# **OFFSHORE RACING CONGRESS**

World Leader in Rating Technology

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MINUTES of a meeting of the International Technical Committee held on 4<sup>th</sup>-6<sup>th</sup> November 2005 at the Grand Copthorne Waterfront Hotel, Singapore.

- Present: Manolo Ruiz de Elvira (Chairman) Friedrich Judel David Lyons Alessandro Nazareth Nicola Sironi (ORC Chief Measurer) Ken Weller (ORC Consultant) Bill Cook (ORC Programmer) Axel Mohnhaupt (ITC Research Assoc.)
- Observers: Dan Nowlan, Offshore Director, US Sailing Peter Reichelsdorfer, US IMS Committee Chairman Ken Hayashi, Japan Sailing Federation, Japan Noburu Kobayashi, ISAF, Japan Minoru Tomita, Japan Ichiro Yokohama, Japan

Committee members Andy Claughton, Rob Pallard, Michael Richelsen, Jim Taylor and Philippe Pallu de la Barrière sent their regrets for being unable to attend.

## 1. Minutes of September 2005 Meeting

Minutes of the previous meeting in Hamburg, Germany were reviewed and approved with a correction in the point 11 where it should read "below 24 m" instead of "above 24 m".

#### 2. Test fleet update

The ITC agreed to update the Test Fleet with the latest production designs as well as a number of representative TP52 designs.

#### 3. Aerodynamic Modeling.

3.1. Upwind aerodynamics - Overlap effects (KNWV 2) and mainsail roach :

As it was already noted in the minutes of the last ITC meeting in Hamburg, last September, during the last week of August ORC aerodynamic tests were performed in the wind tunnel facility at the Politecnico de Milano (Italy) under the supervision of Fabio Fossati. During these tests three different configurations of Mainsail roach were evaluated as well as three different headsails with different degrees of overlap (100, 135 and 150%) with different heel angles.

The sail fabrication was contributed by the North Sails sail loft at Carasco (Italy) under the supervision of Gigio Russo who personally attended the tests and performed the sail trim. Fabio Fossati had compiled a comprehensive report and the first impression from the ITC was that the results represented very high quality data which the Committee has just begun to be properly analyze.

Regarding these tests the ITC wants to reiterate its gratitude for the effort of Fabio Fossati and the Politecnico de Milano wind tunnel team, Gigio Russo and the North sail loft, the Committee members directly involved in the preparation and coordination of the as well as Peter Reichelsdorfer and The North Sails Group that donated the model sails used during the tests and thank them for their support.

However although a big effort was performed in order to obtain valid conclusions to be implemented for the 2006 VPP the ITC does not feel comfortable with the achieved results believing that a partial implementation would not have the desired effects. The ongoing work on this will continue through 2006 with the purpose of finalizing a complete proposal for the upwind aerodynamic model for next year that will include a more realistic depowering scheme for boats with overlap that accounts for the jib base reduction.

The same affects the mainsail roach studies where a partial implementation of the center of effort height calculation was discarded since without the, not yet finalized, model for the effective span would not provide by itself a correct evaluation of its effects on performance.

## 3.2. Spinnakers with wings (KNWV 5):

After some discussion the ITC concluded that the aero model does not have the means to evaluate in a correct way such sails and the proposal is no to allow them for racing under IMS (they do con comply with the IMS rule) leaving open the possibility to allow its use restricted ORC club, and suggesting that in that case the area of the wings should be added to the spinnaker area to obtain a total one to be used for the VPP calculations.

# 4. Hydrodynamic Modeling.

# 4.1. Residuary Drag correction for overhangs length :

The effect of overhang length on residuary resistance was worked out on the basis of the master thesis of Evert Lataire of Delft University. The main principle is the fact that all models of the Delft Systematic Series have a constant LWL/(LWL+Overhang) ratio of .83, while this ratio for the IMS-fleet ranges from .78 to .1. When boats with a different overhang ratio travel at higher speeds, the effective Froude Number (Fn) is also different from the ones as observed during the model tests.

Therefore a Fn transformation has been introduced, which uses at higher speeds the waterline plus the overhang length as the relevant wavemaking length. This has the effect that the predicted residuary resistance at higher speeds decreases for boats with longer overhangs than the Delft Models relative to the ones with shorter overhangs.

The ITC evaluated the effect of this change on the test fleet and decided that the effects were according to the expectations and perceptions and decided to propose its implementation for the 2006 VPP.

## 4.2. Effect of sail induced trim :

Currently the IMS LPP/VPP does not consider the effect of the sail induced trim other than what is implicit in the tank test experiments. However this has a significant effect in a number of factors like length, wetted surfaces and even the data used to perform the tank data expansion for the residuary resistance regressions. With this in mind the ITC plans to include this effect in future studies with the intention of defining a sensible scheme for its use and effect in calculations.

## 4.3. Appendage tip influence on effective draft (DSV3):

As already reported after the September meeting a number of keel geometries with different types of tips including bulbs with different shapes, simple keels, winglets and a combination of these were generated and analyzed with the help of CFD by CRAIN in France under the supervision of Philippe Pallu de la Barriere. Some additional configurations were calculated during the last month and added to the original results that have shown to be a way to better evaluate the effect of keel tips of different shape.

A full model for bulb and wings has been generated that provides a better evaluation for wings and that shows that for normal bulb configurations some smaller corrections in regard of effective draft might be reasonable. However after some tests the Committee proposes just a partial implementation at this stage, due to some potential problems derived from the level of noise in some measured offset files that require some further work in order to avoid some anomalous behaviors. An automatic wind/bulb detection scheme will be implemented for the LPP to perform this task.

Thus the ITC proposal is to replace the current winged keel treatment for this new one in those offset files in which a point has been assigned a flag "4" but at this point just limited to the wing effects but not the bulb ones. After these anomalies are studied and solved the complete model including all bulbs and wings combinations will be implemented.

However the proposed change will treat in a more favorable way the current configurations with wings, especially those in yachts with wings in shallow draft keels.

Rule 528 related to the calculation of the Maximum Draft Including Keel (DHK) should me modified to reflect the changes of the winged keels treatment.

## 5. Crew weight and position:

## 5.1. Crew weight (DSV2):

DSV proposed in their submission number 2 to apply the penalty system for crew weight (consisting in ignoring its weight for the calculation of the sailing displacement) straight on above the lower weight limit instead of the default one as a way to encourage "yacht stability" vs. "crew stability". The results of some test runs showed some undesired effects with some boats taking an unfair advantage of the change thus this approach was not considered appropriate for implementation

## 5.2. Crew default position:

In relation with the crew position but also some measurement trim sensitivities detected in a number of offsets files, the crew position, which effects the longitudinal trim of a yacht, is moved further forward when calculating the sailing trim. The new modified crew position does better represent the trimming of modern yachts and provides a more realistic measurement of the yachts parameters.

The ITC performed some test runs that showed more realistic results for some anomalous yachts and thus the implementation of the default position 0.10\*LSM0 aft of the longitudinal center of buoyancy in Measurement Trim (instead of the current 0.15\*LSM0) is proposed for the 2006 VPP. Accordingly rule 716 should be modified to read as follows:

"CGWL is taken as 0.10\*LSMO abaft the longitudinal center of buoyancy in Measurement Trim."

## 6. Strut Drive Standard Dimensions (DSV4)

In response to the DSV4 submission the ITC agrees that using standard measurements for standard strut drives is a reasonable approach that eliminates measurement uncertainties. However more than part of the rule the Committee believes this should be part of an official measurement instruction.

Related to this, an error in the wording of rule 608.3 was detected (however the current VPP implementation is correct) thus the following paragraph:

"For the purpose of the strut drive calculations above, ST4 shall not be taken as less the 0.1 nor greater..."

should be replaced by

"For the purpose of the strut drive calculations above, ST4 shall not be taken as less than 0.1 (except for those units with a physical measurement of ST4 below 0.1) nor greater..."

#### 7. Age allowance (FIV1):

Following submission FIV1 and a long discussion already started in the last meeting, the Committee agreed not to propose averaging Age and Series dates since it would imply an unfair treatment for production boats that fully maintain the original design, as it is the case for one-design classes that race in more heterogeneous fleets. The ITC understands the either option implies some degree of unfairness but it is its opinion that the proposed one is in the less disruptive one.

#### 8. Interior requirements for the racing class (FIV2)

In response to the FIV2 the ITC proposal is:

- To maintain the current limits of interior height since the proposed reduction is considered excessive when interior height requirement are considered necessary for racing yachts.
- To eliminate the paragraphs suggested in the submission and thus eliminate the requirement in rule 307 for some hard bottom berths for yachts with an AL of 8.5m or greater since this is a case for normal offshore racing yachts with basically no impact in performance.
- To maintain the rule 310 as it is, considering that this change would have a potential effect in performance.

However based on the rationale of the submission the ITC wants to point out that the race organizes can use regulation 101 to, for instance, deem Grand Prix boats holding a valid certificate from complying with some of the regulations of part 3, already defined in their class rules, when competing in IMS races.

#### 9. Limit of internal ballast (FIV3):

As it was already discussed in the previous meeting the ITC believes that although limiting the amount of internal ballast for Cruiser/Racer yachts would be desirable it turns to be extremely difficult (if not impossible) to define and enforce such restriction since there are a number of (more expensive) ways to achieve the same end by artificially increasing the weight of some elements of the yacht. The object was a worthy one, but a practical solution remains elusive outside of specific fleets where no "aggressive" competitors are present.

#### 10. Stability requirements (YAI1):

The Committee has reservations about modifying BLRI without undertaking further study as ISO12217-2 does not clearly address yachts with movable and variable ballast. In the meantime it was agreed that righting arm data for Appendix 10 yachts could be printed on the IMS certificate together with the centre of effort height of the mainsail plus fore-triangle. This would provide sufficient information for independent calculation of other stability factors such as FKR and FIS which are required in ISAF Special Regulations Appendix K.

## 11. Scantlings

Following a day of the Committee's September meeting which was kindly hosted by Germanischer Lloyd in Hamburg, it was agreed that a "user profile" indicating the basic requirements for a new scantling rule would be considered and forwarded to the Classification Society as an aid to its work in developing its rules. Accordingly, the Committee felt that ongoing work in this area should focus on the needs of all offshore racing yachts, which include:

- Plan approval for the designs up to say 30m LOA.
- A practical way of checking if the yacht's construction is in accordance with the plans.
- Materials property verification and building process approval.
- Suitability of the rules for use in Special Regulations categories 0-4 perhaps with graded compliance.
- Inclusion of newer design features such as canting keels and water ballast.
- Evidence of compliance for Race Organisers.

- A gauge of the rules' scantlings versus the draft ISO 12215.
- Affordability for the yacht owner and usefulness for insurers.

The committee is willing to continue its assistance to Germanischer Lloyd.

#### 12. LPP/VPP rewrite status

The full LPP/VPP rewrite has already started and the immediate target will be having the current code working with the same results by spring next year within a new development environment that allows full Windows XP compatibility. From that moment on new features and functionalities will be added that will be defined for the next meeting in a continued work with the research programmer in charge of this project.

#### 13. Summary of Proposed VPP Changes for the 2006 VPP.

- New treatment for winged keels.
- Modification of the crew longitudinal position for sailing trim.
- .Residuary drag correction for overhang length.

#### 14. Recommendations on GPH Class limits

The proposed changes to the VPP result in a minimal change in speeds compared to the 2005 version for this reason no specific advise is provided for National Authorities that should review their fleets in order to identify the convenience to change their limits, This changes would normally be limited to 1 or 2 seconds per mile in GPH.

## 15. ORC Research Fund

For the incoming year one of the ongoing projects, the LPP/VPP rewrite is already covered by previously approved budget,

Besides this project the ITC plans to perform CFD calculations and possibly some additional Wind Tunnel tests with an anticipated cost and in any case would not exceed 20.000 Euro, being this the funds that the ITC kindly requests the Congress to allocate for next year.

## 16. ITC 2006 Agenda

The ITC's principal projects for next year are:

- Continue the already initiated rewrite of the IMS LPP/VPP.
- Continued research on overhangs with added truncated transoms treatment.
- Studies of sail trim moment effect and Residuary Drag in general.
- Development and implementation of a fully revised upwind aerodynamic model.
- Study the possibility to evaluate "Code zero" sails and long spinnaker poles.
- Further refine the treatment of bulb and winged keels
- Review and address Centerboard treatment

# 18. ITC Membership

The ITC proposed the Management Committee that Fabio Fossati becomes an ITC Research Associate.

## 19. Next Meeting

The next meeting of the ITC is planned to take place in Europe (venue to be decided) either the last weekend of February or March. Dates and venue will be confirmed within the next few weeks. Observers are welcome.