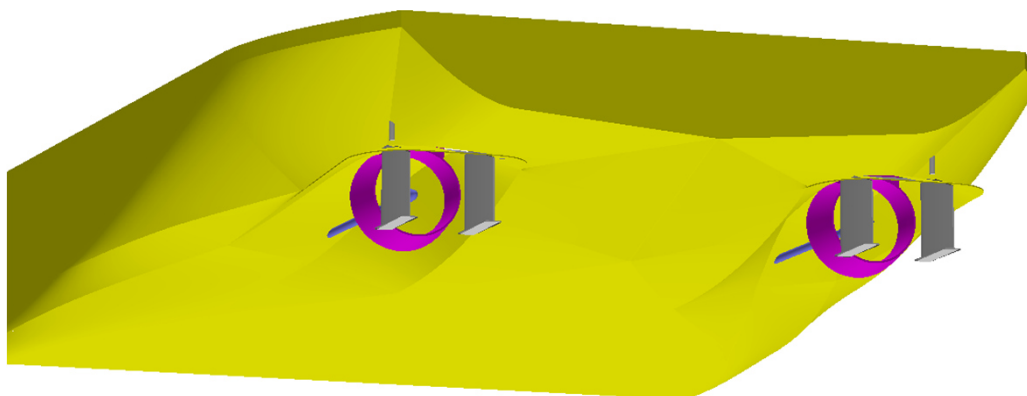
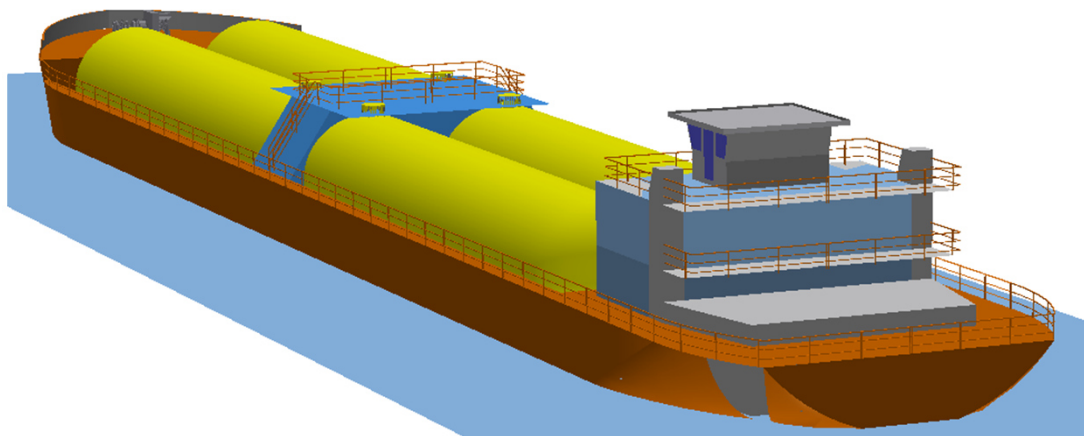
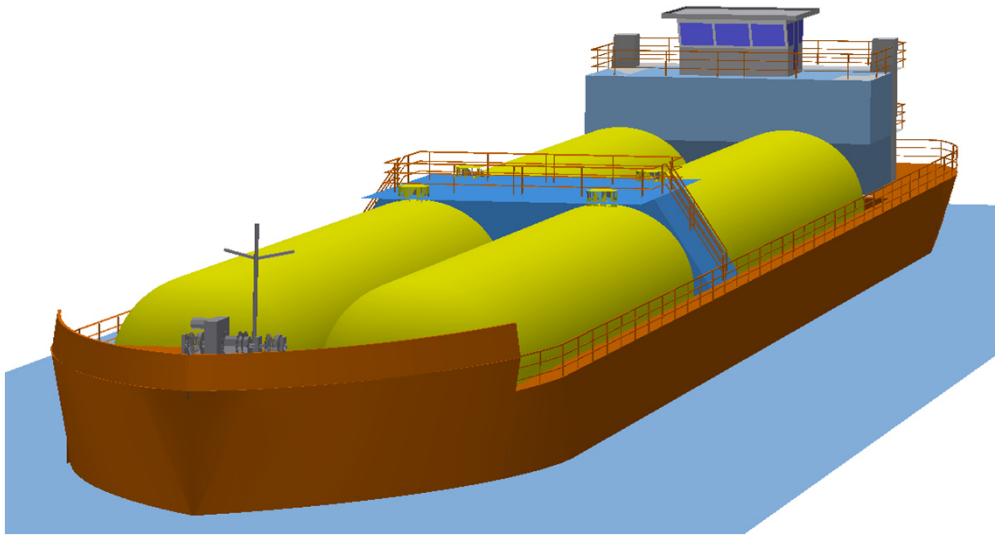


LNG Carrier LNG1



Main dimensions

Cargo type		LNG Barge
Hull type		LNG1
Length o.A.	L	90,00 m
Breadth moulded	B	14,50 m
Depth Main Deck	D	4,20 m
Draught max.	T	2,30 m
Lightweight estimate		1590 t
Payload at T = 2.33 m		1095 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

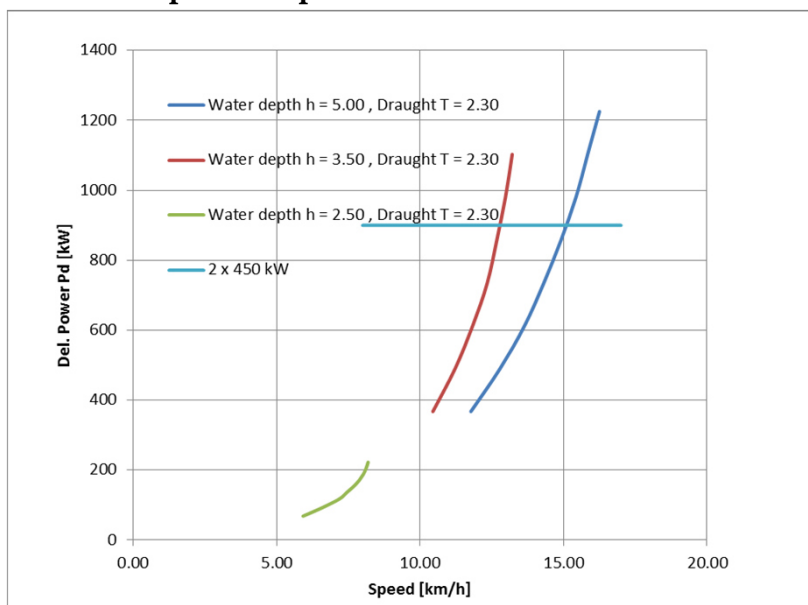
Powering

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, uninterrupt

Estimated speed and power



4 LNG Tanks

Cryogenic tank, double wall vacuum insulated

Outer Length and diameter 30,00 x 5.88 m

Volume inner tank 610 m³ per tank

LNG capacity in 4 tanks 1070 t at rho = 450 kg/m³

Valves, loading and unloading devices on deck of a central service room
267,5

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 1110 kg
- One stern anchor 555 kg

Accommodation

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

Weight calculation results for major components

Steel weight, longt. Framing	638 t
Accommodation	100 t
Machinery & outfitting	65 t
LNG Tanks, 4 pieces	825 t
Sum	1590 t

Electric load requirements

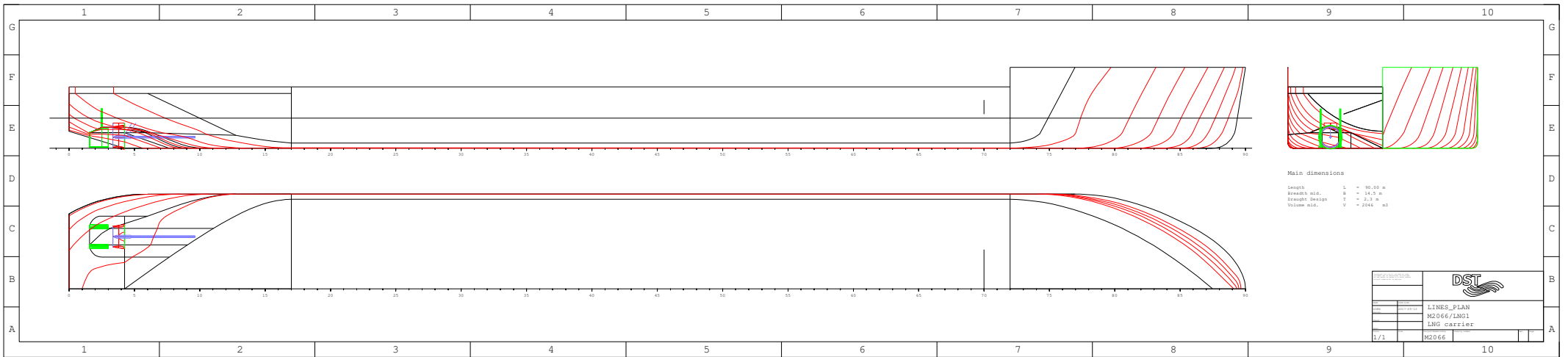
LNG driven genset, 60 kW output

Three-phase AC supply to anchor winches


220 V supply to accomadation

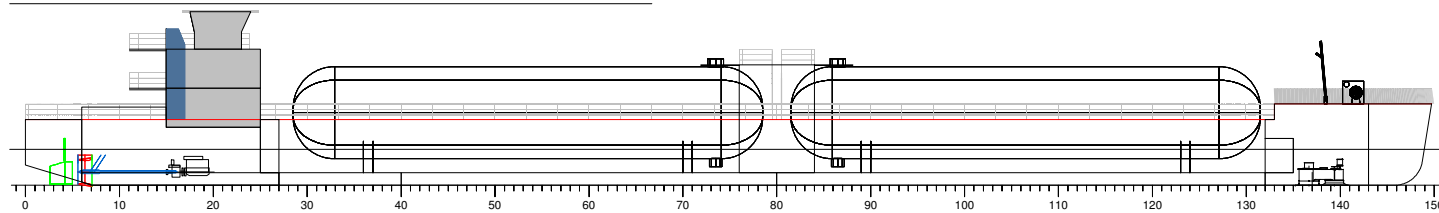
220 V supply to AC accomodation

24 V emergency circuit

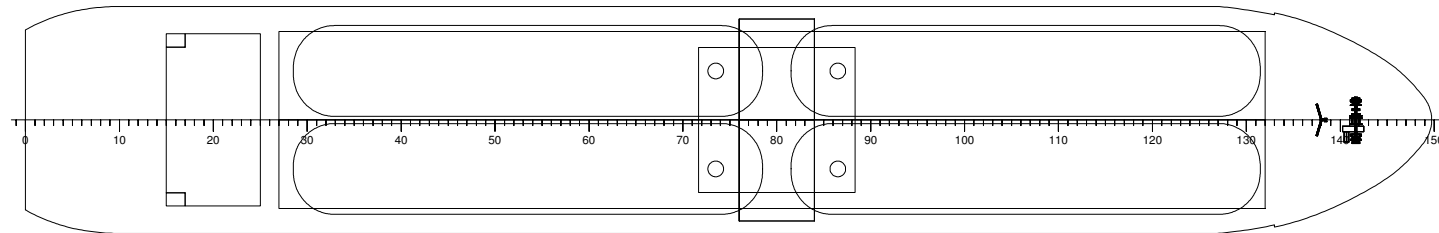


Main dimensions
 Length L = 90.00 m
 Breadth std. B = 14.0 m
 Draught Design T = 2.2 m
 Volume std. V = 2046 m³

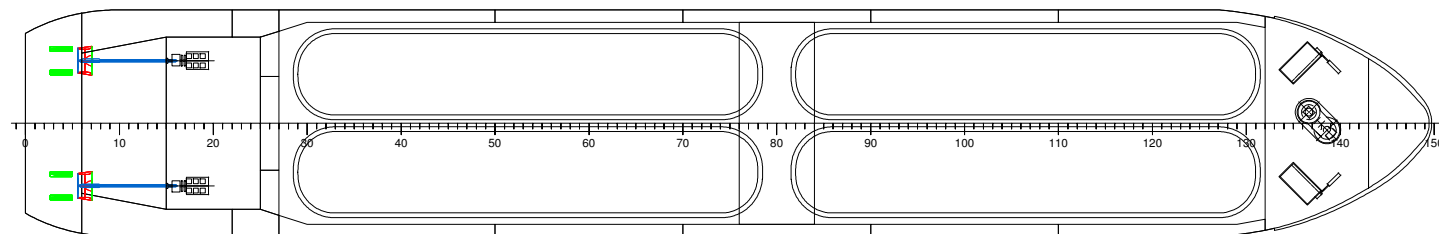
REVISIONS		 DST
No.	Description	
1	Initial	LINES_PLAN
2	Revised	M2066/LNG1
3	Revised	LNG carrier
4	Revised	M2066
1/1		



PROFILE



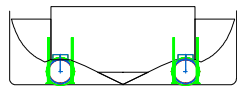
MAINDECK



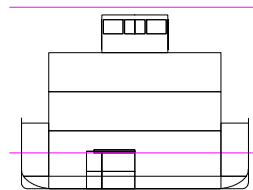
TANKDECK

Main dimensions

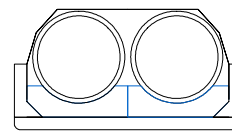
Length $L = 90.00$ m
 Breadth moulded $B = 14.50$ m
 Breadth oA $BoA = 15.00$ m
 Draught max $T = 2.30$ m
 LNG capacity 4×600 m³



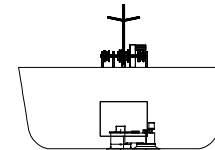
PROP




MRA



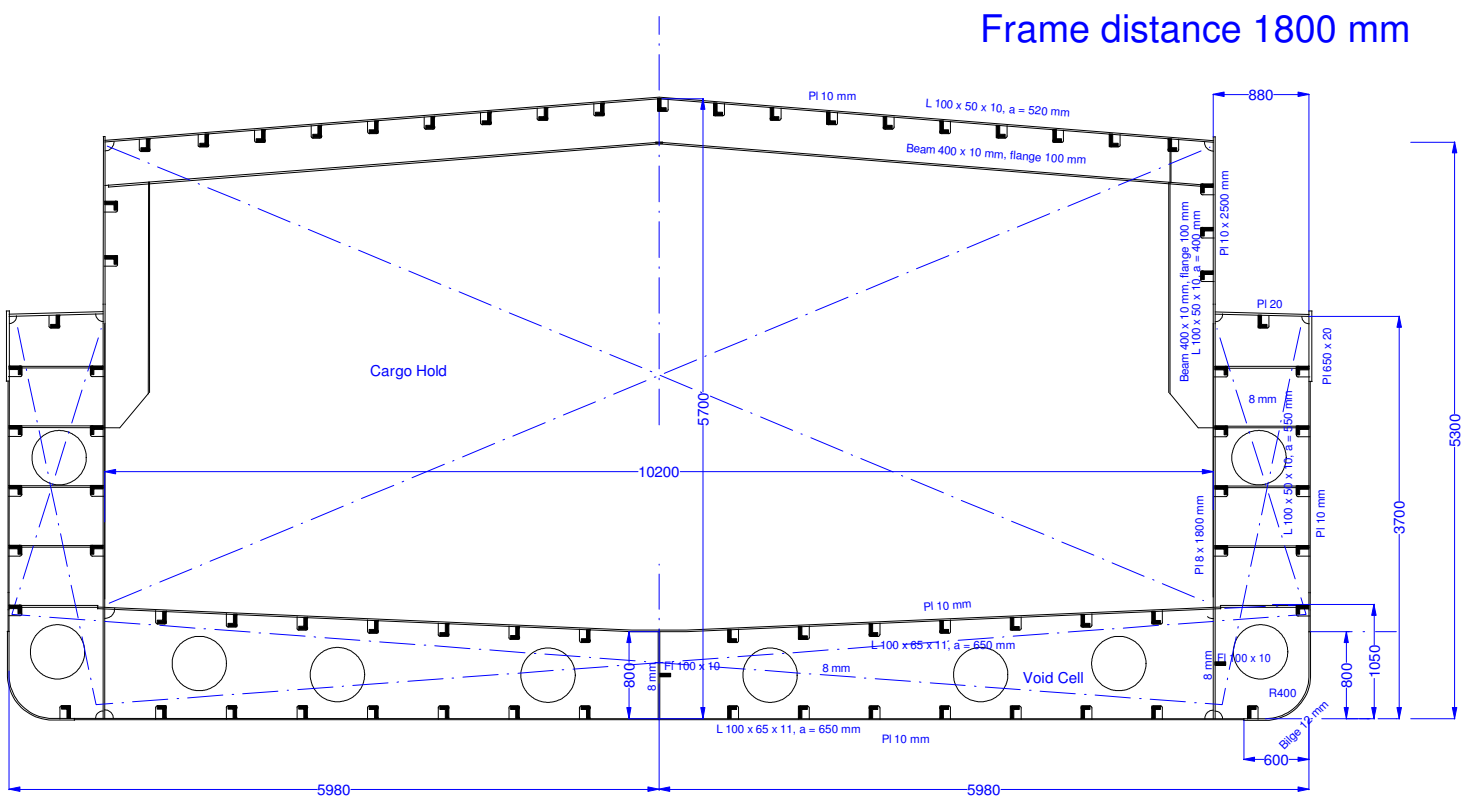
HOLD



MMF

	
Title: <input type="checkbox"/> Day to sign Date: 2017-05-17 Design: Check: Appr: Rev: 1/...	1 LNG1
Project/Revision: Date: 2017-05-17	Rev: Page: LNG1


Tanker T1- Main Frame and Scantling



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

	
Tanker T1 Main Section	
No. 1 Date:	Scale:

M2066/LNG1

PROJECT INFO

L x B = 90.00 x 14.5 m

Project M2066/LNG1

T	DISP	DW	MCT	TCP	KMT	TK
m	t	t	tm/cm	t/cm	m	m
1.600	1807.12	254.1	75.3	11.89	11.562	1.610
1.700	1926.27	373.2	76.0	11.93	10.995	1.710
1.800	2045.77	492.7	76.6	11.96	10.497	1.810
1.900	2165.59	612.5	77.1	12.00	10.056	1.910
2.000	2285.71	732.6	77.6	12.02	9.664	2.010
2.100	2406.10	853.0	78.1	12.05	9.313	2.110
2.200	2526.76	973.7	78.6	12.08	8.998	2.210
2.300	2647.66	1094.6	79.0	12.10	8.715	2.310
2.400	2768.79	1215.7	79.4	12.12	8.458	2.410
2.500	2890.11	1337.0	79.7	12.14	8.226	2.510

M2066/LNG1

PROJECT INFO

L x B = 90.00 x 14.5 m

Project M2066/LNG1, 2017-09-13

LOADING CASES

NAME	TEXT	DISP t	MASS t	MASS t	T m	TR m
1-LIGHTSHIP		1610.06	0.00	0.00	1.496	-0.655
2-MIN_BAL	Min. draught aft	1712.30	21.57	80.67	1.537	-0.172
3-LNG	LNG at 95%	2648.56	1078.49	0.00	2.291	0.100
4-PART_LOAD	Aft tanks empty	2120.09	550.03	0.00	1.776	0.892

M2066/LNG1

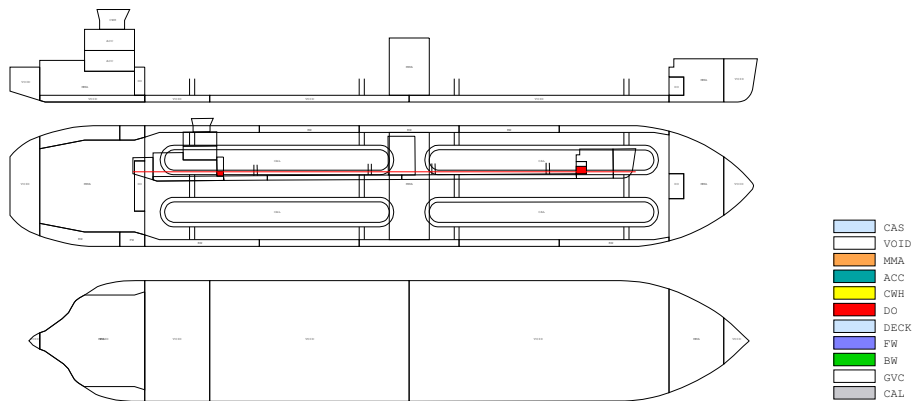
LOADING CONDITION 1-LIGHTSHIP

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity			Free s. moment
				cgx	cgy	cgz	
Fresh Water, RHO=1.000							
FW	Fresh water	31.8	6.00	14.65	0.00	1.10	82.87
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	19.6	5.00	15.60	0.00	1.21	0.00
DOF	Diesel Oil f.	9.5	6.00	80.10	0.00	1.46	0.00
Total of DO		29.1	11.00	50.78	0.00	1.35	0.00
Deadweight			17.0	38.03	0.00	1.26	82.9
Lightweight			1553.1	42.69	0.00	3.62	
Displacement (rho=1.000)			1570.1	42.64	0.00	3.59	82.9

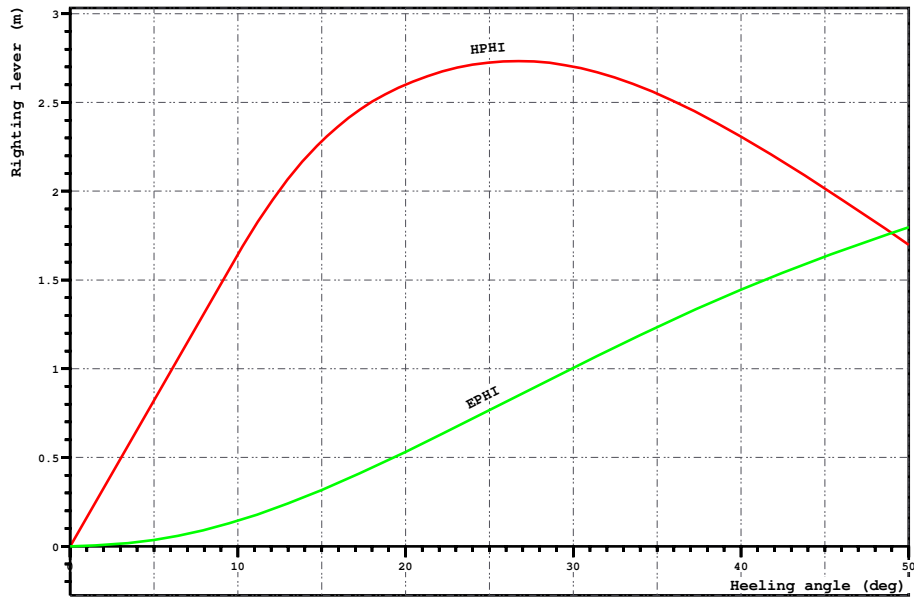
FLOATING POSITION

Draught moulded	1.453 m	KM	13.08 m
Trim	-0.557 m	KG	3.59 m
Heel, PS=+	0.0 deg		
TA	1.670 m	GM0	9.49 m
TF	1.113 m	GMCORR	-0.05 m
Trimming moment	-4153 tonm	GM	9.44 m



Height of the wheelhouse top above waterline: 9.57 m

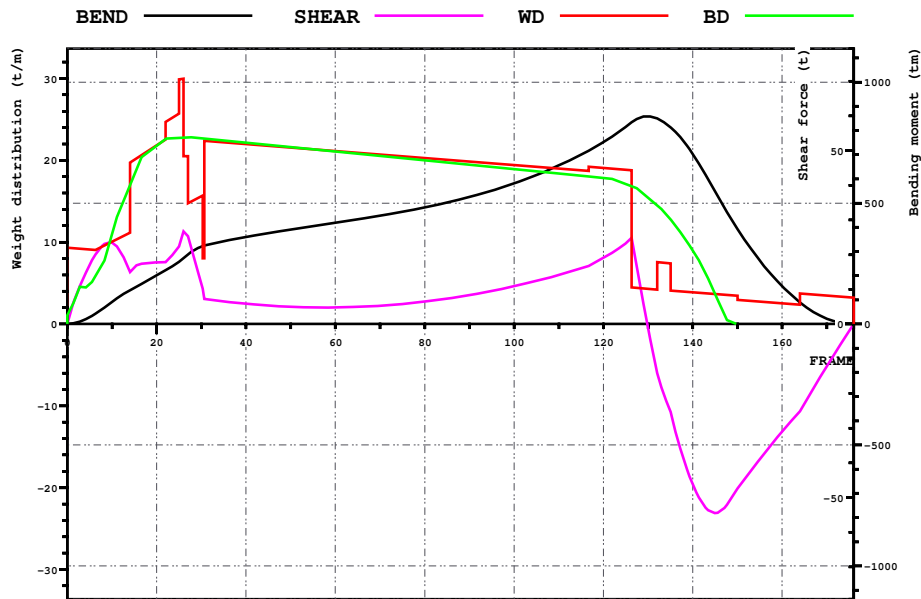
Loading case1 1-LIGHTSHIP,



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	-0.002	0.82	0.036	7.3	0.005
10.0	0.004	1.64	0.143	14.6	0.009
15.0	-0.161	2.28	0.317	21.7	0.014
20.0	-0.630	2.60	0.532	24.9	0.016
30.0	-2.027	2.70	1.003	26.3	0.017
40.0	-3.777	2.31	1.446	25.3	0.016
50.0	-5.558	1.70	1.797	23.0	0.015

Loading case1 1-LIGHTSHIP,



LOADING CONDITION 1-LIGHTSHIP

X	FR	BEND	SHEAR	WD	BD
m	#	tm	t	t/m	t/m
0.000	0.00	0	0	9.33	1.09
6.000	10.00	92	23	10.07	10.99
12.000	20.00	201	18	21.86	21.76
18.000	30.00	320	12	15.58	22.71
24.000	40.00	360	6	21.97	22.17
30.000	50.00	391	5	21.54	21.63
36.000	60.00	419	5	21.12	21.09
42.000	70.00	448	5	20.69	20.55
48.000	80.00	482	6	20.27	20.01
54.000	90.00	525	8	19.84	19.47
60.000	100.00	581	11	19.42	18.93
66.000	110.00	655	14	18.99	18.39
72.000	120.00	752	19	19.07	17.83
78.000	130.00	858	-1	4.30	15.45
84.000	140.00	702	-46	3.88	8.98

M2066/LNG1

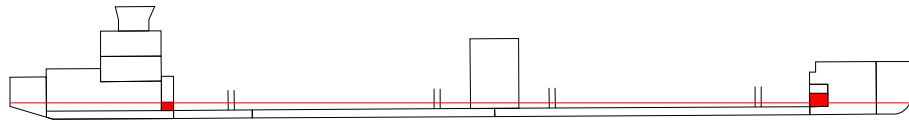
LOADING CONDITION 1-LIGHTSHIP

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgy cgz			Free s. moment
Fresh Water, RHO=1.000							
FW	Fresh water	31.8	6.00	14.65	0.00	1.10	82.87
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	19.6	5.00	15.60	0.00	1.21	0.00
DOF	Diesel Oil f.	9.5	6.00	80.10	0.00	1.46	0.00
Total of DO		29.1	11.00	50.78	0.00	1.35	0.00
Deadweight			17.0	38.03	0.00	1.26	82.9
Lightweight			1553.1	42.69	0.00	3.62	
Displacement (rho=1.000)			1570.1	42.64	0.00	3.59	82.9

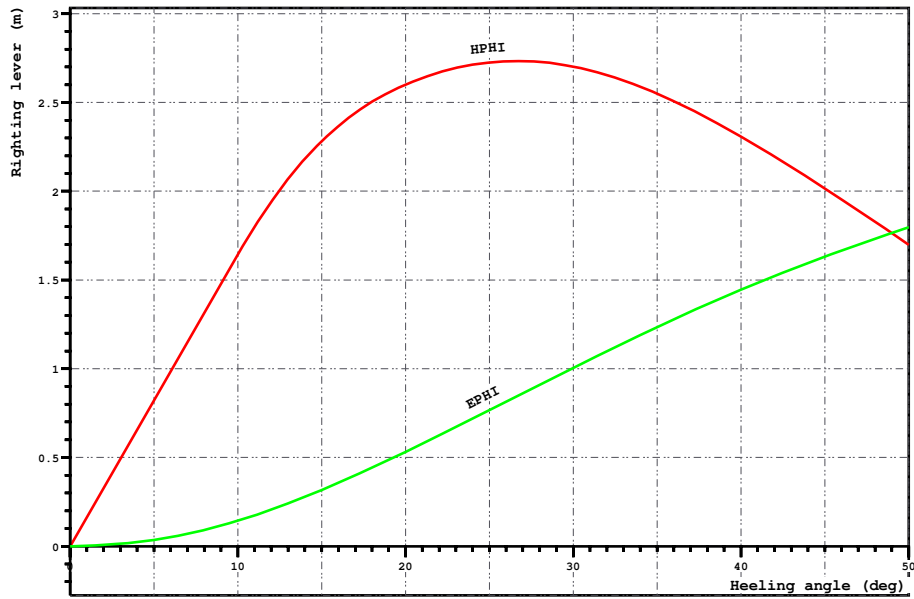
FLOATING POSITION

Draught moulded	1.453 m	KM	13.08 m
Trim	-0.557 m	KG	3.59 m
Heel, PS=+	0.0 deg		
TA	1.670 m	GM0	9.49 m
TF	1.113 m	GMCORR	-0.05 m
Trimming moment	-4153 tonm	GM	9.44 m



Height of the wheelhouse top above waterline: 9.57 m

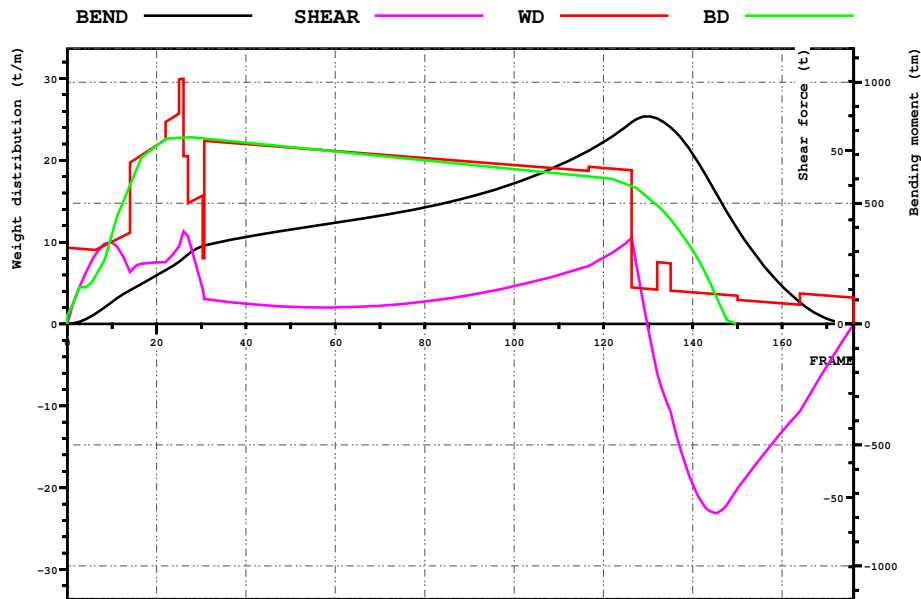
Loading case1 2-MNI_BAL,



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	-0.002	0.82	0.036	7.3	0.005
10.0	0.004	1.64	0.143	14.6	0.009
15.0	-0.161	2.28	0.317	21.7	0.014
20.0	-0.630	2.60	0.532	24.9	0.016
30.0	-2.027	2.70	1.003	26.3	0.017
40.0	-3.777	2.31	1.446	25.3	0.016
50.0	-5.558	1.70	1.797	23.0	0.015

Loading case1 2-MNI_BAL,



LOADING CONDITION 1-LIGHTSHIP

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.33	1.09
6.000	10.00	92	23	10.07	10.99
12.000	20.00	201	18	21.86	21.76
18.000	30.00	320	12	15.58	22.71
24.000	40.00	360	6	21.97	22.17
30.000	50.00	391	5	21.54	21.63
36.000	60.00	419	5	21.12	21.09
42.000	70.00	448	5	20.69	20.55
48.000	80.00	482	6	20.27	20.01
54.000	90.00	525	8	19.84	19.47
60.000	100.00	581	11	19.42	18.93
66.000	110.00	655	14	18.99	18.39
72.000	120.00	752	19	19.07	17.83
78.000	130.00	858	-1	4.30	15.45
84.000	140.00	702	-46	3.88	8.98

M2066/LNG1

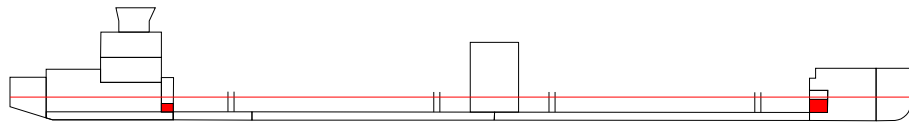
LOADING CONDITION 3-LNG, LNG at 95%

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgy cgz			Free s. moment
Fresh Water, RHO=1.000							
FW	Fresh water	31.8	6.00	14.65	0.00	1.10	82.87
Liquid cargo, RHO=0.450							
R.LNG1	LNG fore PS	269.6	269.62	63.90	3.13	4.64	0.00
R.LNG2	LNG fore SB	269.6	269.62	63.90	-3.13	4.64	0.00
R.LNG3	LNG, aft PS	269.6	269.62	32.10	3.13	4.64	0.00
R.LNG4	LNG, aft SB	269.6	269.62	32.10	-3.13	4.64	0.00
Total of CAL		1078.5	1078.49	48.00	0.00	4.64	0.00
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	19.6	5.00	15.60	0.00	1.21	0.00
DOF	Diesel Oil f.	9.5	6.00	80.10	0.00	1.46	0.00
Total of DO		29.1	11.00	50.78	0.00	1.35	0.00
Deadweight			1095.5	47.85	0.00	4.59	82.9
Lightweight			1553.1	42.69	0.00	3.62	
Displacement (rho=1.000)			2648.6	44.82	0.00	4.02	82.9

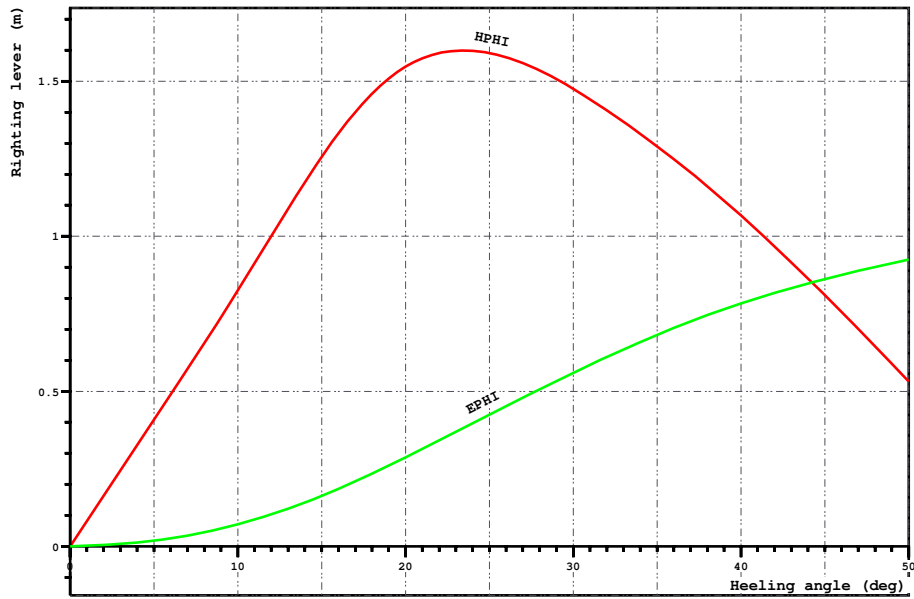
FLOATING POSITION

Draught moulded	2.291 m	KM	8.71 m
Trim	0.100 m	KG	4.02 m
Heel, PS=+	0.0 deg		
TA	2.252 m	GM0	4.69 m
TF	2.353 m	GMCORR	-0.03 m
Trimming moment	783 tonm	GM	4.66 m



Height of the wheelhouse top above waterline: 8.88 m

Loading case1 3-LNG, LNG at 95%

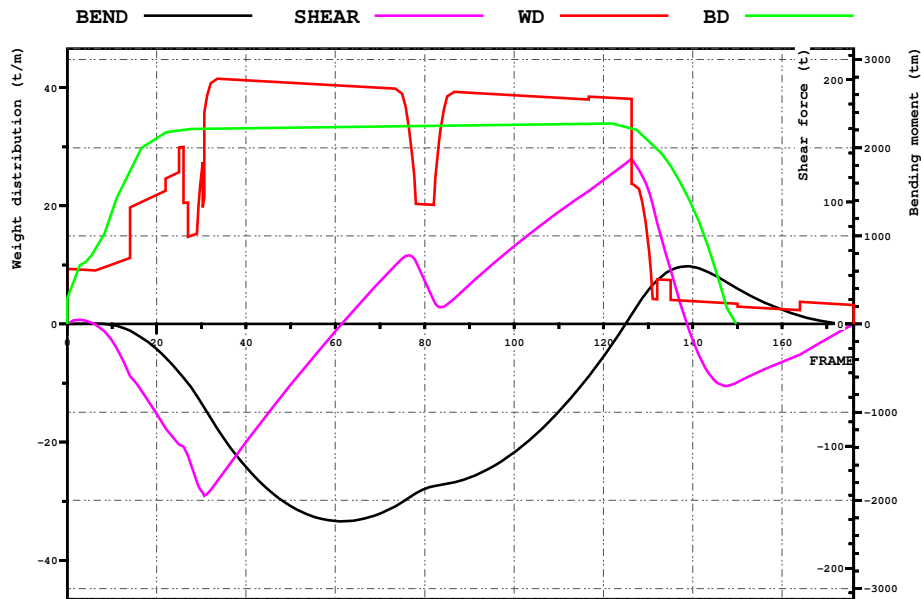


LOADING CONDITION 3-LNG, LNG at 95%

HEEL deg	MS m	HPHI m	EPII mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.002	0.41	0.018	7.3	0.003
10.0	0.016	0.82	0.071	14.6	0.006
15.0	0.052	1.26	0.163	21.7	0.008
20.0	-0.047	1.55	0.287	24.9	0.009
30.0	-0.859	1.48	0.560	26.3	0.010
40.0	-1.938	1.07	0.784	25.3	0.010
50.0	-3.053	0.53	0.925	23.0	0.009

M2066/LNG1

Loading case 3-LNG, LNG at 95%



LOADING CONDITION 3-LNG, LNG at 95%

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.33	4.41
6.000	10.00	-10	-14	10.07	19.03
12.000	20.00	-285	-74	21.86	31.46
18.000	30.00	-894	-137	25.11	33.06
24.000	40.00	-1623	-97	41.26	33.16
30.000	50.00	-2065	-50	40.83	33.26
36.000	60.00	-2234	-6	40.41	33.36
42.000	70.00	-2149	35	39.98	33.45
48.000	80.00	-1871	35	20.27	33.55
54.000	90.00	-1742	32	39.13	33.65
60.000	100.00	-1457	64	38.71	33.74
66.000	110.00	-993	92	38.28	33.84
72.000	120.00	-369	118	38.36	33.92
78.000	130.00	381	110	13.83	31.05
84.000	140.00	648	-13	3.88	19.69

M2066/LNG1

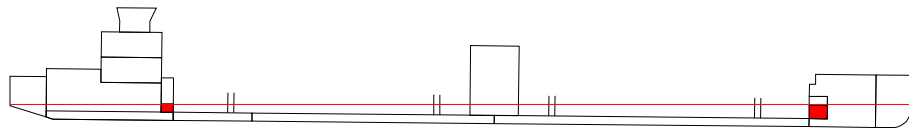
LOADING CONDITION 4-PART_LOAD, Aft tanks empty

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity			Free s. moment
				cgx	cgy	cgz	
Fresh Water, RHO=1.000							
FW	Fresh water	31.8	6.00	14.65	0.00	1.10	82.87
Liquid cargo, RHO=0.450							
R.LNG1	LNG fore PS	269.6	269.62	63.90	3.13	4.64	0.00
R.LNG2	LNG fore SB	269.6	269.62	63.90	-3.13	4.64	0.00
R.LNG3	LNG, aft PS	269.6	5.39	32.10	3.13	2.18	13.22
R.LNG4	LNG, aft SB	269.6	5.39	32.10	-3.13	2.18	13.22
Total of CAL		1078.5	550.03	63.28	0.00	4.59	26.43
Diesel Oil, RHO=0.860							
DOA	Diesel oil a.	19.6	5.00	15.60	0.00	1.21	0.00
DOF	Diesel Oil f.	9.5	6.00	80.10	0.00	1.46	0.00
Total of DO		29.1	11.00	50.78	0.00	1.35	0.00
Deadweight			567.0	62.52	0.00	4.49	109.3
Lightweight			1553.1	42.69	0.00	3.62	
Displacement (rho=1.000)			2120.1	48.00	0.00	3.85	109.3

FLOATING POSITION

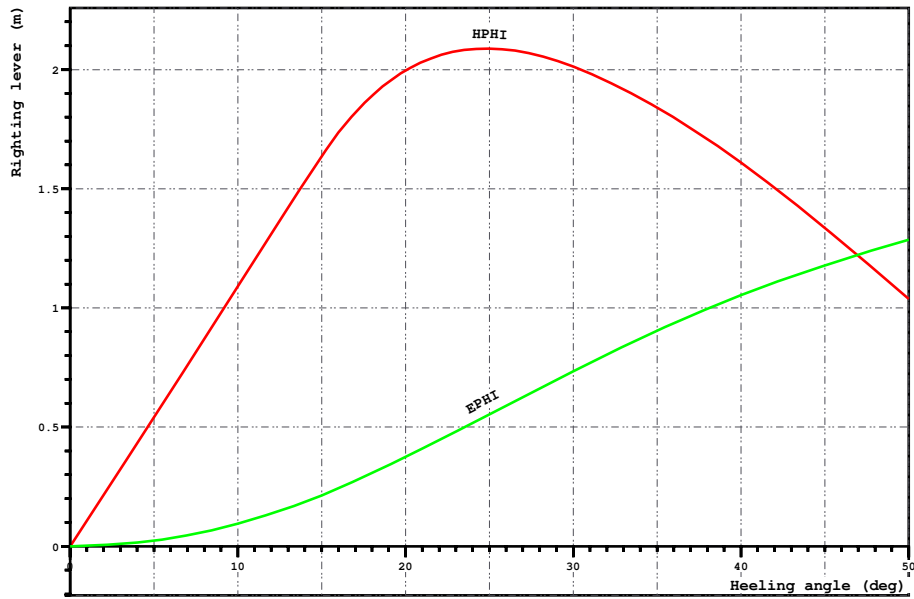
Draught moulded	1.776 m	KM	10.04 m
Trim	0.892 m	KG	3.85 m
Heel, PS=+	0.0 deg		
TA	1.429 m	GM0	6.19 m
TF	2.321 m	GMCORR	-0.05 m
Trimming moment	6491 tonm	GM	6.14 m



Height of the wheelhouse top above waterline: 9.58 m

M2066/LNG1

Loading case 4-PART_LOAD, Aft tanks empty

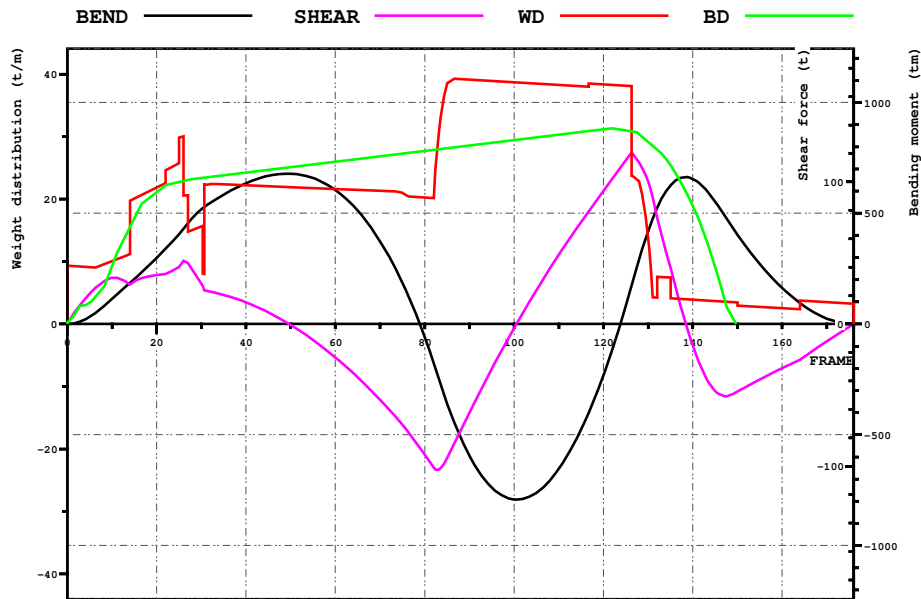


LOADING CONDITION 4-PART_LOAD, Aft tanks empty

HEEL deg	MS m	HPFI m	EPFI mrad	FSMOM tm	DGZ m
0.0	0.000	0.00	0.000	0.0	0.000
5.0	0.005	0.54	0.024	9.6	0.005
10.0	0.024	1.09	0.095	19.2	0.009
15.0	0.048	1.64	0.214	28.6	0.013
20.0	-0.106	2.00	0.375	34.0	0.016
30.0	-1.065	2.01	0.734	39.6	0.019
40.0	-2.351	1.61	1.054	42.4	0.020
50.0	-3.686	1.04	1.286	43.4	0.020

M2066/LNG1

Loading case 4-PART_LOAD, Aft tanks empty



LOADING CONDITION 4-PART_LOAD, Aft tanks empty

X m	FR #	BEND tm	SHEAR t	WD t/m	BD t/m
0.000	0.00	0	0	9.33	0.24
6.000	10.00	113	32	10.07	9.29
12.000	20.00	299	34	21.86	21.06
18.000	30.00	519	28	15.58	23.40
24.000	40.00	636	15	22.21	24.26
30.000	50.00	679	-1	21.90	25.13
36.000	60.00	605	-23	21.60	25.99
42.000	70.00	373	-53	21.32	26.86
48.000	80.00	-61	-92	20.27	27.72
54.000	90.00	-595	-62	39.13	28.59
60.000	100.00	-792	-3	38.71	29.45
66.000	110.00	-654	49	38.28	30.31
72.000	120.00	-229	94	38.36	31.16
78.000	130.00	420	100	13.83	29.17
84.000	140.00	654	-15	3.88	18.91