Ask Steve – May 2015

The Q&A posed below is in reference to a previous post to the Marine Systems Excellence E-zine, The Good Samaritan at Sea, published April 2015

Dear Greg,

I wish to thank you for explicating one of the considerations to be had in mind when faced with a mariner in distress. It is important for all of us who spend time on the water to think (ahead of time) about our responsibilities to the marine community, our personal capabilities and our vessel's preparedness to engage in responding to a distress call.

As a stand-alone article, I worry that many reading it will come away with the thought that it is foolish to go to the aid of a mariner in distress, that protections for Good Samaritans are insufficient and that your word to the wise would lean people away from coming to the aid of a vessel and crew in distress

I suspect that is not your intent: that the legal knowledge you impart is merely one of a number of issues you see as necessary for a skipper to consider: others being, but not restricted to, the crew's and vessel's competency and capacities as well as situational variables such as weather, currents etc.

In the future, I would wish you to remind readers to choose to do the right thing in good faith as one's guidance system (having taken the above considerations in mind), especially where life and limb may be in danger. I would go one step further and suggest that, if Good Samaritan laws are insufficient to protect those who come to aid with reasonable competency and in good faith: that these laws are bad laws and should be challenged. We need all the support that we can muster to do the right thing and to promote operating in good

faith.

Thanks again for your contribution.

My best,

Dick Stevenson

Dick:

I understand your concern that maritime law, by allocating financial responsibility for a maritime loss to a well-intentioned Good Samaritan, may discourage mariners from coming to the aid of a vessel in distress.

The law, however is not so harsh as you may suppose. It only allocates legal and financial responsibility to a volunteer rescue attempt when the assisting person's actions are clearly unreasonable. As a society, at least in this context, we still hold individuals responsible for the reasonableness of their conduct. An example: I have no medical training beyond a basic first-aid course. If someone collapsed near me on the street it would be unreasonable for me to decide that the collapsed person required immediate heart surgery, pull out my pocket knife, and start cutting. If I killed the victim, I would be legally responsible, even though my intent was to save the person's life. I don't have the necessary knowledge. My actions were unreasonable. However, if an ER doctor or a heart surgeon made the same decision and took the same action, even if the result were the same, he/she would likely not face legal liability. In the maritime or in the medical context, you have to know what you are doing.

Greg Dahl

Hi Steve,

Could you be kind enough to advise me? I recently bought a manganese bronze propeller for my boat. The prop was recently fitted and was in the water for only two weeks when the stuffing box developed a heavy water ingress the boat was put ashore for repair. I then inspected the prop and was shocked to find rust deposits on it. Can you state whether mag. bronze can rust? Thanks.

Ronnie

Ronald:

You aren't the first vessel owner to ponder this seeming mystery, a "rusting" bronze propeller. Manganese bronze is an alloy of copper, silicon, lead, zinc (the presence of this metal makes manganese bronze part of the brass family), manganese and iron. It is the latter that accounts for brown stains or in some cases the formation of rust nodules on these propellers.

It's important that all metallic running gear be anodically protected, using zinc or aluminum anodes. In the case of manganese bronze it's especially important as this alloy can suffer from dezincification or iron precipitation if it is inadequately protected. Make certain an anode or anodes are properly attached to the shaft, you can use a multimeter to confirm you have a good, low resistance (it should be less than one ohm) connection between the shaft and anode, and between the anode and the propeller. Furthermore, you can, using a silver-silver chloride reference electrode and multi-meter, confirm that the anodes are providing adequate protection to the propeller.

While the brown stains or nodules are of concern, they rarely become an issue. If, on the other hand, you notice pink areas on the prop surface, that is much more serious, and indicative of dezincification.

Steve,

Thanks for being such a great help to the boating industry.

Is there a meter or some device that I can purchase that can be plugged into a marina’s shore power to verify that my boat will not be exposed to any galvanic current while plugged in at the marina?

Once again thanks for all your help.

Raymond Harris

Dear Ray:

If there is a subject that is most misunderstood in the marine industry, corrosion must surely be it, or at least one of the top contenders.

The most effective means of testing your own vessel for its level of galvanic protection, or susceptibility, is via a silver-silver chloride reference electrode, which is then used with a multi-meter.

Use of this tool isn’t especially intuitive, there are a series of tests you would need to carry out to determine protection levels and to check for the presence of stray current and galvanic corrosion, the scope of which are beyond this response. Having said that, a few facts may help clarify things.

There are primarily two types of corrosion about which you should be concerned. The first is stray current, it is the result of DC positive voltage, i.e. from a battery, “leaking” into water around your boat, usually from your boat. It causes serious, rapid metal loss. There is no way to prevent

this type of corrosion other than stopping it at the leak source. The second is galvanic corrosion, it is the result of dissimilar metals in contact with each other, immersed in an electrolyte, i.e. seawater, a bronze propeller attached to a stainless steel alloy shaft for instance, the former is anodic to the latter and it will corrode if a zinc or aluminum anode isn't present. It is a slow process, and is typically warded off by using sacrificial anodes, zinc or aluminum.

Here's where it gets tricky, an extremely small percentage, less than one percent in my opinion, of corrosion cases are caused directly by shore power, i.e. 120 volts leaking into the water. It's very rare. However, just plugging in to shore power can significantly increase the risk of galvanic corrosion even if the power is never turned on, and that's where folks get confused, they equate plugging in, in marina, with corrosion, and understandably yet mistakenly so. When you plug in, the green grounding wire connects your boat's bonding system to that of your slip neighbor's, and his is connected to his slip neighbor's and so on and so on. Many boats are connected and the one with no anodes left is being protected, potentially, by your anodes via the green grounding wire, with the return path through the water.

This potential corrosion nightmare can be mitigated by using a galvanic isolator or isolation transformer in your shore power circuit, effectively isolating your boat's bonded underwater metals from those of other boats. The galvanic isolator is a must for every boat, even if you plug in just one day a year, and it's cheap, but it does have its limitations, it can only protect to a certain point. The isolation transformer on the other hand is infinitely more effective, with no limitations, it completely isolates your boat's electrical system from the dock and other boats…and predictably it costs much more than the galvanic isolator.

This article covers galvanic isolators http://www.passagemaker.com/channels/galvanic-isolators-and-%C

2%93zinc%C2%94-anode-selection/

This article covers transformers http://www.passagemaker.com/channels/the-ins-and-outs-of-shore power-transformers/

You could purchase Charlie Wing's "Boat Owner's Electrical Handbook" second edition. It's worth having in any event, however, there is a chapter within it on the subject of corrosion and the various measurements you could take using the reference electrode.

Ask Steve questions should be addressed to asksteve@stevedmarineconsulting.com. Please include your full name and home port. Concise questions are more likely to be answered. For more information on the Ask Steve column, please visit www.stevedmarineconsulting.com/ask-steve/.

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