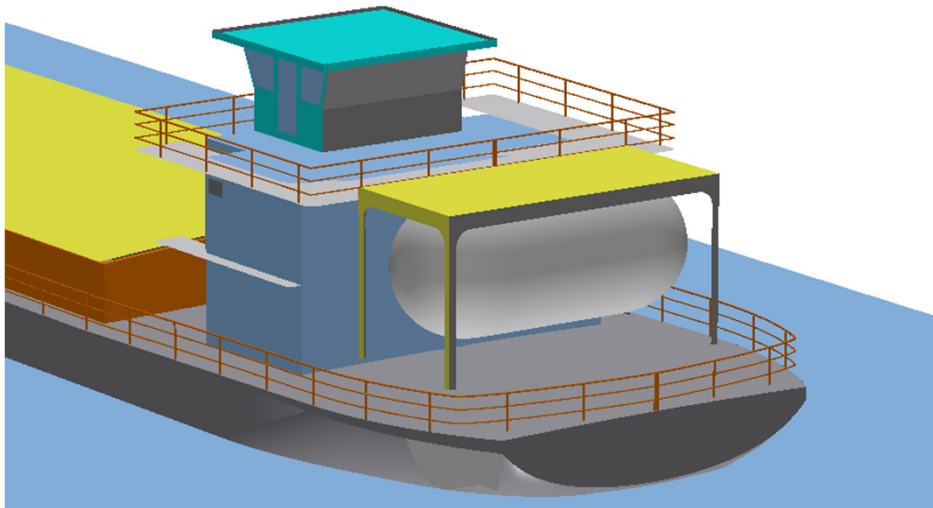
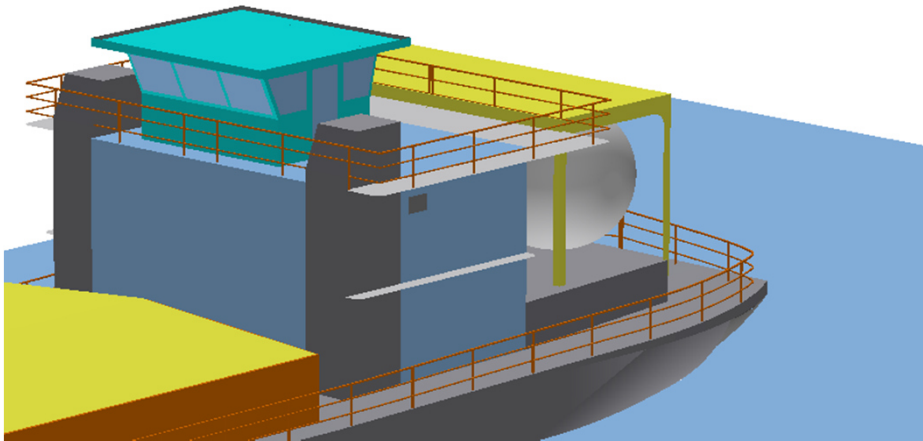

Bulk Carrier B LNG



Main dimensions

Cargo type		Dry Bulk
Hull type		B_LNG
Length o.A.	L	110,00 m
Breadth	B	12,00 m
Depth Main Deck	D	3,70 m
Draught max.	T	2,80 m
Lightweight estimate		852 t
Payload at Tmax		2500 t

Applicable regulations

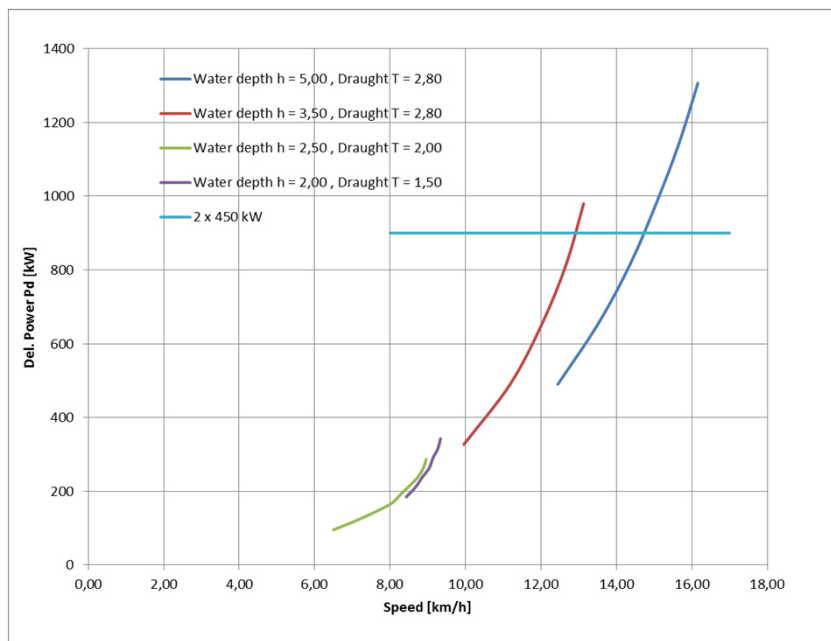
- Vessel built according to Rules and Regulations for the Construction and Classification of Inland Waterways Ships by the Indian Register of Shipping.
- Applicable rules of IWAI for navigation on NW-1, all reaches from Haldia (West Bengal) to Allahabad (Uttar Pradesh).
- "Natural Gas Fueled Vessels for Coastal and Inland Waters" Classification notes, IRClass, July 2017

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

Dual-fuel (Diesel - LNG) marine engine 500 kW in rating A (heavy, uninterrupted duty)



Cargo hold

	Lc	Bc	Hc	Volume
Dimensions:	84,0 m	10,1 m	3,9 m	3308,8 m ³

Divided in 2 parts

Sliding hatch cover, with light alloy profile cover

Provisions

LNG fuel	17 t
Diesel Oil	10 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 0 kg

Accommodation

- Accommodation on two decks for crew of 8 persons

Weight calculation results for major components

Steel weight, longt. Framing	687 t
Accommodation	105 t
Machinery & outfitting	50 t
LNG Equipment	15 t
Sum	852 t

Electric load requirements

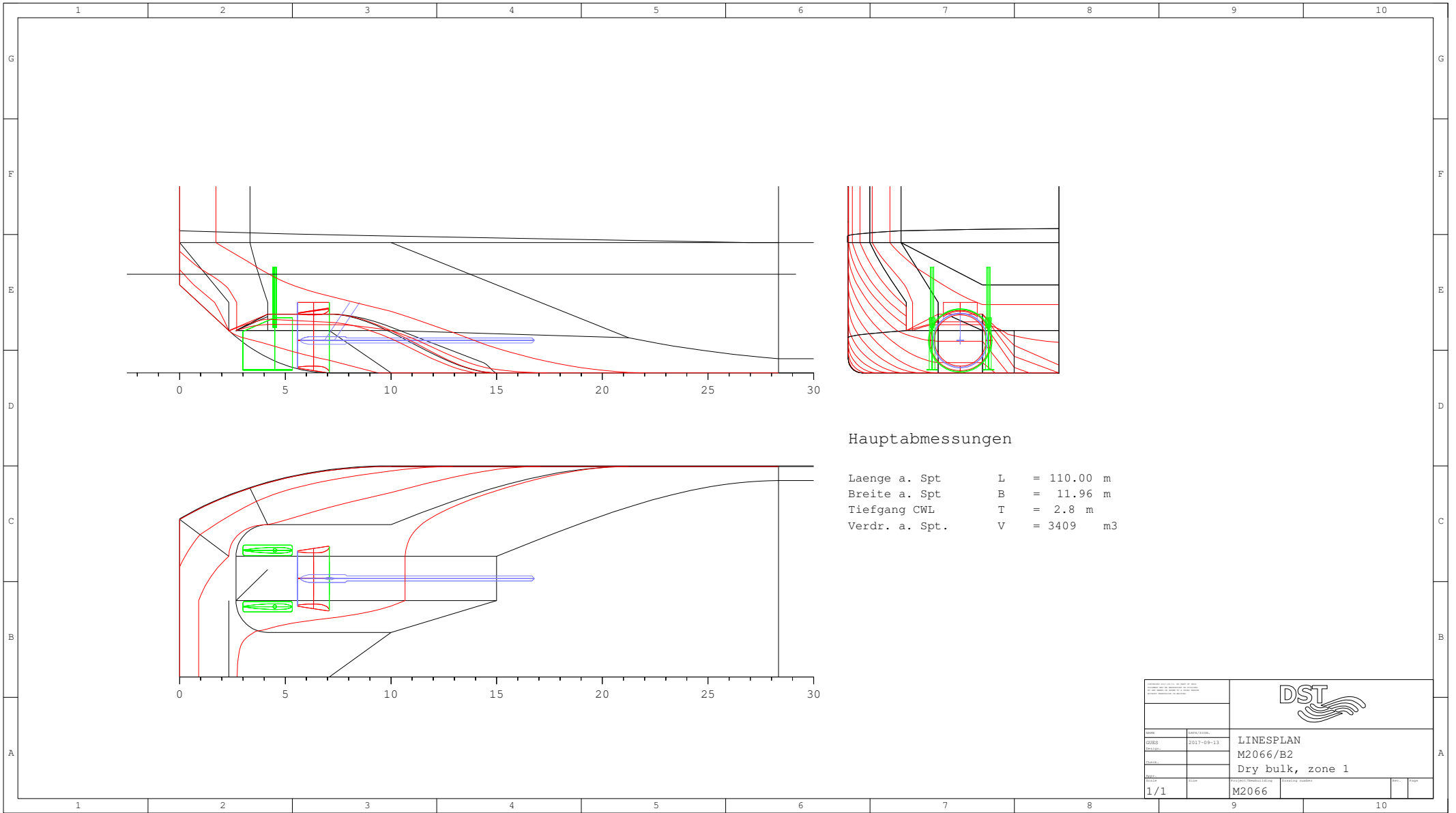
LNG driven genset, 60 kW output

Three-phase AC supply to anchor winches

220 V supply to accomadation


220 V supply to AC accomodation

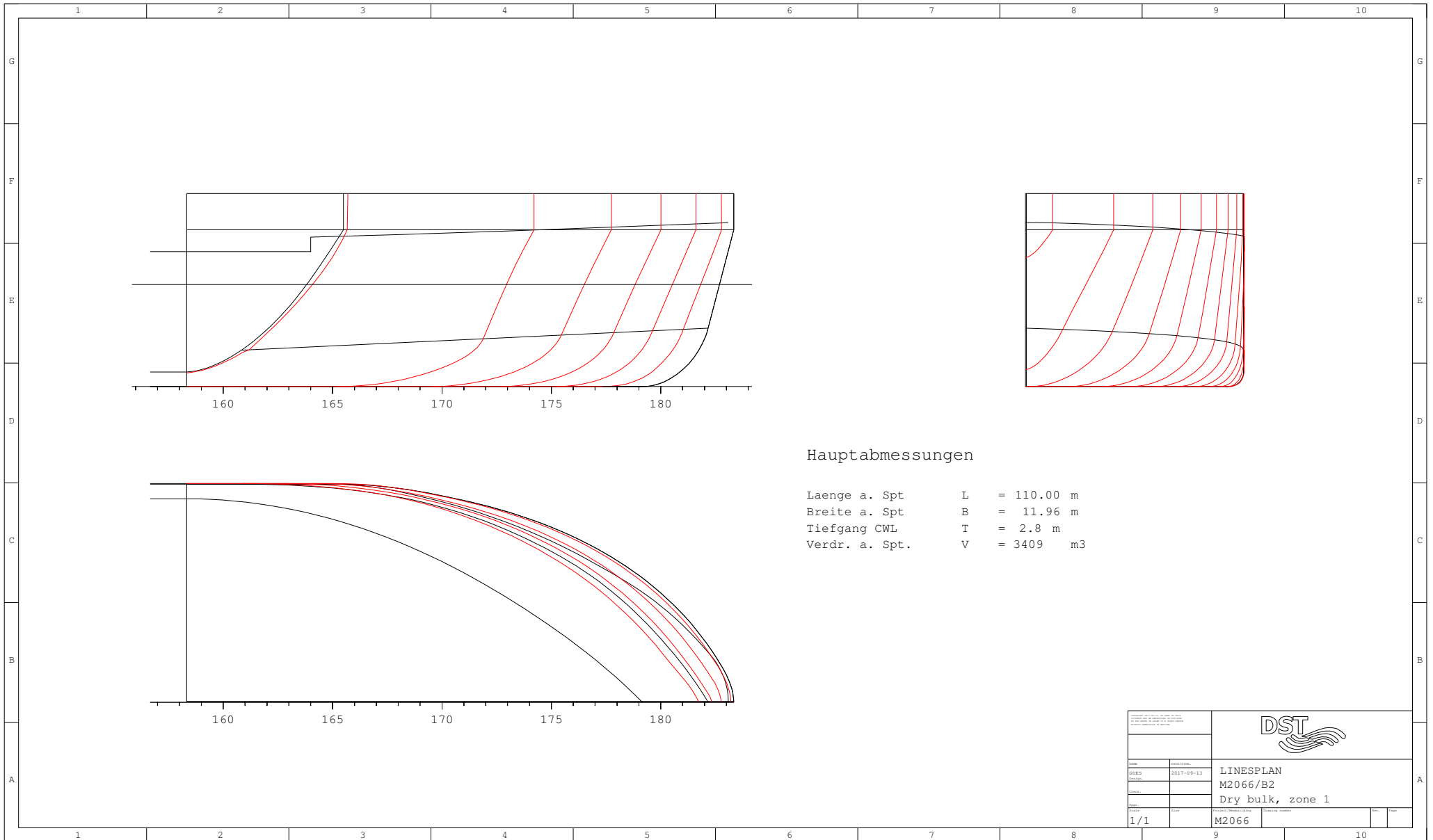
24 V emergency circuit



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

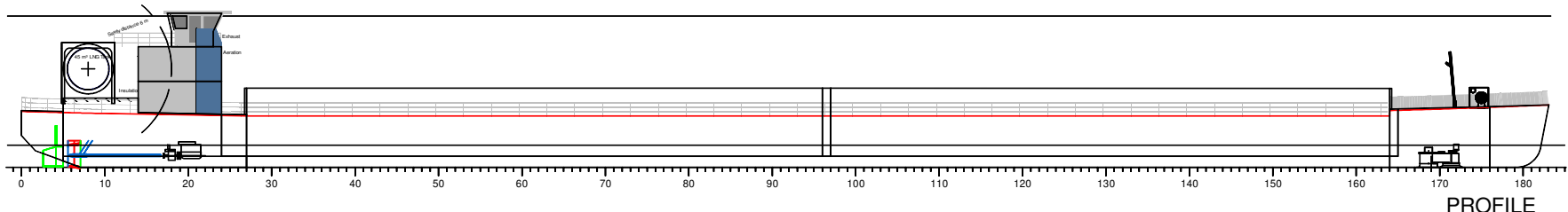
<small>Copyright © 2017 DST Engineering AG Alle Rechte vorbehalten. Nachdruck, Vervielfältigung und Verbreitung, auch auszugsweise, ist ohne schriftliche Genehmigung.</small>			
DATE:	2017-09-13	LINESPLAN M2066/B2 Dry bulk, zone 1	
SCALE:	1/1	PROJECT NUMBER:	M2066
		DRAWING NUMBER:	
		REV.:	
		DATE:	



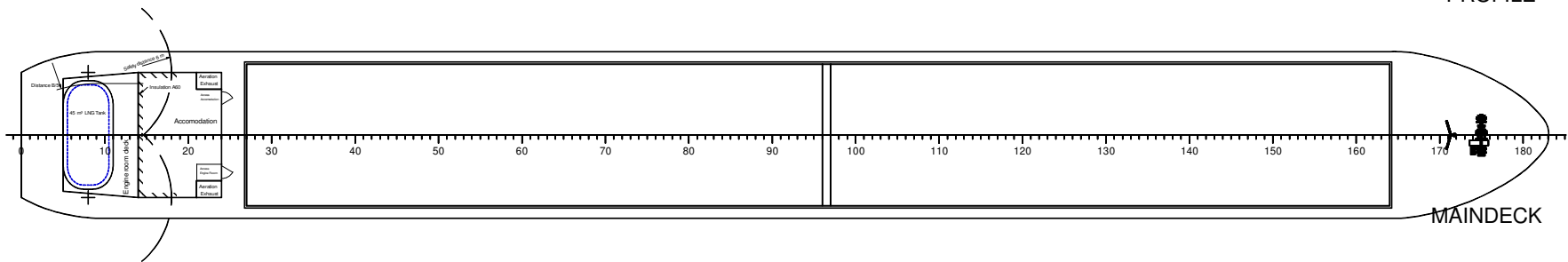
Hauptabmessungen

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

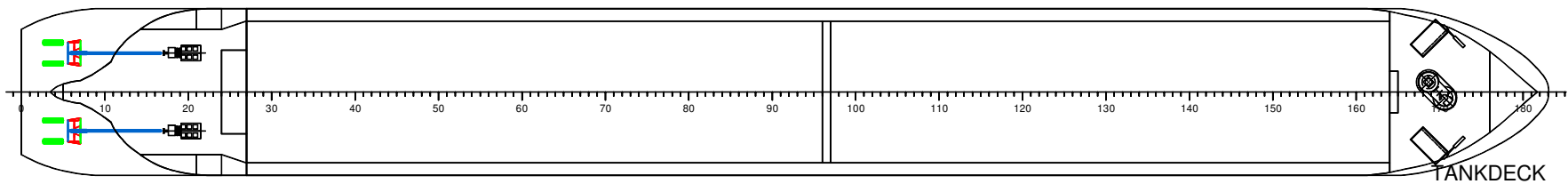
<small> INSTITUT FÜR SCHIFFBAU UND MASCHINENBAU UNIVERSITÄT DUISBURG ESSEN LEHRGEBIET SCHIFFBAU </small>			
<small> Name Datum Blatt </small>	<small> 02011006 2017-09-13 1/1 </small>	<small> Projekt / Objektname M2066 </small>	
<small> Datum 1/1 </small>		<small> Projekt / Objektname M2066 </small>	
		 LINESPLAN M2066/B2 Dry bulk, zone 1 	
		<small> Blatt / Seite 1 / 1 </small>	



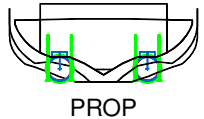
PROFILE



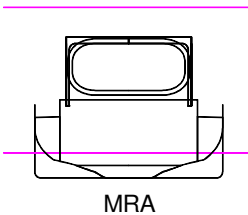
MAINDECK



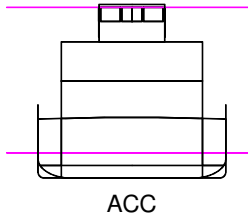
TANKDECK



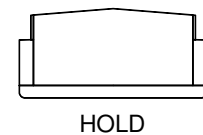
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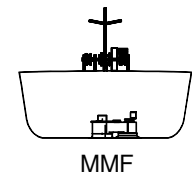
MRA



ACC



HOLD



MMF

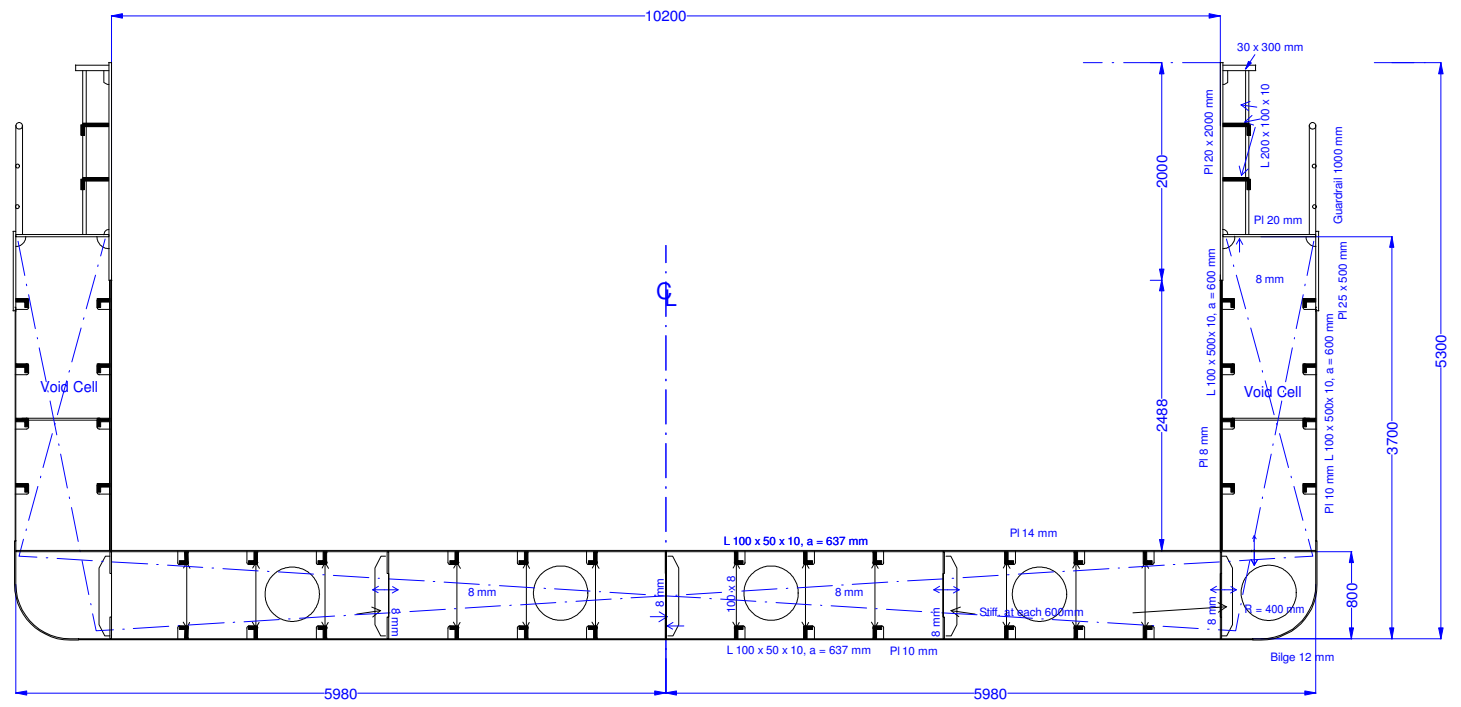
Main dimensions

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

		GENERAL ARRANGEMENT B_LNG	
1/...			


Bulk Carrier B1_LNG - Main Frame and Scantling

Frame distance 1800 mm



Main Dimensions	
Lenght PP	: 110.000 m
Breadth moulded	: 11.960 m
Breadth o. all	: 12.010 m
Draught design	: 2.800 m
Navigation Zone 3	

Date 24.08.2017

	
<p align="center">B1 LNG Bulk Carrier Main Section</p>	
<p>Scale: 1/25</p>	<p>Sheet: G 1</p>

M2066/B1

PROJECT INFO

L x B = 110.00 x 12 m

LOADING CASES

Vessel Type: B1

Loading cases:

CASE	DISP t	LOADBUNKER t	CARGO t	T m	TR m	GM m	GMCORR m	
1-LIGHTSHIP	862	35	30	0	0.75	-0.99	13.859	-0.067
2-CAS1	2115	1288	30	1253	1.78	2.19	5.159	-0.027
3-CAS2	2154	1327	30	1292	1.77	-3.16	5.537	-0.027
4-T280	3372	2545	30	2510	2.79	0.00	3.450	-0.017
5-T130	1512	685	30	650	1.29	0.00	7.904	-0.038

M2066/B1

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	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	4.9	3	98.70	0.00	1.79	0.00

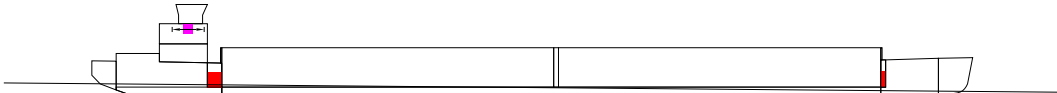
Total of DO		30.9	20	27.81	0.00	1.74	26.93

Fresh Water, RHO=1.000							

FW	Side Tanks a.	14.9	10	13.50	0.00	1.75	31.20
Deadweight			35	21.46	0.00	2.64	58.1
Lightweight			827	47.30	0.00	2.19	
Displacement (rho=1.000)			862	46.25	0.00	2.21	58.1

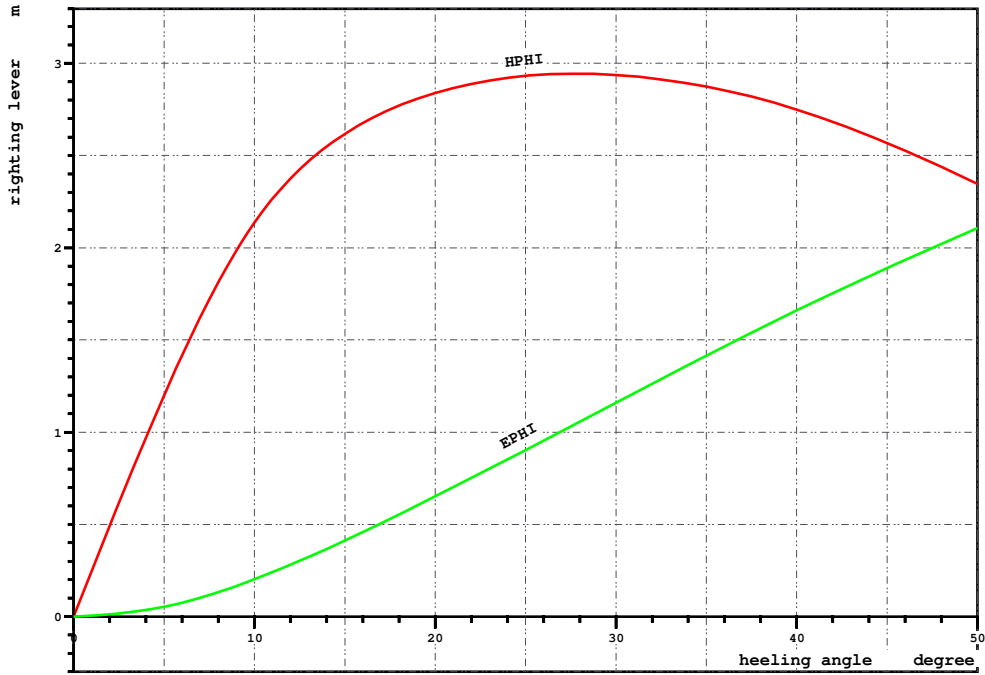
FLOATING POSITION

Draught moulded	0.749 m	KM	16.14 m
Trim	-0.988 m	KG	2.21 m
Heel, PS=+	0.0 deg		
TA	1.243 m	GM0	13.93 m
TF	0.255 m	GMCORR	-0.07 m
Trimming moment	-8654 tonm	GM	13.86 m



M2066/B1

Loading condition 1-Lightship,

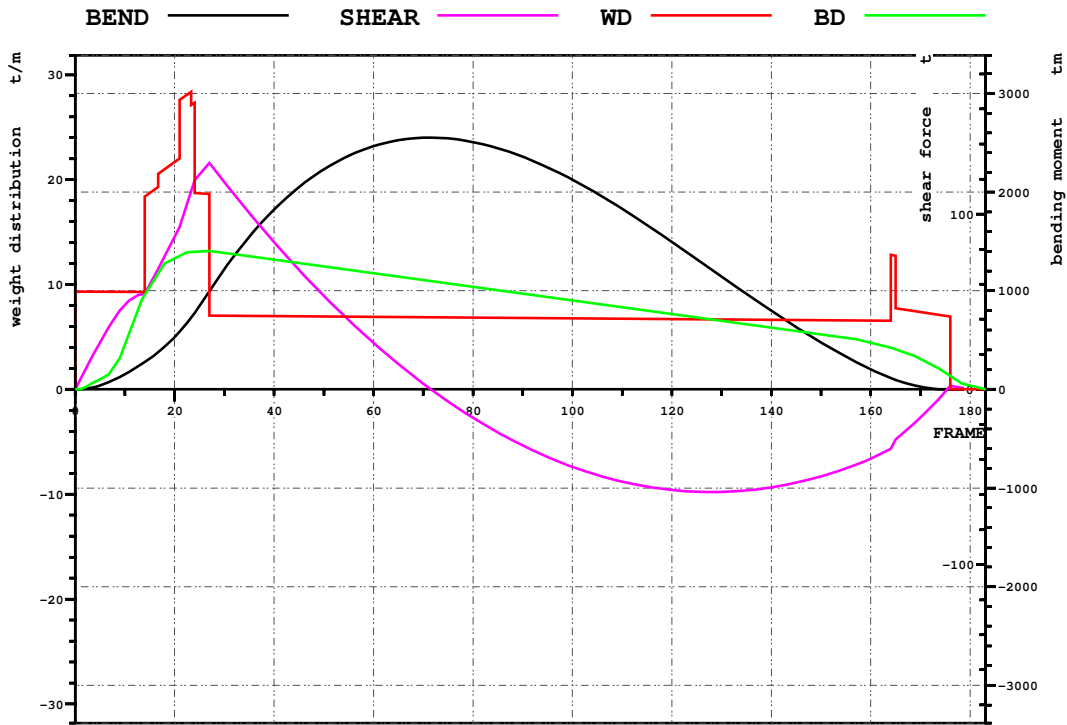


LOADING CONDITION 1-LIGHTSHIP

HEEL degree	MS m	HPHI m	EPHI mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	-0.009	1.20	0.053	5.1	0.006
10.0	-0.270	2.14	0.202	10.3	0.012
15.0	-0.969	2.62	0.412	15.5	0.018
20.0	-1.901	2.84	0.651	19.6	0.023
30.0	-3.996	2.94	1.160	25.9	0.030
40.0	-6.169	2.75	1.660	27.9	0.032
50.0	-8.289	2.35	2.107	27.4	0.032

M2066/B1

Loading condition 1-Lightship,



LOADING CONDITION 1-LIGHTSHIP

			X	Frame
Shear force (min)	-58.6 t	(-)	77.035 m	128.39
Shear force (max)	129.3 t	(-)	16.200 m	27.00
Sagging moment	-1.1 tm	(-)	105.221 m	175.37
Hogging moment	2552.0 tm	(-)	43.057 m	71.76

M2066/B1

LOADING CONDITION 2-CAS1, Cargo hold 1 loaded

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	1253	78.30	0.00	2.33	0.00
Diesel Oil, RHO=0.860							

DOA	Diesel oil a.	26.0	17	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	4.9	3	98.70	0.00	1.79	0.00

Total of DO		30.9	20	27.81	0.00	1.74	26.93
Fresh Water, RHO=1.000							

FW	Side Tanks a.	14.9	10	13.50	0.00	1.75	31.20
Deadweight			1288	76.76	0.00	2.34	58.1
Lightweight			827	47.30	0.00	2.19	
Displacement (rho=1.000)			2115	65.24	0.00	2.28	58.1

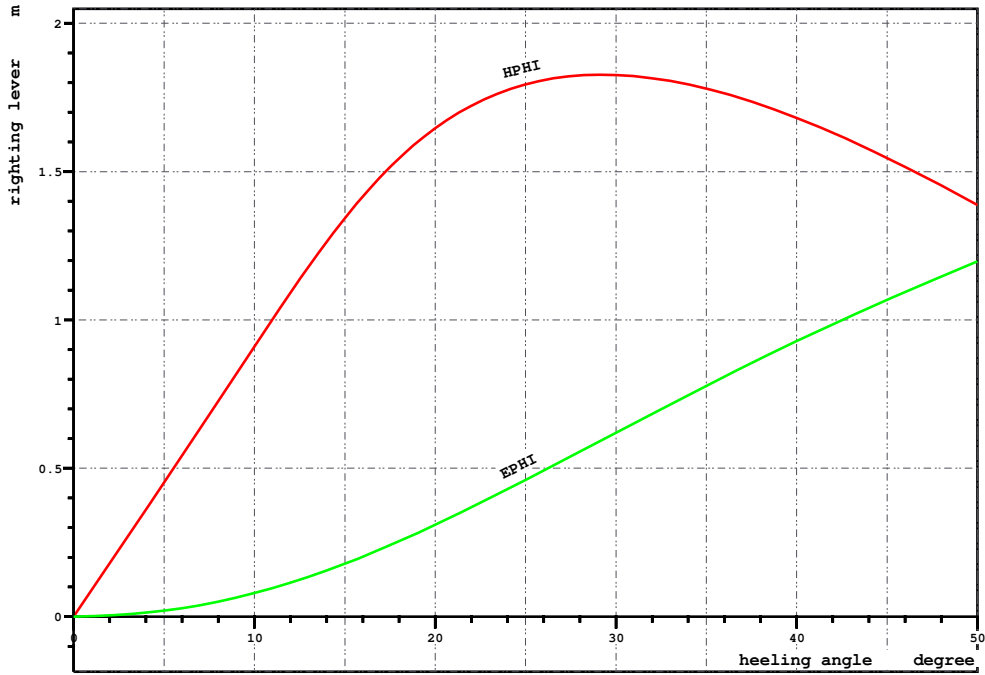
FLOATING POSITION

Draught moulded	1.780	m	KM	7.47	m
Trim	2.187	m	KG	2.28	m
Heel, PS=+	0.0	deg			
TA	0.687	m	GM0	5.19	m
TF	2.874	m	GMCORR	-0.03	m
Trimming moment	19459	tonm	GM	5.16	m



M2066/B1

Loading condition 2-cas1, Cargo hold 1 loaded

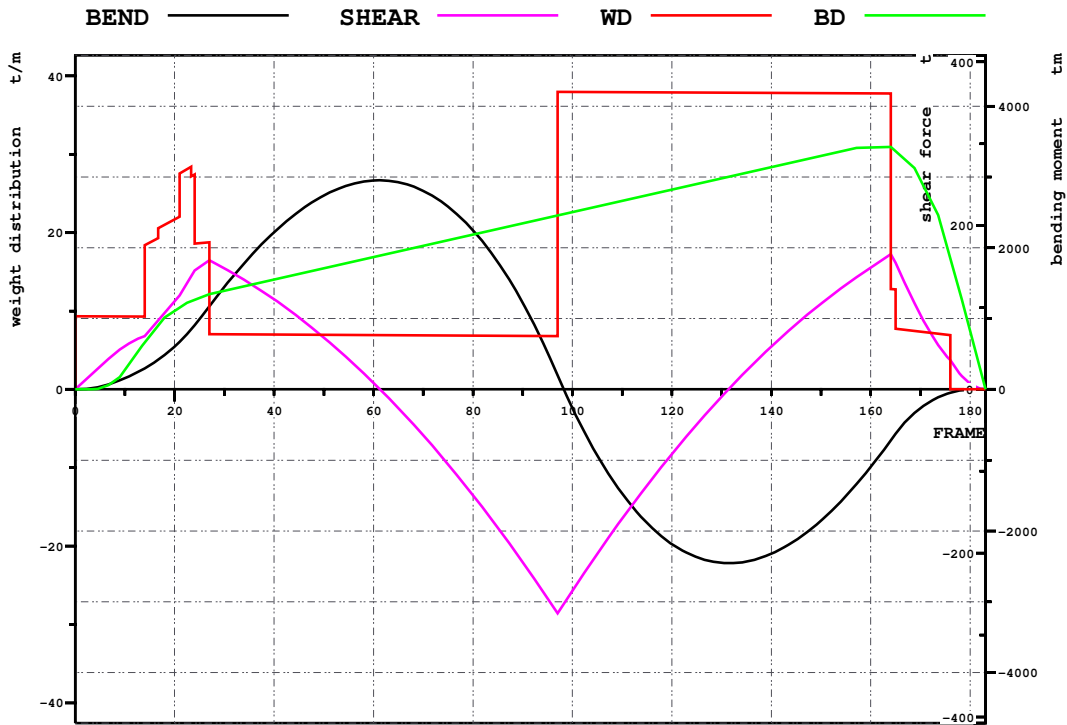


LOADING CONDITION 2-CAS1, Cargo hold 1 loaded

HEEL degree	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	0.45	0.020	5.1	0.002
10.0	0.015	0.91	0.079	10.3	0.005
15.0	0.009	1.34	0.178	15.5	0.007
20.0	-0.118	1.65	0.310	19.6	0.009
30.0	-0.755	1.83	0.619	25.9	0.012
40.0	-1.639	1.68	0.929	27.9	0.013
50.0	-2.572	1.39	1.198	27.4	0.013

M2066/B1

Loading condition 2-cas1, Cargo hold 1 loaded



LOADING CONDITION 2-CAS1, Cargo hold 1 loaded

			X	Frame
Shear force (min)	-273.4 t	(-)	58.200 m	97.00
Shear force (max)	165.2 t	(-)	98.400 m	164.00
Sagging moment	-2454.5 tm	(-)	79.398 m	132.33
Hogging moment	2954.2 tm	(-)	36.750 m	61.25

M2066/B1

LOADING CONDITION 3-CAS2, Cargo hold 2 loaded

LOADING COMPONENTS

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

Solid cargo, RHO=1.000							

LR2	cargo hold	1987.0	1292	36.90	0.00	2.33	0.00
Diesel Oil, RHO=0.860							

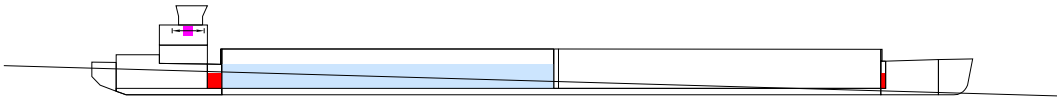
DOA	Diesel oil a.	26.0	17	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	4.9	3	98.70	0.00	1.79	0.00

Total of DO		30.9	20	27.81	0.00	1.74	26.93
Fresh Water, RHO=1.000							

FW	Side Tanks a.	14.9	10	13.50	0.00	1.75	31.20
Deadweight			1327	36.49	0.00	2.34	58.1
Lightweight			827	47.30	0.00	2.19	
Displacement (rho=1.000)			2154	40.64	0.00	2.28	58.1

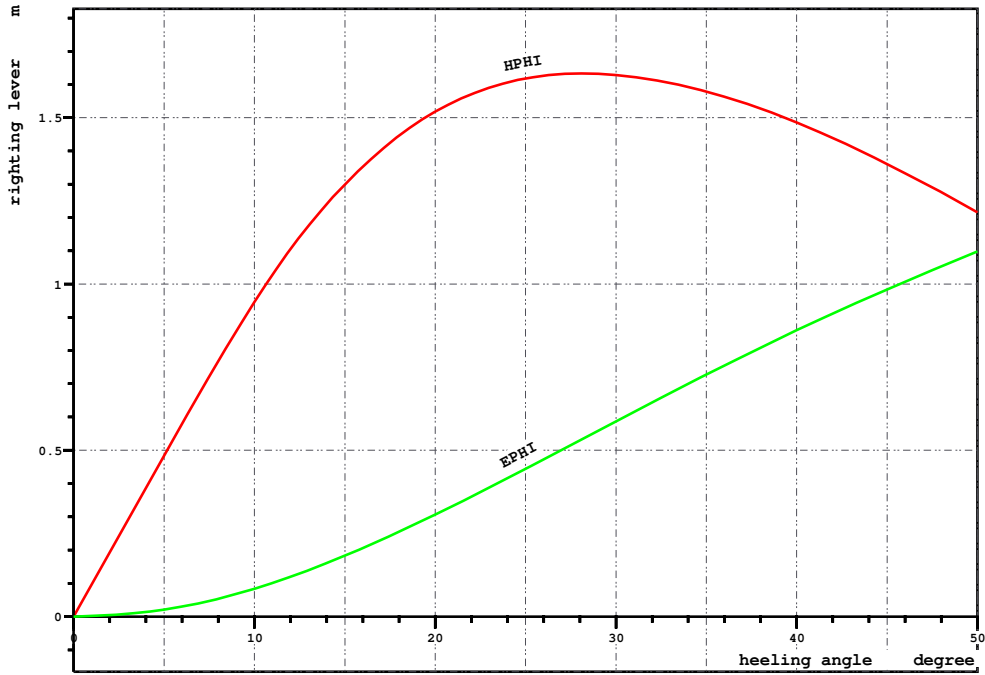
FLOATING POSITION

Draught moulded	1.768	m	KM	7.85	m
Trim	-3.159	m	KG	2.28	m
Heel, PS=+	0.0	deg			
TA	3.347	m	GM0	5.56	m
TF	0.189	m	GMCORR	-0.03	m
Trimming moment	-31983	tonm	GM	5.54	m



M2066/B1

Loading condition 3-cas2, Cargo hold 2 loaded

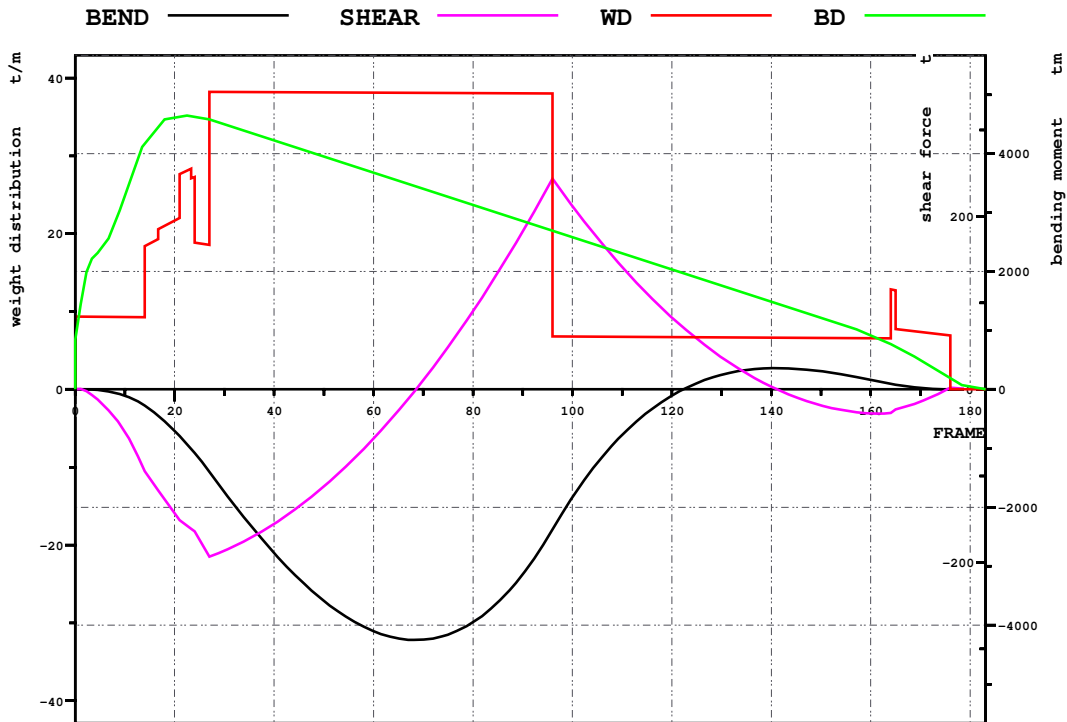


LOADING CONDITION 3-CAS2, Cargo hold 2 loaded

HEEL degree	MS m	HPHI m	EPhi mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.001	0.48	0.021	5.1	0.002
10.0	-0.015	0.95	0.084	10.3	0.005
15.0	-0.133	1.30	0.183	15.5	0.007
20.0	-0.375	1.52	0.307	19.6	0.009
30.0	-1.141	1.63	0.587	25.9	0.012
40.0	-2.078	1.49	0.861	27.9	0.013
50.0	-3.033	1.22	1.098	27.4	0.013

M2066/B1

Loading condition 3-cas2, Cargo hold 2 loaded



LOADING CONDITION 3-CAS2, Cargo hold 2 loaded

			X	Frame
Shear force (min)	-193.4 t	(-)	16.200 m	27.00
Shear force (max)	243.7 t	(-)	57.600 m	96.00
Sagging moment	-4250.5 tm	(-)	40.860 m	68.10
Hogging moment	362.0 tm	(-)	84.157 m	140.26

M2066/B1

LOADING CONDITION 4-T280, Full 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	1270	78.30	0.00	2.35	0.00
LR2	cargo hold	1987.0	1240	36.90	0.00	2.27	0.00

Total of CAS		3915.3	2510	57.85	0.00	2.31	0.00

Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	26.0	17	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	4.9	3	98.70	0.00	1.79	0.00

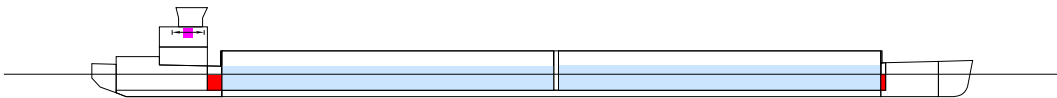
Total of DO		30.9	20	27.81	0.00	1.74	26.93

Fresh Water, RHO=1.000							
FW	Side Tanks a.	14.9	10	13.50	0.00	1.75	31.20

Deadweight			2545	57.35	0.00	2.31	58.1
Lightweight			827	47.30	0.00	2.19	
Displacement (rho=1.000)			3372	54.88	0.00	2.28	58.1

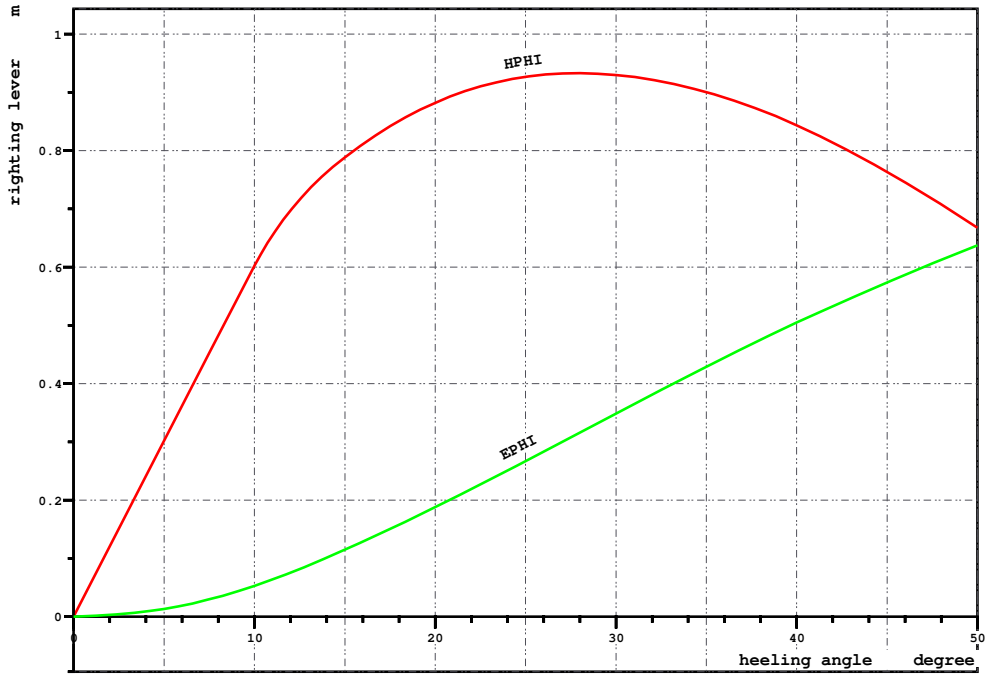
FLOATING POSITION

Draught moulded	2.794	m	KM	5.75	m
Trim	-0.002	m	KG	2.28	m
Heel, PS=+	0.0	deg			
TA	2.795	m	GM0	3.47	m
TF	2.793	m	GMCORR	-0.02	m
Trimming moment	-23	tonm	GM	3.45	m



M2066/B1

Loading condition 4-t280, Full load

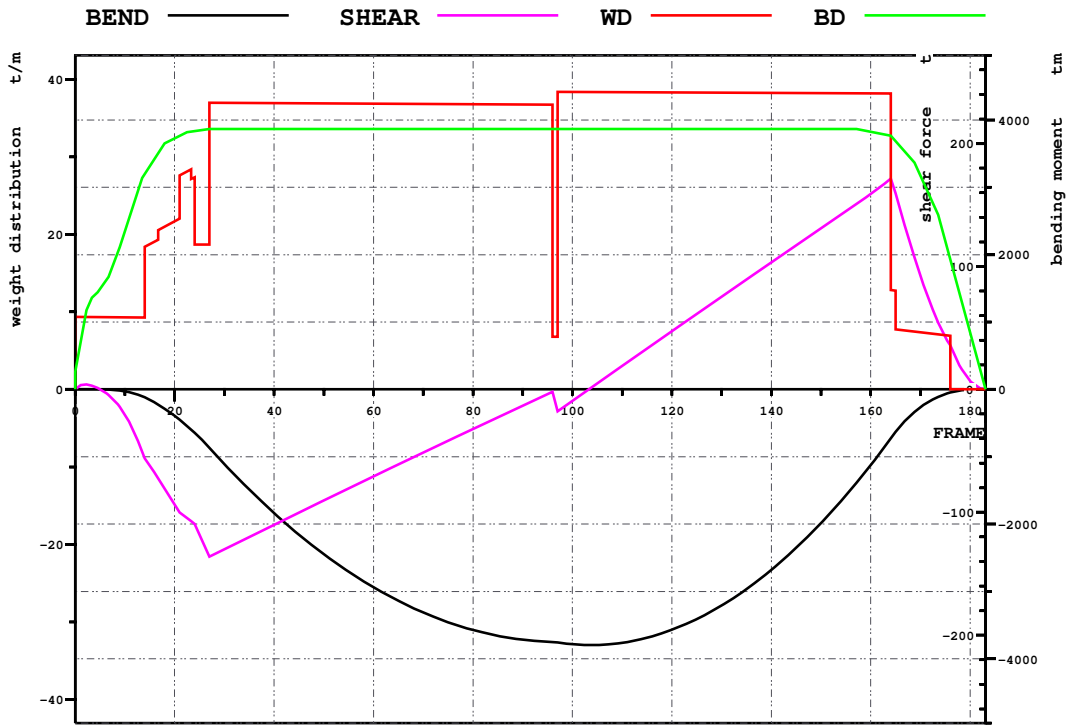


LOADING CONDITION 4-T280, Full load

HEEL degree	MS m	HPHI m	Ephi mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.001	0.30	0.013	5.1	0.002
10.0	0.003	0.60	0.053	10.3	0.003
15.0	-0.104	0.79	0.115	15.5	0.005
20.0	-0.298	0.88	0.188	19.6	0.006
30.0	-0.796	0.93	0.348	25.9	0.008
40.0	-1.377	0.84	0.505	27.9	0.008
50.0	-1.981	0.67	0.637	27.4	0.008

M2066/B1

Loading condition 4-t280, Full load



LOADING CONDITION 4-T280, Full load

			X	Frame
Shear force (min)	-136.1 t	(-)	16.200 m	27.00
Shear force (max)	171.4 t	(-)	98.400 m	164.00
Sagging moment	-3793.4 tm	(-)	62.508 m	104.18
Hogging moment	3.6 tm	(-)	2.700 m	4.50

M2066/B1

LOADING CONDITION 5-T130, 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	500	78.30	0.00	1.41	0.00
LR2	cargo hold	1987.0	150	36.90	0.00	0.98	0.00

Total of CAS		3915.3	650	68.72	0.00	1.31	0.00

Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	26.0	17	15.30	0.00	1.73	26.93
DOF	Diesel oil f.	4.9	3	98.70	0.00	1.79	0.00

Total of DO		30.9	20	27.81	0.00	1.74	26.93

Fresh Water, RHO=1.000							
FW	Side Tanks a.	14.9	10	13.50	0.00	1.75	31.20

Deadweight			685	66.31	0.00	1.38	58.1
Lightweight			827	47.30	0.00	2.19	
Displacement (rho=1.000)			1512	55.91	0.00	1.82	58.1

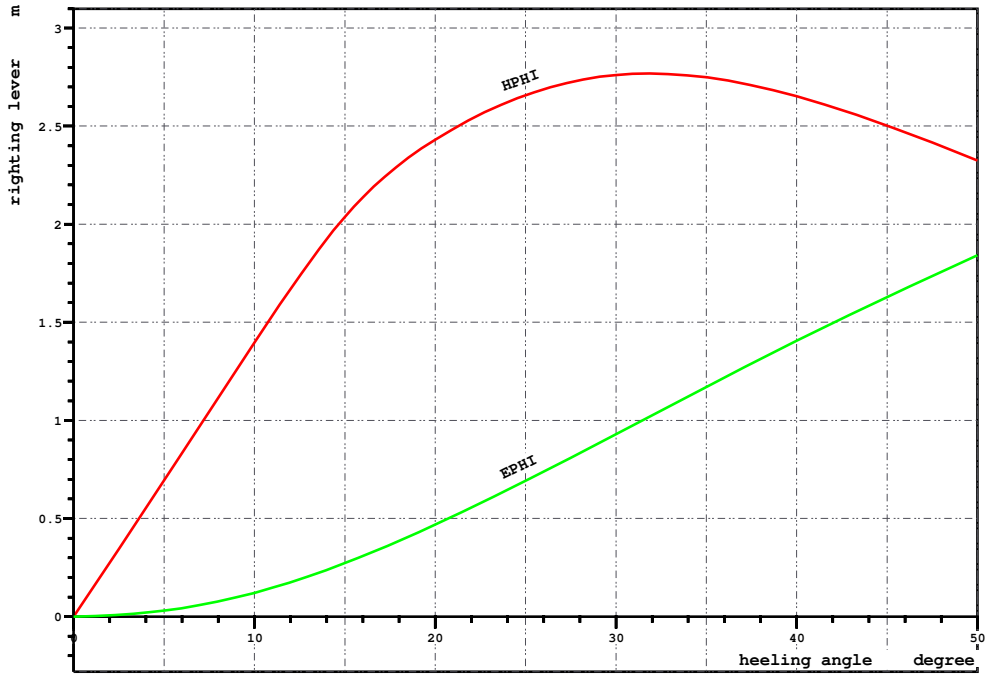
FLOATING POSITION

Draught moulded	1.293	m	KM	9.77	m
Trim	-0.002	m	KG	1.82	m
Heel, PS=+	0.0	deg			
TA	1.294	m	GM0	7.94	m
TF	1.292	m	GMCORR	-0.04	m
Trimming moment	-23	tonm	GM	7.90	m



M2066/B1

Loading condition 5-t130, Min. load

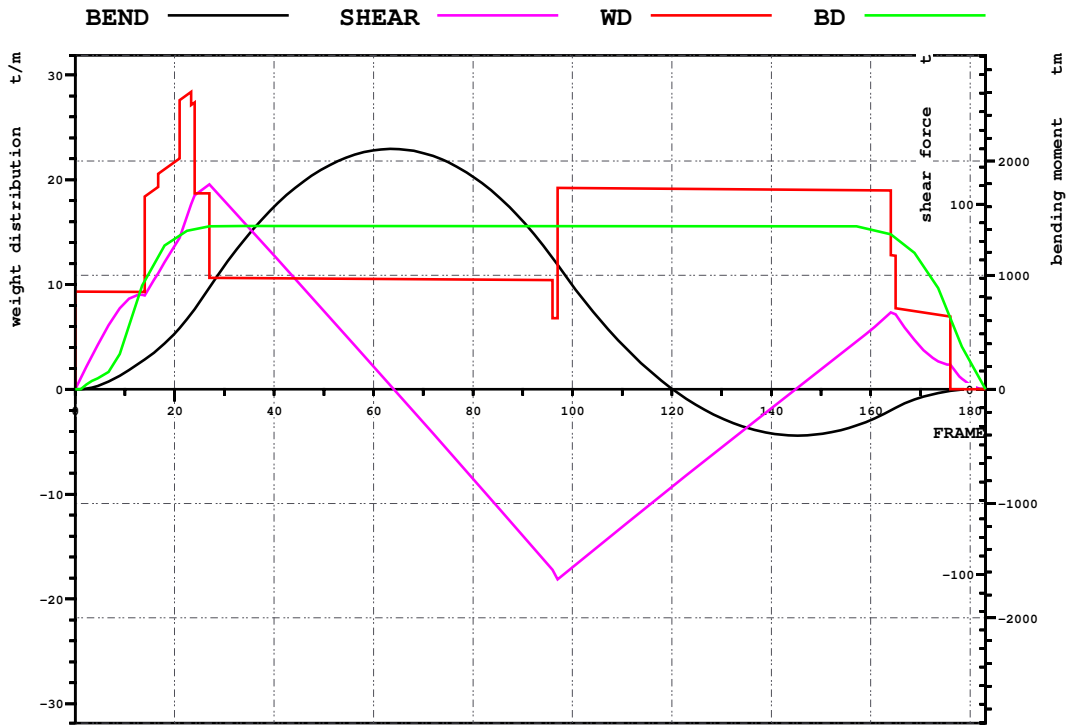


LOADING CONDITION 5-T130, Min. load

HEEL degree	MS m	HPHI m	E PHI mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.004	0.69	0.030	5.1	0.003
10.0	0.023	1.40	0.121	10.3	0.007
15.0	-0.008	2.04	0.272	15.5	0.010
20.0	-0.272	2.43	0.469	19.6	0.013
30.0	-1.194	2.76	0.929	25.9	0.017
40.0	-2.435	2.65	1.406	27.9	0.018
50.0	-3.742	2.32	1.842	27.4	0.018

M2066/B1

Loading condition 5-t130, Min. load



LOADING CONDITION 5-T130, Min. load

			X	Frame
Shear force (min)	-102.7 t	(-)	58.200 m	97.00
Shear force (max)	110.8 t	(-)	16.200 m	27.00
Sagging moment	-403.6 tm	(-)	87.168 m	145.28
Hogging moment	2105.7 tm	(-)	37.998 m	63.33