OFFSHORE RACING CONGRESS

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MINUTES of a meeting of the International Technical Committee held 24th – 26th September, 2004 at the Real Federación Española de Vela (RFEV), Madrid, Spain.

Present: Manolo Ruiz de Elvira (Chairman)
Ken Weller (ORC Consultant)
Nicola Sironi (Chief Measurer)
Andy Claughton
Fietje Judel
Alessandro Nazareth
Rob Pallard
Michael Richelsen
Jim Schmicker
Jim Taylor
Jim Teeters
Axel Mohnhaupt (Research Associate)

Observers: Carlos López (Universidad Politécnica de Madrid, Spain)
Philippe Pallu de la Barrière (CRAIN, France)
Peter Reichelsdorfer (US Sailing)
Miguel Rosa (RFEV, Spain)
Ricardo Zamora (Universidad Politécnica de Madrid, Spain)
Alberto Vidosa (Spain)

Apologies for absence were received from David Lyons.

The Committee thanks the observers for their interest and contributions as well as Miguel Rosa and the RFEV for their hospitality in hosting the meeting.

1. Minutes of the last meeting:

The minutes of the June meeting in Newport were approved, with the observation that the hi-speed residuary resistance coefficients had been agreed to be faired in with the exisiting coefficients at Froude number 0.400 (see item 6 below).

2. Review of the 2004 Season:

The discussion begun at the June meeting was continued with the latest results and impressions, including new designs in the fleet and their relative performance.

Some concern was expressed related to the latest narrow hulls, with "boxy" sections, which were meant to be less favorably treated under the new heeled drag model implemented last November. The trend of the newest and most competitive designs went further this year in the same direction seen

last year, obtaining a visible advantage on the water on certain points of sail, so it was proposed to amplify the effects of the new VPP model implemented last year.

The PIPA correction approved last year reduced the advantage obtained using "fat" strut drives, but did not eliminate it. Some further steps on the matter were agreed (see 4 below).

It was observed that there continued to be some perceived advantage in light air for reduced rated stability, although this seemed to be less than in 2003.

3. Submissions:

The Committee reviewed the annual submissions, a significant number of which were already covered by changes planned for 2005. The submissions will be covered extensively at the November ITC meetings.

4. Strut Drives:

Based on submissions and observations, the 2004 change in the PIPA formulations has not entirely eliminated the attraction of expensive, semi-production strut-drive units. It was therefore agreed to propose two Rule modifications for 2005.

a. First, ST4 would be measured at the aft end of the strut hub instead of at the point of maximum projected area, better representing the flow separation drag. All existing conventional units already have the maximum at that point and relatively few streamlined ones take advantage of a smaller section at the end of the hub.

b. Secondly, it is proposed to apply a maximum ST4 to be used for the PIPA calculation, dependent on the L of the yacht. The maximum has been defined by a curve of values just above those typical of common production units, faired over an ample length range.

   The proposed upper limit for ST4 would so be defined as the lesser of:

   (4*10^-5*L^3-0.0011*L^2+0.0125*L +0.05) or 0.2 (but never less than 0.1)

5. Appendage Viscous Drag:

It was reported for the last few years a trend towards thick keels, with laminar sections and significantly less drag than currently estimated by the VPP, which assumes the more turbulent flow associated with the thin keels previously used. Considering that it is reasonably accurate to assume laminar flow with thick keels, the Committee decided to recommend reducing the estimated increase of drag for keels with a thickness to chord ratio over 10-12% as a way to better evaluate most keels. A test run was performed with the proposed change.

6. Movable Ballast and Trim Tabs (Appx. 10 Yachts):

The race results where water-ballast and canting keel yachts ("Appendix 10 yachts") participated were discussed. It was felt that the 2004 IMS treatment generally overstated the performance predictions for these yachts. While the stability calculations for the yachts were considered to be correct, there were sources of performance decrements which needed to be considered for 2005, including the degradation of lift in canted keels, induced and viscous drag of forward rudders and bilge boards and size of spinnakers actually used relative to IMS rule minimums. Plans for testing revised models in these areas were outlined and tests will be run leading up to November week.

Test data for models towed at speeds high enough to be representative of the offwind speeds attainable by water ballast and canting keel yachts had been incorporated into the residuary resistance

model for Appendix 10 yachts in 2004. The resulting "hi-speed" Rr coefficients had been faired into the existing table of Rr coefficients in such a manner as to leave the coefficients at Fn 0.325 and below unchanged, with coefficient changes appearing at Fn 0.350 and above. The intention is that this table of coefficients be applied to all yachts in 2005, but to minimize or eliminate any effect on yachts of conventional performance, it had been agreed in Newport move the fairing point upward so that no changes result in coefficients below Fn 0.400. A fleet test run would first be exmamined.

7. Rotating Masts (ORC Club):

The Chief Measurer brought to the Committee's attention an issue regarding the rating of rotating wing masts, not permitted under IMS, but locally permitted in a few countries under ORC Club. The practice has been to retain the measured MDT measurements, but reduce the MDLs to the values of the MDTs, leaving the mainsail girths unchanged. From 2000 onward, the VPP has then internally added any excess of MDL beyond MDT*2 to the mainsail girths, adjusted boom length and headboard.

Following discussion, the ITC agreed that mast parasitic drag should be eliminated altogether, this to be accomplished by reducing the measured transverse mast diameters values to a nominal minimum of 0.1cm each but keep the real MDL measurements so that the VPP will automatically add them to the horizontal sail dimensions as noted above.

It was agreed that any Club certificates for yachts with rotating masts should be re-issued following this prescription, with immediate effect.

8. Crew Righting Arm and Windage:

Two changes were proposed related to the crew position.

- **a.** For the calculation of the crew righting arm the beam at deck is replaced by the maximum beam at each station.

- **b.** Eliminate the inboard offset of one foot for the movable crew weight in the VPP calculations. This would more accurately represent the way the crew actually sit on the rail.

As a consequence, a more favorable tradeoff between crew and yacht stability can be expected in 2005.

The effect of crew on vs. under the deck was briefly discussed but it was considered to have an insignificant influence and that to account for it would be complex out of proportion to any benefit.

9. Upright Residuary Drag:

Different regressions produced by Axel Mohnhaupt were tested with available new towing tank model data. Tests were also run removing the WPA/VOL parameter to avoid its interaction with the BTR term in the residuary resistance polynomial. The test runs were examined but no encouraging results were found.

A new extension for high speed Rr will be tested fairing in with the existing Rr table of coefficients the new table of hi-speed coefficients resulting from towing models at speeds higher than Fn 0.6. It is scheduled to recommend implementation for all yachts for 2005, whereas the scheme has been used in 2004 only for Appendix 10 yachts. The result will be more accurate residuary drag prediction where yachts are reaching relative high speeds. At lower speeds there should be little or no change to the existing fleet.

Axel Mohnhaupt reported on a thesis project of a Delft student whose target is the calculation of the wave elevations and positions for different hulls and values of Fn. Axel was able to reproduce the calculations for all the Delft Model testing database, generating for each of them a family of wave profiles at different Froude numbers (towing speeds). Subject to eventual validation, the work may be useful in the study of overhang effects, immersed transoms and dynamic determination of L.

10. Heeled Drag:

The Committee was concerned about the continuing type-forming of narrow, vertical-sided hulls, referred to as "boxy" boats. It was considered that there may be performance factors involved which should be examined and various approaches were reviewed.

Possible techniques for characterizing these hulls and evaluating performance potential of such shapes were examined, including reducing the length-to-beam ratio and waterplane area with heel, so reducing the drag with heel beyond what was estimated last year with the new heeled drag model implemented in the IMS VPP.

It was determined that the ratios (LSM1(25)/B(25))/(LSM1/B) and WPA(25)/WPA (where "25" refers to the value of the parameter at 25-degrees of heel) provided a good representation of these hull types, as well as an explanation for their reduction in drag when heeled beyond what the current model predicts.

It was concluded that the WPA parameter provided the more robust evaluation and would be less vulnerable to exploitation as a heeled drag multiplier incorporated with a linear dependence of WPA(25)/WPA. This multiplier will be reviewed in November based on studies to be performed shortly with these types of hulls.

11. Light Air Beat & Stability:

The committee had been studying the possible reasons for low stability type-forming in light air. Some concern was expressed about the lift coefficients of the headsails at small apparent wind angles, however the first tests carried out did not show the expected results. Other possible solutions relating to the calculation of the apparent wind at lower angles of heel for light wind will be evaluated for November with the intention of proposing a correction for 2005.

12. Pitch Gyradius:

A general discussion took place related to the measurement and effects of gyradius in predicted performance. A working group was created in order to prepare a more detailed analysis, to be discussed at the November meeting. No significant changes in this are expected for the 2005 VPP.

13. Software Update:

The need for a full update of the LPP/VPP program and auxiliary tools to a modern structure and programming language that can simplify the programming tasks, offer a better link between programs and open new possibilities for interfaces was discussed. The ITC programmer will present a full proposal to be discussed in November with the intention of getting work underway.

14. CFD Testing:

Philippe Pallu de la Barrière from CRAIN (Centre de Recherche pour l'Architecture et l'Industrie Nautiques) presented calculations performed with ICARE, a RANS computational fluid dynamics program with free surface including sink and trim calculations performed with models 5 and 6 tested

at IMD. The comparison with the tank results for canoe body alone showed promising results and the ITC will consider a more extensive use of CFD tools for future studies.

The Committee thanked Philippe for his help to the ITC and the presentation of his studies.

15. Cruiser/Racer Regulations:

Better characterization of *bona fide* cruiser/racers was extensively discussed and there was a general agreement that a more effective calculation of the accommodation length (AL), changing the current use of BMAX*3.25 to B multiplied by a different factor, or even use a different formula related to the displacement.

A decision will be taken in November, but more strict criteria for cruiser/racers should be expected, basically intended to restrict to real cruising yachts the advantage of any C/R allowances. Designers and builders are cautioned that such changes are likely to come into effect January 2005.

16. Scoring:

Scoring in general was discussed, and the Copa del Rey results (originally scored with Constructed Course / Performance Curve method) had been re-scored using a "performance line" simplified system, with no significant variations in general. The matter was deferred for further discussion in the next meetings. It was acknowledged that a new "Velum" program is now available.

17. Next Meeting:

The next ITC meeting is scheduled for November 4-6 in Copenhagen in conjunction with the Annual Meeting Week. Observers are welcome at all meetings except that the meeting may be closed the last day. Observers are requested to contact the ORC Secretariat about their wish to attend and to obtain meeting details (also avialable at www.ORC.org).