

Electrolysis hot spots

Because the amount of current needed for electrolysis is so small, the electrical field of a power cord is plenty. The single largest cause of electrolysis is power cords dangling in water. Even just the middle of a power cord touching water, not necessarily the ends, is enough to cause damage well over 100 feet away.

Boats that have poor electrical systems and electrical boxes in power pedestals that are not up to code are also sources of electrical leaks and problems, as are water sources near anything electrical.

Common electrical problems that drive electrolysis include:

- main dock power lines hanging in water, especially in a hose that has become filled with water
- improperly spliced power pedestal wiring
- boat power cables hanging in water
- faulty wiring or electrical equipment in boats
- lack of zincs, electrical bonding and correct grounding in boats
- faulty onboard battery chargers and/or inverters
- non-marine electrical wiring, chargers, etc. onboard.

Since standing water, different metals and electricity often lie in dark places, electrolysis damage may not be noticed until something breaks. When it is diagnosed, care must be paid to find the extent of the damage, which can be much larger than the one piece that gave way.

How to reduce electrolysis on docks

- Pick up dangling power cords out of water, secure them.
- Use only properly grounded and connected, weatherproof, GFCI sockets in proper, weatherproof boxes.
- Replace old dock circuit breakers, sockets and loose, wobbly connections.
- Replace leaking faucets on docks, which provide the continually wet surfaces necessary for electrolysis on the dock itself.
- Check main dock electricity cables to see they are not dangling in water.
- Firmly attach dockboxes, to prevent yanking electrical cables and ensure

the life of breakers, wiring and sockets.

Boaters and electrolysis

In addition to instructing staff about electrolysis dangers, they should be instructed to educate boaters, too. And it may require more than a simple talk about power cords, since many instances of electrolysis arise from faulty boat electrical systems.

Marinas should encourage boaters to:

- Have a marine electrician survey their boat for battery switches and circuits bypassing them, circuit breakers, fusing, charging, inverters, grounding, bonding and zinc placement, and fix any problems.
- Ensure battery switches and emergency wiring are correctly wired and set.
- Keep all zincs up to date and firmly attached.
- Install an onboard isolation transformer.
- Check all electrical systems to ensure substantial, tight, waterproof, marine connections and parts are used.
- Turn off non-emergency electrical systems when not onboard.
- Maintain batteries.

If the boat keeps the proper zincs up to date and securely fastened, these zincs will be the metal that's eaten up by any electrolysis, and the boat won't be damaging it or other boats.

The various metal objects that come in contact with outside water, such as keel bolts and through-hulls on boats, must all be connected securely with special "bonding" wires, which attach the zinc. Few boats are properly bonded, let alone bonded at all, and this is a major cause of electrolysis.

Here are some other common customer complaints regarding electrical power and how to deal with them:

- **This marina is hot:** Direct the boat owner to onboard electrical protection. Electrolysis is a fact of life in any marina, and most causes of electrolysis are other boats. Refer boaters to the tips above or create a list for them. Ask to see the exact electrical source, on the dock that's suspected. If it's a problem, fix it.
- **Dock electricity has eaten (something**

metal and submerged) on my boat:

All boats should be professionally bonded, and all electrical systems should be maintained, especially zincs. Electrical surveys and installing bonding systems is work beyond the training of most boaters. If there are no receipts for this work, assume it has not been done correctly.

- **My neighbor's boat is hot:** A marine electrician can test waters around boats for electrical activity. If a boat is extremely hot, the boat owner may be liable for damage to others. This is a rare occurrence, though. Once again, the best remedy is to ensure adequate electrical protection.
- **My dock electricity spikes or has interference:** It is very rare for main electrical supplies to have these problems. Other boats on the dock usually cause them. An onboard isolation transformer will clean the power. The process of converting 120V AC power to onboard 12V DC power cleans these spikes and dips in power. Batteries also store clean power, so encouraging use of 12V DC systems onboard, instead of 120V AC systems, will greatly help.
- **My dock electricity is under-voltage:** This is easily measured with a voltmeter in the socket. The marina should have one on hand.
- **I am not getting the full amperage with my dock electrical supply:** Test the dockbox circuit breaker and replace, if faulty, loose or old.
- **I'm feeling electricity in the dock freshwater or when I walk on the dock in bare feet:** Often the installation of GFCI receptacles is incorrect or they are simply not installed. These receptacles prevent electrical shock and are mandated by law. An electrician needs to trace this problem, but it's easily fixed.

Educating boaters on electrolysis and electricity focuses them on fixing problems in their boats and creates a proactive image, which in itself precludes many complaints. ⚓

Jerr Dunlap offers results-oriented programs to reduce marina maintenance costs and improve boater relations through educational DVDs, articles, testing and lectures. He can be reached by phone at 310/968-4564 or on the Web at www.my-boat-works.com.