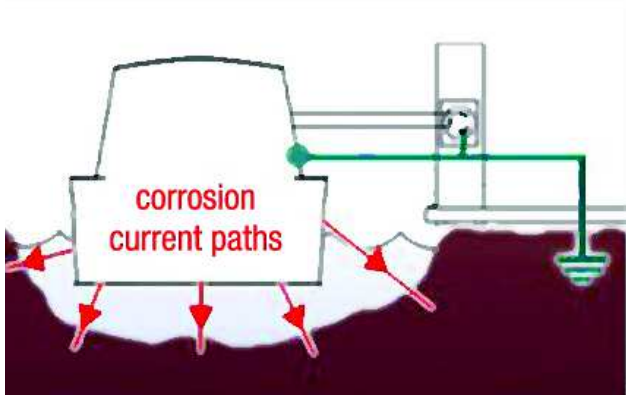
Earth leakage on boats

Edwin Watt of Galvanic Isolators explains the difference between earth leakage, stray currents and galvanic currents.

For further information, contact Galvanic Isolators by phone on 0757 8073490 or via galvanic-isolator.co.uk

Earth leakage is mains electric current that flows to earth from the 240V circuit in your boat, due to electrical faults in wiring or equipment. You are protected from by getting a fatal shock if you touch something live by a residual current device (RCD) which also provides some protection against these electrical faults. Every boat and shore supply should be fitted with an RCD, and in the event of a fault in the boat's wiring or equipment, the RCD disconnects the electrical supply. What earth leakage does not do, at least not directly, is cause corrosion to your boat's hull. However, there are other types of earth currents that do damage a boat's hull and deplete its anodes.



When a galvanic current flows, it takes metal from your boat's hull and deposits it on the bank side.

Galvanic Currents

These flow whenever your boat is connected to a shore-based electricity supply. They occur as a result of chemical reaction between the metalwork of a boat and surrounding metal such as pontoons, other boats, and the minerals in the bank-side.

Galvanic currents are at a very low voltage, so they're not dangerous to life. But they do cause corrosion of a boat's hull, and cause faster than normal anode deterioration. A galvanic isolator or isolation transformer can prevent this from happening.

Stray Currents

These currents flow as a result of faulty wiring or equipment. Unlike earth leakage, which would trip the RCD, stray currents often show no symptoms, and everything appears to be completely normal. But it's not. Voltages are not high enough to kill, but they are much higher than galvanic voltages, so the potential for causing hull damage is enormous.

Anodes can corrode from new to nothing in a matter of months. When, or even before, the anodes are gone, the boat's hull corrodes.

Imprinted Leakage

There is yet another type of leakage, known as imprinted leakage. This can come from the power supplies of battery chargers, computer power supplies, phone chargers etc. Even brand new equipment can cause imprinted leakage. Because of the high frequencies that these devices use, some of their power can be 'coupled' into the boat's wiring, and then to earth. There is often a direct current component to this type of leakage, and it's this that can cause rapid damage to your boat's hull and anodes.

Again, everything can appear normal and this type of fault will not trip an RCD.

A stitch in time...

...could have saved Helen Hutt an embarrassing breakdown!

Surely I'm not alone in believing that my fuel tank is well looked after, making sure no water or foreign bodies fall in, keeping it topped up to prevent condensation, adding FuelSet to protect against diesel bug. How wrong I was!

On the first really warm afternoon this year, I moored up in a fairly isolated, pretty spot, and waded into my maintenance programme, changed the oil and filter, the air filter and finally the fuel filter.

Unfortunately, I was unable to refill the new fuel filter despite hand pumping for more than half an hour. The tank was about a quarter full, but I poured in another 20-litre anyway—to no avail. A call to RCR was inevitable. An engineer talked me through various scenarios over the phone but he was as stumped as I was as to the possible fault.

The following morning, an engineer came out, seemingly unfazed at having to walk over a mile down the towpath. After some rather unpleasant blowing through pipes, he eventually got fuel flowing and the filter filled. But... the engine wouldn't start. He surmised that more fuel was needed to ensure that there was enough above the out-take to prevent any floating debris causing a blockage. But he recommended that I got the tank cleaned out because, almost certainly, fuel contamination was the root cause of the problem.

Although still convinced that it probably wasn't all that bad, I did get the job done two days later, just to be on the safe side. Tankbusters, recommended by RCR, estimated a minimum £270, which in itself took some swallowing. In the event, the diesel in my tank was in such a state that extra filters had to be used and five hours later I was facing a bill of over £400! They pumped the fuel out of my tank, filtered it to remove water, rust and diesel bug, and returned it, along with 50 litres of fresh fuel which they brought with them. I was genuinely shocked by the difference between what came out of my tank and the fresh diesel— a cloudy old port against a quality rosé! Just try it. Pump a jam jar's worth of fuel out of your tank. If it's not absolutely clear, bright pink, it's contaminated—and a breakdown waiting to happen!

Finally, I understand that pilots on some river and sea crossings may insist on seeing evidence of a recently cleaned tank before they will take you. How many more reasons do you need?


From old port....


...to fresh rosé

STOP THEM BUGS....

Some advice from Tankbusters

- **Before filling up at a boatyard or from a fuel boat, proffer a clean jam jar and ask for a sample of diesel to check for clarity. It stands to reason that supply tanks should also be cleaned regularly to eliminate contamination, but I wonder how many are.**
- **Clean your tank filler-cap and inside thread regularly and smear a little grease on it to ensure a good seal to keep water out.**
- **For good measure, fit a water filter—in the form of a bag which floats on the surface of the fuel—to remove condensation. Not cheap, but worth it for extra peace of mind.**
- **Use Marine 16 fuel additive, which is a more effective biocide than FuelSet.**

Tankbusters

tankbusters.co.uk
Bruce 07974808277