OFFSHORE RACING CONGRESS

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MINUTES of a meeting of the **International Technical Committee** held on 4th-6th November 2004 at Bojesen at Axelborg, Copenhagen, Denmark.

Present: Manolo Ruiz de Elvira (Chairman)
Friedrich Judel
David Lyons
Alessandro Nazareth
Rob Pallard
Michael Richelsen
Jim Schmicker
Jim Taylor
Jim Teeters (ORC Research Director)
Nicola Sironi (ORC Chief Measurer)
Bill Cook (ORC Programmer)
Axel Mohnhaupt (ITC Research Assoc.)

Observers: Jean-Louis Conti, Measurement Committee, Club Working Group
Dan Nowlan, Offshore Director, US Sailing
Peter Reichelsdorfer, US IMS Committee Chairman
Konstadina Sfakianaki, IMS measurer, Greece
John Winder (USA)
Boris Hepp, DSV, Germany
Philippe Pallu de la Barrière, CRAIN, France
Marcel Wagenaar, Measurement Committee, Netherlands
Sten Edholm, Sweden

Committee member Andy Claughton sent his regrets for being unable to attend.

1 - Minutes of September 2004 Meeting

Minutes of the previous meeting in Madrid, Spain were reviewed and approved.

2 - ORC Chief Measurer's Report

The new questions to be addressed raised by the Chief Measurer upon questions and requests emerged during the season are included in Par. 12, or referenced to in the context of other paragraphs and Submissions.

A complaint from an Owner was received after the experience in the last part of the season regarding the treatment of centerboards, which is a known question, which has been on the ITC agenda for many years without being addressed, and then abandoned given the scarce appearance of centerboard boats in the IMS high level races. Not being possible to address the question during this meeting, it is proposed to defer it to next yearôs agenda.

3 - Aerodynamic Modeling.

3.1 Upwind aerodynamics (KNWV 2) : The approach used last year to address the problem of the stability effect on performance in light air has been modified in order to make its effect more significant, but this time it has been made dependent on the TWS instead of the heel angle. Therefore, in the wind triangle solution of the VPP, a heel angle smaller than the actual sailing heel is used as in the 2004 VPP. But this time if the TWS is less than 6, zero heel is assumed.

This has the effect of widening the apparent wind angle and accounts for the ability of the trimmers to compensate for the effect of heel by rotating the sail plan. This correction disappears progressively and at 12 knots of TWS the effect is already none. The effect of this proposal is to speed up the whole fleet in light air, encouraging to some point boats with more stability.

However, more detailed analysis is required in this subject as well as a better evaluation of the overlap. The ITC is planning to perform new tests and CFD studies in the near future in order to help address this problem.

3.2 Downwind aerodynamics (RFEV 7): After a brief discussion the ITC concluded that changing the minimum default spinnaker size would have a negative effect in the fleet thus the proposal is to keep the current limits unchanged.

4 - Hydrodynamic Modeling.

4.1 Upright Residuary Drag : After some tests on residuary drag no improvements have been found over the current regression. However with the inclusion of faster yachts in the fleet, the need for a better prediction at higher speeds becomes more and more urgent. With this in mind the ITC has adopted for the whole fleet, as already planned in a previous meeting, the modified upright RR model with more accurate predictions for speeds above Fn=0.325, already used with movable ballast yachts within the 2004 VPP. This has a very small impact in upwind and downwind cases for most of the fleet but becomes relevant when reaching, especially for yachts capable of high speeds.

4.2 Resistance Due to Heel (RFEV4, DSV3, FIV2): Looking at the observed differences between the latest ñbox likeò narrow optimized designs and more conventional ones the ITC believed that the new heel drag model implemented last year was not sufficient to address these differences.

A limit in B related to BMAX for hydrodynamic calculations was considered but the results were not satisfactory.

Based on that, two different hull designs following the latest tendencies were developed and tested with different CFD tools in order to evaluate its differences in performance. A significant difference was found related to the length increase with heel but also a more important decrease of beam (and BTR) with heel. Based on that several modifications to the heel drag model were evaluated and the one finally adopted uses a multiplier that measures the differences with heel of waterplane area and length, as a more robust measurement of the beam reduction. The multiplier is defined as 2/((LSM1xx/LSM0)+(WPA0/WPAxx)^0.5), where xx refers to the heel angle at which the LSM1 and WPA values are calculated for each equilibrium point. This model is different to the one implemented in the 2005 VPP Beta but its effect is very similar.

For the future the ITC plans to tank test models in better agreement with the current tendencies, being the first candidates those that have been evaluated using CFD within the last weeks.

4.3 Appendage Viscous Drag: The ITC decided last September to propose for 2005 the modifications already included in the 2005 VPP Beta version consisting in reducing the estimated increase of drag for keels with a thickness to chord ratio over 10-12%. The committee reviewed this and decided to go ahead with the modification but limited to the top 4 strips of the appendages, in order to avoid an unfair reduction of estimated drag for thick bulbs compared with the current treatment. In absence of bulbs the differences with the beta version are insignificant.

4.4 Movable Ballast yachts: Looking at the race results where water-ballast and canting keel yachts (ñAppendix 10 yachtsò) have raced, there is a clear indication that the 2004 IMS treatment generally overstated the performance predictions for these yachts. The two known punitive (more than originally expected) considerations that were in place in 2004 have been removed. As it was already discussed in the last meeting, the degradation of effective draft in canted keels has been removed and the canted keel will not be longer included in the draft calculation. On the other hand the lifting surfaces placed forward of the keel (bow rudders or daggerboards) have their wetted surface included in the viscous drag calculation. As a result the current estimations are more favorable to this type of yachts compared to reality.

Another change that has a positive effect on these yachts is the extension of the high speed residuary drag formulation to the whole fleet.

However it is acknowledge the need for better information related to these type of configurations and the ITC will plan some tank tests with a model specifically designed for this.

5 - Crew Righting arm:

5.1 Crew righting arm (DSV2): The ITC decided to propose for 2005 the modifications already included in the 2005 VPP Beta version consisting in.

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 sits on the rail as practiced in racing.

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

5.2 Crew extension: In order to accommodate and properly evaluate the use of trapezes or other hiking devices especially in association with Sportboats, a new field has been added in the DAT file (which replaces the ñFLò field that was added for the last couple of years). This measure is read in and taken into account by the LPP+VPP to represent the increased righting moment produced by the crew extending outboard by mean of trapezes, hiking straps or other devices.

It is a linear measurement (in m), intended to represent the distance between the sheerline, where the crew weight is placed by the IMS, and the actual atwhwartships position where the crew is placed when racing.

The use of trapeze is assigned a CEXT value of 1.2m, and the use of hiking straps 0.50m. (see also Minutes of the Sport boat Working Group). Other devices will be evaluated on individual basis. Any doubtful case shall be reported to the Chief Measurer.

In case part of the crew is hiking with a trapeze, and part with hiking straps, a weighted average should be calculated.

6 - Propeller installation drag (FIV1, DSV4)

The ITC reviewed the proposed changes from Madrid already implemented in the 2005 VPP Beta program and agreed to proceed with them as already defined:

a. ST4 shall be measured at the aft end of the 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, for those last ones the new ST4 measurement shall be taken and dat files updated accordingly.

b. An upper ST4 limit will be used for the PIPA. This limit depends on the L of the yacht. The maximum is defined by a curve of values just above those typical of most common production units, faired over an ample length range.

The proposed upper limit for ST4 is thus 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)

7 - Recommendations for Including the Transpac 52 in races under the IMS

Current Transpac 52 designs have characteristics that are not strictly in compliance with the IMS rules. The ITC reviewed those characteristics not in compliance and prepared a list with the following suggestions:

1. The ITC is recommending to remove restrictions on halyard locks for all boats (see minute 12.3). Acceptance of this proposed change would solve the problem of the Transpac 52 rule allowing halyard locks.

2. The Transpac 52 rule permits a single, permanent, adjustable topmast backstay used in conjunction with an adjustable forestay. The IMS rule allows adjustable backstays in conjunction with a fixed forestay OR an adjustable forestay in conjunction with swept spreaders and fixed backstays. For racing under IMS a Transpac 52 must make either the backstay or the forestay fixed to comply with IMS rule 305. For this interpretation ñfixedò means set at a single position and not adjusted while racing

3. The Transpac 52 rule permits minor changes to Part 3, Interior Accommodations, of the IMS Regulations. A Transpac 52 holding a valid class certificate will be permitted to race under IMS with these minor changes.

4. The Transpac 52 rule permits a single, masthead, loose-luffed genoa for use in offshore races only. To compete under IMS using this sail the values of IG, J and LP representing how this sail is set and sheeted must be reflected on the IMS certificate. An alternative would be not using this sail when racing under IMS. ñTechnically fairò certificates for W/L races (not using this sail) would be different than certificates for offshore races (using this sail) for this type of yacht

5. A Transpac 52 must comply with the sail limitations of Section 205 of the IMS Regulations when racing under IMS.

8 - Age allowance (DSV8, RFEV1, SSF2):

ITC agreed to change the optional Age Allowance in Appendix 8 as follows:

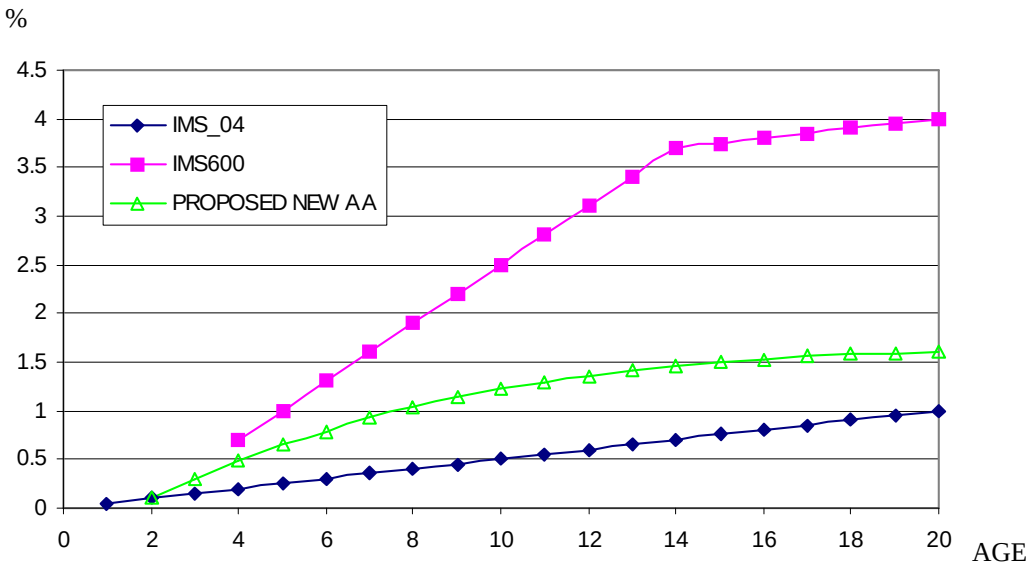
An optional Age Allowance of 0.05% increase in time allowance is applied to a one year old yacht. From the second year on up to a maximum of 20 years the age allowance is calculated as :

AA= 0.00017*Age^3 ï 0.011*Age^2 + 0.25*Age ï 0.35.

The reference year is the current rule year. The age used for the Age Allowance shall be the earlier of Age or Series Dates (see 108.1 & 2,) This allowance is applied by default to the time allowances of both Racing and Cruiser/Racer Division yachts.

The ITC recommends to delete the additional age allowance in the IMS 600 Class Rules.

The enclosed diagram show the effect of the new Age allowance



9 - Gyradius adjustments (RFEV5, RFEV6, FIV3, SWE5):

The Committee reviewed the several Gyradius issues and the fact is that they are part for a more general discussion regarding added resistance in waves. However based on some of the submissions the ITC debated the current adjustments and decided to propose the following:

To maintain the current difference for racing yachts with carbon construction, seen not as a penalization but as a consideration (still small) of the difference of the accommodation weights.

To reduce the minimum limit of the (C/R+FWD ACC) allowance from 0.0035 to 0, dependent on the sail area to displacement ratio with the consequence of a reduction of the allowance for the aggressive C/R yachts.

10 - Cruiser/Racer treatment (DSV5, KNWV1, RFEV2, RFEV3).

After a long discussion about C/R the main conclusion is to acknowledge the difficulties to characterize Cruiser/racers trying to separate the aggressive racers that comply with the current requirements. This is a difficult subject but something the aggressive C/R have taken advantage of is the definition of the accommodation Length (AL) for narrow boats.

Based on that the ITC recommends to replace in IMS Regs 404.1 the term 3.25*BMAX by 1.8*(LOA*BMAX)^0.5.

This change will require some more Interior Volume for narrow yachts . The new rule will apply only for yachts with series dates after 1st January 2005.

Other submissions suggest different ideas, most of them related to internal ballast and keel composition but the ITC believes that any regulations in that direction would be almost impossible to enforce and certainly easy to ñcheatò, just providing additional rules to optimize designs for.

With this in mind the changes the ITC propose related to DA and C/R gyradius adjustments go in the direction of seriously reducing the advantages that aggressive cruiser/racers (with deep keels and high sail areas compared to the displacement) get from those allowances.

11 - Dynamic Allowance (SWE5)

Following Management Committee concerns and Submissions request, ITC reviewed slightly DA formulation.

To address the requirement of reducing the trend of excessive span of keels of aggressive C/R, the allowance due to the term related to effective draft (D) was changed.

This was confirmed also by a study performed by Delft University that relates directly tacking performances to depth of keels, with effects in terms of time lost for every tack of ½ seconds or even more for the same boats with either shallow or deep keels.

The modification went in the direction of lowering the border line (D/L limit, size related to IMS L) where boats begin to get credit for reduced keel draft (you will need for 2005 a slightly shallower keel to begin to get D/L credit) and at the same time increase the overall value of the allowance due to low D/L ratios.

The effect is to speed up a little boats with quite deep keels (0.1/0.2 s/m for boats just below the border line) while shallow keel boats (low D/L) get a rating advantage of maximum 3 s/m.

12 - Measurement and Permitted Materials issues

12.1 MDL measurement: The ITC proposes to add the following wording to IMS 805.9:

"…and the smallest thwartships value found shall be substituted for MDL1, except that any bona fide luff groove will always be included. Any …".

It is reminded that in the VPP any value of MDL1 in excess of 2*MDT1 is ignored for windage considerations, and is automatically added to the mainsail girths.

12.2 Rotating Masts (ORC Club) As it was already proposed in the last meeting in Madrid the ITC proposes to eliminate the mast parasitic drag for rotating masts by reducing the measured mast diameter values to a nominal minimum of 0.1cm each and also add the MDL measurement to the values of E, HB and the mainsail girths.

Any Club certificates for yachts with rotating masts should be re-issued following this prescription.

12.3 Halyard locks (FIV4): Going further than the submission related to halyard locks the ITC considers that halyard locks are nowadays a reliable fitting, widely available and there is no reason to limits its use. Thus the proposal is to remove the restrictions to its use with the only condition that they should be able to be remotely operated from deck.

12.4 Winches with carbon drums: This is another feature that is starting to be commonly available and not offering a significant performance advantage the ITC propose to remove the current restriction to its use under IMS.

12.5 Wing keel treatment (DSV6): The ITC acknowledges there is a problem with the identification of some bulb keels as winged keels. Some work will be done for the future in order to find a better characterization of winged keels but in the meantime the measurement committee should provide the guidelines for a correct identification with an uniform criteria.

13 - Summary of Proposed VPP Changes for IMS 2005

- New PIPA calculation.
- Changes in the upwind aerodynamic model in light air.
- Modification in the drag due to heel.
- Extension of the upright residuary drag model modified for high Fn for all the yachts.
- Change of the keel viscous drag.
- Changes in the crew righting arm calculation.
- Modified age allowance scheme proposed.
- Change of the influence of keel draft in the DA
- Change of the C/R gyradius adjustment.
- New effective draft calculation for yachts with canting keel.
- Use of forward foils in viscous drag calculation for yachts with canting keel.

14 - Recommendations on GPH Class limits

The proposed changes to the VPP result in a significant change in speeds compared to the 2004 version, especially upwind, providing a much closer prediction of speeds compared to reality. As a consequence there is a change in the GPH values for the whole fleet.

Since GPH is widely used to define classes, by the ORC and the National Authorities the ITC considers that a change of the high speed limits should be adopted in order not to harm any boats in the fleet. Lower speed limits might be modified according to a different number depending on the class.

The amount of this change should be in the order of 5 seconds per mile for the bigger yachts (IMS 500), around 7 spm for the IMS 600 and 5 spm for the IMS 670.

Another note relates once again to the DA as a warning for NAôs that use this number as a reference for some classes since this number will change to some extent.

15 - VPP/LPP Documentation

The VPP/LPP documentation does not include the last changes in the models. Pending the eventual approval of the proposals for 2005 The ITC will try to coordinate an update of the documentation.

16 - ORC Research Fund

Once again the committeeôs work this year relied primarily on previous available test results. For the incoming future a number of projects require a new approach, from new models to test to the use of modern tools like CFD.

It is necessary to update the current information in which most of our mathematical models are based with modern designs and updated results.

The intention is trying to get some external funding to cover as much as possible the cost of some of these projects. However in order to schedule some significant research we anticipate an estimated cost of approximately 40,000 euros.

Besides these projects the complete re write of the LPP/VPP has become a priority of first order and a proposal for that is currently being discussed. This should open a full range of possibilities for the future including software integration, web capabilities, improved file formats and reduce long term maintenance cost..

The cost of this code update is estimated in the order of 50,000 Euro and thus the ITC kindly requests the Congress to allocate these funds for next year.

17 - ITC 2005 Agenda

The ITCôs principal projects for next year are:

- Full rewrite of the IMS LPP/VPP.
- Review upwind aero model including light air performance, mainsail girths, overlap effects and asymmetric sails in the ñforbidden zoneò between jib and spinnaker.
- Revise residuary drag including an assessment of effective sailing length, including tail effects.
- Develop and test new models for residuary resistance
- Review the assessment of added resistance in waves
- Monitor drag due to heel.
- Review the treatment of winged keels
- Review and address Centerboard treatment
- Monitor cruiser/racer features and performance differences

18 - ITC Membership

After many years providing a high degree of support Jim Teeters and Jim Schmicker will leave the ITC. The ITC wants to express their thanks to both Jim´s for their great contribution to ITC over the last decade.

New Members will be announced soon.

19- Next Meeting

The next meeting of the ITC is planned to take place in Annapolis (USA) during the Chesapeake Sailing Yacht Symposium beginning of March, 2005. Observers are welcome.