

To: LKSC Racers  
From: LKSC Race Committee  
RE: Races with two wave starts

As you know we have a wide variety of boats in our club, with a broad range of intrinsic boat speeds. Table 1 shows the current roster of boats in the club and their intrinsic boat speeds as determined using the Portsmouth rating system of the US Sailing Association (cf <http://www.ussailing.org/portsmouth/>). Dave Lewis has tabulated these ratings for us. The important number is the D-PN, which is shown as an overall value and also as a function of wind speed. The list is rank ordered from fastest to slowest boats based on the overall D-PN. As expected, the catamarans and scows are the fastest boats while many keel boats and some older designs are the slowest. The idea of the Portsmouth rating system is to provide corrected finishing times so that one can compare sailing performance between racers in boats of widely different intrinsic speeds. However, we think that these ratings can also be used to make our fun races more fun for everyone.

All of us have noted that sailors in the slower boats have sailed reasonably well in our races, but still have finished 5 minutes or more behind the winner of the race and sometimes the faster boats have left for home long before the slowest boats even finish. To try to improve this situation, and to make the race more fun for the slower boats, we will hold races with two wave starts; that is, we will start a group of the slowest boats 6 minutes ahead of the group of faster boats. These groupings are listed in the tables as Group A (faster) and Group B (slower). We think that it will be more fun for the slower boats to be involved throughout the race and more interesting for the faster boats to have to catch the slower boats in order to win. Table 2 provides an estimate of how much Group A should be delayed depending on the length of the race and the median D-PN values of each group. Note that for races where group A will finish in about 40-50 minutes, a Group A delay time of 6 minutes is a good choice. Thus unless the race is very unusual, the Committee Boat Official should use a 6 minute delay for Group A.

Have a look at Table 1 to see whether you are in Group A or Group B. With this information, you know which group to join for the start. If there are enough boats in one class (e.g., Lasers), they may wish to compete within that class; this is possible using the two wave start because all boats in one class are in the same Group. The presence of other boats in the same group should not affect the class competition.

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Table 1 Portsmouth Ratings of Intinsic Boat Speed (cf <a href="http://www.ussailing.org/portsmouth/">http://www.ussailing.org/portsmouth/</a> )								D-PN at different wind speeds			
Sail Number	Boat Name	Boat Type	Skipper	Hull Color	Spinnaker Color	USSA Code	Overall D-PN	Beaufort Range			
								0 - 1 0-4 mph	2 - 3 4-12 mph	4 12-19 mph	5 19-25 mph
***** GROUP A *****											
5329	Blew By You	Hobie 18	Alan Carlson	Blue		H18	71.5	77	73.6	69.7	66.8
2817		Hobie 18	Jon Gray	Yellow		H18	71.5	77	73.6	69.7	66.8
MS7	Red Fish Blue Fish	C Scow	Steve Grant	White		C-SC	79.2	81.4	80.1	78.0	77.6
C-SC-BW		C Scow	Brad Wagner	White		C-SC	79.2	81.4	80.1	78.0	80
426		Inland 20 Scow	Dan Zarnstorff	Green	Aqua/Red	I20-SC	84	88.7	85.2	81	81.8
US-1447		470	Jim Campbell	White	Yellow/Black	470	86.5	91.4	88.3	84.8	82.4
US-1393		470	Preston Northcutt	White	Rainbow	470	86.5	91.4	88.3	84.8	82.4
US5016		Mistral Sailboard	Clyde Fuhrmeister	White		SB-2B/C	86.7	84.4	87.3	0	0
H	Makani	Holder 20	Dave Lewis	White	Black/White	HLR20	86.8	89.4	88.5	85.5	85.8
2828	One More	Buccaneer 18 (SWN18)	Karen Carlson	Blue		BCN	87.1	89.1	87.0	86.5	85.8
961		Buccaneer 18	Rob Sherman	Blue		BCN	87.1	89.1	87	86.5	86.2
156	Smooth Operator	S2 6.7	Dennis Smith	White		S2-6.7	87.8	90.2	88.3	86.5	82
2119		MC Scow (1 or 2 crew)	Bob Janoski	White		MC-SC	88.3	89.8	87.9	87.0	87.6
2084	Lucky Strike	MC Scow (1 or 2 crew)	Nancy Lee	White		MC-SC	88.3	89.8	87.9	87.0	88.4
2293		MC Scow (1 or 2 crew)	Jack Raufman	White		MC-SC	88.3	89.8	87.9	87.0	88.4
INT-CF		Interlake	Clyde Fuhrmeister	White		INT	89.5	92.3	90.1	89.0	88.4
US5016B		Mistral Sailboard	Clyde Fuhrmeister	White		SB-2B	89.7	96.3	92.6	83.8	88.4
2981		Flying Scot	Ken Johnson	Orange	Aqua/Pink	FSCT	90.2	92.2	91.5	89.4	88.4
2190		Flying Scot (19')	Dan Zarnstorff	Orange		FSCT	90.2	92.2	91.5	89.4	87.6
MXRAY-BW		MX Ray	Brad Wagner	White		MXRAY	90.5		90.7		
73224		Laser	Karen Carlson	Yellow		LASE	91.3	93.8	92.2	91.2	88.4
LASE-AC		Laser	Alan Carlson	Red		LASE	91.3	93.8	92.2	91.2	88.4
145234		Laser	Geoff Sobering	White		LASE	91.3	93.8	92.2	91.2	88.4
103398		Laser	Brad Wagner	Yellow		LASE	91.3	93.8	92.2	91.2	88.4
LASE-BW		Laser	Brad Wagner	Orange		LASE	91.3	93.8	92.2	91.2	88.4
***** GROUP B *****											
HWAV-BA		Hobie Wave	Bob Arndt			HWAV	92.5	98.0	93.4	90.4	90.6
MCG26-KH	Red Wine	MacGregor 26	Ken Hagmann			MCG26	92.6	95.8	92.8	92.2	0
BNSH		Banshee	Jim Campbell	White		BNSH	93.5	96.1	94.5	92.5	92
h235	Another One	Hunter 23.5	Brad Wagner	White		HTR235	94.1	95.2	94	93.3	95.3
P23	Stern Warning	Precision 23	Mike Conner	White		PRS23	95.9	98	97.3	95.2	0
15462		Catalina 22	Harmon Ray	White		CAT22	97.3	100.2	97.2	95.2	0
H17		X-Boat	Alan Carlson	White		X-B	97.7	0	98	96.5	0
O20		O'Day 20	Jon Gray	White		ODY20	101.6	103.5	101.7	0	0
OD		O'Day 20	Jack Raufman	White		ODY20	101.6	103.5	101.7		
ZUM-RS		Zuma	Rob Sherman			ZUM	103.2		103.7		
HDC	lemanja	Designers Choice	Bob Lausch	White	None	DC_*	104.8	104.8	104.8	100.5	0
OS		Ospray (O'Day)	Doug Geske	White		OSPRA	105.7	108.2	106.5	102.8	0

**To correct the time to complete the race to compensate for the fact that some boats are much faster than others even when sailed optimally**

Corrected time to finish race based on intrinsic boat speed is given by the formula:  $Corrected\ Time = Clock\ Time / (D-PN/100)$

Thus if Boat A with a D-PN of 87 finished the race in 55 minutes and boat B with a D-PN of 97 finished the race in 60 minutes, then the corrected times for each boat are

$CT\ for\ boat\ A = 55 / 0.87 = 63.22\ min$
$CT\ for\ Boat\ B = 60 / 0.97 = 61.86\ min$

Thus even though Boat A crossed the finish line 5 minutes ahead of Boat B, Boat B was sailed better based on corrected time.

Estimated Group A median finish time, min	Median D-PN		Group A delay time
	A	B	
30.00	86.00	96.00	3.49
30.00	88.00	96.00	2.73
30.00	90.00	96.00	2.00
30.00	86.00	98.00	4.19
30.00	88.00	98.00	3.41
30.00	90.00	98.00	2.67
45.00	86.00	96.00	5.23
45.00	88.00	96.00	4.09
45.00	90.00	96.00	3.00
45.00	86.00	98.00	6.28
45.00	88.00	98.00	5.11
45.00	90.00	98.00	4.00
60.00	86.00	96.00	6.98
60.00	88.00	96.00	5.45
60.00	90.00	96.00	4.00
60.00	86.00	98.00	8.37
60.00	88.00	98.00	6.82
60.00	90.00	98.00	5.33

Formulae:

1. Estimated Group A median corrected time = Estimated Group A median finish time/(D-PN/100)
2. Assume Group A median corrected time = Group B median corrected time if all boats sailed equally well.
3. Estimated Group B median finish time = Estimated Group B median corrected time\*(D-PN)/100
4. Group A delay time = Estimated Group B median finish time - Estimated Group A median finish time
5. Group A delay time = Estimated Group A finish time \*[(Group B D-PN)/(Group A D-PN)-1]