SCOTT JUTSON YACHT DESIGN PTY.LTD.
A.C.N. 050-329-023
P.O BOX 132 - MANLY - 2095 AUSTRALIA
34 DUDLEY ST.- BALGOWLAH - 2093 - AUSTRALIA
TEL: 61 (02) 948 1512 FAX: 61(02) 948 2392

"KINGS CROSS" IMS MODIFICATIONS

BRIEF

To improve the performance of *Kings Cross* under IMS by reducing IOR bow down trim , reducing displacement to improve acceleration and, if required, to fit a bulb to maintain current stability levels as well as Cat. 1 LPS/SI of > 115 degrees.

RESULTS

A range of options was examined through reducing displacement and trim simultaneously through removing ballast from the forward bays working aft. The values on the current page three ballast sheet were assumed accurate for this purpose.

It was found that as little as 100 kg would cause the boat to fall out of Cat 1 stability dropping this value to below 115 degrees. It is therefore not possible to modify the boat without adding a bulb to compensate.

Original design displacement is 200 kg less than current rated trim and this proved to be a practical limit as it requires the removal of nearly all the internal ballast and a bulb of 110 kg fitted to the keel to maintain current stability.

The net effect of all this is quite small on handicap and is therefore well worth doing. The handicap data is presented herein for comparison.

EXECUTION

1. Remove internal ballast as follows:

Current			Revised	Actual	
90	3.65 aft - empty	✓	—	20	3.65
108	3.88 aft - empty	✓	—	40	3.88
36	4.29 aft - ~~36 kg~~	as is	36	36	4.88
55	5.0 aft - 25 kg	+50	75	30	5.0
74	5.50 aft - empty	+25	25	25	5.5
363	61		136	151	5.8

Total removed = 302 kg

Remove 227

2. Fabricate bulb to enclosed template - final weight accounting for accurate keel cut out should be ~~110 kg~~.

85 (25 down)

Actual
Remove 220

3. Fasten keel with bolt pattern shown on template using an epoxy/microballoon filler to insure an accurate fit (i.e., no movement around bolts.

4. Fair exposed keel to match bulb profile.

5. Final freeboards should be as follows: FF : 1.154 m FA : 0.954 m

6. Should be 112 .25 kg/m for an LPS of 115.6 degrees.

7. IMS hull measurement and re-inclination will be required.

FOLLOWING PAGES:

1994 handicaps - unmodified

1994 handicaps - modified

1994 certificate data

1994 VPPs - full printout

Bulb template scaled

Full size bulb template

24.05.94

1994 HANDICAPS - KINGS CROSS UNMODIFIED

Wind Averaged Ratings.

VTW	WW/LW	OLYMPIC	CR	LR	OCEAN	CC CR	CC LR
6.0	1170.4	1095.4	889.6	850.4	1025.3	977.9	923.6
8.0	932.3	881.6	721.3	693.9	802.1	783.5	748.1
10.0	801.1	767.1	631.9	611.3	676.1	677.8	653.5
12.0	722.3	701.0	580.3	563.4	598.1	615.1	597.5
14.0	672.7	660.7	548.5	533.2	546.3	575.9	561.8
16.0	640.3	634.7	527.4	512.3	509.5	550.2	537.4
20.0	601.9	602.9	500.0	483.2	458.2	519.0	505.9
General purpose rating:			650.8				

------- 1994 TIME ALLOWANCES IN SEC/MI BY TRUE WIND VELOCITY & ANGLE -----

Wind Velocity:	6kt	8kt	10kt	12kt	14kt	16kt	20kt
BEAT ANGLES:	45.9°	44.2°	42.6°	41.5°	40.9°	40.6°	40.7°
BEAT VMG:	1079.4	897.3	820.1	779.2	755.7	742.5	731.7
52°:	686.8	582.9	543.1	526.1	516.7	510.9	503.3
R 60°:	638.9	551.9	520.1	506.4	497.9	492.1	483.4
E 75°:	603.6	531.3	502.5	484.3	472.4	465.2	454.0
A 90°:	582.5	517.1	489.9	472.8	462.3	452.1	432.5
C 110°:	609.0	530.6	497.3	473.4	453.6	437.6	416.7
H 120°:	656.4	553.6	510.3	482.8	460.0	440.0	408.4
135°:	780.2	623.4	545.5	508.4	482.6	459.9	419.4
150°:	945.0	741.2	621.9	550.3	512.1	486.0	442.0
RUN VMG:	1091.2	855.9	714.9	617.0	554.2	516.6	468.3
GYBE ANGLES:	140.6°	144.1°	161.3°	166.0°	171.0°	175.0°	175.6°

NOTE: To convert any time allowance above to speed in knots: Kt = 3600/TA

--------- 1994 WIND-AVERAGED TIME ALLOWANCES FOR SELECTED COURSES --------

Windward VMG	1199.5	979.1	865.9	804.6	770.5	751.3	733.5
Leeward VMG	1136.2	879.7	730.4	635.1	571.1	526.8	469.9
Olympic 6-leg	1095.4	881.6	767.1	701.0	660.7	634.7	602.9
Circular Rndm	889.6	721.3	631.9	580.3	548.5	527.4	500.0
Non-Spinnaker	977.9	783.5	677.8	615.1	575.9	550.2	519.0
Ocean for PCS	1025.3	802.1	676.1	598.1	546.3	509.5	458.2

1994 HANDICAPS - KINGS CROSS W/ 110 KG BULB
AND -200 KG TOTAL DSIPLACEMENT

Wind Averaged Ratings.

VTW	WW/LW	OLYMPIC	CR	LR	OCEAN	CC CR	CC LR
6.0	1166.1	1091.5	886.0	846.7	1022.0	973.8	919.3
8.0	929.8	879.4	719.0	691.6	800.0	780.9	745.3
10.0	799.8	766.2	630.5	609.7	674.7	676.0	651.6
12.0	721.9	700.9	579.5	562.2	597.1	614.0	596.2
14.0	673.0	661.2	548.0	532.3	545.4	575.3	560.8
16.0	641.1	635.6	527.2	511.6	508.7	549.9	536.7
20.0	603.0	604.2	500.0	482.5	457.4	519.0	505.3
General purpose rating:			649.3				

------- 1994 TIME ALLOWANCES IN SEC/MI BY TRUE WIND VELOCITY & ANGLE -----

Wind Velocity:	6kt	8kt	10kt	12kt	14kt	16kt	20kt
BEAT ANGLES:	46.0°	44.3°	42.7°	41.7°	41.0°	40.8°	41.0°
BEAT VMG:	1074.9	895.9	820.5	780.8	758.4	746.1	736.2
52°:	683.6	581.3	543.1	526.6	517.4	511.8	504.3
R 60°:	635.5	550.3	519.8	506.5	498.2	492.4	483.8
E 75°:	600.0	529.8	501.3	483.3	472.1	464.9	453.6
A 90°:	579.6	515.8	488.8	472.0	461.7	450.2	431.3
C 110°:	605.0	528.7	495.7	471.6	451.7	435.8	415.5
H 120°:	651.7	551.0	508.7	481.0	457.9	437.6	406.2
135°:	775.0	619.7	543.2	506.8	480.8	457.7	416.6
150°:	939.5	736.8	618.8	548.1	510.7	484.4	439.6
RUN VMG:	1084.8	850.8	711.7	614.5	552.4	515.3	466.4
GYBE ANGLES:	140.4°	144.0°	161.1°	166.0°	171.2°	175.0°	175.5°

NOTE: To convert any time allowance above to speed in knots: Kt = 3600/TA

--------- 1994 WIND-AVERAGED TIME ALLOWANCES FOR SELECTED COURSES --------

Windward VMG	1196.6	978.1	866.4	806.2	773.1	754.6	737.9
Leeward VMG	1130.2	875.4	727.2	632.6	569.1	525.0	467.8
Olympic 6-leg	1091.5	879.4	766.2	700.9	661.2	635.6	604.2
Circular Rndm	886.0	719.0	630.5	579.5	548.0	527.2	500.0
Non-Spinnaker	973.8	780.9	676.0	614.0	575.3	549.9	519.0
Ocean for PCS	1022.0	800.0	674.7	597.1	545.4	508.7	457.4

IMS AMENDED TO JANUARY 1994
DATE RUN: 24/MAY/94 TIME: 4: 7
CERT. NO: 110000
YACHT: KINGS CROSS MODIFIED
SAIL NO: 621
CLASS: DAVIDSON 36

SCOTT JUTSON YACHT DESIGN
HYDROSTATICS & THEORETIC STABILITY

VCG = VERTICAL CENTER OF GRAVITY
VCB = VERTICAL CENTER OF BUOYANCY
LCB = LONGITUDINAL CENTER OF BUOYANCY

LPP INPUT DATA

INPUT FILES: 1101.DAT 24/MAY/94 04:07:26
OFFSETS Measured: 14/AUG/93 KNGCRS.OFF 06/SEP/93 16:36:26
Flotation date year: 93 Specific Gravity: 1.025
Club VCG from offsets datum: -0.0910 Equivalent RM: 112.25

FFM	1.154	FFPS	1.265	FAM	0.954	AFPS	0.738	WCBA	0.000	CBDA	0.000		
FGO	0.567	LBG	0.000	SFFP	0.567	SAFP	9.611	J	3.802	SFJ	0.008		
KCDA	0.000	ECM	0.000	CBRC	0.000	CBMC	0.000	CBTC	0.000	EB	0.000		

HYDROSTATIC DATA

FLOTATION CONDITION:	-- MEAS TRIM -- 0		------ SAILING TRIM ------ 1	2	3	4
HEEL IN DEGREES:	0.0	2.0	0.0	2.0	25.0	0.0
FLOTATION FWD:	0.1109	0.1106	0.1112	0.1109	0.0694	0.3293
FLOTATION AFT:	-0.2166	-0.2176	-0.1341	-0.1350	-0.2887	0.1931
FREEBOARD FWD:	1.1541	1.1544	1.1538	1.1541	1.1956	0.9357
FREEBOARD AFT:	0.9541	0.9551	0.8716	0.8725	1.0262	0.5444
DISPL'T KGS-SW:	4505.5	4505.4	5287.9	5287.9	5287.9	11028.3
WETTED AREA:	21.990	21.985	23.598	23.597	22.388	32.094
RIGHTING MOM'T/DEG:	112.25	112.25	119.75	119.75	107.70	0.00
VCG ABOVE OFFSET DATUM:	-0.0910	-0.0910	0.0233	0.0233	0.0233	0.0233
VCG to average over the boats that use this offset file to get club VCG for the class:	-0.0910					
VCB ABOVE OFFSET DATUM:	-0.2072	-0.2095	-0.1725	-0.1748	-0.4776	0.0223
VCG ABOVE MEASM'T WL:	-0.0282	-0.0282	0.0918	0.0918	0.0918	0.1039
VCB ABOVE MEASM'T WL:	-0.2072	-0.2095	-0.1725	-0.1748	-0.4776	0.0223
LCB AFT OF STEM:	5.3651	5.3651	5.5197	5.5197	5.5197	5.8559
PRISMATIC COEF:	0.4383	0.4378	0.4542	0.4542	0.4498	0.4964
SECOND MOM'T LENGTH:	8.4358	8.4389	8.7236	8.7223	8.5625	10.4034

THEORETIC STABILITY

HEEL IN DEGREES	RT ARM IN MTR
25.	0.5092
60.	0.7102
90.	0.4159
120.	-0.0716
150.	-0.4879
165.	-0.5361

RANGE OF POSITIVE STABILITY: 0 -115.6 DEGREES

Stab Index: 110.9

AREA POS STAB CURVE: 54.03 DG-MTR
AREA NEG STAB CURVE: 22.60 DG-MTR

POS AREA / NEG AREA: 2.4220

BFWD (beam on deck at FWD freeboard station): 0.542
BAFT (beam on deck at AFT freeboard station): 2.504
DMT (sheer to keel tip at DKHA station): 3.060
Max beam (MB): 3.717
KEDA : 0.000
DHK0 : 2.069
HBI : 0.996
ECE : 0.000

EFFECTIVE BEAM: 2.934
BEAM/DEPTH RATIO: 4.818
KEEL DRAFT (DHKA): 2.114 at 5.542
CENTERBOARD EXTENSION (ECMA): 0.000
KGS PER CENTIMETRE OF IMMERSION : 164.38
MOMENT TO CHANGE TRIM 1 CENTIMETRE: 65.086
MINIMUM DISPLACEMENT IN MEASUREMENT TRIM: 2353.KGS.
RANGE AVAILABLE TO DECLARE A CREW LIMIT: 706- 382 KGS.
MAXIMUM CREW WEIGHT FOR RACING WITH THIS CERT: 588 KGS.

KINGS CROSS UPDATED IMS VPP DATA

VTW	BTW	VAW	BAW	V	VMG	PHI	REEF	FLAT	CL	it	
6.0	180.0	2.80	180.0	3.068	-3.068	0.0	1.000	1.000	-0.059	4	spin
6.0	165.0	2.84	147.6	3.271	-3.160	0.2	1.000	1.000	0.629	4	spin
6.0	150.0	3.22	114.3	3.754	-3.251	0.5	1.000	1.000	1.372	4	spin
6.0	135.0	4.18	83.2	4.645	-3.285	1.3	1.000	1.000	2.006	4	spin
6.0	120.0	5.70	62.9	5.524	-2.762	2.4	1.000	1.000	2.233	4	spin
6.0	110.0	6.77	54.4	5.950	-2.035	3.2	1.000	1.000	2.293	3	spin
6.0	90.0	8.53	43.2	6.211	0.000	5.0	1.000	1.000	2.188	4	spin
6.0	80.0	9.06	39.4	5.981	1.039	5.1	1.000	1.000	1.944	3	spin
6.0	75.0	9.21	37.8	5.758	1.490	4.8	1.000	1.000	1.781	3	spin
6.0	70.0	9.27	36.3	5.465	1.869	4.4	1.000	1.000	1.618	3	spin
6.0	60.0	9.14	33.7	4.670	2.335	3.6	1.000	1.000	1.325	4	spin
6.0	140.4	3.74	93.2	4.307	-3.319	1.0	1.000	1.000	1.833	4	spin
6.0	180.0	2.96	180.0	2.800	-2.800	-0.1	1.000	1.000	-0.099	4	jib
6.0	165.0	3.03	150.5	2.928	-2.828	0.3	1.000	1.000	0.141	4	jib
6.0	150.0	3.51	124.8	2.983	-2.583	0.5	1.000	1.000	0.386	4	jib
6.0	135.0	4.15	100.7	3.300	-2.333	0.6	1.000	1.000	0.706	3	jib
6.0	120.0	5.20	73.6	4.343	-2.172	1.1	1.000	1.000	1.240	3	jib
6.0	110.0	6.28	59.4	5.167	-1.767	1.8	1.000	1.000	1.562	3	jib
6.0	90.0	8.28	43.9	5.963	0.000	3.4	1.000	1.000	1.836	3	jib
6.0	80.0	9.02	38.8	6.024	1.046	4.1	1.000	1.000	1.876	3	jib
6.0	75.0	9.32	36.5	6.000	1.553	4.5	1.000	1.000	1.889	3	jib
6.0	70.0	9.57	34.3	5.936	2.030	4.8	1.000	1.000	1.899	3	jib
6.0	60.0	9.88	30.2	5.665	2.832	5.4	1.000	1.000	1.913	3	jib
6.0	52.0	9.90	27.1	5.267	3.242	5.6	1.000	1.000	1.923	3	jib
6.0	170.6	2.95	161.4	2.890	-2.851	0.2	1.000	1.000	0.047	3	jib
6.0	46.0	9.73	25.0	4.818	3.349	5.3	1.000	1.000	1.928	4	jib

VTW	BTW	VAW	BAW	V	VMG	PHI	REEF	FLAT	CL	it	
8.0	180.0	3.80	180.0	4.024	-4.024	-0.1	1.000	1.000	-0.059	4	spin
8.0	165.0	3.85	148.3	4.279	-4.133	0.4	1.000	1.000	0.615	4	spin
8.0	150.0	4.36	116.2	4.853	-4.203	0.8	1.000	1.000	1.329	4	spin
8.0	135.0	5.53	87.1	5.809	-4.107	1.9	1.000	1.000	1.943	4	spin
8.0	120.0	7.25	68.8	6.534	-3.267	3.3	1.000	1.000	2.182	3	spin
8.0	110.0	8.41	60.5	6.809	-2.329	4.5	1.000	1.000	2.252	3	spin
8.0	90.0	10.36	47.7	6.979	0.000	10.8	1.000	1.000	2.276	4	spin
8.0	80.0	11.12	42.3	6.876	1.194	12.9	1.000	1.000	2.147	3	spin
8.0	75.0	11.44	39.9	6.758	1.749	12.7	1.000	1.000	1.990	2	spin
8.0	70.0	11.70	37.9	6.569	2.247	11.4	1.000	1.000	1.789	2	spin
8.0	60.0	11.85	34.4	5.873	2.937	7.7	1.000	1.000	1.404	3	spin
8.0	144.0	4.72	103.5	5.227	-4.231	1.2	1.000	1.000	1.620	4	spin
8.0	180.0	4.01	180.0	3.673	-3.673	-0.1	1.000	1.000	-0.099	4	jib
8.0	165.0	4.10	151.0	3.837	-3.706	0.5	1.000	1.000	0.137	4	jib
8.0	150.0	4.72	125.6	3.900	-3.378	0.8	1.000	1.000	0.378	4	jib
8.0	135.0	5.55	102.1	4.261	-3.013	1.0	1.000	1.000	0.683	3	jib
8.0	120.0	6.82	77.0	5.372	-2.686	1.6	1.000	1.000	1.166	3	jib
8.0	110.0	8.01	64.2	6.116	-2.092	2.5	1.000	1.000	1.453	3	jib
8.0	90.0	10.22	48.5	6.772	0.000	4.7	1.000	1.000	1.780	4	jib
8.0	80.0	11.07	42.6	6.815	1.183	7.0	1.000	1.000	1.848	4	jib
8.0	75.0	11.43	39.8	6.795	1.759	8.4	1.000	1.000	1.870	4	jib
8.0	70.0	11.75	37.1	6.749	2.308	9.8	1.000	1.000	1.886	4	jib
8.0	60.0	12.23	32.0	6.542	3.271	12.0	1.000	1.000	1.907	3	jib
8.0	52.0	12.38	28.3	6.193	3.812	13.0	1.000	1.000	1.919	3	jib
8.0	170.8	3.99	162.0	3.787	-3.738	0.3	1.000	1.000	0.042	3	jib
8.0	44.3	12.25	25.2	5.615	4.018	12.8	1.000	1.000	1.928	4	jib

VPP DATA CONTINUED

VTW	BTW	VAW	BAW	V	VMG	PHI	REEF	FLAT	CL	it	
10.0	180.0	4.84	180.0	4.939	-4.939	-0.1	1.000	1.000	-0.059	3	spin
10.0	165.0	4.91	149.0	5.230	-5.052	0.5	1.000	1.000	0.599	4	spin
10.0	150.0	5.56	118.5	5.818	-5.038	1.2	1.000	1.000	1.274	4	spin
10.0	135.0	6.91	92.4	6.627	-4.686	2.4	1.000	1.000	1.849	3	spin
10.0	120.0	8.72	75.4	7.077	-3.538	4.3	1.000	1.000	2.112	4	spin
10.0	110.0	9.91	66.7	7.262	-2.484	7.2	1.000	1.000	2.201	4	spin
10.0	90.0	11.86	51.6	7.366	0.000	16.8	1.000	1.000	2.297	4	spin
10.0	80.0	12.61	45.0	7.232	1.256	20.7	1.000	1.000	2.237	3	spin
10.0	75.0	12.99	42.1	7.131	1.846	21.2	1.000	0.989	2.116	3	spin
10.0	70.0	13.37	39.5	7.006	2.396	20.7	1.000	1.000	1.954	3	spin
10.0	60.0	14.02	35.3	6.587	3.294	15.8	1.000	1.000	1.499	3	spin
10.0	161.1	5.03	141.0	5.346	-5.058	0.7	1.000	1.000	0.772	4	spin
10.0	180.0	5.09	180.0	4.514	-4.514	-0.2	1.000	1.000	-0.099	4	jib
10.0	165.0	5.20	151.4	4.709	-4.549	0.7	1.000	1.000	0.133	4	jib
10.0	150.0	5.96	126.4	4.775	-4.135	1.1	1.000	1.000	0.369	4	jib
10.0	135.0	6.98	103.6	5.147	-3.640	1.4	1.000	1.000	0.661	3	jib
10.0	120.0	8.41	80.9	6.137	-3.068	2.1	1.000	1.000	1.084	3	jib
10.0	110.0	9.63	69.2	6.697	-2.291	3.0	1.000	1.000	1.338	3	jib
10.0	90.0	11.92	53.0	7.176	0.000	7.0	1.000	1.000	1.702	4	jib
10.0	80.0	12.81	46.2	7.207	1.252	11.3	1.000	1.000	1.811	4	jib
10.0	75.0	13.19	42.9	7.181	1.859	13.4	1.000	1.000	1.846	4	jib
10.0	70.0	13.52	39.8	7.127	2.437	15.4	1.000	1.000	1.870	4	jib
10.0	60.0	14.05	33.7	6.926	3.463	18.8	1.000	1.000	1.901	4	jib
10.0	52.0	14.36	29.6	6.629	4.081	18.9	1.000	0.939	1.799	4	jib
10.0	171.0	5.06	162.7	4.647	-4.590	0.5	1.000	1.000	0.036	3	jib
10.0	42.7	14.38	25.5	5.973	4.388	16.7	1.000	0.855	1.648	4	jib

VTW	BTW	VAW	BAW	V	VMG	PHI	REEF	FLAT	CL	it	
12.0	180.0	5.96	180.0	5.774	-5.774	-0.1	1.000	1.000	-0.059	3	spin
12.0	165.0	6.08	150.0	6.065	-5.859	0.7	1.000	1.000	0.577	4	spin
12.0	150.0	6.88	121.5	6.568	-5.688	1.5	1.000	1.000	1.203	3	spin
12.0	135.0	8.37	98.2	7.104	-5.023	2.9	1.000	1.000	1.734	3	spin
12.0	120.0	10.23	80.9	7.484	-3.742	6.0	1.000	1.000	2.040	5	spin
12.0	110.0	11.37	71.4	7.634	-2.611	11.3	1.000	1.000	2.157	3	spin
12.0	90.0	13.12	54.5	7.626	0.000	22.9	1.000	1.000	2.292	4	spin
12.0	80.0	14.09	47.9	7.432	1.291	23.5	1.000	0.870	1.983	3	spin
12.0	75.0	14.56	44.9	7.323	1.895	23.4	1.000	0.821	1.833	3	spin
12.0	70.0	15.00	41.9	7.200	2.462	23.1	1.000	0.796	1.695	3	spin
12.0	60.0	15.74	36.4	6.864	3.432	21.7	1.000	0.892	1.450	4	spin
12.0	166.0	6.05	152.0	6.040	-5.859	0.7	1.000	1.000	0.536	3	spin
12.0	180.0	6.21	180.0	5.309	-5.309	-0.2	1.000	1.000	-0.099	4	jib
12.0	165.0	6.35	152.0	5.520	-5.332	1.0	1.000	1.000	0.128	4	jib
12.0	150.0	7.24	127.4	5.579	-4.831	1.5	1.000	1.000	0.359	3	jib
12.0	135.0	8.44	105.4	5.904	-4.174	1.8	1.000	1.000	0.633	3	jib
12.0	120.0	10.00	84.8	6.663	-3.332	2.6	1.000	1.000	1.002	3	jib
12.0	110.0	11.24	74.0	7.038	-2.407	3.6	1.000	1.000	1.232	3	jib
12.0	90.0	13.56	56.5	7.485	0.000	10.2	1.000	1.000	1.628	4	jib
12.0	80.0	14.41	48.8	7.499	1.302	15.9	1.000	1.000	1.775	4	jib
12.0	75.0	14.75	45.1	7.448	1.928	18.7	1.000	1.000	1.824	4	jib
12.0	70.0	15.05	41.5	7.362	2.518	21.3	1.000	1.000	1.857	4	jib
12.0	60.0	15.73	35.5	7.108	3.554	22.1	1.000	0.895	1.694	4	jib
12.0	52.0	16.19	31.1	6.837	4.209	21.2	1.000	0.804	1.537	4	jib
12.0	171.5	6.19	164.0	5.447	-5.387	0.7	1.000	1.000	0.025	3	jib
12.0	41.7	16.36	26.0	6.171	4.611	19.1	1.000	0.721	1.388	5	jib

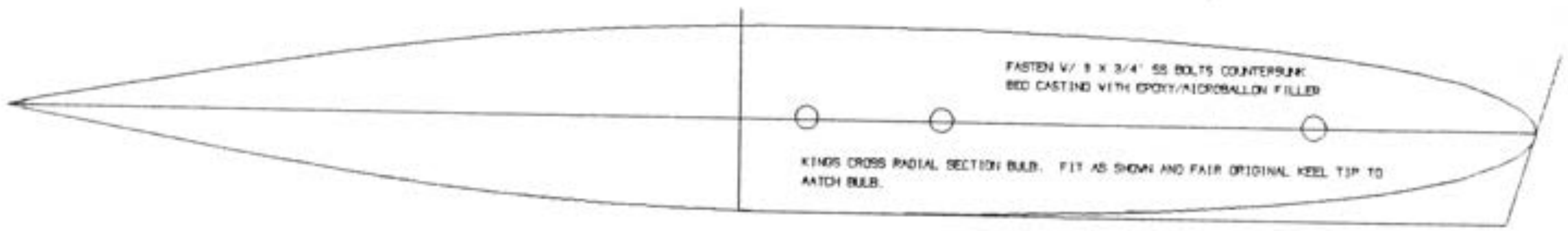
VPP DATA CONTINUED

VTW	BTW	VAW	BAW	V	VMG	PHI	REEF	FLAT	CL	it	
14.0	180.0	7.21	180.0	6.476	-6.476	-0.2	1.000	1.000	-0.059	3	spin
14.0	165.0	7.41	151.4	6.716	-6.487	1.0	1.000	1.000	0.547	4	spin
14.0	150.0	8.36	125.1	7.050	-6.105	1.9	1.000	1.000	1.119	3	spin
14.0	135.0	9.90	102.8	7.487	-5.294	3.6	1.000	1.000	1.637	4	spin
14.0	120.0	11.72	84.9	7.862	-3.931	9.3	1.000	1.000	1.978	4	spin
14.0	110.0	12.74	74.9	7.970	-2.726	15.8	1.000	1.000	2.118	3	spin
14.0	90.0	14.47	57.4	7.797	0.000	25.1	0.982	0.938	2.059	5	spin
14.0	80.0	15.58	50.5	7.577	1.316	24.6	0.966	0.812	1.737	4	spin
14.0	75.0	16.09	47.2	7.457	1.930	24.4	0.962	0.764	1.604	3	spin
14.0	70.0	16.57	44.0	7.328	2.506	24.2	0.961	0.728	1.486	3	spin
14.0	60.0	17.42	38.0	7.003	3.502	23.1	0.968	0.751	1.268	4	spin
14.0	171.2	7.24	163.2	6.595	-6.518	0.6	1.000	1.000	0.289	3	spin
14.0	180.0	7.42	180.0	6.015	-6.015	-0.3	1.000	1.000	-0.099	4	jib
14.0	165.0	7.60	152.8	6.221	-6.009	1.2	1.000	1.000	0.121	4	jib
14.0	150.0	8.60	128.7	6.263	-5.424	1.9	1.000	1.000	0.346	3	jib
14.0	135.0	9.96	107.5	6.501	-4.597	2.3	1.000	1.000	0.601	3	jib
14.0	120.0	11.62	88.6	6.996	-3.498	3.2	1.000	1.000	0.926	3	jib
14.0	110.0	12.88	77.8	7.314	-2.502	4.3	1.000	1.000	1.149	3	jib
14.0	90.0	15.14	59.2	7.756	0.000	13.7	1.000	1.000	1.567	4	jib
14.0	80.0	15.83	50.7	7.724	1.341	20.8	1.000	1.000	1.745	4	jib
14.0	75.0	16.08	46.6	7.626	1.974	24.2	1.000	1.000	1.807	4	jib
14.0	70.0	16.56	43.4	7.500	2.565	24.1	1.000	0.911	1.677	4	jib
14.0	60.0	17.40	37.2	7.226	3.613	23.6	1.000	0.774	1.459	3	jib
14.0	52.0	17.94	32.5	6.957	4.283	22.9	1.000	0.692	1.319	3	jib
14.0	172.3	7.40	166.0	6.138	-6.084	0.8	1.000	1.000	0.009	5	jib
14.0	41.0	18.25	26.6	6.294	4.747	20.8	1.000	0.613	1.180	5	jib

VTW	BTW	VAW	BAW	V	VMG	PHI	REEF	FLAT	CL	it	
16.0	180.0	8.67	180.0	6.970	-6.970	-0.3	1.000	1.000	-0.059	3	spin
16.0	165.0	8.93	153.0	7.151	-6.907	1.2	1.000	1.000	0.512	4	spin
16.0	150.0	9.92	128.0	7.433	-6.437	2.4	1.000	1.000	1.051	3	spin
16.0	135.0	11.48	106.1	7.866	-5.562	4.3	1.000	1.000	1.562	4	spin
16.0	120.0	13.16	88.1	8.226	-4.113	12.9	1.000	1.000	1.926	4	spin
16.0	110.0	13.97	77.8	8.260	-2.825	20.3	1.000	1.000	2.083	3	spin
16.0	90.0	15.87	60.0	7.939	0.000	25.3	0.904	0.994	1.831	7	spin
16.0	80.0	17.06	52.7	7.699	1.337	24.8	0.892	0.848	1.548	4	spin
16.0	75.0	17.61	49.2	7.569	1.959	24.6	0.889	0.791	1.430	3	spin
16.0	70.0	18.12	45.8	7.431	2.542	24.4	0.888	0.746	1.326	3	spin
16.0	60.0	19.04	39.4	7.104	3.552	23.4	0.895	0.728	1.135	3	spin
16.0	175.0	8.68	171.0	7.013	-6.987	0.6	1.000	1.000	0.123	5	spin
16.0	180.0	8.77	180.0	6.593	-6.593	-0.4	1.000	1.000	-0.099	3	jib
16.0	165.0	9.00	153.8	6.760	-6.530	1.6	1.000	1.000	0.112	4	jib
16.0	150.0	10.07	130.4	6.780	-5.872	2.3	1.000	1.000	0.329	3	jib
16.0	135.0	11.54	110.0	6.907	-4.884	2.9	1.000	1.000	0.567	3	jib
16.0	120.0	13.27	91.8	7.268	-3.634	3.9	1.000	1.000	0.865	3	jib
16.0	110.0	14.55	80.8	7.574	-2.591	5.4	1.000	1.000	1.085	4	jib
16.0	90.0	16.60	61.2	7.997	0.000	17.4	1.000	1.000	1.521	4	jib
16.0	80.0	17.10	52.1	7.876	1.368	25.0	0.992	1.000	1.691	4	jib
16.0	75.0	17.59	48.6	7.744	2.004	24.6	0.948	1.000	1.597	4	jib
16.0	70.0	18.08	45.2	7.606	2.601	24.3	0.932	0.942	1.492	4	jib
16.0	60.0	18.99	38.7	7.311	3.656	23.9	0.937	0.787	1.296	4	jib
16.0	52.0	19.61	33.7	7.035	4.331	23.5	0.956	0.669	1.162	4	jib
16.0	173.9	8.75	169.3	6.677	-6.639	0.9	1.000	1.000	-0.018	4	jib
16.0	40.8	20.09	27.2	6.373	4.825	22.2	1.000	0.527	1.013	5	jib

VPP DATA CONTINUED

VTW	BTW	VAW	BAW	V	VMG	PHI	REEF	FLAT	CL	i	
20.0	180.0	11.85	180.0	7.703	-7.703	-0.5	1.000	1.000	-0.059	4	spin
20.0	165.0	12.10	155.3	7.892	-7.623	1.8	1.000	1.000	0.463	4	spin
20.0	150.0	13.10	131.8	8.190	-7.093	3.4	1.000	1.000	0.967	3	spin
20.0	135.0	14.61	110.7	8.642	-6.111	8.0	1.000	1.000	1.457	5	spin
20.0	120.0	15.74	93.0	8.863	-4.432	20.4	1.000	1.000	1.838	4	spin
20.0	110.0	16.17	82.5	8.665	-2.963	27.0	0.976	1.000	1.919	5	spin
20.0	90.0	18.73	64.1	8.174	0.000	25.9	0.807	1.000	1.449	4	spin
20.0	80.0	20.00	56.2	7.898	1.372	25.3	0.777	0.909	1.252	4	spin
20.0	75.0	20.62	52.4	7.749	2.006	25.0	0.776	0.838	1.158	4	spin
20.0	70.0	21.19	48.7	7.592	2.597	24.7	0.776	0.780	1.073	4	spin
20.0	60.0	22.23	41.7	7.244	3.622	24.0	0.784	0.710	0.925	4	spin
20.0	175.5	11.85	172.5	7.743	-7.719	0.9	1.000	1.000	0.092	7	spin
20.0	180.0	11.88	180.0	7.323	-7.323	-0.7	1.000	1.000	-0.099	4	jib
20.0	165.0	12.14	155.9	7.459	-7.205	2.3	1.000	1.000	0.094	4	jib
20.0	150.0	13.26	133.7	7.457	-6.458	3.5	1.000	1.000	0.295	4	jib
20.0	135.0	14.83	114.2	7.496	-5.301	4.5	1.000	1.000	0.511	4	jib
20.0	120.0	16.60	96.3	7.775	-3.888	6.6	1.000	1.000	0.782	4	jib
20.0	110.0	17.76	85.1	8.068	-2.759	10.5	1.000	1.000	0.996	3	jib
20.0	90.0	19.05	64.0	8.347	0.000	25.1	1.000	1.000	1.456	4	jib
20.0	80.0	20.07	55.6	8.087	1.404	25.5	0.904	1.000	1.345	7	jib
20.0	75.0	20.61	51.8	7.936	2.054	25.1	0.859	1.000	1.272	4	jib
20.0	70.0	21.12	48.2	7.777	2.660	24.7	0.822	1.000	1.205	4	jib
20.0	60.0	22.14	41.2	7.441	3.720	24.2	0.821	0.836	1.049	4	jib
20.0	52.0	22.83	35.8	7.139	4.395	23.7	0.838	0.709	0.942	4	jib
20.0	175.3	11.86	172.3	7.376	-7.350	1.3	1.000	1.000	-0.042	8	jib
20.0	41.0	23.45	28.8	6.481	4.890	22.6	0.884	0.546	0.817	5	jib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BED CASTING WITH EPOXY/MICROBALLON FILLER
KINGS CROSS RADIAL SECTION BULB. FIT AS SHOWN AND FAIR ORIGINAL KEEL TIP TO
MATCH BULB.