

12. About Catamarans

12.1. Catamaran History

The dual hull design has been used by humans since at least 280 BC by Egyptians to carry obelisks. The Roman historian, Pliny the Elder, refers to the ship design in *Naturalis Historia*, published circa 77 AD. The ancient seafaring people of Polynesia used dual hull vessels to settle the numerous islands in the South Pacific. In fact, it is they that gave the dual hull design our modern name: catamaran.

Nathanael Herreshoff began to build catamaran boats of his own design in 1877 (US Pat. No. 189,459). The 'Amaryllis' immediately showed her superior performance capabilities at her maiden regatta (The Centennial Regatta held on June 22, 1876, off the New York Yacht Club's Staten Island station). It was this same event, after being protested by the losers, where Catamarans, as a design, were barred from all the regular classes until the 1970's¹²².

In the mid-twentieth century, the catamaran inspired an even more popular sailboat, the Beach Cat. In California, a maker of surfboards, Hobie Alter produced the 250-pound Hobie Cat 14 in 1967, and two years later the larger and even more successful Hobie 16. That boat remains in production, with more than 100,000 made in the past three decades¹²³.

12.2. Major Benefits

Catamarans have a high proportion of deck area to displacement; i.e., they can be large without being heavy. The area between the hulls rides above the waterline and has zero contribution to water resistance, yielding a higher efficiency than similar monohulls.



Illustration 12.1: 200 mph Catamaran

A monohull with a traditional displacement hull has a quickly building hydrodynamic drag barrier which sets the theoretical hull speed based on square root of "width at waterline". Catamarans make use of needle-like hulls which significantly reduce this source of friction. So significant is the reduced hydrodynamic drag, that a 26-foot *TwinVee* will plane in less than 3 seconds and operate at over 20 knots with only one 140 Hp engine¹²⁴. In other words, the catamaran acts like two knives cutting through the water, whereas a monohull acts like a ladle pushing through the water. These boats are fast, and will get the owner home from the ocean even if one engine fails.

Catamarans are inherently more stable due to a wider beam (width). Stability is incredibly important for a racing team, and is one reason why boats capable of travel at nearly 200 mph are catamarans. The increased width creates a large righting moment, a physics term for the force created by an object to right itself. The righting moment means that

122 <http://web.archive.org/web/20080124161749/http://www.ulstc.org/Herreshoff.html>

123 <http://www.hobiecat.com/sailboats/hobie-16/>

124 <http://youtu.be/M8a4eAEfXWw>; test filmed by Domingo Bernardo

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catamarans do not require keels or ballast, further reducing their weight and drag. Less weight also means less displacement is necessary; a 26 foot *TwinVee* draws less than one foot of water. The lower displacement equates to less hydrodynamic drag. The stability difference is similar to the difference between a four-wheeled vehicle with relatively large spacing between the wheels like an Indy car, and a two-wheeled vehicle like a motorcycle; the motorcycle always wants to tip over.

Lightweight design and efficiency allows for smaller engines to propel the vessel. A smaller engine requires less fuel, which allows for smaller fuel tanks, further decreasing weight. The engines on a small boat account for a large percentage of the total cost. A significant reduction of necessary engine size yields a sizable reduction in the total initial cost. The increased efficiency and smaller engines than a monohull reward the owner with smaller operational cost in the form of fuel savings¹²⁵ and maintenance expenses.

The wide spacing between the outboards in a catamaran allows the pilot to maneuver easily at slow speeds. By operating the engines in different directions, the boat can rotate to the left or right without the increased weight, cost and maintenance of bow thrusters; it is easy to park.

12.3. Major Disadvantages, Mostly Myths

As in all things in life, catamarans also have disadvantages over traditional monohulls. The largest and most pervasive is the lack of knowledge concerning catamarans. This deficiency has led to the creation of many catamaran myths, so much so that the Power Catamaran Manufacturing Group has created a set of professionally-produced videos in an attempt to spread the truth. The videos are available free on the internet at <http://www.youtube.com/user/powercatgroup#g/u>.

Common Myths About Catamarans:

- *Catamarans have low resale value*
- *Catamarans roll excessively*
- *Catamarans are low quality boats*
- *Catamarans are unstable in a beam sea*
- *Catamarans are unstable in a following sea*
- *Catamarans are difficult to drive*
- *Catamarans have ugly shear lines*
- *Catamarans lean outboard during a turn*



Illustration 12.2: US Navy Catamaran

The largest true disadvantage of a catamaran is the complexity of design and construction. The hulls are asymmetrical and must be extremely stiff. The frame must be extremely strong and well built to withstand large shear forces. These construction issues create a high quality boat, but at a traditionally higher initial cost. Fortunately, at least some of that higher cost can be mitigated by smaller engines and less fuel consumption.

Another issue which may be considered a disadvantage is the reduction in below deck-space. Since the hulls are thinner and smaller than a monohull, there is less space for staterooms, equipment rooms, lockers and other storage areas. Again, this is not a major disadvantage since catamarans tend to weigh about half of comparable monohulls. If storage is the main concern, a much larger catamaran can accommodate and still outperform its smaller monohull cousin.

125 tested at 40%, more details in [Benefits of Mamba Design](#), page [90](#)