Aluminum Boats: why?

In the past 30 years, fiberglass has been the material of choice of worldwide boatbuilders, particularly for higher-volume production lines. Competitively priced compared with boats made from most other materials, fiberglass boats can also be made from standardized molds that reduce their construction time and labor.

Additionally, the claim has been made that fiberglass boats are "maintenance-free." However, as more has come to be understood about delamination, blistering, leaks, and problems associated with structural fatigue, this claim has proved to be untrue.

Aluminum alloys, which are specified for marine use, suffer from none of these problems.

Corrosion-Resistant Alloys

Central to aluminum's suitability for use in boat construction is the high resistance to corrosion of its alloys for marine applications when used in the specified corrosion resistant tempers. The traditional marine alloys—5083, 5086, and 5456 as well as the more recently developed 5383 and 5059—resist corrosion in fresh water and saltwater.
Except for cosmetic reasons, 5xxx-series alloys don't even have to be painted above the waterline; the unpainted metal reacts with air (as would any other aluminum alloy) to form aluminum oxide—a hard, protective coating that protects the underlying aluminum. For most conditions the bottom of an aluminum hull needs only compatible antifouling paint to prevent the growth of performance-robbing barnacles and weeds and zinc anodes to prevent galvanic corrosion associated with non-aluminum metallic propulsion equipment and other attachments.

Steel—aluminum's other principal competitor as boat material—by contrast, rusts quickly in saltwater and thus requires protection inside and out. The interior of a steel hull is typically painted with coal-tar epoxy, and the exterior epoxy-coated or flame-sprayed with zinc or aluminum. For both jobs, the steel must be sandblasted with sharp silica sand to provide a tooth for the flame spray or paint. This substantial, dirty, and expensive task can offset the higher material cost of the aluminum to a large degree.

More Durable Than Steel and Fiberglass

As for durability and reparability: aluminum comes out ahead of both steel and fiberglass. Compared with a steel hull, a "strength-equivalent" aluminum hull boasts about 29 percent greater dent resistance and 12.5 percent greater resistance to rupture. (Such an aluminum hull would be approximately 50 percent thicker, but lighter, than its steel counterpart, due to aluminum's lighter physical property.) Fiberglass, on the other hand, is extremely brittle and far more likely than either aluminum or steel to rupture upon impact.

Due to the metal's ductility, when an aluminum boat does sustain a dent, it can often be pounded out with a hammer or, if necessary, cut out with a saw and easily replaced. Tales abound of aluminum boats stranded on rocks for days, absorbing blow after blow against their hull, denting—but not rupturing—and being towed to a yard where their damaged sections are cut away and replaced, so the boat could be returned to service. In such instances, if a fiberglass boat did not sink on the spot, its damage would likely render it too costly to repair.

With regard to flammability, aluminum does not burn and requires a temperature of over 600° C (1000°F) to melt. Fiberglass, on the other hand, frequently contains petroleum-based resins that can burn energetically once started. And, while watertight bulkheads can be built in such fiberglass boats, structural fire protection may not be achievable due to the material's flammability.

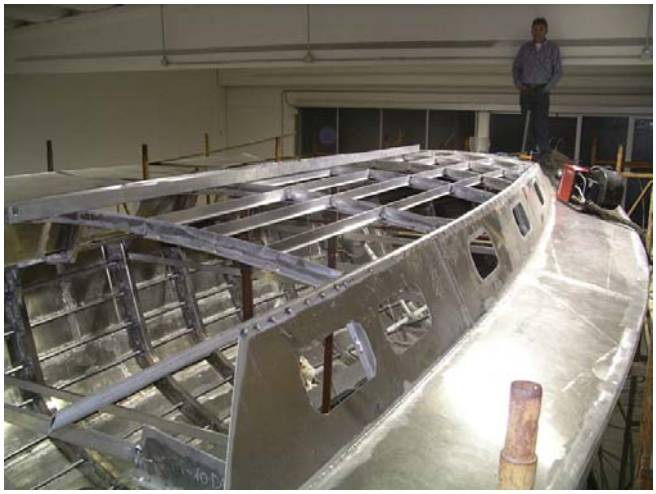
Lightness + Strength = Versatility

An aluminum boat of a strength equal to a comparably designed steel or fiberglass boat will weigh less by approximately 20 percent or more. In fact, weight savings of 35% to 45% in hulls, and 55% to 65% in superstructures, can be achieved with aluminum compared to steel. Put another way, pound for pound aluminum is stronger than either material.

Aluminum's weight advantage means that an aluminum craft of comparable design and equal strength will generally move more quickly if sail driven and use less fuel if motor-driven. The use of aluminum can also improve seaworthiness, safety, and reliability, and lower maintenance costs.

Consider a Boat's Lifetime Costs

Up-front costs for a fiberglass boat will almost always be cheaper than for comparable steel or aluminum craft. But when the costs of routine maintenance—corrosion control, painting, and repainting for steel boats—as well as major repairs—leaks, cracks, and problems stemming from structural fatigue in fiberglass—are factored in, aluminum becomes more price-competitive with both materials. What's more, aluminum boats typically last longer than comparable steel or fiberglass boats and, on average command a higher resale price—both highly relevant when considering a boat's "cost."



One final important difference distinguishing aluminum boats from fiberglass is the known consistent quality of the material. Aluminum manufacturing facilities' operations are certified to one or more ISO standards. And the aluminum that they produce conforms to one or more Aluminum Association standards. With fiberglass, any number of vastly-different-quality resins may be used whose performance and durability can vary widely. While aluminum welds can be x-rayed for verification of a boat hull's integrity, an entire section of fiberglass would have to be excised and essentially destroyed to subject it to analysis.

All told, aluminum boats offer significant advantages over the competition with regard to their weight, strength, durability, the maintenance they require, and their resale value. And, if your aluminum boat bucks the odds and winds up headed for the scrap heap, take heart; it's also highly recyclable.