

Predictions of Resistance and Squat for 10 NPL Series Monohulls

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Summary

Flotilla predictions of resistance and squat are compared to measured values for 10 NPL series model hulls.

Introduction

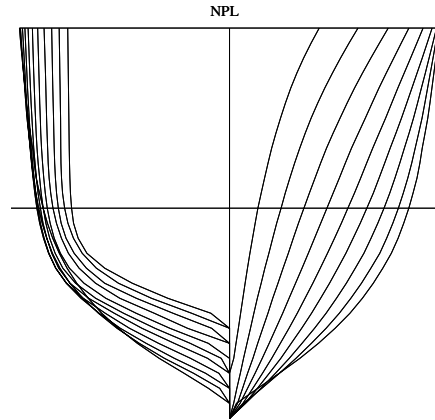


Figure 1: NPL parent hull.

The NPL series of round bilge hulls with transom sterns were first investigated in detail in 1976 by Bailey [1]. In this report we use the name “NPL Series” for the hulls examined in several papers by Molland and his co-workers, (e.g. [2],[3],[4],[5],[6],[7]), and the thesis by Robards [8] (where it is referred to as the “University of Southampton Series”).

Predictions of squat are reasonable for the thinnest, most slender hulls, but barely acceptable for the stubbiest NPL 3b hull shown at the top of the set of plots in Fig. 3.

Acknowledgements

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References

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- [5] Molland, A.F. and Lee, Adrian R., “Resistance experiments on a series of high-speed displacement catamaran forms: variation of prismatic coefficient”, University of Southampton, Ship Science Report 86, 1995.
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- [7] Molland, A.F., Wellicome, J.F. and Couser, P.R., “Theoretical prediction of the wave resistance of slender hull forms in catamaran configuration”, University of Southampton, Ship Science Report 72, 1994.
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	L (m)	L/B	B/T	C_{∇}	C_B	C_M	C_P	C_{VP}	C_{WP}	S/L^2	B_T/B	T_T/T	C_{AT}
3b	1.6	7.0	2.0	6.28	0.396	0.574	0.685	0.523	0.759	0.170	0.820	0.521	0.720
4a	1.6	10.4	1.5	7.42	0.396	0.574	0.685	0.523	0.759	0.136	0.820	0.521	0.720
4b	1.6	9.0	2.0	7.42	0.396	0.574	0.685	0.523	0.759	0.132	0.820	0.521	0.720
4c	1.6	8.0	2.5	7.39	0.396	0.574	0.685	0.523	0.759	0.134	0.820	0.521	0.720
5a	1.6	12.8	1.5	8.53	0.396	0.573	0.685	0.522	0.759	0.110	0.820	0.521	0.720
5b	1.6	11.0	2.0	8.48	0.396	0.573	0.685	0.522	0.759	0.108	0.820	0.521	0.720
5c	1.6	9.9	2.5	8.52	0.396	0.573	0.685	0.522	0.759	0.108	0.820	0.521	0.720
6a	1.6	15.1	1.5	9.52	0.396	0.573	0.685	0.522	0.759	0.093	0.820	0.521	0.720
6b	1.6	13.1	2.0	9.53	0.396	0.573	0.685	0.522	0.759	0.091	0.820	0.521	0.719
6c	1.6	11.7	2.5	9.52	0.396	0.574	0.685	0.523	0.759	0.091	0.820	0.521	0.720

Table 1: Principal particulars of 10 NPL series model hulls.

	x_B/L	z_B/T	x_F/L	$1000I_L/L^4$	$1000I_T/L^4$	$\overline{\text{GM}}_{L0}/L$	$\overline{\text{GM}}_{T0}/B$
3b	0.0638	-0.313	0.084	7.23	0.142	1.76	0.089
4a	0.0638	-0.309	0.084	4.86	0.043	1.97	-0.021
4b	0.0638	-0.309	0.084	5.62	0.067	2.28	0.092
4c	0.0638	-0.313	0.084	6.32	0.096	2.54	0.183
5a	0.0638	-0.313	0.084	3.95	0.023	2.44	-0.024
5b	0.0638	-0.313	0.084	4.60	0.037	2.80	0.090
5c	0.0637	-0.313	0.084	5.11	0.050	3.15	0.183
6a	0.0638	-0.313	0.084	3.35	0.014	2.88	-0.024
6b	0.0638	-0.310	0.084	3.86	0.022	3.33	0.092
6c	0.0638	-0.313	0.084	4.32	0.031	3.72	0.183

Table 2: Principal hydrostatic particulars of 10 NPL series model hulls.

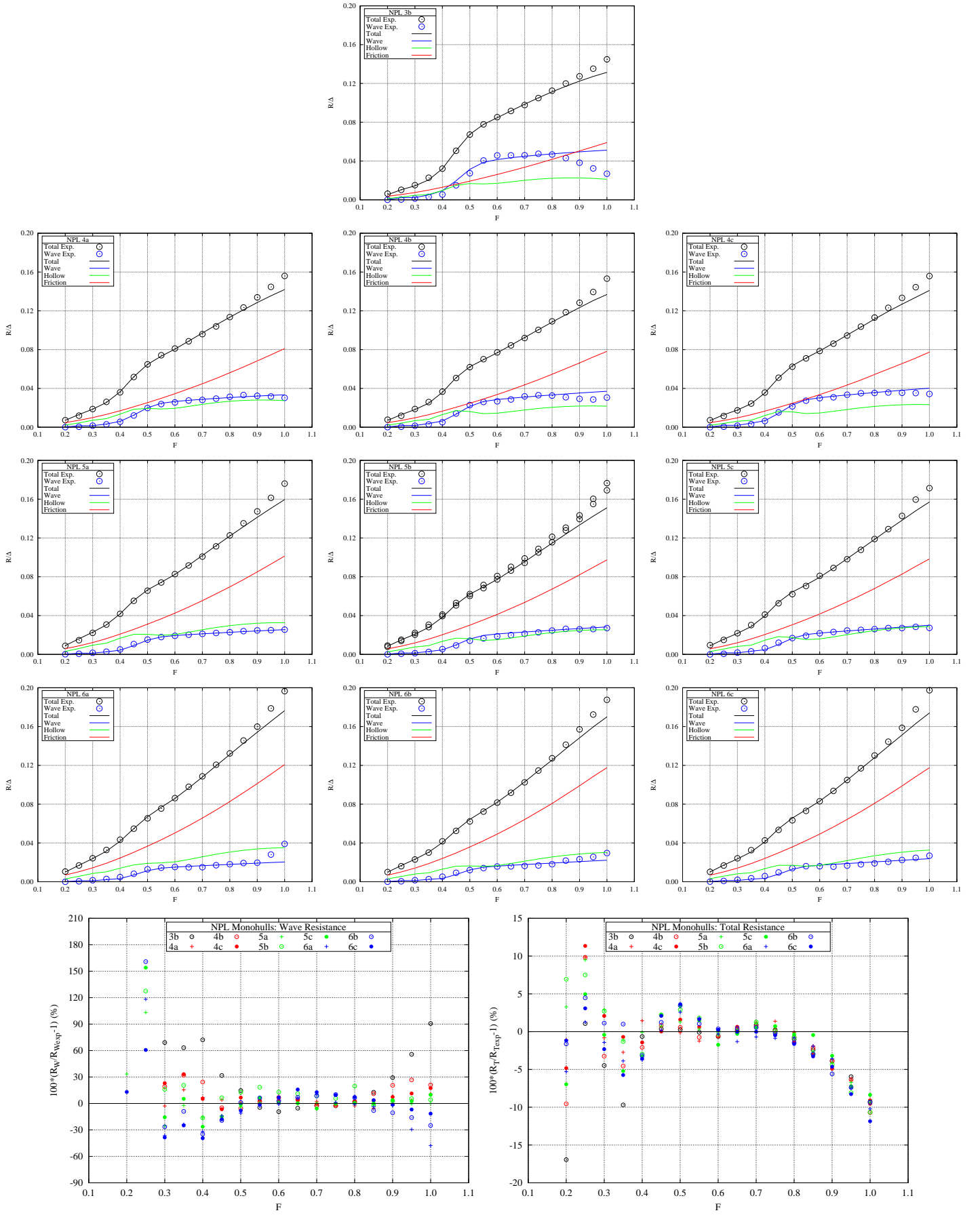


Figure 2: Specific resistance components of NPL series monohulls and relative differences between predicted and measured values of wave resistance and total resistance.

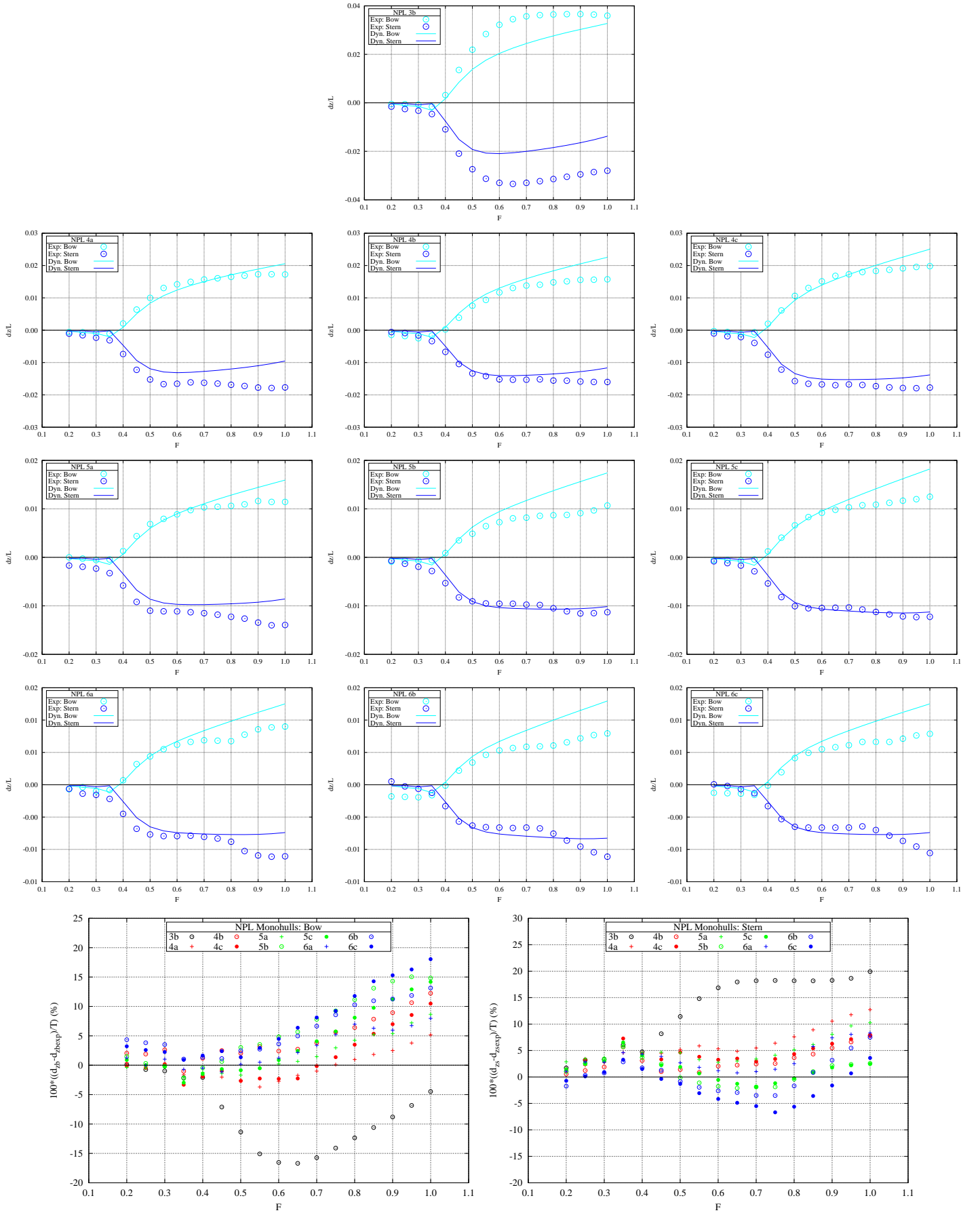


Figure 3: Predicted location of bow and stern compared to measured values and relative differences between predicted and measured values.