SOLE COST AND EXPENSE

46 U.S.C. 4304 (formerly Section 15 of the Act) requires builders to correct defects or failures to comply with applicable regulations "at their sole cost and expense." The Coast Guard recognizes there are some corrections which the boat owner can perform easily, such as replacing an erroneous capacity label. But don't ask the owner to make corrections requiring special tools or expertise that he or she might not have, e.g. properly mixing two part foam flotation. If the owner perfonns a retrofit that is considered inadequate, the Coast Guard's only recourse will be to require you to perfonn it again. For some the second correction, may be more difficult than the first one.

If you choose to ask an owner to perfonn a correction, the instructions in your defect notice must include a statement to the effect that if the owner does not wish to do it, then you will do it. Also, the notice must describe when, where and how you will do it. And remember that the phrase "sole cost and expense" includes costs to transport the boat to and from where you will perfonn the retrofit.

Where a question arises concerning the degree to which you might reasonably expect an owner to make the necessary corrections, contact your local Coast Guard MSO/MIO Office. They will be able to help you determine the best way to conduct a campaign that does not place an undue burden on you or the consumer. (BSC 63)

ALCOHOL - BOOTLEG FUEL?

Is your boat powered by a gasoline engine? If your answer was yes, you've got a problem. Your boat's fuel system may be leaking. Besides fuel leaks, which increase your chances of having a fire or an explosion, the life of your engine might also be shorter. The culprit is alcohol.

Right now your fuel tank probably contains a certain percentage of alcohol mixed with gasoline. The pump where you bought your fuel probably lacked a sign stating that it contained alcohol. The guy who sold it to you might not have known the fuel contained alcohol either. So where did the alcohol come from?

Because of Federal air quality standards, the petroleum industry has reduced the amount of lead released into the atmosphere from exhaust emissions by blending alcohol and gasoline. Recently the EPA ordered a cut in the lead content of gasoline to less than one-half of one percent. Some older engines may need a special additive to provide valve lubrication.

Unleaded gasoline, "super unleaded," etc., may be a blend of ethanol (ethyl alcohol aka "grain alcohol") and gasoline. The largest selling alcohol-gasoline (gasohol) blend in the United States contains about 10 percent ethanol. In Brazil some vehicles run on a 100 percent ethanol fuel. Most of the methanol (wood alcohol) produced in the U.S., is a by-product of natural gas production. Methanol sells for about half as much as gasoline. One major fuel supplier is reported to be using up to 10% methanol in its leaded fuel.

Unfortunately, while the Clean Air Act sets maximum allowable concentrations for the amount of ethanol an unleaded fuel may contain, no Federal limits are set for the amount of methanol a fuel may contain. As a result, anyone in the fuel distribution chain can boost the octane level and in turn the profit on a gallon of gasoline simply by adding a quantity of methanol.

The Danger: While alcohol boosts the octane level of gasoline, it also attacks the rubber fuel hoses and even the metal components in fuel systems. Nitrile rubber fuel hoses, the most common fuel hose material used for a number of years, suffer increased swelling and elongation when soaked in alcohol-gasoline blends. Alcohol will permeate most fuel hose currently being installed in boats; that is, it will pass clear through the hose. The maximum detrimental effects occur at methanol concentrations of about 10 to 25 percent. Some bootleg alcohol- gasoline blends have been found to contain as much as 30 percent methanol! For some unknown reason, increases in the swelling and permeability of nitrile rubber fuel hoses are larger for alcohol-gasoline blends than for either gasoline or alcohol alone.

Some types of synthetic rubber and plastic used in critical components such as fuel pumps, accelerator pumps, hoses, and other components such as gaskets and seals, deteriorate progressively as the concentration of methanol is increased. Methanol-gasoline blends used in fuel systems damage carburetors and plug filters, particularly when there is water in addition to alcohol in the fuel system.

Corrosion of metals is also a problem with alcohol-gasoline blends. The terneplate (lead-tin alloy) coatings used in portable fuel tanks and older permanently installed fuel tanks can be attacked by blends, leading to subsequent corrosion of the steel tank itself. The resulting rust from the tank can plug fuel filters. Laboratory tests with six

metals (aluminum, brass, magnesium, steel, terne alloy and zinc) in alcohol-gasoline blends showed that all of them with the exception of brass exhibited at least some evidence of corrosion after 26 weeks of storage. Corrosion inhibitors added to the fuel by some suppliers can reduce this problem.

Corrosion of metal fuel system parts and the deterioration of synthetic rubber and plastic parts can be greatly accelerated by heat. Permeation of fuel hoses is essentially a chemical reaction. Heat accelerates this chemical reaction. Where hoses attach to fuel pumps on inboard and stemdrive engines, the rate of permeation can be considerably greater.

Phase Separation: Since water contamination of fuel distribution systems as well as condensation in fuel tanks can easily occur, phase separation with alcohol-gasoline blends can also be a major problem. All alcohols absorb water. The water it holds will corrode metal. Phase separation occurs when the alcohol-gasoline mixture is overloaded with water. The fuel separates into two layers: a gasoline rich layer on top and a alcohol-water layer at the bottom. Besides causing tank corrosion, this alcohol-water layer stalls your engine.

Buying Fuel: Currently there is no Federal requirement that fuel pumps display information concerning the concentration of alcohol in the fuels they are dispensing, so when you buy gasoline for your boat, you will have no way of knowing whether someone has added methanol. Only a few States require labeling on gas pumps. You should assume that your fuel contains alcohol and take precautions to reduce the harm it causes.

Inspect Hoses: If you have an inboard or stemdrive gasoline powered boat, inspect the markings on your fuel distribution lines. If they are not marked SAEJ1527DEC85, they should be replaced as soon as practical with hose meeting that specification. This same advice applies to permanently installed fuel systems on outboard powered boats. Some outboard engine owner's manuals advise against the use of fuels containing methanol. The hoses for portable tanks and those supplied with outboard motors usually are not a problem because they are out in the open air.

Owners of gasoline powered boats should inspect their fuel hoses regularly, especially near the engine where engine heat can accelerate deterioration. Look for hoses that are dry and cracked or soft and mushy. A hose that has failed should be replaced immediately, preferably with hose meeting SAE Standard J1527DEC85. Owners of outboards should consider using this hose because it will last longer with regular gasoline or alcohol blends.

If hose meeting the new standard is not available, use any hose marked "USCG Type A." A deteriorated fuel hose should be replaced immediately regardless of the marking. The signs of deterioration vary depending upon whether the fuel lines contain any fuel or not. A deteriorated fuel hose that contains no fuel is stiff and the cover is brittle and may have cracks. If the hoses are soft and swollen they are permeated by alcohol and/or gasoline. They too should be replaced immediately.

Boats with older hoses, particularly those that were manufactured prior to August 1978, the effective date of the Coast Guard Fuel System Standard, may have a serious problem because older hoses will fail rapidly in contact with alcohol. A fuel system containing a lot of hose full of fuel is particularly suspect, because the greater the length of the hose, the more the fuel that can escape. A hose ten feet long can dump a cup of fuel each day.

As we stated earlier, because permeation is essentially a chemical reaction, and heat accelerates chemical reactions, pay particular attention to where the hose attaches to the fuel pump on inboards and stemdrives when looking for damaged hoses.

Replacing Hoses: The Coast Guard realizes that many boat owners prefer to do their own maintenance rather than hire a professional marine mechanic. The price of the recommended replacement hose is considerably higher, but worth it, considering the danger a fire or explosion presents with fuel hoses that are susceptible to damage by alcohol. Just buying the right kind of hose won't solve the problem. Owners who choose to do the work themselves must be particularly careful to make a safe installation:

1. Replace deteriorated hose with new hose labeled "USCG Type A1" or "USCG Type B1" depending on whether the existing hose is Type A or Type B. If in doubt, use Type A1. The newest alcohol resistant fuel hose will be marked "SAE J 1527". If you can't get SAE J1527 and your existing hose is deteriorated, it is better to buy the older spec hose (SAE J30) rather than continue to use the deteriorated hose. Many dealers and suppliers of fuel hose will have hose in stock that does not meet SAE J1527. Such old spec hose is safe only for use in fill lines and vent lines. The danger involving these hoses is less stringent because normally they do not hold fuel for more than a few minutes.

Owners who are unable to find hose meeting the recommended specifications are urged to try to

find fuel which has the correct octane rating for their engine and which does not contain alcohol. Some States do not require the fuel pumps to be labeled with alcohol content. In that case you must make inquiries, particularly from an authorized dealer for your brand of engine.

2. Avoid emptying fuel lines full of gasoline into bilges; use a bucket to catch fuel drained from hoses.

3. Use hose clamps that do not rely solely on the spring tension of the clamp and be sure all connections are clamped securely to fittings. The clamps should be installed beyond the bead or flare or over the serrations of the mating spud, pipe or hose fitting.

4. Be sure to select fuel hose that will properly fit the metal fittings on the connections at each end. Do not buy a larger diameter hose than is necessary and then rely on the tightness of the clamps to compress the hose onto the fitting. If the inside diameter of the hose is larger than the fitting it slips over, you can tighten the clamps forever and the connections will still leak fuel.

5. Finally, in addition to fully ventilating the engine compartment after changing hoses, operate the blower for at least four minutes before starting the engine.

We expect fuel suppliers will add corrosion inhibitors to alcohol-gasoline blends to protect metal fuel system components. Many of the engine builders have already upgraded the gaskets and plastic parts in carburetors, fuel pumps and filters. In spite of these actions, many existing boats may develop fuel system leaks or other problems from the use of alcohol in gasoline.

In the opinions of many experts, this is not a problem which will simply go away. Also, it is not solely dependent on the decision to reduce the lead content of fuel. In a partial response to the problem, many States are requiring labeling on gas pumps dispensing alcohol-gasoline blends. Economics and availability seem to nominate alcohol as the fuel for now and the future. Be prepared. Make sure your fuel hoses can hold their alcohol. [BSCs 59, 60 & 63]

SEAT FASTENERS CAN LET YOU DOWN

The following article by Pete Current, Resource Manager for Fishtrap Lake, U.S. Army Corps of Engineers, is reprinted courtesy of the National Water Safety Congress Journal, Burke, Virginia.

DANGER FROM BEHIND

On 16 April 1983 Fishtrap Lake experienced a fatal drowning accident. This drowning was unique in that it brought to light an equipment failure that may be responsible for other deaths. Early on the morning of the accident, the victim and a close friend launched their boat and proceeded to their favorite fishing spot. Upon reaching that point, the victim sat down in the front pedestal-mounted folding seat and leaned forward to bait his line. After baiting his line, the victim straightened up and leaned back in his seat. At that instant, the seat back fell away and the victim tumbled backward into the lake. The victim could not swim, was not wearing a PFD and the water was cold (48°). Attempts by his companion to rescue the victim were not successful. Investigation of the accident revealed the seat back pivot point hinge pin was an aluminum rivet that had sheared.

The following month a fishing tournament was being held at Fishtrap and I displayed a photograph of the broken seat at the weigh-in station and asked the organizers to check boat seats of participants. Approximately 175 boats were checked and 48 seats were found to be defective. A local vendor participating in the tournament secured his tools and repaired the defective seats. All of the defective seats had aluminum hinge pin rivets. They were replaced with steel rivets. I talked with many fishermen over the summer and was shocked to learn that the failure of folding seat backs (with aluminum hinge pin rivets) was quite common. Most failures resulted in the fisherman falling into the boat but a few fell overboard.

If you own a boat equipped with folding pedestal seats, or if you know of someone who does, please check the seat thoroughly and replace any aluminum hinge pin rivets with steel pins or steel bolts. This simple check could save a life or prevent an injury.

Editor's Note: Although Mr. Current recommends steel pins or bolts, the Coast Guard would prefer that owners use stainless steel bolts.

The American Boat and Yacht Council (ABYC) is currently working on a standard for seat fastenings for boats. It will probably be a year or more before

the standard is published,but in the meantime several recommended practices have been developed.

Several serious accidents have been caused when the helm seat collapsed or came loose from the boat during critical maneuvers. The operators were seriously injured (at least one broken back) and swimmers who were run down sustained crippling injuries. Several fishermen have been thrown overboard when the fastenings on their pedestal seats pulled out of a plywood deck.

The ABYC committee discovered that the lateral force on a seat in a boat can exceed four to five times the weight of the person sitting in that seat. In other words, it is conceivable that a snap turn in rough water could exert as much as a 1000 pound pull sideways on a seat. In the case of a pedestal seat, this in turn could exert a 3000 or 4000 pound pull on the fasteners around the base: to much for screws in plywood, particularly after the plywood has gotten wet.

The committee also found that a healthy young man can exert 1500 to 2000 pounds of force when bracing his feet between a foot rest and the seat back. This force is multiplied by the lever action of a pedestal seat assembly.

Most of the accidents which have occurred involved a seat which was held down by gimlet or sheet metal screws fastened through the plywood or fiberglass cockpit sole. In most cases the plywood was wet and in some cases had turned black from contact with the screw, indicating some incipient rot. The common practice of fastening the seats in a boat over the top of indoor/outdoor carpeting or vinyl fabric almost guarantees that the plywood will eventually be weakened by moisture. The ABYC committee agreed that the best method for fastening a seat was through-bolting with generous sized washers or backing plates. Some types of blind fasteners might offer an equivalent level of integrity to through-bolting; however, these should be tested, since several engineers reported having encountered failures of some types of blind bolt fasteners.

Some engineers reported successful experiences with tapping plates placed underneath the cockpit sole and fastened with self-tapping stainless steel screws. That installation must be done very carefully, because it is easy to strip out the aluminum plate if the pilot hole is drilled oversize. Finally, if all else fails, wood screws or stainless steel sheet metal screws can be made to hold, if they are large enough and if they enter at least one inch of solid wood underneath the plywood.

One engineer reported successful use of #14 x 1 3/4" stainless steel sheet metal screws. They have more thread -- and therefore more holding power -- than the conventional tapered wood screw. Even with long screws of adequate size, care should be taken against weakening the wood by moisture and rot. A teaspoonful of wood preservative squirted into the pilot hole before sinking the screw might make such a fastener more durable.

In making the above recommendations neither the ABYC committee, nor the Coast Guard means to imply that the aluminum pins used by seat manufacturers are always inadequate. The suitability of any hinge pin material depends upon the design of the joint, the hinge material used, the amount of load exerted on the pin, the use of washers or sleeves to carry the load and lubrication of the joint.

Most of the "defective" seats referred to in the National Water Safety Congress Journal article had aluminum hinges fastened with aluminum rivets. The rivets had worn away to the point where the inspectors thought they might fail soon.[BSCs 52, 57 & 58]

REPAIRING BLISTERS IN FIBERGLASS HULLS

Blisters form when water penetrates beneath the gel coat. The water reacts chemically with the polyester resin in the laminate to form a sticky liquid containing acetic acid. The blisters swell as more water is drawn into them by osmosis.

Reports by boat builders, marine surveyors, and material suppliers were submitted to the National Boating Safety Advisory Council (NBSAC) Committee on Osmotic Blistering. The following is a summary of the current information for repairing fiberglass boats which have osmotic blisters.

(1) Puncture all blisters and allow them to drain. Then wash them with fresh water.

(2) Allow the hull to dry. The boat should be in a dry place or at least protected from rain. The longer the drying period, the better. Thirty days is usually long enough, but two or three months isn't too long.

(3) Gouge, grind, or carve out any soft laminate or areas where glass fibers appear in the holes. Do not sandblast or vapor blast the holes, because

there is too much danger of damaging good laminate. If the blisters are close together in a large area, some people recommend carefully removing all of the gel coat in the affected area with a coarse disc sander. Some yards in England are using an electric heat gun to soften the gel coat and removing it with a putty knife. Regardless of whether or not you remove the gel coat, you should carefully sand the bottom of the hull to remove all of the bottom paint to prepare the hull for a coating of epoxy.

(4) Fill all the holes and fair out any gouges. Deep holes (more than one ply) and large holes (more than a couple of inches wide) should be built up with multiple plies of cloth or mat and epoxy laminating resin. Fair shallow holes and gouges with a mix of epoxy resin and phenolic microballoons. Do not use any type of commercial body putty or polyester resin, because water will penetrate and pop the patches out.

(5) Coat the entire underwater surface with 10-12 mils (0.010-0.012") of two part epoxy resin. Do not use any type of paint product containing a solvent. There are many epoxy systems available which are sold specifically for this purpose. Some have a relatively low viscosity and may require four coats to acquire the proper coating thickness. Other epoxy systems are advertised as "high build" and need only two or three coats. If the gel coat was removed, this coating should be about 18 mils (.018").

(6) When the surface has cured according to the epoxy system manufacturer's instructions, sand lightly and apply standard anti-fouling paint. There is some concern by many repair yards that even a carefully repaired hull may blister again.

The NBSAC Committee on Osmotic Blistering believes that blisters will get progressively worse if they are not properly treated when first discovered. The Committee also believes that even if the initial blistering condition is confined to only part of the bottom, you should assume that the entire bottom needs treatment. It doesn't hurt to apply this treatment to a sound hull or to a new boat as a preventative measure, but it probably isn't cost-beneficial.

It appears that most boats do not develop blisters, but for those that do, this treatment does not cost much more if it is applied after blisters first appear.

[BSC 62]

RULES OF THE ROAD: NAVIGATION LIGHTS

Navigation lights are essential to safe boating at night. Under ordinary conditions they tell boatmen something about each other's size, speed, course, and kind of boat (sail, power, tugboat, anchored, etc.). Although it is the boat operator's responsibility to carry and use navigation lights, some manufacturers have chosen to install them before offering their boats for sale.

In some instances the Coast Guard has found that manufacturers are installing navigation lights that cannot pass the requirements of either set of rules - Inland or International. Boat buyers and boat owners assume that the equipment installed on their boats at the time of purchase complies with all legal requirements. Deficient, shoddy and improperly installed equipment seriously endangers their lives as well as the lives of others who operate their boats at night.

In order to reduce the dangers to which the members of the boating public are exposed, under current policy, the boat manufacturer is responsible for the adequacy of navigation lights that the company installs at the factory. Specifically, if a manufacturer decides to offer a boat for sale with navigation lights installed the company must:

(1) Install lights that satisfy the requirements of International Rules; or

(2) Install lights that satisfy the Federal requirements detailed in the special rules that apply to Inland Waters; or

(3) Be able to prove that failure to install lights in a legal configuration was the result of a specific order to the contrary from the buyer.

Under this policy, boats that are manufactured with installed navigation lights that do not meet either Federal or international requirements, contain a defect that creates a substantial risk of personal injury to the public. Thus, such boats are subject to the defect notification requirements in 46 U.S.C. 4310. This policy is in the best interests of both the boat manufacturers and the boating public.

Placement of All-Round Light and Combination Sidelights:

According to Rule 23(a) of the Inland Navigation Rules, a power driven vessel underway shall exhibit:

(1) a masthead light forward; except that a vessel of less than 20 meters in length need not exhibit this light forward of amidships, but shall exhibit it as far forward as is practicable.

(2) sidelights; and
(3) a sternlight.

According to Rule 23(c), a power driven vessel of less than 12 meters in length may, in lieu of the lights prescribed above, exhibit an all-round white light and sidelights.

Subsection 84.03 of Annex I to the Inland Rules states that "The masthead light, or the all-round light described in Rule 23(c), of a power driven vessel of less than 12 meters in length, shall be carried at least one meter higher than the sidelights.

Section 2(d) of Annex I to the International Rules (COLREGS), however, refers only to masthead lights that are carried in addition to sidelights and a sternlight. An International Maritime Organization (IMO) interpretation of the COLREGS indicates that the same separation was intended for an all-round light used in lieu of a masthead light and sternlight.

Coast Guard standards personnel who are on factory visits will check to make sure that the navigation lights on new boats have the required minimum one meter separation.

Masthead Lights and Sternlights:

Some people have received information to the effect that the masthead light and sternlight may be combined into the same fixture on boats up to 20 meters in length, in effect, creating an all-round light (225 degree masthead light + 135 degree sternlight). This information is incorrect.

According to Rule 23(a) of the Inland Navigation Rules, "A power-driven vessel underway shall exhibit:

(1) a masthead light forward; except that a vessel of less than 20 meters in length need not exhibit this light forward of amidships, but shall exhibit it as far forward as is practicable.
(2) sidelights; and
(3) a sternlight.

According to Rule 21(c), of the Inland Navigation Rules, "Sternlight" means a white light placed as nearly as practicable at the stern showing an unbroken light over an arc of the horizon of 135 degrees and so fixed as to show the light 67.5 degrees from right aft on each side of the vessel.

Finally, paragraph (2)(f)(i) of Annex I to the Inland Navigation Rules states, in part, that "The masthead light or lights prescribed in Rule 23(a) shall be so placed as to be above and clear of all other lights and obstructions..."

As a result, an all-round light fixture is not permitted by the Navigation Rules, because the sternlight must be as near as possible to the stern and the masthead light must be as far forward as practicable. Obviously these requirements can't be met if the two lights are in the same fixture or even mounted close together.

Only a power driven vessel of less than 12 meters may display an all-round light and sidelights in lieu of a masthead light, sternlight and sidelights (Rule 23(a)).

[BSCs 24, 54 & 60]

A GOOD WAY TO DIE

How many times have you dismissed a headache and slight nausea as minor seasickness brought on by the combined effects of the sun and the waves or too many beers? Did you ever stop to think that you might have been a victim of carbon monoxide poisoning? The following describes some typical boating fatalities caused by carbon monoxide poisoning and what boat owners can do to prevent them.

The victims of carbon monoxide poisoning feel no particular pain except, perhaps, a severe headache which they usually attribute to some other cause. In fact, carbon monoxide will dull the senses to the point where the victims feel no fear or danger and have no will to save themselves. An hour after they drift into unconsciousness they are dead.

In one accident reported to the Coast Guard, a couple and their two daughters were killed by exhaust fumes that escaped from a cracked generator exhaust manifold. The owner of the boat had left the generator running overnight to supply electricity for a small heater in the cabin. The generator was installed in the engineroom but there were holes in the engineroom bulkhead, left there by the builder and by various mechanics who had worked on the boat since it left the factory.

Inspect the engine and generator exhaust systems for cracks in the hot, unjacketed sections of the exhaust manifolds. Check the tightness of the bolts holding the exhaust manifolds to the engine blocks.

Are the engineroom bulkheads completely sealed against leaks into accommodation areas? Don't bet your life on the integrity of the engine exhaust system. All holes in the engineroom bulkhead for plumbing, wiring and controls should be sealed by whatever means is most convenient. Seal larger holes with pieces of plywood. Fill spaces around wiring and plumbing with caulking, electrician's putty or the nondrying putty material used by

heating and ventilating contractors to seal pipes in the sides of air conditioning equipment.

Don't let anyone tell you that holes are necessary in the engineroom bulkhead for ventilation of the framing. If ventilation is needed, it can be provided on either side of the bulkhead, rather than through it. Sealing the holes in engineroom bulkheads will also make the cabin much quieter while the boat is underway.

Was the generator installed by the boat manufacturer? Don't install a portable generator below decks. No portable generators meet the Coast Guard Electrical and Fuel System Standards. The fuel tank is usually on the top of the generator directly above electrical components that are not ignition-protected, a potentially serious fire hazard on a boat. The exhaust system on a portable generator is usually constructed of nonmarine alloys that will rust through after brief exposure to a salt water environment. The carburetors on most portable generators are not intended for marine use.

Do not use any flame producing device in an unventilated area. Any heater, stove or lantern that produces an open flame uses oxygen. The argument that these devices do not produce carbon monoxide does not apply when they are used in enclosed spaces. Alcohol heaters and stoves, propane heaters and stoves, catalytic heaters, oil lamps, gasoline lanterns, even charcoal stoves consume oxygen. When the amount of oxygen in the air gets below a certain level, these devices produce carbon monoxide because of incomplete combustion of their fuel. Ventilation must be provided whenever any device producing an open flame is used in a boat cabin.

Another accident reported to the Coast Guard involved a large twin screw yacht. The owner and three of his guests who were below during a cruise across a lake were killed by carbon monoxide gas that had seeped into the cabin after escaping from a loose hose coupling on the exhaust pipe for one of the engines.

Employees of the yard that built the boat were probably the last ones to see that exhaust pipe in daylight prior to the accident, some three years after the boat left the factory.

On this particular boat a four inch diameter copper exhaust pipe extended from the exhaust manifold on the engine, to the aft engineroom bulkhead and then behind various pieces of mahogany cabinetry in the aft head and stateroom to the transom. At the engineroom bulkhead where the two sections of copper exhaust pipe met, a length of rubber hose was slipped over the two sections of copper pipe and clamped in place.

Prior to the accident the boat's engines had been overhauled. In order to remove the engines from the boat, mechanics had disconnected both exhaust manifolds and twisted the exhaust pipes out of the way. This was easily done because the pipe rotated in the rubber connection at the bulkhead. When they replaced the engines and reconnected the engine exhaust pipe, the mechanics failed to inspect the other end of that rubber hose connection behind the engineroom bulkhead in the after stateroom. The movement of the forward section of the exhaust pipe had loosened the clamp holding the rubber hose to the rear section. Normal engine vibration probably caused the failure several hours prior to the fatal voyage.

Are rubber exhaust hose connections held by double hose clamps? Be sure that all rubber hose connections in the exhaust system are fitted with two clamps at each end. Double clamping will go a long way toward preventing the exhaust hose from coming loose due to vibration.

Are the exhaust hoses intended for marine use? Make sure the hoses aren't burned through or beginning to show signs of advanced age. If you replace them, be absolutely certain that they are labeled by the manufacturer for use in a marine exhaust system.

Are the exhaust system connections accessible for thorough inspections? If you own a double cabin cruiser or motor yacht, the exhaust lines probably pass through the aft stateroom on their way to the transom. There may be a rubber hose connection at the transom, at the engineroom bulkhead and at each end of any muffler installed in that exhaust line. All of these joints should be accessible for a complete inspection. If you find that the exhaust lines run behind cabinetry, as they do on many boats, now is the time to provide access. Cut holes or install removable panels so that inspection is relatively easy. You will want to inspect these connections at least twice every season. A crack or leak in the exhaust line is easy to detect while the engine is running. These are wet exhaust lines A leak or crack will cause a steady drip of water.

In still another accident, a boat owner was cruising across a bay for a rendezvous with fellow yacht club members while his wife slept on the V-berth up forward. Upon arrival at their destination, the owner found that his wife was dead.

Most boats have a fairly large cabin structure forward of a cockpit area. When the boat is underway, the air swirls around the cabin structure and hardtop into the cockpit and often the cabin crating a low pressure area. This low pressure area will draw air from anywhere, over the transom or even through a sink drain that exits the hull side above the waterline. The exhaust gases are then recirculated throughout the cockpit and cabin areas. This happens regardless of whether the boat is traveling upwind or downwind.

Some people refer to it as the "station wagon effect." Some station wagons have a deflector on the rear edge of the roof to keep road dust from being sucked into the car through the open tailgate window.

On a boat the best solution to the potential for this type of carbon monoxide poisoning is to provide alternate sources of air for the cockpit and cabin areas. Leave a port in the windshield open and open a deck hatch. If you can feel a flow of air coming aft through the cabin and cockpit areas, you probably won't have much of a problem with carbon monoxide being pulled forward and into the boat. Exhaust deflectors can help, but they won't totally eliminate the problem.

Remember that carbon monoxide is a clear and odorless gas that may be present even if the telltale smoke associated with exhaust emissions is not. Don't wait to feel the symptoms of carbon monoxide poisoning. Check your boat's exhaust system frequently.
[BSC 58]

SALES OF DEFECTIVE PRODUCTS PROHIBITED

§ 4307. Prohibited acts

(a) A person may not-

(1) manufacture, construct, assemble, sell or offer for sale, introduce or deliver for introduction into interstate commerce, or import into the United States, a recreational vessel, associated equipment, or component of the vessel or equipment unless -

(A)(i) it conforms with this chapter or a regulation prescribed under this chapter; and

(ii) it does not contain a defect which has been identified, in any communication to such person by the Secretary or the manufacturer of that vessel, equipment or component, as creating a substantial risk of personal injury to the public; or

(B) it is intended only for export and is so labeled, tagged, or marked on the recreational vessel or equipment, including any markings on the outside of the container in which it is to be exported;

(2) affix, attach, or display a seal, document, label, plate, insignia, or other device indicating or suggesting compliance with standards of the United States Government on, in, or in connection with, a recreational vessel or item of associated equipment that is false or misleading; or

(3) fail to provide a notification as required by this chapter or fail to exercise reasonable diligence in carrying out the notification and reporting requirements of this chapter.

(b) A person may not operate a vessel in violation of this chapter or a regulation prescribed under this chapter.

The defect notification and recall regulations administered by the Coast Guard apply to manufacturers and importers of boats and associated equipment (outboards, inboards or sterndrives). These regulations apply when a boat or motor fails to comply with applicable Federal safety standards or contains a defect which creates a substantial risk of personal injury to the public.

Federal statutes (see 46 U.S.C. 4307 above) prohibit the sale of a boat or item of associated equipment if the Coast Guard or the manufacturer has informed the seller that it contains a defect which creates a substantial risk of personal injury to the public. This prohibition has been in existence since August 1971 for boats which do not comply with an applicable Federal safety standard or regulation. Even if the original manufacturer of the product is no longer in business, if it contains a substantial risk defect, the product must be repaired before it can be sold. [BSC 60]