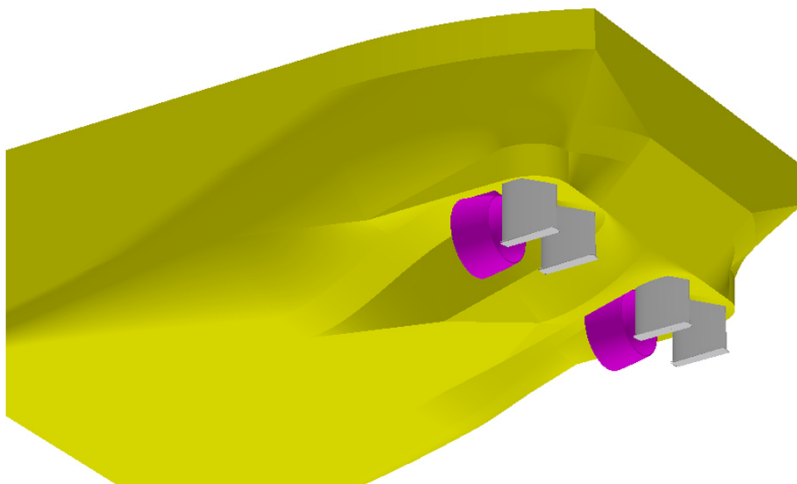
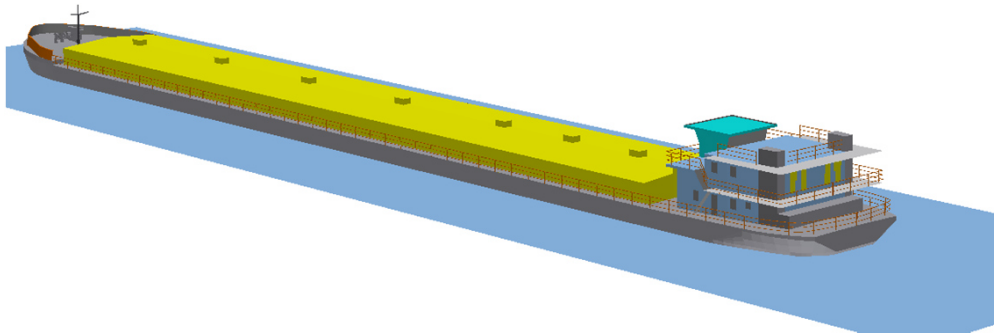
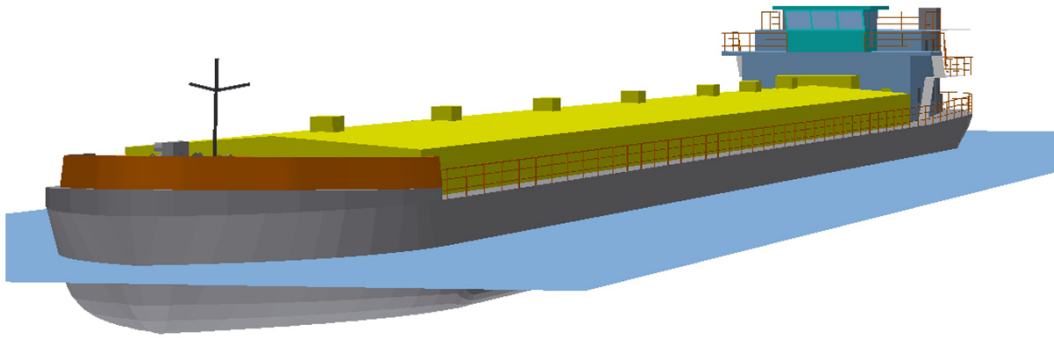


---

## Tanker T1



### Main dimensions

Cargo type		Tanker
Hull type	Center tanks	T1
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		880 t
Payload at Tmax		2434 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).
- ADN Rules 2003 for the transport of dangerous goods on inland waterways, including criteria for intact and damaged stability

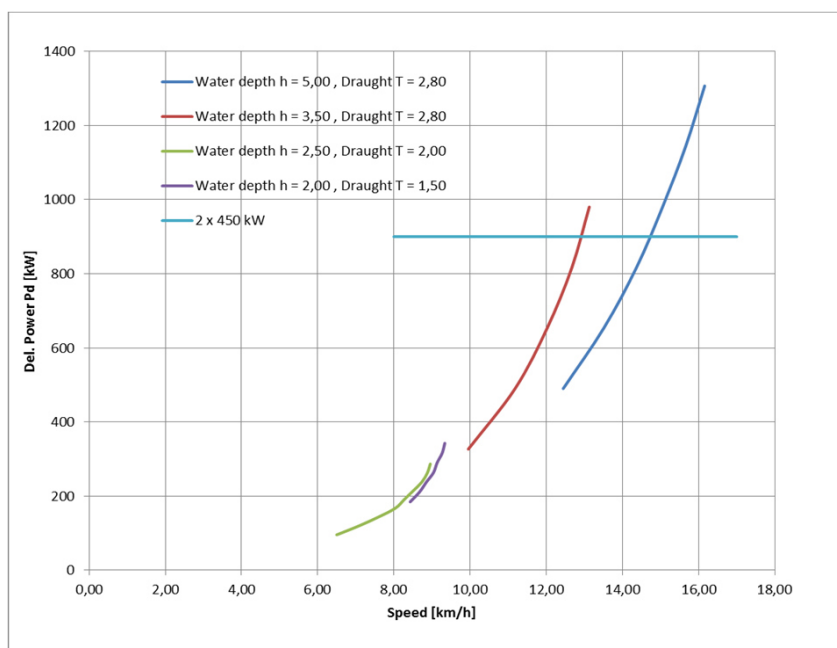
### Powering

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 tanks**

	Lc	Bc	Hc	Volume
Dimensions per tank	13,0 m	10,2 m	4,9 m	615 m <sup>3</sup>
Total volume in 6 tanks				3690 m <sup>3</sup>

Tanks suitable for oil and fuel oil as Diesel Oil, Lubricating Oils, Gas Oil, Kerosene, Naphtha.

**Tank Cargo Handling**

Main cargo pump with electric drive behind the tanks and in front of the accommodation. All tanks with separate loading / unloading pipe in diameter 150 mm, connected to central pipe in diameter 250. Shore connection valves in the center part of the vessel. Separate pipes in diameter 80 for extraction of residual cargo.

Gas displacement line in diameter 150 with safety pressure valves.

Tank heating and / or special tank coating to be specified by the owner

**Sludge tank**

	Lc	Bc	Hc	Volume
Dimensions per tank	1,2 m	10,1 m	4,9 m	56,0 m <sup>3</sup>

**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 1220 kg
- One stern anchor 610 kg

**Accommodation**

- Accommodation on two decks for crew of 8 persons

**Weight calculation results for major components**

Steel weight, longt. Framing	773 t
Accommodation	100 t
Machinery & outfitting	50 t
Tank equipment	30 t
<b>Sum</b>	<b>880 t</b>

**Electric load requirements**

Diesel driven genset, 100 kW output

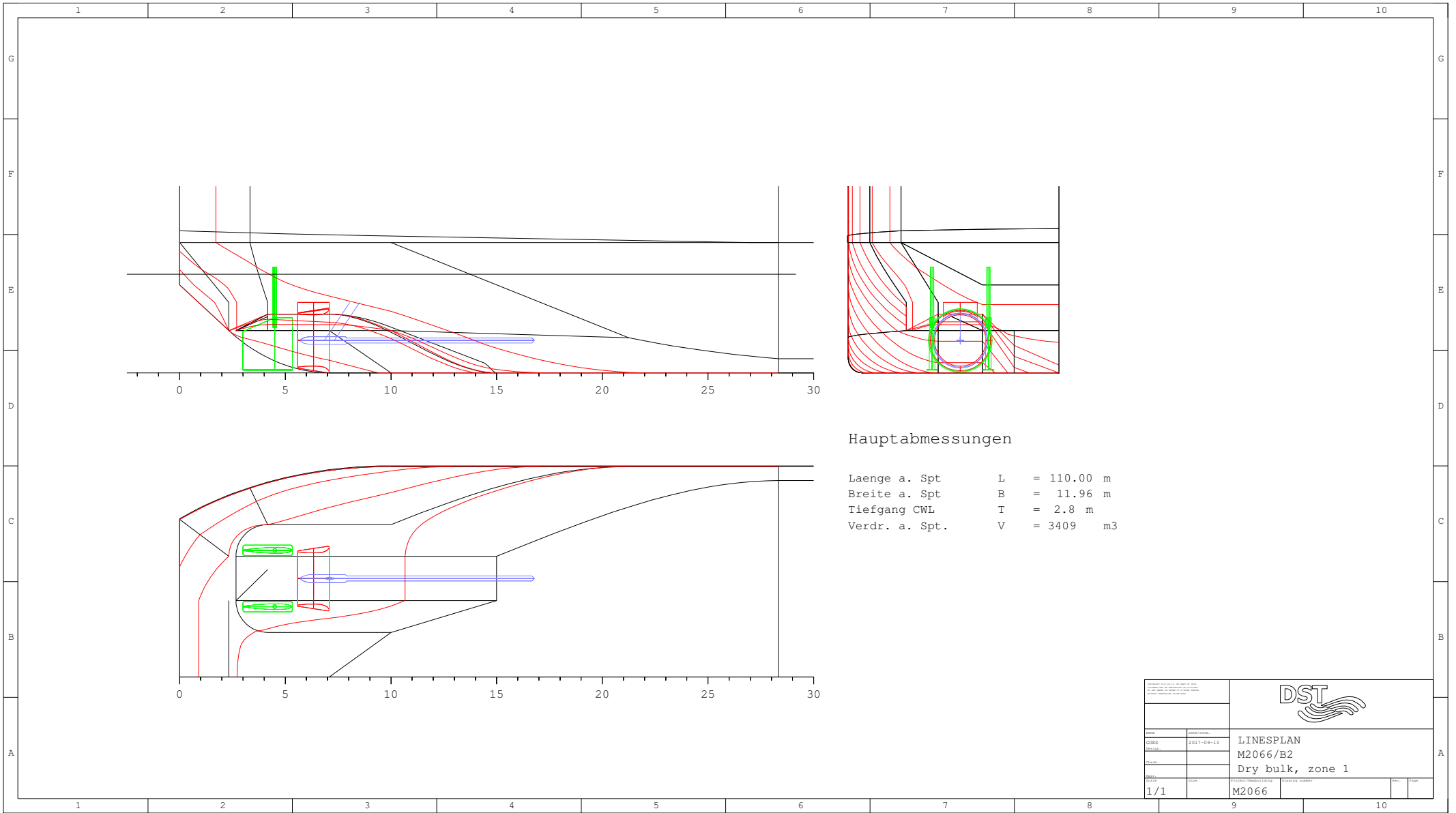
Three-phase AC supply to cargo loading / unloading pump

Three-phase AC supply to anchor winches

220 V supply to accommodation


220 V supply to AC accommodation

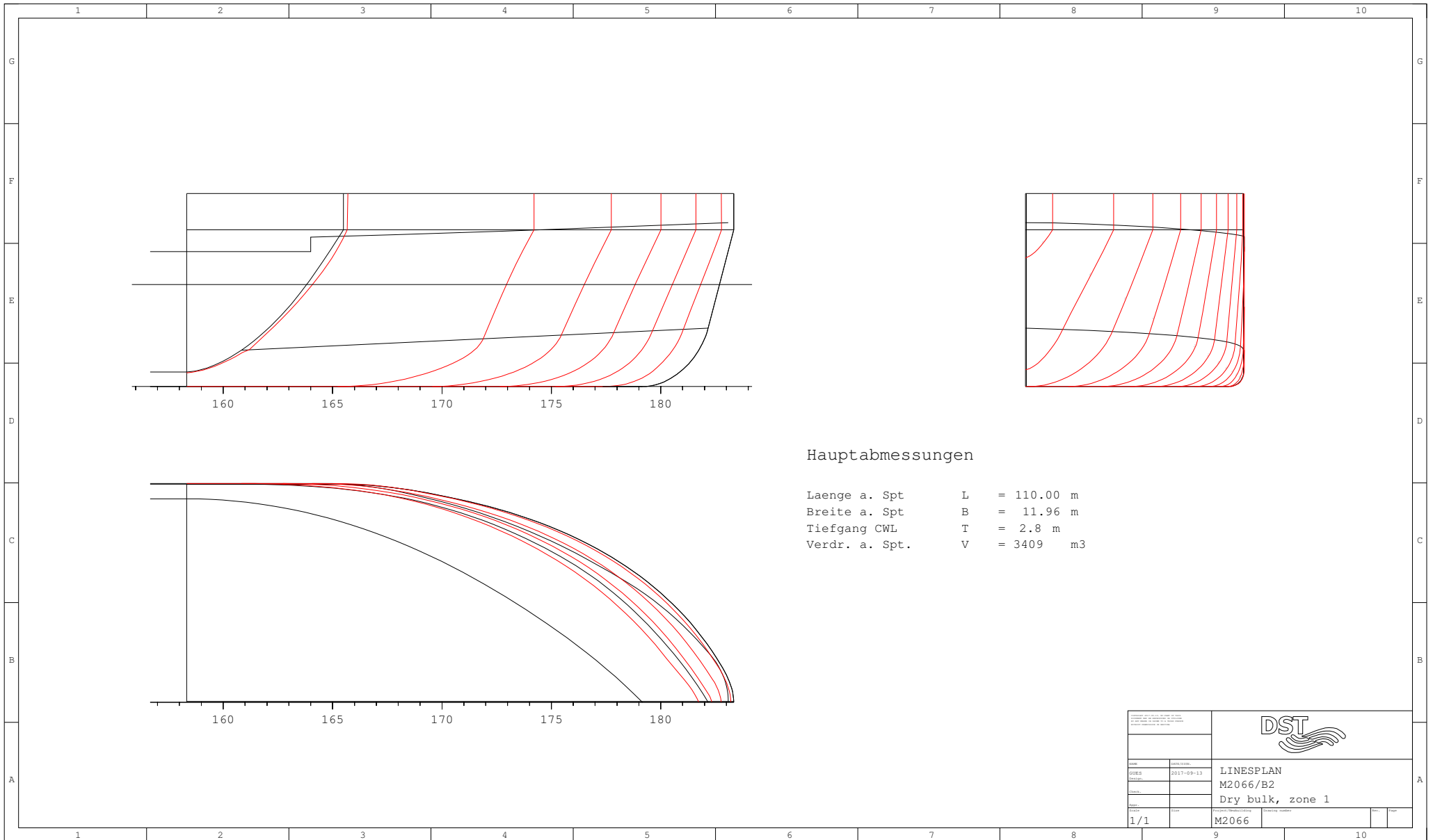
24 V emergency circuit



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

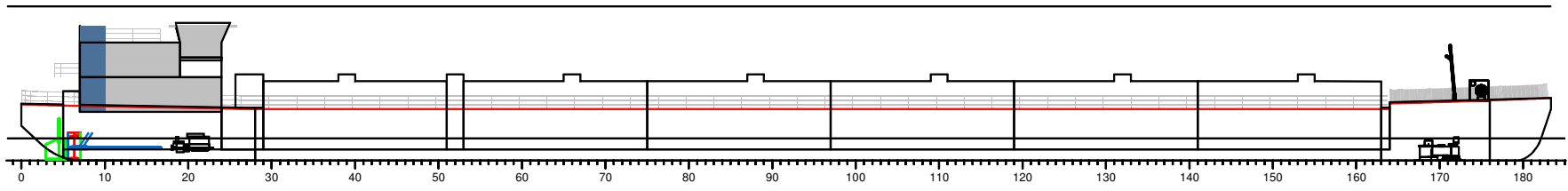
<small>Copyright © 2017 DST Engineering AG          Alle Rechte vorbehalten. Nachdruck, Vervielfältigung und Verbreitung, auch auszugsweise, ist ohne schriftliche Genehmigung der DST Engineering AG.</small>			
DATE:	2017-09-13	LINESPLAN M2066/B2 Dry bulk, zone 1	
SCALE:	1/1	DRAWING NUMBER M2066	SHEET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



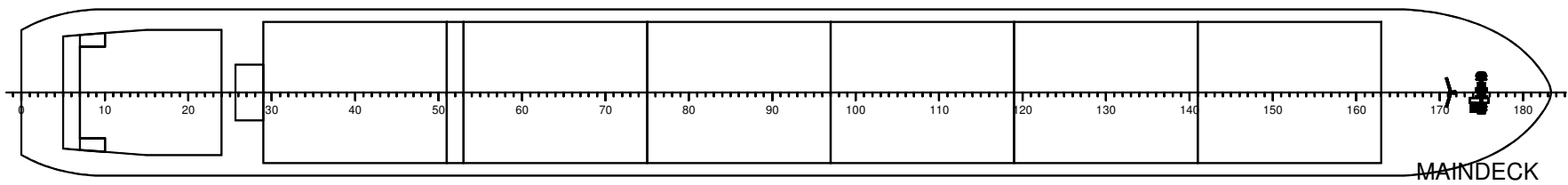
Hauptabmessungen

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

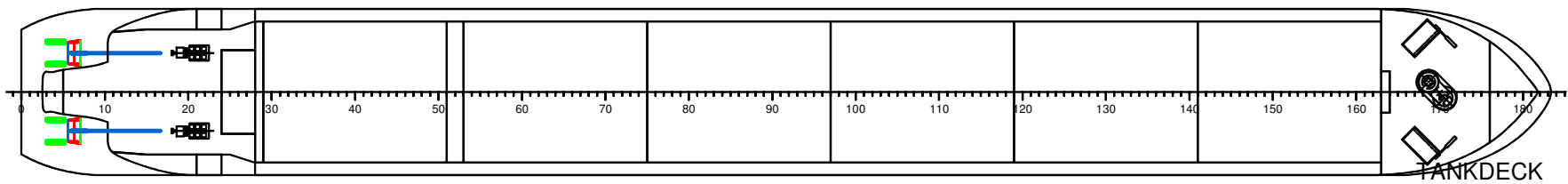
<small>           INSTITUT FÜR SCHIFFBAU UND MASCHINENBAU            UNIVERSITÄT DUISBURG ESSEN            LEHRGEBIET SCHIFFBAU         </small>			
<small>           Name            Datum            Blatt         </small>	<small>           0201/1000            2017-09-13            1/1         </small>	<small>           Projekt/Objekt/Zone            M2066         </small>	
		<b>LINEPLAN</b> <b>M2066/B2</b> <b>Dry bulk, zone 1</b>	
		<small>           Blattnummer            1/1         </small>	<small>           Gesamtanzahl            1         </small>



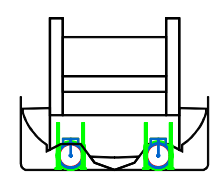
PROFILE



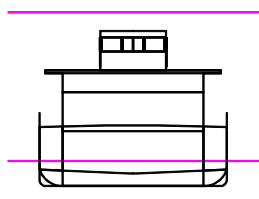
MAINDECK



TANKDECK



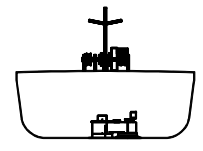
PROP



MRA




HOLD



MMF

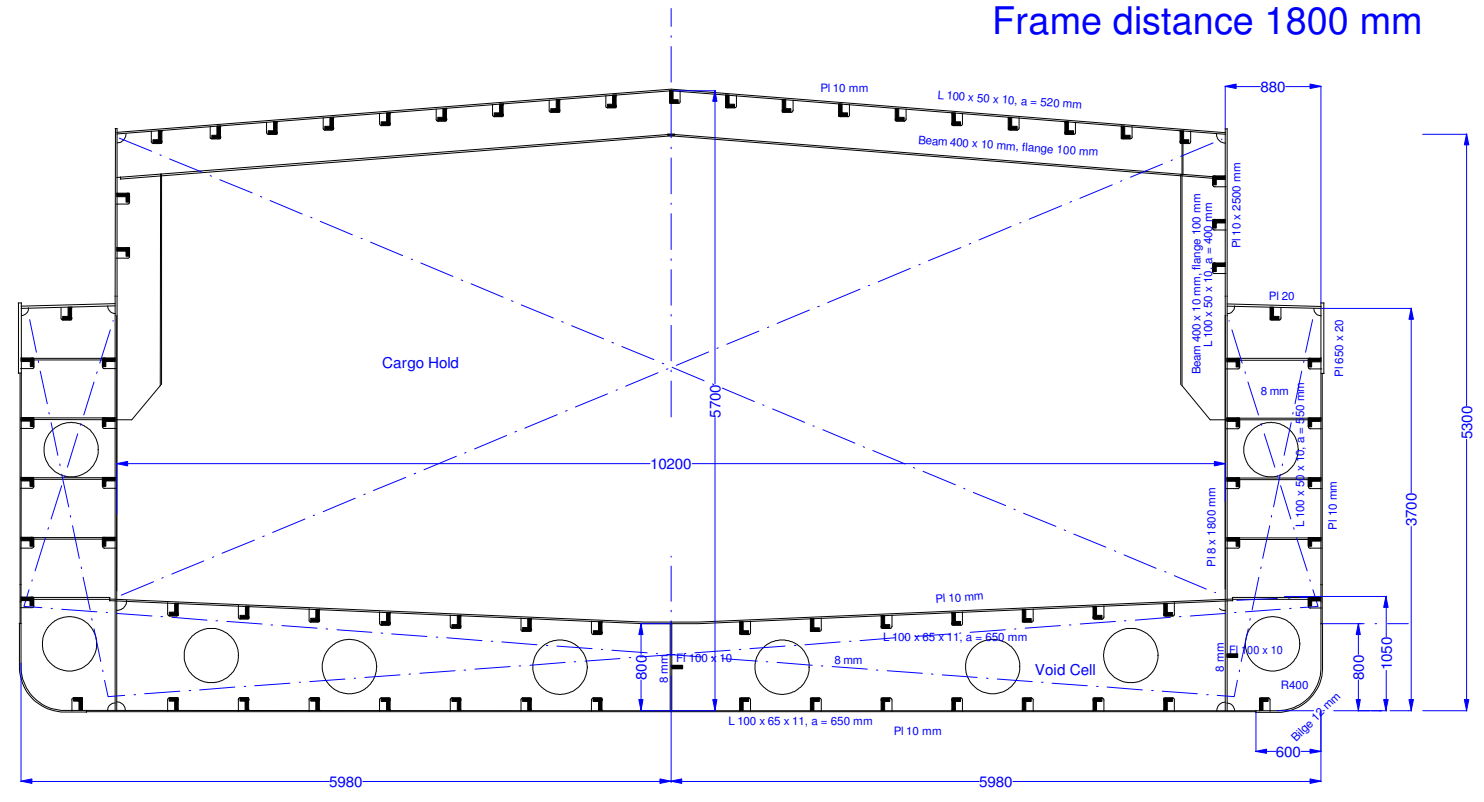
Main dimensions

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

	
GAP T1	
Date: 2017-09-13 Drawn:	1/...
2017-09-13	T1

# Tanker T1- 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 28.08.2017

	
<b>Tanker T1</b> <b>Main Section</b>	
No. <b>G</b> Rev. <b>1</b>	

M2066/T1

## PROJECT INFO

L x B = 110.00 x 11.96 m

Project M2066/T1

T m	DISP t	DW t	MCT tm/cm	TCP t/cm	KMT m	TK m
0.800	933.52	53.5	89.2	11.87	14.909	0.810
0.900	1052.48	172.5	90.1	11.92	13.374	0.910
1.000	1171.81	291.8	91.0	11.95	12.153	1.010
1.100	1291.50	411.5	91.8	11.99	11.160	1.110
1.200	1411.51	531.5	92.7	12.03	10.341	1.210
1.300	1532.10	652.1	94.3	12.09	9.679	1.310
1.400	1653.47	773.5	96.3	12.18	9.129	1.410
1.500	1776.02	896.0	98.5	12.28	8.655	1.510
1.600	1898.96	1019.0	99.3	12.31	8.220	1.610
1.700	2022.41	1142.4	101.3	12.39	7.859	1.710
1.800	2146.41	1266.4	101.8	12.41	7.521	1.810
1.900	2270.64	1390.6	102.4	12.44	7.226	1.910
2.000	2395.11	1515.1	102.9	12.46	6.967	2.010
2.100	2519.87	1639.9	103.6	12.49	6.741	2.110
2.200	2644.88	1764.9	104.2	12.51	6.540	2.210
2.300	2770.15	1890.1	104.9	12.54	6.360	2.310
2.400	2895.69	2015.7	105.5	12.57	6.200	2.410
2.500	3021.48	2141.5	106.1	12.59	6.057	2.510
2.600	3147.50	2267.5	106.5	12.61	5.928	2.610
2.700	3273.70	2393.7	107.0	12.63	5.813	2.710
2.800	3400.10	2520.1	107.4	12.65	5.710	2.810
2.900	3526.68	2646.7	107.9	12.66	5.617	2.910
3.000	3653.44	2773.4	108.3	12.68	5.534	3.010



M2066/T1

## PROJECT INFO

L x B = 110.00 x 11.96 m

Project M2066/T1, 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	0.787	-1.214
2-T280	All tanks loaded	3349.39	2434.39	0.00	2.759	-0.003
3-T180	Part. load	2133.20	1218.20	0.00	1.789	0.000
4-T130	Min. load	1521.78	606.78	0.00	1.290	-0.004

M2066/T1

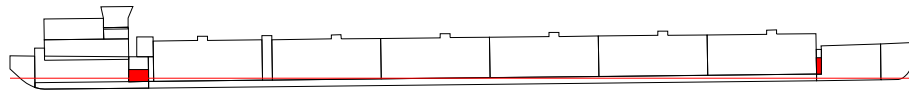
LOADING CONDITION 1-LIGHTSHIP

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgy cgz			Free s. moment
-----							
Diesel Oil, RHO=0.860							
-----							
DOA	Diesel oil a.	34.0	17.00	15.60	0.00	1.55	34.86
DOF	Diesel oil f.	4.3	3.00	98.10	0.00	1.81	0.00
-----							
Total of DO		38.3	20.00	27.98	0.00	1.59	34.86
-----							
Fresh Water, RHO=1.000							
-----							
FW	Side Tanks a.	13.6	10.00	13.50	0.00	1.98	29.87
-----							
Deadweight			35.0	21.56	0.00	2.62	64.7
Lightweight			880.0	45.09	0.00	2.49	
Displacement (rho=1.000)			915.0	44.19	0.00	2.49	64.7

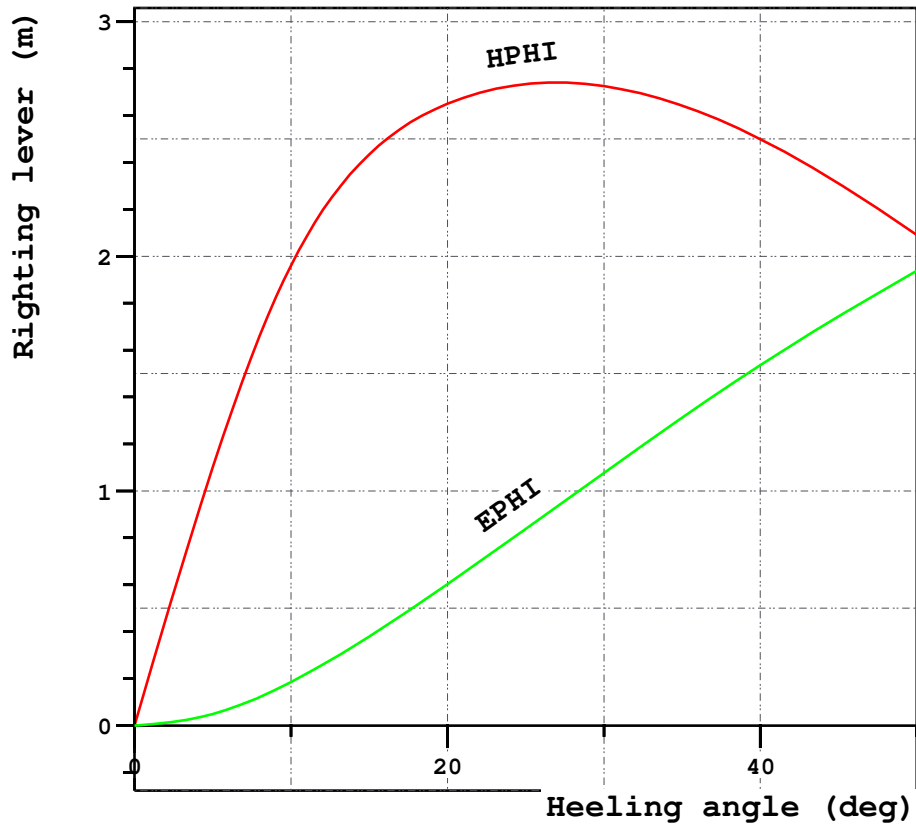
FLOATING POSITION

Draught moulded	0.787	m	KM	15.32	m
Trim	-1.214	m	KG	2.49	m
Heel, PS=+	0.0	deg			
TA	1.394	m	GM0	12.83	m
TF	0.180	m	GMCORR	-0.07	m
Trimming moment	-11061	tonm	GM	12.76	m



Height of the wheelhouse top above waterline: 8.72 m

Loading case1 1-LIGHTSHIP,

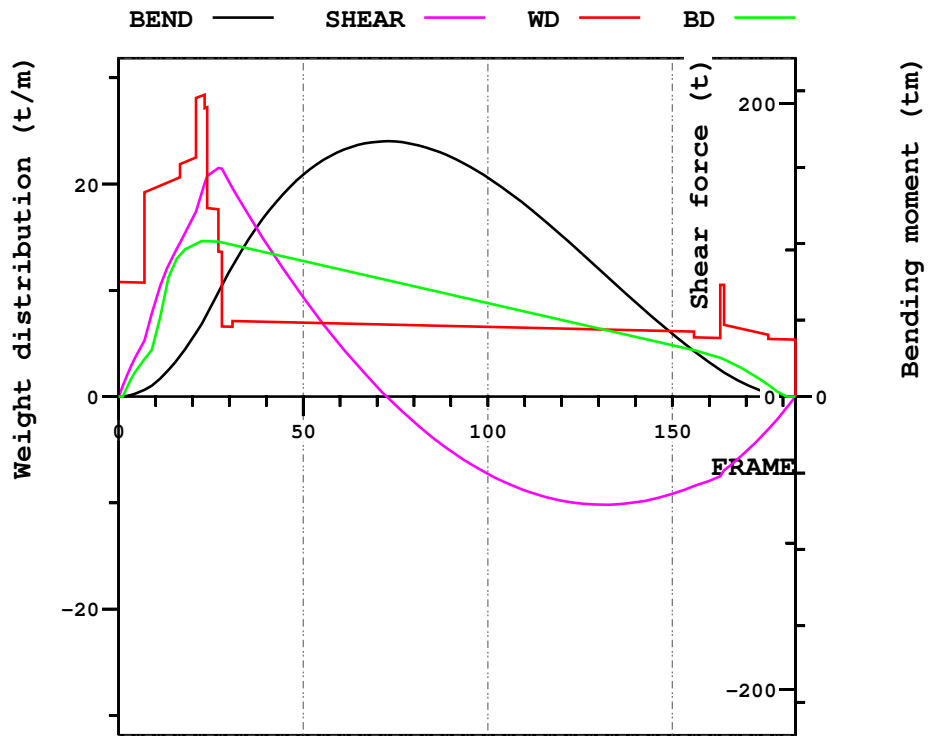


LOADING CONDITION 1-LIGHTSHIP

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	-0.013	1.10	0.049	5.7	0.006
10.0	-0.255	1.96	0.185	11.4	0.012
15.0	-0.867	2.43	0.379	17.2	0.019
20.0	-1.714	2.65	0.602	21.7	0.024
30.0	-3.657	2.73	1.077	29.4	0.032
40.0	-5.712	2.50	1.536	32.1	0.035
50.0	-7.701	2.09	1.938	31.7	0.035

M2066/T1

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	10.78	0.00
6.000	10.00	183	65	19.65	5.75
12.000	20.00	759	121	22.37	14.20
18.000	30.00	1635	146	6.59	14.35
24.000	40.00	2385	105	7.04	13.55
30.000	50.00	2903	68	6.96	12.76
36.000	60.00	3210	35	6.88	11.97
42.000	70.00	3335	7	6.80	11.17
48.000	80.00	3302	-17	6.72	10.38
54.000	90.00	3137	-37	6.64	9.59
60.000	100.00	2867	-53	6.56	8.79
66.000	110.00	2515	-64	6.48	8.00
72.000	120.00	2109	-71	6.40	7.21
78.000	130.00	1674	-74	6.32	6.41
84.000	140.00	1235	-72	6.23	5.62
90.000	150.00	818	-66	6.15	4.83
96.000	160.00	447	-58	5.54	3.95
102.000	170.00	158	-38	6.29	2.44
108.000	180.00	11	-11	5.38	0.17

M2066/T1

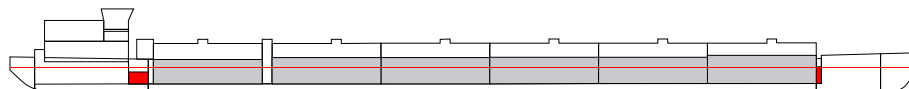
LOADING CONDITION 2-T280, All tanks loaded

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgz			Free s. moment
-----							
Diesel Oil, RHO=0.860							
-----							
DOA	Diesel oil a.	34.0	17.00	15.60	0.00	1.55	34.86
DOF	Diesel oil f.	4.3	3.00	98.10	0.00	1.81	0.00
-----							
Total of DO		38.3	20.00	27.98	0.00	1.59	34.86
-----							
Fresh Water, RHO=1.000							
-----							
FW	Side Tanks a.	13.6	10.00	13.50	0.00	1.98	29.87
-----							
Liquid cargo, RHO=1.000							
-----							
LTANK1	Tank 1 P	605.9	377.73	24.00	0.00	2.34	1130.58
LTANK6		605.3	433.73	91.20	0.00	2.55	1130.58
LTANK3		605.6	405.77	51.60	0.00	2.44	1130.58
LTANK4		605.5	405.69	64.80	0.00	2.44	1130.58
LTANK5		605.4	405.62	78.00	0.00	2.44	1130.58
LTANK2		605.7	405.84	38.40	0.00	2.44	1130.58
-----							
Total of CAL		3633.4	2434.39	58.77	0.00	2.45	6783.46
-----							
Deadweight			2469.4	58.24	0.00	2.45	6848.2
Lightweight			880.0	45.09	0.00	2.49	
Displacement (rho=1.000)			3349.4	54.79	0.00	2.46	6848.2

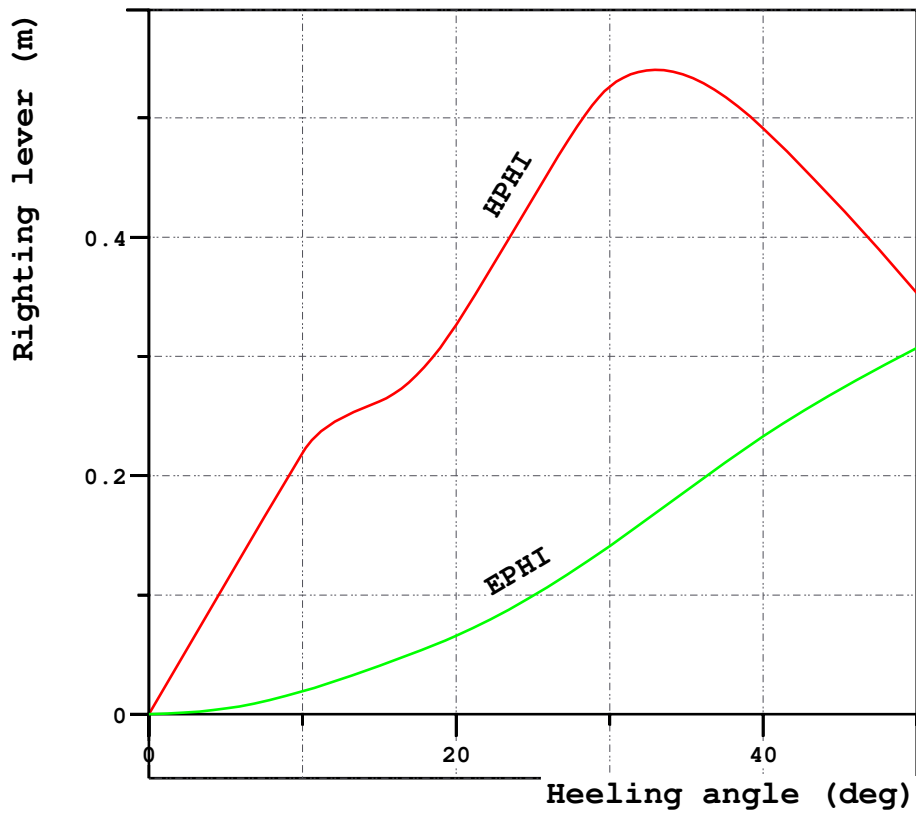
FLOATING POSITION

Draught moulded	2.758	m	KM	5.76	m
Trim	-0.087	m	KG	2.46	m
Heel, PS=+	0.0	deg			
TA	2.802	m	GM0	3.30	m
TF	2.714	m	GMCORR	-2.04	m
Trimming moment	-935	tonm	GM	1.25	m



Height of the wheelhouse top above waterline: 7.16 m

Loading case 2-T280, All tanks loaded

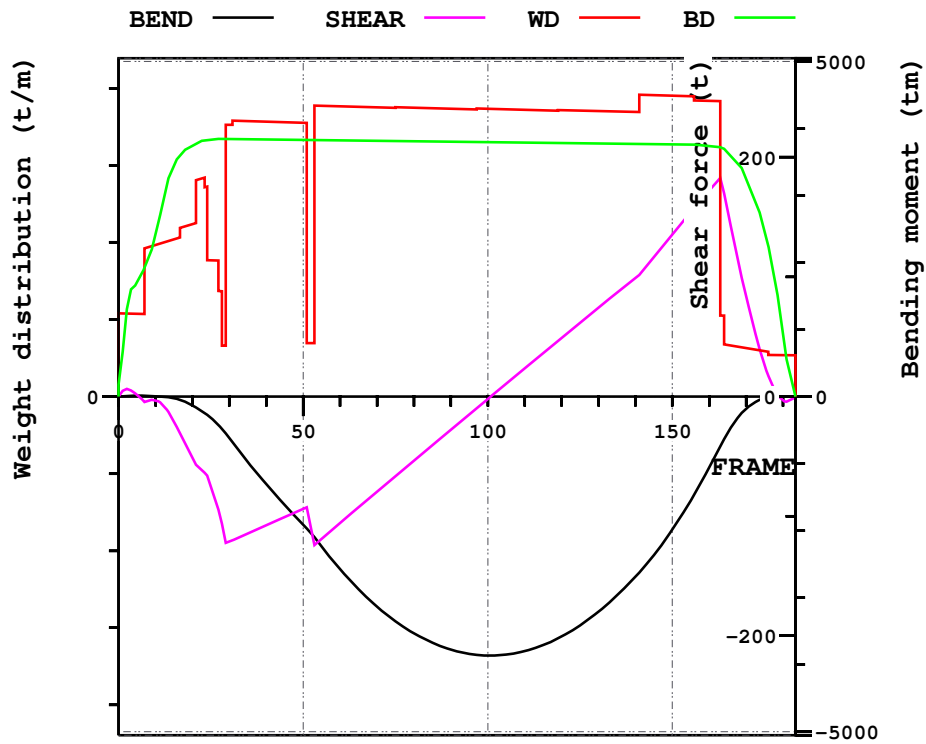


LOADING CONDITION 2-T280, All tanks loaded

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	0.001	0.11	0.005	599.1	0.179
10.0	0.007	0.22	0.019	1207.7	0.361
15.0	-0.045	0.26	0.041	1828.4	0.546
20.0	-0.100	0.33	0.066	2349.0	0.701
30.0	-0.216	0.53	0.141	3034.5	0.906
40.0	-0.616	0.49	0.233	3391.0	1.012
50.0	-1.151	0.35	0.307	3420.5	1.021

M2066/T1

Loading case 2-T280, All tanks loaded



LOADING CONDITION 2-T280, All tanks loaded

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	10.78	1.54
6.000	10.00	5	-3	19.65	21.06
12.000	20.00	-132	-51	22.37	32.53
18.000	30.00	-620	-121	35.25	33.42
24.000	40.00	-1307	-107	35.66	33.36
30.000	50.00	-1910	-94	35.53	33.31
36.000	60.00	-2578	-106	37.64	33.25
42.000	70.00	-3133	-80	37.52	33.19
48.000	80.00	-3532	-54	37.49	33.14
54.000	90.00	-3775	-28	37.36	33.08
60.000	100.00	-3863	-2	37.33	33.02
66.000	110.00	-3798	24	37.20	32.96
72.000	120.00	-3579	49	37.17	32.91
78.000	130.00	-3209	74	37.04	32.85
84.000	140.00	-2688	99	36.92	32.79
90.000	150.00	-1985	136	39.02	32.74
96.000	160.00	-1058	172	38.36	32.51
102.000	170.00	-184	84	6.29	28.25
108.000	180.00	5	-3	5.38	8.02

M2066/T1

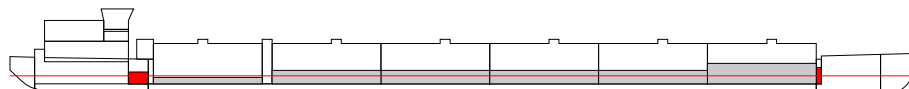
LOADING CONDITION 3-T180, Part. load

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity			Free s. moment
				cgx	cgy	cgz	
-----							
Diesel Oil, RHO=0.860							
-----							
DOA	Diesel oil a.	34.0	17.00	15.60	0.00	1.55	34.86
DOF	Diesel oil f.	4.3	3.00	98.10	0.00	1.81	0.00
-----							
Total of DO		38.3	20.00	27.98	0.00	1.59	34.86
-----							
Fresh Water, RHO=1.000							
-----							
FW	Side Tanks a.	13.6	10.00	13.50	0.00	1.98	29.87
-----							
Liquid cargo, RHO=1.000							
-----							
LTANK1	Tank 1 P	605.9	91.28	24.00	0.00	1.24	1130.58
LTANK6		605.3	315.45	91.20	0.00	2.10	1130.58
LTANK3		605.6	202.88	51.60	0.00	1.67	1130.58
LTANK4		605.5	202.85	64.80	0.00	1.67	1130.58
LTANK5		605.4	202.81	78.00	0.00	1.67	1130.58
LTANK2		605.7	202.92	38.40	0.00	1.67	1130.58
-----							
Total of CAL		3633.4	1218.20	64.18	0.00	1.75	6783.46
-----							
Deadweight			1253.2	62.99	0.00	1.77	6848.2
Lightweight			880.0	45.09	0.00	2.49	
Displacement (rho=1.000)			2133.2	55.61	0.00	2.07	6848.2

FLOATING POSITION

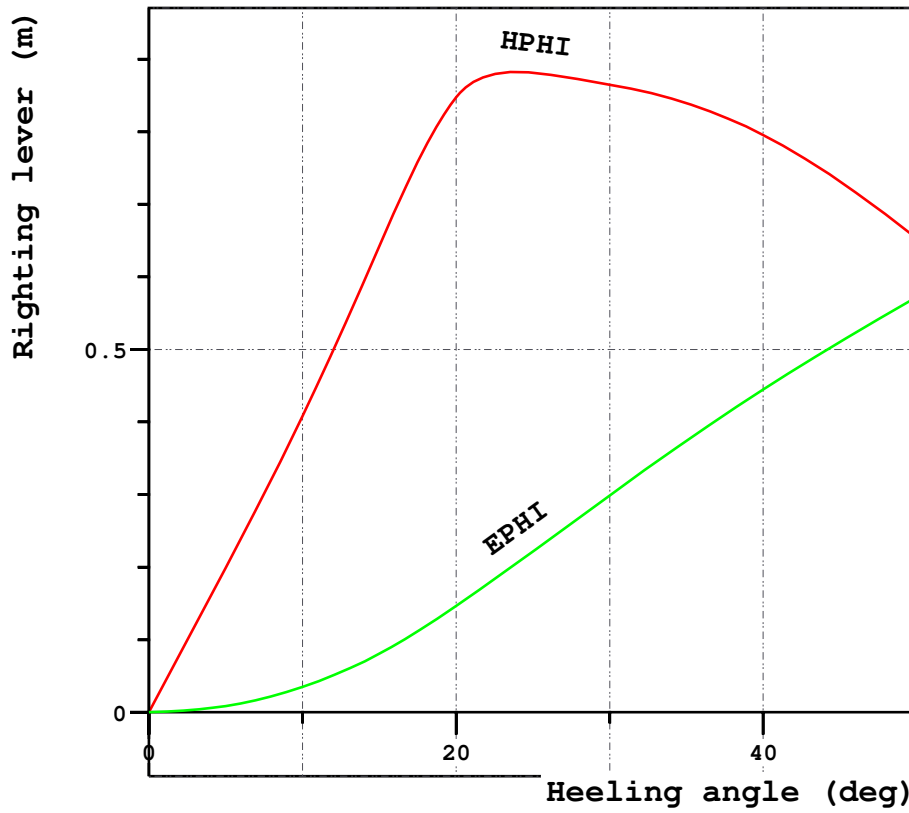
Draught moulded	1.789	m	KM	7.56	m
Trim	0.000	m	KG	2.07	m
Heel, PS=+	0.0	deg			
TA	1.789	m	GM0	5.49	m
TF	1.789	m	GMCORR	-3.21	m
Trimming moment	1	tonm	GM	2.28	m



Height of the wheelhouse top above waterline: 8.16 m



Loading case 3-T180, Part. load

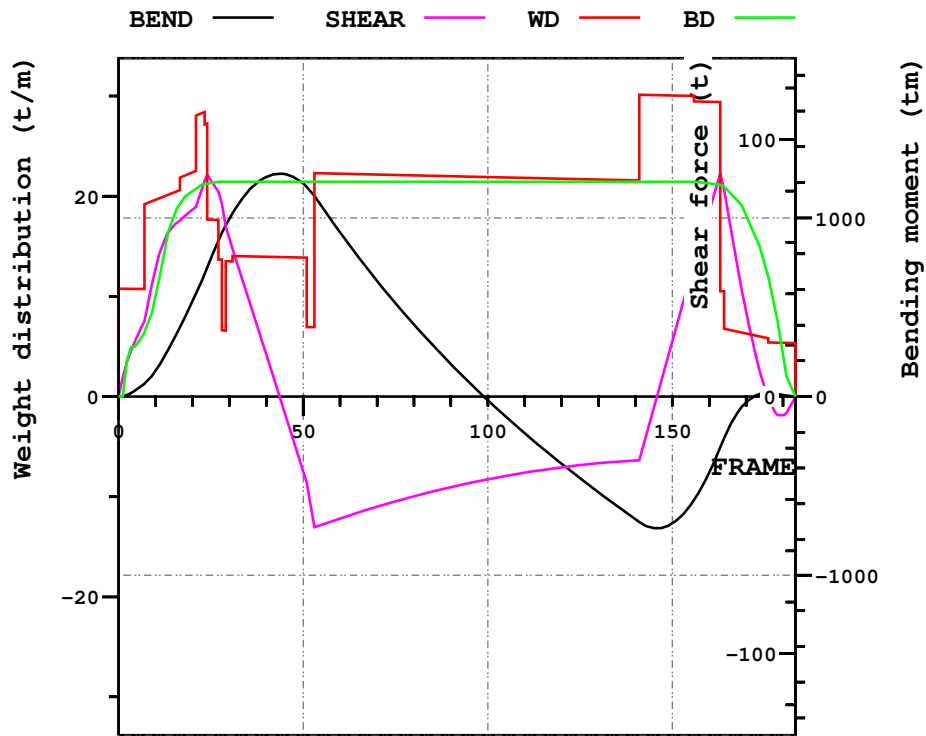


LOADING CONDITION 3-T180, Part. load

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	0.20	0.009	599.1	0.281
10.0	0.013	0.41	0.035	1192.2	0.559
15.0	0.048	0.64	0.081	1764.3	0.827
20.0	0.040	0.85	0.146	2283.4	1.070
30.0	-0.485	0.86	0.299	2977.6	1.396
40.0	-1.199	0.80	0.445	3273.3	1.534
50.0	-2.021	0.65	0.572	3268.5	1.532

M2066/T1

Loading case 3-T180, Part. load



LOADING CONDITION 3-T180, Part. load

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	10.78	0.00
6.000	10.00	145	50	19.65	10.03
12.000	20.00	533	73	22.37	20.50
18.000	30.00	997	61	13.50	21.45
24.000	40.00	1231	16	13.96	21.45
30.000	50.00	1194	-29	13.88	21.45
36.000	60.00	918	-47	22.25	21.46
42.000	70.00	648	-43	22.17	21.46
48.000	80.00	403	-39	22.09	21.46
54.000	90.00	182	-35	22.01	21.46
60.000	100.00	-20	-32	21.92	21.46
66.000	110.00	-205	-30	21.84	21.46
72.000	120.00	-376	-28	21.76	21.46
78.000	130.00	-536	-26	21.68	21.46
84.000	140.00	-688	-25	21.60	21.46
90.000	150.00	-710	22	30.05	21.46
96.000	160.00	-425	72	29.44	21.29
102.000	170.00	-33	33	6.29	18.11
108.000	180.00	9	-7	5.38	4.11

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LOADING CONDITION 4-T130, Min. load

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity			Free s. moment
				cgx	cgy	cgz	
-----							
Diesel Oil, RHO=0.860							
-----							
DOA	Diesel oil a.	34.0	17.00	15.60	0.00	1.55	34.86
DOF	Diesel oil f.	4.3	3.00	98.10	0.00	1.81	0.00
-----							
Total of DO		38.3	20.00	27.98	0.00	1.59	34.86
-----							
Fresh Water, RHO=1.000							
-----							
FW	Side Tanks a.	13.6	10.00	13.50	0.00	1.98	29.87
-----							
Liquid cargo, RHO=1.000							
-----							
LTANK6		605.3	201.79	91.20	0.00	1.67	1130.58
LTANK3		605.6	80.94	51.60	0.00	1.20	1130.58
LTANK4		605.5	121.56	64.80	0.00	1.36	1130.58
LTANK5		605.4	162.17	78.00	0.00	1.52	1130.58
LTANK2		605.7	40.32	38.40	0.00	1.05	1130.58
-----							
Total of CAL		3027.6	606.78	73.59	0.00	1.46	5652.88
-----							
Deadweight			641.8	70.75	0.00	1.53	5717.6
Lightweight			880.0	45.09	0.00	2.49	
Displacement (rho=1.000)			1521.8	55.91	0.00	2.08	5717.6

FLOATING POSITION

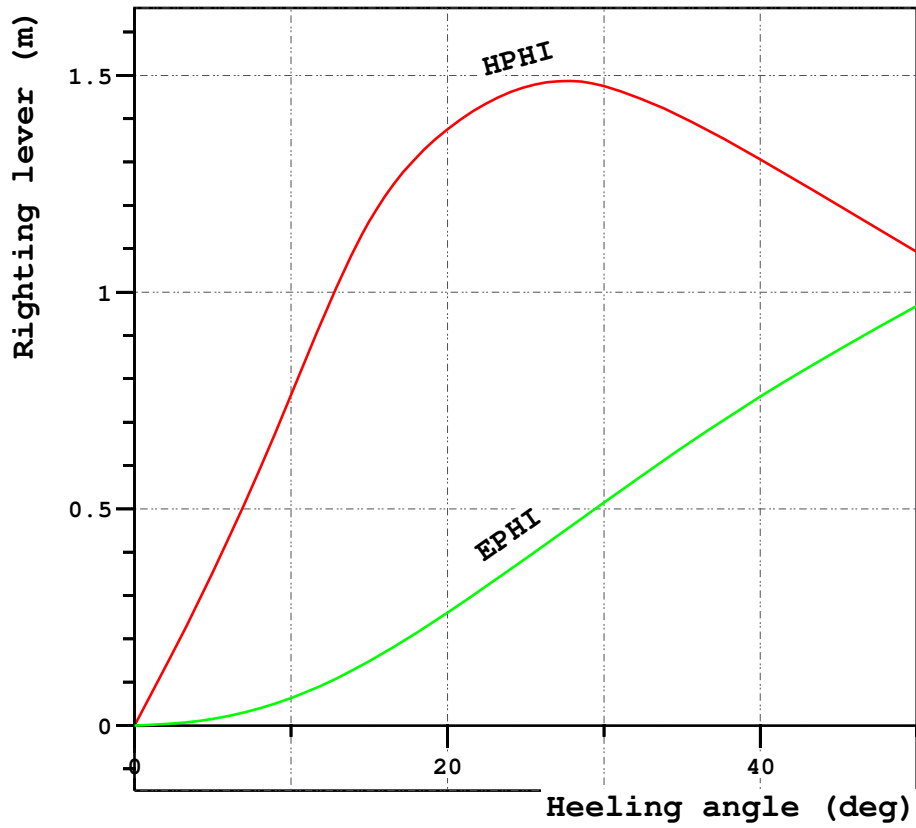
Draught moulded	1.290	m	KM	9.74	m
Trim	-0.004	m	KG	2.08	m
Heel, PS=+	0.0	deg			
TA	1.292	m	GM0	7.66	m
TF	1.289	m	GMCORR	-3.76	m
Trimming moment	-35	tonm	GM	3.90	m



Height of the wheelhouse top above waterline: 8.66 m

M2066/T1

Loading case 4-T130, Min. load

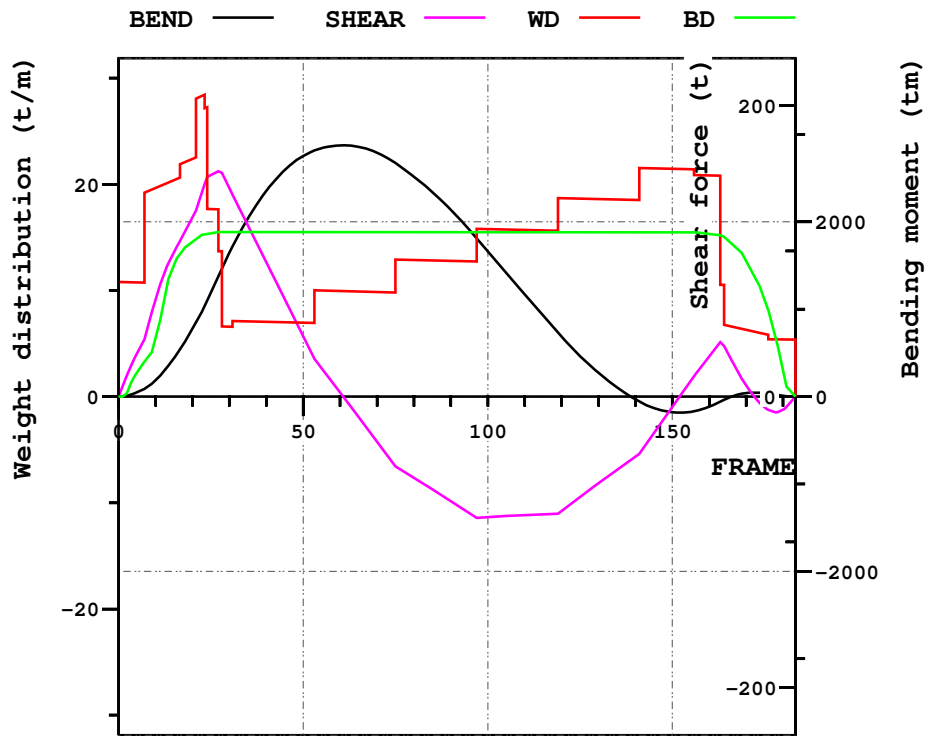


LOADING CONDITION 4-T130, Min. load

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	0.35	0.015	483.8	0.318
10.0	0.023	0.76	0.063	899.2	0.591
15.0	-0.009	1.16	0.148	1233.5	0.811
20.0	-0.272	1.38	0.260	1478.7	0.972
30.0	-1.189	1.48	0.514	1772.1	1.164
40.0	-2.365	1.31	0.759	1904.5	1.251
50.0	-3.524	1.09	0.968	1901.8	1.250

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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	10.78	0.00
6.000	10.00	187	67	19.65	5.52
12.000	20.00	773	123	22.37	14.57
18.000	30.00	1645	143	6.59	15.50
24.000	40.00	2351	92	7.04	15.50
30.000	50.00	2754	41	6.96	15.50
36.000	60.00	2874	3	9.93	15.50
42.000	70.00	2790	-31	9.85	15.49
48.000	80.00	2518	-56	12.85	15.49
54.000	90.00	2135	-72	12.77	15.49
60.000	100.00	1661	-83	15.77	15.49
66.000	110.00	1169	-81	15.68	15.48
72.000	120.00	685	-79	18.68	15.48
78.000	130.00	271	-60	18.60	15.48
84.000	140.00	-31	-41	18.52	15.48
90.000	150.00	-179	-7	21.44	15.47
96.000	160.00	-115	28	20.83	15.31
102.000	170.00	39	8	6.29	12.78
108.000	180.00	10	-9	5.38	2.42