RS700 Righting Moment and Weight Equalisation - No Change

Introduction

1. The 2015 RS700 Sailor Survey suggested that 66% of the Class is content with the current Righting Moment and Weight Equalisation System, so in order to provide a balanced argument, this paper puts forward a case for no change to the current system.

2. It is evident that the call to amend the class rules regarding the weight equalisation system is largely based upon the fact that light sailors see heavier sailors going faster than them upwind and heavier sailors have dominated many of the recent events. This is understandable, but is underpinned by the assumption that the heavier sailor is getting an overall unfair advantage and their eventual finishing position is not consistent with their skill level.

3. The proposal for a change to the current system puts forward a logical argument, but it is based solely on the mathematical leverage calculation. There are however many other real life factors that have a compensating effect on performance across all points of sailing and all wind conditions:

a. **Light-wind Performance**. Although this is glossed over in the change proposal, the advantage is distinctively with the lighter sailor in marginal to full trapezing conditions (for the lighter sailor). In these conditions the heavier sailors additional all up weight means they plane later and slower, as well as sailing lower than their lighter counterparts upwind as they search for power. The upwind advantage only swings to the heavier sailor at the onset of the lighter sailor having to spill wind / luff.

b. **Downwind Performance**. The RS700 is relatively underpowered downwind and lighter sailors sail faster and deeper in all wind strengths below a 'solid F4' (the point at which a heavier sailor can fully commit to the trapeze). Above a 'solid F4' there is little difference in VMG, but the skill of the sailor in the gybes is by far the biggest factor. Additionally, with lighter sailors able to sail faster and deeper, they invariably get the right-of-way and dominate downwind encounters with associated positional gains.

c. **Holding the lane**. As heavier sailors are unable to sail as high as their lighter counterparts they invariably struggle to 'hold the lane' off the start-line and are more likely to get 'swamped' beneath other boats and driven down the pack.

d. **Weighing in**. While the current system compensates for 66% of the *difference* between a heavy sailor and light sailor at weigh in, there is little difference between the weight of the 2 sailors sailing gear. On the water, the effect of near identical sailing gear weight suspected from hole 8 rather than hole 1 gives means that the effective leverage compensation is already greater than quoted 66%.

Evidence for No Change

4. Aside from the visibly obvious arguments that heavier sailors go faster upwind than lighter sailors (in 'powered-up' conditions), and that many of the recent podium positions have been won by heavier sailors, there has been no evidence provided to support the claim that the system is broken. In order to investigate this matter the Chairman attempted analyse results from previous open meetings and nationals to see whether there was a trend of heavy sailors gaining unfair advantage. In order to do this he needed to know the approximate weight of the competitors, the relative wind strength and their finishing positions. Whilst planning to do the study over a number of events, the only recent event which could adequately support the study was the 2014 Nationals (due the range of wind strengths recorded across the event).

5. The analysis spreadsheet is attached and breaks down the results into 3 groups of sailors: Heavy Sailors (above equalisation), Equalised Sailors and Light Sailors. It also examined the wind conditions across the event and put them into 3 wind ranges: <8kts, 8 - 12kts, >12kts. Each sailor's results were averaged in each of the 3 wind ranges. I.e. Richard Wadsworth had an average result of 4.25th in >12kts, 8th in 8 – 12kts, and 7th in <8kts. The Positional Variance of each sailor was then calculated as the difference between his best and worst results across the 3 wind ranges. In this example, Richard Wadsworth has a Positional Variance of 3.75 places (i.e. 8 – 4.25). The Positional Variances for each group (heavy, medium and light) were then averaged to see if the Heavy Sailors had a pattern of high variance across the wind range, which could highlight any unfair advantage. The averaged results of the 3 groups of sailors indicated the following:

a. **Heavy Sailors.** Average Positional Variance = **2.35**
b. **Medium Sailors**. Average Positional Variance = **3.4**
c. **Light Sailors**. Average Positional Variance = **4**

6. This indicates that rather than the Heavier Sailors having an unfair advantage in stronger winds they have the most consistent results across the whole wind range. On the whole it suggests that the weight equalisation system works well (in tandem with the aforementioned compensating factors), and if there were any areas to improve it would not be done at the Heavy Sailor end of the spectrum. It has to be noted that the Chairman was working from personal knowledge of the sailor's weights rather than the actual weight chart, but it is unlikely that any minor errors would significantly change the outcome.

Disadvantages of Adopting the Latest Proposal

7. **Weight**. The results of the 2015 RS700 Sailor Survey showed that the Class had an average sailor weight of 82.5Kgs with half the fleet weighing 80Kgs or less. The new proposal has the lowest weight boundary set at 79Kgs, which could result in nearly half of the Fleet sailing with the maximum 12Kgs of weight in the boat. With the requirement to add lead frequently cited as one of the biggest 'turn offs' to potential new sailors; adding more lead to our 'high performance skiff' will not help recruitment (especially amongst younger sailors).

8. **Hole Zero**. The boat was not designed to be sailed with a 'hole zero' and a consequence of adopting this change is that it will be extremely difficult for sailors to get their heel onto the gunwale with the increased angle between the top of the rack and the gunwale. The RS800 has a moulding in the deck to address this but, the RS700 doesn't. This will mean that 'hole zero' sailors will have to overly bend knees and be more likely to lose their footing when trying to stand on the gunwale. This will be a highly awkward and un-ergonomic position that will have to be endured in marginal trapezing conditions and during any manoeuvre. The drilling of a 'hole zero' would additionally require close supervision and measurement at events with potential for confusion, mistakes and disappointment across the class.

9. **One Design Class**. The RS700 is a one design class and sailors buy the boat with full knowledge of the weight equalisation system; if this doesn't suit them they will probably buy into a different class. Across all dinghy classes, the majority of class rules changes are designed to either improve the performance or 'sailability' of the boat, which generally welcomed by all sailors in the Class. However, this proposal for change penalises the majority of sailors with more lead weights and penalises the heavier sailor with a rack width reduction. Noting that the Musto Skiff is sailed with no lead and wider racks (for the heavier sailors), many RS700 sailors may not have chosen to buy an RS700 if they knew they would be sailing in this configuration. It is the UK Chairman's view that any class rule change should be designed to speed up the boat and make it more attractive, not designed to slow groups of sailors within it down. The prospect of one group of sailors within the class voting in a change that would negatively affect other another group of sailors is highly divisive.

Summary

10. The 2015 season has seen some great racing, with race wins going to <79Kg sailors and >100Kg sailors in the same wind conditions. While we all like to search for reasons as to why we didn't do as well as we'd hoped, the existing weight equalisation system does work well, and the fact that Jerry Wales can consistently dominate sailors 15Kgs heavier than him upwind in overpowered conditions confirms that skill is the prevailing factor. The 2016 season has the potential for some great racing and big turnouts with the Europeans championships at Garda and the National Championships at Hayling Island. The RS700 is a great boat just the way it is and we should focus on getting out on the water and enjoying the close racing that the existing weight equalisation system gives us.

HelmName	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	Total	Nett	12kt+ Average	8-12kts Average	8kt- Average	Variance
Jerry Wales	1	1	1	-2	2	1	1	(22.0 RET)	2	1	34	10	1.33	1.25	1.5	**0.25**
Neil Ashby	-6	4	4	-7	1	4	3	2	1	6	38	25	3.25	4.5	3.5	**1.25**
David Smithwhite	-7	-5	5	1	5	2	5	5	3	2	40	28	5.5	3.25	2.5	**3**
Robbie Bell	5	(22.0 RET)	7	3	7	3	4	1	4	-10	66	34	4.33	4.25	7	**2.75**
Richard Wadsworth	3	8	-10	-10	3	6	6	3	10	5	64	44	4.25	8	7.5	**3.75**
Simon Letten	4	6	3	6	4	7	(22.0 RET)	11	14	-15	92	55	6.25	11.3	14.5	**8.25**
Colin Dacey	10	7	-13	-12	6	5	2	9	5	12	81	56	8	8	8.5	**0.5**
Ian Swann	-12	9	2	8	9	9	-11	10	7	4	81	58	10	7.5	5.5	**4.5**
Gary Austin	9	(22.0 RET)	6	5	12	-13	8	6	8	7	96	61	9	8	7.5	**1.5**
Alex Reid	11	2	8	9	-13	8	10	4	12	-13	90	64	7.5	8.75	12.5	**5**
Spod Olive	8	10	-12	11	-17	12	7	8	6	3	94	65	10.75	10.5	4.5	
Jakub Kosvica	-14	11	9	13	11	11	14	(22.0 RET)	13	8	126	90	12	11.75	10.5	**1.5**
James Bayliss	(22.0 DNF)	(22.0 DNC)	14	15	14	10	12	7	11	11	138	94	10.5	12.75	11	**2.25**
Richard Kennedy	13	(22.0 RET)	11	14	15	17	9	(22.0 RET)	9	9	141	97	14	12.75	9	**5**
Ian Nolan	2	3	15	4	8	(22.0 DNC)	(22.0 DNC)	22.0 DNC	22.0 DNC	22.0 DNC	142	98	4.33	9.5		**4.17**
Graham Blake	15	12	16	-17	10	-18	16	12	16	16	148	113	12.25	16.75	16	**3.75**
Hamish Griffiths	(22.0 DNF)	(22.0 DNC)	21	18	16	14	15	14	17	17	176	132	15	17	17	**2**
Martin Cyan	17	(22.0 DNC)	18	20	21	15	13	(22.0 RET)	15	14	177	133	19	16.5	14.5	**3.5**
James Fuller	(22.0 DNC)	13	20	19	19	16	17	13	(22.0 DNC)	22.0 DNC	183	139	15	18	n/a	**3**
Adrian Howe	16	14	19	(22.0 RET)	20	19	18	(22.0 RET)	22.0 RET	22.0 DNC	194	150	16.66	18.66		**2**
Stephen Hermanson	(22.0 DNF)	(22.0 RET)	17	16	18	22.0 RET	22.0 DNC	22.0 DNC	22.0 DNC	22.0 DNC	205	161	18	16.5		**1.5**

	Average Variance	Average Position
Above Equalised	2.35 places	7.2
Equalised	3.375 places	9.8
Under Equalised / Light	4 places	7.8