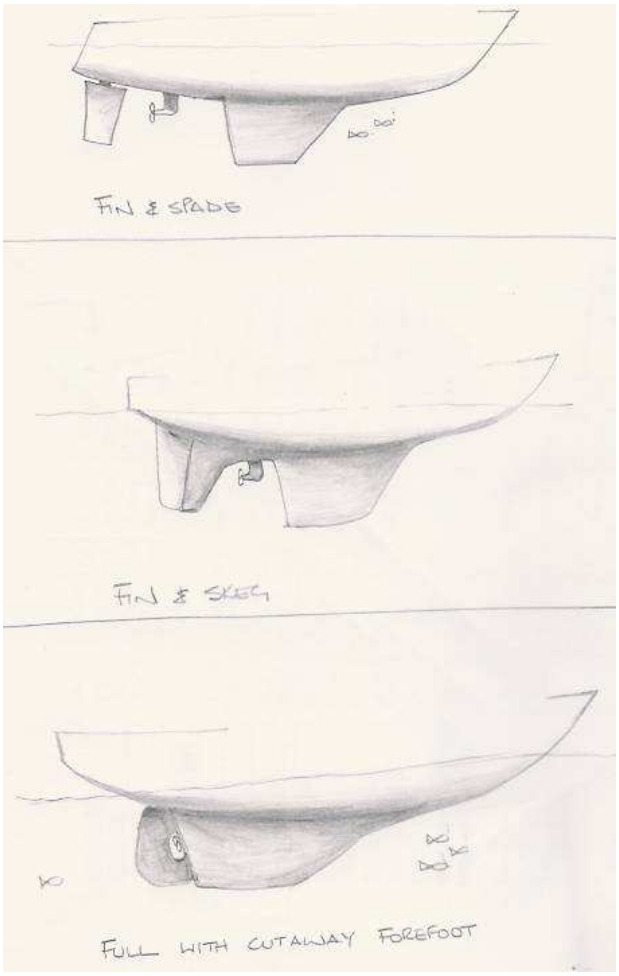
Defining the cruising boat
By John Schofield

Deciding whether or not a monohull boat is capable of providing a safe and comfortable means of undertaking blue water passages and at the same time providing adequately comfortable accommodations requires some realistic assessment.

What features should you look for in a cruising boat? How do you identify those characteristics that make one boat suitable and another not?

There are a number of formulae that help define the character of a boat but first we have to see if our potential cruiser satisfies some critical criteria:

Will she take the ground without the risk of damage to keel or rudder? Bear in mind that we are looking for a cruising boat, not simply a boat that will cross an ocean. Underway on the high seas is the easiest environment with which the cruising boat has to cope; pottering around exotic cruising grounds with dodgy charts, weathering storms at anchor and coming alongside unsuitable docks all take a much bigger toll on the boats infrastructure. Recently we've heard a spate of horror stories about keels falling off and rudders breaking, in some cases with the loss of the boat. I don't believe that a bolted-on fin keel necessarily excludes a boat as a cruising option but the method of attachment and the achievement of the designer's engineering intentions should be carefully considered. I once owned, against my better judgment, a French-built cruiser/racer that suffered a cracked hull after a hard grounding a few days into an extended cruise. I abandoned the trip and sold the boat, so concerned was I that such a design was unviable as a long distance cruising boat.



An unprotected spade rudder is a worry on a cruising boat even though we don't expect it to lead to the loss of the boat; it snags pot lines and other debris and can be a cause for concern if the boat takes the ground.

Another aspect of the underwater profile is the protection afforded the propeller. A prop located between the keel and the spade rudder is exceptionally vulnerable because lines that are shed by the keel are fed into the propeller, and if they miss that they get snagged by the rudder. A shedding rod running from the trailing edge of the keel can be a great help on such

boats, and on fin and skeg designs a wire running from the trailing edge of the keel to the base of the skeg will help to protect the propeller. A full keeled boat with the propeller in an aperture wins this battle hands down, whatever it's other vices.

Will she survive a gale at sea? Sooner or later any boat in continuous commission will encounter heavy weather and it is, of course, vital that the boat comes through intact and with her crew safe and sound.

Good boats can take far more punishment than we might think, and it often happens that they will continue their journey successfully when the crew has given up, or even abandoned ship. We hear tales of abandoned transatlantic-bound boats showing up of their own accord in the Caribbean and several boats abandoned in the infamous Fastnet Race of 1979 were found floating to their marks days later. However, it would be advantageous if the boat were to survive a gale with the crew maintained in reasonable comfort and not of the mindset to contemplate deserting her for a liferaft.

The ability to sail efficiently in heavy weather is required, either punching into big seas or running off downwind under control. A stout, simple rig is the best, especially when shorthanded, and the steady, seakindly motion that comes from higher displacement and a fuller underbody will be appreciated.

A boat's ability to heave-to easily and reliably is a great attribute; heaving-to when the going is tough is a tremendous relief for the crew and for the boat. The madness ends, a relative calm prevails, the crew can rest and recuperate. Boats with rollerfurling headsails need an arrangement that allows a storm jib to be set; a cutter headed rig is an ideal configuration, a detachable inner forestay a close second. A storm trysail set on a separate mast track is good to have but a main that can be deeply reefed will do. A means of securing the helm is required; on a wheel steered boat there is usually a brake and with a tiller there should be a means of lashing available or the tiller can be equipped with a tiller lock such as a Tiller-Hand® or similar device.

The boats ability to heave-to depends to a great extent on her displacement and hull profile but the canny cruiser will be fully aware of what works and what doesn't on his particular boat before the real necessity arises.

Good sea berths and lee cloths can be fitted to any boat even if the original design didn't include them. (That the designer or builder was so certain you would never need proper sea berths might be a clue to the suitability of the boat for offshore work!).

Will she carry sufficient water and stores for an extended cruise? Clearly the ability to carry adequate provisions for the duration of any long offshore journey is paramount, but so is the ability to achieve a degree of self sufficiency when cruising in areas where food and water are expensive, of dubious quality and in short supply. I've cruised in places where finding goods whose sell-by date was in the future was a huge triumph, and in some places water costs more than rum. We cruised for three years with water capacity of 70 gallons for the two of us and it was subsistence living; no opportunity could be missed to top off the tanks. I'd

recommend at least 50 gallons of water per person on board, which should give reasonable drinking, washing and cooking supply for two or three weeks cruising, or a significant offshore passage with more careful consumption.

Does she sail well? There are two critical aspects here: The ability to make good passage times and the ability to sail out of trouble. A cruising boat carries a lot of provisions and extra equipment but needs to be able to sail efficiently thus encumbered. If she can't she'll need a powerful motor and long-range fuel tanks. The ability to sail off a lee shore is an important consideration because we can't always plan where we're going to meet heavy weather, or know when circumstances are going to conspire to trap us in a dangerous situation. We once had to sail off a lee shore in a building gale towing a dinghy full of rainwater when our engine packed in on the approach to Palmas del Mar on the southeast coast of Puerto Rico. Fortunately Adriana sailed well in a lot of wind and we lived to fight another day.

Does she anchor well? Cruisers spend a great deal of time at anchor; we anchored out for 300 days continuously in the last year of our three year modest odyssey. It is important that the boat is comfortable at anchor and can accommodate the tackle and systems to guarantee security on the hook. High freeboard and minimal underwater profile lead to skittish behaviour at anchor and light displacement boats can have a quick motion that is tiring.

Can you live in her? I met a group of four French-Canadians that had travelled from Canada to the Florida Keys in a 20' clinker built sloop, a journey of nearly 2000 miles lasting three months. There were four berths; one on each side and a "double" forward. The boat didn't have standing headroom anywhere except under the companionway hatch and the heads was forward, under the forepeak bunk. The heads occupier was required to sit with head and shoulders protruding through the forward hatch! I don't think that many of us could tolerate such conditions for long, so be sure the living accommodation is adequate and reasonably comfortable bearing in mind the crew and the intended duration of the cruise.

Having addressed these important questions we can take a closer look at those formulae that determine the nature of the boat we are contemplating:

The displacement to length ratio: Basically this tells us how 'heavy' a boat is.

The formula is: D/L ratio = Displacement in long tons/ (0.01 x waterline length) ^{3}

An extremely heavy displacement boat would have a D/L ratio of over 400, a moderately heavy displacement boat would be 300 to 400, a moderate displacement boat 200 to 300 and a light displacement boat would be under 200.

An example of a heavy displacement boat would be the bullet-proof Westsail 32 which has carried many a sailor to the far corners of the world in safety and relative comfort, but she does need half a gale to get her moving. A moderately heavy boat, such as the Nicholson 31 or the Vancouver 32, sails well whilst retaining much of that solid 'go anywhere in any weather' feel. The moderate displacement boats, the majority of mass production boats, have an airy feel with lots of room, deriving their stability from form rather than weight and ballast.

Light displacement boats tend to be either fast, more suited to racing, or they are small and lightly constructed.

I think a D/L of around 300 is a good target for a cruising boat although that might nowadays be considered heavy by some.

The ballast ratio: Ballast x 100 / Displacement.

This is the relationship between total displacement and ballast; it tells us how a boat might stand up to her canvas. Heavily ballasted boats, those with a ratio of 40 -50%, stand up well to their sail area and allow more sail to be carried in heavier conditions. Lightly ballasted boats rely on their hull form to provide some resistance to heeling and generally need to be reefed earlier to remain under control.

The Sail Area to Displacement Ratio:

Sail area (square feet) / (Displacement in pounds/64) to the 2/3 power

The sail area to displacement ratio is usually between 14 and 30. The higher numbers indicate greater power; higher speed and faster acceleration. Boats with SA/D ratios above the mid 20's are usually powerful racing boats. SA/D's in the 17 to low 20's range are good cruising boats that don't need a gale to get them going but are also tractable and don't need constant tweaking and early reefing. Boats with a SA/D of under 15 tend to be somewhat under-canvassed and whilst they won't get you into trouble they won't get you anywhere in light winds either.

Capsize Formula:

Beam / 3√ (Displacement in pounds /64)

The capsize formula was developed in the aftermath of the 1979 Fastnet storm and indicates a boat's tendency to capsize. Boats with a value of under 2 are less likely to capsize than boats with a higher value. This value is probably entirely academic unless you are looking at a boat designed by someone uneducated in the field of boat design!

Comfort factor: From time to time I've encountered formulae that attempt to characterize a boat's 'comfortableness'. (Not to be confused with Ted Brewers 'comfort ratio' which is a measure of seakindliness, not accommodation). Such formulae attempt to distill into a single number the aura of roominess and luxury that some boats have and others lack. The factors that contribute to spaciousness are length, beam and freeboard. You can concoct your own formula based on these factors, weighting them as you see fit depending on what you think contributes the most to comfort. I think beam brings the most significant increase in spaciousness, other things being equal, but I wouldn't want a boat whose beam was more than one third of its length. And I wouldn't consider a boat that didn't have full standing headroom in the living quarters.

Conclusion: By setting your parameters for the ideal boat and then comparing your available choices to that ideal you can make a subjective evaluation of a boat's suitability for long term cruising. Where a boat doesn't quite come up to scratch in one or more areas you can make a judgment as to how much it matters to you and to your intended cruising lifestyle. At least then you are making a conscious decision to allow your boat to stray from 'ideal' rather than experience that dreadful dawning realization that you have chosen unwisely!

I haven't addressed the suitability of multi-hulls as cruising boats because I don't have the personal experience to lend any credibility to my comments. The majority of boats I've encountered when cruising have been monohulls but where I have met catamaran owners they have been universally positive about their choice of boat.

My wife and I set off cruising in a 32' heavy displacement boat with a simple robust sloop rig. Her accommodation was cramped by modern standards and she didn't have many of the creature comforts that some may take for granted today. She did, however, provide the basis for a fantastic three year modest odyssey and for that I can't fault her. Later we took off on a 41' ketch and whilst we had an enjoyable and definitely more comfortable couple of years I missed the honest simplicity of the earlier boat.

Whatever you choose I wish you fair winds and boundless enjoyment wherever you cruise.

Appendix: Data on popular boats (imperial measurements)

	LOA	LWL	Beam	Displ.	Ballast	SA	**D/L ratio**	**L/B ratio**	**Ballast %**	**SA/D**
Moody 33	33	28.5	11.5	4.7	1.7	580	**203**	**2.87**	**36.17**	**19.38**
Nicholson 31	30.8	24.2	10.3	5.8	2.1	624	**409**	**2.99**	**36.21**	**18.13**
Vancouver 32	32	27.5	10.6	6.2	2.6	621	**298**	**3.02**	**41.94**	**17.26**
Oceanis 311	31.3	30.5	10.8	3.53	1.08	540	**124**	**2.90**	**30.59**	**21.84**
Cobra 850	28.5	22	9.5	3.45	1.56	428	**324**	**3.00**	**45.22**	**17.58**
Eliz'bethan 30	29.5	24	9.3	3.2	1.6	436	**231**	**3.17**	**50.00**	**18.82**
Moody 40	40	32.5	13.3	8.1	2.9	855	**236**	**3.01**	**35.80**	**19.89**
Legend 340	33.5	28.6	11.9	4.9	1.83	682	**209**	**2.82**	**37.35**	**22.17**
Contessa 32	32	24	11.9	4.25	2	562	**307**	**2.69**	**47.06**	**20.09**
Rival 34	33.5	24.5	10.3	4.9	2	515	**333**	**3.25**	**40.82**	**16.74**
Bavaria 32	33.9	27.9	11	3.8	1.04	572	**175**	**3.08**	**27.37**	**22.02**
Fisher 30	30	25	9.5	6.5	2.9	365	**416**	**3.16**	**44.62**	**9.83**
Roberts 43	43.3	32.6	13	12	3.48	1000	**346**	**3.33**	**29.00**	**17.90**