WHY USE MARTYR™ ANODES?

Anodes are inexpensive, which means it is important to protect your boat with a quality product. Martyr™ Anodes are pressure die cast and manufactured to strict quality standards through an ISO 9001 Quality Management System. Every anode is UPC barcoded. In addition, each alloy is guaranteed to be manufactured to the latest US Military Alloy Specification and is chemically tested regularly in our in-house labs to ensure consistency.

Poorly manufactured anodes may contain high levels of impurities such as iron, which will leave your boat unprotected. Martyr™ Anodes manufacturers all 3 alloys for the 3 main water environments. Not all anodes are created equal so to be sure buy genuine Martyr™ Anodes.

CORROSION WILL OCCUR IN ALL TYPES OF WATER WITH DRAMATIC EFFECT

Metals have different electrochemical potentials when in contact with one another and form Galvanic cells. The metal with a lower potential in the galvanic cell will be anodic and will corrode. The same effect can occur in areas of different electrochemical potential in a single piece of metal such as a steel plate. Any craft moored and operating in fresh, salt or brackish water is at risk from corrosion and the effects can be costly.

Corrosion on Steel & Aluminum vessels can be identified as either areas of localized pitting to the hull plate, rudders, bilge keels etc. or less obviously in the form of general wastage of the hull plating often occurring below the paint coating. Pitting can lead to the complete penetration of the hull below the waterline. General wastage of the steel can be just as critical, weakening the hull and necessitating expensive re-plating. Corrosion on Aluminum vessels is also generally in the form of localized pitting to the hull plate, rudders, bilge keels and particularly in way of weld seams. Pitting can lead to the complete penetration of the hull below the waterline necessitating expensive re-plating.

On wood and GRP vessels the areas of concern are principally the stern gear i.e. the propellers, shafts, shaft brackets, stern tubes and rudders which are expensive to replace and vital to the vessel, the failure of a propeller or rudder could have disastrous consequences. The effects of corrosion can vary from pitting of propellers and shafts to the decomposition of the alloy of propeller. The failure of something as small and inexpensive as a split pin can result in the loss of the propeller.

Stray current leakage is quite often cited as the cause of corrosion on all types of vessel however more often than not the problem can be traced to a galvanic action. Stray current leakage is the action of electrical current from an external power source such as a battery or shore power supply which because of some electrical system fault on board the vessel passes out through the hull or a fitting in the hull and flows through the water causing "Electrolytic" corrosion. Stray current leakage is usually a result of damage or wear to the wiring system or poor installation of wiring or electrical equipment.

WHAT CAN BE DONE TO PREVENT CORROSION?

The selection of materials is of prime importance in the construction of craft. Generally naval architects and boat builders ensure that they select metals which are as far as possible compatible to each other and when this is not possible metals must be isolated from one another. There will always be occasions when fittings or steel-work require replacement or repair and it is important that when this is done attention is paid to the same criteria. In particular ensure that fastenings and split pins are compatible and of the highest quality.

The paint system on any boat is an important first barrier against corrosion. Seek advice from the paint manufacturers for their recommendations on the most appropriate coating system and follow the application instructions completely. Ensure that a good anti-corrosive primer is applied if anti-fouling is to be used. When using a copper based anti-fouling none of the paint must be applied directly to bare metal surfaces.

Vegetable oil based paints, although far less widely available than in the past, should not be used with cathodic protection systems as the paint tends to saponify.

The correct installation of electrics on a boat will reduce the possibility of stray current leakage and the following actions are recommended.

- Use only high grade insulated wiring of suitable capacity. Undersized wires will cause resistance and consequent voltage drop.
- Clip or support all wires at suitable intervals to prevent fatigue and eventual fracture.
- Use only corrosion resistant terminals and connectors and make sure that all are clean and tight.
- Attach only the main battery leads to battery terminals.

- Fit an isolation switch in the battery circuit.
- Ensure that all battery circuits are correctly fused.
- Keep all wiring, connections and junction boxes above the bilge area and other areas likely to become wet.

Make sure that when fitting additional equipment the work is carried out in accordance with the manufacturer's instructions. The polarity of connections should be correct and each circuit must be correctly fused. Electrical and electronic work is best carried out by a qualified marine electrician.

Ongoing maintenance on your boat is essential. Metal work, paint coatings and electrical installations all require regular inspection. In particular you should inspect the wind and water line area if owning a steel vessel. This area is particularly vulnerable because it is often prone to mechanical damage but derives no protection from an anode system being above the water line.

WHAT IS CATHODIC PROTECTION?

Cathodic protection is an electrochemical process which halts the natural reaction (corrosion) of metals in a particular environment by superimposing an electrochemical cell more powerful than the corrosion cell. Sacrificial Anodes are fitted or bonded to the metal to be protected which in turn as it has a greater electrical potential than the anode material becomes cathodic and causes the anode to waste instead of itself.

In a correctly installed Martyr™ Cathodic Protection System the only corrosion occurs to the sacrificial anode which is replaceable. The number and size of anodes is determined by the type of material and the surface area being protected.

The term bonding refers to the connection of the anode to a remote metal component such as the propeller shaft of rudder stock and it should be remembered that the integrity of the bonding is critical to the effectiveness of the cathodic protection system.

Several factors determine the type of cathodic protection system fitted. Firstly the environment in which the vessel is operating, secondly the size and type of construction and finally the length of time that the vessel is likely to be afloat before the next maintenance slipping.

FIT THE CORRECT ANODE MATERIAL FOR THE WATERS YOUR VESSEL IS OPERATING IN

As a general rule owners should fit the anodes suitable for the environment they most regularly berth in and the following table provides a useful guide:

Salt Water: Fit Zinc (Martyr™ I) or Aluminum Anodes

Brackish Water: Fit Aluminum Anodes (Martyr™ II)

Fresh Water: Fit Magnesium Anode (Martyr™ III)

Some vessels will from time to time move between salt and fresh water, others are berthed within marinas and behind tidal barriers where the water is enclosed and likely to be brackish or even virtually fresh. Owners must be aware of the effects that this may have on their boats and fit the correct cathodic protection system to avoid corrosion. Not all anodes are suitable for every environment, for example the surface of a zinc or aluminum anode will if left in fresh water for some time become covered with an off white crust of oxide which effectively seals the anode and stops it working even when returned to salt water.

Zinc Anodes suffer a similar problem even in brackish conditions whereas Aluminum will continue to operate effectively in river estuaries and other areas of brackish water indefinitely. The consequences of this passivity of the anode are that the next most anodic item within the anode bonding system will start to sacrifice itself which could of course be very serious. It is therefore very important to check Zinc and Aluminum anodes after any trips into fresh water and if necessary clean off or change the anodes. Should a vessel move into fresh water for more than two weeks Martyr™ recommends that an alternative anode system is used suitable for fresh water situations.

Magnesium Anodes on the other hand have a much higher driving voltage than zinc or aluminum making them highly suitable for use in fresh water, they will however become very active in salt water where they will probably only last a matter of months. Protected surfaces can build up a layer of off-white calcareous deposit which will be difficult to remove. Magnesium anodes are not designed for prolonged use in sea water and if you are taking your boat into a salt water location for more than seven days (Fourteen days in any one year) you should consider changing the anodes.

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