



SEAWORTHY

The BoatU.S. Marine Insurance and Damage Avoidance Report*



Photo courtesy of Gary M. Baranec, Altoona, (Pa.) Mirror

Ethanol And Older Engines

Over the past few years—since ethanol has become common for boat engines—Seaworthy has received hundreds of calls and e-mails complaining about problems that ethanol has created for their engines. The majority of these inquiries have one thing in common: They concern older engines, those made before

around 1990, and a high percentage of them involve outboard engines. What is it about older boats that make them more susceptible to ethanol's well-known problems? Seaworthy talked to Ed Alyanak, Mercury Marine's manager of engine test and planning development, and Frank Kelley, Mercury's fuels and lubricants technical specialist—who between them have over 60 years of experience—to find out why older engines suffer more than newer ones and what owners of these engines can do to minimize the problems.

knowledge that they would be vulnerable to new fuels in the future. "No one knew ethanol would be a common additive to gasoline 20 or 30 years ago. We designed engines to run on straight gas," he says. And it's not just the engines that are affected by ethanol. Alyanak says that hundreds of boatbuilders who designed the engines' fuel systems from the gas tank to the engine were also unaware of the future challenges from ethanol. And the very simplicity of older carbureted outboard engines seems to make them particularly susceptible.

Boat engines comprise one of the largest segments of "legacy" engines in the country. Unlike cars, boats often operate for decades, which means that there are hundreds of thousands of older engines—many of which were built 20, 30, or more years ago—still churning the water. According to Alyanak, these engines were engineered and built without the

The issues for older engines fit into three categories: old

Continued on page 8

In This Issue ...

- INSTALLING ELECTRICAL ITEMS6
- MIDDLE AGE BOATS 10
- FITTING OUT WORKSHEET12
- AVOIDING PROP INJURIES13
- RETURN OF PAPER SEAWORTHY 16

*The BoatU.S. Damage Avoidance Program is dedicated to helping you enjoy accident-free boating. Seaworthy looks at real claims and how they might have been avoided. Material in Seaworthy may be reprinted with credit to "Seaworthy, the BoatU.S. Marine Insurance and Damage Avoidance Report."



Charging Batteries

Just a note to thank you for the article in *Seaworthy* about batteries. In the article on lithium batteries, there is a paragraph about how normal marine batteries and the charger heat up without proper air circulation. That caused me to change how I charge the batteries on my center console. The four batteries—two for the outboard and boat electronics and two for the trolling motor—are all located underneath the center console just above the gas tank. Usually charging the batteries overnight, I would put back the compartment cover and mostly close the center console. No more. I am going to leave it open to the air. Thanks again.

J.L. Lagestee
Chino, California

You might note that lithium-ion batteries are usually built-in systems with individual cell-voltage monitoring and charge control, among other protections. There is no trickle-charge allowed current; continuing any current beyond optimal charge level can damage the cell.

A useful resource ...

www.batteryuniversity.com/learn/article/safety_circuits_for_modern_batteries

Eugene Day
Washington, DC

I Saw A Boat Explode Once...

Regarding the Alert on boat explosions, I saw a boat explode once, and I vowed that it would never happen to me! People died in the explosion.

I ALWAYS open the engine hatch for 10 minutes before I start the engines. That goes for diesels, too. I have a nice 47-foot Harbor Master houseboat, which has a very large engine room hatch on the aft deck. I open that and sniff, then LOOK around before starting the engines. I do it every time—EVERY TIME—no excuses.

Roy Gallucci
Stockton, California

Never Finished

Regarding the Personal Account about *Never Finished*, the clamps on a shaft log can come off easily. Temperature changes cause diameter changes. Shrinkage caused by cold water on clamps installed on a hot day, for example, will loosen the clamps. I recommend using clamps with the beveled washers that provide constant torque even during expansion and contraction. These clamps can be purchased at a Caterpillar dealer or possibly any other large-equipment dealer. They are not expensive, especially compared to the results incurred by using the inexpensive clamps. Save a buck, sink a boat. These better clamps should also be required on all below-the-waterline line connections. My boat and another boat at my marina also had a similar clamp issue. Both boats were saved from sinking, one by being hauled out at the last minute and mine by simply sliding the new hose and new clamps back in place and retightening the clamps.

Vibration from a folding prop that does not open correctly will also move that loose hose and sink the boat. I would check the shaft bearings and all other tolerances for excessive wear, wrong parts, or just a bad design on the *Never Finished*. Had the shaft tolerances been less, the sinking would have not have been so quick.

Greg Spring
Cincinnati, Ohio

Three lessons came to my mind that weren't mentioned. First, whenever something unusual happens, check for damage. Second, install a bilge-level alarm. Third, always carry a handheld VHF. You might end up in the water on short notice, and a radio would come in handy.

Ted Fautz
San Diego, California

Thanks for the story about the sinking of *Never Finished* and the important insurance/salvage issues. I'd like to add a couple of thoughts. Boaters should

understand the dangers of hitting any submerged object—even a seemingly harmless crab pot. If you hear a “thump, thump, thump,” stop all engines and check the engine room and bilges. One should assume that there might be damage, especially water coming in at the shaft. That was perhaps the main lesson of the story along with that of not running over them in the first place, but the author “figured those expensive cutters on the props had cut loose whatever it was we hit.” One should regularly check bilges and engine room, anyhow.

One could argue about whether this particular situation called for a mayday or a pan pan since it was a calm, warm summer day, but I was surprised about the author later saying he was ashamed that he did not activate his EPIRB. I say that based on the conditions just noted, time of year, proximity to land, the other modes of communication, and other nearby boats. It is slippery to second-guess in hindsight, but it would seem that activating that global emergency system after contact was made with so many others nearby and prepared to assist would have been unnecessary



Publisher
William M. Oakerson

Editor
Robert A. Adriance, Jr.

Associate Editors
Charles D. Fort
Lenny Rudow

Contributing Writers
Gregory O. Jones

Graphic Artist
Nancy K. Roberts

Proofreader
Regina D. Cruz

Circulation
Nelo Karimi
Kristin Loyd

Seaworthy is published quarterly (Jan, Apr, Jul, Oct) by BoatU.S. Marine Insurance, 880 South Pickett St., Alexandria, VA 22304-4695. Subscription rate: \$10 per year. Single copies: \$3.50. Tel. 800-262-8082 x3276. **POSTMASTER:** Send address changes to *Seaworthy*, 880 South Pickett St., Alexandria, VA 22304-4695.

Letters to the Editor should be sent to *Seaworthy*, c/o BoatU.S., 880 South Pickett St., Alexandria, VA 22304. E-Mail: Seaworthy@BoatUS.com. We reserve the right to edit for clarity and brevity. To get an insurance quote for your boat, call 800-283-2883.

2012 Boat Owners Association of The United States
880 So. Pickett Street, Alexandria, VA 22304

and perhaps unwarranted. Making sure the EPIRB would be handy if needed would seem to be more reasonable.

Real lessons other than the important insurance concern: 1. Bad things happen on nice days—there are always risks. 2. Don't hit crab pots; a good lookout is prudent and required by law on navigable waters—high seas, international water—everywhere! 3. If you hear a thud or think something is wrong—check it out! 4. The engine can always be used as a pump—and two engines pumping might have saved his boat.

Paul Foer
Annapolis, Maryland

Thank you for the great article on the sinking *Never Finished*; it was very informative and helpful as we have had close calls with lobster traps in the past.

The Tigchelaars
Ontario, Canada

I read the recent *Seaworthy* article by John Zalusky and Susan Rork, "The Sinking Of *Never Finished*." Under the sidebar, "A Few Lessons," the authors offered the following observation concerning hoses and, more specifically, hose clamps:

"Use the strongest possible hoses and stainless steel clamps, especially with through-hulls below the waterline. Since the unfortunate run-in with the crab pots, I've installed 'T' bolt clamps, which are much more secure."

As an Accredited Marine Surveyor, I fully agree with the author's advice. All too frequently, while inspecting vessels I have noted the use of automotive-type hose clamps on through-hull fittings and at stuffing box hoses. Although automotive-type hose clamps may have a stainless-steel band, the screw is almost always cadmium-plated steel. Steel screws are subject to severe corrosion degradation, which could lead to failure of the clamp's ability to properly attach the hose to the fitting.

I am a firm believer in the superior quality

of marine approved "T" draw bolt-type clamps and frequently recommend their use. Although not actually required by ABYC and the USCG, I also recommend, when practical, that all below-the-waterline through-hull fittings be double-clamped as an additional safety factor.

Captain Jay Michaud, SAMS, AMS
Marblehead, Massachusetts

I would like to add another safety idea to the story about the sinking of *Never Finished*: I did not read anything about a bilge water alarm in the story. Every boat with a bilge pump can install an alarm for less than \$20. Using an automotive backup alarm from Whitney Auto Parts, you can simply connect the 12-volt DC alarm to the bilge pump positive wire and ground. It will sound anytime the pump is "ON" and should be located near the helm or anywhere it can be heard throughout the boat. I will not complain if it wakes me in the middle of the night. I have installed this system on each of the 27 boats I have owned.

Capt. Haley
USMC Air Safety Officer
Edgewater, Maryland

Checking Through-Hulls

I find the accounts of boat sinkings, collisions, failures, etc., fascinating and educational. This falls in that category.

In November, I purchased a 1990 Luhrs Allura Express Cruiser that had sunk in shallow water at the owner's private dock. The boat was raised, towed to a marina, and cleaned by a competent crew with a mechanic tending to the engine. When I purchased her, BoatU.S. required a survey by one of its approved surveyors.

Among the recommendations he made was to replace the plastic through-hulls in the transom that drained the relatively large cockpit. When I attempted to remove the inspection port covers, accessible only through the transom lockers, I discovered that the one had evidently been painted over with epoxy-type paint and could not be removed. I

unscrewed the entire fitting for access to the through-hull and hose. To my surprise, the hose was connected to the cockpit drain and attached with a single hose clamp. The other end was lying on the floor, not connected to the transom drain! Because the single inspection port for the starboard drain had accidentally been sealed with epoxy paint, it had never been checked in 20 years.

The moral of this event is not only to check your oil and water levels, but also find each through-hull and make their inspection part of your regular maintenance program! And if my surveyor had not insisted I replace the plastic through-hulls with bronze, I would probably never have checked them either, especially the one with a sealed access port!

Lamar F. Neville
Annapolis, Maryland

Locating A Mysterious Leak

I have a 1988 Pearson 31 sailboat. During the last year, I have noticed that the boat takes on about a gallon of water underway. No water comes in while the boat is berthed at the dock. It doesn't matter if we are sailing or powering; the boat must simply be moving. I have checked the obvious places, such as around the shaft through-hulls. I drained the water tanks. I have determined that the water is not back-siphoning through the bilge pump.

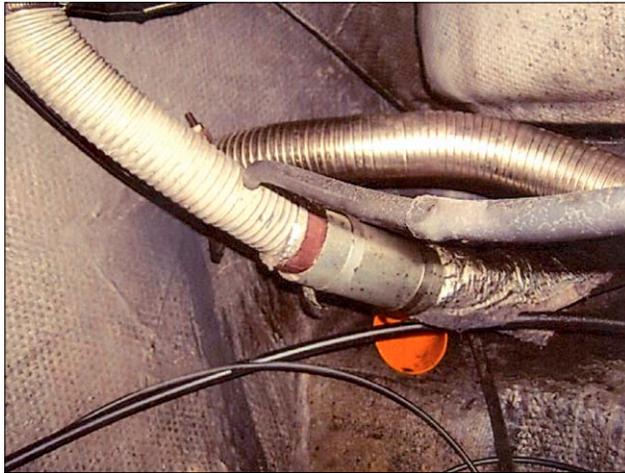
My marina is going to check the keel bolts to see if one or more of them may be loose. They will also check the seal around the bolts. Can you offer any suggestions as to the cause?

Bill Ludlom
Apollo Beach, Florida

First, be certain the water is salt and not leaking from a freshwater component (water heater, fitting, pump, and so on). Once you've established that the leak is salt, check the rudder shaft and keel bolts. If you still can't find the source, sprinkle baby powder inside the boat below the waterline when the bilge is dry and then go sailing; you'll be able to find the source by following the water trail. 🛶

Four Reasons Why You Need To Inspect Through-Hulls And Hoses

Reason #1, Hoses clamped to threaded fittings: This boat took on water at the dock when this cooling-water intake hose leaked (Claim #0209490). The hose is clamped to a threaded fitting, which is almost guaranteed to damage the hose and cause a leak; hoses must be clamped to a barbed surface. Any critical below-the-waterline fitting should also be double-clamped.

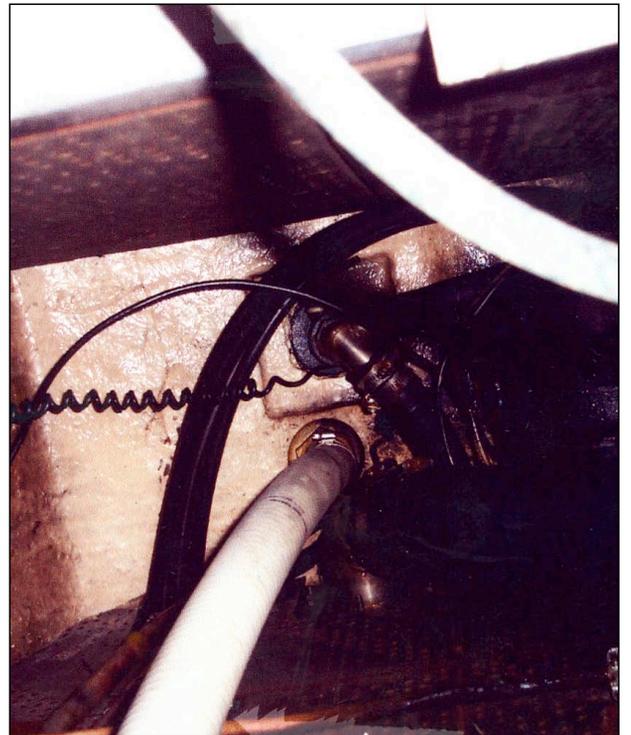


Reason #2, Improvised connections: This photo shows how *not* to tap into an existing hose. Proper fittings are available to do such a job; in this case, the smaller hose could have been attached to a T-fitting inserted into the larger hose. The boat partially flooded when the small hose came off the cockpit scupper hose and rainwater from the cockpit leaked into the bilge, overwhelming the bilge pump (Claim #0115239). If you're not sure how to devise a system, call a boatyard professional.

Reason #3, No seacock: This Asian-built trawler has a through-hull fitting without a seacock — when the hose clamp broke, there was no way to shut off the flow and the boat flooded (Claim #0501202). Every through-hull must have a proper seacock that can be closed in the event of an emergency. Don't forget to exercise your seacocks a few times a year to keep them from seizing. Finally, tying a soft wood plug tied next to each seacock gives you a quick remedy, should a seacock fail.

Reason #4, The hose isn't attached: A 39-foot boat almost sank shortly after it was launched last spring. The previous winter, the marina had winterized the various systems but had neglected to reattach the water intake hoses at the air conditioners. The boat's owner turned on the AC units while the boat was underway and the unit's remote pump immediately began pumping water into the boat, which nearly sunk.

"Professionals" will sometimes make mistakes, including serious ones, and you can't assume that just because the yard winterized the boat last fall, you can forgo your spring checklist (see page 12). Among the various onboard systems, all hoses and through-hulls need to be inspected before leaving the dock in the spring.



Wearing Your Personal Flotation Device (PFD)

A Florida man who was scrubbing the bow of his 43-foot trawler with a mop — a routine job he'd done hundreds of times before—leaned a little too far over the lifelines and tumbled into the water. A woman, the only other person aboard, threw a cushion over the side, but the man couldn't swim. She then raced aft to get a boat hook, but in the few short seconds she was gone, the man disappeared. Divers recovered his body later that afternoon (Claim #0010401).

In another claim, a small sailboat with three people aboard was capsized by a strong gust of wind during a race. Although a chase boat was on scene in minutes, a 77-year-old man was found floating unconscious, barely breathing. A few minutes later, as he was being transported ashore, he had a heart attack and died (Claim #0103545).

The victim had been wearing an inflatable PFD, one of the models that have to be inflated manually. He apparently was too stunned to inflate the vest and was struggling to stay afloat when help arrived.

Most people are good swimmers and don't want to be told



when or where they should wear a PFD. A few years ago, a poll of BoatU.S. members found that 98 percent of the 10,000 respondents were opposed to a federal law requiring adults to wear PFDs on recreational boats. (There are federal and state laws requiring children to wear PFDs.) But at night, in rough conditions, in tippy boats, in cold weather, or if you don't swim, a PFD makes a heck of a lot of sense.



Recognizing Your Limits As A Handyman

Sometimes maintenance is a pretty straightforward DIY job and other times it makes sense to call in a professional. Not many skippers, for example, would consider dealing with a water-soaked deck core. In some cases (see "How to Install Electrical Items") a lack of technical knowledge could be dangerous. But even simple jobs, like changing oil, take a certain amount of know-how. The owner of this boat changed his oil and filter but neglected to run the engine to check for leaks when he was finished. Unfortunately, when he installed the filter, it wasn't seated properly and when the boat was taken out for the first time, all of the oil leaked out and in minutes the engine was destroyed.

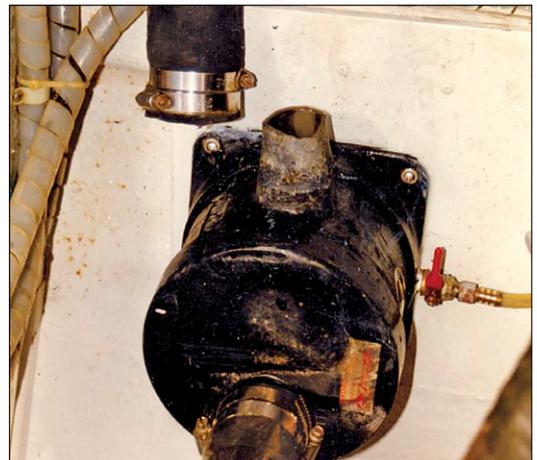
Engines are complex and expensive. If you're not absolutely sure how to go about a job, have a more experienced friend lend a hand, or leave it to a professional mechanic.

The Importance Of CO Detectors!

The generator exhaust hose on the right lead to the death of a man shortly after he had taken possession of a three-year-old boat. The first night aboard was unusually warm, so the new owner left the generator running to power the air conditioner. Sometime during the night, the man woke up, and perhaps feeling sick, moved to a chair where he was found the next morning. At first it was thought he had a heart attack, but a later autopsy revealed he had been overcome by carbon monoxide (CO). The boat did not have a CO detector.

When a marine surveyor was hired to inspect the boat after the owner's death, he touched the hose and it fell off. The nipple, according to the surveyor, was distorted and too short to accommodate the second clamp. The boat had not been inspected by a surveyor when the owner purchased the boat (Claim # 0120756).

Note that every boat with a gasoline engine and accommodation space should have a working CO detector aboard. No exceptions!





How To Install Electrical Items— *Without Burning Your Boat To The Waterline*

Adding electrical equipment is sometimes more than just running a new circuit. If the main panel doesn't have the extra capacity, it has to be upgraded. This one wasn't and overheated, causing a fire (Claim # 0303974).

The flow of electrons moves completely unnoticed, smoothly, silently, and peacefully through the wires on your boat—until it doesn't. The interruption of serenity could result from the improper installation of an electrical item, a poor wiring connection, undersized wiring, or old age and wear, but the end result is the same: the potential for a catastrophic fire.

How electrical items are wired and installed in your boat is incredibly important, yet this job is often tackled by inexperienced do-it-yourselfers. While we love working on our own boats and encourage others to do so, let's spell one thing out, right up-front: if you have any doubts about what you're doing, leave these jobs to a professional marine electrician.

Meltdown Mayhem

"The most critical part of installing electrical items is the wiring, and I've seen the results of substandard installations firsthand," said Capt. Bill Hooper, an ABYC-certified marine electrician and founder of Blue Frontier Marine (www.blue-frontier.com) in Salisbury, Massachusetts. "On one boat I worked on, the customer had used black wires all over the place. He unplugged everything over the winter, and forgot which black wire was which while the boat was laid up. In the spring, he hooked the wires up backwards, and smoked the entire electrical system."

Fortunately, the best way to prevent experiences like this is simple, whether you're

a professional marine electrician or a DIY boat owner: Regardless of what you're installing, be it as weak as a tiny LED courtesy light or as potent as a 100-hp bow thruster, follow ABYC's wiring standards. "That's what they're there for," Hooper says. "Following the standards is key."

Capt. Ric Corley, a marine surveyor in Panama City, Florida and a certified marine investigator who has over 40 years of experience and almost 6,000 surveys under his belt, also believes strongly in adhering to the ABYC recommendations. "This is one of the biggest problems in the industry when it comes to installing anything that runs on electricity, even in some new boats," Corley said. "People use the wrong types of wires, the wrong sizes, the wrong colors, and the wrong connections all the time. Someone may be a good house electrician and know just enough to get themselves into trouble, but boats just don't work like houses. If everyone followed the standards, they'd be a lot better off."

Why is electricity so finicky on boats? Vibration, moisture, and corrosion are the main reasons. These factors work together to make the marine environment far more difficult than it is on dry land, when it comes to harnessing electricity and feeding it to your accessories. To understand why, you first need to understand one thing about the power surging through those wires in your boat: It's trying to escape.

To keep that power where it belongs, we

encase our wires in a non-conductive insulation. This is where vibrations come into play. They can cause the insulator to become chafed, a problem that grows worse with age. That's why one of the ABYC standards calls for wires running through or against a bulkhead, stringer, or



When the owner of this boat added a light fixture, he neglected to add a fuse to the circuit. Fuses protect the wires from overheating and without one, chafe or a defective fixture can cause a fire (Claim # 9800883).

other sharp edge to have chafe protection.

Another way insulation failure can wreak

havoc is due to “wet tracking,” which is a problem common in the moist environments. When the insulation’s surface becomes wet, it can allow a small amount of current to start flowing along its surface. This can cause carbonization (as can exposure to a heat source, such as a wire rubbing up against a hot engine block), which turns the non-conductive insulator into a semi-conductive material.

Vibration, moisture, and corrosion all work together, however, to cause problems at the wiring’s weakest point: the connections. Remember that as electric current flows through any conductive material, it creates heat. When you have a loose or corroded connection, it causes increased resistance, which in turn causes increased heating at the contact. This can form an oxide, and the oxide then conducts current—but with considerably more resistance than that of the wires. The net result? Even more heat is created, and eventually, it can become hot enough to cause the metal to glow. If any combustible materials are nearby, a fire starts. In fact, poor connections are one of the main fire starters on boats. Overloads and spark-producing arcs happen, but much less frequently. So

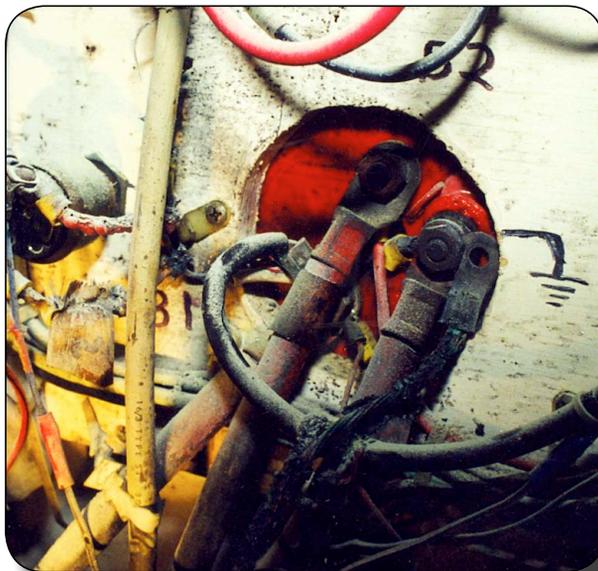
when it comes to any type of electrical installation, making good connections with crimp connectors protected by heat-shrink tubing is extremely important.

the proper breaker(s) and fuses in the appropriate location(s); installing appliances where they may be subject to future water damage; and installing items that don’t belong on a boat in the first place.

“There’s a reason marine-grade costs more,” Corley said. “A third of a cup of gasoline in your bilge is like driving around with three sticks of TNT onboard, and people sometimes try to save money by using automotive or home-improvement items on their boat. These are intrinsically dangerous because they don’t have spark protection. If there’s gas down there and something makes a spark, the boat blows up. In one case I investigated on Massalina Bayou, because one person didn’t follow the right standards, they almost burned down an entire marina. Several boats were tied together and fire quickly spread from one boat to another. If they hadn’t cut three boats loose

and pushed them out to burn in the harbor, the whole place would have gone up.”

No one wants to see their boat aflame, much less be responsible for setting other people’s boats or a marina on fire. So anytime you need an electrical item installed, make sure to follow ABYC standards, know your own limitations, and don’t be slow to call for a professional. Keep that electricity where it belongs—moving quietly and unnoticed. ⚡



When the owner of this boat was installing a new circuit, he neglected to attach the ground wire properly. Eventually, the connector began arcing and caused a fire in the electrical panel.

Amping Up

How do you know when an installation job is too much for you to tackle? Again, when in doubt, defer to the pros. That said, the nature of the gear being installed has a lot to do with just how significant a threat it presents.

“With items like chartplotters and fishfinders, the amperage draw usually isn’t enough to present what you’d call a huge danger,” Hooper explained. “But with something like a windlass or a powerful appliance, the installation should really be done by someone who’s properly trained and certified.”

And while most fires relate to wiring, other aspects of the installation job can also cause problems. Making sure heavy items are completely secure and can withstand the vibrations they’ll be subject to on a moving boat is imperative, for obvious reasons. Other common errors that cause problems include installing an item in an area that doesn’t offer sufficient ventilation, which leads to overheating; failing to install



Wire nuts like these have no place on a boat. Designed for solid core wire, which also should never be used aboard, wire nuts cut into stranded wire, damaging the connection and potentially causing a fire.

Electrical Boo-Boos— The Worst Offenders

Marine surveyors often mention the same practice as one of the worst ever seen at sea when installing electrical devices: The use of wire nuts. Wire nuts work by digging into solid core wire to make a strong connection. But wires on boats are stranded and using wire nuts destroys the strands, actually weakening the connections and potentially causing enough heat to cause a fire.

Other commonly seen offenses include:

- Improperly sized or colored wiring
- The improper use of lamp wires, speaker wires, and other odds and ends meant for a specific purpose.
- Using solid wire instead of stranded wire
- Mounting automotive engine parts on a boat
- Improper breaker location

vulnerable components not designed for ethanol use, ethanol's ability to dissolve deposits, and its ability to absorb enough water to separate.

New Standards

In the mid-1980s, a committee made up of people from the U.S. Coast Guard, the Society of American Engineers (SAE), the American Boat and Yacht Council (ABYC), the National Fire Protection Agency (NFPA), and Underwriters Laboratories (UL) got together. Ethanol (known as gasohol back then) was being introduced for automobile use and it quickly became evident that it would find its way to boats. New standards for hoses were necessary since ethanol was known to attack rubber and plastics. The result was a standard called SAE J1527. Since 1984, all hoses approved for marine use in gas engines have had to be built to this standard and hoses marked "SAE J1527" are capable of withstanding ethanol blends. Hoses not J1527-compliant will quickly deteriorate, potentially causing dangerous leaks, and should be replaced immediately. Something else to consider: Fuel hoses don't last forever and those from the 80s—even if they are properly marked—should be replaced. Most manufacturers advise replacing gasoline fuel hose after 10 years, and any hose that is 20 years old is way past its life; all marine-grade fuel hose has its manufacture date stamped on it.

Plastic and Aluminum Problems

Frank Kelley, Mercury's fuel specialist, says that other plastic and rubber parts on older engines are susceptible to ethanol as well. These include seals and O-rings in the fuel system and carburetors. "Rubber materials tend to get hard and brittle with exposure, which can cause problems with needle valves in carburetors," he says. Some of these rubber components can be partially dissolved with constant exposure to ethanol, and bits and pieces can be carried into the engine's fuel system, causing clogs and misfires. Some older boats may still have plastic fuel filter bowls, which will degrade with exposure to ethanol and could leak, spilling gasoline into the bilge (old plastic fuel filter bowls should be replaced immediately with metal bowls).

One other troublesome area, according to Alyanak, is aluminum carburetors. Before about 1990, carburetors were built with alloys that are much more prone to

corrosion from ethanol. When ethanol contacts the older aluminum carburetor housings, corrosion can cause tiny orifices to clog, which results in hard starting and poor running, two of the most common complaints, especially from outboard owners. This is one of the most serious problems for older outboards because there is often no upgraded carburetor that can be fitted. The only effective solution is to run ethanol-free gasoline (see sidebar). Alyanak says that manufacturers now use new alloys that are far more corrosion resistant.

Non-engine-related problems on older boats involve the fuel-fill gasket, which with age and ethanol exposure can allow rainwater and spray into the fuel tank (more on that later), and fiberglass gas tanks. Not many boats have fiberglass tanks, which have been shown to leach out chemicals that can gum up intake valves and wreck engines. The leaching process also severely weakens the tanks, which in some cases has caused gasoline to leak into the bilge. The only sure cure is to replace the tank with an aluminum one.

Ethanol the Solvent

Another one of ethanol's properties that causes headaches for older boats is its solvent ability. According to Kelley, over the years, gasoline—especially gasoline that may be more than one season old—oxidizes and creates gums and sludge that coat the inside of fuel tanks and even hoses. When gas containing ethanol is introduced, it begins to dissolve the gunk, which is carried to the fuel filter. Initially, this is more of a nuisance since simply changing the filters a few times usually solves the problem. But anything that gets past the filter, or is already downstream of the filter, can cause havoc in the carburetor. Carburetors have tiny orifices that get easily clogged, leading to hard starting, rough running, or even a complete shutdown. Simply getting the carburetor cleaned or rebuilt is often just a short-term solution; preventing the gunk from getting to the carb again is critical. A finer-grade filter (10 microns) will prevent most particles from getting to the carb, though the filters may clog up more frequently as the ethanol dissolves the gunk. (Carry

Ethanol, The Scapegoat

Ethanol has been blamed for everything from rough-running engines to high food prices. And while there are challenges to boaters using ethanol, it can't be blamed for everything that goes wrong. Here are some issues we've heard from boaters that *weren't* caused by ethanol:

"I haven't used my boat for four years but when I topped it off with ethanol last spring, it wouldn't start." *Four-year-old gas — any gas — can gum up carburetors and prevent an engine from starting.* (It's good practice to empty the carburetor completely whenever the boat is being laid up for more than a few weeks.)

"My boat won't get up on plane since I started using ethanol." *E10 has about 3 percent less energy than E0, which is hardly noticeable performance-wise. Something else — a nicked or bent prop, fouled sparkplugs, for instance — is a more likely culprit.*

"Since I started using E10, my gas tanks are full of water!" *Ethanol attracts*

water from the air but it wouldn't likely be enough to cause phase separation — condensation and leaks from deck fittings can, though. Ethanol can cause the water to separate if there is enough already there. The best advice is to keep the tank topped off to reduce condensation, and make sure there is no way water can leak into the gas tank, either through the deck fill or sending unit cover.

"My boat gets vapor lock since I topped up with E10 last winter." *Winter blends of fuel have different vapor pressures than summer blends (whether they have ethanol or not). Vapor lock can be caused by using winter blends in hot weather so try to top off in the fall before winter blends are sold.*

"My mechanic says the engine runs rough because of ethanol." *While E10 can cause some problems, especially in older engines, it's often used as an excuse when the real problem can't easily be found. Tired carburetors, faulty ignition systems, and worn engines can mimic the symptoms of E10 problems.*



Older aluminum carburetors tend to suffer from the corrosive effects of ethanol much more than newer ones, which are made out of more resistant alloys. Corrosion can block tiny orifices, causing hard starting and rough running.

spares and a galvanized bucket to keep old filters prior to disposal.) Any hoses that lead *from* the filter to the carburetor should also be replaced since they may have deposits inside them that get washed into the carburetor by ethanol.

Ethanol Loves Water

Ethanol is hygroscopic, which means it readily absorbs water. This is good news and bad. According to Kelley, the good news is that small amounts of water in gasoline are absorbed and simply get burned along with the fuel. The bad news is that gas with ethanol will keep absorbing water until there is so much that most of the ethanol and water will separate and sink to the bottom of the tank. This is called phase separation. The process is more common in older boats that may have had water in the bottom of the tank for years. Kelley says that once ethanol is introduced, the water—along with more that may be coming through a leaking deck fitting—will be absorbed and can eventually lead to phase separation. This leaves a layer of water/ethanol on the bottom of the tank. If the fuel pickup—resting at the bottom of the tank where the mixture is—picks up a slug of water, the engine will quit. If that isn't bad enough, there's more: "This water/ethanol mixture is quite corrosive, too, and aluminum fuel tanks are at risk of corroding from the inside if they are in contact with this stuff," says Kelley. Preventing water from getting into the tank is much easier than removing it so make sure the fuel fill gasket has a tight fit and keep your tank full—this limits the amount of water that can get into the

tank from condensation. If you suspect you may have water in your tank, contact a company that specializes in cleaning out tanks. *Seaworthy* has reported on several insurance claims for damage and injuries caused by using improper equipment (such as a wet vac) to clean out a tank—leave it to the pros. Not sure if you have water in your tank? You can buy a product called Kolor Kut that's dabbed on the end of a stick and lowered into your fuel tank; it changes color on contact with water. One more thing to mention: Don't plug the fuel tank vent in an attempt to keep moisture out. It's doubtful much gets in that

way and plugging the vent could lead to pressure in the tank, which could cause a spill.

More On Carburetors

"Carburetors are dumb," says Alyanak. "From the factory, they're calibrated to run on one kind of fuel and can't make adjustments on their own, like modern electronic fuel injection can." Engines that were built many years ago, before ethanol, were calibrated to run on straight gas, he says. "Ethanol has extra oxygen in it, which throws off the air/fuel ratio, making the engine run too lean," he says. Lean engines run hotter and have what are euphemistically called "drivability problems"—hard starting and rough running. It's possible, he says, to recalibrate a carburetor to tolerate E10; a good mechanic can do it. New carbureted engines come calibrated for E10.

Tips For Older Engines:

- Fuel-system components on older engines, those built prior to about 1990, should be inspected before starting the engine in order to identify any signs of leakage or corrosion.
- Mercury's fuel expert Kelley says if you are going to run on E10 for the first time, check for the presence of water in your tank, which is common in older boats. Ideally, your tank should be empty of all fuel and water before you add E10.
- Make sure your fuel-fill gasket doesn't

Finding Non-Ethanol Gas

The best way to eliminate the worry about the effects of ethanol on an older engine is simple: Don't use gas containing ethanol. Fortunately, that has become easier lately, with many marinas now stocking E0, and websites showing where it's available. There is even an iPhone app for that (itunes.apple.com/us/app/pure-gas/id454559068?ls=1&mt=8). Below are two sites that list non-ethanol gas — most are auto gas stations (available for trailer boaters), though marinas are listed too.

www.pure-gas.org/index.jsp
www.buyrealgas.com

Before you fuel up at one of these places, you should know a few things. Gas composition tends to change quickly and the availability of E0 is dependent on whether or not it's available from local distributors, so be sure and ask the station if the fuel is still ethanol-free. Also, pump labels are not always reliable. Even though the pump states that gas contains 10-percent ethanol, it could be any number below that as well; it's just not legal for it to be more. In some states, marinas are exempt from listing ethanol content, so just because there's no label, that doesn't mean there's there is no ethanol — ask the operator. In most areas, E0 is considered a "boutique fuel" and costs more than E10. Finally, if you want to know exactly how much ethanol there is in gas, you can test it yourself. Simple reusable kits are available online that will accurately find the ethanol content (www.fuel-testers.com).

leak, or rainwater and spray can get into the tank.

- Don't add a fuel dryer, which is often ethanol—it will just compound the problem. Kelley recommends using a fuel stabilizer each time you fill up (also true of newer engines). Watch out, he warns: Some octane boosters contain ethanol as well—read the label before you add any. Incidentally, according to the chemical engineers, there is no way to recombine separated water and E10. *A*

Inspecting Middle-Aged Boats

Ed Anston, a member in Long Island, still remembers the day 10 years ago that he bought his boat: "I was so excited to finally be buying a new boat; all of the headaches of maintaining my 30-year-old cruiser were going to be a thing of the past. I imagined, aside from getting the bottom painted, I wouldn't have many yard bills." The years have passed quickly and Ed says that his expectations of low maintenance have largely been fulfilled. But lately he's begun to realize that in 10 years, some things beyond routine maintenance have to be addressed. His prop has hit its share of branches, a few port lights are leaking, and his bronze through-hulls are harder to open and close. "I have to keep a sharper eye on systems and components that are starting to need attention."

Compared to cars, boats hang around for a long time; according to the American Automobile Association, the average car is about 10 years old while, according to the National Marine Manufacturers Association, the average boat age is closer to 20 years. A well-built boat will age gracefully, but after about 10 years, some components start to show their age and there are certain areas that need a closer look. If your boat has passed the decade mark, here are some things to keep a close eye on.

Afloat

Take a hard look at how your boat floats at a dock. Larger boats have waterlines that show how the manufacturer intended the boat to float—these waterlines usually correspond to where bottom paint is applied. Typically, the bottom paint extends a few inches up from the waterline. Sight your boat from aft; does it appear to list to one side? How about fore and aft? Does the bow dip or the stern squat at the dock? Boats often gain weight over the years, usually when "stuff" is brought onboard and never taken off. Anchors, chain, spare fuel or water tanks, tools, etc. can cause a boat to



Cutless bearings tend to be forgotten about, but after a few years of use, the inside lining wears and the bearing has to be replaced. There should be very little play when the shaft is moved side to side.

float off its lines. Not only does this affect performance, it might make it more difficult for bilge water to flow where it can be pumped out and can make the cockpit drains less effective. Redistribute or, better yet, remove the accumulated weight.

Engine Area

Depending on where you boat (fresh or saltwater), exhaust manifolds that are more than a few years old need to be inspected carefully; 10 years is about the outside limit in fresh water while manifolds in saltwater may only last half that. Rust streaks on the outside almost always mean rust inside that can't be ignored, at least not for long. A shop can remove the manifolds and pressure-test them, but if they're original equipment, it's good insurance to simply replace them.

Traditional stuffing boxes typically last decades, but the original packing won't. If you find yourself having to re-tighten the stuffing box often, it's time to replace the packing. Consider a newer high-tech type like Gore-Tex that lasts much longer and hardly drips at all. Check the hose clamps on the stuffing box, too; drips will corrode the underside of the clamps, which may be hard to see. Loosen and rotate them, as necessary, and replace any that are corroded.

Bilge pumps lead a tough life and they don't last forever. And it's not just the pumps—switches are notorious for checking out early and wiring can become corroded if the connectors are not waterproof or if the wire sheath has been nicked in the past. A slight voltage drop to the pump can seriously affect its performance. The best way

to check the bilge pump system is to pour some water in the bilge and make sure the automatic switch actuates and the water gets pumped out. (Tip: There have been several claims for water damage due to

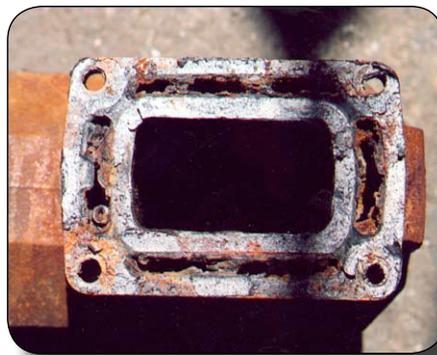
bilge pump switches that got jammed by loose gear in the bilge.) If you want to go an extra step and have easy access to the pump's discharge, place a bucket there and see how long it takes to pump out a few gallons. A little math will show you if your pump is working as advertised; if you get four gallons in a minute in your bucket, multiply that by 60 to get gallons per hour (4 x 60 = 240). Because of

voltage drops, friction in the hoses, and the distance the water has to be lifted, you may be surprised to learn that your pump moves nowhere near as much water as the manufacturer claims. This might be a good time to upgrade.

Gasoline hoses should be inspected routinely, at least twice a year. Run a clean rag over each hose; if the rag smells like gas, the hose must be replaced. Diesel hoses typically last longer, although any low spots that retain fuel may be more prone to leaking. Marine sanitation hoses are notoriously good at telling you when they need to be replaced. When the fateful time arrives, use smooth-walled quality hoses made for sanitation. With any hose replacement, it's a good idea to replace the hose clamps, too.

Belts are likely to have reached the end of their lives after 10 years of steady use. Look for black dust around the pulleys, which indicates excessive wear. It's a good idea also to carry spare belts.

Steering and control cables can be checked by flexing the cable and listening for "crunching." Look also for swelling and rust, which indicate a cable needs to be replaced. Don't forget to lube the steering rod if your system has a zerker



The lifespan of an exhaust manifold can be as little as three years in a warm saltwater environment. Eventually they rust from the inside and if they fail, water can get inside the engine and destroy it (Claim # 0801149)

fitting. Hydraulic steering hoses should be inspected for leaks, especially at connections. Some manufacturers specify replacing the hydraulic fluid at intervals because it can absorb water and cause internal rust.

Coolant wears out over time and the corrosion inhibitors lose their ability, causing pitting and corrosion inside the cooling passages. Extended-life coolants last for up to six years before they start to lose their effectiveness. Make sure you use the coolant specified by your manufacturer. It's also a good time to check the condition of the system's hoses. Bulging, cracking, and soft hoses need to be replaced; older hoses can collapse, causing an engine overheat. Check all the hose clamps and replace any that are questionable.

Props

Over the years, props encounter their share of hits—a floating branch or two, a hard bottom, churned up sand, etc. Eventually they tend to get dinged and bent just enough that, while you can't see it, the damage will negatively affect your boat's performance; a banged-up prop can rob you of 10 percent of your speed and fuel economy. Ten years is a good time to remove your props and take them to a prop shop for checking and/or reconditioning. If your boat has a cutless bearing, it might be due for replacement. There should be little movement when you try to move the prop shaft side to side.

Alarms

Electronic detectors, such as carbon monoxide (CO) and gas fume alarms, have a designed life expectancy. New CO alarms are required to let the owner know their useful life is over after five years; a 10-year-old boat should be ready for its *second* replacement. The sensitive electronics inside the alarms are less effective at detecting deadly CO after a few years. Replacing them is inexpensive insurance. Gas-fume detectors may not even last five years, because they're typically mounted just above the bilge water.

Safety Equipment

Flares have a limited lifespan and most people will have replaced them several times by now (the flares are marked with their expiration dates). Flare guns, even if stored in a watertight container, should be opened and closed occasionally to check for corrosion.

Personal flotation devices (PFDs) don't last forever, either, especially if they are put away wet. Moldy PFDs should be replaced, and if you find any with chafed or cut straps, replace them too. Auto-inflatable PFDs should be carefully checked. Most have a green indicator showing they're armed. There is no set life for the arming mechanism, so at least inspect it and make sure it hasn't gotten wet in the past. If you decide to re-arm it, it's a good opportunity to see how it works; jump overboard or into a swimming pool with it on. Repacking and rearming is not difficult and will give you confidence in your equipment. If you have a throwable PFD with a line, take it out of its case and inspect it. Check closely for mildew, which can usually be cleaned up with vinegar.

Other Stuff

Some anodes should be replaced every one or two years (prop shaft, outdrive, etc), but there are some that last a lot longer. The 10-year mark is a good time to check the one in the water heater (not all water heaters have anodes) and any heat exchangers.

As they age, shore power cords and/or inlets wear out and are prone to arcing that can cause fires. Using your hand, check for excessive heat on the shore power cord at the inlet when the AC system is under a heavy load. Excessive heat—hard to keep your hand on it—indicates the cord and/or the inlet needs to be replaced. Note that cords can suffer damage if they get caught between the boat and a dock or get yanked out accidentally. Run your hands along the (disconnected) cord, feeling for cuts and bulges, and inspect the connectors carefully. Replace any damaged cords or ends immediately.

Over the years, seacocks become stiff if they're not regularly "exercised." If it's been years since one has been opened and closed, it might be frozen, and a frozen seacock is useless. In that case, the boat will have to be hauled so the seacock can be disassembled, cleaned, and lubricated. If you make it a point to work the seacocks a few times a year, they're less likely to

suffer this problem. While you're checking out the seacocks, don't forget to inspect or preemptively replace the hose clamps—it's cheap insurance.

Sailboat Rigging

A boat that is raced hard can go through a set of standing rigging in 10 years or less. Even a sailboat used for daysailing can suffer from cyclical loads that can cause stress cracks, and frequent exposure to saltwater can cause the swages to crack and corrode. Boats that sail in warm salty waters are much likelier to suffer than freshwater cool-weather boats. Depending in part on climate and frequency of use, running rigging (sheets, halyards, topping lifts, etc.) is usually nearing the end of its life at 10 years.

Deck Fittings

With caulked fittings, the boatyard rule of thumb is that after 10 years, the bedding owes you nothing. Depending on the type of caulk, 15 years is the outside limit. Many boatyards consider dark-hulled boats to be harder on bedding than light-colored ones because of the temperature differences. Carefully

check around fittings and underneath those you have access to for leaks. Don't forget to look for telltale signs of leaking around port lights.

The BoatU.S. Marine Insurance Loss Prevention Survey Program

Once a boat reaches 10 years old (and every five years thereafter), it is eligible for a complete marine survey, paid for by BoatU.S. Mike Pellerin, the BoatU.S. vice president of underwriting, says that as a boat ages, it's often hard for an owner to recognize the gradual changes in its condition. The program gives insured members peace of mind by identifying potential problems before they become costly or even dangerous.

To cite one recent example: A surveyor inspected a winterized boat and found a rusted oil pan that was leaking engine oil, which could have led to a seized engine and even fines for pollution discharge. 



"Exercise" your seacocks a few times a year to keep them from seizing. You'll also be aware of other problems, like this handle that rusted off, rendering the seacock useless.

Spring Fitting Out Safety Worksheet

An hour or two spent looking over the boat this spring could save a lot of hassles later this summer. The worksheet below is intended to cover the main systems on a boat that are likely to need your annual attention

Getting Started

If necessary, reinstall batteries. Make sure they're fully charged. Clean and tighten electrical connections, especially both ends of the battery cables. Use a moisture-displacing lubricant at any connection that is exposed to excessive moisture.

Open and close seacocks; handles should move freely. Hoses should be double-clamped with stainless-steel hose clamps. Replace any that look rusted.

Is the raw-water intake strainer clean and free of corrosion? Does the strainer's top fit snugly?

Check running lights. Replace bulbs and/or tighten connections to assure that all are operating properly.

Look for indications of leaking at trim cylinders and hoses as well as at hydraulic steering and rams, which means the O-ring or gasket needs to be replaced.

With conventional stuffing boxes, make sure the stuffing box is sufficiently tight and completely dry when the boat is at the dock. Check again underway to make sure there is a steady drip.

Use a garden hose sprayed at ports and hatches to identify leaks that need to be re-caulked.

Check flares (expiration date) and fire extinguishers (charge). Outdated flares may be kept aboard as spares.

Test bilge pump and high-water switch.

Boats Ashore

Inspect props for dinging, pitting, and distortion.

Replace plastic fittings near the waterline with bronze or Marelon®.

Inspect the anodes on the shaft, outdrive, and trim tabs. Replace any that are more than half-deteriorated.

Outdrives And Outboards

Check outdrive bellows for cracks and tears (look especially in the folds).

Check the hydraulic trim fluid. If you didn't change it last fall, change it now.

Check lower-unit lube level. Creamy oil indicates water (and a bad seal). Many manufacturers recommend changing the oil every year.

List Of Equipment You May Need

Caulk

Polysulfide (deck hardware, below the waterline)
Silicone (Plastic/Plexiglas ports)

Zincs

Shaft
Engine
Outdrive
Trim Tabs

Lubricants

Stainless-Steel Hose Clamps

Rigging Tape (Sailboats)

Power Steering Fluid

Transmission Fluid

Steering And Control Cables

Inspect outer jacket for cracks and swelling, both of which indicate the cable must be replaced. Use waterproof grease at the ends.

Engines And Fuel Systems

Flexible gasoline lines should say "USCG Approved, J1527."

Are fuel hoses supple, with no cracks, bulges, or soft spots? Do the lines smell like gasoline (wipe the lines with a clean rag

and then smell the rag)? Did you also use a rag to detect odors at connections? Cooling hoses should fit snugly and be double-clamped.

Replace fuel filters.

Check engine oil and transmission fluid levels. Also hydraulic steering fluid, trim/tilt system oil, and coolant.

Check belts for tension and wear.

Check raw-water and freshwater pumps for seepage, which indicates a gasket needs to be replaced.

Examine exhaust manifolds for signs of corrosion and water seepage that indicate blockage. (Another indication is an engine that runs hotter than normal.) If you suspect a problem, the only way to know for sure is to remove the manifold. How often you pull the manifold depends on where and how often you go boating (fresh or saltwater). In some tropical areas, manifolds may need to be inspected every other season.

Replacing the (inexpensive) gaskets at the heat exchanger every year helps prevent corrosion at the housing and also lets you look for gunk that can clog the stacks.

Test bilge blower and inspect hose.

Sailboat Rigging

Inspect swage fittings for rust and cracks. Running rigging should be supple and free of chafe.

Inspect stays and shrouds for "fishhooks."

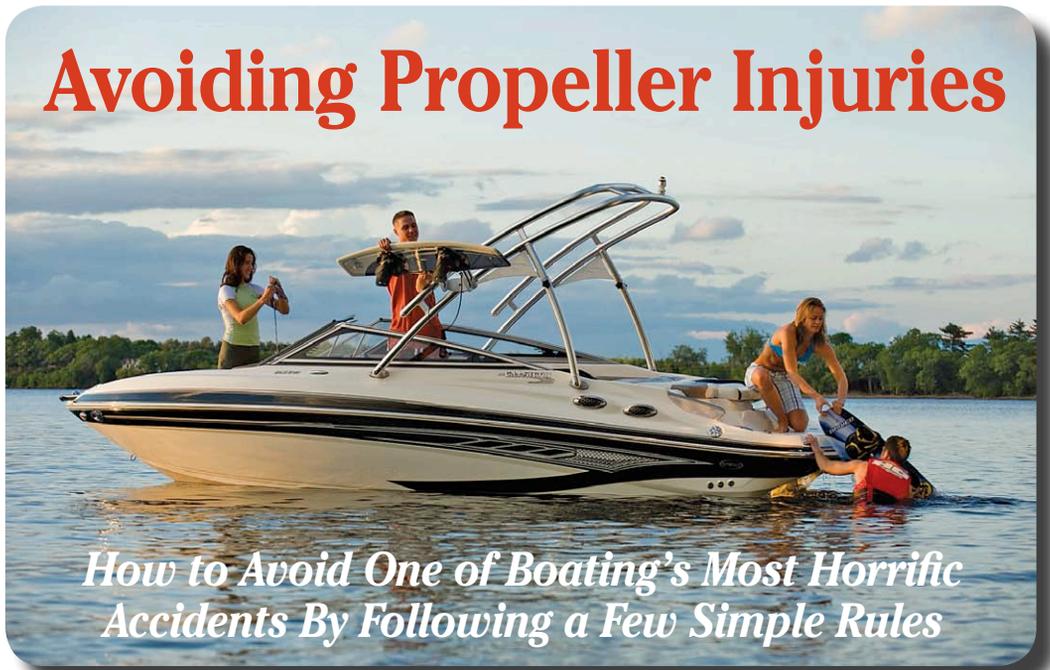
Ensure that spreaders bisect the shrouds at an equal angle. Ends should be protected to prevent chafe.

Remove tape at turnbuckles and lubricate threads (preferably with Teflon®).

Using a hose, check chainplates for leaks. Look for rust streaks inside and out. If necessary, remove and re-caulk. 

Avoiding Propeller Injuries

According to the claim file, the accident occurred so suddenly that most of the people aboard thought the 20-foot boat had bumped bottom. It hadn't. A man on the bow who was seated on the gunwale had been bounced over the side when the boat struck a wake at high speed, and a split second later, he was struck by the prop. The boat's owner responded by throwing the engine into neutral and spinning the boat around, but it was already too late. Despite a frantic search, the body was not found until days later (Claim #0507632).



How to Avoid One of Boating's Most Horrific Accidents By Following a Few Simple Rules

Of all the various types of personal injury claims, none are more frightening than those involving propellers. The injuries are often horrific and, equally as disturbing, may have been prevented by exercising good seamanship.

The following are a few rules that must be followed if prop accidents are to be prevented:

Guarding Against Propeller Accidents While On The Boat

- Many guests don't know a boat can bounce or lurch suddenly, and it's up to you, as skipper, to make sure everyone is seated safely *inside* the boat. Never allow passengers to ride on the bow, gunwales, or transom. If there aren't enough seats for everyone, extra passengers must remain ashore.

- Even if everyone is seated inside the boat, slow down when you encounter a large wake. To minimize the impact, cross the wake at an angle, not straight on.

- Avoid letting anyone aboard drink heavily, especially when the boat is underway. According to the claim files, alcohol was a factor with many prop injuries.

- Wear your engine cutoff switch lanyard. Note that it may be necessary to shorten the lanyard when the operator is seated near the engine—smaller outboards with tiller steering.

- Stay at least 100 feet away from diver-

down flags in rivers, inlets, and navigation channels. On other bodies of water, stay at least 300 feet away. (State laws vary, so it's best to check laws in your area.) Many divers have been killed or seriously injured by props. Turn away from diver-down areas; don't try to idle by. Be aware that divers have difficulty gauging distance underwater and will often stray more than the legal distances from the flag. Current can also cause divers to be swept away from the flag.

- Don't let anyone onto the swim platform while the engine is in gear. Swim platforms tend to be slippery and people have fallen into the prop; this is especially likely to happen when the boat is coming into a dock and the boat bounces off a piling.

- When launching or ungrounding a boat, keep people in the water away from the stern and prop. In the rush to get the boat into open water, it's easy to forget the prop is back there.

Guarding Against Propeller Accidents While Waterskiing Or Swimming

- Get back to skiers immediately; skiers have been run down by other boats while they were waiting to be picked up. The color of the equipment is very important; one skier who was run down had a kneeboard and life vest that were both black, which is less visible against the water. Life vests (required by law), wetsuits, and t-shirts, as well as skis and kneeboards, should be bright colors so that the skier will be easily visible to you

and to other boat traffic. Skiers in the water who are waiting to be picked up can make themselves more visible by holding a ski out of the water.

- NEVER put the engine in reverse and back toward a skier (or anyone else) in the water. A 44-year-old man was injured when the boat's gears jammed in reverse and the spinning prop cut one of his legs. When you pick up a skier, make a gradual turn back and then shut off the engine before you are alongside. When the wind is blowing, always approach from downwind.

- Do not put the engine into gear until you see that everyone who was in the water is seated safely inside the boat. Just because you hear a voice a few feet away, don't assume he or she is aboard. In one injury claim, a man sitting on the swim platform sounded like he was on the boat and the skipper carelessly gunned the engine without looking back to check.

- Don't use an outboard or I/O's lower unit for reboarding. Propellers are sharp, even when they're not moving.

- Never enter swimming zones. 



The passenger on this boat's bow should be seated *inside* the boat.

■ A few weeks before Christmas, one of the BoatU.S. claims adjusters, Angela Nixon Sargis, had what she described as “the strangest phone call ever.” After five years of working in the marine insurance claims department, that covers a lot of phone calls.

Angela had been talking to George Stafford, a marine surveyor in Durham, Connecticut, about a BoatU.S. claim when George abruptly cut her off by announcing in a tense voice that he had to leave. *Click!* The line went dead.

George had been in the parking lot at a local marina when he heard a frightened voice nearby calling for help. He looked over the embankment and saw an elderly gentleman struggling to land a big fish. The man was standing on the edge of a bouncing floating dock, inches from a very strong—and frigid—river current. As George was running toward the float, he called out the obvious question: “WHY AREN’T YOU WEARING A LIFE JACKET?” The man answered that he didn’t have one.

Question: Why didn’t the man save himself by dropping the fishing rod?

Answer: The fish would have gotten away. (Duh.)

George helped the older gentleman hoist the fish onto the float. He even took a picture of the fish to commemorate the event before releasing it back into the water. The man, clearly shaken, said he was done for the day and headed home. George went up to the marina office and found out the man had been retired for many years and, rain or shine, always came to the marina on Thursdays to fish.

So the following Thursday, December 22, George met the man at the marina with a Christmas present: a spanking-new life jacket. The older gentleman gladly accepted his gift and promised to wear it whenever he went fishing.

■ Unless you have a built-in marine battery charger on your boat, there’s a good chance that after a few months of idleness,

your boat’s battery will need a boost to bring it back to dependability. There is also a good chance that you’ll be supplying the



charge with a portable battery charger, like the one you use for your car.

West Marine publishes recommendations on how to care for starting, deep-cycle, and dual-purpose batteries. Among them:

- Batteries should be charged if the hydrometer reading is below 1.1225 specific gravity, or open circuit voltage is below 12.4 volts, or if the first load test is below 9.6 volts. (To that we would add, “Or if you suspect they need it.”)
- Unplug the charger before connecting or disconnecting a battery to avoid dangerous sparks that could cause a battery to explode.
- Stop the charge when two hydrometer or voltage readings recorded two hours apart indicate no increase. Further charging would be useless and may damage the battery and shorten its life. If the battery won’t come to a full charge, replace it.
- Do not leave a battery on a trickle charger for more than 48 hours. Serious damage to the battery WILL occur (or even start a fire, which has resulted in several BoatU.S. Marine Insurance claims).
- Never attempt to charge a frozen battery. To avoid explosion and serious

injury, allow it to warm up to 60 degrees F before charging.

■ In the last issue, *Seaworthy* mentioned that isobutanol had many advantages over ethanol as a biofuel: It doesn’t attract moisture, is less corrosive, can be shipped in existing pipelines, and has a much higher energy value than ethanol (110,000 Btu per gallon vs. 84,000 Btu). Unlike ethanol, it can be used (legally) to power jet airplanes. The article also mentioned a 1992 Buick, powered solely by 100-percent isobutanol, that was driven coast to coast without any problems. The Isobutanolmobile averaged 26 mpg, which was a significant improvement over the 22 mpg it had been getting with E0 gasoline. (And WAY better than it could have gotten with E100, if it would run on the stuff.)

Cynics among you will say that sounds too good to be true; isobutanol will never make it in the marketplace. It’s too practical. Besides, ethanol is making money for a lot of people.

Hmm. According to the *Redwood Falls Gazette*, an ethanol plant in Minnesota is being converted to a plant that produces isobutanol because it makes economic sense. A spokesman for the plant noted the many advantages of isobutanol as a fuel and said that the switch was being made “to provide a better margin for our [investors].” The reason, without getting too deeply into chemistry, is that isobutanol can be used instead of oil to make rubber and plastics. So if the market for fuel is weak, the plant can produce rubber or plastics, and vice versa. This could help smooth out the \$\$ bumps that occur in any commodities market. As one financial analyst said, “Isobutanol is more evolutionary than revolutionary.”

None of this means that there will soon be a stampede to convert ethanol plants to produce isobutanol, but if it proves to be profitable for investors at the plant in Minnesota, it could open the way for more ethanol-isobutanol plant conversions. And if they, too, are profitable, who knows, the common-sense biofuel just might catch on.



was blowing at a sustained 35 mph with an occasional gust to 50. The television forecast, he recalled, continued droning on about 25-mph winds.

Forecasters are the first to admit they don't always get it right, but that didn't stop Doug from being annoyed that someone hadn't noticed the predicted wind speeds had doubled. By Sunday—normally Doug's day off—the

When Doug Hillman arrived at work last October 7, the wind was blowing out of the east-northeast at 25-30 mph. As the owner of Sebastian River Marina in hurricane-prone Sebastian, Florida, wind makes Doug nervous. Earlier that morning, he had been listening to the weather forecast on television, which predicted that two weak fronts driven by a high would result in a windy day with gusts to maybe 25 mph. The wind that day was slightly more than had been predicted, but Doug wasn't concerned. During the night, however, the wind increased even more, rattling the windows and occasionally shaking the house. By the next day, a Saturday, the wind

wind had increased to 40 mph with gusts to 60. Nearby Cape Canaveral recorded an 80-mph gust. Doug, in what could be described as a quiet rage, headed for the marina and did whatever he could to protect the boats. Luckily, the water never made it over the marina's surrounding seawall, and all of the boats survived unharmed. That wasn't true of other marinas in the area, however, where several boats broke loose and were either sunk, dismantled, or scattered in the surrounding marshes.

Where were the weather forecasters? Steve Letro, the meteorologist in charge at

nearby Jacksonville, notes that on October 9, NOAA broadcast a gale warning for 35- to 45-mph winds and higher gusts. Coastal Flood and High Seas warnings were also issued for seas to 15 feet. He says they got it right and complains that unless forecasters use the word "hurricane," nobody seems to pay much attention. But Letro says the National Weather Service can only use the dreaded "H" word when a weather system is actually classified as "tropical," which this one was not. Other wind events have their own names, like "gale" or maybe "tornado."

Why hadn't the high-wind message, whatever it was called, gotten through to Hillman, an avowed weather watcher? Looking back, Doug says his biggest mistake was not listening to the weather channel on his VHF. Television forecasting routinely devotes a minute or two to each area of the country, which is fine for everyday weather—*will I need my raincoat?*—but Doug says it's not always sufficient for extreme weather events.

Television forecasters get their information from a variety of sources, including NOAA. Usually they get it right. But Letro says that the most reliable forecasts come directly from the source—NOAA's VHF forecasts.



With most hurricanes, people do whatever they can to prepare their boats and houses, and either head inland or hunker down at home and hope for the best. What Bert McConnell did when Hurricane Irene came ashore was grab his camera and watch the storm from the Waquoit Bay Yacht Club's deck in Falmouth, Massachusetts. A few doors away, Ed Rogers watched from his house. The result was Ed's self-published book (not for sale) that documents what can happen when a moored boat breaks loose in a crowded mooring field.

The series of events began when a 30-foot sailboat, *KaBoom* (a name



that wound up being strangely prophetic), chafed through its pendant and began "sailing" through the mooring field. The first boat it encountered was Rogers' 29-foot sailboat, *Sweet Pea*. Rogers had stripped off *Sweet Pea's* canvas and secured it with two 3/4-inch nylon pendants with hose for chafe protection at the chocks. He anxiously hoped *KaBoom* would kiss off his boat's hull and continue on to the beach. Instead, he watched as the two boats became entangled and spent nearly an hour bashing against each other before *Sweet Pea's* pendants finally parted. *Sweet Pea* then sailed a tortuous course through the fleet and wound up on the beach. Meanwhile *KaBoom* remained safely tethered on *Sweet Pea's* mooring with the frayed pendants tightly wrapped around



her rudder. The next day, her owner had to go underwater with a knife to cut the pendant.

You can see more of Bert McConnell's storm photos at www.waquoitbayyachtclub.com/WBYCIrenePics.htm. 

The Return of Paper Seaworthy!

And Some Thoughts on Making Boating Safer



You may have noticed that the words you're reading are printed on an actual sheet of paper and not a computer screen. Consider it a return to our roots at BoatUS marine insurance. Starting back in 2009, the paper *Seaworthy* was largely abandoned in favor of an electronic edition. There were several reasons for this, not the least of which was a nasty recession that affected businesses and people everywhere. The decision was made recently to return to paper, based on an improving economy and—we won't mince words—hundreds of emails from members who said they missed reading *Seaworthy* in their barlounge, bed, boat—anywhere but a computer screen. And, as one member wrote, "For everyone like me who bothers to write, there are probably three of four hundred more who are also missing their paper copy."

The letters were many and varied, but all tended to express a preference for

reading on paper. Some examples:

"I used to enjoy reading each issue from cover to cover. At 43 years old, I am in between old school and hi-tech. As I sit around my marina and question boat owners, which tend to be my age and older, I find most still prefer the old Seaworthy."

"I enjoy Seaworthy immensely. Reading [the paper copy] was much more pleasant."

"I'd rather read Seaworthy sitting in my bed."

"Seaworthy has always been worth reading, and you can take 'paper' anywhere and show an article to friends if you want. I can take it out to the boat to check a solution for a problem I may have."

"It needs to be paper."

Needless to say, we got the message. But it also must be emphasized that the purpose of *Seaworthy*—to help members

avoid accidents by learning from actual claims—has never been more relevant. As a national association, BoatUS is the only insurance company willing to pay the salaries, printing costs, and mailing costs that are necessary to educate its insureds. And aside from education, BoatUS has also been a leader in paying legitimate claims. All of this comes at a price, however, which has to be somehow accomplished in an extremely competitive business environment.

The best way to ensure that *Seaworthy* will always be available in print is to read it. BoatUS members who read *Seaworthy* have a head start on becoming safer boaters who are less likely to file a claim. Even the most experienced, conscientious boaters can learn a thing or two from reading about other people's accidents. As a *Seaworthy* reader in Pennsylvania said, "I'm sorry to read about other people's problems, but it sure beats making the mistakes myself." 