Methods of Determining the Thrust Deduction of Inboard Propellers and Outboard Propellers Separately for Twin Skeg, Four Screw Battleship Model No. 3441

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Model 3441

Twin Skeg, 4 Screw Battleship.

Methods of Determining the Thrust Deduction of Inboard Propellers and Outboard Propellers Separately.

Revolutions Method

Fig. 1, Curves of revolutions during run of 101 1/3 feet plotted on speed are taken from self-propulsion tests.

Fig. 2, Curves of thrust deduction are plotted on average propeller revolutions during run of 101 1/3 feet, from data given in Table I and Table II.

Table I is the data obtained by using the outboard propellers only, and varying the propeller thrust and revolutions by varying the pan loading of the towing dynamometer, while keeping the speed constant.

Table II is similar to Table I, for inboard propellers.

From Fig. 1, where V = 4.10 knots for the outboard propellers, the revolutions (n) = 238.0, and in Fig. 2, where n for the outboard propellers = 238.0, the thrust deduction (t) = .16. Therefore, .16 is the thrust deduction of the outboard propellers for a speed of 4.10 knots as shown by the solid circle in Fig. 5. Similarly, .24 is the thrust deduction of the inboard propellers for a speed of 4.07 knots.

Thrust Method

Fig. 3, Curves of thrust are from self-propulsion tests.

Fig. 4, Curves of thrust deduction are plotted on Total Thrust, from data given in Table I and Table II.

From Fig. 3 where V = 4.10 for the outboard propellers the thrust (T) = 6.08 lbs. and in Fig. 4 where T = 6.08 lbs., t = .17. Therefore, where V = 4.10, t = .17 as shown by open circle in Fig. 5. Similarly, for the inboard propellers where V = 4.07, t = .25.

The above methods were repeated for speeds at one half knot intervals thereby determining the curves for thrust deduction shown in Fig. 5.

TABLE I.

OUTBOARD PROPELLERS (1692&3) PROPELLING

Run No.	V_m	R_T	W	X (R_T-W)	T (2DYN.)	t ($1-\frac{X}{T}$)	n
17	4.11	14.61	11.74	2.87	3.84	.253	218.8
18	4.12	14.71	9.70	5.01	6.02	.167	236.0
19	4.185	15.52	8.48	7.04	8.28	.150	250.7
20	4.06	14.05	5.50	8.55	9.79	.126	263.9
21	4.06	14.05	3.67	10.38	11.65	.109	276.5
22	4.07	14.15	2.52	11.63	13.18	.118	284.9
	4.10	Ave.					

TABLE II.

INBOARD PROPELLERS (1694&5) PROPELLING

40	4.17	15.36	11.62	3.74	5.20	.281	218.4
41	4.05	13.96	10.10	3.86	5.22	.260	219.9
42	4.055	13.99	8.40	5.59	7.27	.231	235.0
43	4.035	13.81	6.50	7.31	9.52	.233	252.6
44	4.055	13.99	4.60	9.39	12.04	.220	268.4
45	4.045	13.90	2.84	11.06	14.02	.212	280.7
	4.07	Ave.					

V_m = Model Speed

R_T = Total Resistance

W = Pan load on towing dynamometer

T = Thrust (2 Dynamometers)

t = Thrust Deduction

n = Ave. Revolutions during run of 101 1/3 feet.

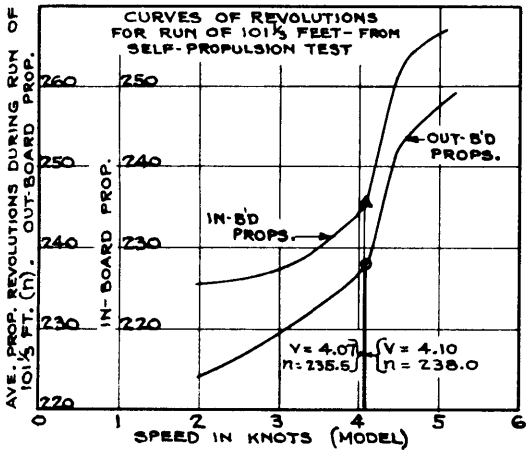

FIG. 1

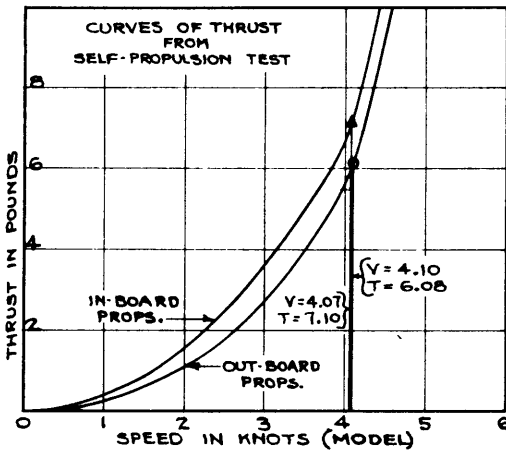

FIG. 3

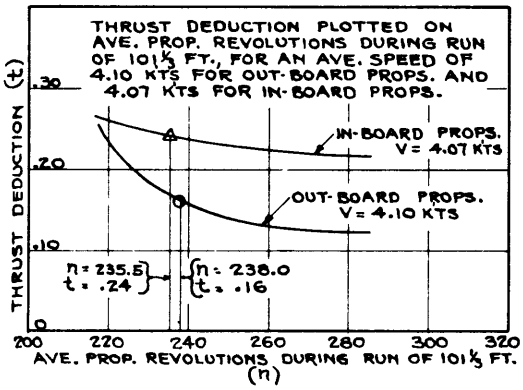

FIG. 2

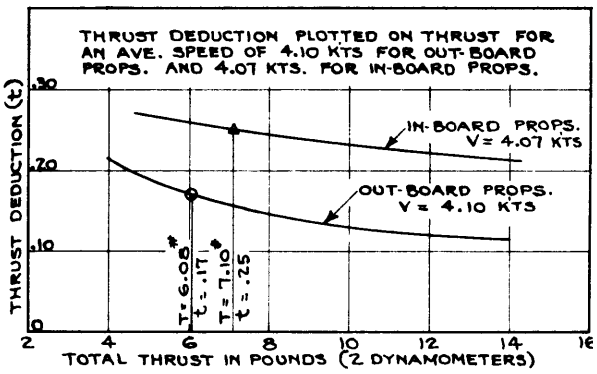

FIG. 4

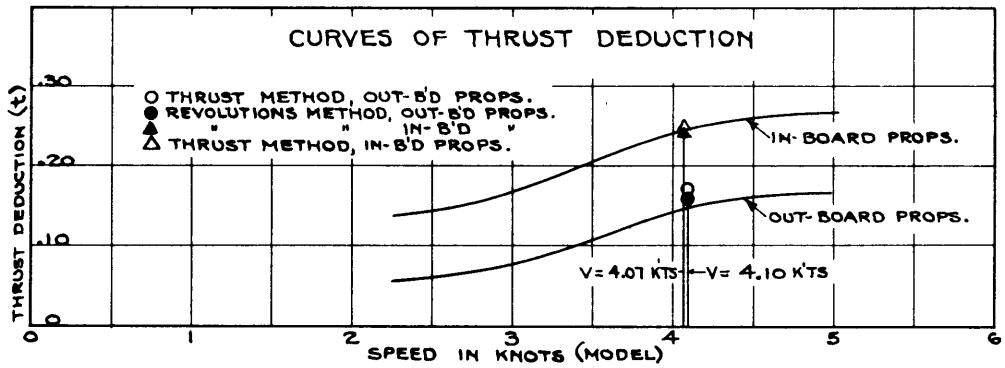

FIG. 5