Sailing Safety Series

Marina Safety (Electric Shock Drowning)
April 2017

Every summer there are heartbreaking news stories of fun family boating days, weekends, and vacations that expectantly end in sudden and extreme tragedy when someone goes in the water at a marina for a quick, refreshing swim (or minor boat maintenance task) and never comes out. However, many experienced boaters, as well as casual guests are still not aware of the inherent danger of swimming in marinas and/or around powered docks due to ESD (Electric Shock Drowning). This Sailing Safety Article focuses on awareness and education for these ESD dangers and provides references for additional information.

Despite safety oriented designs, regulations, new equipment, and periodic inspections, boat marinas are potentially dangerous locations for swimming due to the co-location of water and electricity, especially in fresh water (which conducts electricity more poorly than salt water, and thus makes the swimmer more electrically conductive than the surrounding water).

What might be only a minor, non-lethal electrical shock on land, quickly becomes deadly in the water, even for the most experienced or strongest swimmers. The nature of the risk and tragedy is that an electrical shock can very quickly paralyze

August 2011 Michigan teenager Michael Knudsen and his friends jumped into a Traverse Bay marina for a swim, despite the no swimming signs posted at the marina. It was a decision made in a moment of crazy youthful impulsiveness that had devastating consequences. When Knudsen jumped from the dock into the water, he was shocked by electricity. Knudsen’s final moments were agonizing. As horrified friends watched, he struggled to pull himself out of the water and away from the electric shock. Unfortunately, he was unsuccessful and drowned. The tragedy reached the entire community.

June 2014 A man died after jumping into water charged with electricity from a boat plugged into the wrong size power outlet. Alec McQueen, 22, and two friends pulled their boat into an open slip at the Bullfrog Marina. McQueen jumped into the lake from the swim deck. After he jumped in, one of his friends heard him call out. She turned and saw him in the water but he then disappeared. She saw something under the swim deck of the boat next to hers so she jumped onto that boat and stuck her arm in the water to see if she could feel anything. When she put her arm in the water, she received an electrical shock. The two emergency responders who first arrived on the scene were also shocked when they touched the water.

April 2016 A popular high school cheerleader was killed in a tragic electrical shock drowning when her father tried to help her out. Carmen Johnson, 15, died last month while swimming in Smith Lake in Winston County. A metal ladder lowered into the lake caused an electrical shock in the water. Father Jimmy jumped into save her but he blacked out. Her mother managed to turn off electrical supply, saving Jimmy, their son Eric who had also jumped in, and Carmen’s friend Reagan also in the water but Carmen had already disappeared below the surface and drowned.
(or partially paralyze) a swimmer’s muscles, lead to panic, unconsciousness, and silent drowning; often right in front of friends and family who are rendered helpless to rescue them and/or that are also killed trying. As little as 1-10 milliamps of AC current can be dangerous/deadly when swimming in water.

The root cause of the problem can arise from a non-compliant power installation, an incorrectly performed maintenance repair, damaged/worn/corroded land-side equipment, an incorrect shore-power connector, and/or similar failures on nearby boats in the marina/water as depicted in the picture below. Often there is no-warning as many things seem to be working fine on-shore and aboard the boat. However, electrical current may be “leaking” into the water. As a swimmer, there is no way to be assured that “everything” and all boats around you in a marina are correct and safe (even if it was “ok” yesterday, or just 20 minutes ago, or two dock slips over, etc). Often there is no initial feeling of electrical charge for the swimmer in the water, giving a false sense of safety; and/or it can be triggered when a piece of equipment on nearby boat turns on (battery charger, etc).

The only safe way is to stay out of the water in a marina (or near a powered dock). If you must go in, be sure you are “wearing” a life preserver (you may not even be able to hold-on to a throw-ring if shocked), always have an on-shore observer, and disconnect all nearby shore power connections if possible.
As a boat owner/skipper, you should always warn guests of the danger of ESD in marinas. Risks to others can also be minimized by having an equipment leakage circuit interrupter (ELCI) on your boat’s shorecord inlet. Just like the ground fault circuit interrupters (GFCI) outlets in your boat galley or home kitchen, an ELCI measures the current flowing through the two or three wires that bring power in and out of your boat. The net current of the wires should always be zero. Any imbalance means electricity is leaking somewhere — which is never good. If/when detected, the ELCI will shut off shore power to the boat in the blink of an eye.

For more information, refer to the links below:


http://www.electricshockdrowning.org/esd--faq.html

http://www.boatingmag.com/key-ways-to-prevent-electric-shock-drowning


If you have any questions, please contact us at safety@byc.com, macchair@byc.com, office@byc.com or through the BYC office @ 313-822-1853

Note: The purpose of this article is to highlight concepts for how you and your crew can race as safely as possible. As always, ultimate responsibility for the safety of the crew and the decision whether to race or to stop racing is that of the skipper (RRS4, MSR2). This email is meant a courtesy only and you should always refer to the Notice of Race, Sailing Instructions and Safety Regulations, which govern the race.