re-establishing a vacuum within the system so it is ready to flush again on demand. The switch usually fails in the open position, which prevents the vacuum pump from operating. Replacement, provided you know where to find one, is simple and straightforward.

The remaining plumbing spares should consist of an assortment of hoses: raw-water, freshwater, reinforced, non-reinforced, etc., along with a selection of hose clamps. A few bronze or brass plumbing fittings (the latter for domestic water plumbing, never seawater), plugs, pipe caps, pipe-to-hose adaptors, etc., will round out the plumbing spare parts inventory.

Electrical

In today's electrically/electronically intensive recreational vessels, it would be folly to ignore the possibility of electron-induced failure and the resultant need for spares. Although it may seem overly simplistic, light bulbs are among the most common items to fail. But there's more here than meets the eye. Unlike the light bulbs in your home, where the bulb's wattage may be the only variable, cruising vessels are often filled with a variety of light bulbs in various shapes, sizes, base configurations and voltages.

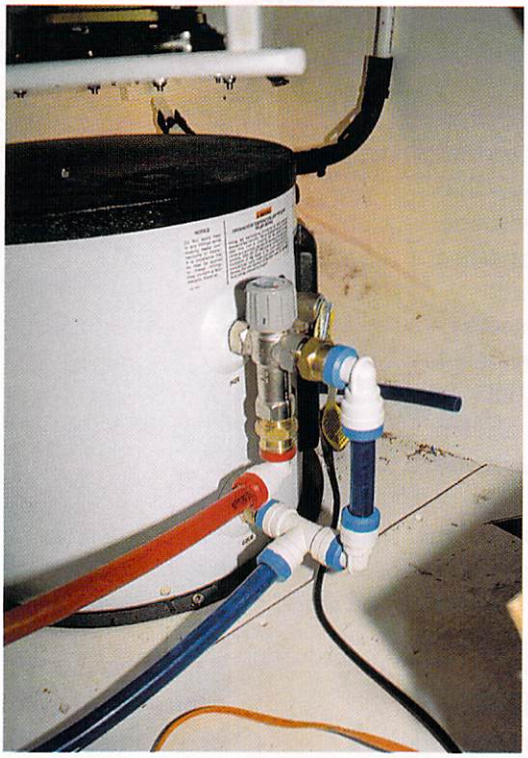
While it may be impractical to keep a spare of every bulb aboard, it is important to prioritize and lay in spares for critical lighting applications. These clearly include navigation, engine instrument and compass lights. Some would consider one set of spares insufficient where critical lighting is



A typical electric head rebuild kit contains a number of parts whose function may be a mystery until the first time you have to carry out an overhaul. Having confidence in your rebuild kits and knowing that they possess all the necessary parts will provide considerable peace of mind.

concerned. For example, on a recent five-day offshore passage, it became necessary for me to replace both port and starboard navigation light bulbs–twice. Then, consider spares for cabin and other lights, particularly if they are unusual fluorescent or halogen bulbs.

The list of other electrical spares could be quite long, indeed, depending on how much electrical gear you have aboard your vessel. Basics, however, include wire of various sizes and lengths, everything from 16-gauge primary wire used for branch circuits to 1/0 and above, depending on your application, used for battery and starter cabling. A variety of crimp-type terminals are part of this section, at least for wire sizes smaller than number 8 (these include red, yellow and blue insulated terminals), along with the necessary crimping tool.



The downside of polyethylene plumbing is that if any of its parts should fail or be holed, repairs are difficult to effect without the appropriate spare parts.

Because wire larger than this requires special tools to terminate, your approach to spares for these cables should be as follows. Measure a few vital cable lengths, from starter to engine battery switch and from alternator to its first termination, for instance, then either cut these spare lengths yourself or have them cut and terminated by your local boatyard. Choose a few nonspecific lengths to be terminated as well, but ensure that all of the eye terminals for dedicated applications will fit the various studs for which they have been cut: one-quarter, five-sixteenths, three-eighths, etc.

Fuses, for every device aboard that is so equipped, must also become part of the spare parts kit. Keep in mind that many electronic devices, radars in particular, utilize proprietary fuses that are not easily obtained from sources other than the manufacturer. Inverters, windlasses, house battery banks and some other high current consumers may be equipped with large fuses, in the 200- and 300-amp range. At least one spare for each of these items should be stocked. Some of the more conscientious yards and builders, when installing these devices, will provide a spare fuse that is securely located adjacent to the fuse block or terminal. This convenience makes for a quick and easy replacement, while eliminating the possibility of misplacing the spare.

Of course, several of the smaller BUSS (the familiar glass tube) or ATC (like those found in late model cars) type fuses, in various amperages, should be kept as spares for various pieces of equipment. My experience has been that many cruisers are often surprised by just how many items aboard their vessel require fuses, until one of these requires replacement.

Finally, the prudent spare parts procurement crew member should consider laying in several spare circuit breakers for his or her vessel's main electrical panel. One of each of the more common sizes–such as 5, 10, 15 and 20 amps–will usually cover any failure or weak performer.

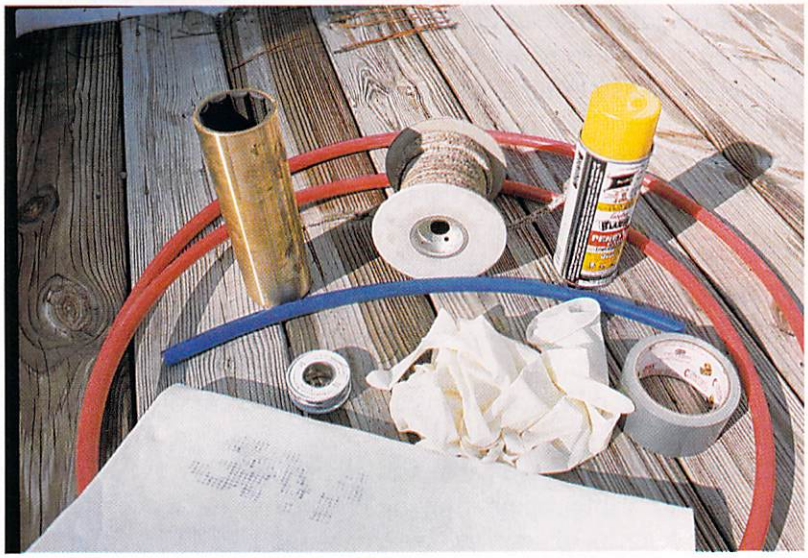
Running Gear And Steering Components

If your vessel is equipped with a conventional flax packing-type stuffing box, carrying a few spare lengths of packing material is a wise decision. This flax packing must be of the correct diameter for your shaft, and you must be prepared to cut and install it. I've found that it can be helpful to have an experienced marine technician precut several lengths of packing material, which can then be stored in a Ziploc bag. This takes some of the anxiety out of getting the length of each ring of packing just right.

If, on the other hand, you are in the "dripless" camp, be prepared to carry a few spares for this type of stuffing box. While dripless stuffing boxes have many advantages over their conventional kin, universality of parts is not one of them. Packing, hose and clamps can be found in just about any chandlery. However, for the unprepared, proprietary dripless stuffing box components must often be shipped in to your breakdown location.

For the two most common types of seals–lip and face–this entails carrying the hard-to-get parts. For lip-type seals, this means a spare lip seal, preferably pre-installed on the shaft. For carbon face seals, a replacement face element and bellows hose are the most commonly serviced items, although they cannot be pre-installed like the lip seal.

Within the running gear realm resides an additional spare that is well worth carrying: the cutless bearing. The aforementioned spare part philosophy of having the part even if you are incapable of installing it applies in this case as much as any. Cutless bearings come in a variety of shapes and sizes. If you make your way to a boatyard because this item has failed, having your own spare aboard may mean the difference between a one-day and a three-day stay in the yard. This axiom holds doubly true if your vessels is equipped with a metric shaft, as these bearings, although available, are not as widely distributed as their SAE counterparts.



An assortment of spares that may be found in the cruisers spare parts locker. These include a cutless bearing, flax packing, penetrating lube, seizing wire, rubber gloves, oil absorbent pads and tape.

Because most trawlers utilize either hydraulic or mechanical (in the form of cables and sheaves) steering systems, the spares can be clearly divided along these lines. Hydraulic steering systems are noted for their durability and installation versatility. When they do fail, however, without spare parts there's usually little a skipper can do other than rig the manual tiller.

For vessels seeking maximum independence or for those venturing far from the security of boatyards and marinas, it is wise to consider a full hydraulic spares complement. This would include, much like battery cabling, various lengths of pre-terminated hydraulic hose. Most hydraulic hose is made using proprietary hose and end fittings that are mated using special mandrels. Thus, carrying a few coupling-equipped spare lengths will enable you to replace a failed or leaking section with a minimum of difficulty.

For the truly globe-girdling vessel, a complete spare hydraulic ram should be given serious consideration. These rams do fail, although not usually in a catastrophic manner. Still, if you are cruising far offshore, a chronic leak could deplete your spare fluid reserves. Rebuilding this ram may be an option, provided the proper spare parts and tools are available; however, the user may have to be prepared to take the steering system offline while this service is being carried out.

Enough hydraulic oil should be carried for at least one complete fluid change. Follow the recommendations of the vessel and steering

It's impractical to have a spare for every gasket. You can, however, make your own provided you keep a good selection of various gasket materials.

system manufacturer to determine the type and quantity of fluid to be used. Alternatively, for older vessels whose steering systems have never been serviced, change the fluid and measure the quantity removed.

Unlike hydraulic steering, cable over sheave steering requires only one primary component, a cable and chain assembly. This cable assembly should include all necessary shackles, thimbles and swages, as well as an ample supply of the ever-versatile cable, or bulldog, clamps. This cable and chain spare assembly can be installed in the event of a cable failure.

In lieu of an en masse cable and chain assembly replacement, cable repairs may be effected using just spare lengths of stainless wire cable and bulldog clamps. Cables that fail over or adjacent to sheaves can be cut back and new cable spliced in a length sufficient to negotiate the sheave during turning. With a good supply of these clamps and a sufficient supply of flexible wire cable, many temporary repairs are possible. The need for repairs to sheave and sprocket assemblies are rare, particularly if these items are inspected and lubricated annually.

Auxiliary Systems

While a failure in one of these systems may not place you or your vessel in harm's way, it may cause the cancellation or curtailment of a long awaited cruise. Top billing on the auxiliary list would very likely go to refrigeration and air-conditioning systems. If either of these systems utilizes raw-water cooling (the latter must, while in the former it's optional), then a spare raw-water pump is a veritable necessity. These pumps are usually of the magnetic drive, non-self-priming variety and as such are often very long-lived. If, however, this stalwart should fail, it could mean some hot, sticky nights or a reefer full of spoiled food.

LP gas solenoids are also among the more important items found in the auxiliary systems category. If this solenoid should fail, plan on eating cold food, because there's simply no way to get gas to your vessel's range unless you have the necessary plumbing components to bypass this valve, which is not only inadvisable but an ABYC violation as well.

If you are uncomfortable replacing this valve, or working on the LP system in general, call on an expert to make the repair. There's simply no margin for error where LP gas systems are concerned. Once again, if you have the necessary spare parts, that's half the battle.

Many cruisers would consider the staple of any spare parts locker an adequately stocked "junk drawer." While the contents of one of these hallowed repositories of various odds and ends varies greatly from vessel to vessel, my recommendations for a few of these items follows.

A variety of stainless steel nuts, bolts and tapping screws makes a good start, as well as a few fine-thread hex head screws for engine work (these can be mild steel). Pipe thread sealing compound is also a necessity for many plumbing or gasket installations. My preference is a product called Leak Lock, manufactured by Highside Chemicals of Gulfport, Mississippi; it's ideal for pipe threads, oil, diesel, coolant, etc. It's even USDA approved for potable water and food. Add to this tubes of 3M 5200 and clear silicone sealant, various sizes of electrical wire ties, stainless steel or Monel seizing wire (in both .032- and .051-inch diameter), 3M all-weather (silver) masking tape, and sand paper in 36, 80 and 220 grit. Finally, spray lubricant and penetrating fluid will round out this drawer. (I prefer PB Blaster, available at most auto parts stores.)

I've omitted duct tape because of a personal aversion I have to this product, particularly where boats are concerned. I've seen too much damage caused by this product, thanks to the water solubility of its substrate. After exposure to water, the glue remains while the silver tape falls to pieces, and heaven help the poor soul who is tasked with removing the remaining goo. If, however, you won't feel comfortable unless there's a roll of this panacea in your junk drawer, there is hope. Instead of the duct stuff, get a roll of 100 MPH Tape. This is the milspec version of duct tape (the Army, in its own inimitable way, calls it: "tape, adhesive, waterproof"). It's strong and shares many of duct tape's attributes, and it's waterproof. Commando types use it to secure their KaBar sheath knives to their web belts. It's even been used to repair bullet holes in aircraft. (It's available from www.uscav.com, 800.777.7172.)

Carrying a proper complement of spares is like taking your umbrella when leaving the house, even on sunny days. It's just a matter of time before you'll need it.

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