

**WHAT IS ELECTRIC SHOCK DROWNING or ESD?** ESD has become the catch-all phrase to encompass all in-water shock casualties and fatalities, but it is defined as:

*The result of the passage of a typically low level AC current through the body with sufficient force to cause skeletal muscular paralysis, rendering the victim unable to help him/herself, while immersed in fresh water, with drowning the eventual result. (Source: [ESD Prevention Association](#), 2014).*

Higher levels of AC current can result in electrocution.

**HOW COMMON IS IT?** Ten to 20 **documented** electric shock drownings occur each year, nationally. However, an unknown quantity of ESDs may be misdiagnosed as drowning due to fatigue, alcohol consumption, cramping, or other factors.

#### **WHERE DOES IT HAPPEN?**

- Usually fresh water (lakes, ponds, streams, rivers). The human body is a better electrical conductor than fresh water and electricity will always follow the path of least resistance. *While conditions can exist in **any** type of water, more conductive salt water generally reduces the risk.*
- Docks that have AC power provided to them and that provide power to boats, boat lifts, lighting or other applications.
- Boats that are plugged into AC power.

#### **WHAT CONDITIONS MUST BE MET FOR ESD TO HAPPEN?**

- There must be a fault in the AC electrical system onboard a boat or on a dock. *When wired correctly, faults are uncommon. But do-it-yourselfers or residential electricians unfamiliar with boat or dock wiring can make mistakes that lead to faults.*
- There must be a lack of or failure of the AC grounding system. *The grounding system is also known as the safety ground, the sole purpose of which is to give fault current a place to go and “trip” a breaker or blow a fuse.*

When the two scenarios above are met, the current has no way to complete the circuit other than through the water.

**WHAT DOES ESD DO TO THE HUMAN BODY?** Keeping in mind that a 100 watt light bulb uses 833 milliamps of electricity, it can take as little as 10-20 milliamps passed through the human body to cause the muscles to seize, leaving the victim conscious and aware that something is wrong, but unable to react or swim effectively. Higher levels of current lead to more severe effects including heart fibrillation and cardiac immobilization.

**HOW IS ESD IDENTIFIED?** No physical evidence is left on the body of an ESD victim, unlike the burns that someone would receive when they are electrocuted. Electric shock drownings are identified when a source of AC leakage is discovered within a given range of the swimmer's location at the time the swimmer is present.

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Electric Shock Drowning (ESD) Resources webpage at The NASBLA Lighthouse ([www.nasbla.org/ESDresources](http://www.nasbla.org/ESDresources))  
([www.nasbla.org/lighthouse](http://www.nasbla.org/lighthouse))

#### APPLICABLE STANDARDS FOR ESD PREVENTION:

- **Boats:** [ABYC](#) E-11, *AC and DC Electrical Systems on Boats*
- **Shore Facilities and Docks:** [NFPA](#) 70, *National Electric Code Article 555* and [NFPA](#) 303, *Fire Protection Standard for Marinas and Boatyards*