ORC

Embracing the future

Here at the end of this strange pandemic year the work done by ORC's International Technical Committee (ITC) has not included much of the usual calibration of the VPP based on championship results and observations, but it has allowed some freedom to research new trends becoming common in ocean racing fleets.

Foiling in particular is finally getting a close look with the hope that the VPP may be able to rate these boats in 2021; this year the ITC partnered with the Sailing Yacht Research Foundation (SYRF) to conduct CFD investigations into the whole area of foiling, with the majority of their initial work now completed. The result is a data set of forces and moments for a range of foils and sailing conditions for popular foil types including the 'chistera' configuration employed on VPLP's well-established Figaro 3.

ITC chairman Andy Claughton steps us through the details: 'The first step in the process is to determine the magnitude of each of these forces, then the direction of the resultant force can be calculated and an induced drag calculated using an appropriate value for the effective span. There is already a routine that calculates the proportion of Fy (lateral force) carried by a daggerboard, and this approach will be extended to the foil based on the projected span on the x-y plane.

'The vertical forces produced by the foil will not be calculated from knowledge of the section shape and angle of attack. Rather the "optimum" vertical force will be calculated by finding the vertical force (Fz) that creates the lowest drag for the boat. As Fz is increased the drag of the hull is reduced as wetted surface area and effective displacement are reduced. But the induced drag increases with the square of Fz, so at some point the extra-induced drag will outweigh the drag reduction on the canoe body.'

To implement this work into a VPP that will produce ratings and certificates the ORC team had to upgrade its format for the offset file, the digital 3D representation of the hull and its appendages. A new format was needed to handle these new-style appendages that could be more logically defined by a common procedure.

'Moreover,' says Claughton, 'we need to store information about the boat superstructures that can't be accommodated by the current format. With the above goals in mind, the staff worked on a format that will be extensible, and is therefore written in XML. It will comprise different blocks: canoe body, daggerboard, rudder, superstructures and so on. Each block will be independently described, and a parent-child relationship among blocks will be defined. This will allow components to be "glued" to any point on the hull defined by x, y, z co-ordinates and set at the required cant angle (rotation about the longitudinal X-axis) and rake angle (rotation about the Y-axis).

'The appendage input is in terms of a series of points describing the "rondure" of the appendage, and for each point the associated chord and thickness are also defined. In this way rudders and retractable appendages can be more accurately measured when removed from the parent hull, and the data easily integrated into the .off file for hydrostatic and VPP calculations.' The weight of the appendages is also to be considered, as it can be considerable… this too will be worked into the calculations to help refine the VPP and hence the ratings.

Another trend is the explosive growth of double-handed sailing, no doubt enhanced both by Olympic medal interest but also by the pandemic restrictions and a general desire for big boat racing to involve fewer crew. ORC met this challenge last year with the introduction of purpose-designed ORC DH certificates, derived from the measurements of an ORC Club or ORCi certificate but with crew weight reduced by default to 170kg. Another change is that the simple scoring options listed on the certificate include models used more commonly in distance races rather than windward/leeward courses: for example, predominantly upwind and predominantly downwind course models to suit races that fit this description.

Another helpful aspect of ORC DH certificates is that they can be equally valid alongside a full-crew certificate for those teams who sail in both modes: no admin hassle and expense of certificate reissuing is needed. This also allows for configuring the boat with different sails appropriate to each mode.

The concept seems to have taken off this year at least: to date nearly 2,400 boats with ORC certificates have opted for a parallel ORC DH certificate, more than a third of total certificates in circulation. We expect this trend will only keep growing in 2021.

Dobbs Davis ❑

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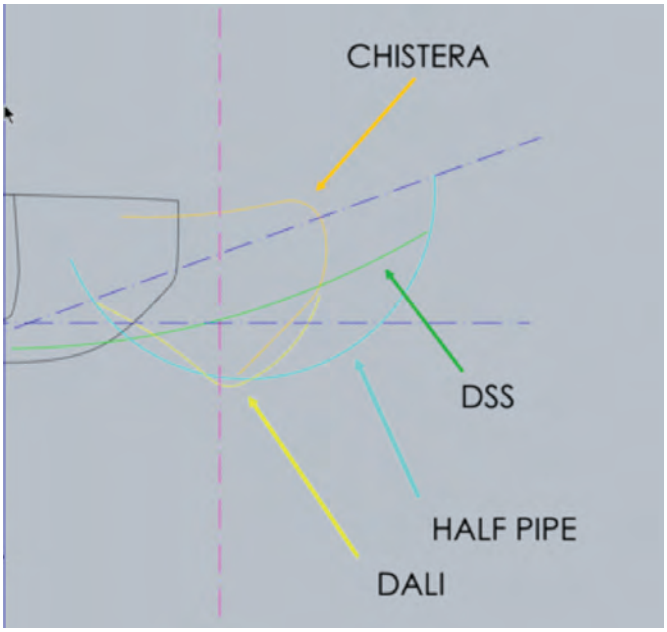

In an ideal world the goal of every rule manager is to find a rating solution for the latest flying foilers. In the real world such a thing is impossible; something of an empirical stab can be made at the latest Imocas with their capacity for sustained flight at 30kt+, but for a reliably accurate solution the boffins should focus their resources on 'foil-assisted' displacement designs like the Figaro 3 (*above left*), designed by VPLP. In passing, should there be an offshore two-handed event at Paris 2024 (which sadly looks increasingly doubtful) the Figaro 3 now seems to be ruled out on account of World Sailing's decision to avoid foils with their extra layer of complexity in extracting optimum performance. The four cases being studied by the ORC Technical Committee (*right*) with VPLP's Figaro 3 chistera foil in yellow. Once a workable formulation is confirmed for the Figaro 3 foil then logic suggests that the next case study should be on the Dali foils as these feature on the older Imocas more likely to appear in ORC and IRC handicap events as they progress down the chain of ownership