

Submission: **SR22-11**

Offshore Special Regulations - Appendix K

Limitations on Moveable and Variable Ballast

A joint submission from the IRC and RYA

Purpose or Objective

OSRs require boats with moveable or variable ballast to assess their stability using ISO 12217-2 and also to comply with OSR Appendix K.

Appendix K specifies boat condition for the calculation of stability and makes a number of detail changes to ISO 12217-2. It then imposes minima for Knockdown Recovery Factor and for Inversion Recovery Factor. There are however no general limitations on the amount of moveable or variable ballast that a boat may carry.

During 2011, a boat with moveable ballast (a canting keel) has been launched with Static Heel Angle (SHA - the angle to which the boat will heel with the keel fully canted) of 95 degrees. ie, the masthead will be in the water. A second similar design is known to be in build. It is considered possible that boats of this nature, if not perhaps as extreme as this example, could comply with ISO 12217-2 and OSR Appendix K for Category 4 and possible Category 3 races.

Quite apart from purely practical considerations relating to boats around her while racing (which are not relevant to OSRs), this is considered to be an undesirable avenue of development from a safety perspective.

For example, the higher SHA is, the closer to maximum righting moment the boat will be when sailing at a normal angle of heel. Additional heel caused by a gust of wind or waves could then heel the boat past the maximum point resulting in reducing righting moment with increasing heel and a capsize. A parallel is a dinghy capsizing. Further, the position of the keel will then be analogous to a dinghy crew hanging on the weather side of a capsized dinghy inevitably resulting in complete inversion.

A second concern is a boat caught aback. This is bad enough for a conventional keel boat and worse for a boat with moveable or variable ballast. Extremes of moveable or variable ballast will result in an untenable situation for a crew.

A third concern relates to a boat with very high SHA sailing to windward that eases sails to bear away behind a right of way boat or other obstruction, or to round a mark. If the keel angle is not reduced, the boat could capsize to windward.

It is proposed therefore that a limit to Static Heel Angle of 35 degrees should be introduced. Apart from the two examples above, research suggests that there are probably no more than 3 boats worldwide which might require modification to comply with this restriction. If no limit is introduced, this number will inevitably increase.

Proposal

Insert new 3.04.08:

3.04.08 A boat fitted with moveable and/or variable ballast shall have a maximum static heel angle in the condition of Minimum Operating Mass (see ISO 12217-2) with moveable ballast moved fully to one side and variable ballast in the condition that produces maximum angle of heel of not greater than 35 degrees.

Current Position

None

Reason

1. To prevent an undesirable avenue of development.