

THE DRUM

From the Commander

Charlie Fausold, N



As boaters we quickly learn the importance of balance: center of effort vs. center of lateral resistance; how to enter a canoe or kayak; distribution of passengers in a bow-rider. Failure to learn these lessons can lead to the inefficient operation of our vessel or worse, and so it is with organizations.

Over the course of its 100-year existence, USPS has acquired its fair share of customs and traditions. They remind us of a nautical heritage as old as humankind, and serve to give the organization a unique identity.

But the flip side of tradition is not keeping up with the times. A cherished custom for some may be a quaint anachronism or even a “turn off” for others. Our society – and the new USPS members we are trying to attract – are much more

culturally diverse than when USPS was founded a century ago. That which was taken for granted in 1913 may no longer be appropriate a century later.

Thus, we need to find a balance between the traditional and the contemporary, between the status quo and the fresh and new. How do we attract and keep members who may be generations apart? Are we seen as open and welcoming or out of touch? Is our calendar of social events getting a bit stale?

One of the strong points about USPS is that local squadrons have considerable leeway to find their own balance between the traditional and the contemporary. Within Seneca Sail and Power Squadron I think we have done a good job finding balance. We maintain decorum, but don’t stress about the uniform of the day. Our meetings are orderly, although we don’t always follow Robert’s Rules to the letter. We consult the operations manual when needed, but we don’t have it memorized. We maintain an ambitious educational program, but we enjoy social time together.

MARCH 2013

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However, maintaining the right balance requires constant effort, and we need to be vigilant about ever-changing conditions. How do you think we are doing? If you have thoughts or ideas on any aspect of your USPS experience, whether it relates to protocol, activities, or something else entirely, your Bridge would love to hear from you.

Fair winds,

- Charlie

From the Executive Officer (XO)

By Mark Erway, Executive Officer

It is my pleasure to be giving back to an organization that has given me so much in the last three years since my wife Anne and I were introduced to sailing. We both received our 'basic' training from USPS. Subsequently I was invited to be a member of the Bridge and use my 'new' eyes to help the bridge better understand the needs of people who are new to boating. So after attending a number of bridge meetings last year, it is my privilege to serve as Squadron XO for 2013. I am still rather new to sailing and have a lot to learn, but USPS and Seneca Sail and Power Squadron are a tremendous educational resource as I grow in knowledge and experience.



- The fatality rate was 6.2 deaths per 100,000 registered recreational vessels.

This rate represents a 14.8% increase from last year's fatality rate of 5.4 deaths per 100,000 registered recreational vessels.

- Seventy (70) percent of all fatal boating accident victims drowned, and of those, eighty-four (84) percent were not reported as wearing a life jacket.
- Only eleven percent of deaths occurred on boats where the operator had received boating safety instruction. Only seven percent of deaths occurred on vessels where the operator had received boating safety instruction from a NASBLA-approved course provider.

The last bullet indicates that boating safety instruction makes quite a difference.

We all know what it's like to be out on the water when it's busy and crowded, especially on a holiday weekend. We're just hoping that someone doesn't run into us, or that we run into someone else, and that we make it safely back to dock. So, let's continue to spread the word, find ways to make education and training easily available and help all boaters enjoy a safe and wonderful time on the water.

- Mark

The Squadron exists to serve all boaters and help make our waterways safer and more enjoyable. I think one of our biggest challenges is engaging weekenders and casual boaters to realize the importance of even a modest amount of education and training. An interesting document to read is the publication from U.S. Department of Homeland Security and the U.S. Coast Guard Recreational Boating Statistics for 2011 (published in spring 2012). It can be found at this link - http://www.uscgboating.org/assets/1/workflow_staging/Publications/557.PDF

A few highlights from the report:

- In 2011, the Coast Guard counted 4588 accidents that involved 758 deaths, 3081 injuries and approximately \$52 million dollars of damage to property as a result of recreational boating accidents.

From the Administrative Officer

By Ray Margeson, Administrative Officer

We attempt to get an e-mail out to all members with a valid e-mail address for each Seneca Sail and Power Squadron event. If you aren't getting e-mails from me, PLEASE let me know at rmargeson@aol.com.

Also, when we send out announcements, there is a deadline posted – and that is because we have to provide attendance information to the restaurant or hotel or caterer. Our contacts with these vendors usually have a minimum number of persons listed. Depending on the vendor, we might squeak by

with lower numbers or they may charge us for the minimum even if we don't have that number of members who have responded. I send out reminder e-mails when our numbers are low as an incentive to try to get those numbers up. I am begging, please respond as soon as you know that you will be attending.

Short term tentative plans include an April gathering at Fulkerson Winery and a May meeting at Tag's.

- Ray

From the Secretary

By Jim McGinnis, Squadron Secretary

Today (2/23), I'm enjoying a free afternoon in Taipei. The temperature is 22°C and overcast with a light breeze. The flight this morning from mainland China was just 90 miles from Fuzhou to Taoyuan Airport across the Straits of Taiwan. I didn't see any individual sailors making the crossing but they certainly might. I know it is uncommon for individual people in Taiwan to have any type of boat. Once, when I went on a fishing charter boat out of the north end of Taiwan, we all had to have our passports checked by emigration on the way out and immigration on the way back. So we are very fortunate to be able to jump on our boats in the US with absolute freedom (oh yes, some

spousal restraints are typically imposed).

At the other end of the spectrum was taking a boat into Jost Van Dyke with Lynne and Scott in the BVI. We arrived while the customs officer was out making bread deliveries (his good paying job) and we had to wait at Foxy's (the famous New Year's Eve bar at the harbor) for a while before we could get through immigration. Try it some time.

I'll work to do a better job this year keeping the Secretary function manned with the Bridge. So far so good, with Meeting minutes issued to the Commander within 24 hours of the last meeting.

Educational Updates

By Tom Alley, Education Officer

As sure as death and taxes, price increases are becoming part of the "new normal" we're all hearing about. The USPS is no exception.

We recently received notice that there would be significant price increases in the cost of textbooks used in a number of our more popular courses and seminars. The price increases are scheduled to take effect on April 1st of this year.

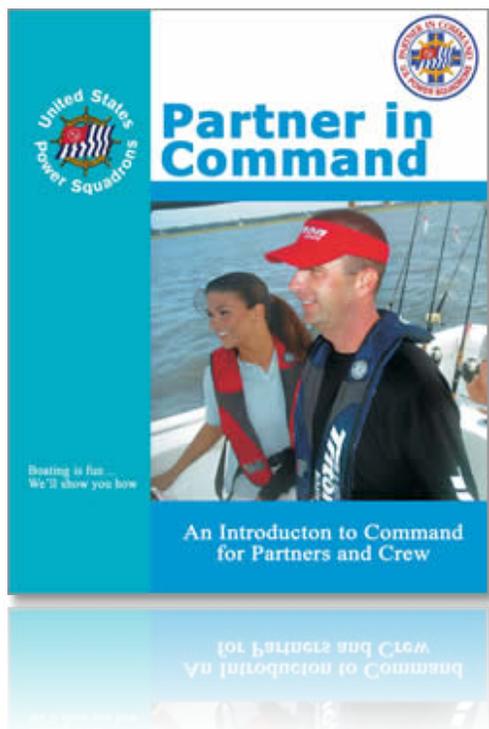
One of the courses affected by this change is Seamanship, which is scheduled to begin this May.

What this means for you is that, with a proposed price increase of 19%, there is a strong incentive to register for this course early!

Deadline for early registration will be March 21st so as to allow time for getting the order processed before the price increase takes effect.

Information about all of our courses is available on the squadron web site or by contacting Tom Alley, the Squadron Education Officer by e-mail at alley@acm.org or calling him at 607-377-6262.

Partner In Command Seminar



When: Saturday, June 29th, 9:00 AM
– Noon

Where: Watkins Glen Yacht Club

How Much:

- SSPS member \$35 / \$10 for partner sharing text
- WGYC/FLYC members \$40 / \$15,
- Public \$50 / \$25

Instructors: Don & Marge Kloeber,
Jim & Sue Morris

Registration: Contact Don Kloeber
before March 20th. (607-562-7540)

This seminar provides an introduction to sail & power boating for crew members who may be required to assist a skipper in the safe operation of a recreational boat, to respond to emergencies or to take over command if the skipper is

incapacitated.

Instruction will include response to emergencies, basic boat operation and slow speed maneuvering.

Skipper and mate / crew are encouraged to attend together.

Editor's Note: USPS has announced a price increase for this course effective April 1st, 2013 (sorry, this is not an April-Fool's joke). Please register before March 20th in order to lock in at the prices listed here.

SENECA SQUADRON NEWS

The Seneca Sail & Power Squadron has a number of events planned in the coming weeks. Watch your e-mail for announcements with additional details for the following:

Arnot Mall Boat Show: Held in early March of every year, our squadron has a booth to provide information to curious boaters.

D/6 Spring Conference: This year's spring conference will be held in Ithaca on April 5th – 7th. All members are welcome to act as representatives for Seneca.

Spring Launch Party: Our annual celebration of spring and the soon-to-begin boating season. Join us this year at Fulkerson Winery on April 13th.

Monthly Dinner Meeting: Stay tuned to see who our guest speaker will be on May 6th at Tag's in Big Flats.

Understanding the Neutral-to-Ground Connection

It's Meaning and Consequences

By Capt. David Rifkin, (USN-Ret)

An often misunderstood and misdiagnosed fault in the AC electrical system on a boat occurs when there is an improper connection between the neutral and ground systems. This fault represents a safety hazard and is not uncommon, especially in older boats. In this article we will examine how this fault occurs, the safety-related consequences of having this fault, and how it can be detected.

First, a little background is in order. The ABYC standards and the National Electric Code are consistent when they require that the neutral and ground only be connected at a "newly derived source." In our case, this means that the connection is made at the marina's electrical service entrance (which is a transformer ashore) and at the output of an operating generator, operating inverter (invert mode), or isolation transformer aboard the boat. When the operating source of power is aboard the boat (a generator), this neutral-ground connection is required to be aboard the boat. And when shore power is the boat's power source, there must be no neutral-ground connections on the boat.

You ask, "why do we have to have any neutral-ground connections"? Seems like getting rid of all of them would eliminate a lot of confusion about when to have them and when they are illegal. Well, having this bond at the source provides a means for having an effective path to carry ground fault currents safely back to the source. For example, if a hot-to-case fault occurs on the boat, the green grounding (or "bonding") wire in the shore cord and throughout a properly wired boat will provide an effective path for any fault current to return to the neutral-ground connection back at the source. This serves two purposes; first, it keeps the touch voltage low on metal-cased equipment, and second, it can cause enough additional

current to flow in a short time to cause a protective action to occur (circuit breaker trip or blown fuse) and clear the fault. Normally, there is supposed to be no current flowing in the green grounding (or "bonding") wiring in the boat's system. (See diagrams on page 4).

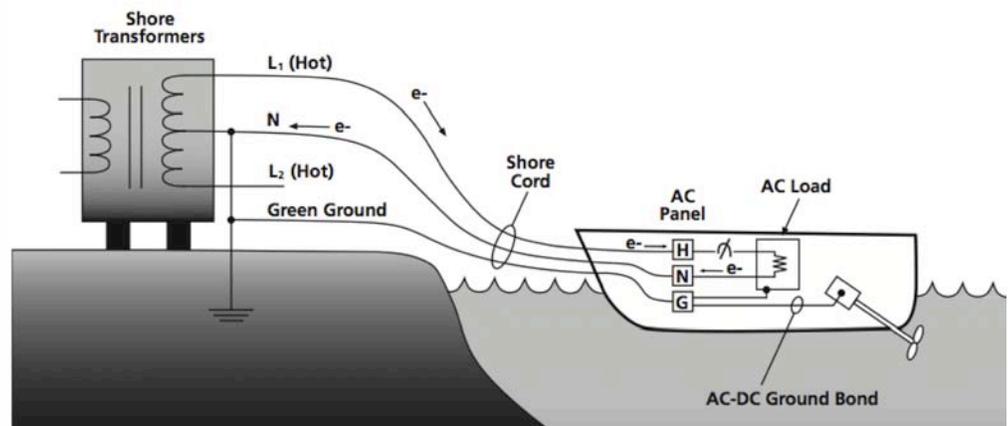
The Problem

Going back to our boat situation, when shore power is being used on the boat, those neutral-ground connections, which are required for generators and inverters, must be broken. Remember that for isolation transformers, the neutral (white wire) and ground (green wire) are permanently joined on the boat on the secondary side only of the transformer since it's considered a newly derived source.

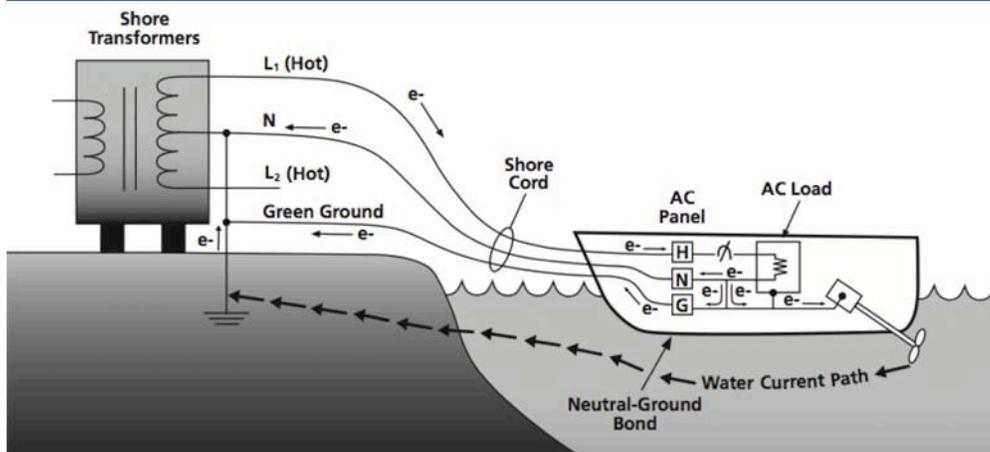
For generators, this connection is normally broken by an additional pole on the shore-genset selector switch. In the case of inverters, it is normally broken automatically inside the case when the inverter operates in the pass-through mode (i.e. when the actual power is coming from shore power and not from the batteries).

So, how does this fault occur on boats? There are

Continued next page.



Proper boat: This illustration shows a properly wired boat receiving 120-volt service. There are no ground faults, or neutral-ground connections therefore no current is flowing in the green grounding wire. Note that the required bond between the AC-DC ground systems is intact on this boat.



Improper boat: This boat has an improper connection between the neutral and ground systems on the boat. This not only creates a second parallel path for current to flow back to the source in the green grounding wire, but also a third parallel path back to the source via the water."

numerous ways a neutral-ground connection is inadvertently established, which explains why it occurs on boats, especially those with modern appliances and older boats that have been "tinkered" with by unqualified electricians. Here's how it can happen:

- *Improper load wiring in the panel.*

When loads are wired into the AC panel, the installer may mistakenly attach a green grounding wire to a neutral terminal (white wires), or vice versa.

- *Improperly configured power source selector switch.*

Use of a shore-genset selector switch without a dedicated pole to break the neutral connection when the "shore" position is selected causes the required genset neutral-ground bond to remain active when receiving shore power.

- *Improperly wired 240v appliances.*

Many 240v appliances (clothes dryers, ranges and cook tops) use 120v to power lights, clocks and audible alarms. These devices often come from the factory with an internal neutral-ground bond so they can be used with older-style three-conductor receptacles. When these appliances are connected to a newer four-conductor receptacle, a neutral-ground bond occurs on the boat. The bond can also occur when using the older style receptacles, depending on how the receptacle is wired. Most instructions explain when the internal bond should be removed.

The Consequences

Now let's examine the consequences of an improper neutral-ground bond aboard. In a properly wired and configured system, all of the supply current will return to the source via the neutral connection for 120v service, or a combination of the neutral and ungrounded (hot) conductors for a 240v service.

However, since the neutral is grounded at the source ashore, a neutral-ground bond on the boat establishes a new path back to the source that directly

parallels the neutral conductor (since the neutral and grounding wires are now connected to each other at each end).

Effectively, we now have a second path for normal load currents to return to the source, this second path being the green grounding (or "bonding") wire. The current flowing in this grounding wire raises the voltage potential of any grounded metal items on the dock to something above earth potential. This elevated potential creates a shock hazard to anyone touching anything grounded on the dock (like shore power pedestals, rails, metal docks, faucets, etc.).

But this dockside shock hazard is only one of the consequences. If the boat is wired to ABYC standards, the AC grounding system is connected to the DC grounding system by a grounding (or "bonding") wire. This creates yet another parallel path for normal load current to travel back to the source: the water path.

Since the DC grounding system is connected to underwater equipment, and since the AC grounding system is staked to earth ground ashore (at the same point where the required neutral-ground connection at the service entrance is made), there is a path for normal return current to flow through the water and earth back to the source ashore. This current can also jump back into a lower resistance grounding wire system on the

Continued next page.

dock by using the underwater metal of other boats as the pathway!

If the resistances of the conductors and connections in the neutral and grounding wires of the dock system and shore cords are low, most all of the load current will be carried by these conductors, and little will enter the water. However, considering the poor condition of wiring systems in many older marinas and boats, along with the condition of the many decrepit shore cord sets you see on the docks, you could have a recipe for disaster.

If the water return path becomes the lowest resistance of the three paths (neutral, ground, and water), then the water path can see a majority of the return current. Note that current doesn't take the least resistance path back to the source, it takes all paths. The most current will flow, however, in the path with the lowest resistance.

Current flow in freshwater means that the voltage potential on underwater equipment has risen significantly. The electric fields established can be strong enough to paralyze (which causes drowning) or even electrocute someone in the water near the boat. In saltwater, the high conductivity of the water will keep the voltage potential on underwater metals relatively low (saltwater is a good conductor) therefore the personnel hazard is not as acute as in freshwater. But be assured, a diver receiving a "tingle" while changing anodes in saltwater, could be seriously injured or even killed working on the same boat in freshwater.

The last potential consequence of a neutral-ground connection on a boat is fire. This can happen during maintenance on the marina electrical system. If a maintenance error is made that inadvertently connects an ungrounded (hot) conductor to the neutral system ashore, the neutral-ground connection on the boat represents a direct short circuit. (Reverse polarity indicators are not required for 240v shore power systems.) Since the neutral is not provided with over-current protection at the main breaker on boats powered by 240v, there is no overcurrent protection available to disconnect the source. Conductors will burn, and fires are likely to start very quickly. This situation occurred a couple years ago at a local

marina in NE Florida, starting fires and destroying several boats (predictably, they were all older boats, and neutral-ground connections were detected on those that still had a relatively intact electrical system).

A similar issue exists with 120v systems. If a boat without a double-pole main supply breaker onboard (required by ABYC standards) also has an improper neutral-ground connection and is then plugged into shore power with reverse polarity, the same direct short as discussed above occurs. In this case, until a dock circuit breaker trips, wiring in the boat's ground system is likely to burn and possibly cause a fire.

The Survey: Does a Fault Exist?

Determining if a neutral-ground fault exists on the boat you are working on or surveying is a matter of making a simple test with a digital multimeter. With the boat unplugged from shore power (see safety note below), measure the resistance between the neutral and ground buses in the panel, or access these two points at any convenient AC receptacle on the boat (the large slot on the receptacle is the neutral). This reading should be greater than 25kohm. Typically the reading will be close to zero ohms if a neutral-ground connection exists.

Important safety note: If the boat has an inverter, make sure the fuse is removed from the DC supply conductor before proclaiming the boat's AC system is deenergized. Inverters can sleep through meter voltage checks on receptacles and come to life when your ohm meter, or you offer a lower resistance and put a load on the system!

In summary, neutral-ground connections represent a safety hazard in the marine environment. Wiring errors usually create this situation. These faults are relatively easy to detect and correction should be made on a priority basis. Adhering to the ABYC electrical standards during maintenance and installation, and inspecting to these standards during surveys will provide the safest possible environment for your clients while enjoying their pastime.

Please see article addendum on next page.

Understanding Grounds - ADDENDUM

There is another problem associated with grounding the neutral on a boat that uses shore power directly (no isolation transformer aboard). It was not discussed in the body of the article since the focus was on electrical safety. If the neutral is grounded on a boat using a galvanic isolator, the isolator will be bypassed and rendered useless. We have seen numerous occasions where improper electrical maintenance or installation was performed on a boat, and the result was rapid sacrificial anode loss and sometimes damage to expensive

aluminum sterndrives or saildrives. Please leave the electrical work to those with an American Boat and Yacht Council (ABYC) electrical certification, for both personnel safety and equipment protection.

This article appeared on <http://homeport.uscg.mil> and was reprinted with permission. (Many thanks, Captain Rifkin!) If you would like to contact the author, you can reach him at:

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The Seneca Sail & Power Squadron, a unit of the United States Power Squadrons, is an organization dedicated to the advancement of responsible and safe boating through continuing education and social interaction.

THE DRUM

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