

An outsiders perspective

A-class catamarans

I recently had the opportunity to follow an A-cat regatta up close across a wide wind range over several races. The quality and performance of both the boats and rigs is definitely impressive and it has been interesting to observe the differences between 'foilers' and 'classics'.

As they race in two divisions starting 5 minutes apart, it is not always possible to tell who is in front, (a coloured patch or symbol on the sail would help) but it is easy to observe that the fastest foilers are capable of lapping most, if not all the classics, conversely it was rather surprising to find that the fastest classics can actually overtake most of the fleet of foilers!



The reason for this is that there is such a huge difference between having foils that lift and actually foiling fast. The foiling boats appear extremely difficult to get up and stay foiling, but when they do foil, the performance difference is massive. Downwind, especially in moderate conditions this is most noticeable. Upwind the foilers are very fast in a straight line, but also sail very low, so their true gains are not as clear.

Classics have come a long way using C-foils to lift much of the boat weight, with the hull still touching the water, they are fast and stable on all points of sail, even perform extremely well in strong winds, without the drawback and dangers of the many quirks of the foilers.

For closest, consistently fast racing, it is pretty obvious that it would be far better if all boats had C-boards and sailed as the fastest classics do now. In many cases, overall speed around the track would improve, at least for the majority of the foilers!

Foilers are exciting and always on the edge, but on the other hand they really struggle in many respects. Here are some of their quirks:

a) In light air when they cannot foil, they are simply slower than classics due to too much drag on the foils.

b) In order to get on the foils they must sail on a reach with skipper on trapeze to build enough speed to take off, so in marginal conditions they can lose quite a lot of ground upwind to get fast enough to foil. If unsuccessful to takeoff, they can easily fall well behind other foilers and even the classics.

c) Even in good foiling conditions, during a gybe, the hulls usually hit the water, the skipper must then head up high on the new tack, get out on the wire and power up to build enough speed to takeoff. It is only once the boat is fast enough to start flying that they can once again build enough speed on the foils to bring the apparent wind forward and drive really fast and low downwind, where they show their very best performance. At times it appears that they need to go back upwind after a gybe in order to take off again and can potentially lose a lot of time doing this.

d) As the breeze builds over 15kts and the waves pick up in open water, when sailing upwind, foilers take time to build speed and power up, but once level and balanced, they have very impressive speed. Unfortunately, this is a state very hard to achieve and maintain especially in waves, as evidenced in the Championship regatta I followed, where only 4 boats were able to achieve this level flight. Most of the other foilers were unable to foil effectively and while trying, they were losing ground. In this respect they were actually slower than the faster classics! For those few who can foil successfully upwind, the speed is very fast, but as height control involves some side slip, they tend to sail rather low.

e) Downwind in stronger wind and waves, the foilers appear very sketchy. They often come down to the surface if they bear away and drive down low or sit level. It seems they need a little heel and to sail high to keep the boat stable. If they bury a hull, they stop rapidly, which can be dangerous. Also, as they ride high, the boat slides sideways under pressure, the windward foil has reduced lift, so it is easy to end up with the leeward hull foiling and the

windward hull hitting the water at speed. It is then possible for the skipper to be catapulted forward, out and off the boat with risk of capsize and major injury to themselves and the boat. Foiling in these conditions is definitely not for the feint hearted.

So, it seems that potential gains from foiling A-cats are not always clear or available to all sailors. Interestingly, from a class perspective it reminds me of the slow and frustrating transition in Moths from Scow to displacement Skiffs during the 1980's. The skiffs were very fast in a particular wind range, but the scows were stable and easy to sail in a breeze. It took a lot of design improvement with narrow hulls, pintail sterns and tee foil rudders over a period of 20 years for the skiffs to finally dominate in all conditions. But this resulted in a boat which was rather unstable and difficult to master for average sailors and so class numbers and popularity slowly died.

The transition from displacement skiff Moths to foiling Moths was very much faster, as there was a clear advantage of some 2-3 times the speed around the course in all conditions, right from the beginning. This is not the case with the A-cats and it is interesting to observe why this may be the case.

Firstly, the class rules regarding foils are very prescriptive and limiting, which is rather surprising for a 'development' class. Initially this has been done for good reason to protect the class and keep it practical, simple and popular. Perhaps to limit or even prevent foiling itself by limiting their width, then to keep the boat practical by inserting foils only from above and also to keep the boat simple and not too technical, complex or expensive by preventing the use of wands for foil incidence control.

Unfortunately, these restrictions have resulted in anything but optimal foiling performance. By comparison with other foiling classes such as the Moth, iFly15 etc, A-cats should be able to take off and foil very stably from 6 kts of wind, flying high upwind at over 25 kts and downwind at perhaps up to 35-40kts! The boat should not be difficult or dangerous to sail as it has 4 foils in the water and it should easily tack and gybe on foils. Most sailors on a foiler should be able to easily outperform even the very best classics in most conditions! This is far from the case currently.

In general, the popularity of catamarans is due to their high speed, along with stability, ease of handling and safety. While foilers have significantly increased the top speed, this has clearly come at the significant cost of the boats becoming much more difficult and dangerous to sail.

From a class perspective, it is unclear whether foilers actually improve the class popularity or if indeed the modern classics are a better all-round option for most sailors. This is of course a decision for the class members themselves. If foilers remain, then perhaps they should be further improved, without such restrictive limitations.

How can this be achieved?

The first thing would be to treat the foiling division of the A-cat class as a true development boat, which it is supposed to be. Remove the restrictions and see what the designers and tinkerers can achieve given the freedom to make a fast stable boat using foils.

a) Allowing incidence control of the foils, will massively increase the efficiency and accuracy of controlled flight, keeping the boat level, fast and safe at all times. Smaller lifting foils should be possible, further reducing drag and removing side slip which will greatly improve upwind performance.

A wand control actually adds very little complexity or cost, especially compared with the board rake, foil shape and rudder adjustment systems currently in use. Further, Tee foils are much simpler and stronger mechanically than C-foils making them cheaper, with less strengthening of the hull required to withstand cantilever loads as required by the current arrangement.

Automatic ride height control enables the skipper to focus less on keeping the boat foiling and more on racing tactics & enjoying the moment. The boat can be pushed much hard, rather than backing off to stay safe or regularly facing those “no guts no glory” moments!.

Incidence control also enables the windward foil to provide full lift, without the hull hitting the water, this should keep the boat faster at all times but most importantly make trapezing much safer.

b) Allow the windward foil to suck, to increase righting moment for further improved upwind performance and stability.

c) Allow retractable boards with clip-on foils. The centreboard can still be inserted from above for practicality but the lifting foils can be clipped on prior to sailing, either on the beach or in the water. No need to tip the boat over. This will make the boats lighter, stronger and cheaper than with the current foils.

d) Consider allowing the foils to splay outwards to provide even more righting moment and counter lateral forces. ie: keep the hulls/platform the same size as it is now for transport by road, but as the foilers are already a separate division to the classics, alter the rules to let them foil with even more efficiency. eg: perhaps add a new box rule beam measurement for the foils when deployed. Moths are meant to be 11' long, but with such rule changes they are now closer to 14' so why retain the current limits on foiling A's.

A-cats have the potential to out perform every other sailing craft, including Moths, due to their large efficient high aspect rig, huge righting moment and light weight. It would be a pity not to encourage and apply the full benefits of a true development class to explore the limits of performance and efficiency of what is possible when sailing on water.

If there is one thing to learn from the Americas Cup cats and mono foilers it is that high speeds and amazing vmg, both upwind and down are truly possible. There is no reason an A-cat should not match them!

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