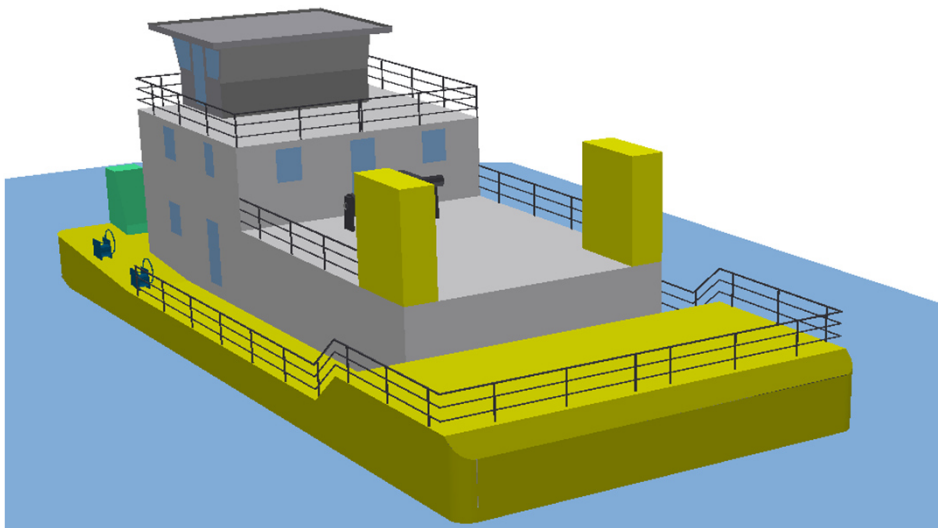
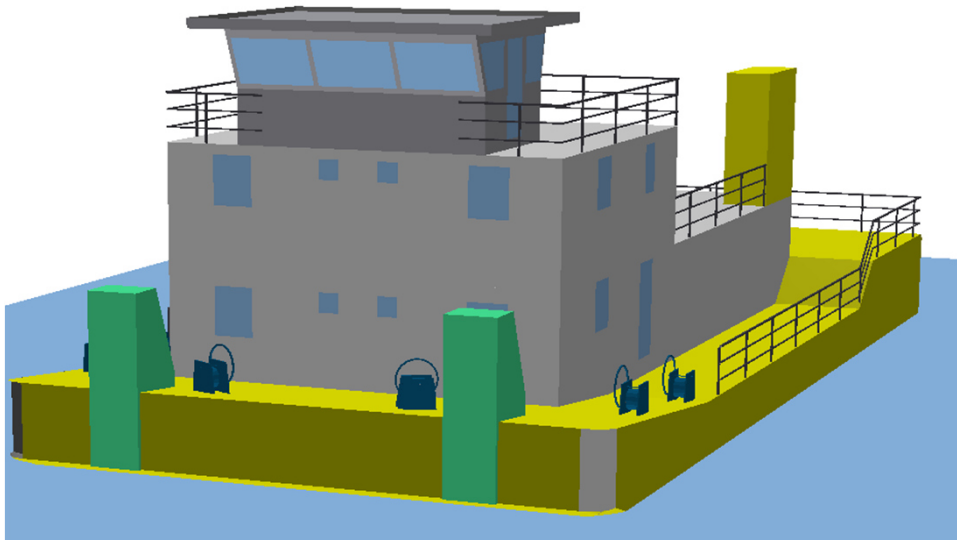


### Push Boat PB



### Main dimensions

Cargo type		Push Boat
Hull type		PB
Length o.A.	L	26,00 m
Breadth moulded	B	12,00 m
Depth Main Deck	D	2,40 m
Draught max.	T	1,60 m
Lightweight estimate		310 t
Payload at Tmax		64 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, from Diamond Harbour (West Bengal) to Allahabad (Uttar Pradesh).  
Main operation sector are reaches upstream of Farakka.

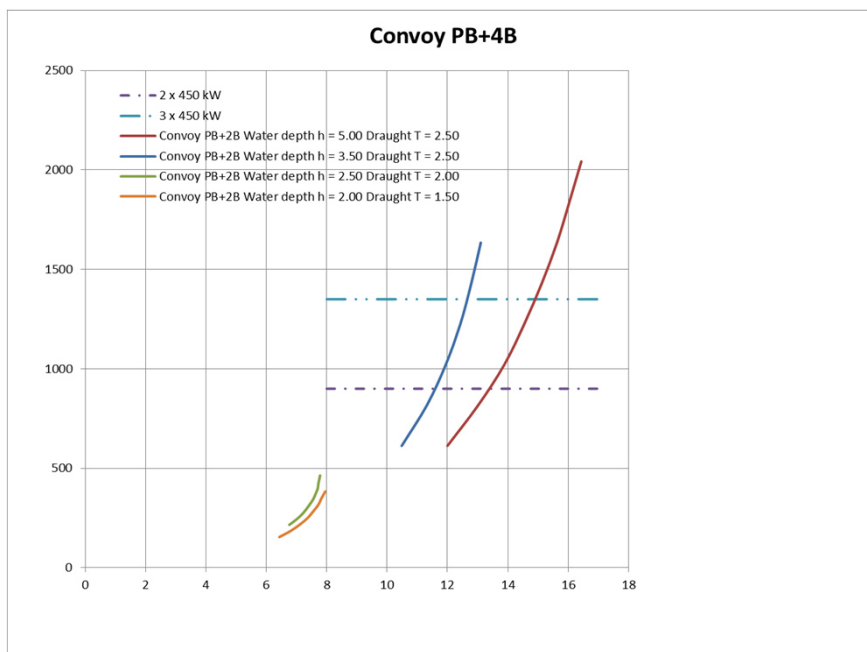
### Powering

Number of Propellers (in nozzles)		3
Propeller diameter	$D_p$	1,45 m
Del. total power	$P_d$	1350 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 with a convoy of 4 barges type DB



### 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.
- Two bow anchors, each 2080 kg
- One stern anchor 1040 kg
- 2 Coupling winches at the bow  
Manually operated, holding force 400 kN each.  
Coupling steel cables with break load of 300 kN, (diameter 26 mm).

### Accommodation

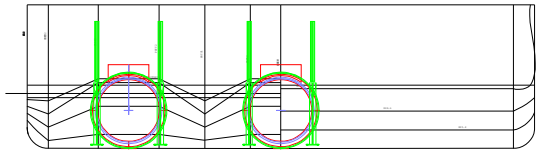
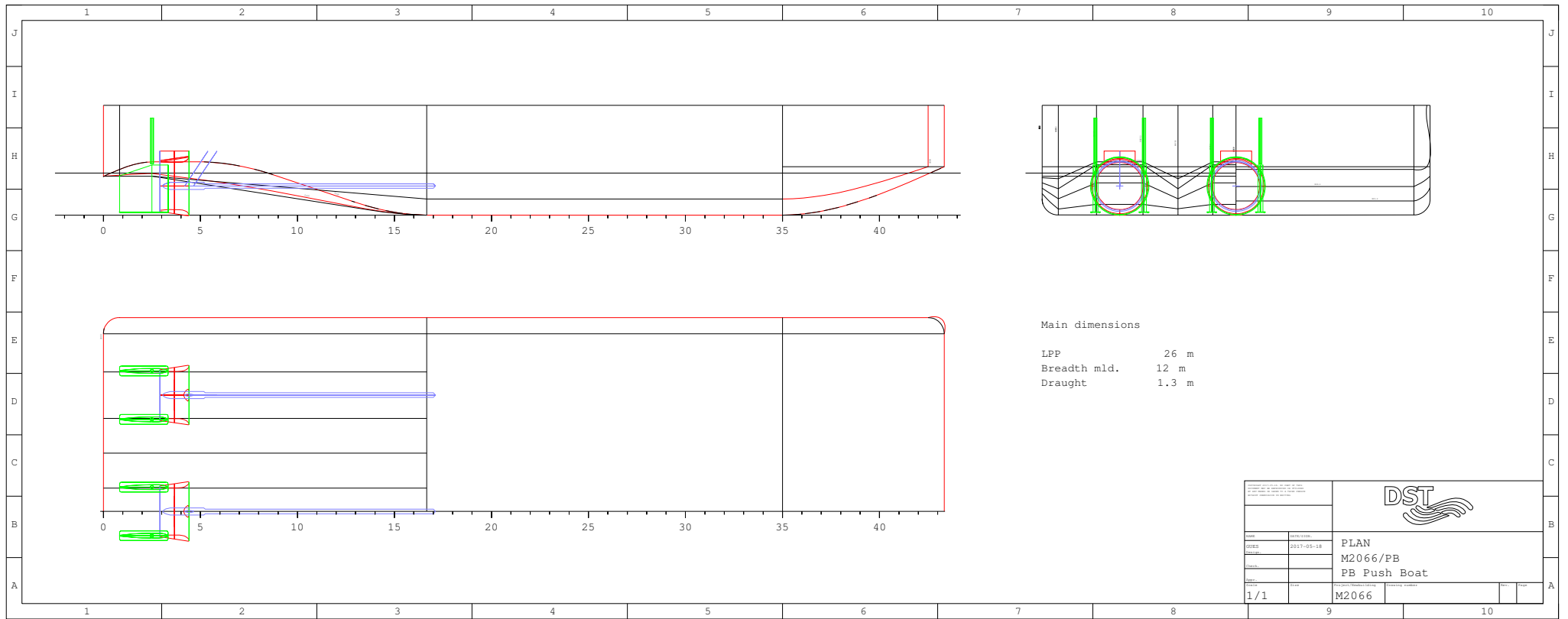
- Accommodation on two decks for crew of max. 12 persons

### Weight calculation results for major components

Steel weight, longt. Framing	244 t
Accommodation	60 t
Machinery & outfitting	60 t
<b>Sum</b>	<b>310 t</b>


### Electric load requirements

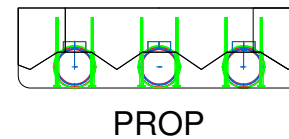
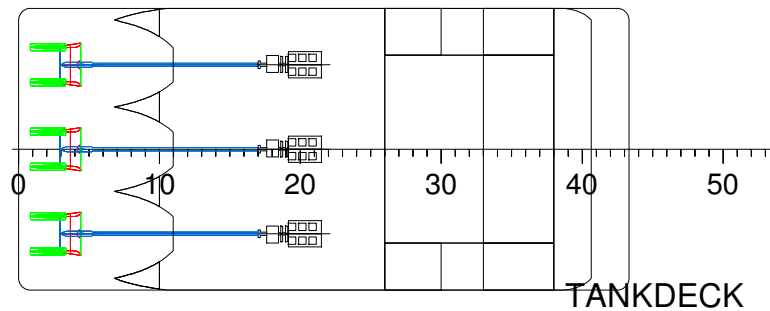
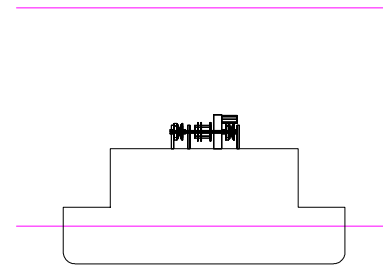
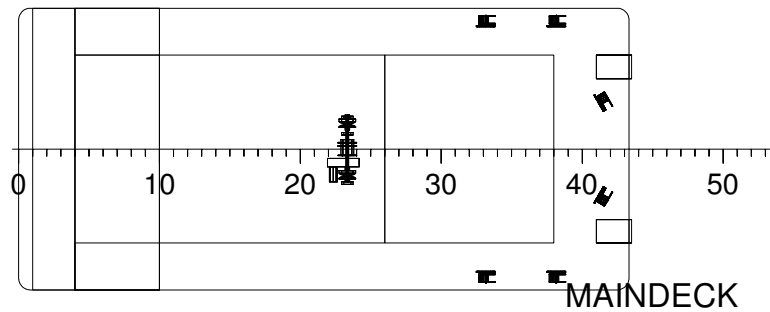
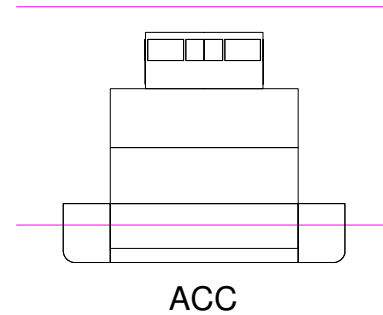
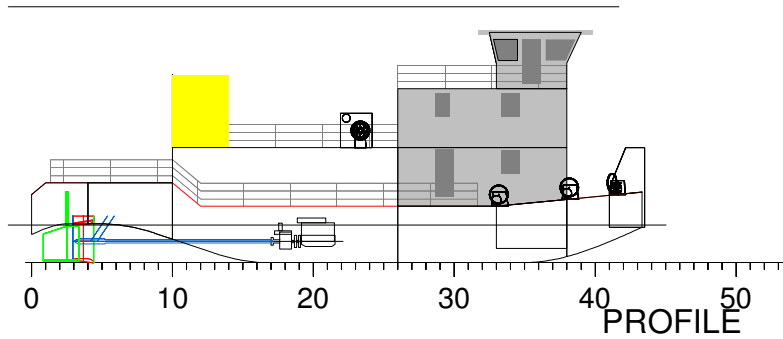
Diesel driven genset, 60 kW output  
 Three-phase AC supply to anchor winches  
 220 V supply to accomadation  
 220 V supply to AC accomodation  
 24 V emergency circuit



Main dimensions


LPP 26 m  
 Breadth mld. 12 m  
 Draught 1.3 m

<small>           1. This drawing is the property of DST            2. It is not to be used for any other purpose            3. It is not to be reproduced or transmitted in any form or by any means            4. It is not to be used for any other purpose         </small>			
Scale:	1:100	PLAN M2066/PB PB Push Boat	
Date:	2017-05-18		
Sheet:			
1/1		M2066	



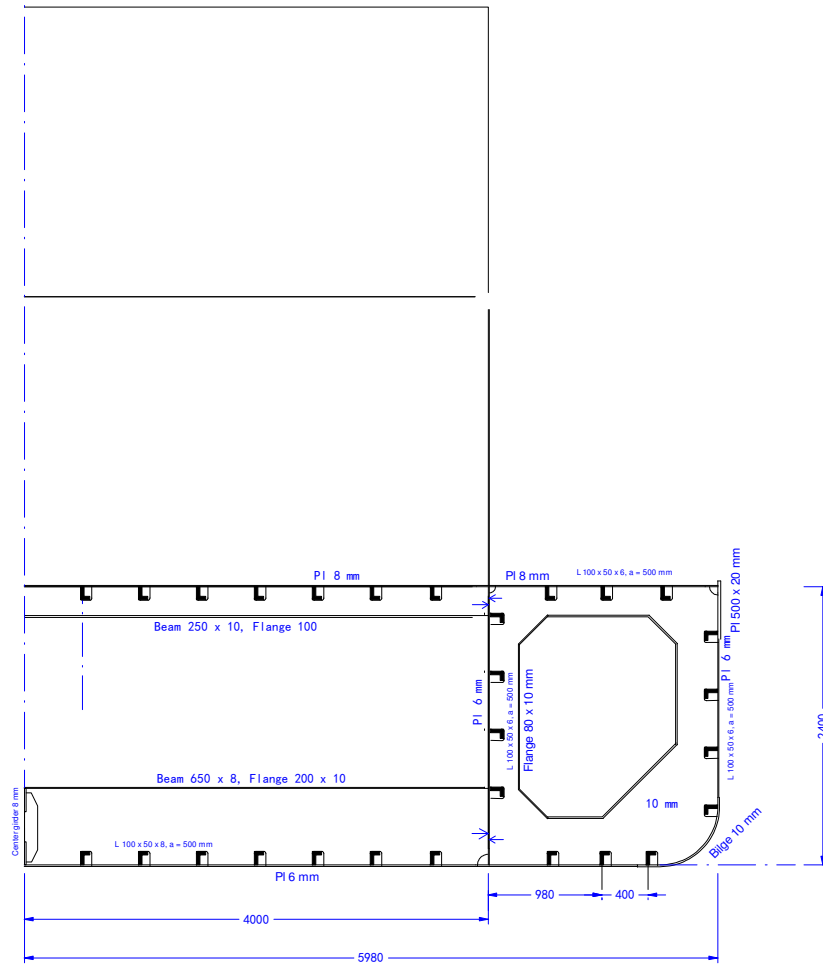
### Main dimensions

Length  $L = 26.0$  m  
 Breadth moulded  $B = 12.0$  m  
 Breadth oA  $BoA = 15.05$  m  
 Draught max  $T = 1.80$  m

<small>Confidentialité des plans de navire          Propriété des plans de navire réservés à l'usage de la DST</small>			
Date: 2017-05-18 Comp: Draw: App: 1/...	Date to sign: 2017-05-18	<b>GENERAL ARRANGEMENT</b> <b>PB</b>	
Project/Modelling: 2017-05-18	Date of printing: 2017-05-18	Page: PB 1	


# Push Boat - Main Frame and Scantling

Frame distance 1800 mm



Main Dimensions  
 Length PP : 26.000 m  
 Breadth moulded : 11.960 m  
 Breadth o. all : 12.000 m  
 Draught design : 1.800 m  
 Navigation Zone 3

Date 18.08.2017

<small>Copyright reserved for the design and construction of the vessel. All rights reserved. No part of this document may be reproduced without the written permission of the designer.</small>			
Title: Push Boat Date: 18.08.2017 Drawn by: [ ] Checked by: [ ] Scale: 1:100		<b>Push Boat Main Section</b>	
Sheet No: 1 Total Sheets: 1		G	1

## PROJECT INFO

L x B = 26.00 x 12 m

### LOADING CASES

Vessel Type: PB

Loading cases:

CASE	DISP t	LOAD t	BUNKER t	CARGO t	T m	TR m	GM m	GMCORR m
1-LIGHT.	310.00	0.00	0.00	0.00	1.444	-0.469	9.405	-0.463
2-DEPAR.	342.36	32.36	32.36	0.00	1.547	-0.008	8.559	-0.419
3-ARRIV.	335.45	25.45	4.18	0.00	1.526	-0.085	8.015	-1.156

M2066/PB

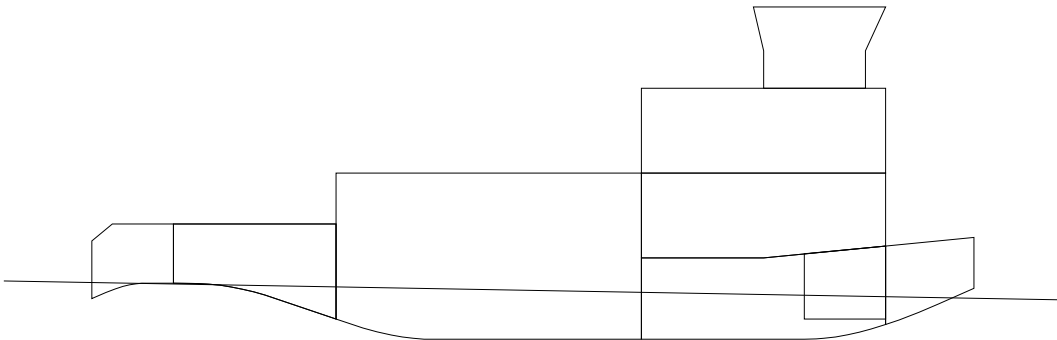
LOADING CONDITION 1-LIGHTSHIP

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgz			Free s. moment
-----							
Diesel Oil, RHO=0.860							
-----							
DO1	stores	31.2	0.00	22.22	0.00	1.62	79.41
Fresh Water, RHO=1.000							
-----							
FW	stores	21.2	0.00	17.40	0.00	1.21	64.09
Deadweight			0.0	0.00	0.00	0.00	143.5
Lightweight			310.0	14.12	0.00	2.59	
Displacement (rho=1.000)			310.0	14.12	0.00	2.59	143.5

FLOATING POSITION

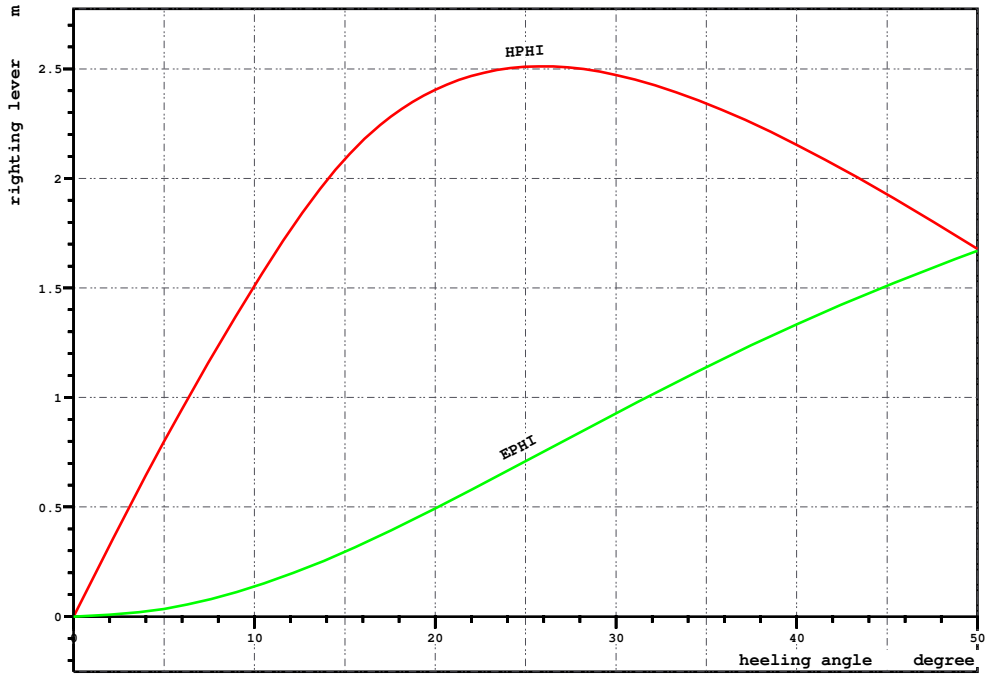
Draught moulded	1.444	m	KM	12.46	m
Trim	-0.469	m	KG	2.59	m
Heel, PS=+	0.0	deg			
TA	1.678	m	GM0	9.87	m
TF	1.209	m	GMCORR	-0.46	m
Trimming moment	-275	tonm	GM	9.40	m





M2066/PB

Loading condition 1-Lightship,

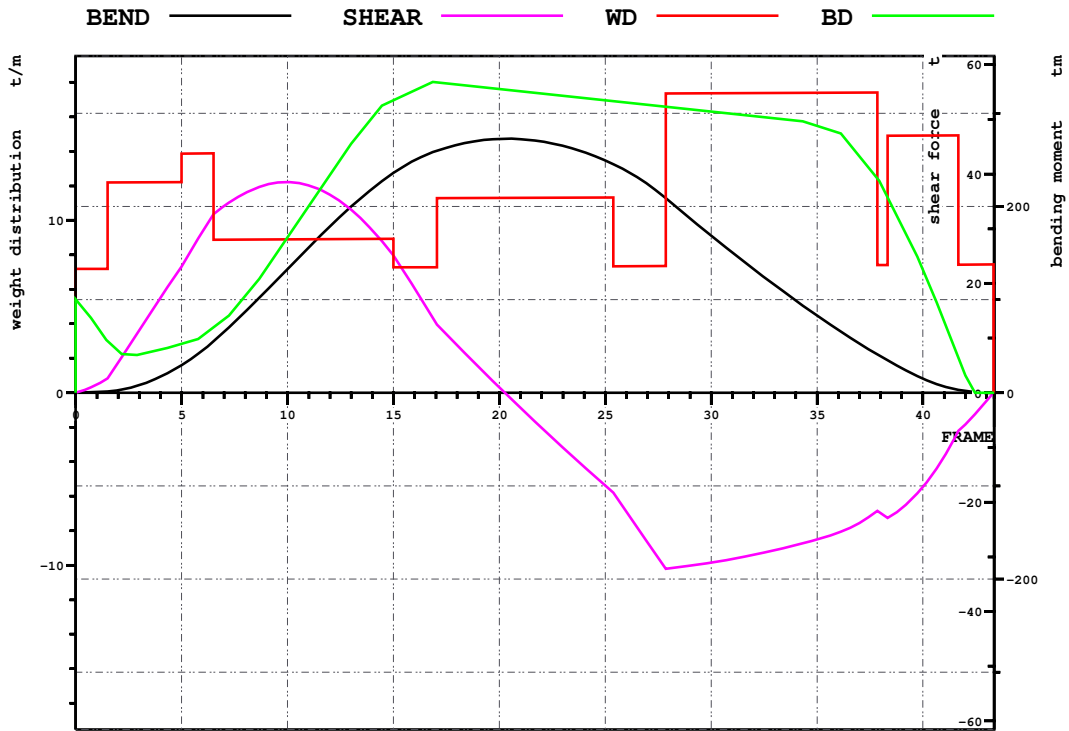


LOADING CONDITION 1-LIGHTSHIP

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	-0.020	0.80	0.035	12.6	0.040
10.0	-0.121	1.51	0.137	25.3	0.082
15.0	-0.347	2.09	0.295	36.9	0.119
20.0	-0.831	2.40	0.493	43.2	0.139
30.0	-2.313	2.47	0.927	46.1	0.149
40.0	-4.045	2.15	1.334	44.5	0.144
50.0	-5.749	1.68	1.670	40.7	0.131

M2066/PB

Loading condition 1-Lightship,



LOADING CONDITION 1-LIGHTSHIP

			X	Frame
Shear force (min)	-32.2 t	(-)	16.713 m	27.86
Shear force (max)	38.5 t	(-)	5.983 m	9.97
Sagging moment	-			
Hogging moment	272.7 tm	(-)	12.342 m	20.57

M2066/PB

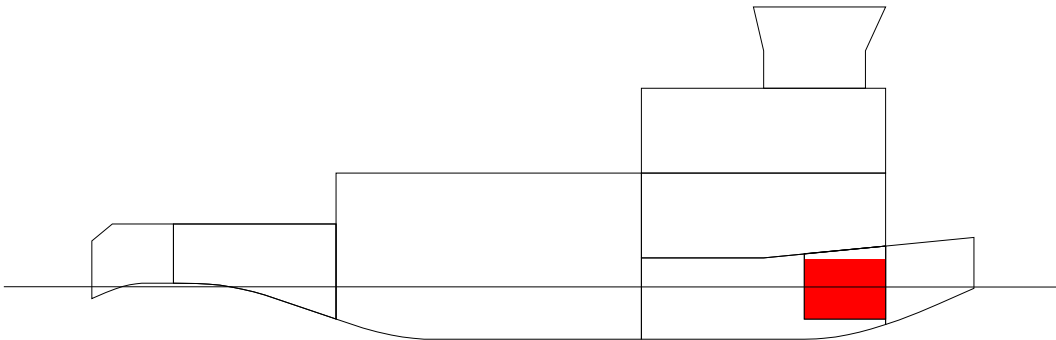
LOADING CONDITION 2-DEPARTURE, Departure

LOADING COMPONENTS

Name		Max. weight	Mass	Center of gravity cgx cgz			Free s. moment
-----							
Diesel Oil, RHO=0.860							
-----							
DO1	stores	31.2	28.12	22.20	0.00	1.47	79.41
Fresh Water, RHO=1.000							
-----							
FW	stores	21.2	4.24	17.40	0.00	0.25	64.09
Deadweight			32.4	21.57	0.00	1.31	143.5
Lightweight			310.0	14.12	0.00	2.59	
Displacement (rho=1.000)			342.4	14.83	0.00	2.47	143.5

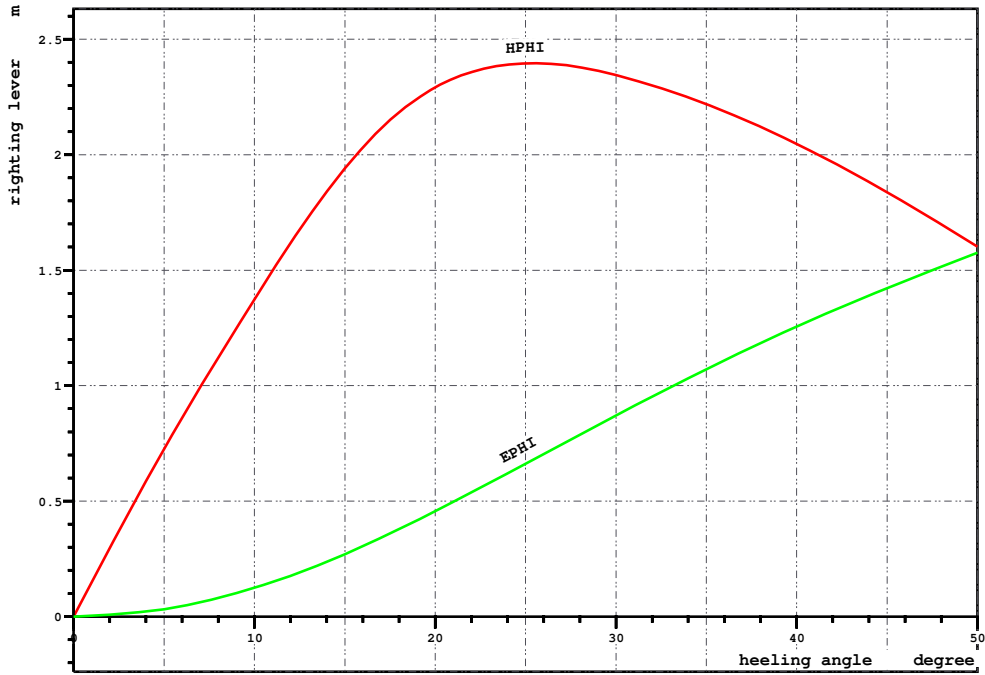
FLOATING POSITION

Draught moulded	1.547	m	KM	11.45	m
Trim	-0.008	m	KG	2.47	m
Heel, PS=+	0.0	deg			
TA	1.551	m	GM0	8.98	m
TF	1.543	m	GMCORR	-0.42	m
Trimming moment	-5	tonm	GM	8.56	m



M2066/PB

Loading condition 2-DEPARTURE, Departure

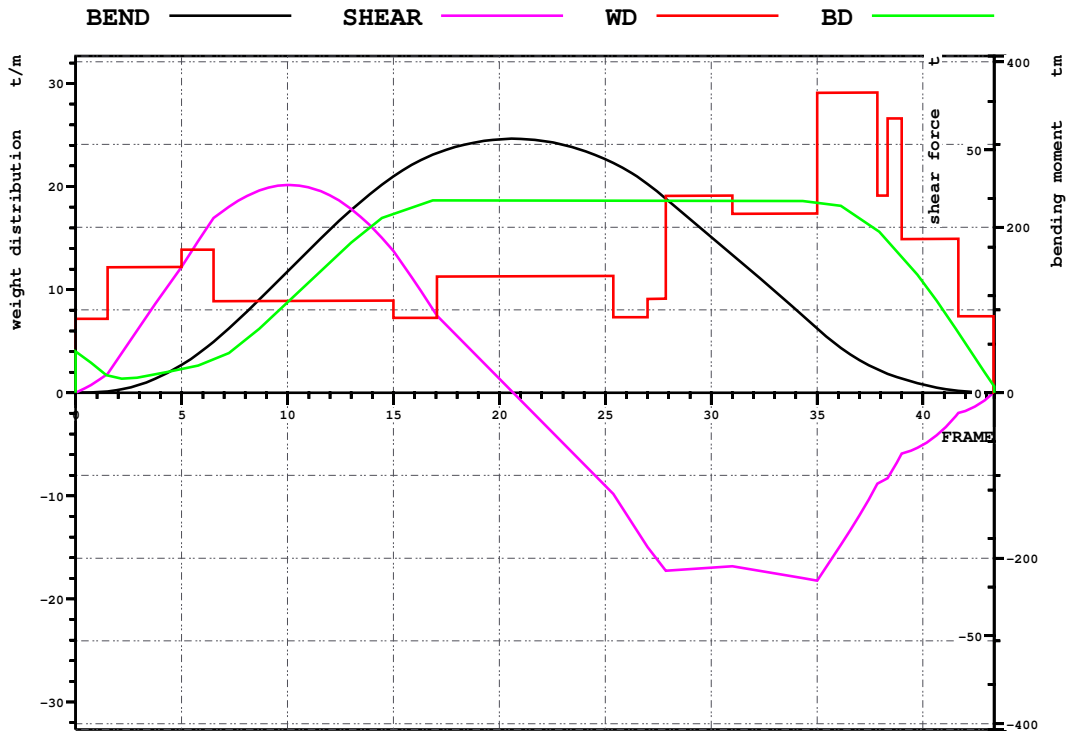


LOADING CONDITION 2-DEPARTURE, Departure

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	-0.020	0.73	0.032	12.6	0.037
10.0	-0.111	1.37	0.124	25.3	0.074
15.0	-0.274	1.94	0.270	36.9	0.108
20.0	-0.653	2.29	0.457	43.2	0.126
30.0	-2.009	2.35	0.870	46.1	0.135
40.0	-3.594	2.05	1.256	44.5	0.130
50.0	-5.156	1.60	1.576	40.7	0.119

M2066/PB

Loading condition 2-DEPARTURE, Departure



LOADING CONDITION 2-DEPARTURE, Departure

			X	Frame
Shear force (min)	-38.6 t	(-)	21.000 m	35.00
Shear force (max)	42.8 t	(-)	6.070 m	10.12
Sagging moment	-			
Hogging moment	306.9 tm	(-)	12.342 m	20.57

M2066/PB

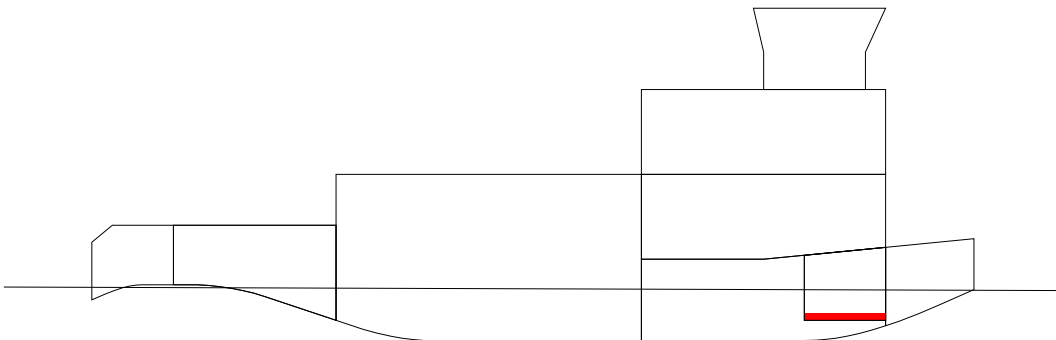
LOADING CONDITION 3-ARRIVAL, Arrival

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
-----							
Ballast Water, RHO=1.025							
-----							
BW_F	stores	23.6	21.26	22.16	0.00	1.28	244.29
Diesel Oil, RHO=0.860							
-----							
DOI	stores	31.2	3.12	22.20	0.00	0.70	79.41
Fresh Water, RHO=1.000							
-----							
FW	stores	21.2	1.06	17.40	0.00	0.07	64.09
Deadweight			25.4	21.97	0.00	1.16	387.8
Lightweight			310.0	14.12	0.00	2.59	
Displacement (rho=1.000)			335.4	14.72	0.00	2.48	387.8

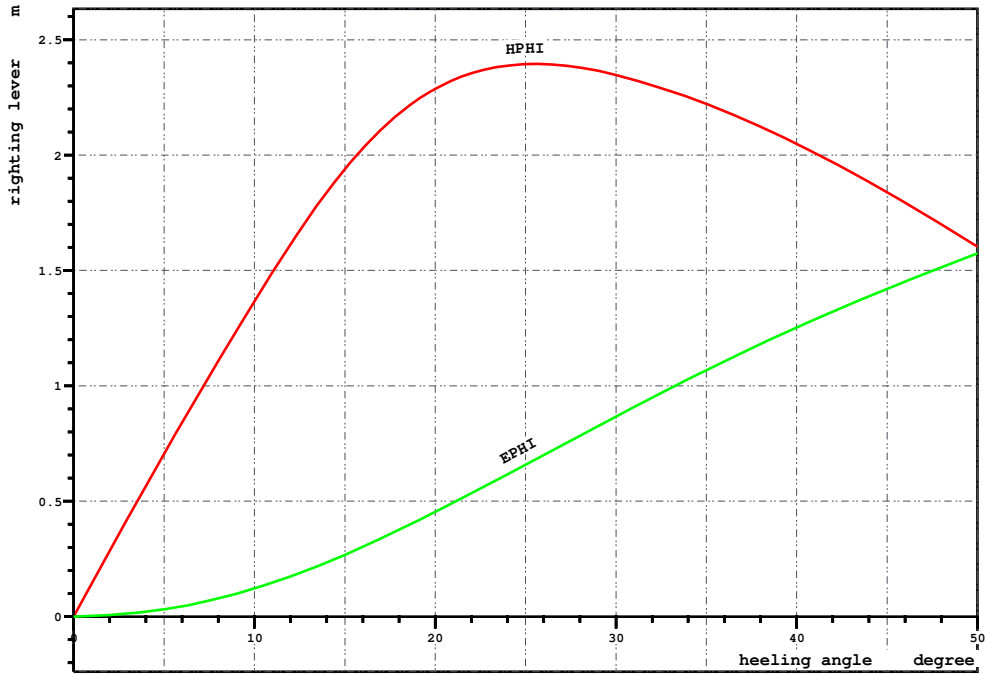
FLOATING POSITION

Draught moulded	1.526	m	KM	11.66	m
Trim	-0.085	m	KG	2.48	m
Heel, PS=+	0.0	deg			
TA	1.568	m	GM0	9.17	m
TF	1.483	m	GMCORR	-1.16	m
Trimming moment	-50	tonm	GM	8.01	m



M2066/PB

Loading condition 3-ARRIVAL, Arrival

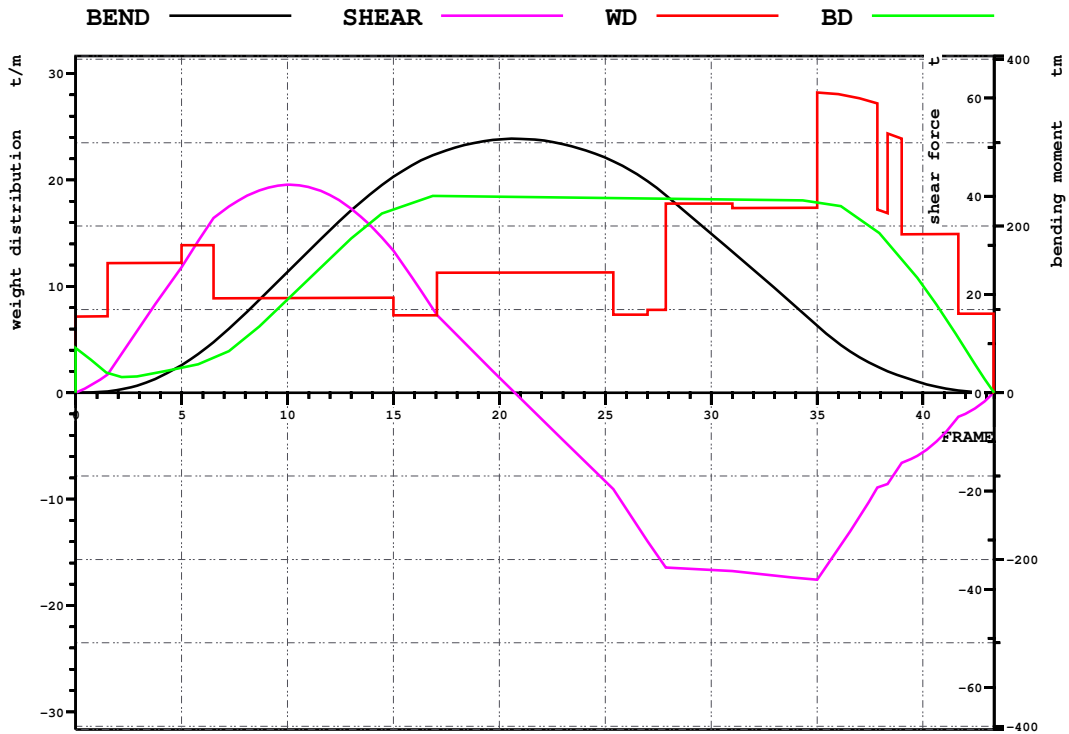


LOADING CONDITION 3-ARRIVAL, Arrival

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	-0.021	0.71	0.031	24.5	0.073
10.0	-0.115	1.37	0.122	37.3	0.111
15.0	-0.289	1.94	0.267	48.8	0.146
20.0	-0.686	2.29	0.453	55.0	0.164
30.0	-2.067	2.35	0.867	57.4	0.171
40.0	-3.683	2.05	1.253	54.9	0.164
50.0	-5.274	1.60	1.573	49.8	0.149

M2066/PB

Loading condition 3-ARRIVAL, Arrival



LOADING CONDITION 3-ARRIVAL, Arrival

			X	Frame
Shear force (min)	-38.1 t	(-)	21.000 m	35.00
Shear force (max)	42.3 t	(-)	6.070 m	10.12
Sagging moment	-			
Hogging moment	304.7 tm	(-)	12.342 m	20.57