half breadths						Simpsons Multiplier	Area under the curve					
Water Level 0	Water level 1	Water Level 2	Water Level 3	Water Level 4	Water Level 5		Water Level 0	Water level 1	Water Level 2	Water Level 3	Water Level 4	Water Level 5
mm	mm	mm	mm	mm	mm		mm	mm	mm	mm	mm	mm
500	0	0	3937	5036	5228	1	500	0	0	3937	5036	5228
500	0	0	4597	5255.4	5379	3	1500	0	0	13791	15766.2	16137
500	0	3846	5113	5500	5482	3	1500	0	11538	15339	16500	16446
593.43	3000	4833	5380.5	5500	5500	2	1186.86	6000	9666	10761	11000	11000
1549.18	4384	5232	5500	5500	5500	3	4647.54	13152	15696	16500	16500	16500
2932.8	4970	5401	5500	5500	5500	3	8798.4	14910	16203	16500	16500	16500
4169.5	5433	5500	5500	5500	5500	2	8339	10866	11000	11000	11000	11000
4300	5461	5500	5500	5500	5500	3	12900	16383	16500	16500	16500	16500
4300	5461	5500	5500	5500	5500	3	12900	16383	16500	16500	16500	16500
3913.61	5211	5500	5500	5500	5500	2	7827.22	10422	11000	11000	11000	11000
2522.5	4173	4751	5085	5282	5282	3	7567.5	12519	14253	15255	15846	15846
1672.14	3160	3793	4249	4657	4892	3	5016.42	9480	11379	12747	13971	14676
855.34	2104	2631	3072	3578	4013	2	1710.68	4208	5262	6144	7156	8026
261.76	1169	1500	1856	2500	3054.4	3	785.28	3507	4500	5568	7500	9163.2
130.88	500	668	941	1492	2094.5	3	392.64	1500	2004	2823	4476	6283.5
0	0	44	196	653	960	1	0	0	44	196	653	960
						Total	75571.54	119330	145545	174561	185904.2	191765.7

Station Spacing : 4000 mm		
Waterplane	Draught (m)	Area under the curve (m^2)
0	0	113.35731
1	1	178.995
2	2	218.3175
3	3	261.8415
4	4	278.8563
5	5	287.64855
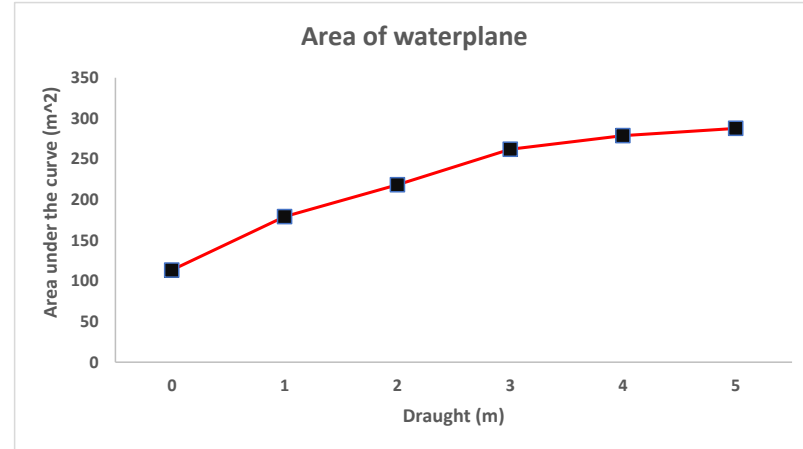
Area of waterplane

waterplane (m)	Area of waterplane(m2)	Simpsons Multiplier	Product
0	113.35731	1	113.3573
1	178.995	4	715.98
2	218.3175	2	436.635
3	261.8415	4	1047.366
4	278.8563	2	557.7126
5	287.64855	1	287.6486
		total	3158.699

Spacing between Waterlines(mm) : 1100

Draught (m)	Spacing between Water level (m)	Volume of displacement (m^3)
0	0	0
1	1.1	304.090347
2	1.1	464.189847
3	1.1	848.224047
4	1.1	1052.718667
5	1.1	1158.189802

Volume of Displacement
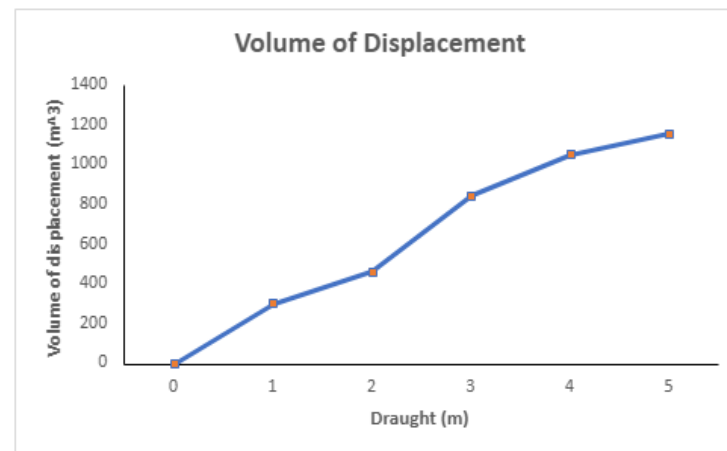
CENTRE OF BUOYANCY:

Draught (m)	Center of Buoyancy (m)
0	0
1	0.5
2	1
3	1.5
4	2
5	2.5
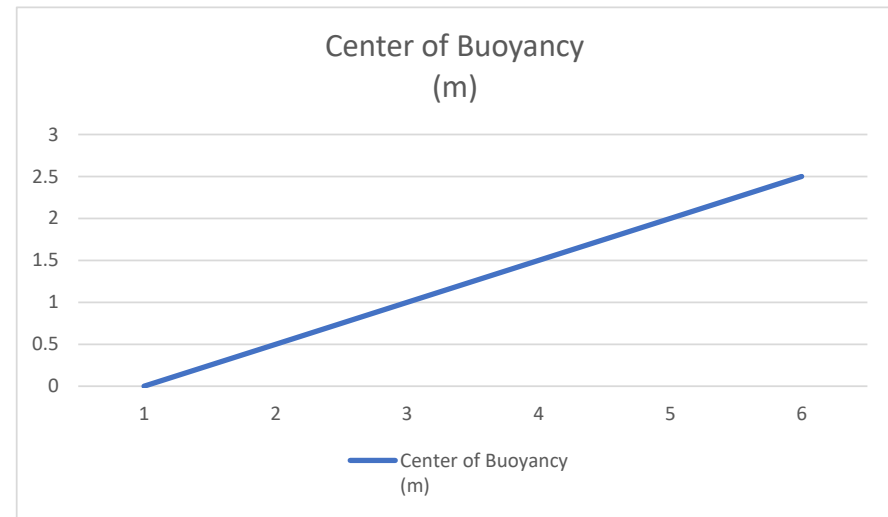
area under the curve							function of volume							function of moment of volume					
Water Level 0	Water level 1	Water Level 2	Water Level 3	Water Level 4	Water Level 5	Simpsons Multiplier	WL 0	WL 1	WL 2	WL 3	WL 4	WL 5	lever arm	WL 0	WL 1	WL 2	WL 3	WL 4	WL 5
mm	mm	mm	mm	mm	mm														
500	0	0	3937	5036	5228	1	0.5	0	0	3.937	5.036	5.228	-30	-15	0	0	-118.11	-151.08	-156.84
1500	0	0	13791	15766.2	16137	3	1.5	0	0	13.791	15.7662	16.137	-26	-39	0	0	-358.566	-409.9212	-419.562
1500	0	11538	15339	16500	16446	3	1.5	0	11.538	15.339	16.5	16.446	-22	-33	0	-253.836	-337.458	-363	-361.812
1186.86	6000	9666	10761	11000	11000	2	1.18686	6	9.666	10.761	11	11	-18	-21.36348	-108	-173.988	-193.698	-198	-198
4647.54	13152	15696	16500	16500	16500	3	4.64754	13.152	15.696	16.5	16.5	16.5	-14	-65.06556	-184.128	-219.744	-231	-231	-231
8798.4	14910	16203	16500	16500	16500	3	8.7984	14.91	16.203	16.5	16.5	16.5	-10	-87.984	-149.1	-162.03	-165	-165	-165
8339	10866	11000	11000	11000	11000	2	8.339	10.866	11	11	11	11	-6	-50.034	-65.196	-66	-66	-66	-66
12900	16383	16500	16500	16500	16500	3	12.9	16.383	16.5	16.5	16.5	16.5	-2	-25.8	-32.766	-33	-33	-33	-33
12900	16383	16500	16500	16500	16500	3	12.9	16.383	16.5	16.5	16.5	16.5	2	25.8	32.766	33	33	33	33
7827.22	10422	11000	11000	11000	11000	2	7.82722	10.422	11	11	11	11	6	46.96332	62.532	66	66	66	66
7567.5	12519	14253	15255	15846	15846	3	7.5675	12.519	14.253	15.255	15.846	15.846	10	75.675	125.19	142.53	152.55	158.46	158.46
5016.42	9480	11379	12747	13971	14676	3	5.01642	9.48	11.379	12.747	13.971	14.676	14	70.22988	132.72	159.306	178.458	195.594	205.464
1710.68	4208	5262	6144	7156	8026	2	1.71068	4.208	5.262	6.144	7.156	8.026	18	30.79224	75.744	94.716	110.592	128.808	144.468
785.28	3507	4500	5568	7500	9163.2	3	0.78528	3.507	4.5	5.568	7.5	9.1632	22	17.27616	77.154	99	122.496	165	201.5904
392.64	1500	2004	2823	4476	6283.5	3	0.39264	1.5	2.004	2.823	4.476	6.2835	26	10.20864	39	52.104	73.398	116.376	163.371
0	0	44	196	653	960	1	0	0	0.044	0.196	0.653	0.96	30	0	0	1.32	5.88	19.59	28.8
						total	75.57154	119.33	145.545	174.561	185.9042	191.7657		-60.3018	5.916	-260.622	-760.458	-734.1732	-630.0606

Draught	∑f(v)	∑f(Mv)	LCB
m			m
0	75.5715	-60.3018	-0.797943669
1	119.33	5.916	0.049576804
2	145.545	-260.622	-1.790662682
3	174.561	-760.458	-4.356402633
4	185.904	-734.173	-3.949204966
5	191.766	-630.061	-3.285571999

Longitudinal Centre of Buoyancy
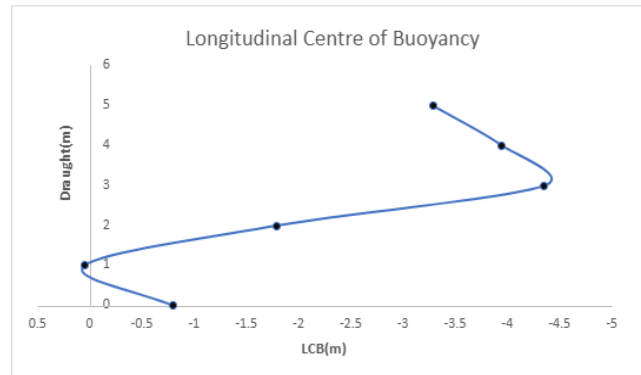
Area under the curve						Simpsons Multiplier	Yi3					
Water Level 0	Water level 1	Water Level 2	Water Level 3	Water Level 4	Water Level 5		WL 0	WL 1	WL 2	WL 3	WL 4	WL 5
mm	mm	mm	mm	mm	mm		m^3	m^3	m^3	m^3	m^3	m^3
500	0	0	3937	5036	5228	1	0.125	0	0	61.02337795	127.7194867	142.8916124
1500	0	0	13791	15766.2	16137	3	10.125	0	0	7868.800418	11757.15785	12606.35845
1500	0	11538	15339	16500	16446	3	10.125	0	4608.004119	10827.10621	13476.375	13344.49405
1186.86	6000	9666	10761	11000	11000	2	3.343709012	432	1806.218841	2492.228682	2662	2662
4647.54	13152	15696	16500	16500	16500	3	301.1554061	6824.905703	11600.80762	13476.375	13476.375	13476.375
8798.4	14910	16203	16500	16500	16500	3	2043.301067	9943.841313	12761.67119	13476.375	13476.375	13476.375
8339	10866	11000	11000	11000	11000	2	1159.770124	2565.896284	2662	2662	2662	2662
12900	16383	16500	16500	16500	16500	3	6440.067	13191.72376	13476.375	13476.375	13476.375	13476.375
12900	16383	16500	16500	16500	16500	3	6440.067	13191.72376	13476.375	13476.375	13476.375	13476.375
7827.22	10422	11000	11000	11000	11000	2	959.0751046	2264.035343	2662	2662	2662	2662
7567.5	12519	14253	15255	15846	15846	3	1300.105345	5886.134383	8686.405717	10650.20312	11936.58815	11936.58815
5016.42	9480	11379	12747	13971	14676	3	378.706646	2555.914176	4420.114779	6213.62747	8180.949893	9482.969723
1710.68	4208	5262	6144	7156	8026	2	10.01235707	149.0243338	291.3952895	463.856468	732.8937048	1034.016483
785.28	3507	4500	5568	7500	9163.2	3	1.452763316	129.3982945	273.375	517.8678313	1265.625	2308.143214
392.64	1500	2004	2823	4476	6283.5	3	0.181595414	10.125	24.14428819	67.4922473	269.0242865	744.2624581
0	0	44	196	653	960	1	0	0	0.000085184	0.007529536	0.278445077	0.884736
						total	19057.61312	57144.72235	76748.88693	98391.71335	109638.1118	113492.1089

Station Spacing (mm) =4000		

Waterplane	Draught(m)	Transverse MI (m^4)
0	0	16940.10055
1	1	50795.30876
2	2	68221.23283
3	3	87459.30076
4	4	97456.09938
5	5	100881.8746

Draught	Center Of Buoyancy	Vol of Disp.	Transverse MI	BM
	KB	V	I_T	I_T/V
m	m	m^3	m^4	m
0	0	0	16940.1	
1	0.5	304.090347	50795.31	167.0402
2	1	464.189847	68221.23	146.9684
3	1.5	848.224047	87459.3	103.1087
4	2	1052.718667	97456.1	92.57564
5	2.5	1158.189802	100881.9	87.10306

Metacentric Height
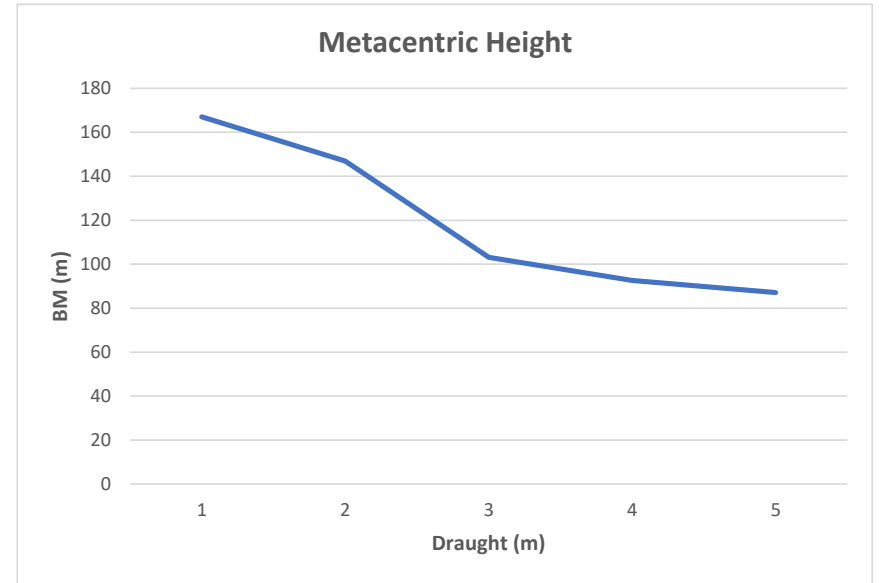
		half breadths				lever arm	simpsons multiplier	Moment of elemental area					
Water Level 0 mm	Water level 1 mm	Water Level 2 mm	Water Level 3 mm	Water Level 4 mm	Water Level 5	lever arm	simpsons multiplier	Water level 0	Water Level 1	Water Level 2	Water Level 3	Water Level 4	Water Level 5
500	0	0	3937	5036	5228	-30	1	-30	0	0	-236.22	-302.16	-313.68
500	0	0	4597	5255.4	5379	-26	3	-78	0	0	-717.132	-819.8424	-839.124
500	0	3846	5113	5500	5482	-22	3	-66	0	-507.672	-674.916	-726	-723.624
593.43	3000	4833	5380.5	5500	5500	-18	2	-42.72696	-216	-347.976	-387.396	-396	-396
1549.18	4384	5232	5500	5500	5500	-14	3	-130.13112	-368.256	-439.488	-462	-462	-462
2932.8	4970	5401	5500	5500	5500	-10	3	-175.968	-298.2	-324.06	-330	-330	-330
4169.5	5433	5500	5500	5500	5500	-6	2	-100.068	-130.392	-132	-132	-132	-132
4300	5461	5500	5500	5500	5500	-2	3	-51.6	-65.532	-66	-66	-66	-66
4300	5461	5500	5500	5500	5500	2	3	51.6	65.532	66	66	66	66
3913.61	5211	5500	5500	5500	5500	6	2	93.92664	125.064	132	132	132	132
2522.5	4173	4751	5085	5282	5282	10	3	151.35	250.38	285.06	305.1	316.92	316.92
1672.14	3160	3793	4249	4657	4892	14	3	140.45976	265.44	318.612	356.916	391.188	410.928
855.34	2104	2631	3072	3578	4013	18	2	61.58448	151.488	189.432	221.184	257.616	288.936
261.76	1169	1500	1856	2500	3054.4	22	3	34.55232	154.308	198	244.992	330	403.1808
130.88	500	668	941	1492	2094.5	26	3	20.41728	78	104.208	146.796	232.752	326.742
0	0	44	196	653	960	30	1	0	0	2.64	11.76	39.18	57.6
							total	-120.6036	11.832	-521.244	-1520.916	-1468.3464	-1260.1212

Draught (m)	Area under the curve (m^2)	Moment of Elemental Area(m^3)	LCF (m)
0	113.35731	-120.604	-1.063927858
1	178.995	11.832	0.066102405
2	218.3175	-521.244	-2.387550242
3	261.8415	-1520.92	-5.80855212
4	278.8563	-1468.35	-5.265615301
5	287.64855	-1260.12	-4.380762566

Longitudinal Center of Flotation
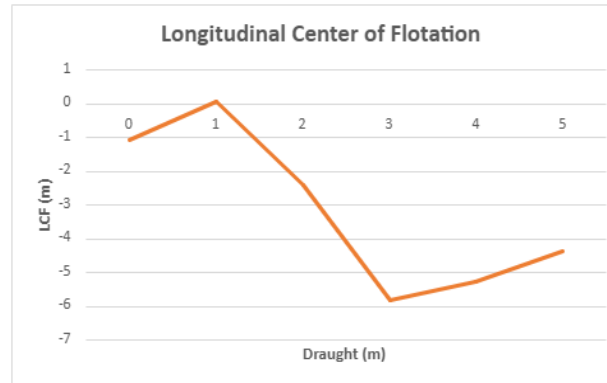
FORM COEFFICIENTS:

Draught	Vol. of Displacement	L	B	T	C_B V/LBT	A_M	C_P V/LA$_M$	C_M A$_M$/BT
m	m³	m	m	m		m²		
1	304.090347	60	11	5	0.092149	11	0.460743	0.2
2	464.189847	60	11	5	0.140664	22	0.351659	0.4
3	848.224047	60	11	5	0.257038	33	0.428396	0.6
4	1052.718667	60	11	5	0.319006	44	0.398757	0.8
5	1158.189802	60	11	5	0.350967	55	0.350967	1
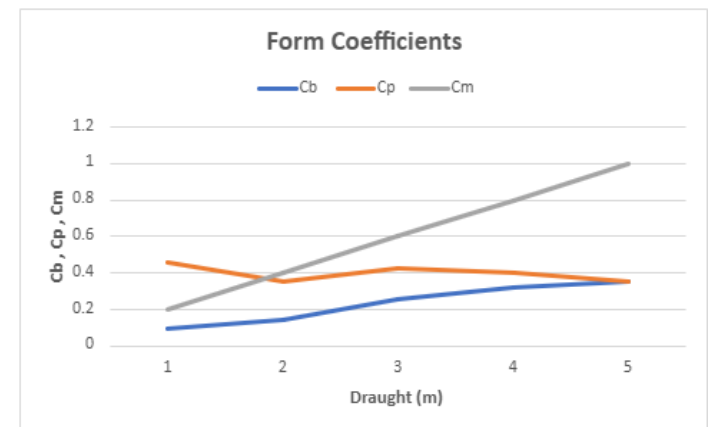
Form Coefficients

COEFFICIENT OF AREA OF WATERPLANE:

Draught	Area of Waterplane A_{WP}	L	B	LB	C_{AWP} $A_{WP}/(LB)$
m	m^2	m	m	m^2	
0	113.35731	60	11	660	0.1717535
1	178.995	60	11	660	0.271204545
2	218.3175	60	11	660	0.330784091
3	261.8415	60	11	660	0.396729545
4	278.8563	60	11	660	0.422509545
5	287.64855	60	11	660	0.435831136

Coefficient of area of waterplane
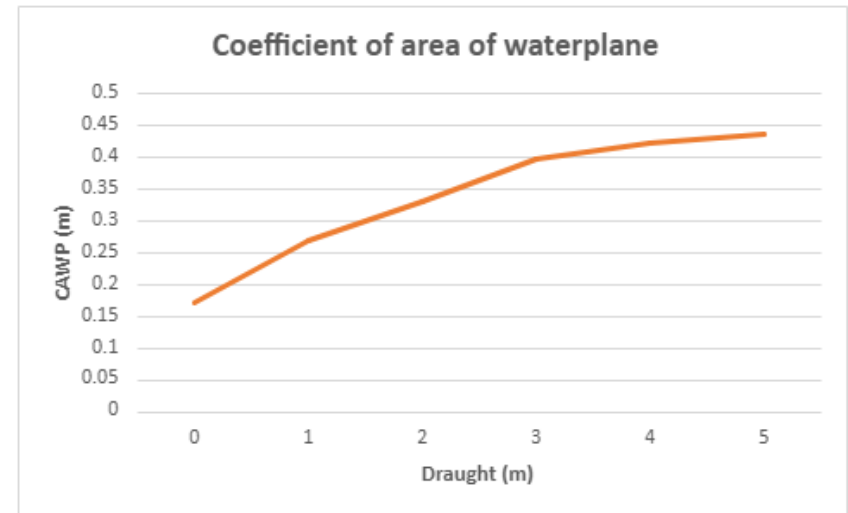
TPC

Draught	Area of Waterplane	Density of Sea Water	TPC
	A_{WP}	ρ	$A_{WP}*0.01*\rho$
m	m^2	t/m^3	t/cm
0	113.35731	1.025	1.161912428
1	178.995	1.025	1.83469875
2	218.3175	1.025	2.237754375
3	261.8415	1.025	2.683875375
4	278.8563	1.025	2.858277075
5	287.64855	1.025	2.948397638

Tonne per cm
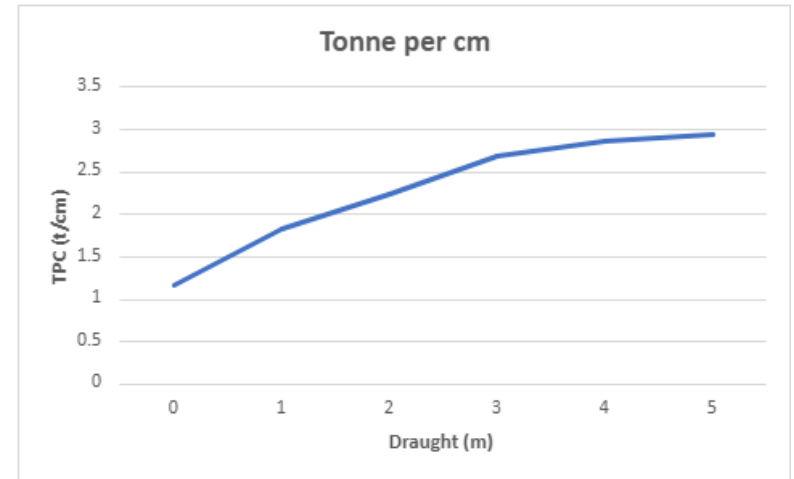
		half breadths						Longitudinal Moment of Inertia					
Water Level 0 mm	Water level 1 mm	Water Level 2 mm	Water Level 3 mm	Water Level 4 mm	Water Level 5	lever arm	simpsons multiplier	Water Level 0 mm	Water level 1 mm	Water Level 2 mm	Water Level 3 mm	Water Level 4 mm	Water Level 5
500	0	0	3937	5036	5228	-30	1	900	0	0	7086.6	9064.8	9410.4
500	0	0	4597	5255.4	5379	-26	3	2028	0	0	18645.432	21315.9024	21817.224
500	0	3846	5113	5500	5482	-22	3	1452	0	11168.784	14848.152	15972	15919.728
593.43	3000	4833	5380.5	5500	5500	-18	2	769.08528	3888	6263.568	6973.128	7128	7128
1549.18	4384	5232	5500	5500	5500	-14	3	1821.83568	5155.584	6152.832	6468	6468	6468
2932.8	4970	5401	5500	5500	5500	-10	3	1759.68	2982	3240.6	3300	3300	3300
4169.5	5433	5500	5500	5500	5500	-6	2	600.408	782.352	792	792	792	792
4300	5461	5500	5500	5500	5500	-2	3	103.2	131.064	132	132	132	132
4300	5461	5500	5500	5500	5500	2	3	103.2	131.064	132	132	132	132
3913.61	5211	5500	5500	5500	5500	6	2	563.55984	750.384	792	792	792	792
2522.5	4173	4751	5085	5282	5282	10	3	1513.5	2503.8	2850.6	3051	3169.2	3169.2
1672.14	3160	3793	4249	4657	4892	14	3	1966.43664	3716.16	4460.568	4996.824	5476.632	5752.992
855.34	2104	2631	3072	3578	4013	18	2	1108.52064	2726.784	3409.776	3981.312	4637.088	5200.848
261.76	1169	1500	1856	2500	3054.4	22	3	760.15104	3394.776	4356	5389.824	7260	8869.9776
130.88	500	668	941	1492	2094.5	26	3	530.84928	2028	2709.408	3816.696	6051.552	8495.292
0	0	44	196	653	960	30	1	0	0	79.2	352.8	1175.4	1728
							total	15980.4264	28189.968	46539.336	80757.768	92866.5744	99107.6616

Draught (m)	Longitudinal MI	Volume of displacement (m^3)	Unit wt of sea water (t/m^3) ®	BM_L	Weight of displacement of ship	Length (L)	MTC
0	15980.43	304.090347					
1	28189.97	464.189847	1.025	60.72939807	475.7945932	60	4.815786542
2	46539.34	848.224047	1.025	54.86680101	869.4296482	60	7.950470583
3	80757.77	1052.718667	1.025	76.71353471	1079.036634	60	13.79611904
4	92866.57	1158.189802	1.025	80.18251399	1187.144547	60	15.86470571
5	99107.66	340732135.1	1.025	0.000290867	349250438.5	60	16.93089192

Moment to Change Trim by 1 cm