



Late to the party (but encouraging)

Extremely light winds typified the ORC Worlds last year in Trieste. Being very much the characteristic conditions for the North Adriatic for the time of year, this was well anticipated by most of the teams and will have been the focus for much of their preparations.

In our own case, for our newly launched Aquatic 40 design, the worlds came around all too quickly with only two weeks to prepare the boat after it first went into the water. This was always going to be a tough ask for a new boat being sailed by a new team, but the event nevertheless provided an excellent platform from which to learn, observe and witness the level of preparation going into some of the top ORC campaigns.

The opening coastal race provided a promising start to the regatta, which then extended into a longer course that took the boats through Italian, Slovenian and Croatian waters. Sadly this was also characterised by frequent shut-downs and big wind shifts which caused the fleet to compress at various stages and in Class B ultimately favoured the slower, lower-rating boats.

For the inshore series, with 49 boats competing in Class B, clean starts and good upwind pace and height were paramount. With such short upwind legs (15-20 minutes on average) and so few clear lanes, there was very little opportunity in the light 5-7kt winds to make up for a poor start. In fact, across all the inshore races in Class B no fewer than 80 per cent of the top-10 boats rounding the first windward mark also went on to finish inside the top 10 on corrected time for that race. With the start proving so key to finishing position it was little surprise that the regatta saw no fewer than six general recalls, while race 3 had 10 boats black-flagged at the start – which sadly included our Aquatic 40!

Despite the conditions being significantly lighter than the 12kt used to determine the ORC's Class Division Length (CDL), in Class B the results still ended up closely tied to that CDL with the top three places comprising two Club Swan 42s and a Cossutti-designed M45.

These boats all occupy a similar position within the Class B design space – big, relatively heavy designs, long on the waterline, but with generous upwind sail area to wetted area providing a key advantage on the water in such light winds in being able to squeeze

out ahead of the fleet on the first windward leg, as well as the obvious bonus that size combined with good upwind performance provides in being able to 'boss' such a crowded startline.

By contrast, lighter-displacement designs featured strongly in the equally large Class C fleet. This was perhaps aided by the fact that the larger, heavier-displacement designs in Class C were generally a little shorter on sail area relative to their wetted area and displacement in relation to their Class B counterparts. This seemed to offer more opportunity for the smaller, lighter boats to pop out with good starts, hold clear lanes upwind and stay in phase with the shifts, usually coming out towards the front end of the fleet at the weather mark.

Of course, the landscape for both these classes will change considerably given more breeze, where sailing length kicks in to a greater degree upwind, alongside sail area to displacement ratio, particularly downwind. Also, the greater sail-carrying power of some designs will move them to the fore in terms of upwind potential.

This is more in line with where we targeted optimum performance for the Aquatic 40 and was a little closer to the conditions experienced at the Europeans in Gdansk. At 40ft our emphasis was always on creating a relatively fast boat for her length, to maintain position towards the front of a crowded Class B fleet, but also to provide a well-rounded performance profile suitable for a wide array of events and to deliver fast, fun and responsive sailing characteristics – while obviously playing within the constraints of what we found to be favourable under the ORC rule.

With the ORC hydro model now decoupled from some of the parameters that in the past were typeforming towards some undesirable traits, there is more freedom than there was before to design fast and efficient hull forms within the target range of displacement, beam and so on.

There are, however, still underlying sensitivities in the ORC system to volume distribution, hull section shaping and how maximum beam is distributed along the yacht's length (for instance). This currently restricts the use of some of the latest hull form developments and shapes which are increasingly implemented with lighter designs



Built by Oceantec, the Aquatic 40 is the Humphreys design office's first serious flirtation with the ORC system; it is also one of still surprisingly few attempts to create an ORC-competitive racer-cruiser slippery enough that it should also be competitive racing offshore in the big IRC events. This was borne out by the fact that while the crew struggled to get the boat ready for the narrow-groove upwind/downwind inshore courses she did show some encouraging flashes of real speed during the coastal stage

in IRC and in many box rule classes, where the simplified nature of these formats affords the designer much more freedom to simply draw fast shapes.

Obviously the ORC VPP attempts to pick up the enhanced performance that these more contemporary shapes can generate. However, based on our own CFD/VPP studies using the 2017 version of the rule the increase in rating is not currently matched by the increase in performance, particularly given the heavy bias towards windward-leeward performance at championship events.

The result is that more classic hull shapes with relatively fine fore-and-aft sections remain strongly favoured within ORC, certainly among the mid-sized light to moderate-displacement designs, and this very much fed into the hull form we developed for the Aquatic 40. This is characterised by a modest ratio of beam to canoe body draft, with a fairly evenly distributed rocker profile (certainly more so than we would introduce for IRC where the aft overhang is more heavily factored in the rating), as well as relatively narrow, symmetric heeled waterlines making for an efficient upwind shape – and with an impressive high mode.

One further factor contributing to this is the current ORC treatment of rated righting moment, which is calculated as two-thirds measured (by inclining test) righting moment and one third default righting moment. This dilutes the rated righting moment for higher stability designs or amplifies the rated righting moment for low stability designs; it was introduced to encourage typeforming towards higher stability with more lead in the keel as opposed to in the bilges.

For a new design, employing well-refined engineering, materials and build processes, as has very much been the case on the Aquatic 40, this was an obvious avenue to exploit. The resulting high mechanical stability that is achievable for a given displacement once again tends to favour an approach towards relatively lower form stability, slender-section hull forms.

While this approach towards delivering relatively high mechanical stability is certainly beneficial when the boat starts to power up upwind in above 8-9 TWS, which is well in line with our optimisation targets for the client's home waters in the Baltic, this is less the case in the really light winds as experienced at the last worlds in Croatia, where the ORC VPP tends to over-rate high stability at very low wind speeds.

Given the proximity of the last worlds and Europeans, there was no opportunity to re-mode the boat specifically for the different events following the light conditions anticipated for the worlds in Trieste, but there are several configuration changes that could be implemented to better suit very light-air Mediterranean venues.

Aquatic hull number two is now in build at Oceantec in Slovenia and could be available early in the New Year, allowing plenty of preparation time ahead of what promises to be another fascinating season, particularly given the highly anticipated combined IRC/ORCi world championships to be held in The Hague in July.

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