

Electrolysis: I hear the word constantly at work, at marinas, in chat rooms and watering holes wherever boaters are found. Seldom is the word applied correctly in the conversation. The word electrolysis has grown into a universal term to describe disappearing or rusting metal on boats. I must admit that a universal term is handy to describe three different things but it lacks a certain amount of accuracy that may prove useful when one is attempting to eradicate a symptom.

According to Webster's (and Corporal Klinger) Electrolysis (noun) is : **a:** the producing of chemical changes by passage of an electric current through an electrolyte
b: subjection to this action2: the destruction of hair roots by an electrologist using direct current.

That was the last Webster's reference and I will not consult Wikipedia. I am shooting for a general understanding by my readership, not a chemical science degree.

Ok you may learn three new terms; these are the three primary causes of metal corrosion on boats. All boats of all construction and propulsion when immersed in seawater (electrolyte) are subject to corrosion in one or all of these three flavors: Galvanic, Stray current and Crevasse corrosion.

“Galvanic corrosion” is the simple chemical reaction that takes place when almost any metal is immersed in an electrolyte :I. E: Seawater. The metal creates a specific “potential” (think voltage). Because different metals make different voltages the lesser of the two will plate off or sacrifice itself to the greater. One trick to controlling this corrosion is to make all metals the same voltage by wiring them together to even their potential and offering a sacrificial weak metal. The green bonding wires and zinc anodes perform this function. We will cover shore cord born galvanic corrosion at a later date.

“Stray Current corrosion” is what happens when DC current is introduced into the seawater or through the metals touching the seawater. (Including bilge water) This type of corrosion can be identified by the speed in which it destroys expensive parts. Some of my readers will attest to loosing tens of thousands of dollars in running gear to a bad alternator in less than a week. Others have lost outboard and stern drive legs in under a month to a loose wire or bad bilge pump. There are three primary causes of this dilemma that I encounter on a regular basis; the first is abandoned wires or connections in the bilge water, another is faulty bilge pumps and poor connections, the third is engine alternators going bad and shunting raw current through the case ground into the running gear.

“Crevasse corrosion” is basically what happens when metal is constantly wet but is starved of oxygen. Think of a screw in wet wood. Most metals used in boat rigging and construction rely in some way on oxygen to form a corrosion resistant barrier. An orange stain bleeding from the fitting is a good clue. Once the fastener begins to bleed it must be replaced and re-sealed. Good rigging practice can avoid these failures when assembling

or servicing a boat. The basic idea of prevention is to keep moisture from entering and / or stagnating around the metal. A few tips: When bolting, over drill the hole by a size then countersink. This allows the sealer to coat the entire bolt shank and form a ring of sealer under the bolt head. When screwing again counter sink the pilot hole. When installing inboard propellers take the extra time to lap the keys and prop tapers.

Corrosion problems tend to be expensive to repair and difficult to accurately diagnose. If you suspect your zinc anodes are experiencing accelerated wear or you are suffering drive line failures, engine cooler failures, rampant orange stains from mounted hardware or even shocks when you touch the steering wheel you may want to consider retaining a marine electrician or qualified surveyor to help you track down the culprit.