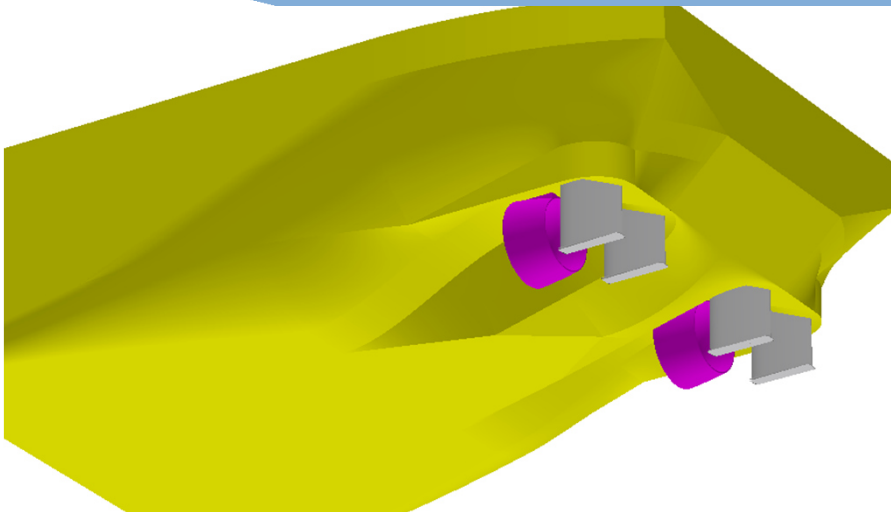
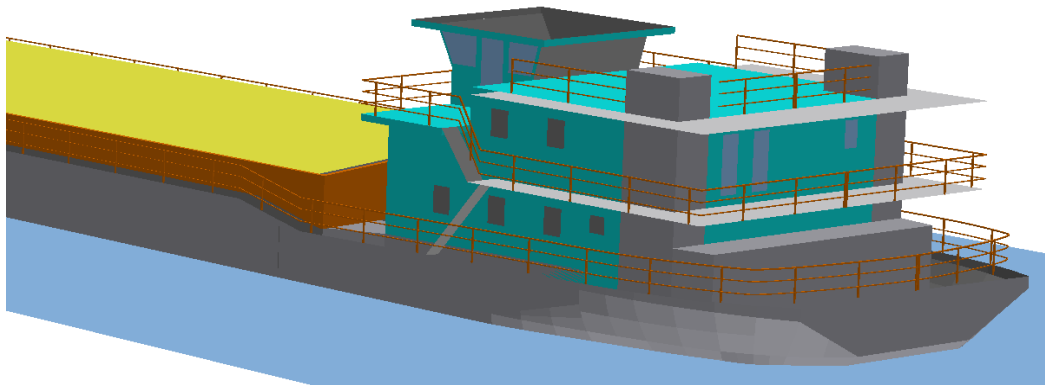
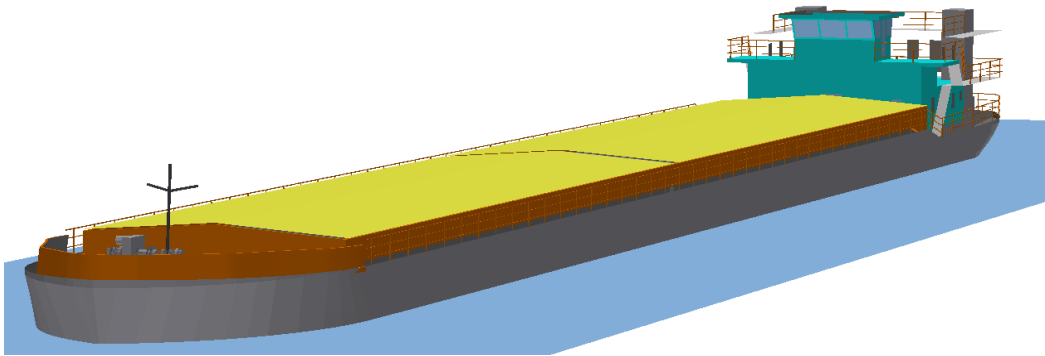


Bulk Carrier B2



Main dimensions

Cargo type		Dry Bulk
Hull type		B2
Length o.A.	L	110,00 m
Breadth	B	12,00 m
Depth Main Deck	D	4,30 m
Draught max.	T	2,80 m
Lightweight estimate		880 t
Payload at Tmax		2515 t

Applicable regulations

- Vessel built according to Rules and Regulations for the Construction and Classification of Inland Waterways Ships by the Indian Register of Shipping.
- Applicable rules of IWAI for navigation on NW-1, all reaches from Haldia (West Bengal) to Allahabad (Uttar Pradesh).

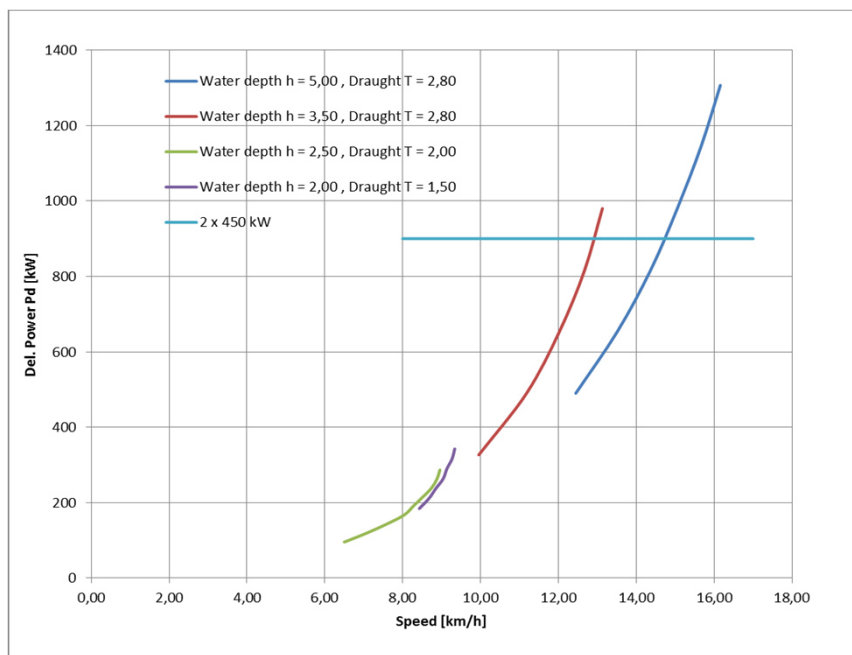
Powering

Number of Propellers (in nozzles)		2
Propeller diameter	D_p	1,45 m
Del. total power	P_d	900 kW
Rate of rev.	n [1/min]	390

Reversible gear box

Diesel marine engine 500 kW in rating A (heavy, uninterrupted duty)

Estimated speed and power



Cargo hold

	Lc	Bc	Hc	Volume
Dimensions:	98,4 m	10,1 m	4,5 m	4472,3 m ³

Divided in 2 parts

Sliding hatch cover, with light alloy profile cover

Provisions

Diesel Oil	30 t
Fresh Water	12 t
Lub Oil	1 t
Sludge	2 t
Black Water	8 t

Equipment

- Twin rudder blades with high efficiency profiles behind each propeller.
- Bow thruster with vertical propeller shaft, propeller diameter 0.80 m. Diesel engine drive, 150 kW.
- Two bow rudder flaps in dimension of b x h = 2.0 x 1.0 m
- Two bow anchors, each 1240 kg
- One stern anchor 620 kg

Accommodation

- Accommodation on two decks for crew of max. 12 persons

Weight calculation results for major components

Steel weight, longt. Framing	765 t
Accommodation	100 t
Machinery & outfitting	50 t
Hatch Cover	25 t
Sum	880 t

Electric load requirements

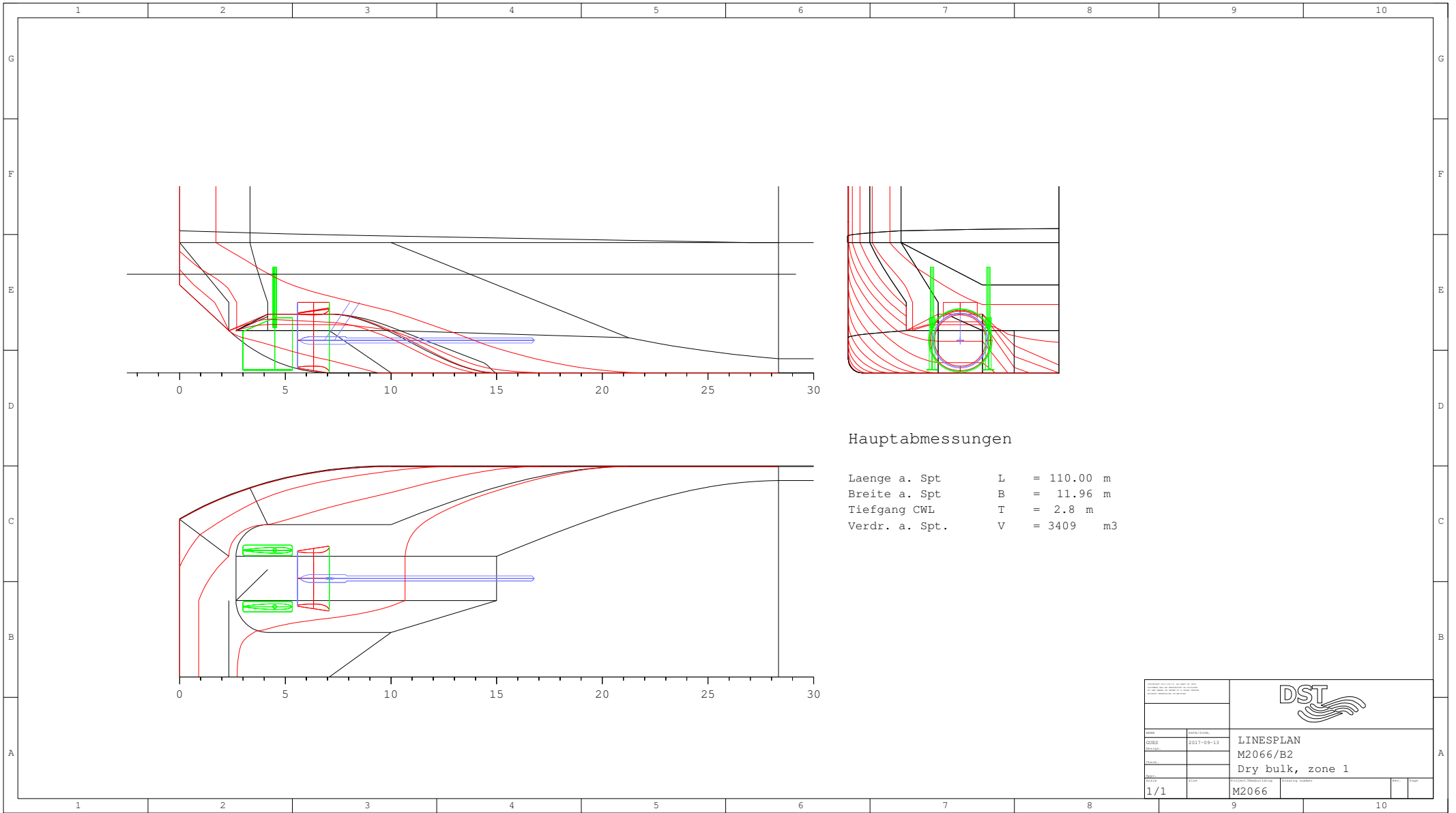
Diesel driven genset, 60 kW output

Three-phase AC supply to anchor winches

220 V supply to accomadation


220 V supply to AC accomodation

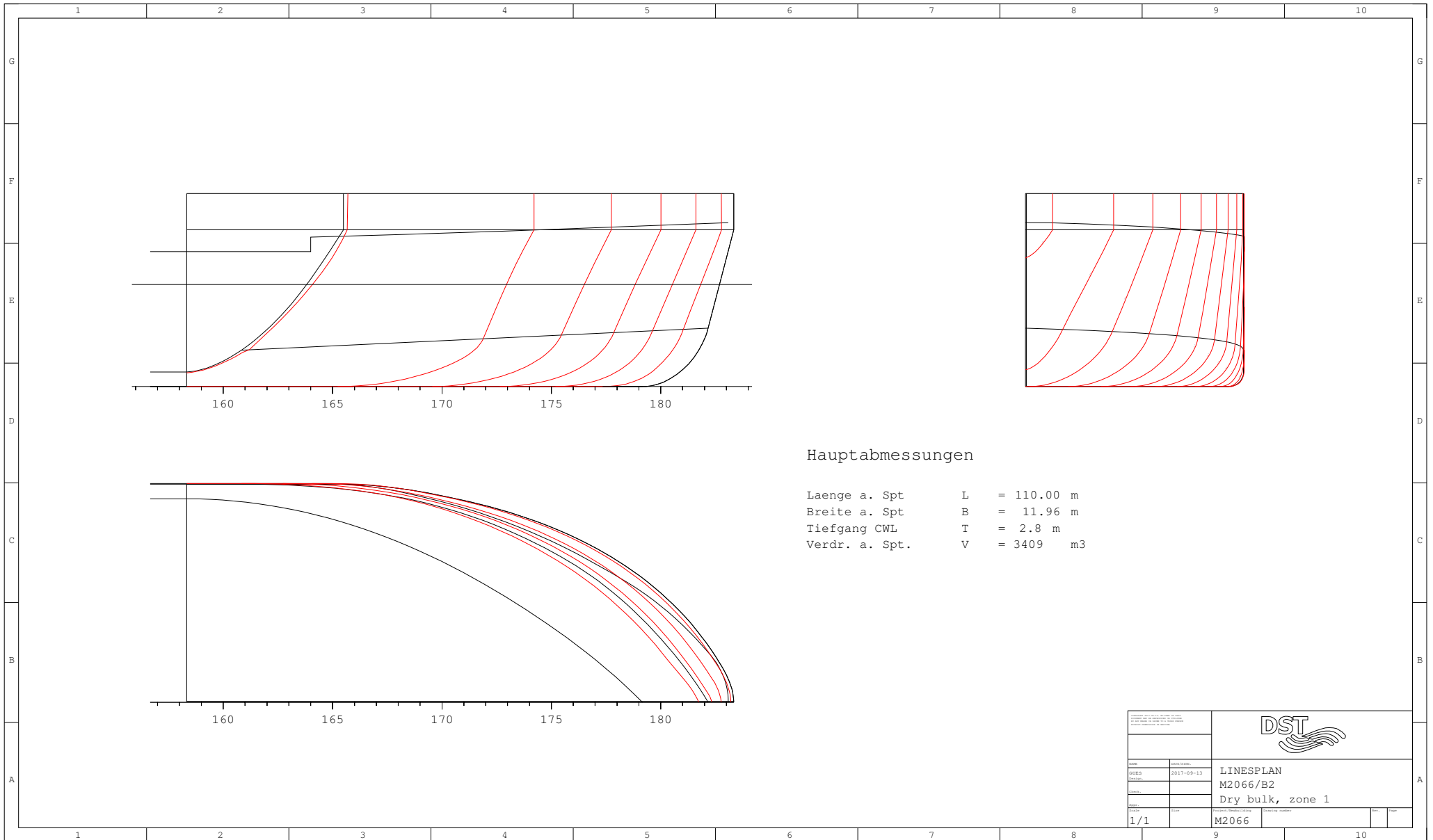
24 V emergency circuit



Hauptabmessungen


Laenge a. Spt L = 110.00 m
 Breite a. Spt B = 11.96 m
 Tiefgang CWL T = 2.8 m
 Verdr. a. Spt. V = 3409 m3

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NOV	DATE/ENG	LINESPLAN	
01/05	2017-09-13	M2066/B2	
PLAN		Dry bulk, zone 1	
NOV	SCALE	PROJECT NUMBER	REV. / PAGE
1/1	1:1	M2066	

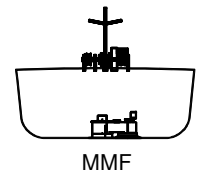
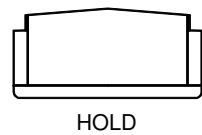
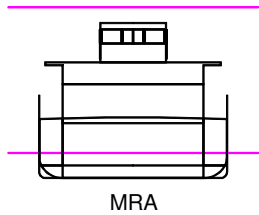
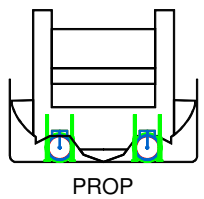
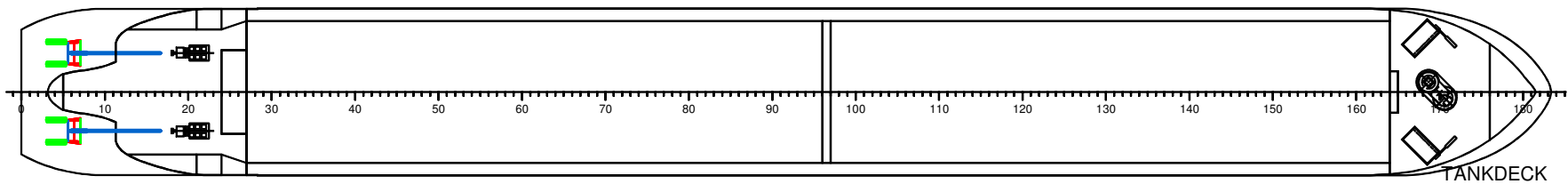
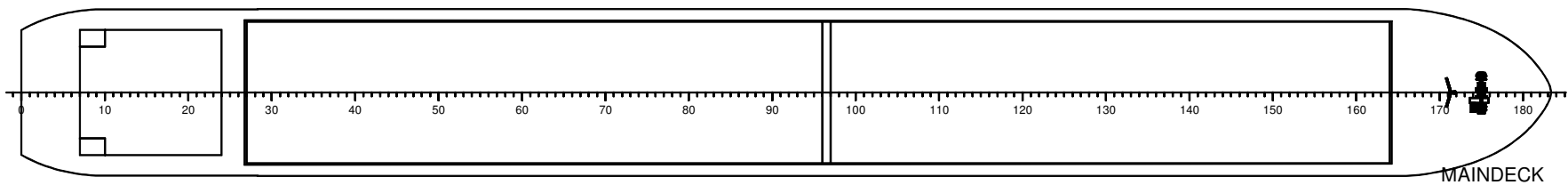
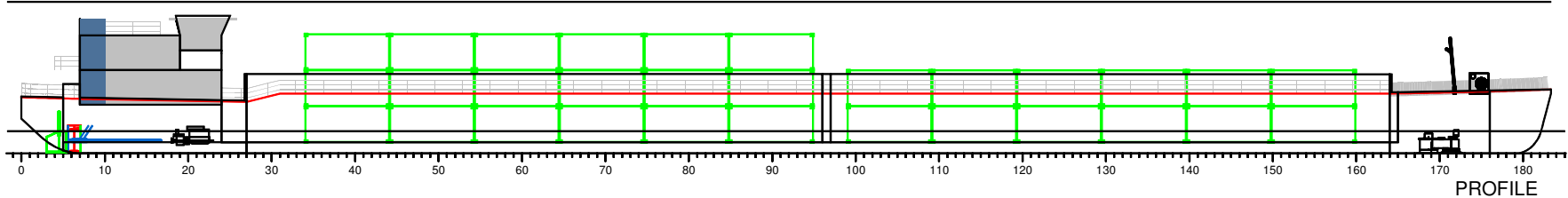


Hauptabmessungen

Laenge a. Spt L = 110.00 m
 Breite a. Spt B = 11.96 m
 Tiefgang CWL T = 2.8 m
 Verdr. a. Spt. V = 3409 m³

<small> INSTITUT FÜR SCHIFFBAU UND MASCHINENBAU UNIVERSITÄT DUISBURG ESSEN LEHRGEBIET SCHIFFBAU </small>			
<small> Name Datum Blatt </small>	<small> 0201/1000 2017-09-13 1/1 </small>	<small> Projekt / Objektname M2066 </small>	
<small> Datum 1/1 </small>		<small> Projekt / Objektname M2066 </small>	
<small> Blatt 1/1 </small>		<small> Projekt / Objektname M2066 </small>	
<small> Datum 1/1 </small>		<small> Projekt / Objektname M2066 </small>	

LINESPLAN
 M2066/B2
 Dry bulk, zone 1

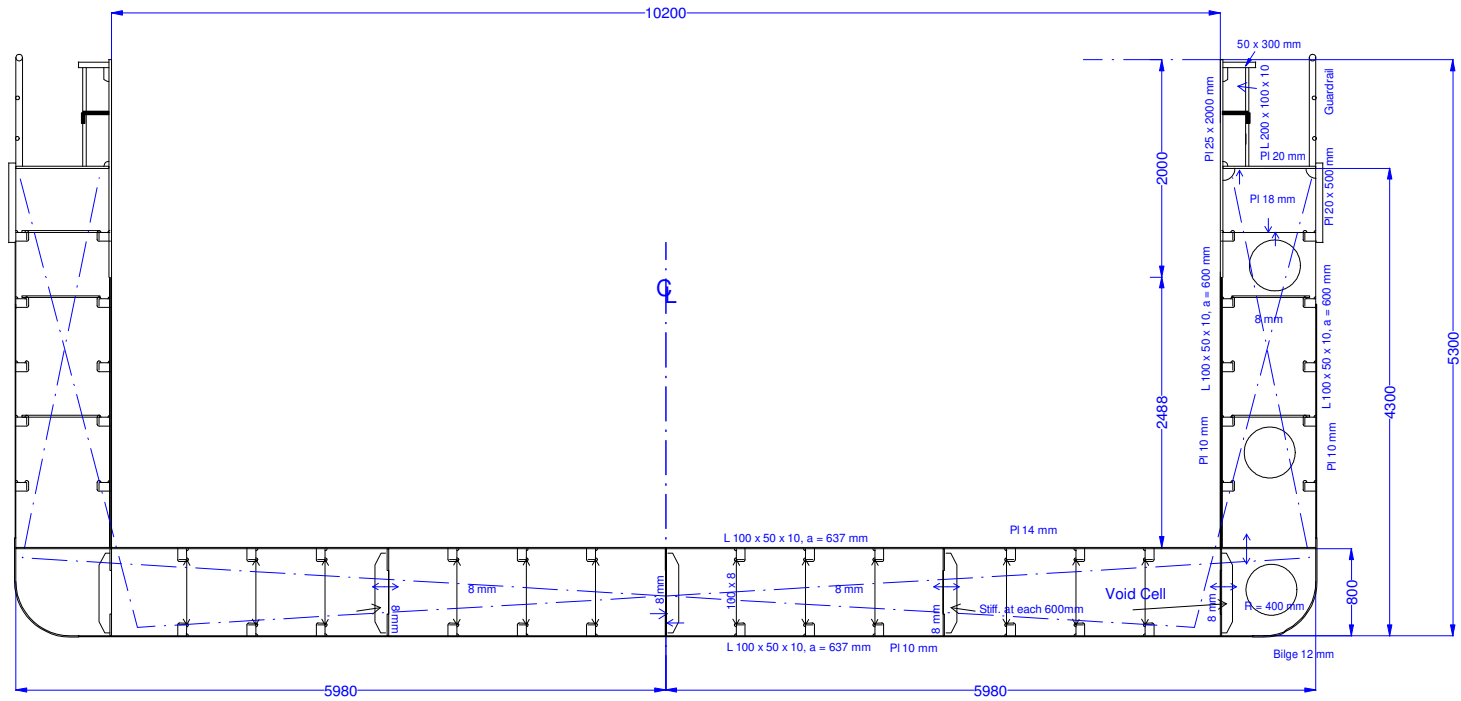


Main dimensions
 Length L = 110.0 m
 Breadth moulded B = 12.0 m
 Breadth oA BoA = 12.05 m
 Draught max T = 2.80 m

B2 NW-1	
Date: 2017-09-13 Drawn: [blank] Appr: [blank]	2017-09-13 1


Bulk Carrier B2 - Main Frame and Scantling

Frame distance 1800 mm



Main Dimensions	
Lenght PP	: 110.000 m
Breadth moulded	: 11.960 m
Breadth o. all	: 12.000 m
Draught design	: 2.800 m
Navigation Zone 1	

Date 25.08.2017

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Date: 2015.11.30 Drawn: [] Checked: [] Scale: 1/25		Bulk Carrier B2 Main Section	
Sheet: 1/25		Grid: G 1	

M2066/B2

PROJECT INFO

L x B = 110.00 x 11.96 m

Project M2066/B2

T m	DISP t	DW t	MCT tm/cm	TCP t/cm	KMT m	TK m
0.800	936.71	56.7	89.6	11.92	14.998	0.810
0.900	1056.07	176.1	90.5	11.96	13.453	0.910
1.000	1175.81	295.8	91.3	11.99	12.223	1.010
1.100	1295.90	415.9	92.2	12.03	11.223	1.110
1.200	1416.30	536.3	93.0	12.06	10.398	1.210
1.300	1537.27	657.3	94.6	12.13	9.731	1.310
1.400	1659.02	779.0	96.5	12.21	9.176	1.410
1.500	1781.94	901.9	98.8	12.31	8.699	1.510
1.600	1905.24	1025.2	99.5	12.34	8.259	1.610
1.700	2029.03	1149.0	101.5	12.42	7.896	1.710
1.800	2153.36	1273.4	102.0	12.45	7.556	1.810
1.900	2277.90	1397.9	102.5	12.47	7.258	1.910
2.000	2402.67	1522.7	103.0	12.49	6.997	2.010
2.100	2527.67	1647.7	103.6	12.52	6.769	2.110
2.200	2652.93	1772.9	104.2	12.54	6.565	2.210
2.300	2778.45	1898.4	104.8	12.56	6.384	2.310
2.400	2904.22	2024.2	105.4	12.59	6.223	2.410
2.500	3030.23	2150.2	105.9	12.61	6.078	2.510
2.600	3156.45	2276.4	106.4	12.63	5.948	2.610
2.700	3282.85	2402.8	106.8	12.65	5.832	2.710
2.800	3409.42	2529.4	107.2	12.66	5.728	2.810
2.900	3536.16	2656.2	107.6	12.68	5.634	2.910
3.000	3663.06	2783.1	108.0	12.70	5.550	3.010

M2066/B2

PROJECT INFO

L x B = 110.00 x 11.96 m

Project M2066/B2, 2017-09-11

LOADING CASES

NAME	TEXT	DISP t	MASS t	MASS t	T m	TR m
1-LIGHTSHIP		915.00	0.00	0.00	0.785	-1.093
2-T280	Full load	3395.00	2480.00	0.00	2.788	-0.002
3-T180	Min. load	2145.00	1230.00	0.00	1.792	-0.002
4-T130	Min. load	1545.00	630.00	0.00	1.305	-0.002

M2066/B2

LOADING CONDITION 1-LIGHTSHIP

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgy cgz			Free s. moment

Diesel Oil, RHO=0.860							

DOA	Diesel oil a.	26.0	17.00	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	5.2	3.00	98.70	0.00	1.79	0.00

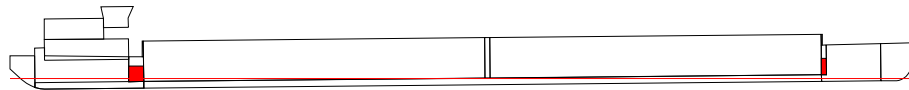
Total of DO		31.2	20.00	27.81	0.00	1.74	26.93

Fresh Water, RHO=1.000							

FW	Side Tanks a.	14.7	10.00	13.50	0.00	1.76	21.48
Deadweight			35.0	21.46	0.00	2.64	48.4
Lightweight			880.0	46.34	0.00	3.27	
Displacement (rho=1.000)			915.0	45.39	0.00	3.25	48.4

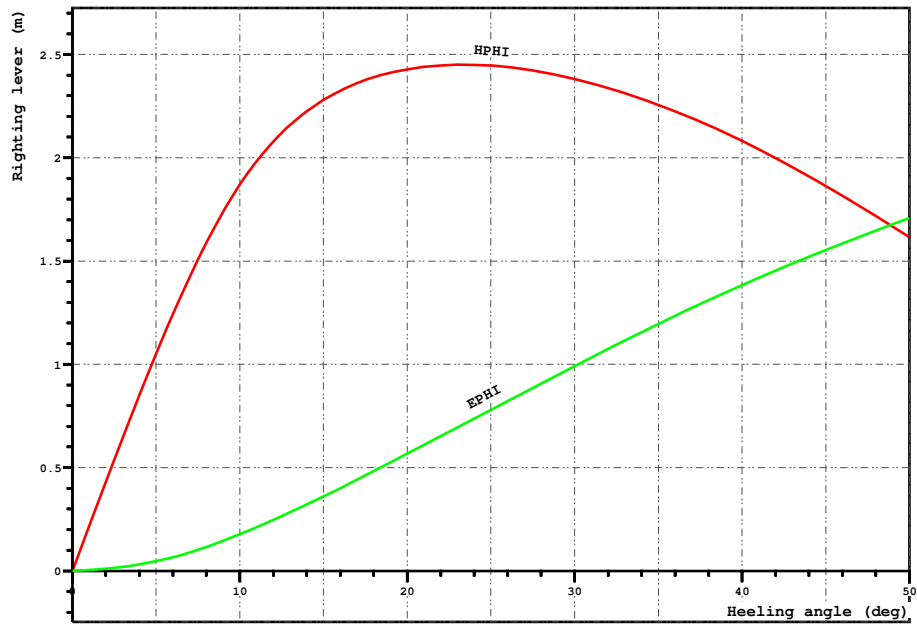
FLOATING POSITION

Draught moulded	0.785 m	KM	15.43 m
Trim	-1.093 m	KG	3.25 m
Heel, PS=+	0.0 deg		
TA	1.332 m	GM0	12.19 m
TF	0.239 m	GMCORR	-0.05 m
Trimming moment	-9958 tonm	GM	12.13 m



Height of the wheelhouse top above waterline: 8.77 m

Loading case1 1-LIGHTSHIP,

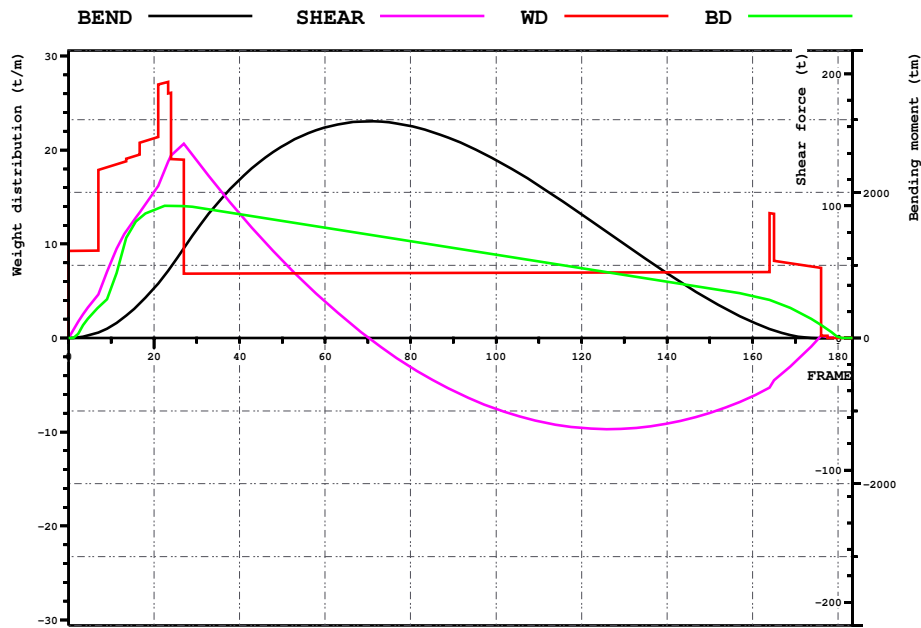


LOADING CONDITION 1-LIGHTSHIP

HEEL deg	MS m	HPHI m	EPhi mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	-0.007	1.05	0.047	4.2	0.005
10.0	-0.236	1.87	0.177	8.5	0.009
15.0	-0.860	2.28	0.360	13.0	0.014
20.0	-1.721	2.43	0.567	17.5	0.019
30.0	-3.686	2.38	0.992	24.3	0.027
40.0	-5.723	2.08	1.384	26.7	0.029
50.0	-7.691	1.62	1.708	26.5	0.029

M2066/B2

Loading case1 1-LIGHTSHIP,



LOADING CONDITION 1-LIGHTSHIP

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.28	0.00
6.000	10.00	161	58	18.32	5.37
12.000	20.00	682	111	21.25	13.62
18.000	30.00	1489	134	6.86	13.89
24.000	40.00	2175	94	6.87	13.17
30.000	50.00	2634	59	6.88	12.45
36.000	60.00	2892	27	6.89	11.74
42.000	70.00	2976	1	6.91	11.02
48.000	80.00	2912	-22	6.92	10.30
54.000	90.00	2726	-40	6.93	9.59
60.000	100.00	2444	-54	6.95	8.87
66.000	110.00	2094	-63	6.96	8.15
72.000	120.00	1700	-68	6.97	7.44
78.000	130.00	1289	-69	6.98	6.72
84.000	140.00	888	-65	7.00	6.00
90.000	150.00	523	-57	7.01	5.29
96.000	160.00	220	-44	7.02	4.47
102.000	170.00	27	-18	7.87	2.92
108.000	180.00	-1	0	0.00	0.14

M2066/B2

LOADING CONDITION 2-T280, Full load

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgy cgz			Free s. moment

Solid cargo, RHO=1.000							

LR1	cargo hold	1928.3	1301.07	78.30	0.00	2.39	0.00
LR2	cargo hold	1987.0	1178.93	36.90	0.00	2.20	0.00

Total of CAS		3915.3	2480.00	58.62	0.00	2.30	0.00

Diesel Oil, RHO=0.860							

DOA	Diesel oil a.	26.0	17.00	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	5.2	3.00	98.70	0.00	1.79	0.00

Total of DO		31.2	20.00	27.81	0.00	1.74	26.93

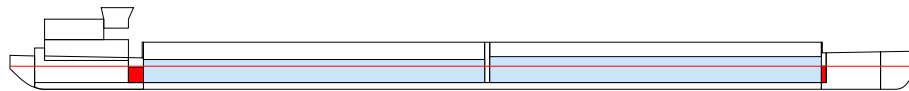
Fresh Water, RHO=1.000							

FW	Side Tanks a.	14.7	10.00	13.50	0.00	1.76	21.48

Deadweight			2515.0	58.10	0.00	2.30	48.4
Lightweight			880.0	46.34	0.00	3.27	
Displacement (rho=1.000)			3395.0	55.05	0.00	2.55	48.4

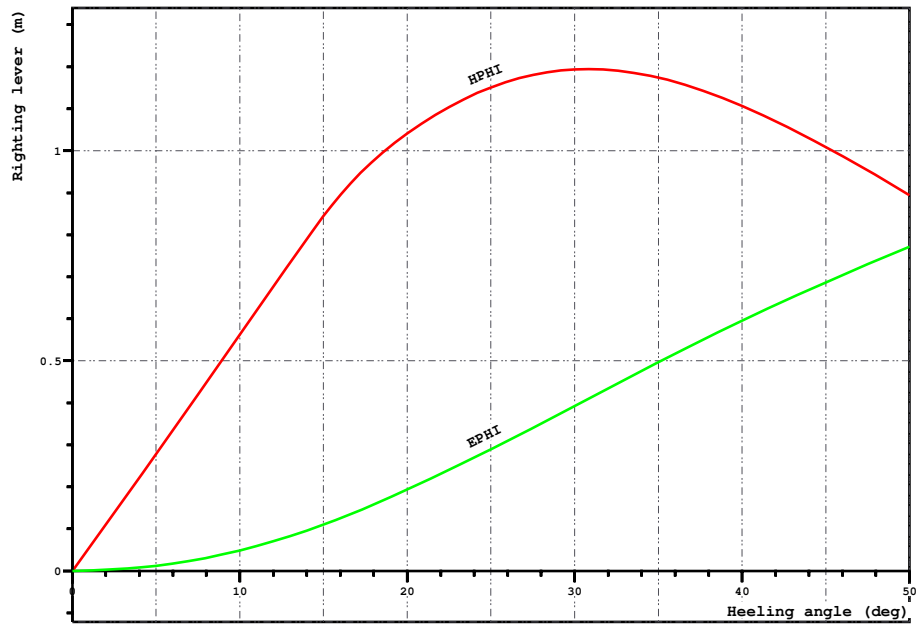
FLOATING POSITION

Draught moulded	2.788	m	KM	5.74	m
Trim	-0.002	m	KG	2.55	m
Heel, PS=+	0.0	deg			
TA	2.789	m	GM0	3.19	m
TF	2.787	m	GMCORR	-0.01	m
Trimming moment	-23	tonm	GM	3.18	m



Height of the wheelhouse top above waterline: 7.16 m

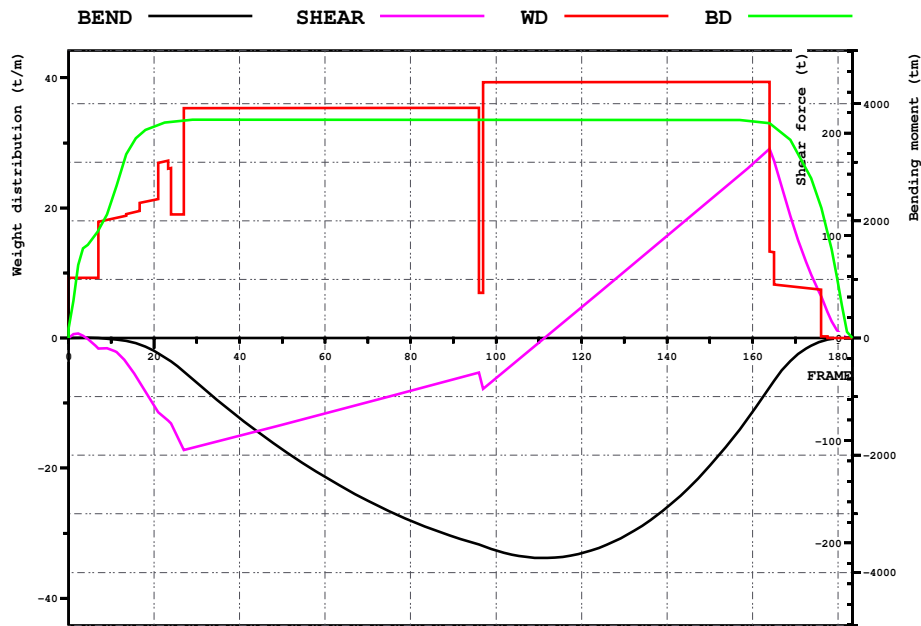
Loading case 2-T280, Full load



LOADING CONDITION 2-T280, Full load

HEEL deg	MS m	HPI m	EPI mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.001	0.28	0.012	4.2	0.001
10.0	0.011	0.56	0.049	8.5	0.003
15.0	0.023	0.84	0.110	13.0	0.004
20.0	-0.045	1.04	0.193	17.5	0.005
30.0	-0.394	1.19	0.392	24.3	0.007
40.0	-0.936	1.11	0.596	26.7	0.008
50.0	-1.541	0.89	0.771	26.5	0.008

Loading case1 2-T280, Full load



LOADING CONDITION 2-T280, Full load

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.28	1.47
6.000	10.00	-16	-11	18.32	20.96
12.000	20.00	-219	-66	21.25	32.49
18.000	30.00	-763	-106	35.33	33.56
24.000	40.00	-1364	-95	35.34	33.55
30.000	50.00	-1899	-85	35.36	33.55
36.000	60.00	-2370	-74	35.37	33.55
42.000	70.00	-2776	-63	35.38	33.55
48.000	80.00	-3115	-52	35.40	33.55
54.000	90.00	-3388	-41	35.41	33.55
60.000	100.00	-3623	-39	39.31	33.55
66.000	110.00	-3751	-5	39.32	33.54
72.000	120.00	-3672	30	39.34	33.54
78.000	130.00	-3385	65	39.35	33.54
84.000	140.00	-2887	100	39.36	33.54
90.000	150.00	-2181	135	39.38	33.54
96.000	160.00	-1264	170	39.39	33.33
102.000	170.00	-317	104	7.87	29.03
108.000	180.00	-5	7	0.00	8.44

M2066/B2

LOADING CONDITION 3-T180, Min. load

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgz			Free s. moment

Solid cargo, RHO=1.000							
LR1	cargo hold	1928.3	782.50	78.30	0.00	1.75	0.00
LR2	cargo hold	1987.0	447.50	36.90	0.00	1.33	0.00

Total of CAS		3915.3	1230.00	63.24	0.00	1.60	0.00

Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	26.0	17.00	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	5.2	3.00	98.70	0.00	1.79	0.00

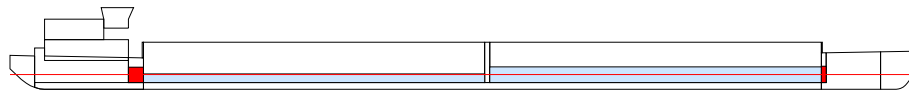
Total of DO		31.2	20.00	27.81	0.00	1.74	26.93

Fresh Water, RHO=1.000							
FW	Side Tanks a.	14.7	10.00	13.50	0.00	1.76	21.48

Deadweight			1265.0	62.08	0.00	1.63	48.4
Lightweight			880.0	46.34	0.00	3.27	
Displacement (rho=1.000)			2145.0	55.63	0.00	2.30	48.4

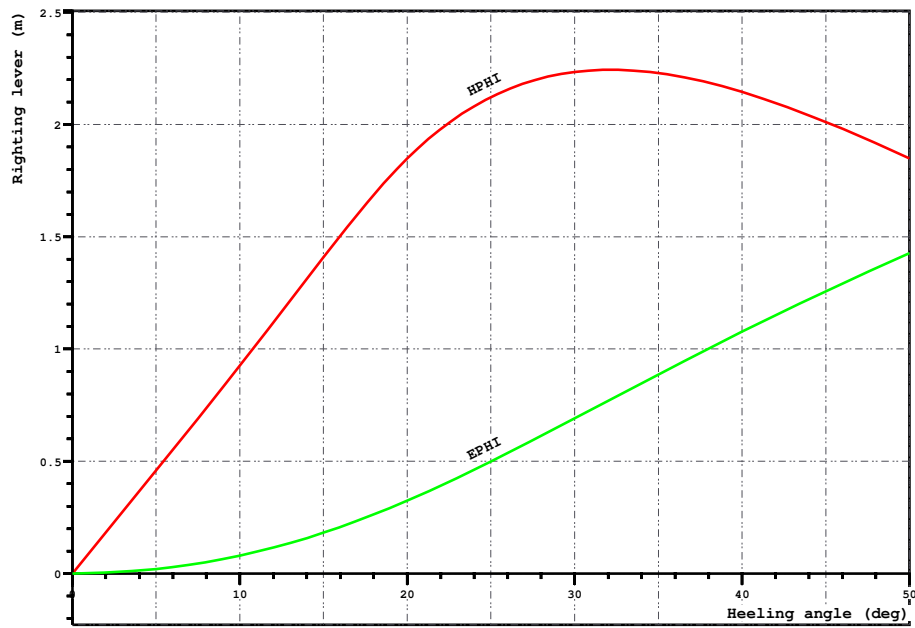
FLOATING POSITION

Draught moulded	1.792	m	KM	7.58	m
Trim	-0.002	m	KG	2.30	m
Heel, PS=+	0.0	deg			
TA	1.794	m	GM0	5.28	m
TF	1.791	m	GMCORR	-0.02	m
Trimming moment	-23	tonm	GM	5.25	m



Height of the wheelhouse top above waterline: 8.16 m

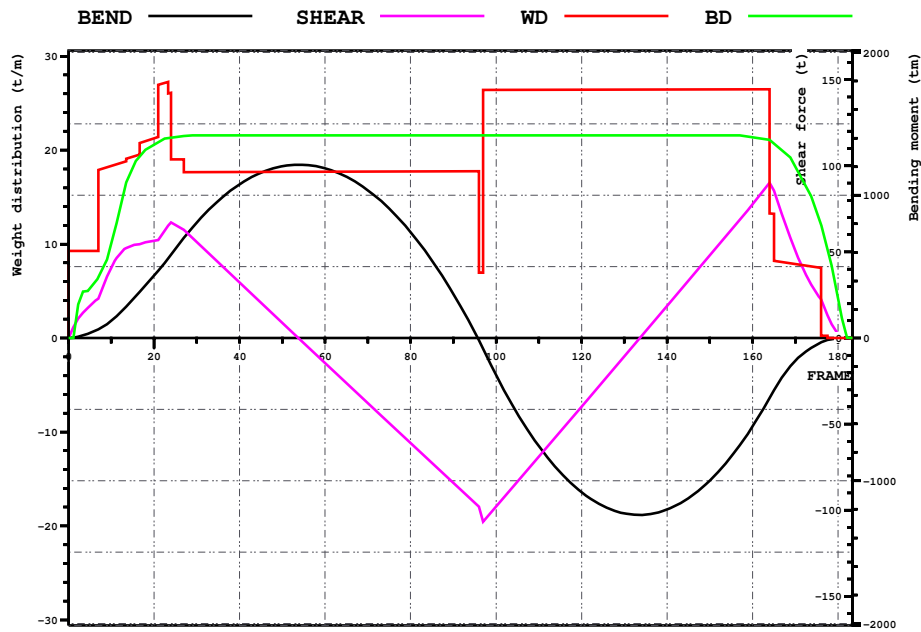
Loading case 3-T180, Min. load



LOADING CONDITION 3-T180, Min. load

HEEL deg	MS m	HPHI m	EPhi mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.002	0.46	0.020	4.2	0.002
10.0	0.013	0.93	0.080	8.5	0.004
15.0	0.048	1.41	0.182	13.0	0.006
20.0	0.052	1.85	0.325	17.5	0.008
30.0	-0.393	2.23	0.691	24.3	0.011
40.0	-1.235	2.15	1.077	26.7	0.012
50.0	-2.181	1.85	1.428	26.5	0.012

Loading case 3-T180, Min. load



LOADING CONDITION 3-T180, Min. load

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.28	0.00
6.000	10.00	121	41	18.32	10.08
12.000	20.00	436	56	21.25	20.57
18.000	30.00	809	56	17.66	21.59
24.000	40.00	1076	32	17.68	21.59
30.000	50.00	1203	9	17.69	21.59
36.000	60.00	1189	-15	17.70	21.59
42.000	70.00	1035	-38	17.72	21.59
48.000	80.00	742	-61	17.73	21.59
54.000	90.00	310	-84	17.74	21.58
60.000	100.00	-259	-98	26.41	21.58
66.000	110.00	-756	-69	26.42	21.58
72.000	120.00	-1079	-40	26.44	21.58
78.000	130.00	-1228	-11	26.45	21.58
84.000	140.00	-1201	19	26.46	21.58
90.000	150.00	-999	48	26.48	21.57
96.000	160.00	-619	78	26.49	21.37
102.000	170.00	-160	51	7.87	18.22
108.000	180.00	-3	3	0.00	4.26

M2066/B2

LOADING CONDITION 4-T130, Min. load

L O A D I N G C O M P O N E N T S

Name		Max. weight	Mass	Center of gravity cgx cgy cgz			Free s. moment

Solid cargo, RHO=1.000							

LR1	cargo hold	1928.3	523.28	78.30	0.00	1.44	0.00
LR2	cargo hold	1987.0	106.72	36.90	0.00	0.93	0.00

Total of CAS		3915.3	630.00	71.29	0.00	1.35	0.00

Diesel Oil, RHO=0.860							

DOA	Diesel oil a.	26.0	17.00	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	5.2	3.00	98.70	0.00	1.79	0.00

Total of DO		31.2	20.00	27.81	0.00	1.74	26.93

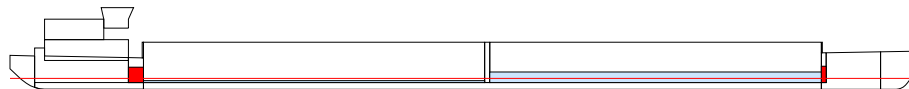
Fresh Water, RHO=1.000							

FW	Side Tanks a.	14.7	10.00	13.50	0.00	1.76	21.48

Deadweight			665.0	68.66	0.00	1.42	48.4
Lightweight			880.0	46.34	0.00	3.27	
Displacement (rho=1.000)			1545.0	55.95	0.00	2.47	48.4

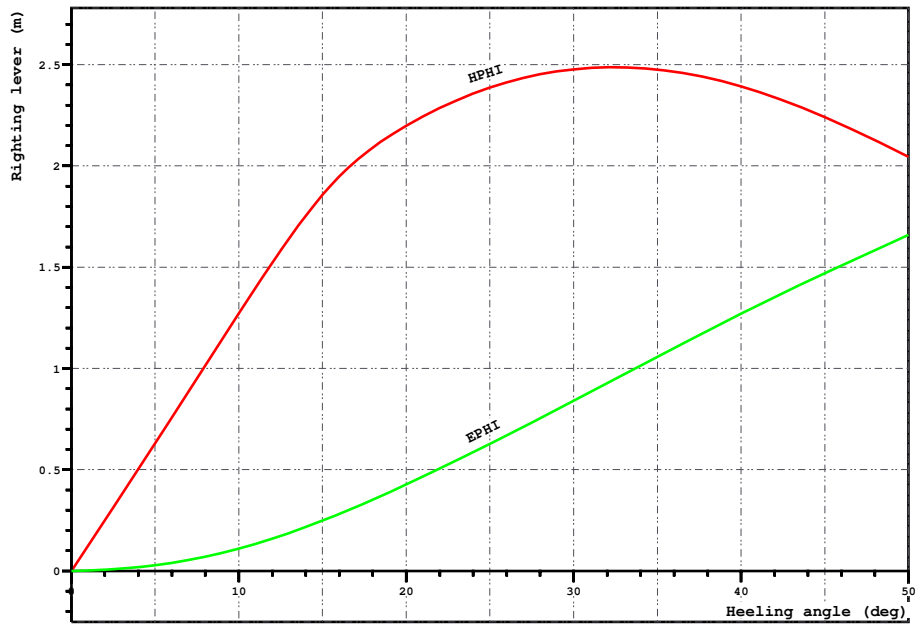
FLOATING POSITION

Draught moulded	1.305	m	KM	9.70	m
Trim	-0.002	m	KG	2.47	m
Heel, PS=+	0.0	deg			
TA	1.306	m	GM0	7.22	m
TF	1.304	m	GMCORR	-0.03	m
Trimming moment	-23	tonm	GM	7.19	m



Height of the wheelhouse top above waterline: 8.64 m

Loading case 4-T130, Min. load

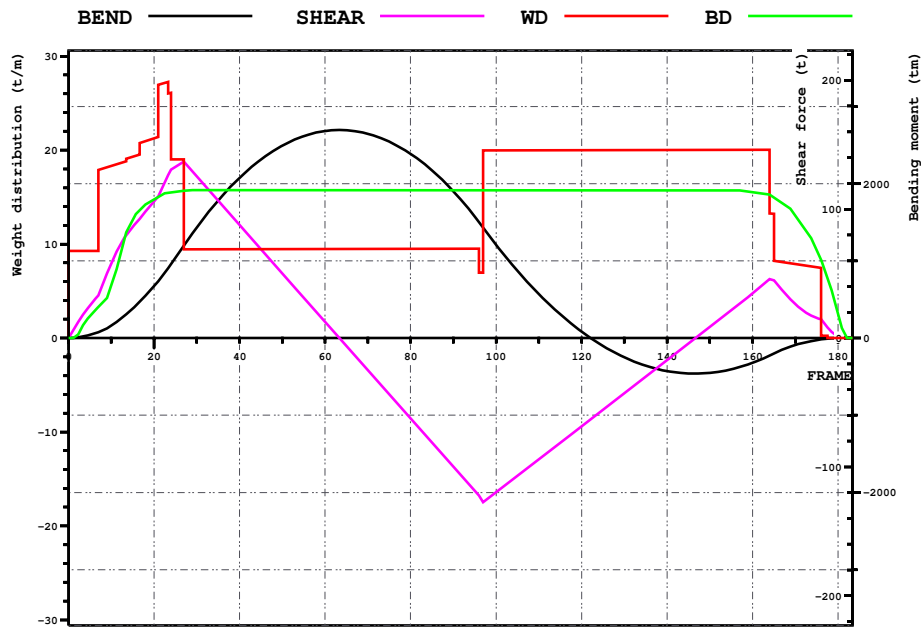


LOADING CONDITION 4-T130, Min. load

HEEL deg	MS m	HPHI m	EPhi mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.003	0.63	0.027	4.2	0.003
10.0	0.022	1.27	0.110	8.5	0.006
15.0	-0.004	1.86	0.248	13.0	0.008
20.0	-0.260	2.20	0.427	17.5	0.011
30.0	-1.118	2.48	0.840	24.3	0.016
40.0	-2.233	2.39	1.270	26.7	0.017
50.0	-3.471	2.04	1.660	26.5	0.017

M2066/B2

Loading case 4-T130, Min. load



LOADING CONDITION 4-T130, Min. load

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.28	0.00
6.000	10.00	161	58	18.32	5.62
12.000	20.00	671	106	21.25	14.74
18.000	30.00	1431	126	9.43	15.74
24.000	40.00	2074	88	9.45	15.73
30.000	50.00	2491	50	9.46	15.73
36.000	60.00	2681	13	9.47	15.73
42.000	70.00	2646	-25	9.48	15.73
48.000	80.00	2386	-62	9.50	15.73
54.000	90.00	1902	-100	9.51	15.73
60.000	100.00	1209	-120	19.96	15.72
66.000	110.00	570	-94	19.98	15.72
72.000	120.00	83	-69	19.99	15.72
78.000	130.00	-250	-43	20.00	15.72
84.000	140.00	-428	-17	20.01	15.72
90.000	150.00	-453	9	20.03	15.72
96.000	160.00	-321	35	20.04	15.53
102.000	170.00	-91	26	7.87	13.01
108.000	180.00	-2	2	0.00	2.56