

UNITED STATES COAST GUARD AUXILIARY



DEPARTMENT OF HOMELAND SECURITY
The civilian component of the U. S. Coast Guard
(Authorized by Congress in 1939)

Is it Drowning, or Electric Shock Drowning?

What You Need to Know to Help Save a Life



Innocent enough? But is there electricity in the water? Boaters and parents need to know about Electric Shock Drowning, and what to do to save a life. Photo Credit: Brian Fitzgerald

such as estuaries or rivers may only be in the danger zone after heavy rains. In saltwater, electrical current takes the path of least resistance, bypassing swimmers.

Unlike a drowning swimmer, who typically can't yell out for help because their mouth is mostly underwater, an ESD victim is often confused about what is happening to them, may be able to shout, and will feel numbness, tingling, pain and paralysis. A drowning victim often looks "playful", while an Electric Shock Drowning victim looks "distressed" and may simply roll onto their back – if wearing a life jacket - or roll face down into the water, totally unresponsive.

A typical drowning can take as up to a minute for an adult or just 20 seconds for a child, with the victim's arms moving in a climbing-a-ladder type motion, taking quick gulps of air, with the mouth below the water much of the time. ESD victims can be instantly paralyzed and not move at all.

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Electric Shock Drowning: What You Need To Know

IN GENERAL

- ESD victims are good candidates for successful Cardiopulmonary Resuscitation (CPR). Learn to perform CPR and maintain your training.
- To retrieve a person in the water, reach, throw, and row, but don't go.
- Tell others about ESD. Most people have never heard of it and are unaware of the danger.
- Make sure your children understand the importance of not swimming anywhere there could be electricity. Don't let them roughhouse on docks. Tell them what to do if they feel a tingling or shock in the water (see below).

IN MARINAS

- NEVER swim within 100 yards of any freshwater marina or boatyard.
- Talk to marina owners or operators about the danger of ESD. Ask your marina operator to prohibit swimming at their facility and post signs.
- Ask marina operators if they are aware of and following the guidelines from NFPA 303 (Fire Protection Standard for Marinas and Boatyards) and National Electric Code (NEC) 555.

IF YOU HAVE A BOAT

- Have your boat tested once a year to see if it is leaking electricity, or buy a clamp meter and test it yourself. If you find any problems, have your boat inspected by a qualified electrician trained to ABYC standards.
- Have a qualified ABYC electrician install an ELCI on your boat (refer them to the ABYC E-11 Standard) or use an ELCI in the shore power cord. As an alternative, install an isolation transformer on the boat.
- Test the GFCI/ELCI at least once a month or per the manufacturer's specifications.
- DO NOT do your own 120-volt AC electrical work on a boat or hire an electrician who is not familiar with ABYC standards to do it. Many of the problems that lead to electrical faults result from the differences between shore and boat electrical systems and standards.
- DO NOT use common household extension cords for providing shore power to your boat. Use, and encourage other boaters to use, shore power cords built to UL standards.
- NEVER dive on your boat to work on underwater fittings when it is plugged in to shore power, even in saltwater.

IF YOU HAVE A PRIVATE DOCK

- NEVER swim within 100 yards of ANY dock using electrical power!
- If you have not electrified your dock or put an AC system on your boat, weigh the risks carefully before doing so.
- If you need electricity on your dock, hire a licensed electrician and make sure the wiring meets the requirements in NFPA 303 and NEC 555. If your dock is already wired, hire an electrician to check that it was done properly. Because docks are exposed to the elements, their electrical systems should be inspected at least once a year.
- Exercise your GFCIs/ELCIs as recommended by the manufacturer.
- If you normally run a power cord from your house or garage to charge your batteries, make sure the outlet has a GFCI and include an ELCI somewhere in the shore power cord.
- NEVER swim off your dock without shutting down all shore power to the boat and the dock.
- Even if you adhere to all of these rules, nearby docks can still present a shock hazard. Educate your neighbors and work together with them to make the waterfront safe.

IF YOU'RE IN THE WATER AND YOU FEEL TINGLING OR SHOCKS

- DO NOT follow your instinct to swim toward the dock!
- SHOUT! Drowning victims cannot speak, let alone shout. Let everyone know what's happening so they'll understand the danger and react appropriately.
- Try to stay upright and back out of the area the way you came, warn any other swimmers in the area of the danger, and then head for shore 100 yards or more from the dock.
- Alert the dock or marina owner and tell them to shut the power off to the dock until they locate the problem and correct it.
- Go to the hospital to make sure there are no lingering effects that could be dangerous.

IF YOU HAVE TO RESCUE AN ESD VICTIM

- Know how to distinguish drowning from ESD (see Alert for how to recognize "normal" drowning; tingling, numbness, or pain all indicate ESD).
- Fight the instinct to enter the water – many rescuers have died trying to help ESD victims.
- Call for help. Use 911 or VHF Channel 16 as appropriate.
- Turn off the shore power connection at the meter base and/or unplug shore power cords.
- Get the victim out of the water. Remember to reach, throw, row, but don't go.
- If the person is not breathing or you cannot get a pulse, perform CPR until the Fire Department, Coast Guard, or ambulance arrives.

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HYPOTHERMIA:

Hypothermia happens in very low temperatures when your body loses more heat than it can produce. Early symptoms of hypothermia include feeling cold, shivering, losing your sense of balance, and feeling tired or ill. In severe cases the victim may fight, quarrel, or appear to be drunk. If the victim is not treated, they will shiver violently, have a high heart rate, and will stop thinking clearly. In advanced stages of hypothermia, victims will stop shivering, lose consciousness, have blue skin, and be unable to walk or speak. As this condition gets worse, a victim's breathing and heart can stop, and the victim may die.

COLD WATER IMMERSION:

The topic of hypothermia does not fully cover the effects of cold water immersion. The shock of being suddenly immersed in cold water can kill before hypothermia has a chance, in several ways.

INITIAL COLD WATER SHOCK (UP TO 5 MINUTES)

The sudden shock of cold water causes a gasp reflex. This is an involuntary intake of 2 to 3 quarts of air – or water, if the victim's head is under water. The victim that breathes in water may quickly drown. Cold water shock can cause hyperventilation, breathlessness, or irregular breathing. Another danger is the "gag reflex" in which spasms in the throat can prevent air or water from passing into the lungs, causing asphyxiation or "dry drowning." Sudden immersion in cold water can trigger a heart attack (cardiac arrest). Cold water entering the ear canal can cause vertigo and disorientation, actually causing victims to swim down to their death, instead of up, toward safety.

IMPARED MOTOR FUNCTION (3 TO 30 MINUTES)

The initial cold shock can result in a feeling of panic and tiredness that can cause the victim to be unable to swim or breathe in water. Loss of muscle coordination due to the cold water will impair swimming ability.

HYPOTHERMIA (30 TO 60 MINUTES)

Body core cooling leads to hypothermia, unconsciousness and death. The victim's body type, size, insulation of clothing, life jacket use and other factors affect the survival time in cold water.

POST-RESCUE COLLAPSE:

After rescue, someone who has been immersed in cold water is still in danger from "post-rescue collapse." As blood pressure drops, inhaled water can damage the lungs. Cardiac arrest or arrhythmia can develop as cold blood is released from arms and legs into the body core.

EXPECTED SURVIVAL TIME IN COLD WATER:

Redding area water temperatures for Sacramento, Pit, McCloud, rivers in the winter are from 32 degrees to 50 degrees, so your survival time is 15 to 60 minutes, in the summer, it is between 50 and 75 degrees, and 2 to 5 hours.

THE OCEAN: Year-round temperatures from approximately Santa Barbara northward range from the high 40s to mid 50s. South of Santa Barbara, summer temperatures can reach mid 70s and winter temperatures will range in the high 50s to low 60s.

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Instinctive Drowning Response

The Instinctive Drowning Response (IDR) is what people do to avoid actual or perceived suffocation in the water, and it does not look like most people expect. There is very little splashing, no waving, and no yelling or calls for help of any kind. To get an idea of just how quiet and un-dramatic from the surface drowning can be, considered this: It is the number 2 cause of accidental deaths in children, age 15 and under, of the approximate 750 children who will drown next year, about 375 of them will do so within 25 yards of a parent or other adult. In ten percent of those drowning, the adult will actually watch them do it, having no idea it is happening. An article written by Charlie Duncan a USCG Auxiliarist, describes the Instinctive Drowning Response like this:

1. Except in rare circumstances, drowning people are physiologically unable to call out for help.
2. Drowning people's mouths alternately sink below and reappear above the surface of the water. The mouths of drowning people are not above the surface of the water long enough for them to exhale, inhale, and call out for help. When the drowning people's mouths are above the surface, they exhale, and inhale quickly as their mouths start to sink below the surface of the water.
3. Drowning people cannot wave for help. Nature instinctively forces them to extend their arms laterally and press down on the water's surface.
4. Through-out the IDR, drowning people cannot voluntarily control their arm movements.
5. From beginning to end of the IDR, people's bodies remain upright in the water, with no evidence of a supporting kick. Unless rescued by a trained individual, these drowning people can only struggle on the surface of the water from 20 to 60 seconds before submersion occurs.