

# Predictions of the Resistance and Squat of Doctors’ “Lego” Series Monohulls

L. Lazauskas, Cyberiad, leo@cyberiad.net  
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## Summary

Predictions of resistance and squat of Doctors’ “Lego” Series model hulls are compared to measured values.

## Notes

The performance of Doctors’ Lego series has been reported in several papers by Doctors and his co-workers, (e.g. [1],[2],[3],[4],[5],[6]) and the thesis by Robards [7].

The sinkage of the Lego 9 hull seems atypical. It is possible that the locations of the forward and aft towing posts were recorded incorrectly.

## Acknowledgements

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## References

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- [4] Doctors, L.J. and Day, A.H., “Steady-state hydrodynamics of high-speed vessels with a transom stern”, *24th Symposium on Naval Hydrodynamics*, Val de Reuil, France, Sept. 17–22 2000.
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- [6] Doctors, L.J. and Day, A.H., “Nonlinear free-surface effects on the resistance and squat of high-speed vessels with a transom stern”, *24th Symposium on Naval Hydrodynamics*, Fukuoka, Japan, July 2002.
- [7] Robards, Simon William, “The hydrodynamics of high-speed transom-stern vessels”, *M. Engineering thesis*, The University of New South Wales, Nov. 2008.

	$L$ (m)	$L/B$	$B/T$	$C_{\nabla}$	$C_B$	$C_M$	$C_P$	$C_{VP}$	$C_{WP}$	$S/L^2$	$B_T/B$	$T_T/T$	$C_{AT}$
Lego 1	0.750	5.00	1.600	4.48	0.444	0.500	0.667	0.667	0.667	0.297	1.000	1.000	0.667
Lego 2	0.938	6.25	1.600	5.05	0.486	0.573	0.729	0.667	0.729	0.243	0.938	1.000	0.667
Lego 3	1.120	7.50	1.600	5.65	0.500	0.625	0.750	0.667	0.750	0.204	0.750	1.000	0.667
Lego 4	1.313	8.75	1.600	6.32	0.486	0.656	0.729	0.667	0.729	0.173	0.438	1.000	0.667
Lego 5	1.500	10.00	1.600	6.60	0.556	0.667	0.833	0.667	0.833	0.158	1.000	1.000	0.667
Lego 6	1.688	11.20	1.600	7.10	0.566	0.667	0.850	0.667	0.850	0.141	0.938	1.000	0.667
Lego 7	1.875	12.50	1.600	7.61	0.567	0.667	0.850	0.667	0.850	0.127	0.750	1.000	0.667
Lego 8	2.063	13.80	1.600	8.18	0.552	0.667	0.828	0.667	0.828	0.114	0.438	1.000	0.667
Lego 9	2.250	15.00	1.600	8.47	0.593	0.667	0.889	0.667	0.889	0.107	1.000	1.000	0.667
Lego 10	2.438	16.20	1.600	8.91	0.597	0.667	0.896	0.667	0.896	0.099	0.938	1.000	0.667
Lego 11	2.625	17.50	1.600	9.37	0.595	0.667	0.893	0.667	0.893	0.092	0.750	1.000	0.667
Lego 12	2.813	18.80	1.600	9.88	0.582	0.667	0.874	0.667	0.874	0.085	0.438	1.000	0.667

Table 1: Principal particulars of Doctors' Lego series model hulls.

	$x_B/L$	$z_B/T$	$x_F/L$	$1000I_L/L^4$	$1000I_T/L^4$	$\overline{\text{GM}}_{\text{L0}}/L$	$\overline{\text{GM}}_{\text{T0}}/B$
Lego 1	0.1250	-0.375	0.125	10.00	0.305	0.85	-0.097
Lego 2	0.1070	-0.375	0.107	8.33	0.189	1.03	-0.083
Lego 3	0.0833	-0.375	0.083	6.67	0.112	1.17	-0.083
Lego 4	0.0500	-0.375	0.050	5.00	0.065	1.23	-0.092
Lego 5	0.0750	-0.375	0.075	5.83	0.061	1.66	-0.060
Lego 6	0.0665	-0.375	0.067	5.27	0.044	1.86	-0.057
Lego 7	0.0539	-0.375	0.054	4.62	0.032	2.02	-0.060
Lego 8	0.0332	-0.375	0.033	3.84	0.022	2.09	-0.067
Lego 9	0.0521	-0.375	0.052	4.24	0.020	2.56	-0.050
Lego 10	0.0476	-0.375	0.048	3.95	0.016	2.78	-0.049
Lego 11	0.0395	-0.375	0.040	3.60	0.013	2.95	-0.052
Lego 12	0.0248	-0.375	0.025	3.13	0.010	3.01	-0.057

Table 2: Principal hydrostatic particulars of Doctors' Lego series model hulls.

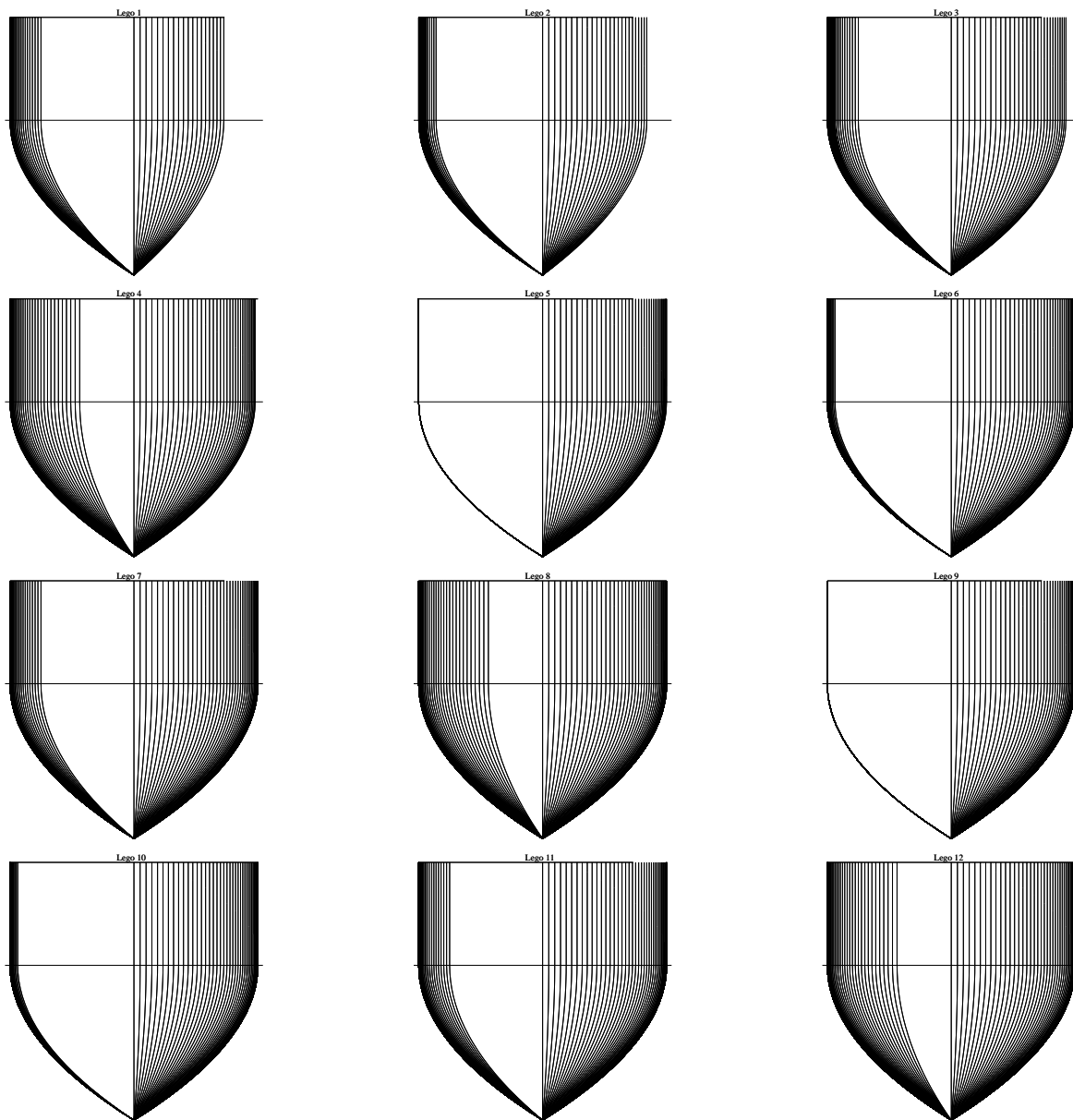


Figure 1: Body plans of Doctors' Lego series hulls.

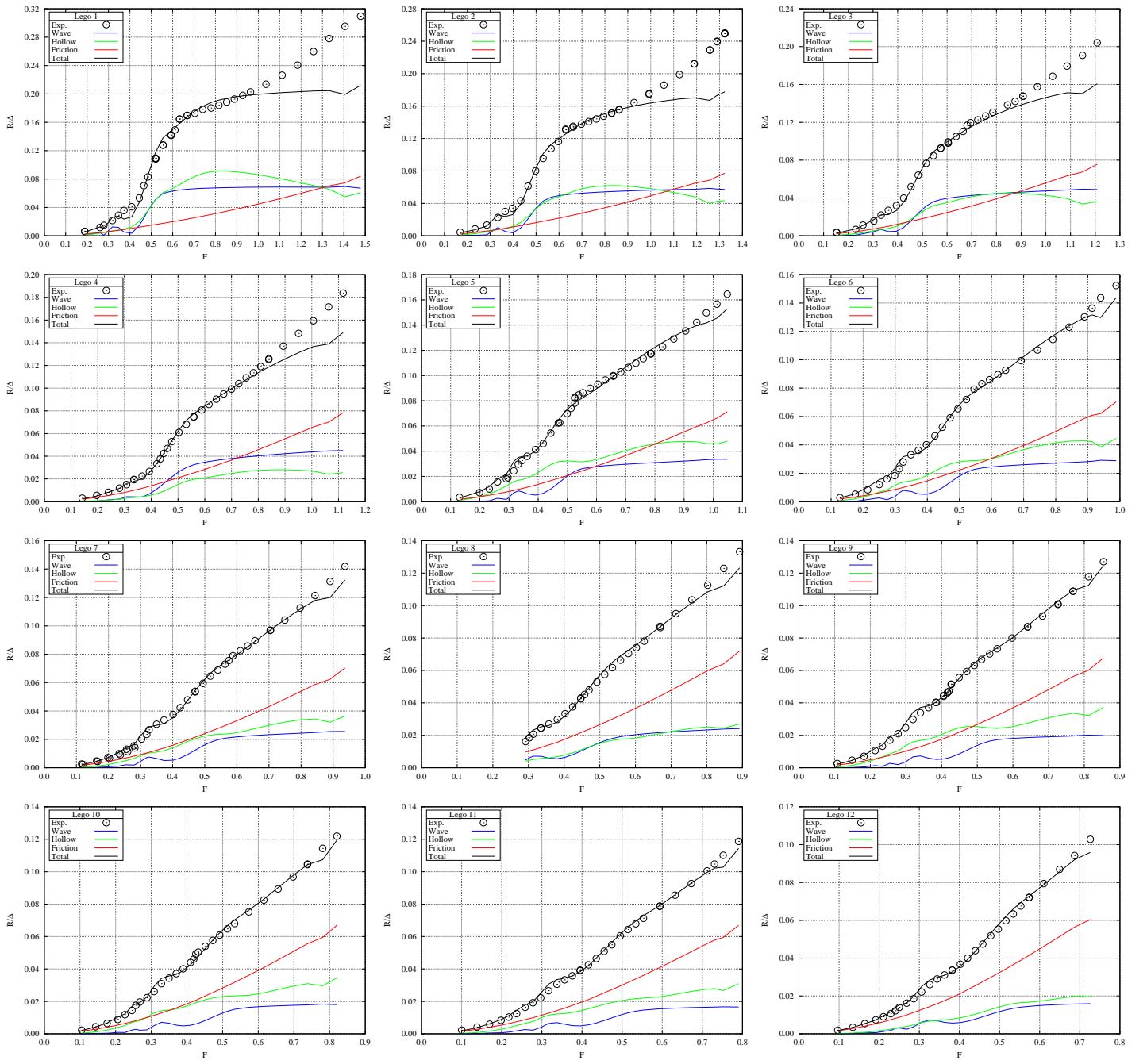


Figure 2: Specific resistance components of Doctors' Lego series model hulls.

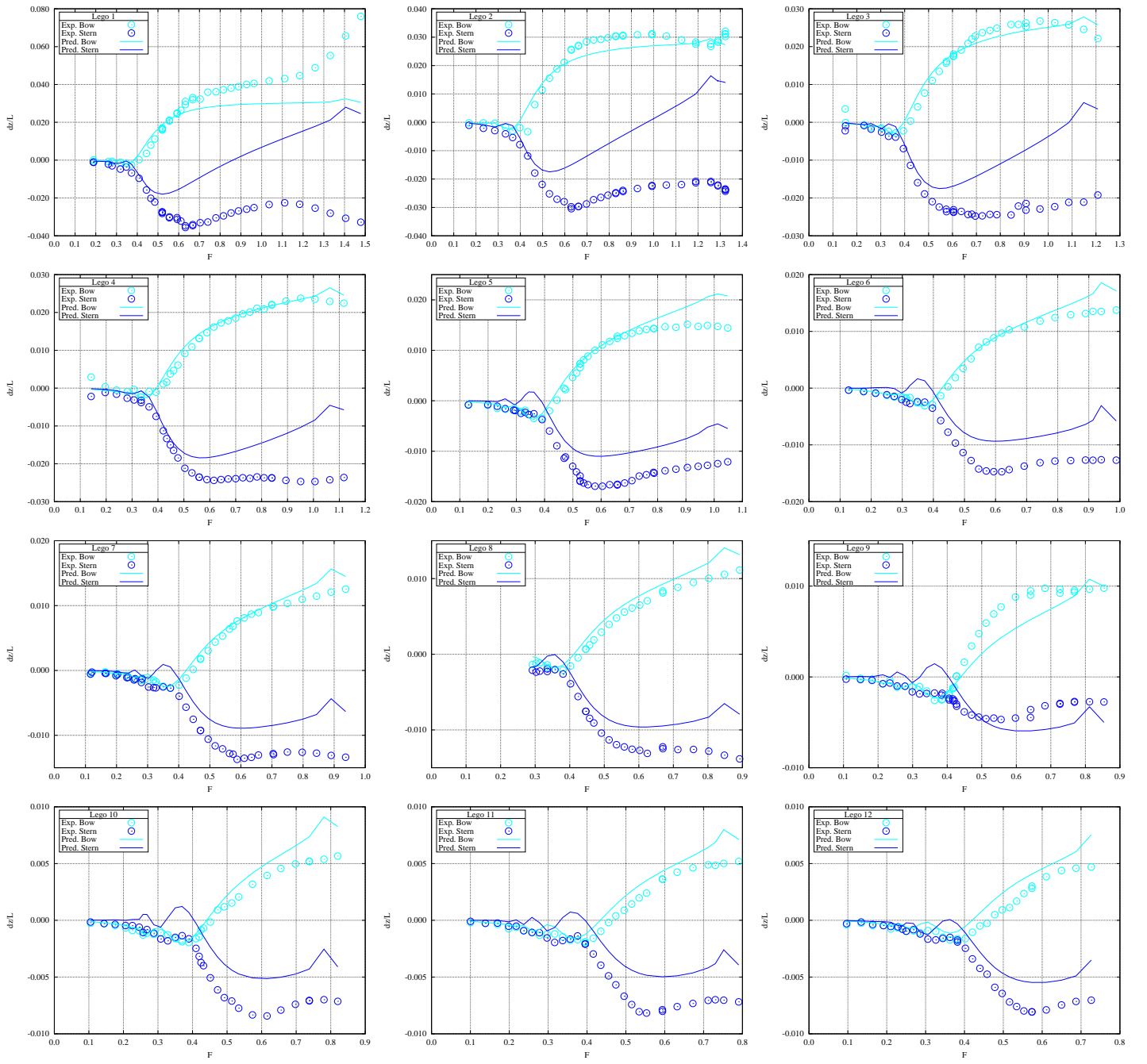


Figure 3: Location of bow and stern of Doctors' Lego series model hulls.