April 2019 Newsletter

Photo Essay: Anchor Rode Cut-Away Lines

Other than for inspections or testing, it's a part of your anchor rode you hope to never fully see; the connection between the final inboard link of chain, the "bitter end", and the vessel, should consist of a section of line. The reason for this "insert", often referred to as a cut-away, is to enable the vessel operator to jettison the anchor and rode with relative alacrity should the need arise. This might be needed in the following scenarios; you are dragging onto a lee shore, by the time you retrieve the anchor and get underway you may be in the surf or aground; you find you are being born down upon by a vessel underway or adrift; you have a medical emergency aboard and need to get underway immediately. If time permits, tying a length of line and a float or fender onto the rode will enable you to return and retrieve it, or simply record the GPS location (you could drag for it using another anchor, on a track perpendicular to the direction the rode was laying). Alternatively, you can use a longer length of floating cut-away line such as polypropylene, or Samson MFP float line; which will remain on the surface, making retrieval easier.

The cut-away line itself should be spliced onto the chain (three strand is most often used, although braided may be used provided it's spliced), thereby minimizing its profile. A knotted line, or worse a shackle and thimble, will not pass easily, if at all, through the chain pipe; in fact, they are likely to get jammed; a scenario that prevents jettisoning *or* retrieval of the rode. The line should have sufficient tensile strength to support the suspended weight of the rode

and anchor in the event it fully deploys or runs free in deep water (typical 5/8 inch three strand nylon line has a minimum breaking strength of 9,000 lbs. – 400 feet of 1/2” G43 chain weighs 1,000 lbs., and thus this should present no problem), where the full weight would have to be supported. The final 25 feet of chain should be painted a distinctive color, like fluorescent orange, which will serve to alert the user that he or she is approaching the end of the line, or chain, as it were.

When needed, the cut-away should deploy itself onto the deck or anchor pulpit, where it will be cut with a sharp, serrated knife (you should not have to descend into the chain locker to cut it, and you should keep your cutting tool of choice readily accessible, and you should be able to find it in the dark). Equally as important, the cut-away must not be too long, the union between line and chain should stop on the pulpit, making it possible to attach a chain hook to the rode for retrieval should it deploy inadvertently, in the event of a windlass malfunction for instance. This means you must have a chain hook that is secured to a suitable length of line, one that can be bent onto the windlass capstan. Hauling in on this will allow you to re-reeve the rode over the chain wildcat, sometimes called a gypsy. The pad eye or hard point to which the cut-away line is attached, inside the chain locker, must also be sufficiently sturdy to support the full rode and anchor weight.

Finally, if you’ve never tested your cut away, you should, even, if you are willing, to the point of cutting it, so you’ll know what’s required. At the very least, you should run the chain out in shallow water, or while hauled, to expose the cut-away. Be warned, once the cut-away line reaches the wild cat it will run free momentarily and then be brought up short; it may be somewhat startling. Do this to ensure the cut-away doesn’t get hung up in the chain pipe or spurling tube, and to make certain the line/chain interface stops where

it can be easily reached to secure your retrieving chain hook tackle.

Ask Steve

Dear Steve,

Inverter manufacturers recommend a separate distribution panel and outlets for inverter loads. I have loads that are currently plugged in to an outlet on a circuit from the main AC panel, these loads are a Microwave and coffee maker. I do not want to have to switch plugs when I want AC from the inverter for these appliances. What is the best practice to distribute AC current from the inverter to these appliances?

In total I have 3 circuits that I could feed from an inverter, a Port and Starboard circuit for lights and outlet, and a Microwave / Coffee maker circuit.

Are there any books or publications on this subject that you would recommend?

Thank you,

Tom Binzer

Tom:

While there are certain requirements regarding how an inverter is wired, including the need for a separate neutral bus, the loads that are carried by the inverter would operate when on shore power or genset because most inverters have what’s known as a pass through mode. In other words, when the inverter is not inverting, it allows power from these other sources to pass through it, supplying whatever would otherwise have been powered by the inverter.

Having said that, it is critically important that those installing the inverter follow the manufacturer's installation instructions to the letter, as well as applicable ABYC guidelines, including, among others, those related to neutral bus and neutral to ground isolation, as well as the inverter chassis ground wire size.

Steve,

I came across your site while doing some research. I'm wondering if you could explain when it would be correct to ground to the hull of a steel ship. We have a three phase, four wire generator 120/208 3ph.

Presently the neutral is bonded to the hull in the main distribution panel. Is this common practice? We are experiencing around 10 amps to ground through the meter. We have it isolated to two panels, to circuits. Previously I have only seen the neutral bonded to the hull at the gen. set. And no where else in the ship. Neutrals and ground conductors are separated in all panels.

Is there any problem removing the bonding conductor from the neutral to the hull in the distribution panel creating a floating or isolated neutral system? Your input is appreciated.

Many thanks,

Edward Poulin

Ed:

Let me begin by saying that my expertise and experience is primarily in yachts, rather than large commercial ships. Having said that, I consulted with a colleague who is knowledgeable on the subject, I'll put you in touch if you wish to retain him for further analysis. I assume this has

nothing to do with shore power, i.e. this is strictly genset related. The reason you want the hull bonded is, in the event an AC short to the hull occurs, there will be a path back to the genset to trip a breaker, and thus it should be bonded.

I suspect the current transformer for the ground current is on the neutral conductor to the hull. This means that there is one or more Neutral-Ground bonds in equipment (creating parallel paths which include the hull), or there is equipment with AC ground fault leading back to the genset via that neutral to hull connection. Knowing exactly where the current transformer is installed would help narrow this down.

“Floating” the neutral is not an option. In some cases the grounding system is floated so there is no electrical connection to the hull (ungrounded system). In that case you must have ground fault indicators (measuring resistance of each phase to ground to determine if there are shorts to ground…….one phase can fault to ground with no issues…..but when the second one faults, fireworks are usually the result).

Hi Steve,

I am the owner of Nordhavn 6202 motor vessel Bonne Vie. I am in the middle of a refit and am having the whole exterior painted. My painter is recommending Awlgrip on the hull and Awlcraft on the pilot house and masts, etc. He said he would not be able to paint the pilot house and all the other components at one time and he feels Awlcraft would blend easier. What are your thoughts?

Thanks,

Ronald S. Bonvie,

Ron:

There are several reasons to use Awlcraft, and in this case

your painter is right, it is easier to blend (and repair). Having said that, many large vessel's cabins and decks are painted with Awlgrip, using natural borders top establish paint breaks and lines. Many painters prefer Awlcraft because it is easier to fix errors, drips, runs, sags, bugs etc.

There is a substantial difference between traditional Awlgrip and Awlcraft 2000. The former is linear polyester urethane that is extremely durable, abrasion, weather and UV resistant. It was originally developed for use on aircraft. Depending on the region, I've seen light colors last and look great for upwards of 20 years, and dark colors for 15 years. It requires exceptional skill and experience to apply and repair. Awlgrip has a thicker resin layer that gives it its durability, however, this layer prevents scratches, drips and runs from being easily buffed out while retaining long lasting shine and performance.

Awlcraft 2000 is an acrylic urethane, it was developed by Akzo Nobel to be easier to apply by less skilled applicators. It dries quicker, which reduces the likelihood of dust and insect entrapment. Because of its softer finish, a result of the less dense molecular structure, it has a lower melting point, thus when buffed, the coating can be made to flow, making repairs much easier.

Polyester molecules (Awlgrip) are much smaller than acrylic molecules (Awlcraft), which means for a given volume the polyester coating is denser, and thus more abrasion and chemical resistant, and has better color retention.

Awlgrip can be brushed, Awlcraft 2000 cannot. Both stratify, leaving a resin rich layer at the top, with a pigment rich layer beneath, which is one of the reasons they are long lasting. Awlgrip's layer is thicker than Awlcrafts, which is why it's more durable and more chemical resistant, and why it's more difficult to repair. Any buffing or repair that reduces the resin film thickness will compromise longevity and

durability, as well as potentially affecting the warranty.

In order to repair a scratch for instance in Awlgrip, buffing or sanding, known as “cutting” must go deeper, penetrating the pigment layer. The resin layer is thicker and less able to flow or melt, filling the scratch or damage. Initially the repair may look shiny, however, if it’s exposed the pigment and no longer has a clear coating, it will eventually dull, which means it will require regular application of Awlcare, a protective polymer coating that restores gloss, temporarily. This peculiarity of Awlgrip makes the edges of painted repair areas more difficult to blend.

Awlcraft’s thinner, less dense, less cross linked, softer and more “flow-able” surface resin layer makes repairs easier. This makes it possible to carry out repairs that do not expose the pigment, because the surface resin layer melts and flows without exposing the pigment. It also makes touch up blending easier.

Even though Awlcraft 2000 is easier to repair, I’ve seen many repair jobs botched, primarily because unskilled or inexperienced operators use too much pressure, or to many rpm on buffing wheels, causing excessive resin melting or cutting too deeply, exposing pigment.

Today, many yards use the terms interchangeably, which is misleading. These coatings are very different animals, each with their own sets of advantages and disadvantages. If ease of repair is of the greatest importance to you, go with Awlcraft 2000, if longevity and durability is more important, and especially if you opt for a dark color, go with Awlgrip. Above all else, vet the yard that will carry out the work carefully, among other things ask for references that include recently painted vessels as well as those that are five or more years old, preferably painted by the same painter who will lift his or her gun to your hull.

Hi Steve,

I surveyed a Searay 300 Sundancer with Bravo III outdrives on it. Reportedly, there were different models of Bravo III outdrives on the boat.

When the owner pulled the boat in the fall, he found a lot of corrosion on one of them and is looking to blame me for the large cost of replacing the corroded outdrive because I did not inform him the boat had two different outdrive models at the time the survey was done in the summer – months earlier.

Not sure about the existence of two different Bravo III models and not sure I am at fault here. Frankly, I did not check the model numbers on them.

Any light shed on this is greatly appreciated.

Thanks,

Steve Colletti

Steve:

When it comes to corrosion it's very easy to point fingers, but much more difficult, although never impossible with the right tools and knowledge, to prove exactly what occurred.

There have been issues with Bravo III stern drives and corrosion. If you Google search <Mercury Bravo III corrosion issues> you'll get many hits. Bravo III drives use two stainless steel propellers, which are in close proximity to the aluminum lower unit. Aluminum is anodic to stainless steel in much the same way a zinc anode is anodic to a propeller or shaft, the anode corrodes, thereby protecting the shaft and prop, or cathode. In the case of a stern drive, its passive cathodic protection is provided by anodes, aluminum or magnesium, and its active protection may be provided by an

impressed current system, which uses electricity to prevent corrosion, more on that below. You might begin with a call or visit to a Mercury dealer, to determine what changes were made and when, and if they had any effect on corrosion resistance.

All Mercury drives are aluminum, which is the third least noble, or the third most corrosion-prone metal on the galvanic series, after zinc and magnesium, so they are corrosion prone even when everything is right. However, because he's the one making the claim, the onus would be on the boat owner to substantiate this, to prove the drive series theory is relevant, and that the corrosion is the direct result of the drive type, rather than a fault, external influences or improper maintenance.

Having said that, there are host of reasons why stern drives corrode, including onboard faults that could lead to stray current corrosion; or a malfunction in the Mercathode impressed current system (has it been inspected or tested? If it malfunctions it can cause severe corrosion), failure to replace anodes, or a failure to use the correct anodes (aluminum for salt water, magnesium for fresh, many owners and even pro's incorrectly use zinc), or a failure to replace them often enough. Are all of the drive's stainless steel bonding wires intact and has continuity been checked? A nearby vessel or steel bulkhead could also cause corrosion that is limited to one drive and not the other, depending on proximity. Is the vessel equipped with an operational and properly wired galvanic isolator? The drive type or series would have no bearing on issues of this sort. In some cases Mercury recommends that a second Mercathode system be installed to provide additional protection.

After investigating the above possibilities, if nothing definitive is found, a reference electrode test should be carried out on the boat, while afloat, preferably by an ABYC certified corrosion technician, to confirm the protection level. As one of my corrosion analysis colleagues likes to

say, when a corrosion theory is proffered, “follow the electrons”, to definitively determine the cause of the corrosion.

This article, and the two more embedded within it, is objective and does provide some background on the Bravo III corrosion issue http://my.boatus.com/consumer/BravoIII.asp.