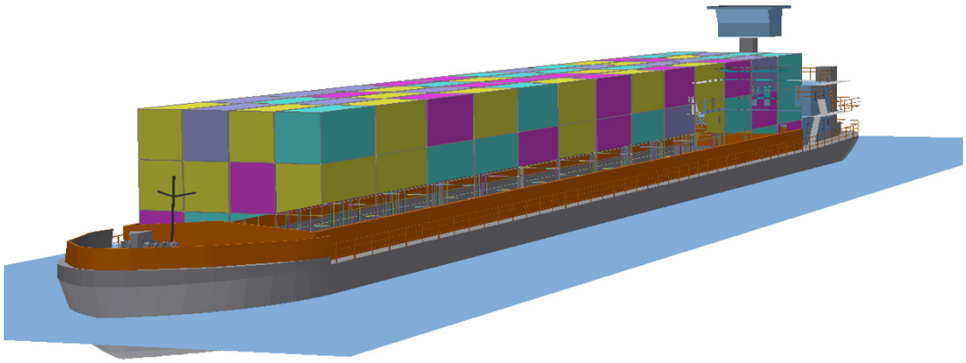
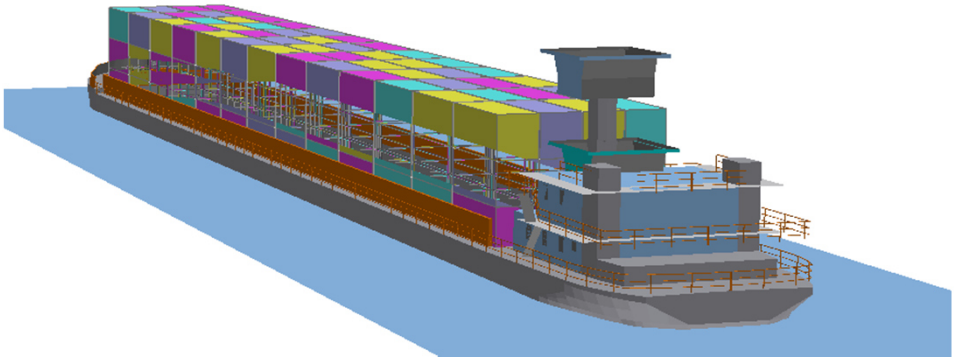
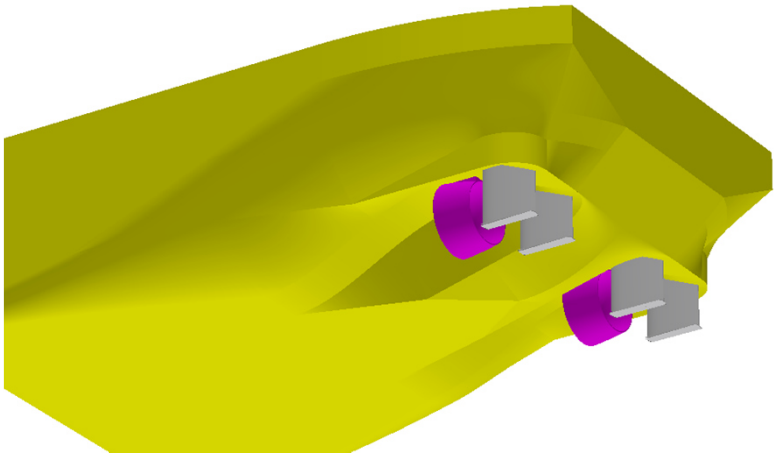
Container Vessel CO1







Main dimensions

Cargo type		Container
Hull type		CO1
Length o.A.	L	110,00 m
Breadth	B	12,00 m
Depth Main Deck	D	3,70 m
Draught max.	T	2,50 m
Lightweight estimate		810 t
Payload at Tmax		2183 t
Container capacity	TEU	208

Applicable regulations

- Vessel built according to Rules and Regulations for the Construction and Classification of Inland Waterways Ships by the Indian Register of Shipping.

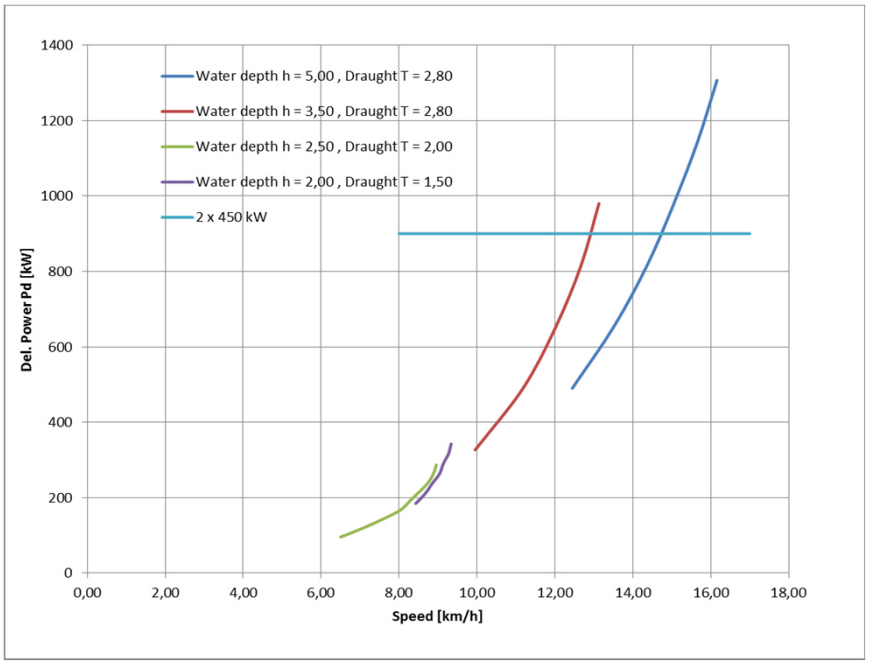
- Applicable rules of IWAI for navigation on NW-1, from Diamond Harbour (West Bengal) to Allahabad (Uttar Pradesh). Navigation zone "Zone 3" IRClass

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:	84,0 m	10,10 m	3,90 m	3308,8 m³

- Suits 4 Containers in breadth
- Reinforcements at container stacking positions
- Containers on 4 stacks height, after control of stability

Double hull

Double bottom 800 mm in height, side cells 990 mm in breadth

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 1150 kg
- One stern anchor 575 kg

Accommodation

Wheelhouse on lifting column, lifting height 4.50

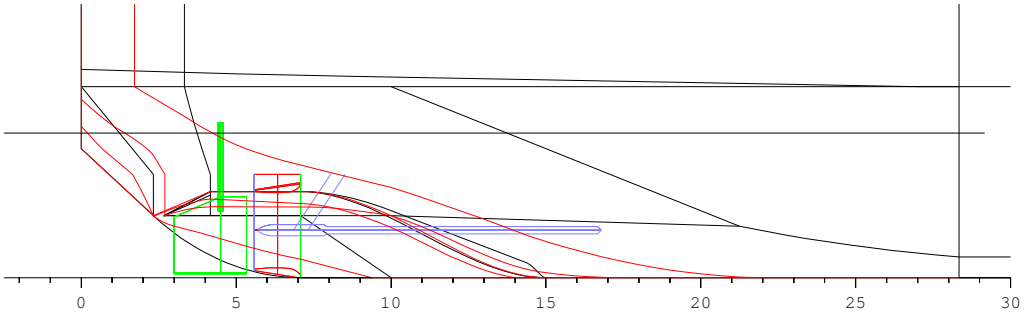
- Accommodation on two decks for crew of max. 12 persons

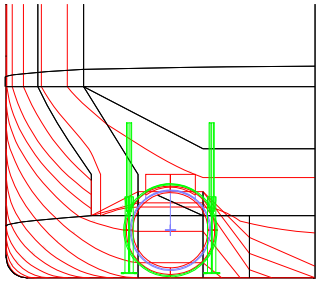
Weight calculation results for major components

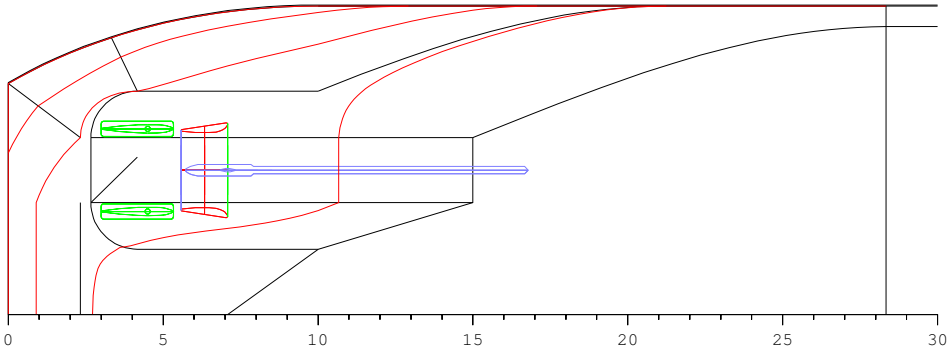
Steel weight, longt. Framing		683 t
Accommodation		105 t
Machinery & outfitting		50 t
	Sum	**810 t**

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

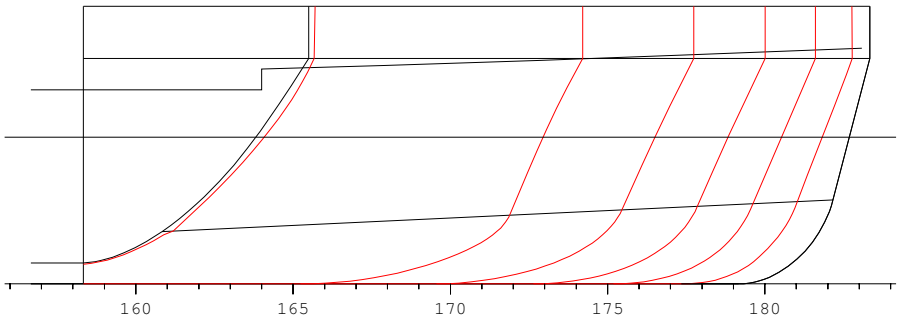
Laenge a. Spt	L	= 110.00 m
Breite a. Spt	B	= 11.96 m
Tiefgang CWL	T	= 2.8 m
Verdr. a. Spt.	V	= 3409 m3

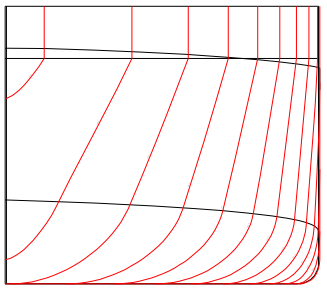
DST

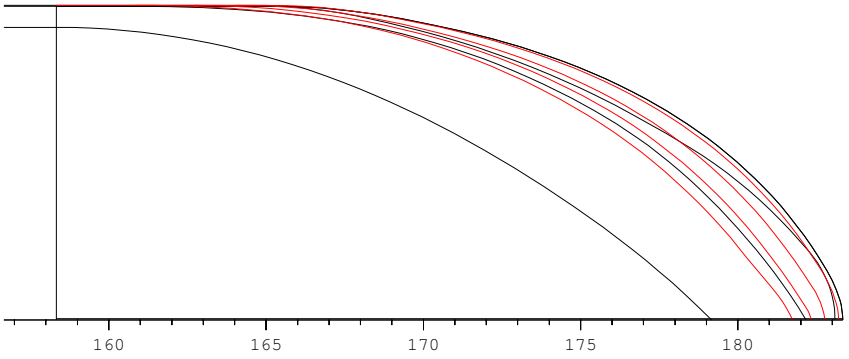
GUES	2017-09-13

LINESPLAN
M2066/B2
Dry bulk, zone 1

Scale	Sheet	Project/Newbuilding	Drawing number
1/1		M2066	







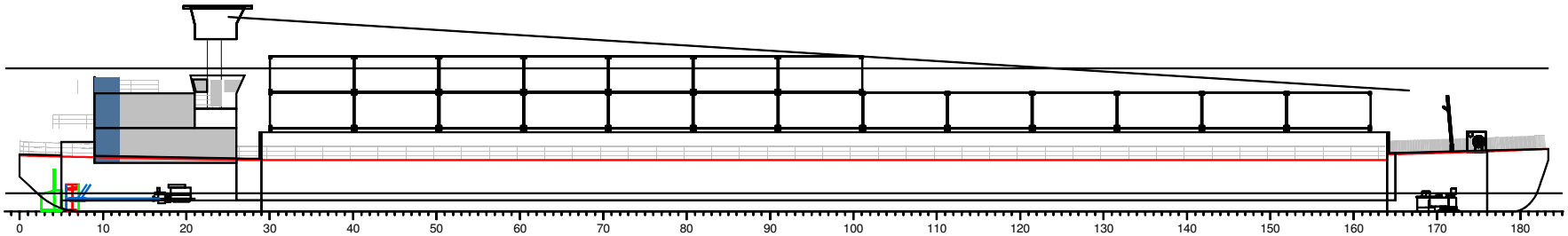
Hauptabmessungen

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

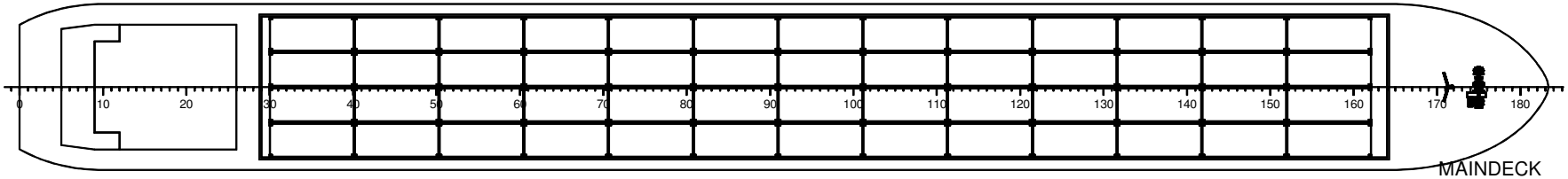
DST

LINESPLAN
M2066/B2
Dry bulk, zone 1

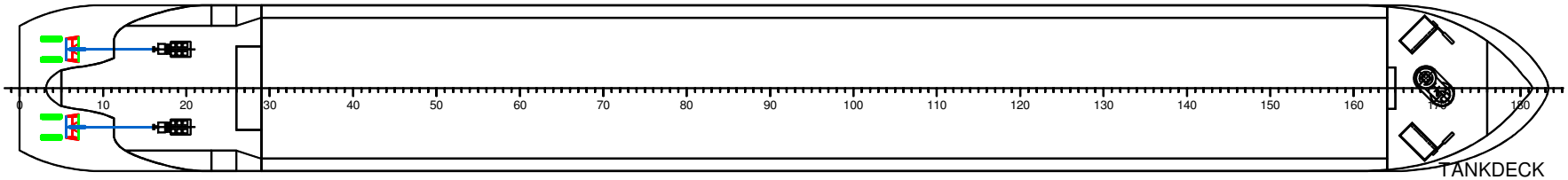
DRAWN	DATE/SIGN		
DUES	2017-09-13		
Design			
Check			
Appr.			
Scale	Size	Project/Newbuilding	Drawing number / Rev. / Page
1/1		M2066	



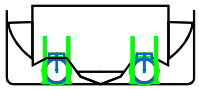
PROFILE



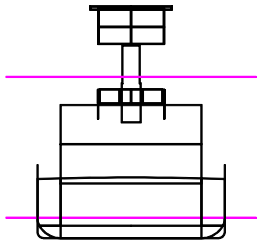
MAINDECK



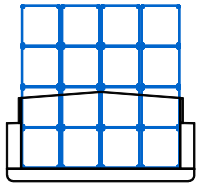
TANKDECK



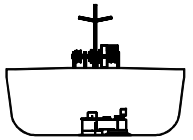
PROP



MRA



HOLD



MMF

Main dimensions

Lenght	L	=	110.00	m
Breadth	B	=	12.00	m
Draught max	T	=	2.50	m

DST

CONTAINER CARRIER
CO1

NAME	DATE/SIGN
Gui	2017-05-12
Design	
Check	
Appr.	

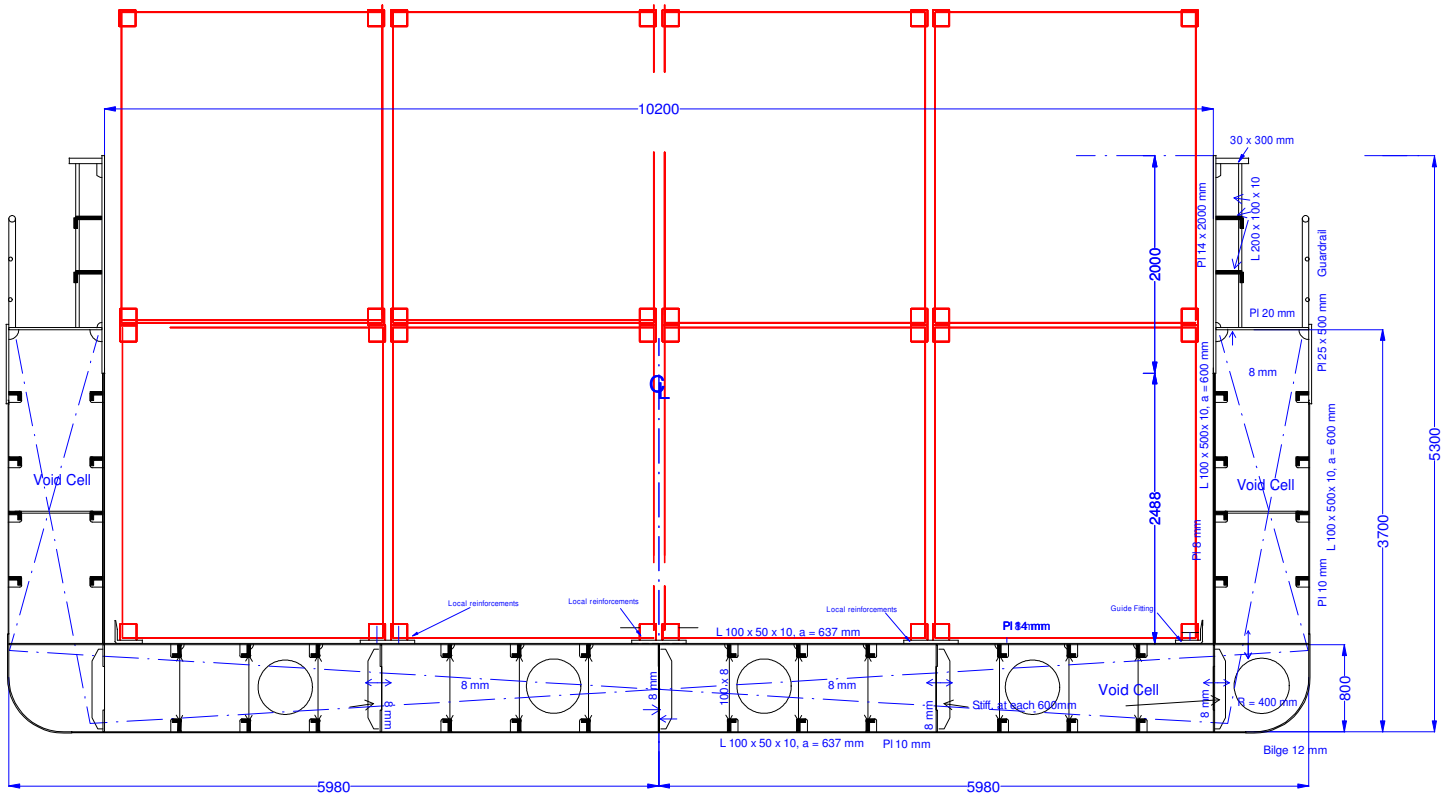
Scale: 1/...

Drawing Number: 2017-05-12

Rev: Page: CO1

Container Carrier Co1 - 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 18.08.2017

DST

Container Carrier Co1
Main Section

1/25

G 1

PROJECT INFO

L x B = 110.00 x 11.96 m

Project M2066/CO1

T m	DISP t	DW t	MCT tm/cm	TCP t/cm	KMT m	TK m
0.800	933.52	151.5	89.2	11.87	14.909	0.810
0.900	1052.48	270.5	90.1	11.92	13.374	0.910
1.000	1171.81	389.8	91.0	11.95	12.153	1.010
1.100	1291.50	509.5	91.8	11.99	11.160	1.110
1.200	1411.51	629.5	92.7	12.03	10.341	1.210
1.300	1532.10	750.1	94.3	12.09	9.679	1.310
1.400	1653.47	871.5	96.3	12.18	9.129	1.410
1.500	1776.02	994.0	98.5	12.28	8.655	1.510
1.600	1898.96	1117.0	99.3	12.31	8.220	1.610
1.700	2022.41	1240.4	101.3	12.39	7.859	1.710
1.800	2146.41	1364.4	101.8	12.41	7.521	1.810
1.900	2270.64	1488.6	102.4	12.44	7.226	1.910
2.000	2395.11	1613.1	102.9	12.46	6.967	2.010
2.100	2519.87	1737.9	103.6	12.49	6.741	2.110
2.200	2644.88	1862.9	104.2	12.51	6.540	2.210
2.300	2770.15	1988.1	104.9	12.54	6.360	2.310
2.400	2895.69	2113.7	105.5	12.57	6.200	2.410
2.500	3021.48	2239.5	106.1	12.59	6.057	2.510
2.600	3147.50	2365.5	106.5	12.61	5.928	2.610
2.700	3273.70	2491.7	107.0	12.63	5.813	2.710
2.800	3400.10	2618.1	107.4	12.65	5.710	2.810
2.900	3526.68	2744.7	107.9	12.66	5.617	2.910
3.000	3653.44	2871.4	108.3	12.68	5.534	3.010

PROJECT INFO

L x B = 110.00 x 11.96 m

Project M2066/CO1, 2017-09-13

LOADING CASES

NAME	TEXT	DISP t	MASS t	MASS t	T m	TR m
1-LIGHTSHIP		817.00	0.00	0.00	0.711	-1.097
2-3STACKS	3 stacks at 14t/TEU	3001.00	0.00	0.00	2.499	0.009
3-4STACKS	4 stacks, top stack .	3001.00	0.00	0.00	2.499	-0.012
4-T130	56 TEU on two stacks	1545.00	0.00	0.00	1.310	-0.032

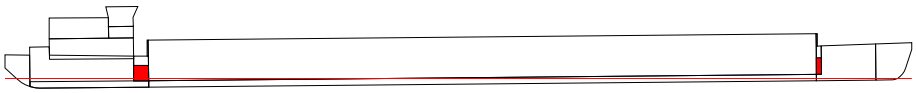
LOADING CONDITION 1-LIGHTSHIP

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
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	25.9	17.00	16.50	0.00	1.73	27.03
DOF	Diesel oil f.	4.9	3.00	98.70	0.00	1.79	0.00
Total of DO		30.8	20.00	28.83	0.00	1.74	27.03
Fresh Water, RHO=1.000							
FW	Side Tanks a.	14.6	10.00	14.70	0.00	1.76	30.43
Deadweight			35.0	22.39	0.00	2.64	57.5
Lightweight			782.0	45.61	0.00	2.27	
Displacement (rho=1.000)			817.0	44.62	0.00	2.28	57.5

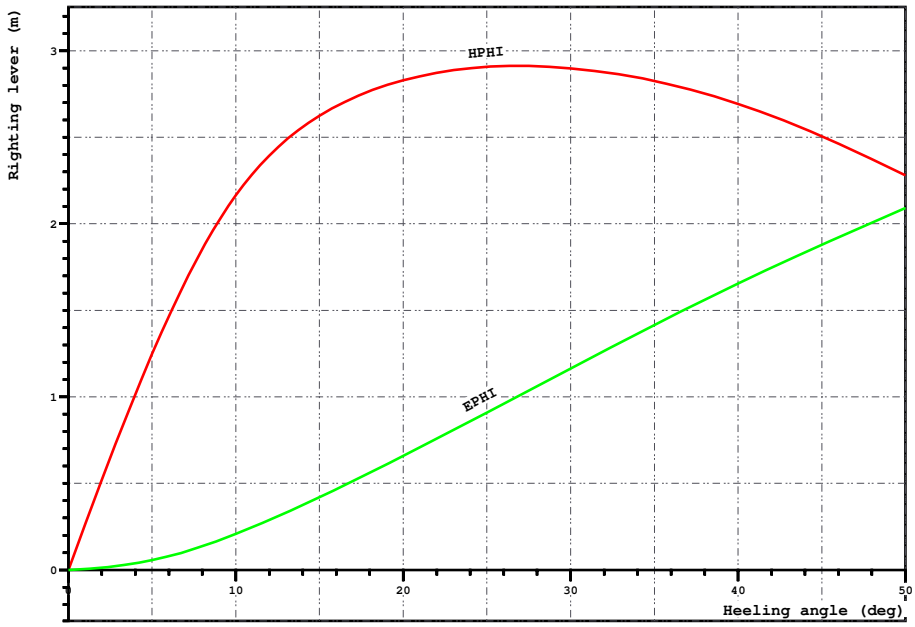
FLOATING POSITION

Draught moulded	0.705	m	KM	16.92 m
Trim	-1.061	m	KG	2.28 m
Heel, PS=+	0.0	deg		
TA	1.236	m	GM0	14.64 m
TF	0.175	m	GMCORR	-0.07 m
Trimming moment	-9486	tonm	GM	14.56 m



Height of the wheelhouse top above waterline: 8.77 m

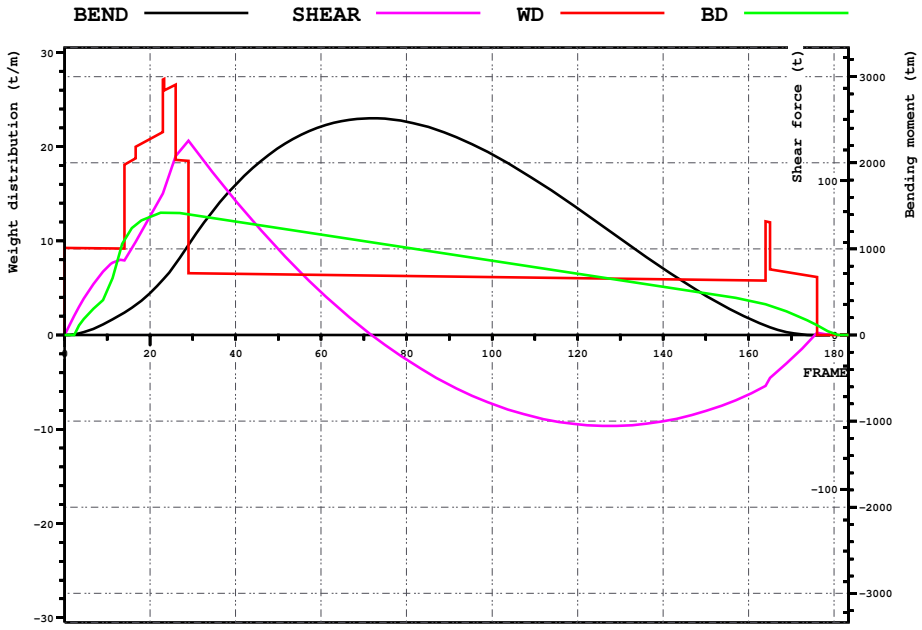
Loading casel 1-LIGHTSHIP,



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	-0.022	1.25	0.056	5.0	0.006
10.0	-0.364	2.17	0.208	10.1	0.012
15.0	-1.144	2.62	0.420	15.3	0.019
20.0	-2.152	2.83	0.659	19.4	0.024
30.0	-4.387	2.90	1.164	25.6	0.031
40.0	-6.680	2.69	1.655	27.6	0.034
50.0	-8.898	2.28	2.091	27.0	0.033

Loading casel 1-LIGHTSHIP,



LOADING CONDITION 1-LIGHTSHIP

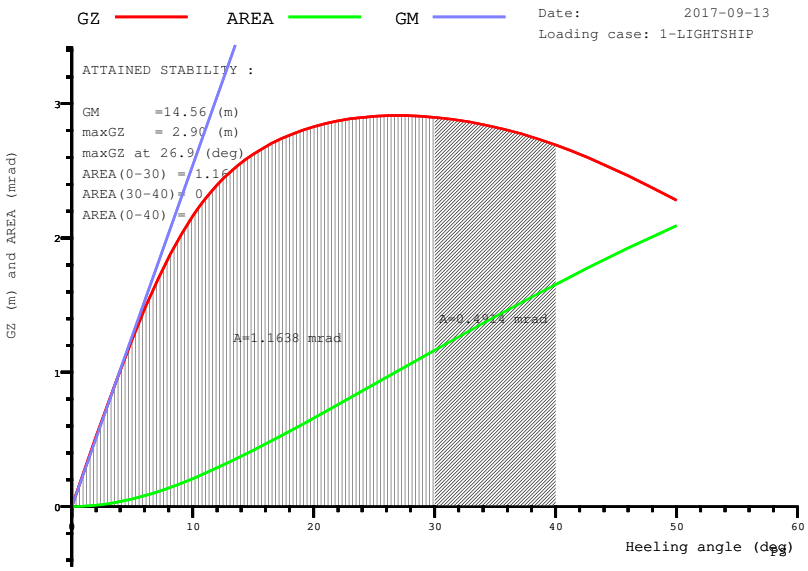
X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.25	0.00
6.000	10.00	148	44	9.19	4.75
12.000	20.00	487	77	20.80	12.53
18.000	30.00	1117	122	6.55	12.75
24.000	40.00	1745	87	6.49	12.06
30.000	50.00	2171	56	6.44	11.37
36.000	60.00	2420	28	6.38	10.67
42.000	70.00	2515	4	6.32	9.98
48.000	80.00	2478	-16	6.27	9.29
54.000	90.00	2332	-32	6.21	8.59
60.000	100.00	2100	-45	6.15	7.90
66.000	110.00	1805	-53	6.10	7.21
72.000	120.00	1471	-58	6.04	6.51
78.000	130.00	1119	-59	5.98	5.82
84.000	140.00	774	-56	5.93	5.12
90.000	150.00	457	-49	5.87	4.43
96.000	160.00	193	-39	5.81	3.65
102.000	170.00	24	-15	6.59	2.28
108.000	180.00	0	0	0.00	0.16

Loading condition: 1-LIGHTSHIP

RCR	TEXT	REQ	ATTV	UNIT	STAT
AREA30	Area under GZ curve .	0.055	1.164	mrad	OK
AREA40	Area under GZ curve .	0.090	1.655	mrad	OK
AREA3040	Area under GZ curve .	0.030	0.491	mrad	OK
GZ0.2	Max GZ > 0.2	0.200	2.899	m	OK
MAXGZ25	Max. GZ at an angle .	25.000	26.910	deg	OK
GM0.15	GM > 0.15 m	0.150	14.565	m	OK

ATTAINED STABILITY VERSUS IMO CRITERIA

According to IMO Resolution A.749(18)



IMO STABILITY CRITERIA: STATUS: OK / NOT MET

GM >= 0.15 m		OK
GZ >= 0.20 m in angle of heel >= 30 degr		OK
GZ max in angle of heel >= 25 degr		OK
Area 0...30 degr. >= 0.055 mrad	*)	OK
Area 30..40 degr. >= 0.03 mrad	**)	OK
Area 0...40 degr. >= 0.09 mrad	**)	OK

*) From 0 degr. or the angle of steady equilibrium
**) To 40 degr. or the angle of flooding

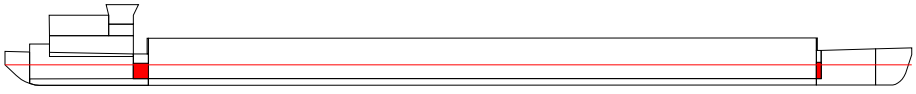
LOADING CONDITION 2-3STACKS, 3 stacks at 14t/TEU

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
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	25.9	17.00	16.50	0.00	1.73	27.03
DOF	Diesel oil f.	4.9	3.00	98.70	0.00	1.79	0.00
Total of DO		30.8	20.00	28.83	0.00	1.74	27.03
Fresh Water, RHO=1.000							
FW	Side Tanks a.	14.6	10.00	14.70	0.00	1.76	30.43
STACK1							
(STACK1)		0.0	728.00	59.00	0.00	2.00	0.00
STACK2							
(STACK2)		0.0	728.00	59.00	0.00	4.90	0.00
STACK3							
(STACK3)		0.0	728.00	59.00	0.00	7.80	0.00
Deadweight			2219.0	58.42	0.00	4.86	57.5
Lightweight			782.0	45.61	0.00	2.27	
Displacement (rho=1.000)			3001.0	55.08	0.00	4.19	57.5

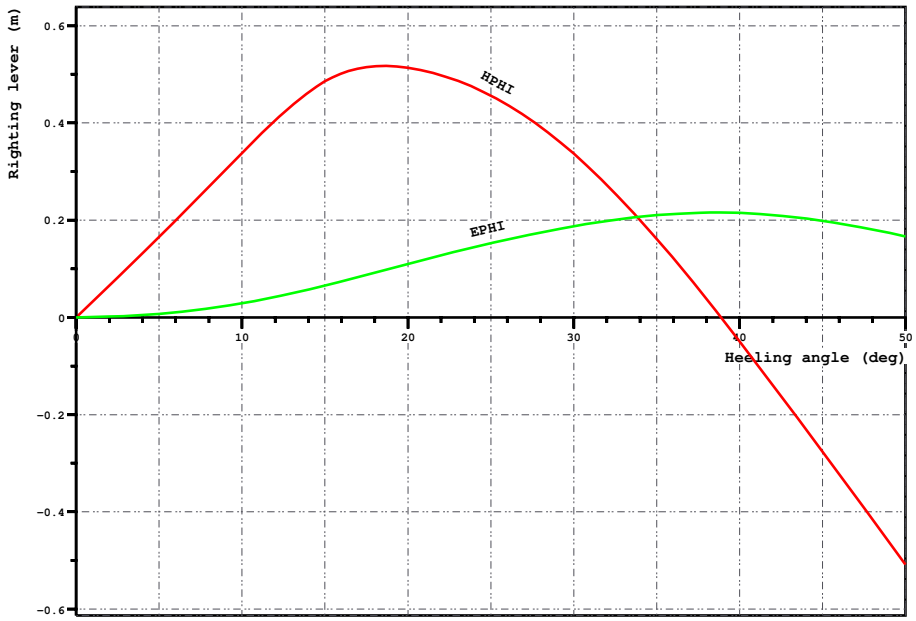
FLOATING POSITION

Draught moulded	2.483	m	KM	6.08 m
Trim	-0.031	m	KG	4.19 m
Heel, PS=+	0.0	deg		
TA	2.498	m	GM0	1.90 m
TF	2.467	m	GMCORR	-0.02 m
Trimming moment	-327	tonm	GM	1.88 m



Height of the wheelhouse top above waterline: 7.36 m

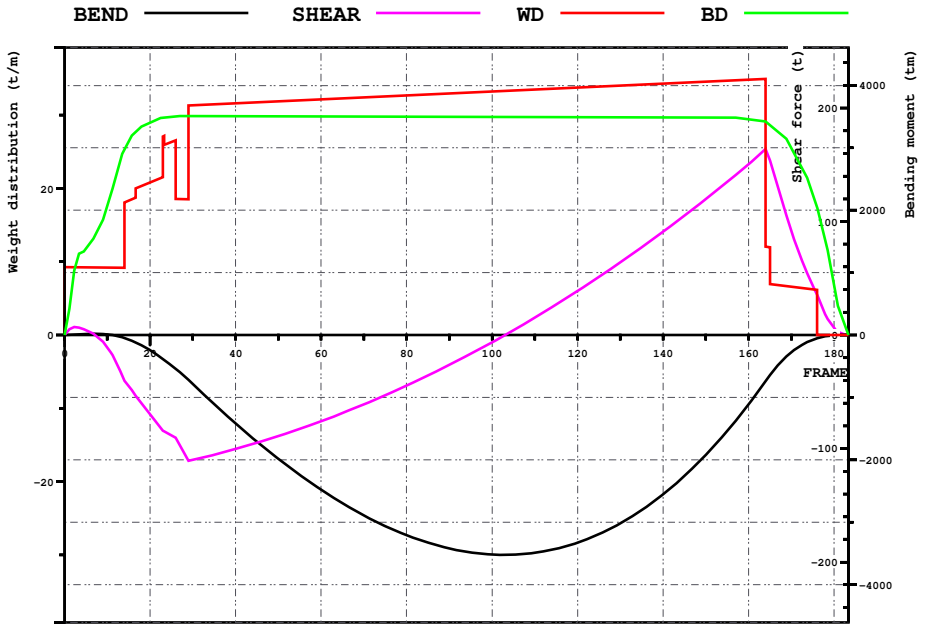
Loading casel 2-3STACKS, 3 stacks at 14t/TEU



LOADING CONDITION 2-3STACKS, 3 stacks at 14t/TEU

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	0.17	0.007	5.0	0.002
10.0	0.012	0.34	0.029	10.1	0.003
15.0	0.000	0.49	0.066	15.3	0.005
20.0	-0.129	0.51	0.110	19.4	0.006
30.0	-0.603	0.34	0.188	25.6	0.009
40.0	-1.259	-0.05	0.215	27.6	0.009
50.0	-1.952	-0.51	0.167	27.0	0.009

Loading casel 2-3STACKS, 3 stacks at 14t/TEU



LOADING CONDITION 2-3STACKS, 3 stacks at 14t/TEU

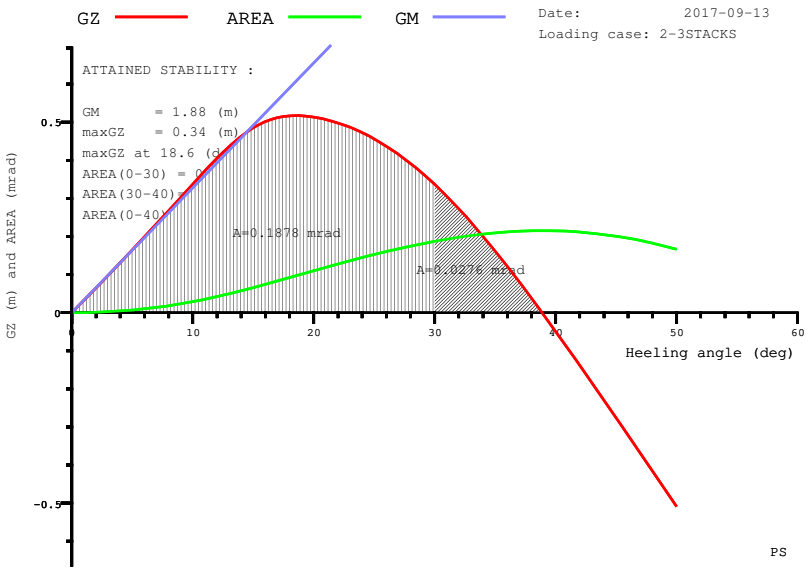
X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.25	0.03
6.000	10.00	10	-11	9.19	17.63
12.000	20.00	-243	-70	20.80	28.96
18.000	30.00	-785	-110	31.35	29.89
24.000	40.00	-1416	-100	31.62	29.87
30.000	50.00	-1984	-89	31.89	29.85
36.000	60.00	-2478	-76	32.15	29.83
42.000	70.00	-2890	-61	32.42	29.81
48.000	80.00	-3207	-45	32.69	29.79
54.000	90.00	-3420	-26	32.96	29.77
60.000	100.00	-3518	-6	33.23	29.75
66.000	110.00	-3491	15	33.50	29.73
72.000	120.00	-3328	39	33.77	29.71
78.000	130.00	-3020	64	34.04	29.69
84.000	140.00	-2555	91	34.31	29.67
90.000	150.00	-1923	120	34.58	29.65
96.000	160.00	-1113	150	34.84	29.42
102.000	170.00	-277	92	6.59	25.49
108.000	180.00	-5	6	0.00	6.87

Loading condition: 3 stacks at 14t/TEU

RCR	TEXT	REQ	ATTV	UNIT	STAT
AREA30	Area under GZ curve .	0.055	0.188	mrad	OK
AREA40	Area under GZ curve .	0.090	0.215	mrad	OK
AREA3040	Area under GZ curve .	0.030	0.028	mrad	NOT MET
GZ0.2	Max GZ > 0.2	0.200	0.337	m	OK
MAXGZ25	Max. GZ at an angle .	25.000	18.584	deg	NOT MET
GM0.15	GM > 0.15 m	0.150	1.877	m	OK

ATTAINED STABILITY VERSUS IMO CRITERIA

According to IMO Resolution A.749(18)



IMO STABILITY CRITERIA: STATUS: OK / NOT MET

GM >= 0.15 m		OK
GZ >= 0.20 m in angle of heel >= 30 degr		OK
GZ max in angle of heel >= 25 degr		NOT MET
Area 0...30 degr. >= 0.055 mrad	*)	OK
Area 30..40 degr. >= 0.03 mrad	**)	NOT MET
Area 0...40 degr. >= 0.09 mrad	**)	OK

*) From 0 degr. or the angle of steady equilibrium
**) To 40 degr. or the angle of flooding

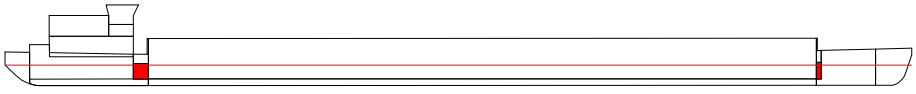
LOADING CONDITION 3-4STACKS, 4 stacks, top stack with reduced weight

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
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	25.9	17.00	16.50	0.00	1.73	27.03
DOF	Diesel oil f.	4.9	3.00	98.70	0.00	1.79	0.00
Total of DO		30.8	20.00	28.83	0.00	1.74	27.03
Fresh Water, RHO=1.000							
FW	Side Tanks a.	14.6	10.00	14.70	0.00	1.76	30.43
STACK1							
(STACK1)		0.0	624.00	58.90	0.00	2.00	0.00
STACK2							
(STACK2)		0.0	624.00	58.90	0.00	4.90	0.00
STACK3							
(STACK3)		0.0	624.00	58.90	0.00	7.80	0.00
STACK4							
(STACK4)		0.0	312.00	58.90	0.00	10.70	0.00
Deadweight			2219.0	58.32	0.00	5.68	57.5
Lightweight			782.0	45.61	0.00	2.27	
Displacement (rho=1.000)			3001.0	55.01	0.00	4.79	57.5

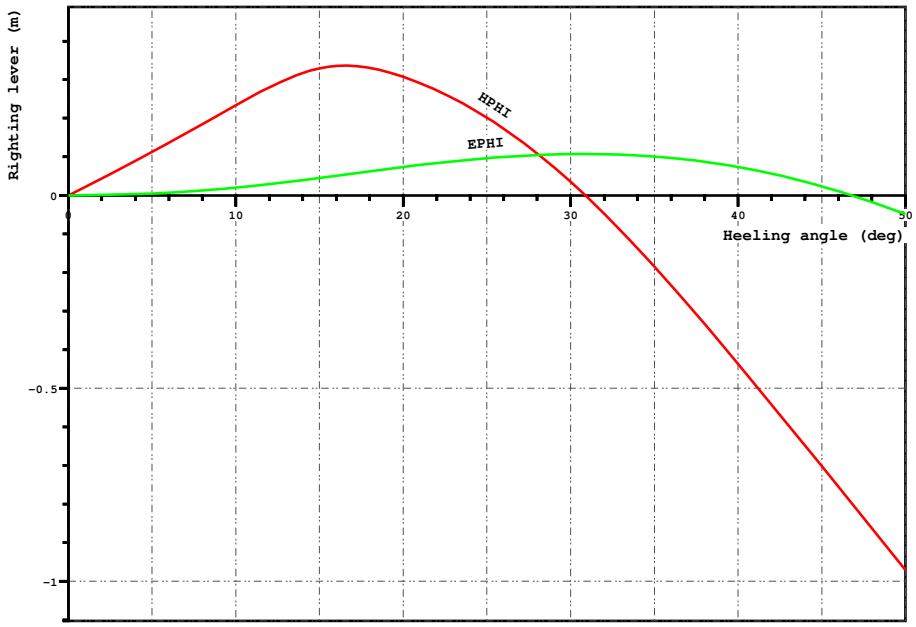
FLOATING POSITION

Draught moulded	2.482	m	KM	6.08 m
Trim	-0.052	m	KG	4.79 m
Heel, PS=+	0.0	deg		
TA	2.508	m	GM0	1.29 m
TF	2.456	m	GMCORR	-0.02 m
Trimming moment	-545	tonm	GM	1.28 m



Height of the wheelhouse top above waterline: 7.35 m

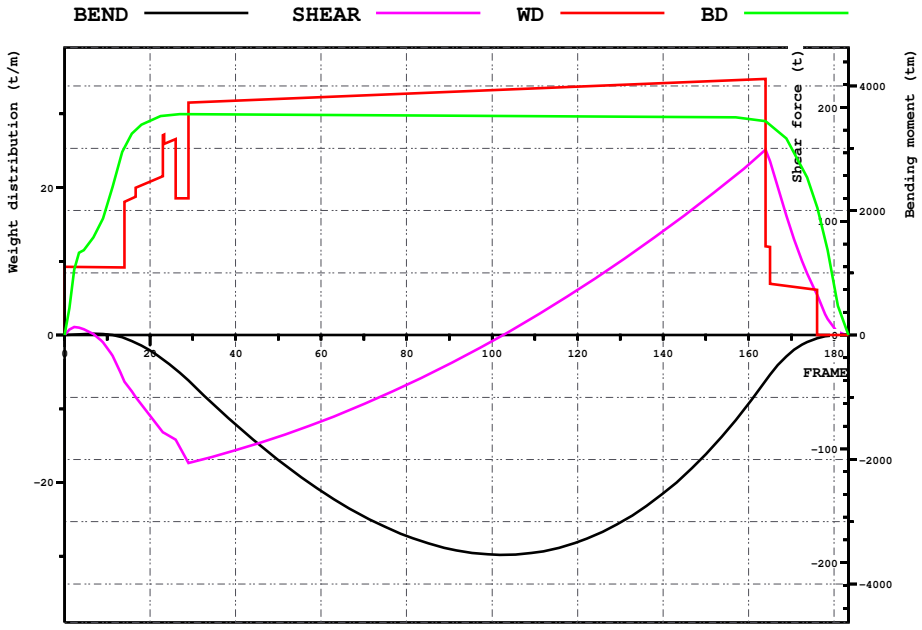
Loading casel 3-4STACKS, 4 stacks, top stack with reduced weight



LOADING CONDITION 3-4STACKS, 4 stacks, top stack with reduced weight

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	0.11	0.005	5.0	0.002
10.0	0.012	0.23	0.020	10.1	0.003
15.0	0.000	0.33	0.045	15.3	0.005
20.0	-0.129	0.31	0.074	19.4	0.006
30.0	-0.603	0.04	0.107	25.6	0.009
40.0	-1.260	-0.44	0.074	27.6	0.009
50.0	-1.953	-0.97	-0.049	27.0	0.009

Loading casel 3-4STACKS, 4 stacks, top stack with reduced weight



LOADING CONDITION 3-4STACKS, 4 stacks, top stack with reduced weight

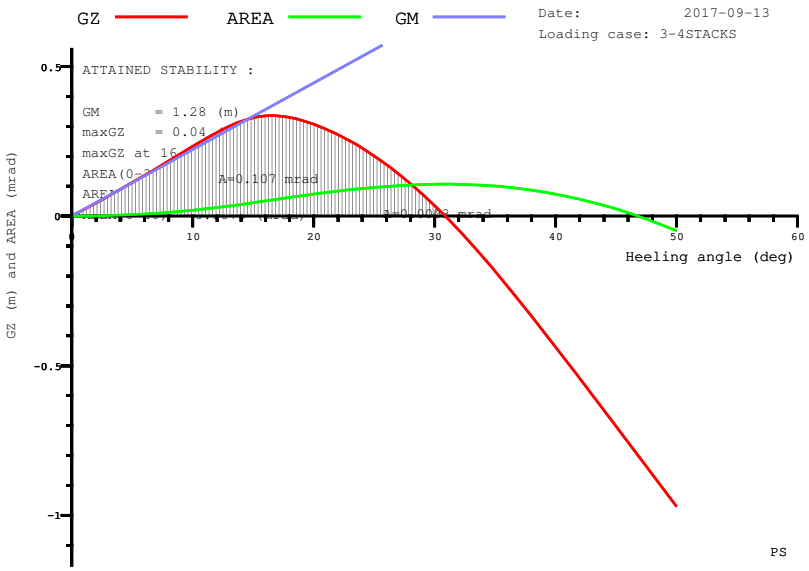
X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.25	0.08
6.000	10.00	9	-11	9.19	17.73
12.000	20.00	-250	-71	20.80	29.06
18.000	30.00	-799	-111	31.55	29.97
24.000	40.00	-1437	-101	31.78	29.94
30.000	50.00	-2009	-89	32.02	29.91
36.000	60.00	-2504	-76	32.26	29.87
42.000	70.00	-2914	-61	32.50	29.84
48.000	80.00	-3228	-44	32.74	29.81
54.000	90.00	-3436	-25	32.98	29.77
60.000	100.00	-3528	-5	33.22	29.74
66.000	110.00	-3495	16	33.46	29.71
72.000	120.00	-3328	40	33.70	29.67
78.000	130.00	-3015	65	33.94	29.64
84.000	140.00	-2547	91	34.18	29.60
90.000	150.00	-1915	119	34.42	29.57
96.000	160.00	-1107	150	34.66	29.32
102.000	170.00	-276	92	6.59	25.39
108.000	180.00	-5	6	0.00	6.83

Loading condition: 4 stacks, top stack with reduced weight

RCR	TEXT	REQ	ATTV	UNIT	STAT
AREA30	Area under GZ curve .	0.055	0.107	mrad	OK
AREA40	Area under GZ curve .	0.090	0.107	mrad	OK
AREA3040	Area under GZ curve .	0.030	0.000	mrad	NOT MET
GZ0.2	Max GZ > 0.2	0.200	0.035	m	NOT MET
MAXGZ25	Max. GZ at an angle .	25.000	16.503	deg	NOT MET
GM0.15	GM > 0.15 m	0.150	1.275	m	OK

ATTAINED STABILITY VERSUS IMO CRITERIA

According to IMO Resolution A.749(18)



IMO STABILITY CRITERIA: STATUS: OK / NOT MET

GM >= 0.15 m		OK
GZ >= 0.20 m in angle of heel >= 30 degr		NOT MET
GZ max in angle of heel >= 25 degr		NOT MET
Area 0...30 degr. >= 0.055 mrad	*)	OK
Area 30..40 degr. >= 0.03 mrad	**)	NOT MET
Area 0...40 degr. >= 0.09 mrad	**)	OK

*) From 0 degr. or the angle of steady equilibrium
**) To 40 degr. or the angle of flooding

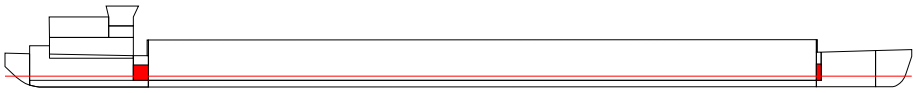
LOADING CONDITION 4-T130, 56 TEU on two stacks

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
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	25.9	17.00	16.50	0.00	1.73	27.03
DOF	Diesel oil f.	4.9	3.00	98.70	0.00	1.79	0.00
Total of DO		30.8	20.00	28.83	0.00	1.74	27.03
Fresh Water, RHO=1.000							
FW	Side Tanks a.	14.6	10.00	14.70	0.00	1.76	30.43
STACK1							
(STACK1)		0.0	364.00	68.20	0.00	2.00	0.00
STACK2							
(STACK2)		0.0	364.00	68.20	0.00	4.90	0.00
Deadweight			763.0	66.10	0.00	3.41	57.5
Lightweight			782.0	45.61	0.00	2.27	
Displacement (rho=1.000)			1545.0	55.73	0.00	2.83	57.5

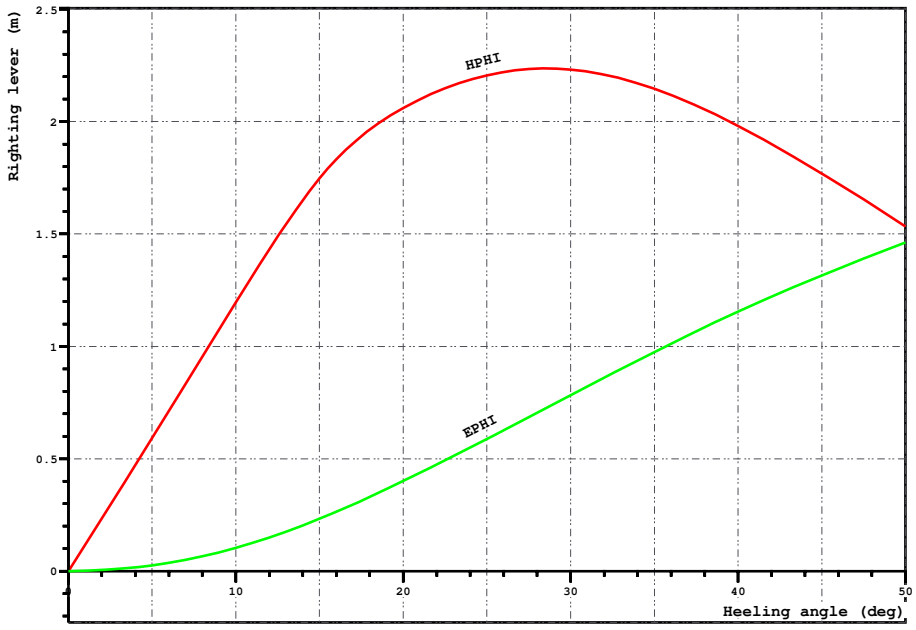
FLOATING POSITION

Draught moulded	1.310	m	KM	9.63 m
Trim	-0.032	m	KG	2.83 m
Heel, PS=+	0.0	deg		
TA	1.326	m	GM0	6.79 m
TF	1.293	m	GMCORR	-0.04 m
Trimming moment	-308	tonm	GM	6.76 m



Height of the wheelhouse top above waterline: 8.53 m

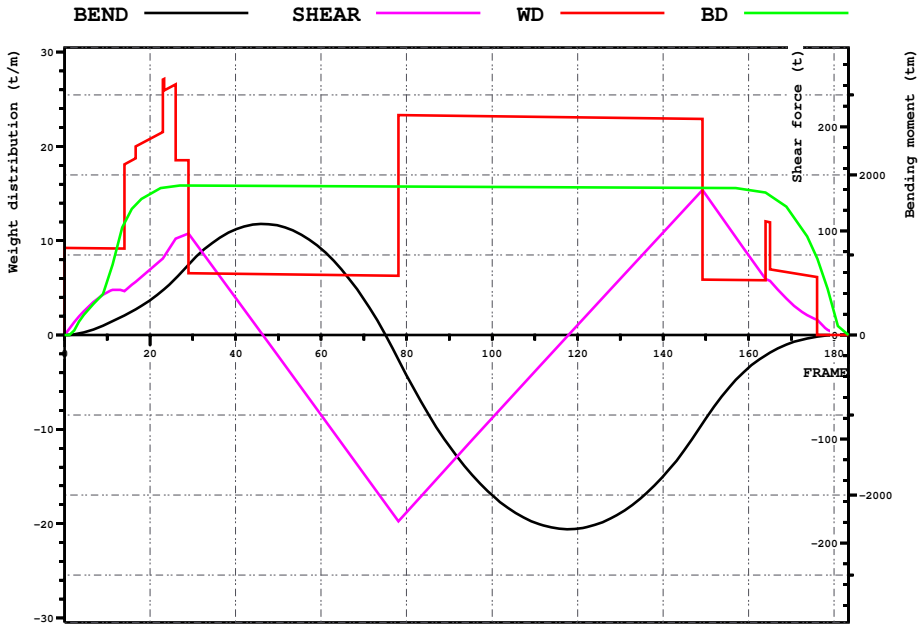
Loading casel 4-T130, 56 TEU on two stacks



LOADING CONDITION 4-T130, 56 TEU on two stacks

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	0.59	0.026	5.0	0.003
10.0	0.022	1.20	0.104	10.1	0.007
15.0	-0.001	1.75	0.233	15.3	0.010
20.0	-0.250	2.06	0.401	19.4	0.013
30.0	-1.148	2.23	0.783	25.6	0.017
40.0	-2.368	1.98	1.155	27.6	0.018
50.0	-3.652	1.53	1.463	27.0	0.017

Loading casel 4-T130, 56 TEU on two stacks



LOADING CONDITION 4-T130, 56 TEU on two stacks

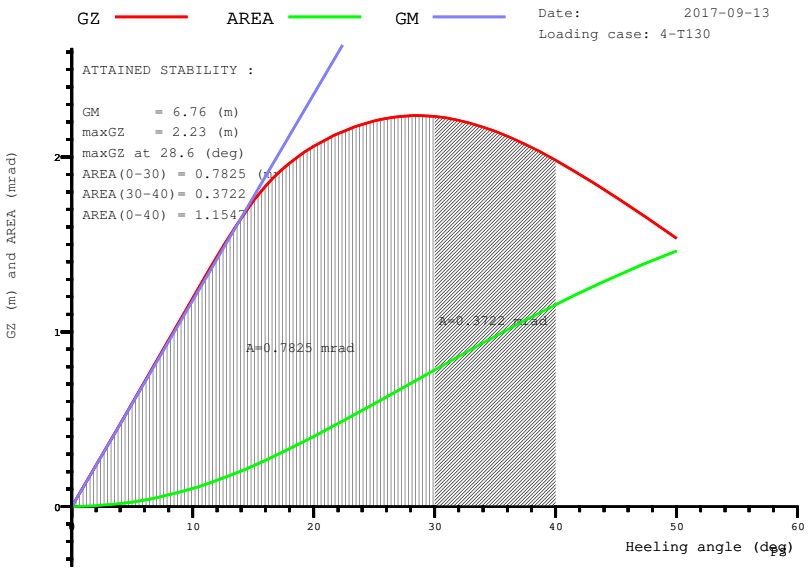
X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.25	0.00
6.000	10.00	142	41	9.19	5.75
12.000	20.00	435	63	20.80	14.93
18.000	30.00	934	92	6.55	15.85
24.000	40.00	1319	36	6.49	15.83
30.000	50.00	1368	-20	6.44	15.81
36.000	60.00	1078	-76	6.38	15.79
42.000	70.00	451	-133	6.32	15.77
48.000	80.00	-504	-170	23.32	15.75
54.000	90.00	-1388	-125	23.26	15.72
60.000	100.00	-2001	-80	23.20	15.70
66.000	110.00	-2344	-35	23.15	15.68
72.000	120.00	-2418	10	23.09	15.66
78.000	130.00	-2225	54	23.03	15.64
84.000	140.00	-1766	99	22.98	15.62
90.000	150.00	-1044	135	5.87	15.60
96.000	160.00	-411	77	5.81	15.39
102.000	170.00	-98	31	6.59	12.86
108.000	180.00	-2	2	0.00	2.44

Loading condition: 56 TEU on two stacks

RCR	TEXT	REQ	ATTV	UNIT	STAT
AREA30	Area under GZ curve .	0.055	0.783	mrad	OK
AREA40	Area under GZ curve .	0.090	1.155	mrad	OK
AREA3040	Area under GZ curve .	0.030	0.372	mrad	OK
GZ0.2	Max GZ > 0.2	0.200	2.232	m	OK
MAXGZ25	Max. GZ at an angle .	25.000	28.590	deg	OK
GM0.15	GM > 0.15 m	0.150	6.755	m	OK

ATTAINED STABILITY VERSUS IMO CRITERIA

According to IMO Resolution A.749(18)



IMO STABILITY CRITERIA: STATUS: OK / NOT MET

GM >= 0.15 m		OK
GZ >= 0.20 m in angle of heel >= 30 degr		OK
GZ max in angle of heel >= 25 degr		OK
Area 0...30 degr. >= 0.055 mrad	*)	OK
Area 30..40 degr. >= 0.03 mrad	**)	OK
Area 0...40 degr. >= 0.09 mrad	**)	OK

*) From 0 degr. or the angle of steady equilibrium
**) To 40 degr. or the angle of flooding