



THE TAMING OF THE CAT

Developments in design and increased accessibility through chartering have raised the profile of catamarans enormously in recent years. Are they practical for the ordinary cruising owner? What should buyers be looking for?

BY JAMES JERMAIN

The story of the modern catamaran really started in the 1950s and 1960s when designers began producing practical cruising designs ranging in style from low, sleek semiracing types to boxy, spacious motorsailers. Also in the '60s, the first ocean-racing multihulls arrived. These boats did a great service to the catamaran cause by raising its profile, but also did a great disservice by highlighting its one great weakness—an inability to recover from a capsize.

In spite of the many attractions of catamarans, sales never built to the critical mass that would allow the sort of design development that had taken place around the cruising monohull. Catamaran designers and builders struggled on through the '70s and '80s, producing worthy designs in small numbers. Then in the late '80s the French suddenly discovered (with the aid of government backing) that cats made perfect Caribbean and Mediterranean charter boats. And suddenly there was money for large-scale production

Billy Black

building and more extensive research into design. Most of this research went, inevitably, into cats suitable for safe family chartering, and these boats dominate the marketplace today.

Although charter companies have a fairly tightly defined set of needs, individual cruising owners range from the daysailing gunkholer to the ocean-crossing liveaboard and can have very different requirements. The market for modern production cats is still not big enough to cover the complete spectrum, but there are small builders around the world who can satisfy special needs. The question is what to look for. Here are some answers.

Hull design

Why would you buy a cat rather than a monohull? Speed? Space? Stability? Safety? Stowage room? All these things can be designed into a cruising catamaran, but not necessarily all at once. Good stowage means weight, which kills speed.

Illustrations by Kim Downing © 2003 Sail Publications

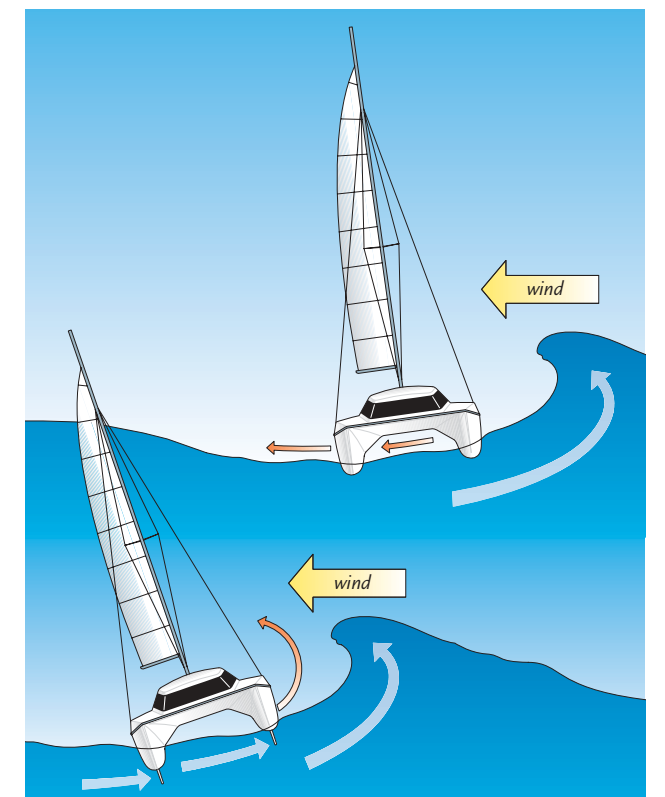
Catamaran design has blossomed over the last decade; today's big charter/cruising cats place the accent on comfort and safety

Stability means small rigs and wide beam, which means less speed and less maneuverability; safety means buoyancy chambers and less space. As with monohulls, each cat is a compromise that must be balanced to suit different needs.

Keels. Low-aspect fixed keels have become almost universal among cruising cats—and for good reason. For the builder they are easy and cheap to mold. For the user they are uncomplicated and reasonably efficient. The boat can be beached safely on them, their shallow draft is ideal for gunkholing, there are few, if any, safety considerations, and they are an ideal place to put water and fuel tanks where the weight contributes to stability, if not to speed.

When raised, daggerboards allow access to shallower anchorages. And by lowering or raising daggerboards strategically, you can fine-tune sailing performance. Lower the daggerboards to resist leeway and improve pointing. Raise them to reduce wetted surface for more speed or to deliberately encourage leeway. Provided you have the sea room, this can be a safety benefit in big, breaking beam seas when a fixed keel might dig in and trip the boat over.

Some builders and designers don't like daggerboards because they are difficult and time-consuming to design and make. They have to resist considerable side forces, and any failure can have serious consequences. Often owners don't like them because they take up space in the hulls that could be used for the accommodation. Cruising should be simple and, like centerboards on monohulls, daggerboards add complication. They can rattle about if not well designed and built. The lifting mechanism and the boards themselves need regular inspection and servicing. Ultimately, they are not as foolproof as fixed keels.



Retracting daggerboards allow the hull to sideslip in big, breaking beam seas, where fixed keels might dig in and trip the boat up

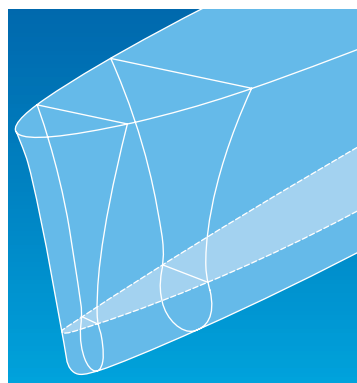


Accommodation is a major selling point for catamaran builders; this 40-footer has the volume of a 60-foot monohull

Hull shape. Most modern designs have modified U-shaped sections, which give a reasonable compromise between load-carrying ability and speed. The greater the beam of the hulls (as opposed to the overall beam of the boat), the greater the load-carrying capacity but the higher the drag. Coastal cruisers can have a fairly flat run with little rocker, but offshore designs need more rocker and more V-shaped sections forward to give a gentler motion and better wave-piercing ability.

The shape of the bows of many cruising cats, with their plumb stems, limited flare, and rolled decks, owes more to styling fashion taken from racing cats than to good cruising principles. The bow of a cruising cat needs a certain amount of overhang and flare. This gives the reserve buoyancy necessary to stop the stem from digging in and tripping the boat up. Australian designer Lock Crowther developed a distinctive bow profile, which is tulip-shaped with a small, almost bulblike enlargement below the waterline. His bows also slope sharply inward and have considerable flare below deck level. This has proved an extremely efficient shape, but, being asymmetric and complex to build, is not popular with builders unless performance is a major criterion.

The last quarter of the hull is a critical area. Many older cats had very fine canoe sterns. These were, and are, very safe when running before big seas, which flow round the stern rather than picking it up and burying the bow. However, it is an inefficient shape for



Lock Crowther's "tulip" bow design is very efficient but complex to build

speed, and the loss of buoyancy aft can cause the boat to hobbyhorse uncomfortably. Also, any weight added aft will cause the boat to squat and drag its stern. Some flattening of the stern sections leading to a modest transom is desirable.

Interestingly, a hull that is moderately full in the ends and not too beamy amidships (i.e., has a high prismatic coefficient) is usually quicker than one that is narrow in the ends and fat in the middle. In addition, it is a good shape for evenly distributing the weight of stores and equipment. Very slender hulls are fine for powered-up racing boats, but cruising boats achieve their best overall performance and load-carrying ability with hulls whose ratio of waterline length to beam is around 12 to 1.

Above the waterline. Many modern cats have a distinct knuckle just above the waterline, usually on the inboard side, but sometimes outboard as well. There is good reason for this. In a seaway the knuckle increases buoyancy rapidly as the hull rises and falls in the waves. It can also reduce spray, which causes drag and reduces crew comfort. It allows the hull to be loaded up without sinking too much and increasing drag. In terms of accommodation, it adds significant breadth internally at just the right height for berths, without developing excessive waterline beam. High topsides can look ugly but are not as detrimental to performance as you might think. They also allow the bridgedeck to be carried higher above the water.

Overall beam

Early cruising catamarans were much narrower overall than their modern counterparts. Designers in the 1960s believed that a wide beam placed too much stress on the crossmembers between the hulls and made the boat difficult to tack. It was also thought that the long lever between lee bow and mast could increase the chance of pitchpoling. (Cynics suggest that favoring narrow beam had more to do with the size of the building sheds in those days.)

Today it is generally accepted that more beam means more stability and therefore more sail-carrying capacity and more speed. It also means a wider bridgedeck and more accommodations, as well as more weight and cost. A designer/builder I

Gilles Martin-Roget

WILL THE BOAT PERFORM?

Because the body of information on cats is so much less than that on monohulls, buyers often find it difficult to get unbiased information on how any particular cat is going to perform. Clearly, a huge range of factors contributes to the speed potential of any boat, and cats are more complex than most. One simple formula (too simple, perhaps) has been devised by designer Derek Kelsall. It yields a performance factor that can be useful in comparing one boat to another provided they are of roughly the same type and configuration:

$$KSP = 0.5 \times \frac{\sqrt{LWL} \times Sa}{D}$$

where KSP = the Kelsall Sailing Performance, LWL = the waterline length, Sa = the sail area, and D = the actual displacement (rather than estimated design displacement). All figures are in feet and pounds. For example, when a boat with a KSP of 1 is sailing at 10 knots, a boat with a KSP of 0.8 will be sailing at 8 knots.

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spoke to recently said he could build me a 36-foot cat as cheaply as a 33-foot cat, but if I asked him to add 3 feet to the beam the cost would double. Cat buyers should realize that, in accommodation terms, extra beam is equivalent to extra length in a monohull.

Another factor that suggests wide is good is the interference of the wakes off the two bows. If the two wave trains meet halfway back under the bridgedeck, they not only cause significant drag, but the resulting pyramid waves can slap noisily on the underside of the bridgedeck. The wider the boat, the farther aft the waves meet, resulting in less drag and a quieter, smoother ride. On the other hand, wider boats tend to have a more uncomfortable short and sharp motion. So, what is the happy medium?

A cat with bridgedeck accommodation gets heavier, and therefore slower, as it gets wider. This can be overcome by adding more sail, but then the rig is harder to handle. Under power, with twin engines,

Billy Black

On many production catamarans, beam is kept relatively modest at around half of length overall



How much clearance should the bridgedeck have? With cats of all descriptions having made successful ocean crossings, even the experts disagree on this question

handling a wide cat is not a problem, but fitting one into a marina may be. Cost is significant, and there seems little point in paying the penalty that wide beam generates beyond a point where safety is reasonably guaranteed. Designers seem to agree that a length-to-beam ratio of around 2 to 1 is a good compromise.

Bridgedecks

Early designers of cruising cats were probably influenced by the accepted aesthetics of monohull shapes and thus kept their creations as low and sleek as possible. Perhaps because of the charter market, where space is all-important, or perhaps because cat design and aesthetics have at last generated a vocabulary of their own, today's designers have shown a refreshing to-hell-with-it attitude to height. For the cat sailor, this is mostly to the good.

In terms of the bridgedeck, height has two very specific advantages. First, it means more headroom in the saloon and hulls. Second, it means greater clearance between the bridgedeck and the water. Offshore, in big seas, the slamming of waves under the deck is not just noisy and uncomfortable, it is a serious safety hazard because of the extra stresses being put on the structure.

But there are limits. A high



CAT CONTACTS

Aeroyacht (Outrenner and St. Francis cruising cats): 800-446-0010; www.aeroyacht.com
Alliaura Marine Groupe (Privilege cruising cats): www.alliaura.com for U.S. dealers
American Sail (beach cats): 843-552-8548, www.americansail.com
Blue Water Catamarans (Brazapi and Soubise Plaisance cruising cats): 800-861-0483; www.bluewatercatamarans.com
Bimare (sport cat): North American Bimare Javelin 2 distributor, tel. 757-435-9320,

www.f18htclass.com
Buhler Yachts (custom cats): 250-495-3257
Catamaran Company (Fontaine Pajot and Lagoon cruising cats): 954-566-5427; www.catamaran.com
Catana (cruising cats): www.catana.com for U.S. dealers
Chris White Designs (custom): 508-636-6111
Conser Catamaran (cruising cats): 949-645-0272, www.consercatamaran.com
Endeavour Catamaran Corp. (cruising cats): 727-573-5377, www.endeavourcats.com
Escape sailboats (beach cat): 800-724-5663,

www.escapesail.com
Express Multihulls (cruising cat): 410-263-5580, www.expressmultihulls.com.au/em
Fontaine Pajot (cruising cats): www.fontaine pajot.com for U.S. dealers
Gemini Marine Group (Prestige and Broadblue dealer): 443-994-2705, www.broadblue.co.uk
Gold Coast Yachts (cruising cats): 340-778-1004, www.goldcoastyachts.com
Greene Marine (custom): 207-846-3184
Gunboat Company (performance cruising cats): 508-295-1337; www.gunboat.info
Hobie Cat Company (beach/sport cats):

800-402-4349, www.hobiecat.com
International Fiberglass (beach cat): 919-596-2887, www.intl-fiberglass.com
Island Catamaran (cruising cat): 843-442-2311; www.islandcatamaran.com
James Wharram Designs (cruising cats): 011-441-872-864792, www.wharram.com
Jones Boats (custom): 609-628-2063, www.jonesboats.com
Key West Multihull Technologies (custom): 305-872-7389
Kurt Hughes Sailing Designs (custom): 206-284-6346, www.multihulldesigns.com
Lagoon America (cruising cats): 410-280-

2368, www.cata-lagoon.com
Maine Cat (cruising cats): 888-832-2287, www.mecat.com
Manta Enterprises (cruising cats): 800-228-2010, www.mantausa.com
Mastermold Composite Services (kits): 808-250-6555
Morrelli & Melvin Design and Engineering (design): 949-723-7640
Multihull Design Center (custom): 909-734-5486, www.multihulldesigncenter.com
Multiplast Yachts (custom): www.multiplast-yachts.com
Olympic Boat Works (custom): 360-385-

7796, www.olympus.net/olympicboatworks
PDQ Yachts (cruising cats): 888-297-2287, www.pdqyachts.com
Pedigree Cats (custom): 360-942-2810, www.pedigreecats.com
Performance Catamarans, Inc. (Nacra, Inter, and Prindle): 714-835-6416, www.performancecat.com
Performance Cruising, Inc. (Gemini cruising cat): 410-626-2720, www.geminiatamarans.com
Perry Catamarans (cruising cats): www.perrycatamarans.com
Reynolds Sailing (performance cat): tel.



Daggerboards are essential equipment for high-performance catamarans; note also the asymmetric hulls on this Catana

bridgedeck means a higher rig and a higher center of effort and gravity, and thus lower stability at extreme heel angles. Although the effect of windage on leeway and pointing ability is less than might be supposed, it is not negligible. High topsides mean the only practical way to board is over the stern or from a high dock. A cat that will be doing extensive bluewater sailing should have a bridgedeck just high enough to clear the waves under normal conditions. How high should that be? As an example, designer Ian Farrier quotes the height at 2 feet, 9 inches for his 41-foot offshore cat; the consensus seems to be that clearance should not be less than 2 feet. A coastal-cruising cat, for which ultimate stability is less of a concern, can afford to go proportionally higher in the topsides and, because it is less likely to encounter extreme conditions, enjoy more space below.

While height and width are both important, the length of the bridgedeck is also a major consideration. Designers of early cruising cats were divided as to whether the bridgedeck should be solid from the transoms almost all the way to the bows, or whether a shorter deck, with safety netting forward, was the way to go. Today the latter has largely won out.

The big problems with solid bridgedecks are weight (particularly weight in the wrong place, far forward) and the greatly increased risk of damaging slamming. Designers favored them because, in the early days when stresses were less understood, the full deck, molded as one piece with the hulls, made a much stronger structure and gave better support to the rig. They also created more space in the saloon, but the length was often not easy to incorporate into a coherent design.

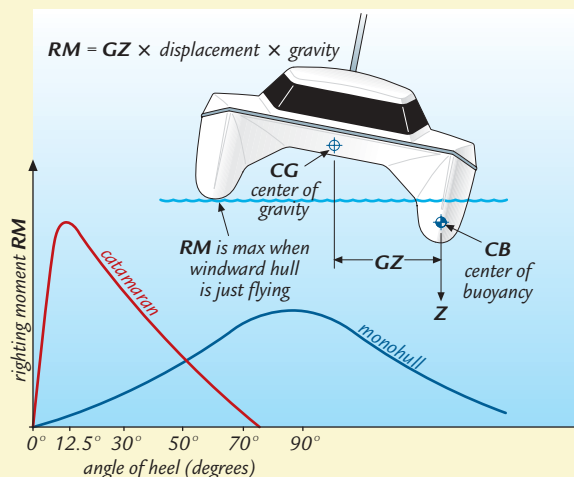
Today, short, wide bridgedecks are the norm for ocean-cruising cats. They offer plenty of easily used space, are light, have less windage, and are quieter.

Into the interior

The sheer volume of a modern cat would astonish a cat sailor of the 1960s. More height and width mean more space

BUT THEY CAPSIZE, DON'T THEY?

Let's be quite clear about this. The incidence of capsize among modern cruising catamarans is almost nil. Certainly fewer cruising cats capsize than monohulls sink. Ask yourself this: Would you prefer to await rescue sitting on the underside of a wide bridgedeck with the ship's stores still accessible, or crouched in a tiny liferaft with just the contents of the survival pack for comfort?



A catamaran is extremely stiff at low angles of heel, with maximum righting moment achieved when its windward hull is just clear of the water; past this point stability diminishes rapidly compared to a monohull

But if you buy a cat you must accept that capsize is possible and that righting, without external assistance, is not. Cats, by their nature, give little warning of the moment they are going to flip, even to experienced sailors, so you need some sort of quasi-scientific basis on which to make the vital decision of when to reef. Designers have come up with quite a simple equation, based on the balance of righting force with heeling force. It gives the wind speed necessary to lift the windward hull in a flat sea (static stability).

$$V_a = \frac{F \times \sqrt{D} \times 0.5Bcl}{S_a \times H_{ce}}$$

where V_a = apparent-wind speed, D = actual displacement, Bcl = the beam between the centerlines of the two hulls, S_a = sail area at the time, and H_{ce} = the height of the center of effort of the current rig. F is a constant, which is usually taken to be 14. All figures are in feet and pounds.

Because the sea is never still, particularly in wind speeds sufficient to capsize a cat, wave motion is a major factor in any capsize, and this needs to be taken into consideration. If you reduce the apparent-wind speed given by the above formula by a sixth, this will give you a safe margin in most sea conditions.

Christian Février

for everything, and even more of everything, but have allowed modern designers to give the layout a complete makeover.

Once, the standard configuration for a medium-size cat allowed for a double cabin, the galley, and a second cabin in one hull, a cabin, navigation area, and heads in the other hull, and a plain saloon on the bridgedeck. In many modern cats all the working and daytime activities are carried out on the bridgedeck. The cook enjoys panoramic views and good ventilation, while the navigator benefits from better communications with the helm and the ability to pilot the boat under cover. The hulls usually contain sleeping cabins and heads, which can be supplied in a variety of combinations. Often, cats are available in two configurations—a charter layout, with the emphasis on plenty of berths and heads, and an owner's layout, with a large suite in one or both hulls. A valuable by-product of these configurations is that the bows can be left empty, either as sealed compartments with stowage for light items or as buoyancy chambers. As a result, most modern cats are virtually unsinkable.

Peter McGowan

Not surprisingly, having gotten used to this level of



Galley up (above) or galley down (below)? With so much space to play with, cat designers have plenty of options for accommodation layouts



Billy Black

CAT PROS AND CONS

For:

- No heeling. Even when hard pressed, cats will heel to only 5 degrees or so. Drinks stay on tables, stoves don't need gimbals, bunks stay level.
- Virtually no rolling at anchor.
- Space and comfort. A modern cat offers over twice the space of a similar-length monohull. There is full headroom in the hulls, and the saloon is up in the light and air. The cockpit is huge, and the trampoline offers acres of sunbathing space. Many people find they are less seasick than they are in monohulls, if at all.
- Privacy. Two couples sailing together can have a hull each with their own heads and shower.
- Speed. Don't be looking for the speeds of ocean-racing multihulls, but in average cruising conditions you can expect a cat to outperform a monohull of similar length. The difference will be marginal on the wind and in light airs, but significant on a reach and in strong winds.
- Shallow draft. Even with fixed keels, a cat will draw much less than a fixed-keel monohull. Also, it can often be beached on the level. With lifting keels, many 40-foot cats can float in as little as 18 inches of water.
- Modern cats are virtually unsinkable.
- There is space to carry all your cruising needs.

Against:

- Length for length, cats are more expensive than monohulls. When considering comparative costs you need to look at overall volume to get a fairer comparison.
- It may be more difficult to find a marina with a walk-on, direct-access berth, and you may have to pay a premium.
- Few companies produce cats under 38 feet. The smaller the boat, the less well the formula works.
- Even modern cruising cats are not good load carriers. Fill up all those lovely lockers and you will pay a huge speed penalty.
- The short, sharp, unpredictable motion of a cat does not suit some people, who prefer the more exaggerated, slower motion of a monohull, even if it is heeled at 20 degrees.
- The risk of capsize, though minute, does exist.

convenience, buyers are reluctant to do without it. Yet, these configurations are hard to incorporate successfully into boats of less than 38 feet. So, a consequence of designing cats with much better accommodation is that builders find it hard to sell smaller models because of their comparatively low headroom and smaller galleys and navigation areas. In fact, there are some very good and comfortable smaller cats down to about 30 feet.

Conclusion

People who have sailed catamarans have believed, since the earliest days, that they have much to offer and are, in many ways, superior cruising machines to monohulls. In recent years the breed has undergone a bit of a resurgence, and the advantages that cats have always enjoyed have been heightened while many of the drawbacks have been eliminated or reduced. Arguably, the cat market still does not cater to as full a spectrum of sailors as the monohull market does; there are only a limited number of designs equivalent to the heavy-displacement long-distance ocean cruiser, for example, and the concept of a cruiser/racer has never really emerged in the world of two hulls.

But as an alternative to the mass of today's mid-range monohull family cruisers, multihulls offer space, safety, and comfort in a package that is at least as fast as a monohull of the same length, is virtually unsinkable and safe from capsize if properly handled, can crawl up the shallowest rivers, and sails on an even keel.

James Jermain is a professional writer who has been sailing and reviewing catamarans for 30 years.

CAT CONTACTS

800-366-8584, www.reynolds33.com
Seawind Catamarans (cruising cats):
www.seawind.cats for U.S. dealers
Southern Ocean Yacht Sales (performance cats): 305-860-5635

The Moorings (Leopard and Moorings cruising cats): 888-233-4913, www.mooringsprivatesales.com
The Multihull Co. (Switch 51 and Cougar 41 cruising cats): 610-617-0500; www.multihullcompany.com
TomCat Boats (trailerable): 905-584-1236,

www.tomcatboats.com
Trade Wind Yachts (Island Spirit cats): 800-825-7245, www.tradewindyachts.com
True Wind (cruising cat): 781-925-9186, www.truewind.info
Voyage Yachts (cruising cats): 410-956-1880, www.voyageyachts.com