HUNTER WHARF & BARGE

GREY PONTOON BARGE

UVI 433722

Stability Report for Operations in Sheltered Waters Areas E and D

LNA 19027-035-01-0

2019-11-07

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Rev.			
PRE 2019-09-24		Original release	JCK
0 2019-11-07		Minor text revisions, appendices 1 & 2 added	JCK

1 PRINCIPAL PARTICULARS

Vessel Name	*Grey Barge*
Operator	Hunter Wharf & Barge
Unique vessel identifier	433722
HIN AUWW	158909HH9
Length overall, m	16.848
Amidships, m	8.424
Waterline Length, m	16.848
Pontoon Depth, m	1.500
Pontoon Beam, m	3.850
Beam Barge, mld, m	9.000
Side & Bottom Plate, mm	10
Deck Plate, mm	12
Longitudinal Stiffener spacing, mm	600
Frame spacing	1892 mm throughout
Watertight Bulkheads	Frames #3 and #6
Maximum speed, knots	Dumb Barge
Number of crew	5
Operational Category	2E (2D Transit)
Limiting Excavator used in analysis	Komatsu PC228US-LC-8, 2.925 m arm, 600 mm shoes

2 NOTES TO THE OPERATOR

2.1 Purpose of booklet

The purpose of this booklet is to provide guidance for the safe operations of a mobile tracked excavator with counterweight fulfilling various transport and construction duties.

When operating the excavator, tracks are not permitted closer than 1 metre measured from the edge of the barge and a minimum freeboard of 50 mm must be maintained. Refer to 2.2 Table of lifting capacities for the Komatsu PC228US-LC-8 <u>when operated onboard the barge</u>. This table replaces the lifting capacity table for the excavator in the machine manual in this situation.

While the barge with excavator may transit in partially smooth waters area D, it is strongly recommended that the excavator should only be operated in an unsecured manner in smooth waters Area E as dynamic forces of waves and swell have not been considered. 'Pick and shift' is not permitted at any time. Vessel to be upright - zero heel, prior to commencement of machine operations.

Excavator to be secured during transit area D.

2.2 Table of Lifting Capacities PC228US-LC-8

Load radius from crane centreline, m															
	3.00		4.60			6.10			7.60						
Load point height from deck, m	LOS, t	LOE, t	LOS, t	LOE, t	LOEE, t	LOS, t	LOE, t	LOEE, t	LOS, t	LOE, t	LOEE, t	LOS, t	LOE, t	LOEE, t	Max Radius
6.10						4.22	5.23	4.85							
4.60			4.82	6.45	5.48	4.07	5.07	4.92	3.47	3.47	4.43				
3.00	5.90 7	.43	4.90	6.52	5.60	4.15	4.84	5.00	3.36	3.36	4.50				
0.00	**5.54***	**5.54***	5.00	6.75	5.75	4.30	4.43	5.15	3.15	3.15	4.64	2.73	2.73	**3.80***	8.30
-3.00	6.37	7.93	5.25	6.70	6.00			5.33							
-4.60	6.50	8.09	5.35	6.88	6.05										

LOS	Load over side of barge & load over side of crane (tracks longitudinal)
LOE	Load over end of barge & load over side of crane (tracks transverse)
LOEE	Load over end of barge & load over front of crane (tracks longitudinal)
BOLD*	load limited by hydraulic capacity
t	1000 kg

2.3 Stability booklet to be kept on vessel

A complete and legible copy of this stability booklet must always be kept on board the vessel . If this book should be lost, or become illegible, a replacement copy must be obtained as soon as possible.

2.4 Notice to operator

The loading conditions shown in this book are typical for the intended service of the vessel. Compliance with the stability criteria shown does not ensure immunity against capsizing, regardless of the circumstances, nor absolve the operator from his or her responsibility with the safety of the vessel and crew. The operator must exercise and use good seamanship, having regard to the weather and navigational zone.

2.5 Aspects of loading

The following matters have been considered when making up the loading conditions:

Barge particulars:

a) Spuds are assumed to be <u>down</u> while excavator is operating
b) Spuds are assumed to be <u>up</u> while barge is transiting

Excavator particulars

For the purpose of loading condition calculations, the following excavator particulars have been used:

a)	Total mass of excavator	PC228US-LC-8	22.830 t;
b)	Mass of counterweight	PC228US-LC-8	6.060 t
c)	Length of arm	PC228US-LC-8	2.925 m

d) A range of loads have been investigated – refer to Table for lifting capacities, load radius and load height limits
e) The excavator tracks have been positioned both
   i. parallel to the longitudinal axis with outboard track 1 metre from side deck edge, front of tracks 1 metre from end deck edge;
   ii. perpendicular to the longitudinal axis with outboard track 1 metre from end deck edge, front of tracks 1 metre from side deck edge;
f) Load on excavator has been considered over side of barge perpendicular to tracks[1], over end of barge perpendicular to tracks and over end of barge parallel to tracks (over front of excavator)
g) When barge is transiting the excavator is assumed to be on the centre line and close to amidships, so barge is upright and has minimum trim;

Loading conditions have been produced with 5 Crew aboard. Each crew is assumed to weigh 100 kg. Various additional pieces of equipment are included. Summary tables of these conditions are shown in

[1] Note1: the lifting moment causes maximum heel when the excavator is so positioned

Appendix 1 and particular examples are shown in Appendix 2.

2.6 Summary

The operator of the vessel is to ensure that the weight of equipment is not in excess of, and its location not significantly higher above the deck than what is shown in the loading conditions in this report.

When operating the mobile excavator, tracks are not permitted closer than 1 metre measured from the edge of the barge and a minimum freeboard of 50 mm must be maintained. Loads are not to exceed those of the relevant lifting capacities table.

Vessel to be upright - zero heel, prior to commencement of machine operations.

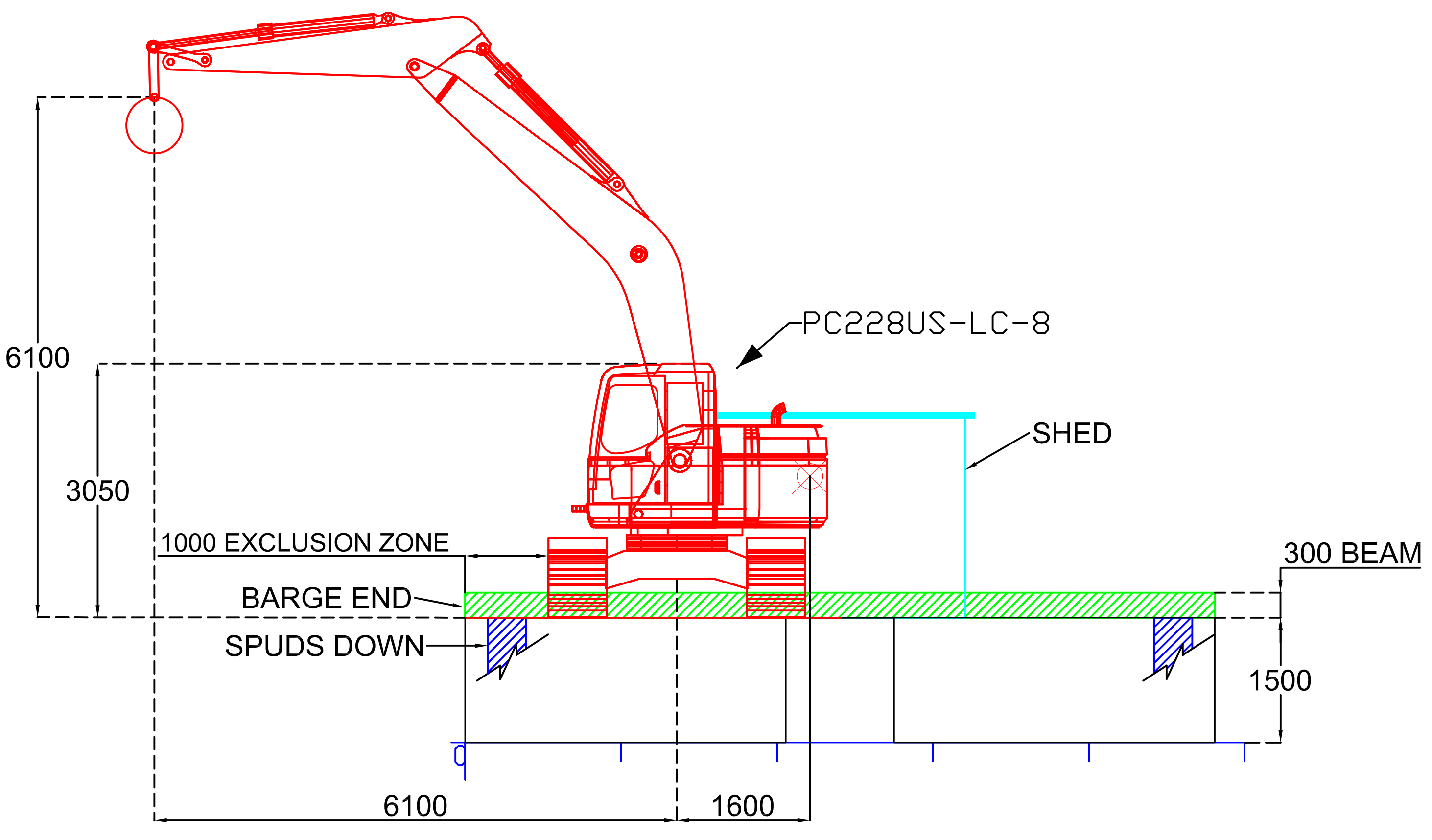
Voids are to be kept dry. Loose water will create a free surface which will adversely affect the stability during lifting operations.

3 PC228US-LC-8 Operating Sketches

SK01 shows the PC228US-LC-8 at a load radius of 6.1 m for load height 6.1 m above deck tracks longitudinal and load over side of barge and over side of excavator. Lifting capacity in this situation is 4.22-ton load on hook, Ref 2.2 Table.

SK02 shows the machine at load radius of 8.3 m with load about deck height. Lifting capacity in this situation is 2.73-ton load on hook, Ref 2.2 Table.

The load capacity is assumed to be the sum of the weight of any attachment plus the weight lifted e.g. rock grab plus rocks.



BARGE STABILITY END ELEVATION (OPERATING)

CLIENT:
HWB

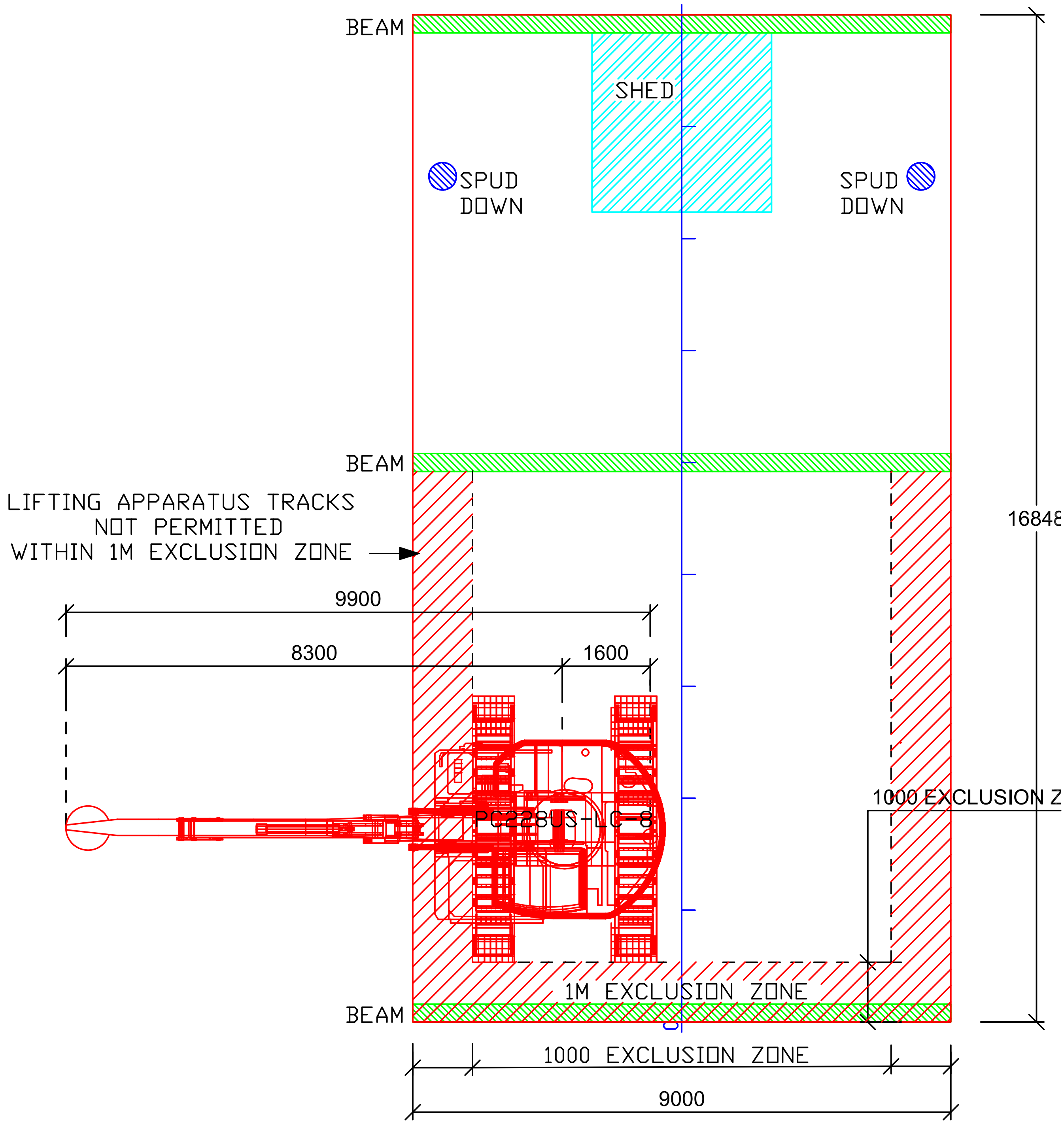
HWB GREY PONTOON BARGE

LIFTING OPERATIONS

19027-SK01

SCALE
NTS

LIGHTNING
NAVAL ARCHITECTURE



BARGE STABILITY PLAN (OPERATING)

CLIENT: HWB

HWB GREY PONTOON BARGE

LIFTING OPERATIONS

19027-SK02

SCALE NTS

LIGHTNING NAVAL ARCHITECTURE

4 STABILITY CRITERIA

This vessel's stability during operations has been compared with the criteria as set out in Part C Section 6 Subsection 6A Chapter 6E & F of the National Standard for Commercial Vessels. Some additional criteria have been added to minimise operational risk.

The stability will be considered satisfactory if the following criteria are met during operations:

1) Residual Area between righting lever (GZ) and heeling lever curve up to the maximum residual GZ shall be not less than 0.0533 metre-radians (3.05 metre-degrees)[2] Ref. 6E.2b;
2) Angle of heel from lifting (or other operations) shall not exceed 5 degrees Ref. 6E.3;
3) Minimum freeboard during operations shall be greater than 50 mm;
4) Metacentric height GM shall be greater than 1.0 m;
5) The range of stability shall be greater than 20 degrees;
6) Area above righting lever without load and below the counterweight moment curve up to the point of vanishing stability shall be greater than the area below the righting lever curve with load released up to the steady angle of heel before the load was released. Ref 6F.1b[3]

During transit:

7) The barge must not heel more than an angle equivalent to the loss of one half the initial freeboard or 5 degrees whichever is less when subject to a wind pressure of 360 Pa (Area D Partially Smooth)
8) Criterion 1 – 5 above with wind heeling moment replacing load heeling moment where applicable and minimum freeboard during transit of 200 mm required.

5 LIGHTWEIGHT PARTICULARS

Lightweight particulars of the barge were determined by calculation. The calculation is appended to this report, Refer Appendix 4.

The site shed is included in the lightweight

The Lightship Particulars as calculated are used in the loading conditions:

Lightship Weight:	52.01 Tonnes
LCG, forward of frame #0	8.606 metres
VCG, above Base Line:	1.096 metres

[2] Angle of down-flooding to be not less than 40 degrees Ref. 6E.1 – as there are no down-flooding openings this criterion is not relevant.

[3] Compliance with this criterion is demonstrated for maximum lift-height load case LC11.61.

6 HEELING MOMENTS

Heeling moments from Load on Hook with excavator on exclusion zone boundary have been calculated for all operating loading conditions. Heeling moments for Wind Heeling have been calculated for the transit conditions. The angles of heel are shown in Appendix 1 for each condition.

6.1 Load on Hook Heeling Moment

The Komatsu load chart for the PC228US-LC-8 was used as the base figures for load on hook. The maximum permitted load from those tables was then reduced where necessary to just satisfy the stability criteria.

Limiting heel angle to less than 5 degrees or maintaining the minimum freeboard to 50 mm during operations are the limiting stability criteria in all operational conditions examined. The minimum freeboard is calculated along the length of the vessel.

6.2 Wind Heeling Moment

The calculation has been undertaken in accordance with NSCV Subsection 6A Annex B of the Intact Stability Requirements. Appendix 3 illustrates the wind profile area and lever. The sketch shows the wind profile at light transit draught.

Appendix 1 Loading Conditions Summary Table

LIGHTNING NAVAL ARCHITECTURE

CASE	DESCRIPTION	DISP	LOAD	LIFT	T	TR	HEEL	GM
		tons	tons	tons	metres	metres	degrees	metres
LC05.3	PC228 LONGL - LIFT OVER SIDE 4.6M BELOW DECK	93.989	41.98	6.50	0.692	0.855	4.123	10.248
LC05.4	PC228 LONGL - LIFT OVER SIDE 4.6M BELOW DECK	92.839	40.83	5.35	0.684	0.824	4.452	10.324
LC06.3	PC228 LONGL - LIFT OVER SIDE 3M BELOW DECK	93.859	41.85	6.37	0.691	0.855	4.135	10.136
LC06.4	PC228 LONGL - LIFT OVER SIDE 3M BELOW DECK	92.739	40.73	5.25	0.683	0.824	4.460	10.228
LC08.3	PC228 LONGL - LIFT OVER SIDE DECK LEVEL	93.029	41.02	5.54	0.685	0.837	3.975	10.003
LC08.4	PC228 LONGL - LIFT OVER SIDE DECK LEVEL	92.489	40.48	5.00	0.681	0.821	4.444	10.064
LC08.6	PC228 LONGL - LIFT OVER SIDE DECK LEVEL	91.789	39.78	4.30	0.675	0.801	4.692	10.144
LC08.7	PC228 LONGL - LIFT OVER SIDE DECK LEVEL	90.639	38.63	3.15	0.667	0.768	4.544	10.279
LC08.8	PC228 LONGL - LIFT OVER SIDE DECK LEVEL	90.219	38.21	2.73	0.664	0.756	4.476	10.329
LC09.3	PC228 LONGL - LIFT OVER SIDE 3M ABOVE DECK	93.389	41.38	5.90	0.688	0.853	4.174	9.751
LC09.4	PC228 LONGL - LIFT OVER SIDE 3M ABOVE DECK	92.389	40.38	4.90	0.680	0.823	4.484	9.893
LC09.6	PC228 LONGL - LIFT OVER SIDE 3M ABOVE DECK	91.639	39.63	4.15	0.674	0.801	4.691	10.003
LC09.7	PC228 LONGL - LIFT OVER SIDE 3M ABOVE DECK	90.849	38.84	3.36	0.668	0.777	4.731	10.120
LC10.4	PC228 LONGL - LIFT OVER SIDE 4.6M ABOVE DECK	92.309	40.30	4.82	0.679	0.823	4.494	9.809
LC10.6	PC228 LONGL - LIFT OVER SIDE 4.6M ABOVE DECK	91.559	39.55	4.07	0.674	0.800	4.714	9.931
LC10.7	PC228 LONGL - LIFT OVER SIDE 4.6M ABOVE DECK	90.959	38.95	3.47	0.669	0.782	4.834	10.030
LC11.6	PC228 LONGL - LIFT OVER SIDE 6.1M ABOVE DECK	91.709	39.70	4.22	0.675	0.807	4.637	9.825
LC105.3	PC228 TRV - LIFT OVER END 4.6M BELOW DECK	95.579	43.57	8.09	0.705	1.120	2.324	10.181
LC105.4	PC228 TRV - LIFT OVER END 4.6M BELOW DECK	94.369	42.36	6.88	0.696	1.136	2.244	10.266
LC106.3	PC228 TRV - LIFT OVER END 3M BELOW DECK	95.419	43.41	7.93	0.704	1.117	2.347	10.046
LC106.4	PC228 TRV - LIFT OVER END 3M BELOW DECK	94.189	42.18	6.70	0.695	1.130	2.260	10.151
LC108.3	PC228 TRV - LIFT OVER END DECK LEVEL	93.029	41.02	5.54	0.686	1.009	2.223	10.028
LC108.4	PC228 TRV - LIFT OVER END DECK LEVEL	94.239	42.23	6.75	0.695	1.142	2.318	9.911
LC108.6	PC228 TRV - LIFT OVER END DECK LEVEL	91.919	39.91	4.43	0.678	1.056	2.133	10.167
LC108.7	PC228 TRV - LIFT OVER END DECK LEVEL	90.639	38.63	3.15	0.669	1.009	2.032	10.314

CASE	DESCRIPTION	DISP	LOAD	LIFT	T	TR	HEEL	GM
		tons	tons	tons	metres	metres	degrees	metres
LC108.8	PC228 TRV - LIFT OVER END DECK LEVEL	90.219	38.21	2.73	0.665	0.994	1.999	10.363
LC109.3	PC228 TRV - LIFT OVER END 3M ABOVE DECK	94.919	42.91	7.43	0.700	1.111	2.436	9.572
LC109.4	PC228 TRV - LIFT OVER END 3M ABOVE DECK	94.009	42.00	6.52	0.694	1.136	2.355	9.705
LC109.6	PC228 TRV - LIFT OVER END 3M ABOVE DECK	92.329	40.32	4.84	0.681	1.089	2.205	9.943
LC109.7	PC228 TRV - LIFT OVER END 3M ABOVE DECK	90.849	38.84	3.36	0.670	1.029	2.075	10.157
LC110.4	PC228 TRV - LIFT OVER END 4.6M ABOVE DECK	93.939	41.93	6.45	0.693	1.137	2.378	9.593
LC110.6	PC228 TRV - LIFT OVER END 4.6M ABOVE DECK	92.559	40.55	5.07	0.683	1.108	2.248	9.812
LC110.7	PC228 TRV - LIFT OVER END 4.6M ABOVE DECK	90.959	38.95	3.47	0.671	1.042	2.100	10.068
LC111.6	PC228 TRV - LIFT OVER END 6.1M ABOVE DECK	92.719	40.71	5.23	0.684	1.122	2.285	9.692
LC205.4	PC228 LONGL - LIFTOVER END 4.6M BELOW DECK	93.539	41.53	6.05	0.690	0.981	3.365	10.297
LC206.4	PC228 LONGL - LIFTOVER END 3M BELOW DECK	93.489	41.48	6.00	0.689	0.981	3.398	10.186
LC206.5	PC228 LONGL - LIFTOVER END 3M BELOW DECK	92.819	40.81	5.33	0.684	1.002	3.326	10.247
LC208.3	PC228 LONGL - LIFT OVER END DECK LEVEL	93.239	41.23	5.75	0.687	0.910	3.441	9.988
LC208.4	PC228 LONGL - LIFT OVER END DECK LEVEL	93.239	41.23	5.75	0.687	0.974	3.441	9.998
LC208.6	PC228 LONGL - LIFT OVER END DECK LEVEL	92.639	40.63	5.15	0.683	0.997	3.368	10.072
LC208.7	PC228 LONGL - LIFT OVER END DECK LEVEL	92.129	40.12	4.64	0.679	1.016	3.307	10.135
LC208.8	PC228 LONGL - LIFT OVER END DECK LEVEL	91.289	39.28	3.80	0.673	0.977	3.202	10.229
LC209.4	PC228 LONGL - LIFT OVER END 3M ABOVE DECK	93.089	41.08	5.60	0.686	0.972	3.494	9.812
LC209.5	PC228 LONGL - LIFT OVER END 3M ABOVE DECK	92.489	40.48	5.00	0.682	0.993	3.413	9.903
LC209.7	PC228 LONGL - LIFT OVER END 3M ABOVE DECK	91.989	39.98	4.50	0.678	1.011	3.346	9.981
LC210.4	PC228 LONGL - LIFT OVER END 4.6M ABOVE DECK	92.969	40.96	5.48	0.685	0.969	3.516	9.722
LC210.6	PC228 LONGL - LIFT OVER END 4.6M ABOVE DECK	92.409	40.40	4.92	0.681	0.991	3.436	9.817
LC210.7	PC228 LONGL - LIFT OVER END 4.6M ABOVE DECK	91.919	39.91	4.43	0.677	1.009	3.367	9.901
LC211.6	PC228 LONGL - LIFT OVER END 6.1M ABOVE DECK	92.339	40.33	4.85	0.680	0.989	3.458	9.738

CASE	DESCRIPTION	DISP	LOAD	LIFT	T	TR	HEEL	GM
		tons	tons	tons	metres	metres	degrees	metres
LC300.1	PC228US-LC-8 LONGL ON CL - TRANSIT VOYAGE	97.999	45.99	0.00	0.725	0.150	0.000	8.984

Appendix 2 Loading Conditions Examples

LOADING CONDITION LC08.81, PC228 LONGL - LIFTING LOAD OVER SIDE, DECK LEVEL

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
Excavator, RHO=1.000							
PC228	PC228 LONGL .	0.0	13.45	3.22	1.79	2.44	0.00
ARM	PC228 LONGL .	0.0	3.32	3.22	5.66	3.44	0.00
CWT	PC228 CWT FO.	0.0	6.06	3.22	0.36	3.17	0.00
Total of EXC		0.0	22.83	3.22	1.98	2.78	0.00
Load on Hook, RHO=1.000							
PLOAD	LOAD ON HOOK.	0.0	2.73	3.22	1.96	1.50	0.00
Deadweight, RHO=1.000							
PERSONS	5 PERSONS	0.0	0.50	8.42	0.00	2.50	0.00
EQUIPT	EQUIPT INCL .	0.0	2.40	14.90	0.00	2.50	0.00
DUNNAGE	HARDWOOD DUN.	0.0	7.50	5.92	0.00	1.55	0.00
MISC	MISC GEAR	0.0	2.00	1.92	0.00	2.50	0.00
WC	SITE TOILET	0.0	0.25	15.42	0.00	3.00	0.00
Total of DWT		0.0	12.65	7.28	0.00	1.95	0.00

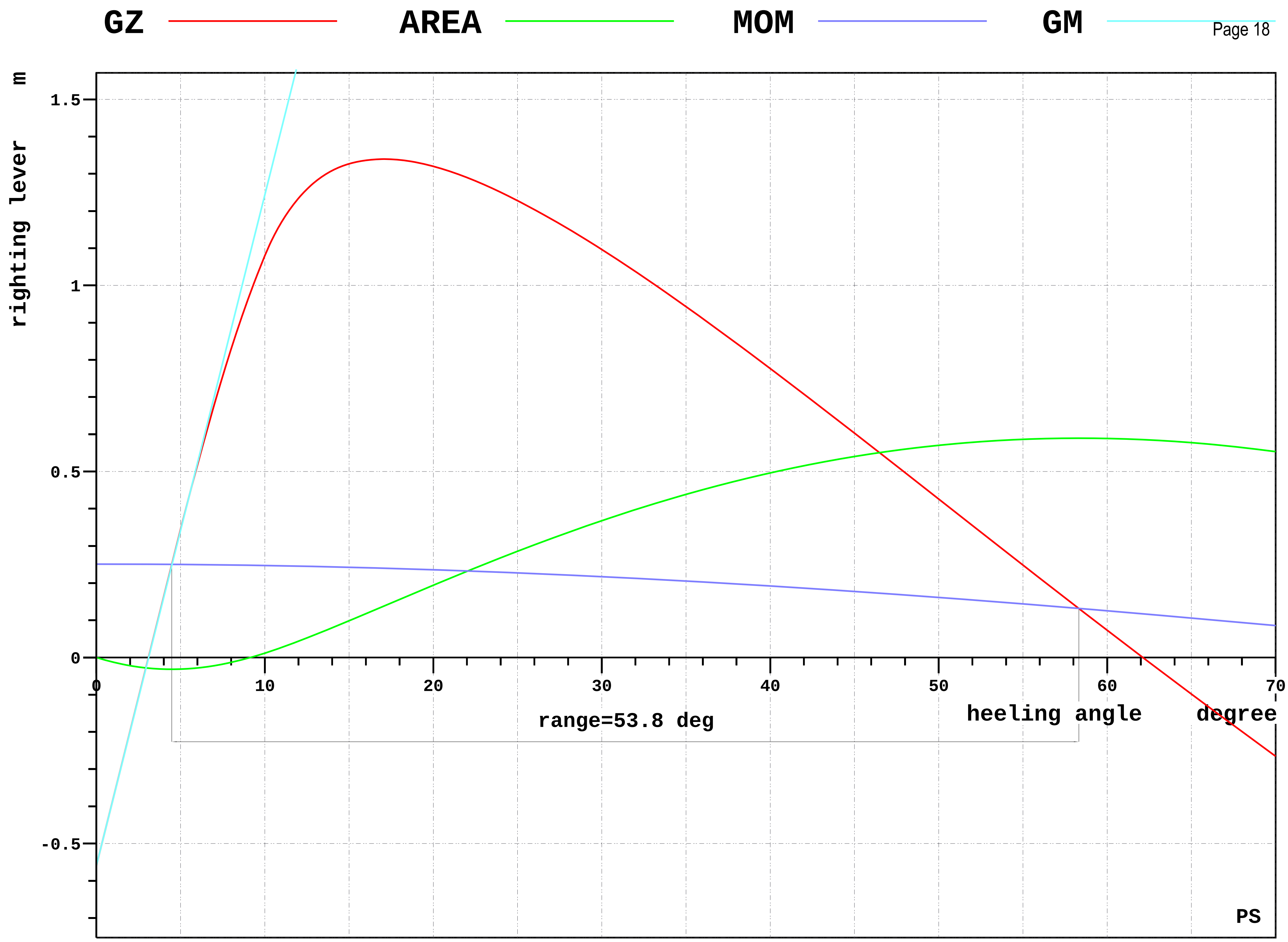
	Mass	cgx	cgy	cgz	Free s. moment
Deadweight	38.21	4.57	1.32	2.41	0.0
Lightweight	52.01	8.61	0.00	1.10	
Displacement (rho=1.025)	90.22	6.90	0.56	1.65	0.0

FLOATING POSITION BEFORE LIFT MOMENT APPLIED

Draught moulded	0.665	m	KM	11.98	m
Trim	0.757	m	KG	1.65	m
Heel, PS=+	3.1	deg			
TA	1.044	m	GM0	10.33	m
TF	0.287	m	GMCORR	0.00	m
Trimming moment	-137	tonm	GM	10.33	m

Loading condition: PC228 LONGL - LIFTING LOAD OVER SIDE, DECK LEVEL

TEXT	REQ	ATTV	UNIT	STAT	MIN_GM
6E.2b Res.area>0.0533m*rad	0.053	0.175	mrad	OK	8.361
6E.3 Max angle of heel from lift	5.000	4.477	deg	OK	9.249
4B.2a Min.frbd 0.05 in operations	0.050	0.102	m	OK	9.023
GM > 1.0 m	1.000	10.329	m	OK	1.000
Min. Range of Stability	20.000	53.842	deg	OK	8.073


GZ
AREA
MOM
GM
m
righting lever
1.5
1
0.5
0
-0.5
0
10
20
30
40
50
60
70
range=53.8 deg
heeling angle
degree
PS

LOADING CONDITION LC11.61, PC228 LONGL - LIFT OVER SIDE 6.1M ABOVE DECK

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
Excavator, RHO=1.000							
PC228	LONGL LOS	0.0	13.45	3.23	1.79	2.44	0.00
CWT	CWT SIDE LIFT	0.0	6.06	3.23	0.36	3.17	0.00
ARM	ARM SIDE LIFT	0.0	3.32	3.23	3.90	4.76	0.00
Total of EXC		0.0	22.83	3.22	1.72	2.97	0.00
Load on Hook, RHO=1.000							
PLOAD	LOAD ON HOOK.	0.0	4.22	3.23	1.96	7.63	0.00
Deadweight, RHO=1.000							
PERSONS	5 PERSONS	0.0	0.50	8.42	0.00	2.50	0.00
EQUIPT	EQUIPT INCL .	0.0	2.40	14.90	0.00	2.50	0.00
DUNNAGE	HARDWOOD DUN.	0.0	7.50	5.92	0.00	1.55	0.00
MISC	MISC GEAR	0.0	2.00	1.92	0.00	2.50	0.00
WC	SITE TOILET	0.0	0.25	15.42	0.00	3.00	0.00
Total of DWT		0.0	12.65	7.28	0.00	1.95	0.00

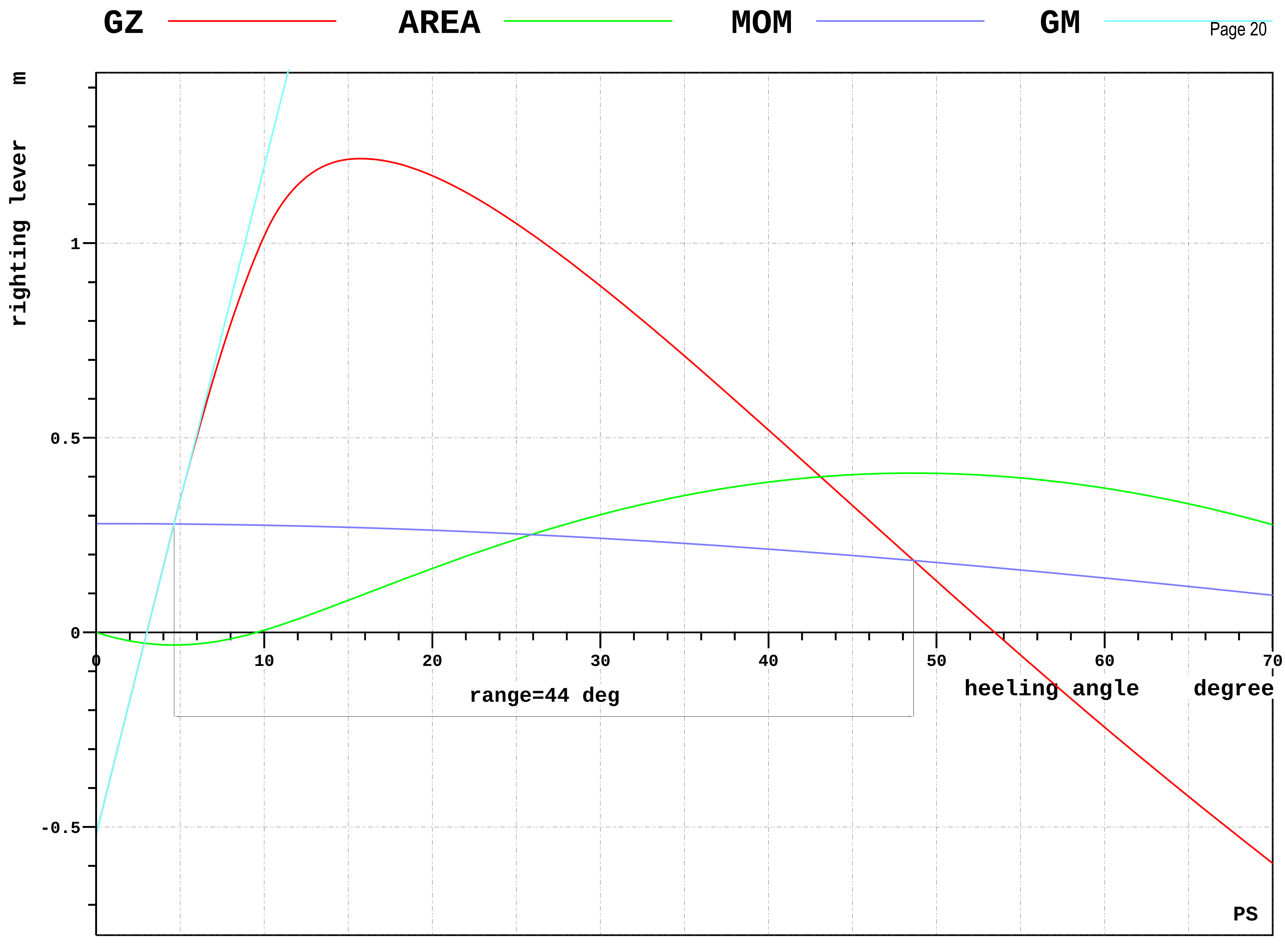
	Mass	cgx	cgy	cgz	Free s. moment
Deadweight	39.70	4.52	1.20	3.14	0.0
Lightweight	52.01	8.61	0.00	1.10	
Displacement (rho=1.025)	91.71	6.84	0.52	1.98	0.0

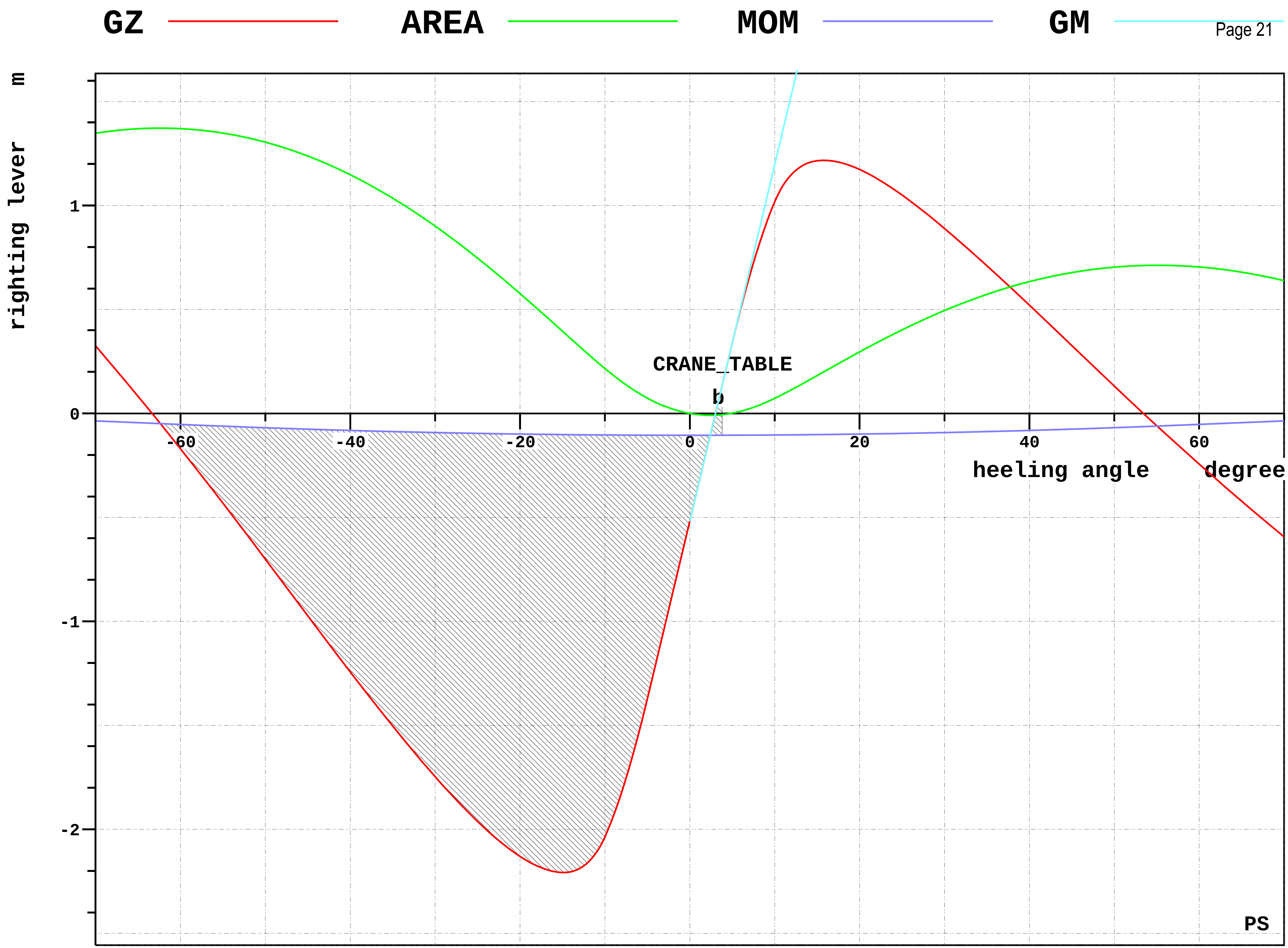
FLOATING POSITION BEFORE LIFT MOMENT APPLIED

Draught moulded	0.676	m	KM	11.81	m
Trim	0.808	m	KG	1.98	m
Heel, PS=+	3.0	deg			
TA	1.080	m	GM0	9.82	m
TF	0.272	m	GMCORR	0.00	m
Trimming moment	-144	tonm	GM	9.82	m

Loading condition: PC228 LONGL - LIFT OVER SIDE 6.1M ABOVE DECK

TEXT	REQ	ATTV	UNIT	STAT	MIN_GM
6E.2b Res.area>0.0533m*rad	0.053	0.131	mrad	OK	8.370
6E.3 Max angle of heel from lift	5.000	4.639	deg	OK	9.119
4B.2a Min.frbd 0.05 in operations	0.050	0.052	m	OK	9.766
GM > 1.0 m	1.000	9.825	m	OK	1.000
Min. Range of Stability	20.000	44.001	deg	OK	8.039
6F.1b Min. ratio of area A1/A2>1.0 a.	1.000	472.274		OK	-


GZ
AREA
MOM
GM
righting lever m
1
0.5
0
-0.5
0
10
20
30
40
50
60
70
heeling angle degree
range=44 deg
PS


GZ
AREA
MOM
GM
righting lever m
1
0
-1
-2
-60
-40
-20
0
20
40
60
heeling angle degree
CRANE_TABLE
b
PS

LOADING CONDITION LC300.1, PC228US-LC-8 LONGL ON CL - TRANSIT VOYAGE

L O A D I N G   C O M P O N E N T S

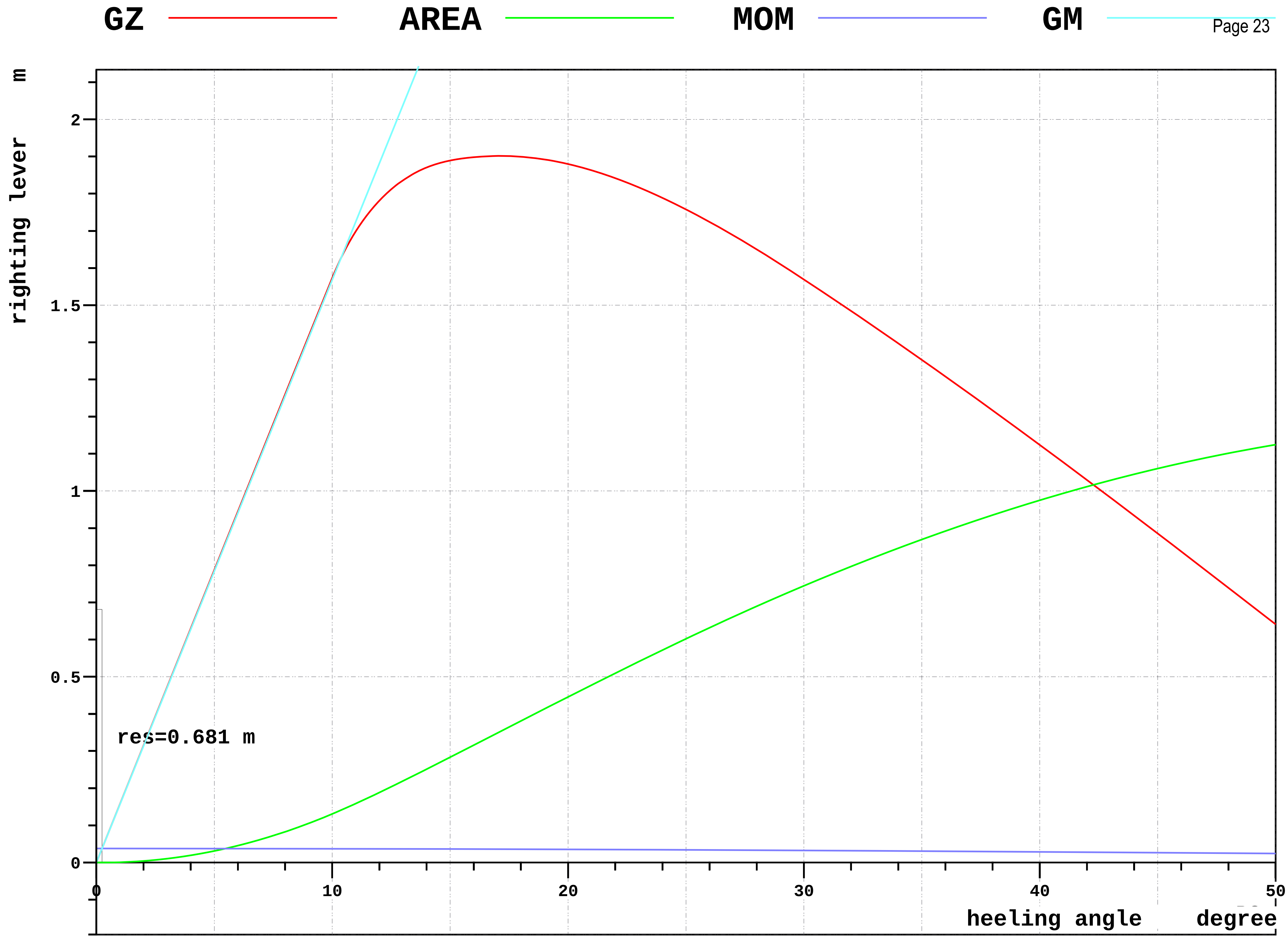
Name		Max. weight	Mass	Center of gravity cgx	cgy	cgz	Free s. moment
Excavator, RHO=1.000							
PC228	PC228 TRANSIT	0.0	22.83	7.23	0.00	3.30	0.00
Deadweight, RHO=1.000							
SPUDS	SPUD STBD	0.0	1.21	14.15	-4.00	8.50	0.00
SPUDP	SPUD PORT	0.0	1.21	14.15	4.00	8.50	0.00
PERSONS	5 PERSONS	0.0	0.50	8.42	0.00	2.50	0.00
EQUIPT	EQUIPT INC R.	0.0	2.65	14.95	0.00	2.55	0.00
DUNNAGE	HARDWOOD DUN.	0.0	7.50	5.92	0.00	1.55	0.00
MISC	MISC GEAR	0.0	2.00	1.92	0.00	2.50	0.00
LOAD	MATERIALS	0.0	8.09	7.23	0.00	3.00	0.00
Total of DWT		0.0	23.16	7.98	0.00	3.00	0.00
Deadweight			45.99	7.61	0.00	3.15	0.0
Lightweight			52.01	8.61	0.00	1.10	
Displacement (rho=1.025)			98.00	8.14	0.00	2.06	0.0

FLOATING POSITION

Draught moulded	0.725	m	KM	11.04	m
Trim	0.150	m	KG	2.06	m
Heel, PS=+	0.0	deg			
TA	0.800	m	GM0	8.98	m
TF	0.650	m	GMCORR	0.00	m
Trimming moment	-27	tonm	GM	8.98	m

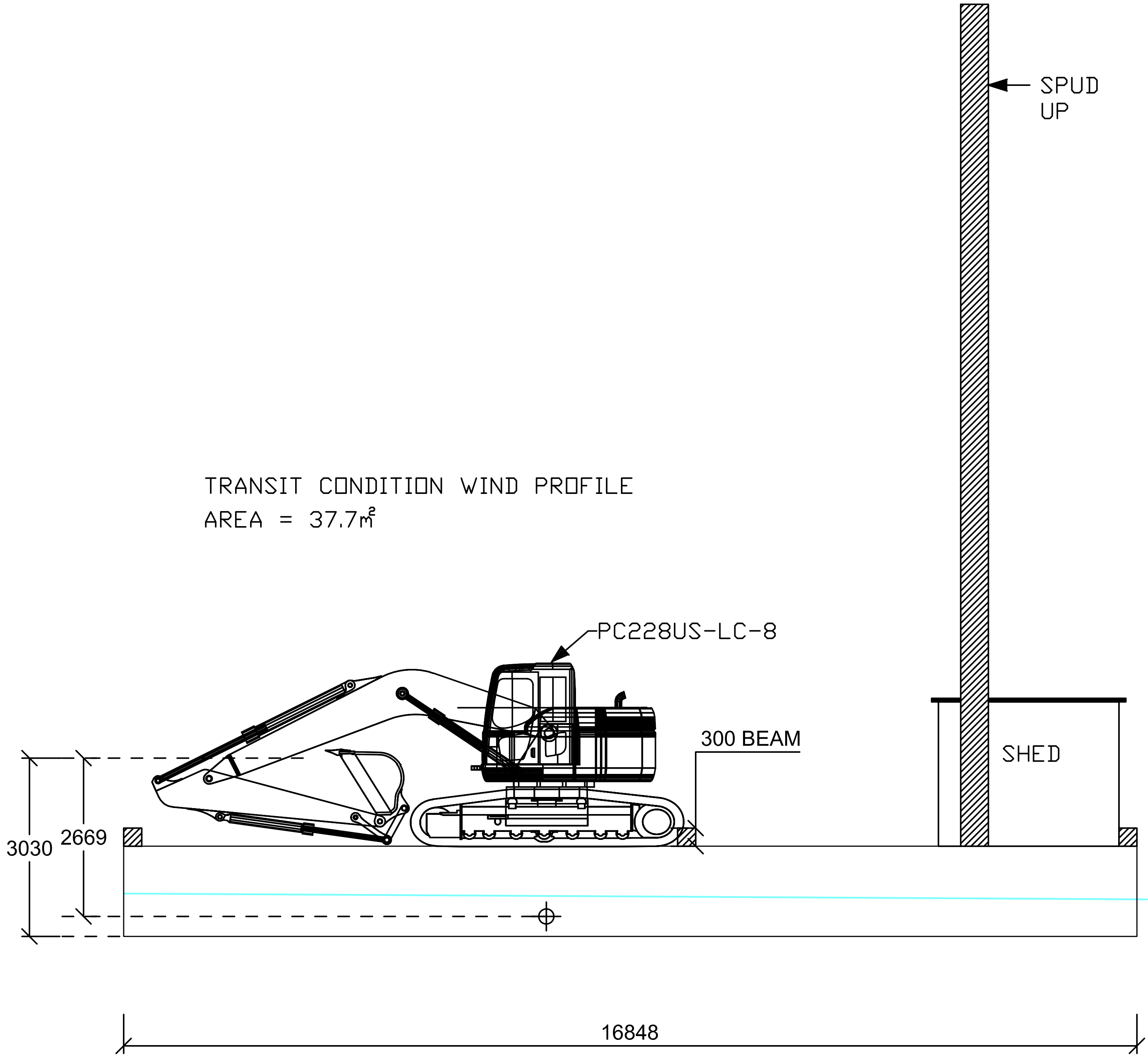
Loading condition: PC228US-LC-8 LONGL ON CL - TRANSIT VOYAGE

TEXT	REQ	ATTV	UNIT	STAT	MIN_GM
Res. area > 0.0533 rad*m	0.053	0.353	mrad	OK	3.211
GM > 1.0 m	1.000	8.984	m	OK	1.000
Min. Range of Stability	20.000	48.530	deg	OK	4.830
1/2 of freeboard not immersed	0.350	0.681	m	OK	0.450
Max heel due to wind<0.5FBD or 5 deg.	4.435	0.240	deg	OK	0.450
Minimum frbd 200mm during transit	0.200	0.681	m	OK	0.289



GZ
AREA
MOM
GM
righting lever m
2
1.5
1
0.5
0
res=0.681 m
0
10
20
30
40
50
heeling angle degree

Appendix 3 Wind Profile Sketch



BARGE STABILITY SIDE ELEVATION (TRANSIT)

CLIENT: HWB	HWB GREY PONTOON BARGE	SCALE NTS	LIGHTNING NAVAL ARCHITECTURE
	TRANSIT WIND PROFILE 19027-SK03	COPYRIGHT ©	

Appendix 4 Lightweight Calculation

Barge Particulars

PONTOON WEIGHT	no.	thks	length	perimeter/ width	VOLUME	MASS	LCG	VCG	TCG
DECK	1	0.012	16.848	3.85	0.7784	6.110	8.424	1.500	0
BOTTOM	1	0.01	16.848	3.85	0.6486	5.092	8.424	0.000	0
BHDS	4	0.01	1.5	3.85	0.2310	1.813	8.424	0.750	0
SIDE PLATES	2	0.01	16.848	1.5	0.5054	3.968	8.424	0.750	0
DECK STIFFENERS	4	0.06	16.848	0.15	0.6065	4.761	8.424	1.450	0
						21.744	8.424	0.938	0
PONTOON PORT						21.744	8.424	0.938	2.575
PONTOON STBD						21.744	8.424	0.938	-2.575
BEAM1	1	0.02	9	1.75	0.3150	2.473	0.225	1.775	0
BEAM2	1	0.02	9	1.75	0.3150	2.473	9.36	1.775	0
BEAM3	1	0.02	9	1.75	0.3150	2.473	16.623	1.775	0
SHED	1	0.003	18	28.8	0.1404	1.102	14.898	2.700	0
SPUDP	0	0.0086	14	0.406	0.0000	0.000	14.148	8.5	4
SPUDS	0	0.0086	14	0.406	0.0000	0.000	14.148	8.5	-4
BARGE - OPERATING SPUDS DOWN						52.009	8.606	1.095	0