Расчёты элементов статики и остойчивости модели бронированного катера БМО пр.194

1. **Выдержка из таблицы нагрузок катера БМО**

2. **Гидростатические характеристики**

3. **Элементы статики при больших углах крена и характеристики ДСО при штатных нагрузках**

   3.1 водоизмещение порожнем 41.7 т
   3.2 водоизмещение стандартное 50.7 т
   3.3 водоизмещение нормальное 55,0 т
   3.4 водоизмещение полное 60.5 т
   3.5 водоизмещение наибольшее 72.0 т

4. **Проверка модели по основному критерию Правил РРР 2015 при полном водоизмещении**

   4.1. Расчётная амплитуда качки и кренящий момент
   4.2. Предельно допустимый момент и основной критерий

1. Выдержка из таблицы нагрузок катера БМО

	Вес, m	Центр тяжести		Водоизмещение							
		от основной. z	от мидел. x	порожнем				стандартное			
				P	% D	Mx	Mz	P	% D	Mx	Mz
Корпус	33,69	1.45	-0,36	33,7	80,8	-12,0	49,0	33,7	66,5	-12,0	49,-0
Вооружение	2.97	2.88	-0.90	3,0	7,2	-2,7	8.6	3,0	5,9	-2,7	8,6
Боезапас	4.87	2.04	-2.42	—	—	—	—	4,9	9,7	11.8	10,0
Мины и дополнительный запас снарядов	11.48	2,76	-5.58	—	—	—	—	—	—	—	—
Механизмы	5,00	0,94	-5,43	5,0	12,0	-27,2	4,7	5,0	9,8	-27.2	4,7
Топливо	8,00	1,15	-0,70	—	—	—	—	—	—	—	—
Топливо 50%	4,00	0,85	-0,70	—	—	—	—	—	—	—	—
Масло	0,50	0,98	-4,42	—	—	—	—	—	—	—	—
Масло 50%	0,25	0,65	-4,42	—	—	—	—	—	—	—	—
Вода	2,20	1.26	1.33	—	—	—	—	0,9	1,7	3.4	1,1
Вода 50%	1,10	0.9	1.33	—	—	—	—	—	—	—	—
Снабжение, команда и провизия	3,25	1.29	1.01	—	—	—	—	3,25	6,4	3,3	4.2
Сумма весов и моментов				41,7		-41.9	62,3	50,7		47,0	77,6
Отстояние центра тяжести корабля от миделя Xg/от ОП Zg						-1,00	1,49			- 0,93	1,53

	Вес, m	Центр тяжести		Водоизмещение							
		от основной. z	от мидел. x	нормальное				полное			
				P	% D	Mx	Mz	P	% D	Mx	Mz
Корпус	33,69	1.45	-0,36	33,7	61,2	-12,0	49.0	33,7	55.8	-12.0	47.0
Вооружение	2.97	2.88	-0.90	3,0	5,5	-2,7	8,6	3,0	5,0	-2,7	8,6
Боезапас	4.87	2.04	-2.42	4,9	8,6	-11,8	10,0	4,9	8,1	-11.8	10,0
Мины и дополнительный запас снарядов	11.48	2,76	-5.58	—	—	—	—	—	—	—	—
Механизмы	5,00	0,94	-5,43	5,0	9,1	-27,2	4,7	5,0	8,3	-27.2	4,7
Топливо	8,00	1,15	-0,70	—	—	—	—	8,0	13,2	—5.6	9,2
Топливо 50%	4,00	0,85	-0,70	4,0	7,2	-2,7	3,4	—	—	—	—
Масло	0,50	0,98	-4,42	—	—	—	—	0,5	0,8	—2,2	0,5
Масло 50%	0,25	0,65	-4,42	0,25	0,5	-1,1	0,2	—	—	—	—
Вода	2,20	1.26	1.33	—	—	—	—	2,2	3,7	2,9	2,8
Вода 50%	1,10	0.9	1.33	1,1	2,0	1,5	1.0	—	—	—	—
Снабжение, команда и провизия	3,25	1.29	1.01	3.25	5,9	3,3	4,2	3.25	5,3	3,3	4,2
Сумма весов и моментов				55,2		-52.7	81,1	60,5		-55,3	89,0
Отстояние центра тяжести корабля от миделя Xg/от ОП Zg						-0,95	1,47			-0,91	1,47

2. Гидростатические характеристики

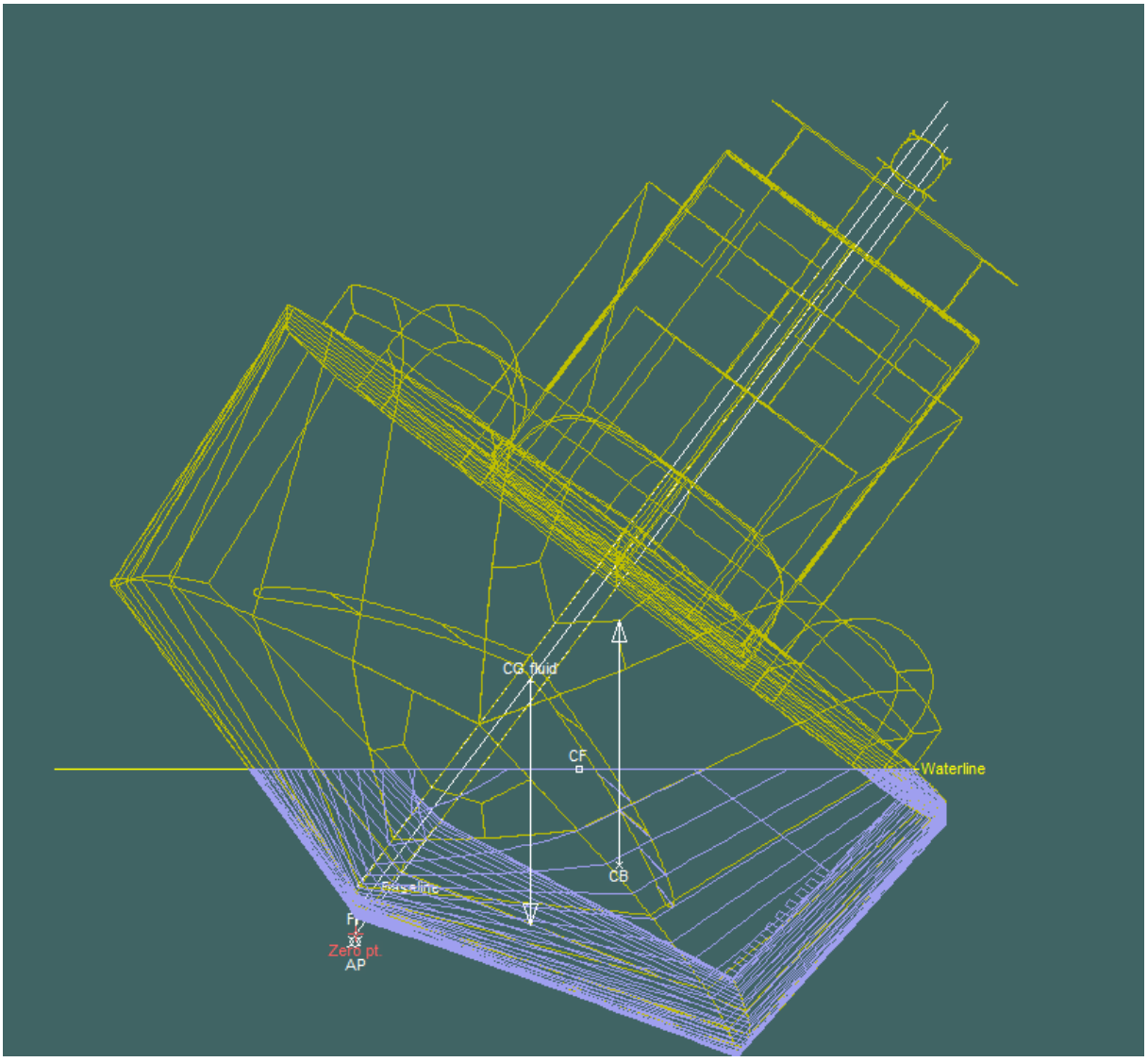
№1–порожнем, №2-стандартное, №3–нормальное, №4–полное, №5 – наибольшее

Нагрузка № 1 2 3 4 5

1	Draft Amidships m	0,873	0,980	1,033	1,095	1,214
2	Displacement t	41,70	50,70	55,20	60,50	72,00
3	Volume (displaced) m^3	41,700	50,700	55,200	60,500	72,000
4	Heel deg	0,0	0,0	0,0	0,0	0,0
5	Draft at FP m	0,713	0,833	0,881	0,952	0,881
6	Draft at AP m	1,032	1,127	1,184	1,239	1,547
7	Trim (+ve by stern) m	0,319	0,294	0,302	0,287	0,666
8	WL Length m	23,810	23,888	23,916	23,955	23,924
9	Beam max on WL m	4,028	4,042	4,048	4,057	4,072
10	Sect. area amidships m^2	2,339	2,772	2,984	3,237	3,721
11	Wetted Area m^2	97,606	103,325	106,079	109,313	116,059
12	Waterpl. Area m^2	84,023	85,113	85,505	85,977	86,396
13	Waterpl. Itrans m^4	99,375	101,625	102,594	103,768	105,673
14	Waterpl. Ilong m^4	3281,72	3379,40	3410,21	3447,60	3457,03
15	Prismatic coeff. (Cp)	0,749	0,766	0,773	0,780	0,809
16	Block coeff. (Cb)	0,498	0,536	0,552	0,569	0,609
17	Midship Sect. area coeff. (Cm)	0,665	0,700	0,714	0,729	0,753
18	Waterpl. area coeff. (Cwp)	0,876	0,882	0,883	0,885	0,887
19	LCB from aft perp. (+ve fwd) m	10,989	11,059	11,040	11,081	10,324
20	VCB m	0,595	0,655	0,685	0,719	0,806
21	LCF from aft perp. (+ve fwd) m	10,963	11,052	11,075	11,106	11,060
22	VCF m	0,887	0,992	1,044	1,106	1,240
23	KG m	1,490	1,530	1,470	1,470	1,680
24	BMt m	2,383	2,004	1,859	1,715	1,468
25	BML m	78,698	66,655	61,779	56,985	48,014
26	GMt m	1,488	1,130	1,074	0,964	0,594
27	GML m	77,803	65,780	60,994	56,234	47,140
28	KMt m	2,978	2,660	2,544	2,434	2,274
29	KML m	79,286	67,305	62,459	57,700	48,802
30	Immersion (TPc) tonne/cm	0,840	0,851	0,855	0,860	0,864
31	MTc tonne.m	1,352	1,389	1,403	1,417	1,414
32	GZ m	0,000	0,000	0,000	0,000	0,000
33	RM at 1deg = GMt.Disp.sin(1) tonne.m	1,083	1,000	1,034	1,018	0,746
34	Max deck inclination deg	0,7609	0,7030	0,7220	0,6852	1,5905
35	Trim angle (+ve by stern) deg	0,7609	0,7030	0,7220	0,6852	1,5905
36	Density of Seawater tonne/m^3	1,000	1,000	1,000	1,000	1,000
37	Lat.proj. Windage area m^2	42,431	39,853	38,589	37,085	34,236
38	Lat.proj. Windage VCA (world) m	1,837	1,896	1,925	1,960	2,027
39	Lat.proj. Underwater area m^2	18,353	20,931	22,194	23,699	26,547
40	Lat.proj. Underwater VCA (world) m	0,466	0,523	0,551	0,583	0,645

3.Элементы статики при больших углах крена и характеристики ДСО при штатных нагрузках

Схема расположения центров тяжести CG, величины CB и ватерлинии CF , а также максимального плеча статической остойчивости при крене,соответствующем углу максимума 38 градусов с учётом сопутствующего дифферента.Водоизмещение полное 60,5 тонн.



3.1 Водоизмещение порожнем 41,7 т

Stability Calculation - BMO 41,7

Stability 20.00.06.0, build: 0 Model file: C:\Users\PC\Desktop\BMO file\BMO 41,7 (Medium precision, 59 sections, Trimming off, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance -ideal(worst case): Disp.%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Loadcase - BMO
Damage Case - Intact
Free to Trim
Specific gravity = 1; (Density = 1 tonne/m^3)
Fluid analysis method: Use corrected VCG

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	41,700	41,700			11,000	0,000	1,490	0,000	User Specif
2	**Total Loadcase**			**41,700**	**0,000**	**0,000**	**11,000**	**0,000**	**1,490**	**0,000**	
3	**FS correction**								**0,000**		
4	**VCG fluid**								**1,490**		

Heel to Starboard deg	0,0	5,0	10,0	15,0	20,0	25,0	30,0	35,0	40,0
GZ m	0,000	0,129	0,246	0,329	0,385	0,424	0,452	0,475	0,495
Area under GZ curve from zero heel m.rad	0,0000	0,0057	0,0223	0,0476	0,0789	0,1143	0,1526	0,1931	0,2355
Displacement t	41,70	41,70	41,70	41,70	41,70	41,70	41,70	41,70	41,70
Volume (displaced) m^3	41,700	41,704	41,700	41,700	41,700	41,700	41,700	41,700	41,700
Draft at FP m	0,713	0,711	0,703	0,684	0,652	0,609	0,551	0,476	0,378
Draft at AP m	1,032	1,032	1,024	1,000	0,960	0,903	0,829	0,734	0,617
Draft Amidships m	0,873	0,871	0,864	0,842	0,806	0,756	0,690	0,605	0,498
Trim (+ve by stern) m	0,319	0,321	0,321	0,316	0,307	0,294	0,278	0,259	0,239
WL Length m	23,810	23,808	23,802	23,788	23,763	23,726	23,670	23,585	23,442
Beam max extents on WL m	4,028	4,043	3,974	3,706	3,526	3,410	3,346	3,327	3,231
Wetted Area m^2	97,606	97,052	94,216	91,171	89,180	87,953	87,349	87,250	87,838
Waterpl. Area m^2	84,023	83,490	79,642	75,117	72,099	70,243	69,367	69,371	68,482
Prismatic coeff. (Cp)	0,749	0,750	0,757	0,764	0,768	0,771	0,773	0,776	0,779
Block coeff. (Cb)	0,498	0,497	0,510	0,562	0,617	0,682	0,763	0,878	1,107
LCB from aft perp. (+ve fwd) m	10,989	10,988	10,988	10,988	10,988	10,989	10,989	10,990	10,991
LCF from aft perp. (+ve fwd) m	10,963	10,975	11,050	11,119	11,177	11,228	11,275	11,317	11,442
KG fluid m	1,490	1,490	1,490	1,490	1,490	1,490	1,490	1,490	1,490
GMt corrected m	1,488	1,457	1,146	0,774	0,537	0,386	0,297	0,259	0,162
Max deck inclination deg	0,7609	5,0578	10,0282	15,0173	20,0114	25,0076	30,0050	35,0032	40,0020
Trim angle (+ve by stern) deg	0,7609	0,7665	0,7666	0,7549	0,7329	0,7022	0,6634	0,6175	0,5715

Heel to Starboard deg	45,0	50,0	55,0	60,0	65,0	70,0	75,0	80,0	85,0
GZ m	0,497	0,479	0,444	0,393	0,328	0,251	0,167	0,078	-0,014
Area under GZ curve from zero heel m.rad	0,2789	0,3216	0,3620	0,3986	0,4302	0,4555	0,4738	0,4846	0,4874
Displacement t	41,70	41,70	41,70	41,70	41,70	41,70	41,70	41,70	41,70
Volume (displaced) m^3	41,700	41,700	41,700	41,700	41,696	41,698	41,698	41,700	41,699
Draft at FP m	0,256	0,108	-0,075	-0,319	-0,664	-1,180	-2,033	-3,733	-8,793
Draft at AP m	0,484	0,332	0,149	-0,083	-0,399	-0,863	-1,625	-3,124	-7,602
Draft Amidships m	0,370	0,220	0,037	-0,201	-0,532	-1,022	-1,829	-3,429	-8,197
Trim (+ve by stern) m	0,229	0,224	0,223	0,236	0,265	0,317	0,409	0,609	1,191
WL Length m	23,168	22,939	22,850	22,813	22,899	23,106	23,282	23,435	23,573
Beam max extents on WL m	3,000	2,824	2,685	2,497	2,337	2,214	2,119	2,047	1,995
Wetted Area m^2	88,751	89,408	89,537	88,901	88,274	87,735	87,512	87,381	87,317
Waterpl. Area m^2	64,583	61,063	57,667	53,586	50,104	47,294	45,272	43,740	42,622
Prismatic coeff. (Cp)	0,790	0,800	0,807	0,813	0,814	0,812	0,810	0,810	0,809
Block coeff. (Cb)	1,621	2,925	18,447	0,000	0,000	0,000	0,000	0,000	0,000
LCB from aft perp. (+ve fwd) m	10,992	10,993	10,993	10,993	10,993	10,994	10,994	10,992	10,994
LCF from aft perp. (+ve fwd) m	11,575	11,673	11,684	11,682	11,666	11,626	11,626	11,625	11,622
KG fluid m	1,490	1,490	1,490	1,490	1,490	1,490	1,490	1,490	1,490
GMt corrected m	-0,095	-0,304	-0,481	-0,674	-0,821	-0,924	-0,995	-1,045	-1,073
Max deck inclination deg	45,0013	50,0009	55,0006	60,0004	65,0003	70,0002	75,0001	80,0001	85,0000
Trim angle (+ve by stern) deg	0,5458	0,5337	0,5335	0,5629	0,6319	0,7566	0,9752	1,4533	2,8407

	Name	Long. Pos. m	Offset m	Height m	Type	Linked to	Flood from	Intact (use for intact case)	Damage (use for damage cases)
1	DF point	17,1	1,75	2,43	Downflooding point	None	Sea	☑	☑
2	DF point	17,1	-1,75	2,43	Downflooding point	None	Sea	☑	☑

	Key point	Type	Immersion angle deg	Emergence angle deg
1	Margin Line (immersion pos = 0 m)		21,5	n/a
2	Deck Edge (immersion pos = 0 m)		24,5	n/a
3	DF point	Downflooding point	53,8	0
4	DF point	Downflooding point	Not immersed in positive range	0

	Code	Criteria	Value	Units	Actual	Status	Margin %
1	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 30**				**Pass**	
2		*from the greater of*					
3		spec. heel angle	0,0	deg	0,0		
4		*to the lesser of*					
5		spec. heel angle	30,0	deg	30,0		
6		angle of vanishing stability	84,2	deg			
7		**shall not be less than (>=)**	**0,0550**	**m.rad**	**0,1526**	**Pass**	+177,38
8							
9	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 40**				**Pass**	
10		*from the greater of*					
11		spec. heel angle	0,0	deg	0,0		
12		*to the lesser of*					
13		spec. heel angle	40,0	deg	40,0		
14		first downflooding angle	53,8	deg			
15		angle of vanishing stability	84,2	deg			
16		**shall not be less than (>=)**	**0,0900**	**m.rad**	**0,2355**	**Pass**	+161,63
17							
18	**267(85) Ch2 - General Criteria**	**2.2.1: Area 30 to 40**				**Pass**	
19		*from the greater of*					
20		spec. heel angle	30,0	deg	30,0		
21		*to the lesser of*					
22		spec. heel angle	40,0	deg	40,0		
23		first downflooding angle	53,8	deg			
24		angle of vanishing stability	84,2	deg			
25		**shall not be less than (>=)**	**0,0300**	**m.rad**	**0,0829**	**Pass**	+176,34
26							
27	**267(85) Ch2 - General Criteria**	**2.2.2: Max GZ at 30 or greater**				**Pass**	
28		*in the range from the greater of*					
29		spec. heel angle	30,0	deg	30,0		
30		*to the lesser of*					
31		spec. heel angle	90,0	deg			
32		angle of max. GZ	43,2	deg	43,2		
33		**shall not be less than (>=)**	**0,200**	**m**	**0,499**	**Pass**	+149,50
34		*Intermediate values*					
35		angle at which this GZ occurs		deg	43,2		
36							
37	**267(85) Ch2 - General Criteria**	**2.2.3: Angle of maximum GZ**				**Pass**	
38		**shall not be less than (>=)**	**25,0**	**deg**	**43,2**	**Pass**	+72,73
39							
40	**267(85) Ch2 - General Criteria**	**2.2.4: Initial GMt**				**Pass**	
41		spec. heel angle	0,0	deg			
42		**shall not be less than (>=)**	**0,150**	**m**	**1,488**	**Pass**	+892,00
43							

3.2 Водоизмещение стандартное 50,7 т

Stability Calculation - BMO 50,7

Stability 20.00.06.0, build: 0Model file: C:\Users\PC\Desktop\BMO file\BMO 50,7 (Medium precision, 59 sections, Trimming off, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance -ideal(worst case): Disp.%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Loadcase - BMO
Damage Case - Intact
Free to Trim
Specific gravity = 1; (Density = 1 tonne/m^3)
Fluid analysis method: Use corrected VCG

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	50,700	50,700			11,070	0,000	1,530	0,000	User Specif
2	**Total Loadcase**			**50,700**	**0,000**	**0,000**	**11,070**	**0,000**	**1,530**	**0,000**	
3	**FS correction**								**0,000**		
4	**VCG fluid**								**1,530**		

Heel to Starboard deg	0,0	5,0	10,0	15,0	20,0	25,0	30,0	35,0	40,0
GZ m	0,000	0,099	0,199	0,282	0,340	0,382	0,414	0,438	0,445
Area under GZ curve from zero heel m.rad	0,0000	0,0043	0,0173	0,0385	0,0658	0,0974	0,1322	0,1694	0,2081
Displacement t	50,70	50,70	50,70	50,70	50,70	50,70	50,70	50,70	50,70
Volume (displaced) m^3	50,700	50,700	50,700	50,700	50,700	50,700	50,700	50,700	50,700
Draft at FP m	0,833	0,832	0,826	0,814	0,789	0,751	0,699	0,630	0,541
Draft at AP m	1,127	1,127	1,125	1,111	1,081	1,034	0,970	0,887	0,796
Draft Amidships m	0,980	0,979	0,976	0,962	0,935	0,893	0,835	0,758	0,669
Trim (+ve by stern) m	0,294	0,296	0,299	0,298	0,292	0,283	0,270	0,257	0,255
WL Length m	23,888	23,887	23,883	23,876	23,860	23,835	23,798	23,743	23,660
Beam max extents on WL m	4,042	4,057	4,104	3,934	3,741	3,616	3,546	3,456	3,162
Wetted Area m^2	103,325	103,311	102,335	99,469	97,360	96,057	95,396	95,601	96,842
Waterpl. Area m^2	85,113	85,350	84,562	80,398	77,198	75,245	74,343	73,146	68,407
Prismatic coeff. (Cp)	0,766	0,766	0,769	0,775	0,780	0,784	0,787	0,789	0,794
Block coeff. (Cb)	0,536	0,534	0,530	0,561	0,608	0,659	0,720	0,815	1,014
LCB from aft perp. (+ve fwd) m	11,059	11,060	11,058	11,059	11,059	11,060	11,060	11,061	11,061
LCF from aft perp. (+ve fwd) m	11,052	11,041	11,081	11,151	11,215	11,272	11,325	11,451	11,622
KG fluid m	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530
GMt corrected m	1,130	1,146	1,104	0,795	0,562	0,415	0,329	0,222	-0,057
Max deck inclination deg	0,7030	5,0490	10,0244	15,0153	20,0103	25,0070	30,0047	35,0031	40,0023
Trim angle (+ve by stern) deg	0,7030	0,7056	0,7138	0,7102	0,6969	0,6749	0,6455	0,6133	0,6079

Heel to Starboard deg	45,0	50,0	55,0	60,0	65,0	70,0	75,0	80,0	85,0
GZ m	0,430	0,398	0,353	0,299	0,236	0,165	0,086	0,004	-0,081
Area under GZ curve from zero heel m.rad	0,2465	0,2827	0,3156	0,3441	0,3675	0,3851	0,3961	0,4000	0,3967
Displacement t	50,70	50,70	50,70	50,70	50,70	50,70	50,70	50,70	50,70
Volume (displaced) m^3	50,700	50,695	50,696	50,697	50,698	50,699	50,699	50,704	50,703
Draft at FP m	0,437	0,313	0,163	-0,028	-0,293	-0,694	-1,359	-2,689	-6,663
Draft at AP m	0,697	0,585	0,450	0,281	0,058	-0,268	-0,804	-1,861	-5,014
Draft Amidships m	0,567	0,449	0,307	0,127	-0,117	-0,481	-1,082	-2,275	-5,838
Trim (+ve by stern) m	0,260	0,271	0,287	0,309	0,351	0,426	0,555	0,828	1,649
WL Length m	23,534	23,328	23,179	23,099	23,222	23,410	23,570	23,710	23,833
Beam max extents on WL m	2,937	2,763	2,629	2,539	2,414	2,284	2,185	2,111	2,057
Wetted Area m^2	97,843	98,543	99,052	99,360	99,182	98,598	98,305	98,139	98,062
Waterpl. Area m^2	64,187	60,682	57,872	55,511	52,734	49,755	47,564	45,919	44,731
Prismatic coeff. (Cp)	0,801	0,810	0,819	0,824	0,824	0,821	0,819	0,818	0,817
Block coeff. (Cb)	1,294	1,751	2,710	6,812	0,000	0,000	0,000	0,000	0,000
LCB from aft perp. (+ve fwd) m	11,062	11,062	11,062	11,062	11,062	11,062	11,062	11,061	11,061
LCF from aft perp. (+ve fwd) m	11,726	11,786	11,837	11,866	11,845	11,800	11,787	11,778	11,772
KG fluid m	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530	1,530
GMt corrected m	-0,279	-0,446	-0,571	-0,671	-0,772	-0,864	-0,924	-0,964	-0,985
Max deck inclination deg	45,0017	50,0013	55,0009	60,0007	65,0005	70,0004	75,0003	80,0002	85,0001
Trim angle (+ve by stern) deg	0,6218	0,6478	0,6853	0,7376	0,8383	1,0174	1,3254	1,9751	3,9305

	Name	Long. Pos. m	Offset m	Height m	Type	Linked to	Flood from	Intact (use for intact case)	Damage (use for damage cases)
1	DF point	17,1	1,75	2,43	Downflooding point	None	Sea	☑	☑
2	DF point	17,1	-1,75	2,43	Downflooding point	None	Sea	☑	☑

	Key point	Type	Immersion angle deg	Emergence angle deg
1	Margin Line (immersion pos = 0 m)		16,8	n/a
2	Deck Edge (immersion pos = 0 m)		19,5	n/a
3	DF point	Downflooding point	49	0
4	DF point	Downflooding point	Not immersed in positive range	0

	Code	Criteria	Value	Units	Actual	Status	Margin %
1	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 30**				**Pass**	
2		*from the greater of*					
3		spec. heel angle	0,0	deg	0,0		
4		*to the lesser of*					
5		spec. heel angle	30,0	deg	30,0		
6		angle of vanishing stability	80,2	deg			
7		**shall not be less than (>=)**	**0,0550**	**m.rad**	**0,1322**	**Pass**	+140,30
8							
9	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 40**				**Pass**	
10		*from the greater of*					
11		spec. heel angle	0,0	deg	0,0		
12		*to the lesser of*					
13		spec. heel angle	40,0	deg	40,0		
14		first downflooding angle	49,0	deg			
15		angle of vanishing stability	80,2	deg			
16		**shall not be less than (>=)**	**0,0900**	**m.rad**	**0,2081**	**Pass**	+131,27
17							
18	**267(85) Ch2 - General Criteria**	**2.2.1: Area 30 to 40**				**Pass**	
19		*from the greater of*					
20		spec. heel angle	30,0	deg	30,0		
21		*to the lesser of*					
22		spec. heel angle	40,0	deg	40,0		
23		first downflooding angle	49,0	deg			
24		angle of vanishing stability	80,2	deg			
25		**shall not be less than (>=)**	**0,0300**	**m.rad**	**0,0760**	**Pass**	+153,26
26							
27	**267(85) Ch2 - General Criteria**	**2.2.2: Max GZ at 30 or greater**				**Pass**	
28		*in the range from the greater of*					
29		spec. heel angle	30,0	deg	30,0		
30		*to the lesser of*					
31		spec. heel angle	90,0	deg			
32		angle of max. GZ	39,1	deg	39,1		
33		**shall not be less than (>=)**	**0,200**	**m**	**0,446**	**Pass**	+123,00
34		*Intermediate values*					
35		angle at which this GZ occurs		deg	39,1		
36							
37	**267(85) Ch2 - General Criteria**	**2.2.3: Angle of maximum GZ**				**Pass**	
38		**shall not be less than (>=)**	**25,0**	**deg**	**39,1**	**Pass**	+56,36
39							
40	**267(85) Ch2 - General Criteria**	**2.2.4: Initial GMt**				**Pass**	
41		spec. heel angle	0,0	deg			
42		**shall not be less than (>=)**	**0,150**	**m**	**1,130**	**Pass**	+653,33
43							

№3 Водоизмещение нормальное 55,2 т

Stability Calculation - BMO 55,2

Stability 20.00.06.0, build: 0 Model file: C:\Users\PC\Desktop\BMO file\BMO 55,2 (Medium precision, 59 sections, Trimming off, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance -ideal(worst case): Disp.%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Loadcase - BMO
Damage Case - Intact
Free to Trim
Specific gravity = 1; (Density = 1 tonne/m^3)
Fluid analysis method: Use corrected VCG

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	55,200	55,200			11,050	0,000	1,470	0,000	User Specif
2	**Total Loadcase**			**55,200**	**0,000**	**0,000**	**11,050**	**0,000**	**1,470**	**0,000**	
3	**FS correction**								**0,000**		
4	**VCG fluid**								**1,470**		

Heel to Starboard deg	**0,0**	**5,0**	**10,0**	**15,0**	**20,0**	**25,0**	**30,0**	**35,0**	**40,0**
GZ m	0,000	0,094	0,191	0,280	0,347	0,397	0,436	0,465	0,469
Area under GZ curve from zero heel m.rad	0,0000	0,0041	0,0165	0,0372	0,0647	0,0972	0,1337	0,1731	0,2140
Displacement t	55,20	55,20	55,20	55,20	55,20	55,20	55,20	55,20	55,20
Volume (displaced) m^3	55,200	55,200	55,200	55,200	55,200	55,200	55,200	55,200	55,200
Draft at FP m	0,881	0,880	0,875	0,865	0,842	0,807	0,757	0,689	0,605
Draft at AP m	1,184	1,184	1,182	1,174	1,149	1,107	1,049	0,977	0,903
Draft Amidships m	1,033	1,032	1,029	1,019	0,995	0,957	0,903	0,833	0,754
Trim (+ve by stern) m	0,302	0,304	0,307	0,309	0,307	0,301	0,291	0,287	0,298
WL Length m	23,916	23,915	23,912	23,906	23,893	23,871	23,839	23,791	23,722
Beam max extents on WL m	4,048	4,064	4,111	4,044	3,845	3,717	3,645	3,419	3,129
Wetted Area m^2	106,079	106,105	105,745	103,438	101,264	99,909	99,224	100,026	101,318
Waterpl. Area m^2	85,505	85,807	86,016	82,904	79,611	77,609	76,691	73,153	67,976
Prismatic coeff. (Cp)	0,773	0,774	0,775	0,781	0,786	0,790	0,793	0,796	0,801
Block coeff. (Cb)	0,552	0,550	0,546	0,560	0,604	0,650	0,704	0,815	0,986
LCB from aft perp. (+ve fwd) m	11,040	11,040	11,040	11,040	11,040	11,040	11,040	11,041	11,041
LCF from aft perp. (+ve fwd) m	11,075	11,072	11,078	11,143	11,209	11,268	11,324	11,541	11,690
KG fluid m	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470
GMt corrected m	1,074	1,091	1,107	0,891	0,656	0,507	0,419	0,193	-0,084
Max deck inclination deg	0,7220	5,0517	10,0258	15,0165	20,0113	25,0079	30,0055	35,0039	40,0031
Trim angle (+ve by stern) deg	0,7220	0,7247	0,7331	0,7376	0,7319	0,7174	0,6957	0,6860	0,7103

Heel to Starboard deg	**45,0**	**50,0**	**55,0**	**60,0**	**65,0**	**70,0**	**75,0**	**80,0**	**85,0**
GZ m	0,452	0,420	0,376	0,323	0,263	0,196	0,123	0,045	-0,035
Area under GZ curve from zero heel m.rad	0,2543	0,2925	0,3272	0,3578	0,3834	0,4034	0,4174	0,4248	0,4252
Displacement t	55,20	55,20	55,20	55,20	55,20	55,20	55,20	55,20	55,20
Volume (displaced) m^3	55,197	55,198	55,199	55,199	55,199	55,199	55,202	55,203	55,202
Draft at FP m	0,508	0,395	0,257	0,083	-0,156	-0,512	-1,107	-2,294	-5,846
Draft at AP m	0,824	0,734	0,628	0,495	0,320	0,071	-0,337	-1,146	-3,559
Draft Amidships m	0,666	0,564	0,442	0,289	0,082	-0,220	-0,722	-1,720	-4,702
Trim (+ve by stern) m	0,315	0,339	0,370	0,412	0,476	0,583	0,770	1,148	2,287
WL Length m	23,625	23,474	23,312	23,218	23,332	23,515	23,669	23,804	23,923
Beam max extents on WL m	2,907	2,735	2,603	2,508	2,426	2,321	2,219	2,142	2,087
Wetted Area m^2	102,326	103,086	103,681	104,155	104,319	103,828	103,535	103,355	103,267
Waterpl. Area m^2	63,701	60,292	57,617	55,521	53,555	50,860	48,624	46,934	45,710
Prismatic coeff. (Cp)	0,807	0,815	0,824	0,830	0,829	0,826	0,824	0,823	0,822
Block coeff. (Cb)	1,207	1,524	2,057	3,284	11,858	0,000	0,000	0,000	0,000
LCB from aft perp. (+ve fwd) m	11,040	11,040	11,040	11,040	11,040	11,040	11,040	11,041	11,042
LCF from aft perp. (+ve fwd) m	11,782	11,848	11,902	11,950	11,941	11,851	11,839	11,828	11,820
KG fluid m	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470
GMt corrected m	-0,290	-0,444	-0,562	-0,648	-0,724	-0,803	-0,865	-0,908	-0,932
Max deck inclination deg	45,0025	50,0020	55,0016	60,0012	65,0009	70,0007	75,0005	80,0003	85,0002
Trim angle (+ve by stern) deg	0,7522	0,8098	0,8841	0,9839	1,1364	1,3911	1,8381	2,7385	5,4438

	Name	Long. Pos. m	Offset m	Height m	Type	Linked to	Flood from	Intact (use for intact case)	Damage (use for damage cases)
1	DF point	17,1	1,75	2,43	Downflooding point	None	Sea	☑	☑
2	DF point	17,1	-1,75	2,43	Downflooding point	None	Sea	☑	☑

	Key point	Type	Immersion angle deg	Emergence angle deg
1	Margin Line (immersion pos = 0 m)		14,6	n/a
2	Deck Edge (immersion pos = 0 m)		17,2	n/a
3	DF point	Downflooding point	46,9	0
4	DF point	Downflooding point	Not immersed in positive range	0

	Code	Criteria	Value	Units	Actual	Status	Margin %
1	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 30**				**Pass**	
2		*from the greater of*					
3		spec. heel angle	0,0	deg	0,0		
4		*to the lesser of*					
5		spec. heel angle	30,0	deg	30,0		
6		angle of vanishing stability	82,8	deg			
7		**shall not be less than (>=)**	**0,0550**	**m.rad**	**0,1337**	**Pass**	+143,02
8							
9	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 40**				**Pass**	
10		*from the greater of*					
11		spec. heel angle	0,0	deg	0,0		
12		*to the lesser of*					
13		spec. heel angle	40,0	deg	40,0		
14		first downflooding angle	46,9	deg			
15		angle of vanishing stability	82,8	deg			
16		**shall not be less than (>=)**	**0,0900**	**m.rad**	**0,2140**	**Pass**	+137,80
17							
18	**267(85) Ch2 - General Criteria**	**2.2.1: Area 30 to 40**				**Pass**	
19		*from the greater of*					
20		spec. heel angle	30,0	deg	30,0		
21		*to the lesser of*					
22		spec. heel angle	40,0	deg	40,0		
23		first downflooding angle	46,9	deg			
24		angle of vanishing stability	82,8	deg			
25		**shall not be less than (>=)**	**0,0300**	**m.rad**	**0,0804**	**Pass**	+167,84
26							
27	**267(85) Ch2 - General Criteria**	**2.2.2: Max GZ at 30 or greater**				**Pass**	
28		*in the range from the greater of*					
29		spec. heel angle	30,0	deg	30,0		
30		*to the lesser of*					
31		spec. heel angle	90,0	deg			
32		angle of max. GZ	38,2	deg	38,2		
33		**shall not be less than (>=)**	**0,200**	**m**	**0,470**	**Pass**	+135,00
34		*Intermediate values*					
35		angle at which this GZ occurs		deg	38,2		
36							
37	**267(85) Ch2 - General Criteria**	**2.2.3: Angle of maximum GZ**				**Pass**	
38		**shall not be less than (>=)**	**25,0**	**deg**	**38,2**	**Pass**	+52,73
39							
40	**267(85) Ch2 - General Criteria**	**2.2.4: Initial GMt**				**Pass**	
41		spec. heel angle	0,0	deg			
42		**shall not be less than (>=)**	**0,150**	**m**	**1,074**	**Pass**	+616,00
43							

3.4 Водоизмещение полное 60,5 т

Stability Calculation - BMO 60,5

Stability 20.00.06.0, build: 0 Model file: C:\Users\PC\Desktop\BMO file\BMO 60,5 (Medium precision, 59 sections, Trimming off, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance -ideal(worst case): Disp.%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Loadcase - BMO
Damage Case - Intact
Free to Trim
Specific gravity = 1; (Density = 1 tonne/m^3)
Fluid analysis method: Use corrected VCG

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	60,500	60,500			11,090	0,000	1,470	0,000	User Specif
2	**Total Loadcase**			**60,500**	**0,000**	**0,000**	**11,090**	**0,000**	**1,470**	**0,000**	
3	**FS correction**								**0,000**		
4	**VCG fluid**								**1,470**		

Heel to Starboard deg	**0,0**	**5,0**	**10,0**	**15,0**	**20,0**	**25,0**	**30,0**	**35,0**	**40,0**
GZ m	0,000	0,085	0,172	0,260	0,331	0,385	0,428	0,451	0,448
Area under GZ curve from zero heel m.rad	0,0000	0,0037	0,0148	0,0338	0,0597	0,0910	0,1265	0,1650	0,2044
Displacement t	60,50	60,50	60,50	60,50	60,50	60,50	60,50	60,50	60,50
Volume (displaced) m^3	60,500	60,500	60,500	60,500	60,500	60,500	60,500	60,500	60,500
Draft at FP m	0,952	0,950	0,946	0,937	0,918	0,886	0,839	0,775	0,700
Draft at AP m	1,239	1,238	1,237	1,232	1,213	1,177	1,124	1,068	1,012
Draft Amidships m	1,095	1,094	1,091	1,085	1,065	1,031	0,982	0,921	0,856
Trim (+ve by stern) m	0,287	0,288	0,291	0,295	0,295	0,291	0,285	0,292	0,312
WL Length m	23,955	23,954	23,951	23,947	23,936	23,918	23,891	23,851	23,799
Beam max extents on WL m	4,057	4,072	4,119	4,167	3,962	3,828	3,735	3,374	3,088
Wetted Area m^2	109,313	109,357	109,401	107,978	105,723	104,320	103,897	105,341	106,661
Waterpl. Area m^2	85,977	86,314	87,182	85,766	82,376	80,323	78,577	72,802	67,452
Prismatic coeff. (Cp)	0,780	0,781	0,782	0,786	0,791	0,796	0,799	0,802	0,808
Block coeff. (Cb)	0,569	0,567	0,562	0,559	0,599	0,641	0,691	0,816	0,962
LCB from aft perp. (+ve fwd) m	11,081	11,081	11,081	11,081	11,081	11,081	11,081	11,081	11,079
LCF from aft perp. (+ve fwd) m	11,106	11,107	11,102	11,162	11,230	11,293	11,408	11,638	11,765
KG fluid m	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470
GMt corrected m	0,964	0,980	1,026	0,936	0,702	0,553	0,421	0,106	-0,149
Max deck inclination deg	0,6852	5,0466	10,0232	15,0151	20,0105	25,0074	30,0052	35,0041	40,0034
Trim angle (+ve by stern) deg	0,6852	0,6878	0,6957	0,7042	0,7032	0,6937	0,6792	0,6975	0,7458

Heel to Starboard deg	**45,0**	**50,0**	**55,0**	**60,0**	**65,0**	**70,0**	**75,0**	**80,0**	**85,0**
GZ m	0,427	0,391	0,345	0,291	0,231	0,167	0,098	0,025	-0,051
Area under GZ curve from zero heel m.rad	0,2428	0,2786	0,3108	0,3386	0,3614	0,3788	0,3904	0,3958	0,3947
Displacement t	60,49	60,50	60,50	60,50	60,50	60,50	60,50	60,50	60,50
Volume (displaced) m^3	60,494	60,500	60,500	60,500	60,500	60,500	60,502	60,501	60,502
Draft at FP m	0,615	0,517	0,398	0,248	0,047	-0,247	-0,740	-1,724	-4,677
Draft at AP m	0,953	0,886	0,809	0,713	0,586	0,408	0,126	-0,434	-2,105
Draft Amidships m	0,784	0,702	0,603	0,480	0,317	0,080	-0,307	-1,079	-3,391
Trim (+ve by stern) m	0,339	0,370	0,411	0,465	0,539	0,655	0,866	1,291	2,571
WL Length m	23,731	23,636	23,493	23,392	23,482	23,655	23,803	23,930	24,041
Beam max extents on WL m	2,869	2,700	2,569	2,470	2,405	2,341	2,259	2,180	2,123
Wetted Area m^2	107,650	108,398	109,005	109,267	109,669	109,788	109,604	109,409	109,308
Waterpl. Area m^2	63,133	59,714	57,087	54,836	53,331	51,837	49,913	48,167	46,901
Prismatic coeff. (Cp)	0,813	0,819	0,827	0,834	0,833	0,830	0,828	0,826	0,826
Block coeff. (Cb)	1,133	1,351	1,662	2,181	3,381	13,587	0,000	0,000	0,000
LCB from aft perp. (+ve fwd) m	11,079	11,080	11,080	11,079	11,079	11,079	11,079	11,079	11,081
LCF from aft perp. (+ve fwd) m	11,845	11,904	11,959	11,956	11,997	11,969	11,923	11,910	11,900
KG fluid m	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470	1,470
GMt corrected m	-0,336	-0,474	-0,576	-0,657	-0,714	-0,762	-0,815	-0,853	-0,876
Max deck inclination deg	45,0028	50,0024	55,0019	60,0016	65,0012	70,0009	75,0007	80,0004	85,0002
Trim angle (+ve by stern) deg	0,8080	0,8826	0,9810	1,1099	1,2857	1,5638	2,0661	3,0778	6,1148

	Name	Long. Pos. m	Offset m	Height m	Type	Linked to	Flood from	Intact (use for intact case)	Damage (use for damage cases)
1	DF point	17,1	1,75	2,43	Downflooding point	None	Sea	☑	☑
2	DF point	17,1	-1,75	2,43	Downflooding point	None	Sea	☑	☑

	Key point	Type	Immersion angle deg	Emergence angle deg
1	Margin Line (immersion pos = 0 m)		12,7	n/a
2	Deck Edge (immersion pos = 0 m)		15,1	n/a
3	DF point	Downflooding point	44,3	0
4	DF point	Downflooding point	Not immersed in positive range	0

	Code	Criteria	Value	Units	Actual	Status	Margin %
1	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 30**				**Pass**	
2		*from the greater of*					
3		spec. heel angle	0,0	deg	0,0		
4		*to the lesser of*					
5		spec. heel angle	30,0	deg	30,0		
6		angle of vanishing stability	81,7	deg			
7		**shall not be less than (>=)**	**0,0550**	**m.rad**	**0,1265**	**Pass**	+130,02
8							
9	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 40**				**Pass**	
10		*from the greater of*					
11		spec. heel angle	0,0	deg	0,0		
12		*to the lesser of*					
13		spec. heel angle	40,0	deg	40,0		
14		first downflooding angle	44,3	deg			
15		angle of vanishing stability	81,7	deg			
16		**shall not be less than (>=)**	**0,0900**	**m.rad**	**0,2044**	**Pass**	+127,17
17							
18	**267(85) Ch2 - General Criteria**	**2.2.1: Area 30 to 40**				**Pass**	
19		*from the greater of*					
20		spec. heel angle	30,0	deg	30,0		
21		*to the lesser of*					
22		spec. heel angle	40,0	deg	40,0		
23		first downflooding angle	44,3	deg			
24		angle of vanishing stability	81,7	deg			
25		**shall not be less than (>=)**	**0,0300**	**m.rad**	**0,0779**	**Pass**	+159,78
26							
27	**267(85) Ch2 - General Criteria**	**2.2.2: Max GZ at 30 or greater**				**Pass**	
28		*in the range from the greater of*					
29		spec. heel angle	30,0	deg	30,0		
30		*to the lesser of*					
31		spec. heel angle	90,0	deg			
32		angle of max. GZ	36,8	deg	36,8		
33		**shall not be less than (>=)**	**0,200**	**m**	**0,453**	**Pass**	+126,50
34		*Intermediate values*					
35		angle at which this GZ occurs		deg	36,8		
36							
37	**267(85) Ch2 - General Criteria**	**2.2.3: Angle of maximum GZ**				**Pass**	
38		**shall not be less than (>=)**	**25,0**	**deg**	**36,8**	**Pass**	+47,27
39							
40	**267(85) Ch2 - General Criteria**	**2.2.4: Initial GMt**				**Pass**	
41		spec. heel angle	0,0	deg			
42		**shall not be less than (>=)**	**0,150**	**m**	**0,964**	**Pass**	+542,67
43							

3.5 Водоизмещение наибольшее 72.0 т

Stability Calculation - BMO 72,00

Stability 20.00.06.0, build: 0 Model file: C:\Users\PC\Desktop\BMO file\BMO 72,00 (Medium precision, 59 sections, Trimming off, Skin thickness not applied). Long. datum: AP; Vert. datum: Baseline. Analysis tolerance - ideal(worst case): Disp.%: 0,01000(0,100); Trim%(LCG-TCG): 0,01000(0,100); Heel%(LCG-TCG): 0,01000(0,100)

Loadcase - BMO
Damage Case - Intact
Free to Trim
Specific gravity = 1; (Density = 1 tonne/m^3)
Fluid analysis method: Use corrected VCG

	Item Name	Quantity	Unit Mass tonne	Total Mass tonne	Unit Volume m^3	Total Volume m^3	Long. Arm m	Trans. Arm m	Vert. Arm m	Total FSM tonne.m	FSM Type
1	Lightship	1	72,000	72,000			10,350	0,000	1,680	0,000	User Specif
2	**Total Loadcase**			**72,000**	**0,000**	**0,000**	**10,350**	**0,000**	**1,680**	**0,000**	
3	**FS correction**								**0,000**		
4	**VCG fluid**								**1,680**		

Heel to Starboard deg	0,0	5,0	10,0	15,0	20,0	25,0	30,0	35,0	40,0
GZ m	0,000	0,052	0,107	0,166	0,226	0,270	0,287	0,279	0,252
Area under GZ curve from zero heel m.rad	0,0000	0,0023	0,0092	0,0211	0,0382	0,0601	0,0846	0,1094	0,1327
Displacement t	72,00	72,00	72,00	72,00	72,00	72,00	72,00	72,00	72,00
Volume (displaced) m^3	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000	72,000
Draft at FP m	0,881	0,880	0,875	0,865	0,842	0,800	0,735	0,654	0,561
Draft at AP m	1,547	1,546	1,546	1,545	1,545	1,541	1,548	1,566	1,594
Draft Amidships m	1,214	1,213	1,210	1,205	1,193	1,171	1,142	1,110	1,078
Trim (+ve by stern) m	0,666	0,667	0,670	0,680	0,703	0,741	0,812	0,912	1,033
WL Length m	23,924	23,923	23,920	23,914	23,901	23,876	23,836	23,779	23,702
Beam max extents on WL m	4,072	4,088	4,135	4,216	4,254	4,085	3,697	3,324	3,046
Wetted Area m^2	116,059	116,097	116,084	115,772	114,595	114,559	115,782	117,268	118,497
Waterpl. Area m^2	86,396	86,723	87,590	88,491	87,799	82,375	76,126	69,998	64,863
Prismatic coeff. (Cp)	0,809	0,809	0,810	0,813	0,819	0,821	0,820	0,824	0,829
Block coeff. (Cb)	0,609	0,607	0,601	0,593	0,593	0,631	0,716	0,821	0,926
LCB from aft perp. (+ve fwd) m	10,324	10,326	10,326	10,326	10,325	10,324	10,322	10,320	10,317
LCF from aft perp. (+ve fwd) m	11,060	11,059	11,042	10,968	10,887	11,213	11,545	11,749	11,873
KG fluid m	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680
GMt corrected m	0,594	0,609	0,651	0,698	0,645	0,349	0,060	-0,191	-0,378
Max deck inclination deg	1,5905	5,2445	10,1221	15,0798	20,0595	25,0481	30,0426	35,0396	40,0371
Trim angle (+ve by stern) deg	1,5905	1,5907	1,5996	1,6232	1,6781	1,7694	1,9383	2,1753	2,4656

Heel to Starboard deg	45,0	50,0	55,0	60,0	65,0	70,0	75,0	80,0	85,0
GZ m	0,212	0,162	0,105	0,043	-0,022	-0,089	-0,158	-0,226	-0,294
Area under GZ curve from zero heel m.rad	0,1531	0,1695	0,1812	0,1876	0,1886	0,1837	0,1729	0,1562	0,1335
Displacement t	72,00	72,00	72,00	71,99	72,00	72,00	72,00	72,00	72,00
Volume (displaced) m^3	72,004	71,998	71,995	71,995	71,996	71,999	72,001	72,002	72,003
Draft at FP m	0,454	0,328	0,176	-0,016	-0,279	-0,665	-1,302	-2,571	-6,367
Draft at AP m	1,633	1,682	1,747	1,835	1,959	2,148	2,465	3,104	5,024
Draft Amidships m	1,043	1,005	0,962	0,909	0,840	0,741	0,581	0,266	-0,671
Trim (+ve by stern) m	1,179	1,354	1,571	1,851	2,238	2,813	3,767	5,674	11,391
WL Length m	23,592	23,418	23,269	23,183	23,295	23,476	23,632	23,770	23,892
Beam max extents on WL m	2,835	2,676	2,560	2,478	2,421	2,337	2,276	2,229	2,205
Wetted Area m^2	119,436	120,110	120,648	121,118	121,374	121,313	121,358	121,375	121,390
Waterpl. Area m^2	60,756	57,458	54,875	52,914	51,258	49,679	48,524	47,642	47,025
Prismatic coeff. (Cp)	0,836	0,844	0,852	0,857	0,855	0,851	0,849	0,847	0,847
Block coeff. (Cb)	1,032	1,143	1,257	1,379	1,520	1,771	2,302	5,099	0,000
LCB from aft perp. (+ve fwd) m	10,315	10,312	10,310	10,309	10,308	10,308	10,307	10,308	10,308
LCF from aft perp. (+ve fwd) m	11,960	12,016	12,059	12,100	12,095	12,014	11,947	11,874	11,801
KG fluid m	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680	1,680
GMt corrected m	-0,513	-0,611	-0,681	-0,727	-0,759	-0,779	-0,786	-0,784	-0,771
Max deck inclination deg	45,0345	50,0316	55,0282	60,0246	65,0207	70,0167	75,0126	80,0085	85,0043
Trim angle (+ve by stern) deg	2,8111	3,2288	3,7447	4,4099	5,3269	6,6844	8,9188	13,3009	25,3876

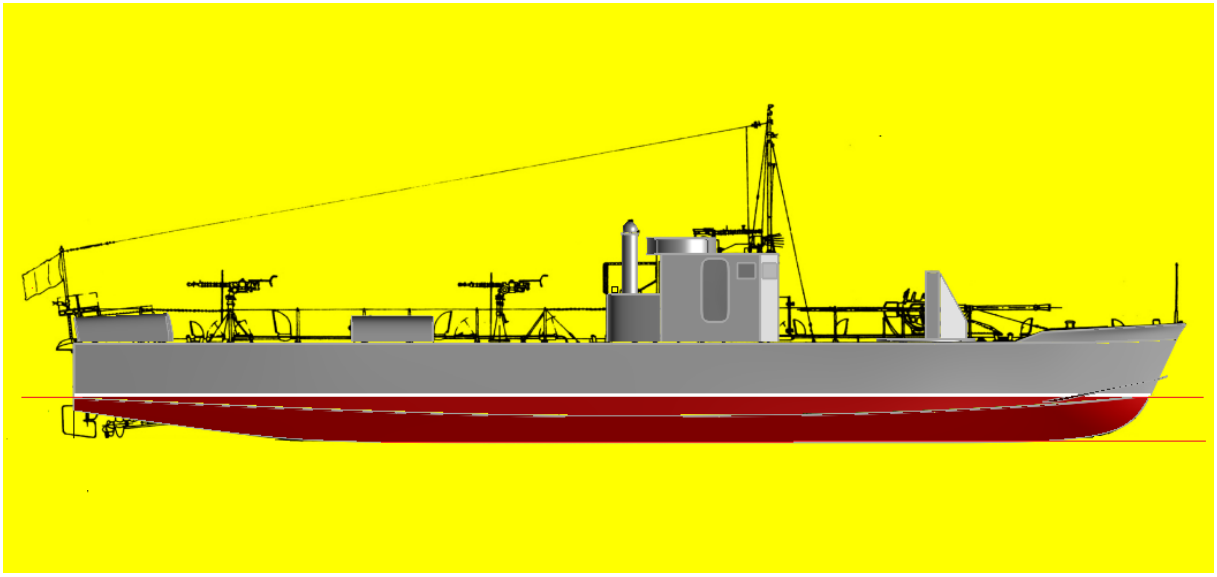
	Name	Long. Pos. m	Offset m	Height m	Type	Linked to	Flood from	Intact (use for intact case)	Damage (use for damage cases)
1	DF point	17,1	1,75	2,43	Downflooding point	None	Sea	☑	☑
2	DF point	17,1	-1,75	2,43	Downflooding point	None	Sea	☑	☑

	Key point	Type	Immersion angle deg	Emergence angle deg
1	Margin Line (immersion pos = 0 m)		2,6	n/a
2	Deck Edge (immersion pos = 0 m)		5	n/a
3	DF point	Downflooding point	42,5	0
4	DF point	Downflooding point	Not immersed in positive range	0

	Code	Criteria	Value	Units	Actual	Status	Margin %
1	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 30**				**Pass**	
2		*from the greater of*					
3		spec. heel angle	0,0	deg	0,0		
4		*to the lesser of*					
5		spec. heel angle	30,0	deg	30,0		
6		angle of vanishing stability	63,3	deg			
7		**shall not be less than (>=)**	**0,0550**	**m.rad**	**0,0846**	**Pass**	+53,75
8							
9	**267(85) Ch2 - General Criteria**	**2.2.1: Area 0 to 40**				**Pass**	
10		*from the greater of*					
11		spec. heel angle	0,0	deg	0,0		
12		*to the lesser of*					
13		spec. heel angle	40,0	deg	40,0		
14		first downflooding angle	42,5	deg			
15		angle of vanishing stability	63,3	deg			
16		**shall not be less than (>=)**	**0,0900**	**m.rad**	**0,1327**	**Pass**	+47,48
17							
18	**267(85) Ch2 - General Criteria**	**2.2.1: Area 30 to 40**				**Pass**	
19		*from the greater of*					
20		spec. heel angle	30,0	deg	30,0		
21		*to the lesser of*					
22		spec. heel angle	40,0	deg	40,0		
23		first downflooding angle	42,5	deg			
24		angle of vanishing stability	63,3	deg			
25		**shall not be less than (>=)**	**0,0300**	**m.rad**	**0,0482**	**Pass**	+60,56
26							
27	**267(85) Ch2 - General Criteria**	**2.2.2: Max GZ at 30 or greater**				**Pass**	
28		*in the range from the greater of*					
29		spec. heel angle	30,0	deg	30,0		
30		*to the lesser of*					
31		spec. heel angle	90,0	deg			
32		angle of max. GZ	30,9	deg	30,9		
33		**shall not be less than (>=)**	**0,200**	**m**	**0,287**	**Pass**	+43,50
34		*Intermediate values*					
35		angle at which this GZ occurs		deg	30,9		
36							
37	**267(85) Ch2 - General Criteria**	**2.2.3: Angle of maximum GZ**				**Pass**	
38		**shall not be less than (>=)**	**25,0**	**deg**	**30,9**	**Pass**	+23,64
39							
40	**267(85) Ch2 - General Criteria**	**2.2.4: Initial GMt**				**Pass**	
41		spec. heel angle	0,0	deg			
42		**shall not be less than (>=)**	**0,150**	**m**	**0,594**	**Pass**	+296,00
43							

4. Проверка модели по основному критерию Правил РРР 2015 при полном водоизмещении

Силует корпуса и надстроек модели, применявшейся для определения центра и площади парусности в Maxsurf



4.1. Расчётная амплитуда качки и кренящий момент

Расчётная условная амплитуда качки, раздел 2.4	**Обознач. или формула**	**Ед.**	**БМО**
Водоизмещение в пресной воде полное	D	кН/т	593/60,5
Водоизмещение объёмное	V	м3	60,5
Осадка средняя	Tср	м	1,1
Длина судна по действующую ватерлинию	Lвл	м	23,96
Ширина судна по действующую ватерлинию	Bвл	м	4,06
Аппликата ЦТ	Zg	м	1,47
Поперечная метацентрическая высота	ho	м	0,96
Отношение	Zg/B		0,36
Величина	n1 = ho B / (Zg $\sqrt[3]{V}$)		0,67
Величина (таблица 2.4.3-1)	mo		1,76
Множитель	m1 = mo / √ho	c^-1	1,79
Отношение	B / T		3,69
Множитель (таблица 2.4.3-2)	m2		0,8
Коэффициент полноты водоизмещения	δ		0,57
Множитель (таблица 2.4.3-3)	m3		0,82
Величина	m = m1 m2 m3	c^-1	1,17
Амплитуда бортовой качки судна (таблица 2.4.1)	θm	град.	30
Форма скул корпуса			острые
Наличие скуловых или брускового киля			нет
Площадь киля	Sk	м2	
Множитель	r = (r1 + r2) r3		
Коэффициент полноты ватерлинии	α		
Величина	q = r α √Bвл		
Коффициент: острые скулы (п.2.4.2) или киль табл. (2.4.5)	k		0,75
Амплитуда бортовой качки судна с учётом k (п.2.4.4)	θk = k θm	град.	22
Расчётный период качки, раздел 2.4			
Поправочный коэффициент c (п. 2.4.10-6)	c = 0,373 + 0,023B/T - 0,00043L		0,45
Период бортовой качки судна (п. 2.4.10-4)	τ = 2cB / √ho	сек	3,7
Кренящий момент Мкр, раздел 2.2			
Площадь парусности с учётом несплошных поверхностей 5%	S	м2	39
Центр парусности от ОП с учётом статического момента 10%	zп	м	2,1
Возвышение центра парусности над плоскостью ватерлинии	zт = zп - T	м	1
Условное расчётное давление ветра (таблица 2.2.2)	p	Па	196
Коэффициент (таблица 2.2.6-1)	a1		0,44
Коэффициент (таблица 2.2.6-2)	a2		0,2
Приведённое плечо кренящей пары	z = zт + a1 a2 T	м	1,2
Кренящий момент (формула 2.2.1)	Мкр =0,001 p S z	кНм	9,17

4.2. Предельно допустимый момент и основной критерий

	Code	Criteria	Value	Units	Actual	Status	Margin %
1	ISO 12217-1:2002(E)	**6.3.2 Wind heeling arm**					
2		*Wind arm: a P A (h - H) / (g disp.) cos^n(phi)*					
3	расчёт площадей	constant: a =	1				
4	ДСО A1 = A2	wind pressure: P =	196,0	Pa			
5	при переменном	area centroid height (from zero point): h =	1,200	m			
6	gust ratio K	total area: A =	39,000	m^2			
7		height of lateral resistance: H =	0,000	m			
8		cosine power: n =	0				
9		gust ratio	9,27			K	
10		*Intermediate values*					
11		Heel arm amplitude		m	0,015		
12							
13	ISO 12217-1:2002(E)	**6.3.2 Rolling in beam waves and wind**				Fail	
14		6.3.2 Wind heeling arm (steady)					
15		*Area1 integrated from the greater of*					
16		angle of equilibrium (with gust heel arm)	8,4	deg	8,4		
17		*to the lesser of*					
18		first downflooding angle	44,3	deg	44,3		
19		*Area2 integrated to the lesser of*					
20		roll back angle from equilibrium (with steady heel arm)	22,9 (-22,0)	deg	-22,0		
21		**Area1 / Area2 shall be greater than (>)**	**100,00**	**%**	**100,00**	Fail	0,00
22		*Intermediate values*					
23		Equilibrium angle with steady heel arm		deg	0,9		
24		Equilibrium angle with gust heel arm		deg	8,4		
25		Area1 (under GZ), from 8,4 to 44,3 deg.		m.rad	0,2269		
26		Area1 (under HA), from 8,4 to 44,3 deg.		m.rad	0,0898		
27		Area1, from 8,4 to 44,3 deg.		m.rad	0,1371	A1=A2	
28		Area2 (under GZ), from -22,0 to 8,4 deg.		m.rad	-0,0611		
29		Area2 (under HA), from -22,0 to 8,4 deg.		m.rad	0,0760		
30		Area2, from -22,0 to 8,4 deg.		m.rad	0,1371	A2=A1	
31							

Крен	lкр	lдоп
град	м	м
-25,000000	0,015461	0,143366
-20,000000	0,015461	0,143366
-15,000000	0,015461	0,143366
-10,000000	0,015461	0,143366
-5,000000	0,015461	0,143366
0,000000	0,015461	0,143366
5,000000	0,015461	0,143366
10,000000	0,015461	0,143366
15,000000	0,015461	0,143366
20,000000	0,015461	0,143366
25,000000	0,015461	0,143366
30,000000	0,015461	0,143366
35,000000	0,015461	0,143366
40,000000	0,015461	0,143366
45,000000	0,015461	0,143366
50,000000	0,015461	0,143366
55,000000	0,015461	0,143366
60,000000	0,015461	0,143366
65,000000	0,015461	0,143366
70,000000	0,015461	0,143366
75,000000	0,015461	0,143366
80,000000	0,015461	0,143366

Вес судна Δ = 60,5т*9,807 = 593 кН

Мдоп = Δ*lдоп = 593*0,14337 = 85,0184

Мкр = Δ*lкр = 593*0,01546 = 9,1678

Запас остойчивости по основному критерию К= Мдоп/ Мкр=9,27