

INTERNATIONAL TECHNICAL COMMITTEE

Meeting

held on Saturday, 6th - Monday 8th October in Scheveningen, Netherlands

MINUTES

- Present:Alessandro Nazareth (Chairman), Jason Ker (UK), Andy Claughton (UK), Nicola Sironi
(ORC Deputy Chief Measurer), Antoine Cardin (FRA-GER), Rob Ranzenbach (USA),
Matteo Polli (ITA), Zoran Grubisa (CRO-ORC Chief Measurer), Panayotis Papapostolou
(GRE-ORC Programmer), Davide Battistin (ITA-ORC Programmer)
- Observers: Gennaro Aveta (ITA RO and ORC SY), Michiel Woort (Holland KNWV), Peter De Jong (Holland – KNWV), Manolo Ruiz de Elvira (Spain), Simon Forbes (UK – World Sailing), Hendrik Plate (GER – World Sailing), Philippe Luke (HOL – Hoek Design), John Victorin (GER), Jeroen De Vos (HOL – Dykstra Design), Leo Van Raam (Holland - Noordzee Club), Arthur Peltser (Holland)
- Apologies: Apologies for absence were received from Jim Schmicker (USA) and David Lyons (AUS)

1. Welcome, meeting logistics

The Committee thanks Michiel Woort, Peter de Jong and KNWV for organizing the meeting in Scheveningen again after less than 3 months.

2. Review of July 2018 meeting minutes

The minutes of the last meeting in Scheveningen of July 2018 were approved with no amendments nor discussion.

3. Report from Chief Measurer on the 2018 season

There were few complaints or issues raised during the season. Zoran Grubisa noted that some measurement issues arose during the Sportboat Europeans Championship for freeboards and weight checks, as the dimension of the boats makes the one mm approximation of freeboard measurement quite effective on the handicap, often going outside the tolerances set in ORC rule 305.2. For the future it should be studied if those tolerances should be increased for Sportboats, but the concern is that everybody will use the increased tolerance for tuning the handicap.

Also a post-race analysis of Offshore World Championship 2018 was performed. A comparison of the entries versus the ORC world fleet was made to see the distribution of the classes:



Class C seems to almost cover the average composition of the world fleet, Class A is moved more towards light boats while Class B is in between. One of the main issues is in Class A with the TP52 sweeping the class and a Class 40+ boat (HITCHIKER) not managing to beat them while in CLASS C it seems more balanced. No main measurement issues were found.

A re-scoring of the World Championship was also performed, where IRC scoring was in some way favoring/un-favoring some boats but very few changed positions apart from Class C that was the most crowded with major differences.

4. Submission Review

ARG 1- ASYMMETRIC SPINNAKERS WITH OR WITHOUT POLE

The main issue related to this submission is policing the use of the asymmetric spinnaker with the pole, but this will be dealt with by the RC and other competitors. After verifying with ORC programmer that this is feasible, ITC will implement in next year's VPP the possibility for a boat with symmetric and asymmetric spinnakers in her inventory to declare use of the asymmetric only on centreline and the symmetric on pole, and to be rated accordingly.

A new field for this purpose will be introduced in the Manager. Given there may be an unrated advantage, ITC suggests that if a boat is found using the pole with an asymmetric sail when not declared, then this boat should be disqualified. A test run for the boats with both symmetric and asymmetric spinnakers was performed without any particular concern.

The submission is therefore supported.

ARG2 – LIFTING KEELS WITH BULBS

The submission is not supported by ITC for safety issues related to a higher VCG when the ballasted keel with bulb is raised, which makes the boat much less stiff.

ARG3 - ASYMMETRIC SPINNAKERS ON SHW LIMIT

The 75% SHW/SFL hard limit has been set in RRS 50 for a long time, where all the existing sails designed to it are highly-specialized sails so that changing this rule would affect a lot of boats. In addition this request will oblige us to define a new kind of sail (transition between headsail and spinnaker).

The submission is therefore not supported.

ESP1 - NON-SPINNAKER HANDICAPS

Not enough evidence has been produced by the RFEV. The ITC considers the treatment of non-spinnaker boats is correctly addressed by the VPP by using a configuration with a dummy asymmetric spinnaker on a pole with the same surface area as the largest headsail, so it is likely faster.

The submission is therefore not supported.

GER2 - REVIEW MEASUREMENT VALUES AND NEED FOR DATA

ITC defers this to the Measurement and Rating Officer Committees. The Committee is open-minded to accept all proposals that DSV can make on this topic and it will revise internally all the non-effective VPP fields. This may also be an occasion to revise the current definition of LOA that has created some ambiguity between the offset file, dxt file and last station X coordinate.

ITA3 - PRESERVATION OF THE FLEET

ITC believes that the tools used to validate all new VPP amendments are returning a full reliability in the process. The test runs are not only a unique tool, but they allow a full rescoring of last year's most important races (most importantly the World Championship) and the comparison with the real performances of a wider database of boats that have provided their data logs (see paragraph 7 below). This is a very powerful and reliable process of tuning the VPP for the following year. The Committee has a program to invite, through the National Authorities, all the owners to provide their data logs to increase the data base used for comparisons. This means that the preservation of the fleet is well-pursued and all modifications are made in reducing the differences between actual speeds and those predicted by the VPP.

ITA5 – MULTI-BLADE PROPELLERS

ITC has already decided since the first meeting of the year in Athens to implement for 2019 the 4- bladed propeller, so the submission is therefore supported.

NED1 - SPINNAKER POLE LENGTH

Deferred to the Measurement Committee.

POL1 - INCREASE VPP TRUE WIND SPEED - 24 (26) KNOTS

ITC is confident that the VPP at 20 kts TWS is very reliable to handicap boats in strong winds, also above 20 kts. The Committee therefore believes that speed differences computed at 20 kts of wind are more correct in terms of speed differences between the boats than in 24-26 kts where surfing or deep reefing could produce large changes in bat performance.

The submission is therefore not supported.

RUS2 - OFFSHORE RACES – PRE-SELECTED COURSES

The request made in the Submission is already possible with the present version of the ORC scoring software which allows any kind of pre-constructed courses for offshore (but also inshore) races. ITC prefers to leave the certificate as it is without adding any other allowance on it, as this would introduce only a more complicated reading and may raise complaints or requests for clarification.

The submission is therefore not supported.

5. Aerodynamics.

5.1 Upwind Aero Model CFD research update

A further development of the CFD analysis will be performed in 2019. Jason Ker will send a proposal with "reduced" budget for additional CFD work to run additional models of overlapping sails with sheeting angles taking into account chainplate width. The objective is to tune the new Aero model for:

• Overlapping jibs

But also to tune the current formulation with existing data:

- Fractionality
- Square top mainsail
- Aspect ratio of sailplans

5.2 PHIUP Removal Check

The Committee verified the possibility to re-introduce the full effect of Aero modifications made in 2017 for the 2018 VPP. A Test run with the complete removal of PHIUP correction and the remaining 20% of Heff increase was prepared. The plot below show the differences in handicap when all boats have their RM increased by 10%, the blue dots are the proposed VPP, the red dots are the 2018 VPP (very slight differences are seen):



Also the transition between 2018 to 2019 is showing no trend versus low stability boats (low RM MEAS/RM DEF ratio):



The committee would have liked to suggest to introduce the above aero amendments in the 2019 VPP but looking at overall test runs the variations of handicap for GPH and various WL handicaps was considered too high so this will be further inspected in 2019.

6. Hydrodynamics

6.1 Hydro CFD research Update

Jason Ker presented a report about the current situation of CFD Hydro research, and below is an excerpt:

500 hull shapes have been run with RANS CFD. Preliminary comparisons of the test fleet's ORC predicted residuary resistance drags versus the CFD pressure drags show:

- Generally large differences.
- Those differences show no trend versus LVR, BTR, LCB, Cp etc.
- Some very large ratios occur at low Fn's, particularly under 0.25, which will be partly because the ORCi 'transom drag' has not been computed and included into the comparison.



Since the last meeting in July some important progress has been made:

- LPP the Fortran LPP was not available so in order to progress the studies an LPP was developed in Python. At the time of the last meeting in July, we had the length part of the measurement working well but we had some bugs with LCG and the flotation engine. These have now been fixed and the LPP is now a solid foundation from which to develop new concepts of length measurement
- A neural network drag model has been successfully created for the CFD test fleet. The purpose of this network is to predict the drags for all of the test fleet at all speeds. That enables the 500 different shapes to be compared at the same Froude number.
- Prior to the last meeting, we had briefly attempted to create an RBF model using LVR v BTR v FN using the CFD data and the present ORC length system. It was not possible to obtain a sensible result, partly because the level of discrepancy between the 'measured' and 'effective' lengths. We have since then improved our RBF modelling techniques which should give us a much stronger chance to succeed in training RBF surfaces.

Length Assessment:

• While the present lengths are created at fixed heights above the LSM1 (static sailing) waterplane, our plan is to create generic waveforms that depend on Fn and LVR (and maybe BTR) at LSM1 and then 'float' the hulls on those waveforms in the LPP.



As the CFD data includes transom drag, the plan is to incorporate the transom drag into the length assessment by taking account of a difference in curve of areas between the measured curve and a default curve that is tangent at the transom. A measurement Optimization will be performed comparing the RR from neural network and RBF surfaces. RMS errors of NN v RBF are calculated for the 500-boat fleet and summed. This will be iterated until the minimum error is minimized.

Andy Claughton will make a coordination of a WG including Jason Ker, Antoine Cardin, Matteo Polli and Davide Battistin. With the ORC research budget for 2019 (see par. 19) a PhD student could be hired to perform a complete CFD post-processing (hopefully including aero too) following the guidelines from the WG.

6.2 Heel effect on hull balance

Andy Claughton presented in July a proposal for addressing heel balance of boats and induced drag dependency on heel (Di factor). Andy Claughton explains:

"As a yacht heels the line of action of the total aerodynamic and hydrodynamic forces move apart, and this creates a bow to weather yaw moment. To maintain a steady course the rudder must be used to shift the hydrodynamic center of pressure aft. The magnitude of the heel induced yaw moment is dependent not only on the flow asymmetry around the heeled hull, but also on the Resistance (R): Side Force (SF) ratio of the hull, keel and rudder combination. Whilst the moment created by the asymmetric hull is difficult to predict the effect of the shift of the force vectors can be predicted from the VPP outputs. In broad terms a light, stiff boat has a low R:SF ratio and the induced yaw moment is low whereas a heavy, tender boat has high R:SF ratio and a larger induced yaw moment. Predicting exact rudder angles is beyond our scope, but we can calculate the R:SF effects.."

The "Comfortable condition" is considered when a boat is well balanced when fully powered up, so the 'optimum' sailing condition has been set at TWS=14, TWA=52. Then for each other sailing point the heel and speed-induced moment change from the comfortable condition is computed. A crude force model for the rudder is used to calculate a change of rudder lift coefficient.

Finally, the performance detriment for having the rudder at a non-optimum lift coefficient is computed. Davide Battistin coded a routine following the above approach and produced a test run, but the ITC believes that the results were not in the expected direction so ITC will keep this item into 2019 agenda as it is an important effect that should be included into the ORC VPP.

6.3 Funsteady function revision

The Funsteady term takes empirically into account the difficulty of reaching the maximum performances after manoeuvring. It is a multiplier which is made by a term finertia based on the ratio of wind speed and boat displacement, and a term fdraft based on the draft/length ratio and being effective only above D/LSM1>0.19:

$$f_{draft} = 1 + 10 \cdot \left[\max\left(\frac{IMSD}{LSM1}, 0.19\right) - 0.19 \right]^2$$



The Draft term has been removed as this parameter has nothing to do with unsteady effects. The removal of this term will return a more fair handicap for the keels without any type forming factor versus low draft keels.

6.4 Added resistance in waves upgrade

ITC worked also this year on the current formulation of added resistance. The effect of mast weight is very strong compared to the other gyradius terms so the current calculation of gyradius increment due to the mast has been revised and compared with original 1995 one from Greg Stewart.

Having not found any bug but thinking that the gyradius adjustment for the mast is quite high in a big part of the fleet , ITC will keep this item on 2019 agenda and for 2019 will support the reduction at 50% of the gyradius adjustment for the mast, hence reducing the overall effect.

Also the base gyradius calculation based on the ratio LOA/LSMH is considered to give too much favor to boats with long overhangs, so a new base gyradius has been tested (using LSM4/LSMH as ratio) and will be introduced in the 2019 VPP.

6.5 Crew Weight transverse position sensitivity adjustment

The effect of a crew weight increase on a J/70 that in light winds is going in the wrong direction has been inspected by ITC. Davide Battistin prepared a code for the transfer of the CW from leeward to windward, trying to locate the crew transversally in the optimum position when the crew is not sitting in the rail.

With this new formulation the optimum transverse position is computed in a way that the faster solution is obtained. In addition, the CW windage is computed with DEFAULT CW removing all the negative effects of CW increase. With the above amendment there are no cases where the increase in CW generated a decrease in terms of handicap (like it was happening in the J70)

The ITC will support the introduction of this new formulation in the 2019 VPP.

6.6 Default RM removal check

For the sake of removing all adjustment in the VPP, the Committee tested the complete removal of the averaged righting moment with default RM. The test has been done comparing the results with the IMS 2005 VPP that was the last version without default RM average, testing a variation of +/-10% on the RM.

The same test has been done comparing this with the 2018 VPP. The results are showing that the effect of stability decrease is similar to that in 2005 VPP when the boats were optimized reducing stability, hence the Committee will keep this item in the 2019 agenda without removing the Default RM.

6.7 Foils assessment in VPP

ORC programmer Davide Battistin completed the code for the more complex foils the ITC has suggested to include in the lifting surface as input (to be studied how to describe in the off/dxt file). Davide commented that RR is difficult to compute when going fast and with very high reduction of DSPL. Andy suggested (to avoid to compute RR out of our VPP ranges for Fn) that below 75% of original DSPL the RR should be computed as ratio of DSPL/DSPL0.

ITC decided that this item is not urgent to complete. It was discussed that the coding will be completed and tested just in case some boats will show up and will want to be rated, otherwise we will wait until 2019 to include it in the VPP with further testing and tuning.

Andy Claughton and Antoine Cardin will make some homework to further tune the current code. A Figaro3 shape prepared by Antoine will be used to test the code, testing it and keeping it in standby until some foils for the boat will show up to be measured.

7. Data acquisition status

Rob Ranzenbach made an update of current situation of Database. The following boats are currently loaded into ORC database for VPP comparison (all boats have been processed and analysed by KND to check if the data is suitable)

- TP52- 4 boats in KND database
- Farr40- Plenty (owner supplied data logs)
- M32- 2 boats in KND database
- Wally 94- Magic Blue (owner supplied data logs?)
- Ker 46- Lady Mariposa (owner supplied data logs)
- JV72- Momo (owner supplied data logs?)
- Swan 42- Selene (owner supplied data logs)
- X37- Hansen (owner supplied data logs)
- Swan 45- Elena Nova (navigator supplied polar transformed to 10 M)
- GP 42- Silva Neo (navigator supplied polar transformed to 10 M)

The following boats have been providing data but some of them have been discarded or need some further work from KND:

- Dufour 40 Performance- Flying Dolphin (owner supplied data logs, KND but expressed some concern about data quality)
- Italia 9.98 Low Noise: Polar provided by Matteo Polli, but KND expressed some concern about data quality
- Cookson 50 Mascalzone: Polar provided by navigator, but KND but expressed some concern about data quality
- Swan 601- Flow Polar provided by KND but expressed some concern about data quality (Thanks Nicola)
- Beneteau 36.7 jib: Owner to send test results for evaluation by KND before providing entire set of data logs (Thanks Jim Schmicker)
- Beneteau 36.7 genoa: Owner to send test results for evaluation by KND before providing entire set of data logs

ITC will continue to collect data logs during 2019 and invites all owners to cooperate for improving this important tool.

8. NYYC research

Rob Ranzenbach reported about the research made by NYYC on the comparison of 4 handicap systems (ORC, ORR, IRC, PHRF) with some speed test on real boats. A PDF illustrating the research was shown after the entire Committee signed a NDA as requested by NYYC. A discussion followed, and ITC will be pleased to cooperate with members of NYYC committee to complete and update the project.

9. Default RM regression for CLUB certificates

A new regression for the default RM for non-inclined CLUB boats proposed by Antoine Cardin has been tested and results in a better fit the measured RM and not unfavoring small boats as the previous one. The ITC support its introduction in the VPP for Club boats but only when the default RM will no longer be used for ORCi certificates to average measured RM.

10. BLRI assessment

Alessandro Nazareth presented a paper with current situation of BLRI against ISO FKR and OSR Appendix 1 (for Moveable Ballast boats). There are some slight modifications to the current BLRI formulation that could increase the similarity with FKR (taking into account that ORC could not include in the calculation of the stability curve the cockpit and coachroof shapes for offset file structures that only describes hull shapes).

This will be coded in the 2019 VPP.

11. SYRF-ITC collaboration projects

SYRF sent a proposal of research cooperation to ITC before the meeting. During the meeting there was a long telephone call with Larry Rosenfeld and McKenzie Wilson about areas of possible cooperation. The projects they listed were:

- H0
- DATA BASE. This is a data base of rough logs, not post-processed as the ORC database that has been analysed, clean and re-defined at 10 m height as per ORC VPP by KND
- PPP
- TRACKER

Before the telephone call the Committee agreed on its intention for asking SYRF to support and fund current ORC research, where Andy Claughton volunteered to write a proposal for their Board. Current ORC research that could be funded includes:

- Foils assessment
- Aero CFD with a better assessment of overlapping jibs
- HYDRO CFD with a better assessment of the rated length
- DATA ACQUISITION

12. Hull Measurement Guide update

This is a work in-progress, as soon as a new video will be ready this will be circulated for comments.

13. Sails Measurement Guide videos update

A revised version of the videos about sails measurement has been showed during the meeting. The Committee strongly supports these kinds of tools that will be very useful for the sailing constituency. Videos of rig and prop measurement will also be prepared in the future.

14. Rhino plug in for deriving offset files update

Davide Battistin informed the Committee about the completion of the plug-in. A video illustrating its functionality was also circulated before the meeting. The ORC staff decided to distribute it with the DVP package and that the Rhino company (McNeel) will be contacted to verify the best possible way of distributing it as an official Rhino plug-in.

15. ORCSY update

Alessandro Nazareth made a quick report of the SY season. One issue coming from the J-Class was that they were easily winning the MYRC. Another possible issue is with light boats. Main amendments to the 2019 ORCSY VPP will be focused on:

- Thick and shallow keel resistance revisions
- Tacking allowance of heavy and low-sail area boats
- Mizzen staysail blanketing factor
- Penalty for non-measured boats revision

The J-Class shape is under inspection as clipping could cause some non-correct evaluation of hull and appendage separation and hence their resistance. Manolo Ruiz de Elvira volunteered to have a look at clipping for wine glass sections boats (like seen in the J-class). A complete analysis of the season is to verify if some further amendments to ORC SY VPP will be needed.

16. Decisions already taken in previous meetings to be recommended to next Congress:

WATER BALLAST

Wording about water ballast will be revised to specify that the movement will be allowed only transversally (no longitudinal shift).

PIPA

Installation with shaft out of centerline will be measured in the plane represented by strut and shaft. 4bladed feathering and solid prop will be included in 2019 with PIPA increased the same amount between 2 and 3 blades.

CONSTRUCTION MATERIALS

Wording was prepared by David Lyons better specifying the meaning of "shell" in ORC rule 101 - 101 a) should be corrected adding shell.

Inclining weights longitudinal position recording

Regarding boom inclining and the difficulty to position the weights in way of LCF the committee suggested to measure longitudinal position of weights to let LPP compute inclining trim and a more accurate RM.

Measurement of square top mainsails revision

Rob Ranzenbach prepared a report on the way the mainsail is measured. The wording about the last battens above HUW will be revised and owners should be alerted about necessity of re-measuring their sails.

Measurement of Mizzen Staysail revision

Rob prepared a report on the mizzen staysail. The previous definition of different edges/corners (leech/foot/luff and tack/clew/head) will be revised to be consistent with how the sail is declared by the owner to be flown and owners should be alerted about necessity of re-measuring their sails.

17. 2019 VPP. Preparation of an "all effects" test run and a beta VPP for immediate release

An all-effects test run has been prepared after the meeting with the following features:

- ASYMMETRIC SPINNAKERS WITH OR WITHOUT POLE
- Funsteady function revision with D/L term removal
- Added resistance in waves upgrade (base gyradius and mast gyradius adjustment at 50% of current value)
- CW transversal position optimization with default CW windage

A corresponding beta VPP has been prepared and the ITC suggests its distribution to RO and DVP users for debugging. The test run showed correct variations in handicaps for the various kinds of boats. An overall effect in GPH variations is represented by the following plot:



The ORCi world fleet's GPH is changing in the range of +/-0.5% in its majority, the single WL handicap variations showed a similar variation, without any significant trend (L, LVR etc.).

The rescoring of major championships did not show any large re-shuffling of results.

18. Completion of recommendations to the Congress

- ASYMMETRIC SPINNAKERS WITH OR WITHOUT POLE
- Funsteady function revision with D/L term removal
- Added resistance in waves upgrade (base gyradius and mast gyradius adjustment at 50% of its value)
- CW transversal position sensitivity adjustment with default CW for windage calculations
- PIPA revision off CL stocks, 4 bladed feathering propellers
- Construction materials limits revision of wording
- Inclining weights longitudinal position recording
- Measurement of square top mainsails clarification
- Measurement of Mizzen Staysail clarification
- BLRI revision
- WATER BALLAST CLARIFICATION

19. ORC Research Fund budget planning for 2019

The committee discussed possible research projects that could be funded for 2019 and decided that the funding will be covering the project currently in progress with the possibility to hire a PhD or MS student that could work, in close conjunction with Jason Ker, on the post-processing of the CFD projects already in progress (the CFD work will be supervised by Andy Claughton and Jason Ker):

- Aero CFD research completion (see 5.1)
- Hydro CFD research follow up and completion (see 6.1)
- Data Analysis with more data log acquisition (see 7.)

In addition, for a medium-term research a joint cooperation with SYRF will be possibly established (see par. 11). The Chairman will discuss research funding with the Management Committee in Sarasota.

20. Strategic planning for work after this meeting - Main projects for 2019

Looking at items already in the agenda and other items coming from submissions deferred to next year, this is the preliminary work agenda for 2019:

- Aero CFD
- Hydro CFD
- Foils
- Default RM
- Liftshare function
- Added resistance and Mast gyradius adjustment
- Default RM removal
- Keels frictional resistance revision
- Revision of all the unsteady effect in VPP
- Revision of sails coefficients to improve spinnaker-headsail cross-overs

with DATA ACQUISITION as a fundamental tool to be expanded.

21. Next meetings scheduling

Next meeting will be held in Annapolis (USA) on the 17th-18th of March 2019, the day after the CSYS.

22. Any other business

The enclosed shaft was discussed (see picture) It was suggested to check the clipping to let the LPP considering the box enclosing the shaft as part of the hull and not as an appendage. Discussions about the prop noted that multi-blade folding propellers are huge and the diameter of folded propeller is always larger than the hub diameter. It was decided to suggest to the Measurement Committee to take into account that for folding multi-blade propellers the max dimension of the hub and folded blades diameter will be taken as PHD.



John Victorin from Germany was bringing to the attention of the committee four different items:

- Appendage viscous drag
- Leeway effect on sail forces
- Wind gradient
- Wind weighed sail center of effort

The Committee discussed the above proposals and decided that next year the revision of viscous drag will be included into the agenda, while it was discovered that there is some inconsistency between the wind gradient used in the VPP (very close to what Victorin was proposing) and the VPP documentation (not so correct).

Not having any other items to discuss the meeting was adjourned at 18.00