

FIGURE 3-1 - SKETCH ARRANGEMENTS OF STANDARD RUDDERS AND PROPELLERS

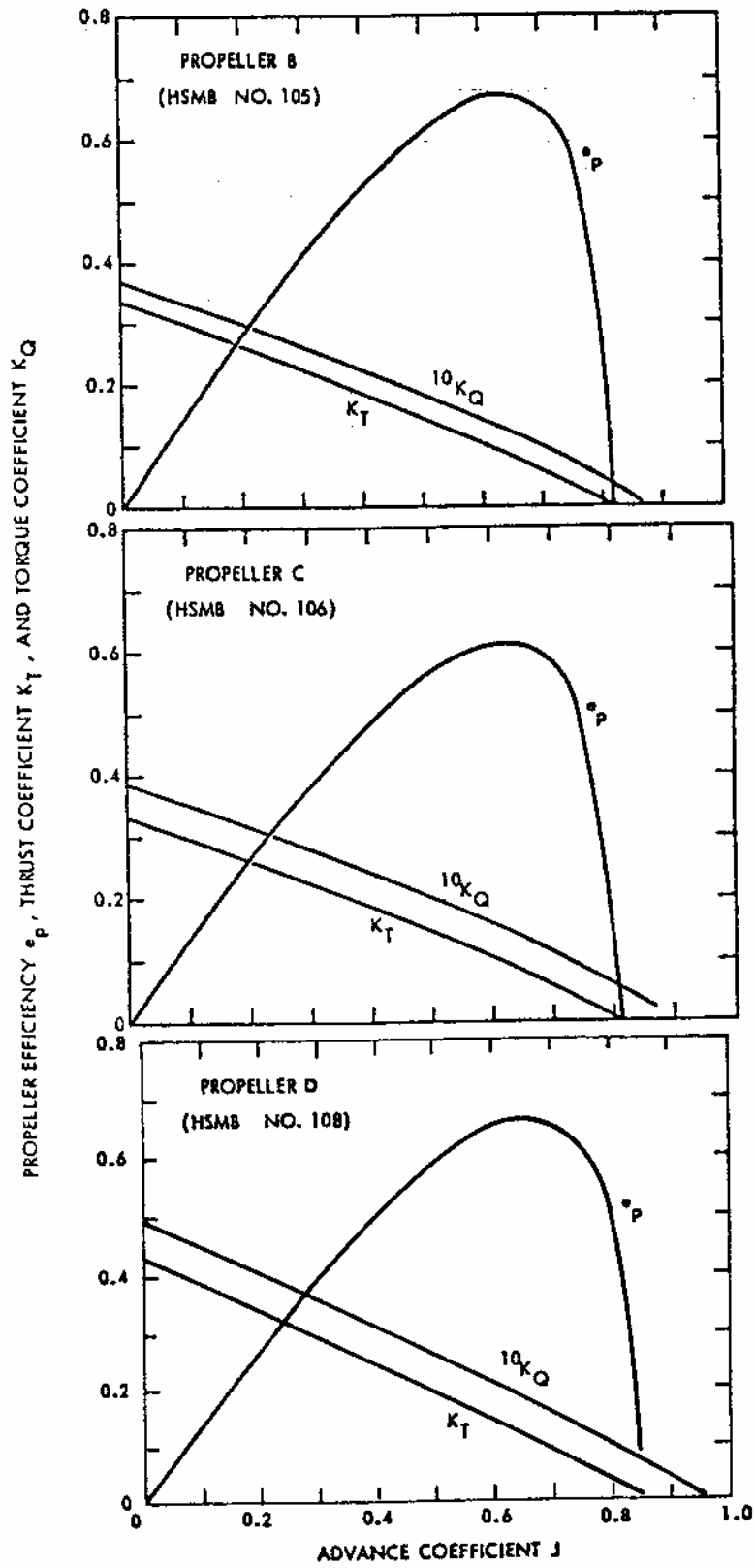


FIGURE 3-2 - OPEN-WATER CHARACTERISTICS OF HSMB STOCK PROPELLERS USED IN PROPULSION TESTS

TABLE 3-1  
Principal Geometric Characteristics of Series Models

	Designation and Model Number															
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	7166-1	7166-7	7166-8	7166-4	7166-5	7166-6	7370-2	7370-1	7370-4	7370-7	7370-3	7370-8	7370-6	7370-9	7370-5	7370-10
(a) Pull-Load Condition																
Length (L) ft	22.00	24.00	26.00	18.00	20.00	22.00	20.00	26.00	24.00	27.48	20.00	22.90	26.00	20.00	22.00	22.90
Beam (B) ft	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.58	4.00	4.58	4.00	4.00	4.00	4.58
Draft (T) ft	1.333	1.333	1.333	1.333	1.333	1.333	1.333	1.333	1.067	1.018	1.067	1.018	1.067	1.067	1.067	1.018
Displacement (V) ft <sup>3</sup>	102.64	111.97	121.31	81.58	90.66	99.73	85.34	117.86	87.04	108.88	72.54	90.74	97.07	68.27	82.13	85.40
Wetted Surface (S) ft <sup>2</sup>	134.384	146.396	158.374	108.139	119.988	131.750	115.178	155.224	131.719	162.897	110.150	136.208	145.389	105.751	123.440	130.897
LCB (Percent L fwd midship)	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
(b) Ballast Condition																
Draft (T) ft, Mean	0.792	0.792	0.792	0.792	0.792	0.792	0.792	0.792	0.633	0.604	0.633	0.604	0.633	0.633	0.633	0.604
F.P.	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.667	0.533	0.508	0.533	0.508	0.533	0.533	0.533	0.508
A.P.	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.917	0.733	0.700	0.733	0.700	0.733	0.733	0.733	0.700
Displacement (V) ft <sup>3</sup>	57.50	62.60	67.29	45.74	50.86	55.00	46.56	65.68	48.49	60.65	40.42	50.53	54.59	37.20	46.18	46.60
Wetted Surface (S) ft <sup>2</sup> (Bare Hull)	104.673	114.306	123.768	83.211	92.842	101.711	87.519	120.956	105.071	131.987	87.117	109.364	117.204	82.450	98.714	103.816

Table 3-2  
Geometric Characteristics of Standard Rudders

Characteristic	Rudder Designation		
	B	D	E
Total profile area $A_T$ , ft <sup>2</sup>	0.8869	0.7247	0.6871
Fixed area $A_F$ , ft <sup>2</sup>	0.1118	0.0953	0.0821
Movable area $A_M$ , ft <sup>2</sup>	0.7752	0.6294	0.6050
Mean span $\bar{b}$ , ft	1.1202	0.9153	0.8678
Root chord, ft	0.7917	0.7917	0.7917
Tip chord, ft	0.7917	0.7917	0.7917
Root section (NACA designation)	0015	0015	0015
Tip section (NACA designation)	0015	0015	0015
Aspect ratio (geometric) $b^2/A_T$	1.4149	1.1560	1.0960
Taper ratio $\lambda$	1.0000	1.0000	1.0000
Rudderstock centerline, percent chord from leading edge	30	30	30
Total rudder area ratio $A_T/L \cdot T$			
B/T = 3.00	0.1663 $\frac{B}{L}$		
B/T = 3.75		0.1699 $\frac{B}{L}$	
B/T = 4.50			0.1474 $\frac{E}{I}$
Movable rudder area ratio			
B/T = 3.00	0.1454 $\frac{B}{L}$		
B/T = 3.75		0.1475 $\frac{B}{L}$	
B/T = 4.50			0.1298 $\frac{E}{I}$

Notes: All dimensions listed are in model scale. The centerline of the rudderstock is located at the AP in all cases investigated (see Figure 3-1). Factors given for rudder area ratio apply directly only for specified value of B/T = 3.00, 3.75, or 4.50.

Table 3-3

## Geometric Characteristics of HSMB Stock Propellers

Designation	Standard Propellers		
	B	D	C
HSMB stock no.	105	108	106
Number of blades	4	4	4
Diameter, ft	0.689	0.604	0.833
Pitch at 0.7 radius, ft	0.512	0.499	0.622
Blade chord at 0.7 radius, ft	0.298	0.302	0.371
P/D	0.743	0.826	0.746
B/T = 3.00	0.517		0.625
B/T = 3.75		0.566	
B/T = 4.50		0.593	