The Big Three

In introducing aluminum alloy boats to fiberglass recreational and commercial mariners three questions inevitably come up. I call them the "Big Three":

1) Does the aluminum alloy corrode away in saltwater?
2) Does the aluminum alloy get hot in direct sunlight?
3) Does an aluminum boat have a greater chance of getting struck by lightning?

Quickly the three answers are:

1) No. Boats built from high quality aluminum alloy, properly wired and provided with a sacrificial anode will last indefinitely. Our lifetime warranty is your assurance.
2) No. Aluminum boats do not get overly or unusually hot in the sun.
3) No. You are safer (not safe) in an aluminum boat than in a fiberglass or wood boat in a thunderstorm.

For many people these answers seem either wrong or at least counterintuitive.

If you put a piece of high-quality steel in saltwater it will corrode away and aluminum doesn't seem tougher than steel. An aluminum hull must be a corrosion problem one thinks. Correct?

Even if it doesn't corrode away it must get incredibly feet-burning hot down here in Florida, right?

Beyond that a metal boat must act as an attractant to lightning – correct?

Corrosion:

We're all familiar with rust. It is our most common interaction with corrosion. A steel or iron thing is exposed to the environment and it goes all orangey and flakey and starts to disintegrate. Right?

What about aluminum? As stated before nearly all metals that one uses are “alloys” of different metals but are commonly called by their main ingredient.

Our boats are made from either 5086 0r 5083 marine-grade, aluminum alloy. This metal is designed, composed and tested to exist in the saltwater environment.

There are other alloys of aluminum that because of the alloying metals would, in fact, corrode and fall apart in a saltwater environment but the 5000 series is designed to be submerged, semi-submerged or tangential to the saltwater environment. The point of this alloy is that the other ingredients in the mix (mainly magnesium) is less noble than the aluminum and won’t corrode the base metal.

An aluminum alloy that features copper, for instance, should never be used in saltwater – baaaad.

Alloy with magnesium – goood!

Further aluminum alloy has a special and highly beneficial property – passivation.

What is passivation? Think stainless steel.

Steel corrodes. Stainless steel is corrosion resistant – why?

Both stainless steel (an alloy) and marine-grade aluminum (an alloy) corrode but just a little bit. Passivation means that as oxygen reacts with the metal the resultant surface oxide forms a protective, tight and tough layer that prevents further oxygen from reaching un-oxidized metal.

Returning to regular steel we are familiar with the oxide (rust) forming and then falling off in a continual process until the metal is consumed. Steel boats use coatings like paint to prevent this activity and to prevent oxygen getting to the metal.

For aluminum alloy (a highly reactive metal) as soon as clean aluminum is met by oxygen it reacts. It oxidizes. It corrodes. The action is almost instantaneous.

Seems bad – doesn't it? A highly reactive, instantaneously corroding material to make a hull from? What???

Here's the great part. The unexpected part. The cool part.

The oxide layer that forms on an exposed aluminum surface is the second hardest naturally occurring substance on the planet! Aluminum oxide is second only to diamonds in toughness. Further it adheres. It doesn't slough off like rust does. If forms and it stays. Once formed no fresh oxygen can get at the highly reactive aluminum it can only get to the un-reactive aluminum oxide! Corrosion (oxidation) stops. The surface will remain in this condition indefinitely.

In a test done by ALCOA a test plate was semi-submerged in Narragansett Bay for 30 years – the degradation was microscopic. 30 years!

An aside – *the boat hull should not be used as a ground for the electrical system and a sacrificial zinc should be used whenever dissimilar metals are attached to the hull below the waterline.*

Heat!

What most of us think of when we think of a metal vehicle is a car. A car's body is made from sheet steel covered in paint. This covering of steel/paint acts like a heat sink building up heat and holding it. Cars can and do get quite hot in the sun. (On a side note - old Landrovers had aluminum alloy bodies - if you ever put your hand on a Landrover in the sun you would be surprised at the difference between them and a Jeep, for instance)

Aluminum in general and 5000 series alloy additionally are both tremendous conductors of heat rather than great accumulators of heat. The only metals better than aluminum for conducting heat are silver, gold and copper. For instance both very high-end cookwear and stadium bleacher seats are made from aluminum alloys. For cookwear the ability of the alloy to pass heat directly from the burner to the food is extremely important in cooking. More importantly when the chef turns down the heat the temperature in the pan goes down immediately as the alloy doesn't hold the heat. In a cast iron skillet you can turn down the heat but the darn thing will be very hot for a good long time afterwards! Lastly you can actually hold the handle of an alloy skillet when the pan is over the burner as the

heat is mostly dissipated by the time it reaches your hand.

Same thing but in reverse for bleachers. If made from steel or even fiberglass you would have a lot of shrieking women at every Miami Dolphins game as they set their keisters on a heat sink.

With our boats the alloy sheds what heat it takes-on very quickly as the boat is residing in 90 degree air and 70 degree water (I'm using Mexico numbers, I believe) thus the boat will equalize with its surroundings.

The only exception to this is our non-skid floor. The chemical composition of this does have some heat sink properties and the floor can become quite warm. As our non-skid is very, very aggressive to begin with you are probably not wearing bare feet anyhow but if you were in bare feet you would probably want to take a bucket of seawater now and then to cool it off.

Lightning.

I respectfully call this the Miami Boat Show question since the one time we did the Miami Show I spent about 50% of my time answering just this question!

First of all let me premise my answer by saying that you are never, ever safe in a lightning storm. You should do everything in your power to avoid being in a lightning storm - including not going out if storms are predicted and running in when the sky turns that ominous dark suggesting a storm is on its way.

Secondly, I know a lot about lightning - I was, as a young man, a meteorologist in the Marine Corps. I know the science behind lightning as well as the danger of it. Beyond my own knowledge I have checked with various experts on the subject including the National Weather Service and a professional yacht lightning consultant as the answer to this question is very important to be correct.

Finally, the answer is that you are safer in an alloy boat than in a glass boat. Why?

Assuming that you are talking apples to apples and that both boats are the same height above sea level there is nothing about aluminum that is more "Attractive" than glass. Air is a great insulator and thus both glass and alloy provide the same shortcut that the lightning is seeking to ground.

Once lightning has found your boat the metal boat provides a very good conductor for the lightning's current to go to ground whereas the fiberglass boat does not. The strike on a glass boat may well run through the boats electrical system which, unfortunately, runs back towards the operator (you!)

Additionally, if you are in one of our boats with a cabin or t-top you are even safer. Lightning consultants encourage you to create a halo of metal or wires around the people on a boat as when the strike hits the current will follow the metal halo away from the

operator and crew (You!) and towards the boats perimeter where it will continue along the hull and to ground. All of our superstructures are welded to the boat and thus provide excellent conductivity to ground.

Finally, let me reiterate - you are NOT safe on a metal boat in a lightning storm nor are you safe in a fiberglass boat in a lightning storm.
So we've answered the "Big Three" – corrosion, heat and lightning. The answers aren't that they are manageable problems or semi-problems or ignorable problems. The answers are that they are features or benefits of aluminum alloy boats and NOT problems.

But these facts don't make our boats good boats. Good boats come from design and execution of great materials not from the great material

Best boat material – best boat design!