

Lies, Damned Lies & Statistics

How will the new breed of canoes perform?

There is no clear way of predicting the performance and ease of handling to the proposed change of rules but maybe the following will give some insight.

The table below was initially generated to try and prove whether the Bethwaites had developed a superior design of high performance sailing dinghy.

Columns 1-15 are self explanatory and are based on published data for the respective classes.

Column 19 GYS – (Geoff's Yard Stick) is my prediction of the around course speed equated to the Victorian Yard Stick.

It utilises a well known but very basic formula for predicting the horse power requirements for planing power boats. The formula incorporates weight, sail area (horse power), over all length and a constant.

In this case it has been transposed to give a Yardstick figure closely resembling the VYS.

The formula has a constant representing hull form and as the same constant has been used for all classes, boats of above average efficiency should show up very clearly.

Of the 24 boats with a VYS and assuming a variation of +/- 2 is acceptable, 10 are in range, 10 out perform, 4 under perform. This assumes of course that the VYS has some validity.

Interestingly only one Bethwaite design out performs – that is the 29er.

All other out performers with the exception of the Fireball are development classes.

For the most part they are skiff type classes with considerable up wind and downwind sail area.

The notable exceptions are the Moth and Northbridge Senior. The Northbridge Senior bears some comparison with the IC in that the MG is the spinnaker version and both hulls can be sailed in either class.

The Fireball's apparent performance is an aberration I cannot explain, particularly as I remember consistently beating them with a Cherub in the late 60's. Maybe somebody can enlighten me.

Note both the current IC's and AC's are average performers, probably because the conservative sail area versus righting moment.

So were does this get us.

An IC to the new minimum weight will have a predicted yardstick of 87.4 – 6 points better than the existing IC and the same as Phil in his modified AC.

A skinny IC has the same figure because the formula has not been adjusted for hull form.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	19	20	21
Class	VYS	LOA	Wt.	Helm Wt	Crew Wt	Crew Wt	Total Crew + Hull	D/L	D/L with Crew	Beam	Wing	S.A.	R.M.	RM/SA	GYS	VYS	Diff GYS-VYS
18'	68	5486	65	80	80	80	305	10.97	51.47		4270	32.0	485.6	15.2	72.3	68.0	4.3
49ER	83	4990	61	80	85		226	13.68	50.68	1690	2900	21.2	387.8	18.3	81.8	83.0	-1.2
14'	86.5	4267	61	80	80		221	21.88	79.27	1840	1840	18.6	291.2	15.7	93.4	86.5	6.9
F.D.	92.5	6050	125	80	90		295	15.73	37.12	1700	1700	15.0	225.5	15.0	92.8	92.5	0.3
16'	86	4877	70	80	80	80	310	16.82	74.47	1520	1780	22.0	285.6	13.0	92.4	86.0	6.4
12'	92	3658	45	80	80		205	25.62	116.70	1800	1500	21.0	264.0	12.6	94.5	92.0	2.5
I.C.	94	5180	75	75			150	15.04	30.07	1010	2010	10.0	150.8	15.1	93.6	94.0	-0.4
I.C.Light		5180	50	75			125	10.02	25.06	1010	2010	10.0	150.8	15.1	87.4		
Skinny IC		5180	50	75			125	10.02	25.06	850	2010	10.0	150.8	15.1	87.4		
Skinny IC+		5180	50	75			125	10.02	25.06	850	2110	11.0	158.3	14.4	84.0		
A.C.		5180	75	75			150	15.04	30.07	1010	2010	10.0	150.8	15.1	91.5		
Phil	87	5180	75	80			155	15.04	31.07	1010	2010	12.0	160.8	13.4	86.5	87.0	-0.5
Musto		4550	58	80			138	17.16	40.82	1350	2350	11.5	166.0	14.4	90.6		
RS700		4680	56	80			136	15.22	36.97	1920	2330	12.8	165.2	12.9	85.1		
Bucko		4290	55	80			135	19.41	47.65	1500	2565	11.0	174.6	15.9	94.2		
Sharpie	95	5990	90	80	80	85	335	11.67	43.43	1440	1440	16.5	252.9	15.3	94.2	95.0	-0.8
B14	96.5	4250	64	80	80		224	23.23	81.31	1670	3180	17.2	254.4	14.8	96.5	96.5	0.0
505	97	5050	127	80	80		287	27.48	62.10	1880	1880	16.3	222.4	13.7	97.9	97.0	0.9
29ER	95	4450	75	65	65		205	23.72	64.82	1770	1770	13.2	173.6	13.2	99.7	95.0	4.7
Fireball	101	4900	79	80	80		239	18.71	56.61	1400	1400	11.4	184.0	16.1	104.2	101.0	3.2
470	101	4700	80	80	80		240	21.47	64.41	1600	1600	14.0	200.0	14.3	100.2	101.0	-0.8
MG	106.5	4300	64	80	65		209	22.43	73.25	1830	1830	9.3	191.2	20.6	111.4	106.5	4.9
Tasar	107.5	4420	68	80	60		208	21.94	67.12	1750	1750	11.4	122.5	10.7	107.0	107.5	-0.5
Contender	107.5	4850	80	80			160	19.54	39.08	1500	1500	10.0	132.0	13.2	98.9	107.5	-8.6
NS14	108	4267	64	75	50		189	22.95	67.79	1860	1860	9.3	116.3	12.5	111.6	108.0	3.6
Cherub	106	3657	50	75	75		200	28.49	113.95	1800	1800	11.2	202.5	18.1	111.7	106.0	5.7
Moth	106.5	3353	35	80			115	25.87	85.01	400	2250	8.0	90.0	11.3	112.0	106.5	5.5
Laser	112	4230	59	80			139	21.72	51.17	1420	1420	7.1	56.8	8.0	111.9	112.0	-0.1
Finn	113	4500	105	80			185	32.11	56.57	1510	1510	10.0	132.4	13.2	106.7	113.0	-6.3
Nat.E	113	4600	97	80	75		252	27.77	72.14	1600	1600	12.5	191.5	15.3	105.8	113.0	-7.2
125	123	3830	50	75	65		190	24.80	94.24	1430	1430	9.5	158.6	16.7	112.9	123.0	-10.1

61.82

14.9

Add 2.3%
If No
Spinnaker

	4% plus better than GYS
	Canoe Family
	Good Correlation
	2% plus worse than GYS

Assuming development takes the usual course and based on the Northbridge Senior experience a yardstick of 84 should be possible. This will most likely require hard chine hulls (spray break away) and airfoil rotating rigs and most likely T foil rudders to reduce pitching and nose diving.

Looking at the Righting Moment versus Sail Area an increase to 11 sq m is feasible with an increase of 100 to 150mm in plank length. These increases could end up with an IC at 80.

How will it handle

The table below compares the righting moment – hull only and wetted surface of various hulls including a Musto look alike (MLA).

Note the incredible form stability of the MLA.

The skinny IC is a bit tenderer than the existing IC but with carbon fibre masts and light weight planks is probably comparable to an IC with aluminium mast and heavy plank. Further calculations will be carried out

Note the wetted surfaces in all cases are similar. The difference arises in the ability of spray to break away from the hull surface – either via a chine or high rise in hull cross section curve. In the case of the MLA it probably sticks to the hull increasing resistance.

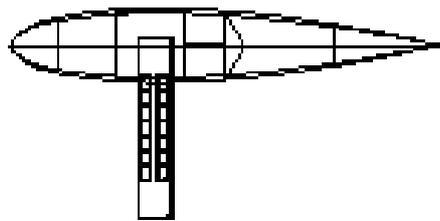
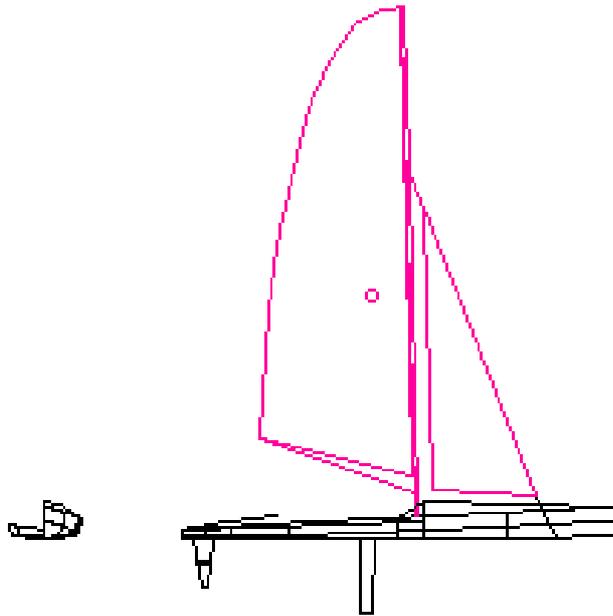
	Wt.	WS 0	WS 5	WS 10	WS 15	RM 5	RM 10	RM 15
MLA	140	3.154	2.944	2.697	2.337	21.014	35.494	45.93
IC	160	3.090	2.806	2.826	2.674	11.166	20.565	28.868
IC Skinny*	120	2.678	2.414	2.496	2.391	7.657	14.132	19.491
A Cat	125	2.684	2.271	2.084	2.079	144	151	151

WS = wetted surface at x angle of heel – sq m

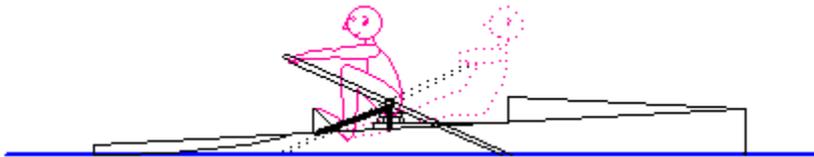
RM= righting moment of hull only at x angle of heel - kgm

* Refer design below

IC Fat Arse



What to do with your old IC



Put on a sliding seat – fore and aft and go for a row.