Offshore Special Regulations 3.04 Working Party Report

Submitted by

Dan Nowlan (Chair), Andy Claughton and Richard Hinterhoeller

Stability Working Party Terms of Reference

1. To review the requirements of The World Sailing Offshore Regulations section **3.04. Stability – Monohulls** with the objective of improving offshore safety.
2. To study the implications of any changes to the regulations on existing fleets and events around the world.
3. If deemed beneficial, draft a Submission for potential changes to the OSR and present to the Chair of the Oceanic and Offshore Committee and Special Regulations Sub Committee by 01 September 2024.
4. To provide a written report on the findings including the implications of any suggested changes before 01 September 2024 to be circulated with the Special Regulations Sub-Committee and the Oceanic and Offshore Committee.

Observations

1. Offshore Special Regulations 3.04 offer too many ways to meet safety criteria. E.g. boats in Category 0 and 1 events may meet either ISO 12217-2 or ORC Stability Index. Boats in Category 2 and 3 events may meet either of those methods or SSS.
    a. Since each method uses different calculation procedures, the "safe' criteria do not always align.
    b. This misalignment permits a boat to choose a screening system which permits it to race when other systems would deny its entry.
2. ISO 12217-2 (hence ISO), consisting of minimum STIX, AVS and m*A_{GZ}, is the only international standard:
    a. Permitting an alternative system that is less strict than ISO shouldn't be permitted.
    b. ISO became effective in the European Community on 15 June 1998.
    c. Boats with a series date preceding 15 June 1998 need the ability to be judged by a method other than ISO,
3. Stability measurements (hydrostatic and inclination measurements) and displacement:
    a. Category 1 races such as Newport Bermuda Race, Transpacific Yacht Race, Sydney Hobart Race and Vic Maui require each boat to have measurements, not designer calculations.
    b. Boats are sometimes modified to the detriment of their stability.
    c. In-water measurements have discovered instances where there's a discrepancy between the designer's/builder's declaration and the actual boat.

   d. In the UK, under the Maritime and Coastguard Agency rules, no stability regulation for commercially operated vessels carrying paying passengers, from a cruise ship to a 30' charter yacht can be signed off without an inclining test[1].

4. Acceptance of ISO:
   a. There appears to be good acceptance of ISO for OSR categories 3 and 2 especially in Europe.
   b. Category 1 races such as Newport Bermuda Race, Transpacific Yacht Race and Sydney Hobart Race use a higher screening standard:
      i. Newport Bermuda Race and Transpacific Yacht Race require boats to meet the ORR (same as ORC) Stability Index. Whereas ISO would permit a minimum Angle of Vanishing Stability (AVS) of 100°, The ORC method can be shown to require a somewhat higher minimum value (over 105° for large, heavy boats to over 115° for smaller, lighter boats)[2].
      ii. Australian Sailing requires a higher STIX (35 vs the ISO value of 32).
5. OSR 3.04 is difficult for owners and Organizing Authorities to understand.

<u>Recommendations</u>

1. For offshore categories 2 and 3, make no changes.
2. For offshore categories 0 and 1, require the most stringent requirement of ISO 12217-2 or ORC Stability Index.
3. For offshore category 0 and 1, measured displacement and stability shall be used for the ISO and ORC calculations.
4. Make access to ISO, ORC and SSS values easier:
   a. Host a list on the World Sailing website.
   b. ORC has generously offered their database to help populate this list.
   c. Per Jason Smithwick of the RORC Rating Office, pending formal approval from the RORC, they would be pleased to share their ISO 12217-2 and SSS databases with World Sailing.
   d. Dan Nowlan contacted the ORA (owners of the US ORR Rule), and they are willing to share their measured Stability Index database with World Sailing

[1] CODE OF PRACTICE FOR THE CONSTRUCTION, MACHINERY, EQUIPMENT, STABILITY, OPERATION AND EXAMINATION OF SAILING VESSELS, OF UP TO 24 METRES LOAD LINE LENGTH, IN COMMERCIAL USE AND WHICH DO NOT CARRY CARGO OR MORE THAN 12 PASSENGERS.

[2] See Figure 1 below and notes

e. The ORC International Technical Committee is considering adding ISO (STIX, $m*A_{GZ}$ and AVS – initially LPS will be used in lieu of AVS) values to their certificates.

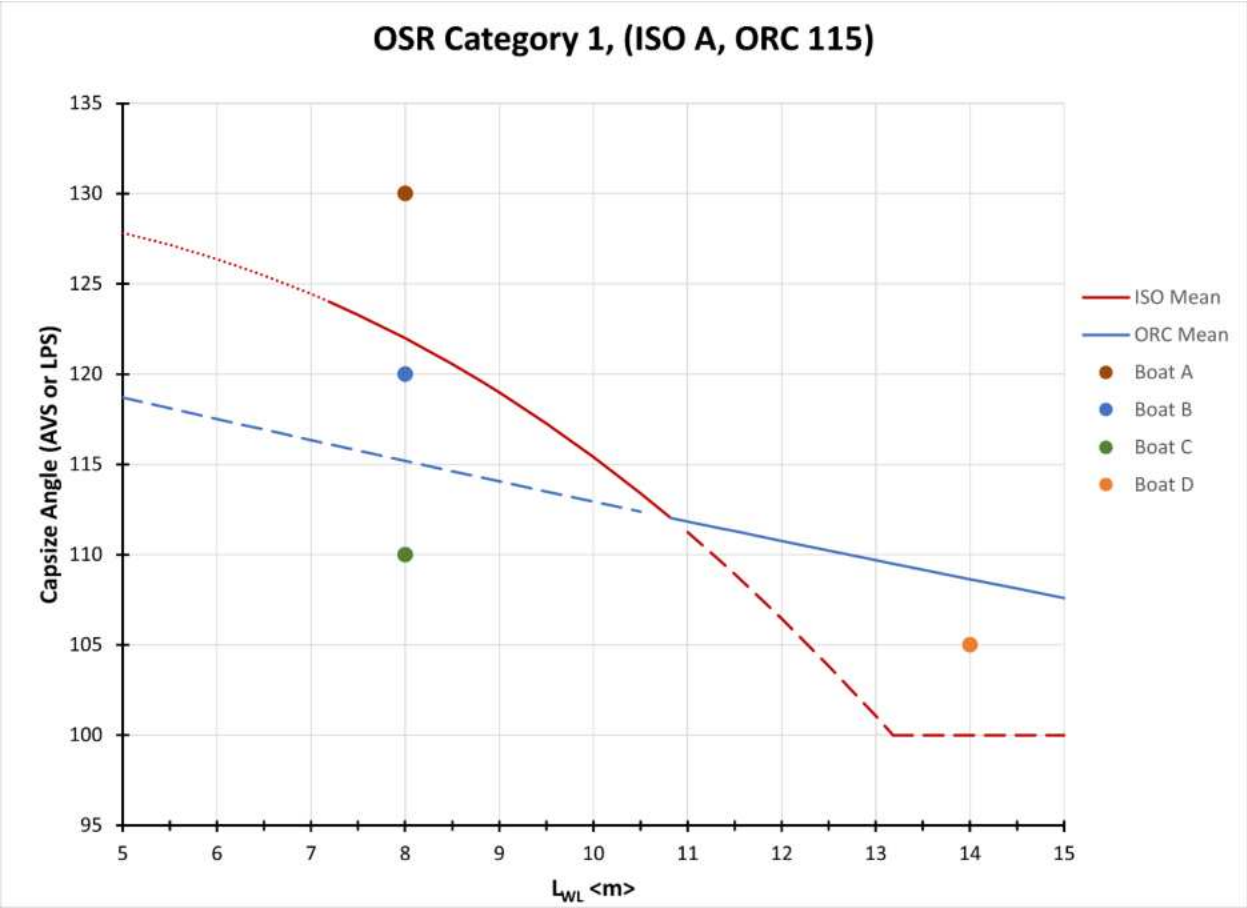
f. The initial focus of the database is to publish stability screening values for category 2 and 3 production boats which precede adoption of ISO 12217-2.

g. As measured displacement and stability ISO 12217-2 data becomes available it will be added to the World Sailing database.

5. After the World Sailing database is operational and is providing a source for measurement-based ISO 12217-2 and ORC Stability Index values, present the Submission based on these recommendations (found in Appendix A) to the Offshore Special Regulations Sub-Committee.

6. The Working Party's thinking is that the next edition of the Offshore Special Regulations is January 2026. The terms of the submission would take effect on January 2027. That gives ample time for Category 0 and 1 event participants to comply.

Figure 1: Simplified Comparison between ISO and ORC



a. The red lines represent minimum Angle of Vanishing Stability (AVS) that an average displacement boat for a given waterline length (L_{WL}) would require to meet ISO 12217-2 (assuming that it meets the STIX requirement).
b. For the same boats, the blue lines represent the minimum Limit of Positive Stability (LPS) in the ORC system (assuming that the Capsize Increment is 1).
c. The proposed regulations would require a boat to meet the higher of the two screening methods (continuous lines).
d. The dashed lines show the minimum values where a boat could meet one screening method, but not both.
e. The red dotted line shows the minimum AVS, but boats in that size range wouldn't meet the minimum righting energy requirement under ISO 12217-2.
f. Examples (only boat A meets the proposed regulation):
    i. Boat A (red dot) exceeds the minimum for ISO and ORC
    ii. Boat B (blue dot) exceeds the ORC minimum but fails to meet ISO.
    iii. Boat C (green dot) fails both ISO and ORC.
    iv. Boat D (orange dot) exceeds the ISO minimum but fails to meet ORC.

Appendix A – Draft Submission

Purpose or Objective

(See the report)

Proposal

Summary of changes to Offshore Special Regulations 3.04:

1. For offshore categories 2 and 3, make no changes.
2. For offshore categories 0 and 1, require the most stringent requirement of ISO 12217-2 or ORC Stability Index.
3. For offshore category 0 and 1, measured displacement and stability shall be used for the ISO and ORC calculations.

3.04 Stability – Monohulls

Mo0 — 3.04.1 a) Compliant with ISO 12217-2[a] design category A and having a minimum Stability Index in the ORC rating system of 120[b]. Starting in 2027, this compliance shall be confirmed by having the actual displacement measured and by an inclination test.

Mo1 — b) Compliant with ISO 12217-2[a] design category A and having a minimum Stability Index in the ORC rating system of 115[b]. Starting in 2027, this compliance shall be confirmed by having the actual displacement measured and by an inclination test.

Mo~~2~~ — c) Compliant with ISO 12217-2[a] design category A.

Mo3 — d) Compliant with ISO 12217-2[a] design category B or higher.

Mo0,1,2,3 — [a] This can be demonstrated either by EC Recreational Craft Directive certification having obtained the CE mark or by the designer's declaration. The latest effective version of ISO 12217-2 should be used unless the boat was already designed to a previous version.

Mo0,1 — [b] This can be demonstrated either by a valid ORC international rating certificate or by the designer's declaration.

Mo0,1,2,3 — 3.04.2 Where compliance in accordance with OSR 3.04.1 cannot be demonstrated, a boat shall be able to demonstrate either:

Mo0,1,2,3 — **Table 2 – STIX, AVS, m*A_{GZ} and ORC Requirements**

Mo0,1,2,3 — a)

Race Category	0	1	2	3
minimum Stability Index in the ORC rating system	120	115		
minimum ISO 12217-2 Stability Index (STIX)	32			23
minimum ISO 12217-2 Angle of Vanishing Stability (AVS)	130-0.002*m			130-0.005*m
but AVS always >=	100°			95°

a minimum righting energy m*A_{GZ} (where A_{GZ} is the positive area under the righting lever curve in the minimum operating condition, expressed in kg metre degrees from upright to AVS)	172000	57000

Mo0,1,2,3 or

Mo0,1,2,3 **Table 3 – ORC Stability Index or SSS Requirements**

Mo0,1,2,3 b)

Race Category	0	1	2	3
minimum Stability Index in ORC Rating System, or			110	103
minimum IRC Safety and Stability Screening numeral (SSS) Base value			28	15
SSS may only be used if the series date is before			1995	2000

Mo0 3.04.3 A boat shall be capable of self-righting from an inverted position with or without reasonable intervention from the crew and independent of the condition of the rig.

Current Position

The current position shows the original including changes

3.04 Stability – Monohulls

Mo0 3.04.1 a) Compliant with ISO 12217-2~~*~~[a] design category A **and having a minimum Stability Index in the ORC rating system of 120[b]. Starting in 2027, this compliance shall be confirmed by having the actual displacement measured and by an inclination test.**

Mo1 b) Compliant with ISO 12217-2~~*~~[a] design category A **and having a minimum Stability Index in the ORC rating system of 115[b]. Starting in 2027, this compliance shall be confirmed by having the actual displacement measured and by an inclination test.**

Mo~~0,1,2~~ ~~a)~~c) ~~Able to demonstrate c~~**C**ompliant~~ce~~ with ISO 12217-2~~*~~[a] design category A~~ or higher either by EC Recreational Craft Directive certification having obtained the CE mark or by the designer's declaration~~.

Mo3 ~~b)~~d) ~~Able to demonstrate c~~**C**ompliant~~ce~~ with ISO 12217-2~~*~~[a] design category B or higher~~ either by EC Recreational Craft Directive certification having obtained the CE mark or by the designer's declaration~~.

Mo0,1,2,3 ~~*~~[a] **This can be demonstrated either by EC Recreational Craft Directive certification having obtained the CE mark or by the designer's declaration.** The latest effective version of ISO 12217-2 should be used unless the boat was already designed to a previous version.

Mo0,1 [b] **This can be demonstrated either by a valid ORC international rating certificate or by the designer's declaration.**

Appendix A – Draft Submission

Mo0,1,2,3 3.04.2 Where compliance in accordance with OSR 3.04.1 cannot be demonstrated, a boat shall be able to demonstrate either:

Mo0,1,2,3 **Table 2 – STIX, AVS, ~~and~~ m*A_{GZ} and ORC Requirements**

Mo0,1,2,3 a)

Race Category	0	1	2	3
minimum Stability Index in the ORC rating system	**120**	**115**		
minimum ISO 12217-2 Stability Index (STIX)	32			23
minimum ISO 12217-2 Angle of Vanishing Stability (AVS)	130-0.002*m			130-0.005*m
but AVS always >=	100°			95°
a minimum righting energy m*A_{GZ} (where A_{GZ} is the positive area under the righting lever curve in the minimum operating condition, expressed in kg metre degrees from upright to AVS)	172000			57000

Mo0,1,2,3 or

Mo0,1,2,3 **Table 3 – ORC Stability Index or SSS Requirements**

Mo0,1,2,3 b)

Race Category	0	1	2	3
minimum Stability Index in ORC Rating System, or	~~120~~	~~115~~	110	103
minimum IRC Safety and Stability Screening numeral (SSS) Base value			28	15
SSS may only be used if the series date is before			1995	2000

Mo0 3.04.3 A boat shall be capable of self-righting from an inverted position with or without reasonable intervention from the crew and independent of the condition of the rig.

Reasons

(See the report)