POWER CATAMARANS:

Making the right choice

part one

by Peter and Lorma Brady

For the last 30 or so years we have seen an extraordinarily fast evolution in the development of non-planing power catamarans with a number of different branches of the family tree forming. I have been lucky enough to not only witness this development, but to have also been in the right place at the right time to be a part of it. Over the last 23 years that I have been specialising in designing and building power cats, my designs have completed well over 60,000 miles at sea and both my wife Lorma and I have completed over 5,000nm of these observing how they behave and comparing their performance to other types of boats experiencing the same conditions. I've read as much published data and every boat test of power cats that I have been able to find during this time and have spoken at length to both my clients and professional skippers about their experiences on mine and other designer's boats that they have operated. At boat shows we have looked at all types of boats and their features and also listened to the comments of potential buyers looking over the boats as they compare one type against another and when we are writing, we try to blend this research plus our own experience, with Lorma also adding a woman's perspective on boating to the mix.

As with all things multihull there always seems to be extremes both in types and opinions and non-planing power catamarans are no exception. The difficulty for the boating public and in particular with multihulls as their history is so short, is in separating opinions from fact when trying to decide if a non-planing power catamaran is the right fit for them and if so what type. To understand where non-planing power catamaran design is today and where it is heading, it is important to know where it began and how it has evolved. I have used the term non-planing for this article as it covers all the types or names designers have given non-planing hull forms like displacement, high-speed displacement, displaning and semi-displacement over the years.

In the 1980's sailing catamarans were becoming more popular as main stream cruising boats and were being fitted with larger engines as smaller lighter diesels became more widely available. Their excellent performance under power started multihull designers and builders thinking about the potential as a pure power boat and in the mid-80's Lock Crowther was the first in our part of the world to design non-planing power catamarans for commercial applications. Moving forward to the late 80's, both Malcolm Tennant and myself started to design higher speed motor-sailing catamarans and from there, graduated to pure power catamarans in the 1990's. Malcolm developed what he called his CS 'high speed displacement hull form' which was effectively a very narrow double ender with a flat plate on the back to prevent squatting, whereas Lock and I used a hull form that was more like a narrow version of the fast round bilge monohull used in commuter launches and German E-boats in the 1920's and 30's, and the 'down east' style fast fishing boats. My focus at first was displacement speed, minimal horsepower and range, with a keel forming out of the hull (built down or hollow garboard in older boatbuilding terminology) to not only maximise the displacement to wetted surface ratio, but also to provide the best tracking in following seas and protect the stern gear. Unfortunately Lock died in 1993 just as interest in the type gathered pace, so it is hard to know if or how he would have approached the pleasure boat market.

It didn't take long for commercial operators to recognise the potential of the non-planing power catamaran type to carry a good load with both low wash and fuel efficiency, with Malcolm leading the way in both designing and promoting them after Lock's death. As most of Malcolm's early boats were ferries

with only seating at bridgedeck level or pleasure boats with very minimal fitouts, the performance and fuel economy figures were spectacular for the boats length and horsepower and this is why I think a great many other designers adopted the CS hull form.

By the mid-90's the non-planing power catamarans potential had been identified, but a hull design had not been developed that could achieve better than 'just over' displacement speeds, have enough hull width and volume to make it practical for smaller boats as well the ability to carry a reasonable load and be fuel efficient to provide range. As Malcolm moved the CS hull form across into the cruising power boat market it still shone in regards to fuel efficiency and range but did not translate so well into boats under 45ft (13m). The narrow hulls meant that the accommodation for boats of this size needed to be just on or above wingdeck level, making for very high topsides that did not always appeal to the general market.

So in 1996 when I was approached to design a 33ft (10m) power cat flybridge cruiser capable of economically cruising at around 15kts, I drew what became the Scimitar 1010.

At that time, to my knowledge, no one in the world had attempted to design an alternative to a planing or displacement power cat that small, particularly one that had to have a mid-tech construction system suitable for production boatbuilding. So, with no confirmed data or reference point to work from, I used my own research to modify the hull shape of the displacement power cats I had already designed and went with my instincts and the well proven principle of what looks right usually is right and drew a very organic hull shape that created the best possible flow onto the propeller. The hull shape was not particularly narrow, having a hull beam to waterline length ratio of under 1:10, yet achieved a top speed of over 20kts from 2 x 100hp engines, even better than I had predicted. The Scimitar 1010 recorded an economy rate of 5nm per imperial gallon (US gallons smaller quantity) at 8.7kts in pure displacement mode, this dropped to 3.87 NMPG at 11.9kts crossing over the boundary into displaning mode, then rose to 4.15 NMPG at 15.7kts in pure displaning mode. It seemed to break all the rules, even those laid down by experienced sailing multihull designers that narrow was the only way to go, and showed that there was a practical alternative hull shape that worked for smaller boats. We called our hull type 'displaning' as it seemed the perfect way to describe how the hull worked as it crossed through the boundary between displacement speeds into planing speeds. The Scimitar 1010 was also a breakthrough on another level, as it showed that power cats didn't have to be radical or different in styling from monohulls and this attracted more main stream interest in the type.

In the next few years we started to see more established monohull designers such as Alan Wright in New Zealand and Scott Jutson in Australia move into power cats. Alan used a hull shape similar to mine, whilst Scott went even wider and others seeing Malcolm Tennant's success widened the CS hull form for small boats to get usable accommodation in the hulls, however fuel efficiency dropped and issues such as aeration and cavitation of the props became apparent. If you look at Malcolm's later designs that featured more extensive fitouts, then even his own pure CS designs hull speed, fuel economy and horsepower for length figures are much the same as mine or other designers.

In the late 1990's the French boatbuilders entered the power catamaran market with Fountaine Pajot introducing their Trawler range, Lagoon in 1999 with their 43 and in North America sailing catamaran builders such as PDQ moved into power cats in 2000. From there, leading up to the GFC, we saw a number of new designers and boatbuilders dipping their toes in to the power catamaran market by either adapting existing sailing catamarans into power cats like the Leopard Cats from South Africa and the Perry's and the Lightwave locally, or through new designs using a variety of different hull types. Construction went worldwide with a number of custom boatbuilders setting up from Poland to Chile.

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As with all parts of the boatbuilding industry, the GFC saw a near total wipe out of professional non-planing power catamaran builders, along with a collapse of the amateur builder market and when Malcolm Tennant died in 2008, we lost one of the great enthusiasts and promoters of the non-planing type.

Post GFC the designing and building of non-planing power catamarans in Australia and New Zealand like all other types of boats has dropped right off with imported boats dominating the market while the Australian dollar was high. Australian designers such as Jeff Schionning have moved away from non-planing into outboard powered planing power cat design, while New Zealanders Roger Hill and Noah Thompson are still designing both planing and non planing power cats. As the Australian dollar has dropped, the imports pricing advantage has been dramatically reduced, offering hope to the local industry again, although it will take time for designers and builders to re-enter the market and they will need to decide where they believe the market is heading.

So here we are today in the power catamarans evolution and just like sailing catamarans, we are seeing a couple more splits in the direction of non-planing power cat design. The size of the charter and the US inland waterway markets are starting to dictate trends and designers are trying to fit even more luxuries into the hulls. Until recently non-planing power cats have still been a relatively niche market, developing in pockets and testing different sections of the boating market. Malcolm and Lock had promoted the cause of the commercial non-planing power cat for ferries very effectively and it has been often quoted that well over 50% of all fast ferries worldwide are now based on the catamaran hull form. Malcolm had also been a very effective promoter of the non-planing long-range cruiser, building up a strong global following until his death. We had concentrated on the 10-20m long-range market for both leisure and what I would call light commercial (dive and scientific charter, whale watching etc) as had a number of other designers however it is the bareboat charter market that has really taken off in the last few years.

We always knew the non-planing power cat's potential in the charter market and its attributes of stability, large flat decks, shallow draft, mechanical safety from twin engines and manoeuvrability also made it perfect for bareboat charter. The second Scimitar we built in 1997 was modified especially for bareboat charter in the Whitsundays and we also designed and built a 10m four cabin power cat specifically for bareboat charter a couple of years later, but because the charter fleets in Australia are relatively small by world standards and at that stage were mostly made up of privately owned vessels leased to fleet managers, there weren't the numbers to have any great influence on non-planing power cat design locally. Most development still focused around fuel efficiency, range and seaworthiness as most of us saw long-range cruising as the type's unique ability and therefore its greatest market potential. When non-planing power cats entered the bareboat charter fleets, they were usually a converted sailing cat or an offshore power cat with smaller engines. The big change to how both sailing and non-planing power catamarans were evolving came when bareboat charter boats become predominately owned by larger international companies such as Moorings and Sunsail. Their fleet buying power and the need to standardise fleets to improve economies of scale started to dictate design as builders realised that by having their boats in the charter fleet effectively meant they were giving potential buyers a test run in the ideal environment of smooth water, relaxed atmosphere and most importantly no market competition. The old car industry saying of 'win on Sunday, sales on Monday' was working just as well in the boating market, but in the slightly different format of 'charter on Sunday, buy on Monday'.

It is hard to argue both from a designer or builders perspective especially after the lean times of the last few years with wanting to build for this market, as the potential numbers are so great, however it needs to be recognised that the features that the charter market require are not necessarily suitable for all types of boating, just as the racing cars that win on a Sunday are not the ones you then drive on the road.

If you look at how the majority of bareboat charter boats are used, you can better understand why they are developed down a certain path.

(a) Most bare boats are only allowed to travel a short distance from their base (around 20 miles) in sheltered waters during the day and at displacement speeds, so the features that define an offshore boat's capabilities like ride, economy, performance and range are not required or tested.

(b) Most charterers would be groups of couples looking to relax and do what couples do when relaxed, hence the need for equal sized double bedrooms with en-suites (each couple paid the same money so want the same facilities) and some privacy between the cabins which the cats four corners do very well. The rest of the time on board will be spent sun bathing, swimming, eating, drinking and entertaining, so as long as the boat is shallow draft to access more anchorages, easy to drive with twin widely spaced engines and stable so drinks can be put down anywhere without spilling, it's a winner and power cats do all these things very well.

(c) A large fuel capacity is not required as the boats never travel far, however a large water capacity is needed for all those showers and the complexity of a watermaker is not what you want charterers playing around with.

(d) As large engines are not required to run at just over displacement speeds, then non-turbo and non-rail injection engines would be preferable for their simplicity, however they are getting harder to find these days.

(e) Spares do not need to be carried as you do not want the charterers trying to fix anything and backup systems are not required as the boat is only a radio call from help anyway.

(f) Most charters are only a week or so long and so most charterers arrive with nothing more than an overnight bag, so internal cabin storage is not a great requirement, this allows the cabin to be more open and therefore, feel larger.

(g) The majority of cooking will be done outdoors on the barbecue and will be of a casual nature, therefore the galley can be more minimal in its equipment levels and storage. As most eating will be outside, even the dining area can be more compact than usual. By squeezing the saloon-galley area, the builders have been able to push the hulls volume out into it to maximise the space below. This has however come at the loss of space in the saloon-galley area with the benches and seating having large spaces behind them which are in effect the ceilings of the accommodation in the hulls.

(h) Helm stations will only be used for a maximum of a couple of hours a day and therefore are of a more basic nature and often with very little protection from the elements.

So from these requirements and that of the US inland water ways market which is pretty much the same type of usage, we have on the market what is basically a smooth water displacement power cat that has as its design priorities, internal hull volume to create the largest bedroom and bathroom sizes and as many as possible. The styling of most is still heavily influenced by sailing cats rather than power boats, particularly in the aft end of the boat where the cockpits are still using mostly a sailing cat layout. In some cases this is because they are a sailing cat with the rig removed and a flybridge fitted, in other cases they are purpose designed but just seem to have retained the styling and cockpit layout of the sailing cat as either the designers are more familiar with it, or they believe the public is. The smaller narrow cockpit also fits with larger aft bedrooms, however I am not quite sure why designers stop the aft deck so short of the hulls as it seems such a waste of one of the best parts of the boat and makes the enginerooms very tight. Instead designers seem to have turned the flybridge into the primary entertaining area, locating barbecues, sinks, fridges and dining areas up there rather than on the aft deck as most monohull power boats do. This expanded role for the flybridge is possible with the power catamarans beam in providing the extra room and its stability making this area usable at anchor. It is however in combination with low sides and minimal protection on the flybridge an admission that the boats are not being designed for offshore conditions, as although power catamarans do not roll like a monohull, they have their own type of sometimes sharp motion that would make these facilities unusable at sea. It is also an interesting direction given that power boats in general have headed back towards more non-flybridge set ups, with simpler and larger aft decks where owners can arrange their dining or lounging furniture to suit the sun or winds direction. Protection from the sun and wind is not a priority in less tropical climates, however it is in Australia in particular and if you see the amount of covers and structures that are added to imported boats once they get here, you realise how necessary they are.

By all means chartering a power cat is great way to test whether a non-planing power cat is for you, however bareboat charter is a commercial operation and therefore, the more people on board for the least possible build cost, the better the profit. There are design features that work for this restricted application, however they are not necessarily ideal for other boating conditions and it is important that the public understand this in making the right choice for their intended usage.

Next issue we will look at the differences between inshore and offshore non-planing power cats and where offshore design developments are heading.