



STABILITY BOOKLET

SAM BROWEMA

REV. A1

ORIGINATOR	ENG. CONTROLLED	ENG. APPROVED	CLASS APPROVED
			SIGNATURE
LEVI LUIJENDIJK	NAME	NAME	NAME
2021-08-25	DATE	DATE	DATE

TABLE OF CONTENTS

1	INTRODUCTION.....	5
1.1	GENERAL	5
2	VESSEL PARTICULARS.....	6
2.1	GENERAL PARTICULARS	6
2.2	LIGHT SHIP WEIGHT	7
2.3	HYDROSTATICS	7
2.4	LOAD CASES	8
	APPENDIX A – ORIGINAL LIGHTWEIGHT CALCULATION	10
	APPENDIX B – LOAD CASE I	11
	APPENDIX C – LOAD CASE II	13
	APPENDIX D – LOAD CASE III	15
	APPENDIX E – LOAD CASE IV	17
	APPENDIX F – LOAD CASE V	19
	APPENDIX G – LOAD CASE VI.....	21
	APPENDIX H – LOAD CASE VII.....	23



TABLE OF FIGURES/TABLES

Figure 1: SAM..... 6

Table 1: Light ship weight and center of gravity 7

Table 2 Hydrostatic data provided by Browema 7

Table 3 Description on load cases 9



REVISION HISTORY

REV.	DATE	REVISION STATUS	AMENDMENTS
A1	2021-08-25	Internal review, preliminary revision	-

REFERENCE DOCUMENTS

No.	DOCUMENT	DOCUMENT NUMBER	REVISION
1	Stabilität und Trimm des MS 2 (dated at 17-1-1991)	-	-
2	Stabiliteitsberekening kraan Sam	-	-
3			
4			
5			
6			



1 Introduction

1.1 General

The following booklet shows stability calculations for landing vessel SAM. The following items are included in this document:

- Main dimensions of the vessel
- Hydrostatic particulars of the vessel
- Eight load cases
- Wind moment calculation data
- General drawings of the vessel

All calculations are carried out for freshwater with a density of 1.000 ton/m^3 . The calculations have been completed using the program Excel.



2 Vessel particulars

2.1 General particulars

Name of vessel	:	SAM
Type of vessel	:	Landing vessel
Owner	:	Browema International B.V.
Length overall	:	26.00 [m]
Length waterline	:	25.00 [m]
Breadth mould	:	7.37 [m]
Depth mould	:	2.20 [m]
Summer draft (mould)	:	1.70 [m]



Figure 1: SAM

2.2 Light ship weight

The light ship weight and center of gravity used as provided by Browema can be found in Table 1.

Light ship weight			
Weight [ton]	LCG [m]	TCG [m]	VCG [m]
164.5	12.68	0.00	1.86

Table 1: Light ship weight and center of gravity

2.3 Hydrostatics

The hydrostatic data as provided by Browema can be found in Table 2.

<i>Draft</i> [m]	<i>Carene</i> [m ³]	<i>KMt</i> [m]	<i>MCTC</i> [m]	<i>LCB</i> [m]	<i>GML</i> [m]	<i>KML</i> [m]	<i>KF</i> [m]	<i>LCF</i> [m]
0.8	105	10.7	456.5	13	64.99	67	0.45	13.5
0.9	124	9.5	442.4	12.98	62.99	65	0.51	13.1
1	142	8.6	428.4	12.95	60.99	63	0.6	12.85
1.1	160	7.8	393.2	12.93	55.99	58	0.68	12.65
1.2	180	7.2	358.1	12.91	50.99	53	0.71	12.59
1.3	200	6.6	323.0	12.89	45.99	48	0.75	12.73
1.4	220	6.1	301.9	12.87	42.99	45	0.8	12.75
1.5	240	5.8	280.9	12.86	39.99	42	0.88	12.79
1.6	260	5.5	252.8	12.85	35.99	38	0.91	12.8
1.7	280	5.2	238.7	12.85	33.99	36	0.99	12.82
1.8	300	5	224.7	12.86	31.99	34	1.05	12.83
1.9	320	4.8	217.6	12.87	30.99	33	1.1	12.84

Table 2 Hydrostatic data provided by Browema



2.4 Load cases

A total of eight load cases were investigated as requested by Browema. Table 3 displays a description on the differences between the load cases.

Case I:
Vessel in draft testing condition Spud pole up Original crane in rest Wind Beauf 7-8 (perpendicular)
Case II:
Vessel in draft testing condition Spud pole up Original crane in rest Nifty-lift-HR21 in use, positioned starboard at aftship 30 tonne cargo with centre of gravity 2.0 m above deck Wind Beauf 5-6 (perpendicular)
Case III:
Vessel in draft testing condition Spud pole up Original crane in use Nifty-lift-HR21 in use, positioned starboard at aftship 30 tonne cargo with center of gravity 2.0 m above deck Wind Beauf 5-6 (perpendicular)
Case IV:
Vessel in draft testing condition Spud pole up Original crane in rest Nifty-lift-HR21 in use, positioned in front of stud poles at center line 30 tonne cargo with centre of gravity 2.0 m above deck Wind Beauf 5-6 (perpendicular)
Case V:
Vessel in draft testing condition Spud pole up Original crane in use Nifty-lift-HR21 in use, positioned in front of stud poles at center line



30 tonne cargo with centre of gravity 2.0 m above deck Wind Beauf 5-6 (perpendicular)
Case VI:
Vessel in draft testing condition Spud pole in <u>use</u> Original crane in rest Nifty-lift-HR21 in use, positioned in front of stud poles at center line 30 tonne cargo with centre of gravity 2.0 m above deck Wind Beauf 5-6 (perpendicular)
Case VII:
Vessel in draft testing condition Spud pole in <u>use</u> Original crane in use Nifty-lift-HR21 in use, positioned in front of stud poles at center line 30 tonne cargo with centre of gravity 2.0 m above deck Wind Beauf 5-6 (perpendicular)

Table 3 Description on load cases

2.5 Conclusion

The vessel complies with the stated stability criteria. Special notice will need to be made for load case III, V and VII. These load cases investigated the impact of operating both the installed crane and the Nifty-lift-HR21 at their maximum capability. Each of these load cases complies with the stated stability criteria but result in an unworkable circumstance due their large angles of heel (7+ degrees).



Appendix A – Original lightweight calculation


Hans Peter Rüdé Schiffbau Dipl.-Ing. Tel. 040-7385298 Fax 040-7304339 mail@hpruede.de	"SAM"	Datum 14.03.2021 Seite 8 Auftrag 2108
--	--------------	---

Gewichtsrechnung :

Benennung	G [t]	TCG [m]	LCG [m]	VCG [m]
Aus der Besrehenden Berechnung mit Datum 17.01.1991:				
Landungsboot mit Seitenpontons	120,40	0,00	12,42	1,67
Pfähle	6,00	0,00	12,52	4,00
100% Vorräte	11,70	0,00	12,38	1,14
Neuer Kran EFFER 88N	7,00	-3,87	22,77	4,50
Gewichtszunahme seit 1991	19,40	1,40	9,34	1,86
Summe Schiff betriebsbereit	164,50	0,00	12,50	1,86
		(+Bb/-Stb.)		



Appendix B – Load case I

	Stability Calculation				
	Project :	se-21072		Originator :	LLu
	Doc. No. :			Checked :	
	Subject/Remarks :	Case I		Revision :	A1

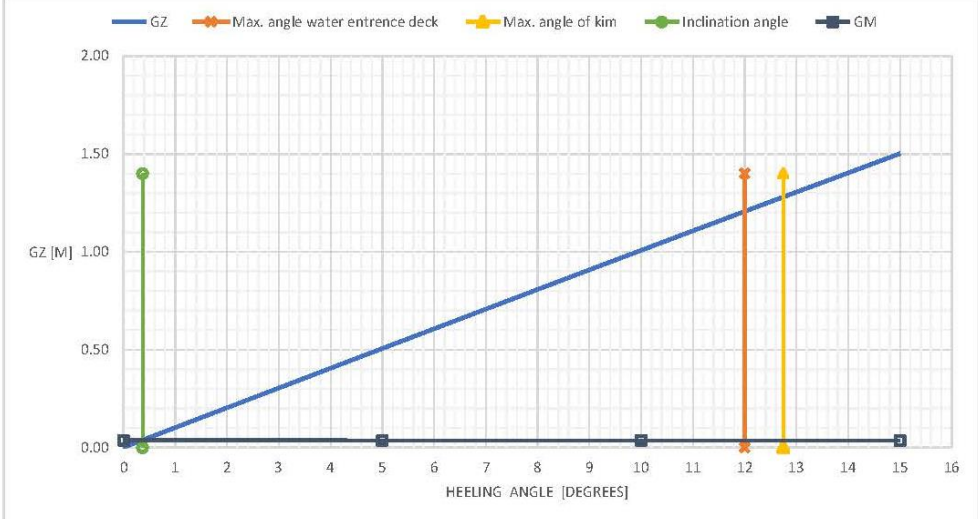
Loading table								
Description	Weight [ton]	LCG [m]	TCG [m]	VCG [m]	FS.corr	X MOM [tonm]	Y MOM [tonm]	Z MOM [tonm]
Lightship	164.50	12.50	0.00	1.86		2056.25	0.00	305.97
Stud pole original	-6.00	12.52	0.00	4.00		-75.12	0.00	-24.00
Stud pole adjusted	6.00	17.50	0.00	4.00		105.00	0.00	24.00
Total	164.50	12.68	0.00	1.86	0.00	2086.13	0.00	305.97

Floating position	
Draught	1.12 [m]
Trim	-0.11 [m]

Critical angles	
Max. angle water entrance deck	12.00 degree
Max. angle of kim	12.75 degree

Transverse stability	
KG =	1.86 [m]
GG' =	0.000 [m]
KG' =	1.86 [m]
KMt =	7.67 [m]
GM' =	5.81 [m]
Longitudinal stability	
LCB	12.93 [m]
MCTC	362.00 [m]
LCG-LCB	-0.24 [m]
Trim mom	-40.1147 [t*m]


GZ values	
Heeling Angle [degrees]	GZ [m]
0	0.00
5	0.51
10	1.01
15	1.50



GZ in range 0°-15°			
Angle	GZ	SF	GZ*SF
0	0.000	1	0.00
5	0.506	4	2.02
10	1.008	2	2.02
15	1.502	4	6.01
Total			10.05

GZ in range 30°-40°	
0.00	[mrad]




	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5" style="text-align: left; padding: 2px;">Stability Calculation</th> </tr> <tr> <td style="width: 20%; padding: 2px;">Project :</td> <td style="width: 40%; padding: 2px;">se-21072</td> <td style="width: 20%; padding: 2px;">Originator :</td> <td colspan="2" style="width: 20%; padding: 2px;">LLu</td> </tr> <tr> <td style="padding: 2px;">Doc. No. :</td> <td style="padding: 2px;"></td> <td style="padding: 2px;">Checked :</td> <td colspan="2" style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Subject/Remarks :</td> <td style="padding: 2px; text-align: center;">Case I</td> <td style="padding: 2px;">Revision :</td> <td colspan="2" style="padding: 2px;">A1</td> </tr> </table>	Stability Calculation					Project :	se-21072	Originator :	LLu		Doc. No. :		Checked :			Subject/Remarks :	Case I	Revision :	A1	
Stability Calculation																					
Project :	se-21072	Originator :	LLu																		
Doc. No. :		Checked :																			
Subject/Remarks :	Case I	Revision :	A1																		

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Asymmetrical load</th> </tr> <tr> <td style="width: 70%; padding: 2px;">GM Trans. [m]</td> <td style="width: 30%; padding: 2px; text-align: right;">5.81</td> </tr> <tr> <td style="padding: 2px;">Displacement [t]</td> <td style="padding: 2px; text-align: right;">164.50</td> </tr> <tr> <td style="padding: 2px;">TCG [m]</td> <td style="padding: 2px; text-align: right;">0.00</td> </tr> <tr> <td style="padding: 2px;">M I [t*m]</td> <td style="padding: 2px; text-align: right;">0</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Wind load</th> </tr> <tr> <td style="width: 70%; padding: 2px;">Total surface [m2]</td> <td style="width: 30%; padding: 2px; text-align: right;">62.00</td> </tr> <tr> <td style="padding: 2px;">Wind lever [m]</td> <td style="padding: 2px; text-align: right;">2.48</td> </tr> <tr> <td style="padding: 2px;">Factor C</td> <td style="padding: 2px; text-align: right;">1.6</td> </tr> <tr> <td style="padding: 2px;">Wind force</td> <td style="padding: 2px; text-align: right;">Bf. 7-8</td> </tr> <tr> <td style="padding: 2px;">Wind pressure [t/m2]</td> <td style="padding: 2px; text-align: right;">0.025</td> </tr> <tr> <td style="padding: 2px;">M II [t*m]</td> <td style="padding: 2px; text-align: right;">6.150</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Summary</th> </tr> <tr> <td style="width: 70%; padding: 2px;">Inclination angle [deg.]</td> <td style="width: 30%; padding: 2px; text-align: right;">0.37</td> </tr> <tr> <td style="padding: 2px;">T Aft</td> <td style="padding: 2px; text-align: right;">1.07</td> </tr> <tr> <td style="padding: 2px;">T Forward</td> <td style="padding: 2px; text-align: right;">1.18</td> </tr> <tr> <td style="padding: 2px;">T max. [m]</td> <td style="padding: 2px; text-align: right;">1.18</td> </tr> <tr> <td style="padding: 2px;">Depth [m]</td> <td style="padding: 2px; text-align: right;">2.20</td> </tr> <tr> <td style="padding: 2px;">Width [m]</td> <td style="padding: 2px; text-align: right;">9.9</td> </tr> <tr> <td style="padding: 2px;">Loss of freeboard</td> <td style="padding: 2px; text-align: right;">0.03</td> </tr> <tr> <td style="padding: 2px;">Leftover freeboard</td> <td style="padding: 2px; text-align: right;">0.99</td> </tr> </table>	Asymmetrical load		GM Trans. [m]	5.81	Displacement [t]	164.50	TCG [m]	0.00	M I [t*m]	0	Wind load		Total surface [m2]	62.00	Wind lever [m]	2.48	Factor C	1.6	Wind force	Bf. 7-8	Wind pressure [t/m2]	0.025	M II [t*m]	6.150	Summary		Inclination angle [deg.]	0.37	T Aft	1.07	T Forward	1.18	T max. [m]	1.18	Depth [m]	2.20	Width [m]	9.9	Loss of freeboard	0.03	Leftover freeboard	0.99	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.00</td> <td style="padding: 2px; text-align: center;">0.00</td> <td style="padding: 2px; text-align: center;">0.00</td> <td style="padding: 2px; text-align: center;">0.00</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.037</td> <td style="padding: 2px; text-align: center;">0.037</td> <td style="padding: 2px; text-align: center;">0.037</td> <td style="padding: 2px; text-align: center;">0.036</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.037</td> <td style="padding: 2px; text-align: center;">0.037</td> <td style="padding: 2px; text-align: center;">0.037</td> <td style="padding: 2px; text-align: center;">0.036</td> </tr> </table>	Phi	0.00	5	10	15	Lever	0.00	0.00	0.00	0.00	Phi	0.00	5	10	15	Lever	0.037	0.037	0.037	0.036	Phi	0.00	5	10	15	Lever	0.037	0.037	0.037	0.036
Asymmetrical load																																																																									
GM Trans. [m]	5.81																																																																								
Displacement [t]	164.50																																																																								
TCG [m]	0.00																																																																								
M I [t*m]	0																																																																								
Wind load																																																																									
Total surface [m2]	62.00																																																																								
Wind lever [m]	2.48																																																																								
Factor C	1.6																																																																								
Wind force	Bf. 7-8																																																																								
Wind pressure [t/m2]	0.025																																																																								
M II [t*m]	6.150																																																																								
Summary																																																																									
Inclination angle [deg.]	0.37																																																																								
T Aft	1.07																																																																								
T Forward	1.18																																																																								
T max. [m]	1.18																																																																								
Depth [m]	2.20																																																																								
Width [m]	9.9																																																																								
Loss of freeboard	0.03																																																																								
Leftover freeboard	0.99																																																																								
Phi	0.00	5	10	15																																																																					
Lever	0.00	0.00	0.00	0.00																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.037	0.037	0.037	0.036																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.037	0.037	0.037	0.036																																																																					



Appendix C – Load case II

	Stability Calculation			
	Project : se-21072		Originator : LLU	
	Doc. No :		Checked :	
	Subject/Remarks : Case II		Revision : A1	

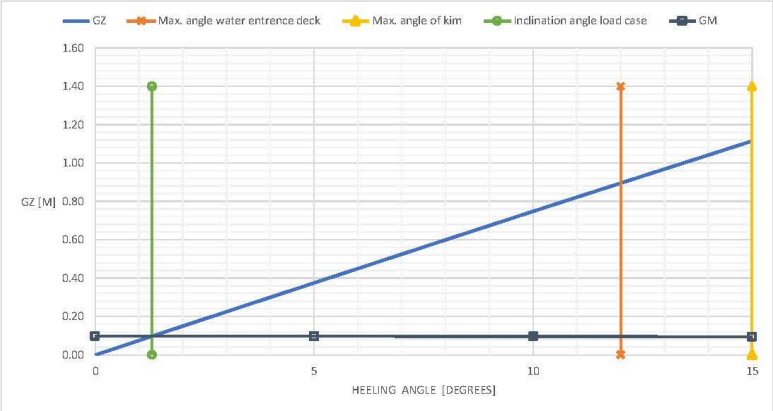
Loading table								
Description	Weight [ton]	LCG [m]	TCG [m]	VCG [m]	FS.corr	X MOM [tonm]	Y MOM [tonm]	Z MOM [tonm]
Lightship	164.50	12.68	0.00	1.86		2085.86	0.00	305.97
Additional Cargo	30.00	15.00	0.00	4.20		450.00	0.00	126.00
Nifty-lift-HR21	6.89	10.10	2.35	3.29		69.59	16.19	22.67
Total	201.39	12.94	0.080	2.26	0.00	2605.45	16.19	454.64

Floating position	
Draught	1.31 [m]
Trim	0.03 [m]


Critical angles	
Max. angle water entrance deck	12.00 degree
Max. angle of kim	15.00 degree

Transverse stability	
KG =	2.26 [m]
GG' =	0.000 [m]
KG' =	2.26 [m]
KMt =	6.57 [m]
GM' =	4.31 [m]
Longitudinal stability	
LCB	12.89 [m]
MCTC	366.80 [m]
LCG-LCB	0.05 [m]
Trim mom	9.811832 [t*m]

GZ values	
Heeling Angle [degrees]	GZ [m]
0	0.00
5	0.38
10	0.75
15	1.11



GZ in range 0°-15°			
Angle	GZ	SF	GZ*SF
0	0.000	1	0.00
5	0.375	4	1.50
10	0.748	2	1.50
15	1.115	4	4.46
Total			7.46

	Stability Calculation																												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 30%;">Project :</td> <td style="width: 40%;">se-21072</td> <td style="width: 15%;">Originator :</td> <td style="width: 15%;">LLu</td> </tr> <tr> <td>Doc. No. :</td> <td></td> <td>Checked :</td> <td></td> </tr> <tr> <td>Subject/Remarks :</td> <td>Case II</td> <td>Revision :</td> <td>A1</td> </tr> </table>	Project :	se-21072	Originator :	LLu	Doc. No. :		Checked :		Subject/Remarks :	Case II	Revision :	A1																
Project :	se-21072	Originator :	LLu																										
Doc. No. :		Checked :																											
Subject/Remarks :	Case II	Revision :	A1																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left;">Asymmetrical load</th> </tr> <tr> <td>GM Trans. [m]</td> <td>4.31</td> </tr> <tr> <td>Displacement [t]</td> <td>201.39</td> </tr> <tr> <td>TCG [m]</td> <td>0.080</td> </tr> <tr> <td>M.I [t*m]</td> <td>16.1915</td> </tr> </table>	Asymmetrical load		GM Trans. [m]	4.31	Displacement [t]	201.39	TCG [m]	0.080	M.I [t*m]	16.1915	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Phi</td> <td>0.00</td> <td>5</td> <td>10</td> <td>15</td> </tr> <tr> <td>Lever</td> <td>0.080</td> <td>0.080</td> <td>0.079</td> <td>0.078</td> </tr> </table>	Phi	0.00	5	10	15	Lever	0.080	0.080	0.079	0.078								
Asymmetrical load																													
GM Trans. [m]	4.31																												
Displacement [t]	201.39																												
TCG [m]	0.080																												
M.I [t*m]	16.1915																												
Phi	0.00	5	10	15																									
Lever	0.080	0.080	0.079	0.078																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left;">Wind load</th> </tr> <tr> <td>Total surface [m2]</td> <td>62.00</td> </tr> <tr> <td>Wind lever [m]</td> <td>2.48</td> </tr> <tr> <td>Factor C</td> <td>1.6</td> </tr> <tr> <td>Wind force</td> <td>Bf. 5-6</td> </tr> <tr> <td>Wind pressure [t/m2]</td> <td>0.014</td> </tr> <tr> <td>M.II [t*m]</td> <td>3.444</td> </tr> </table>	Wind load		Total surface [m2]	62.00	Wind lever [m]	2.48	Factor C	1.6	Wind force	Bf. 5-6	Wind pressure [t/m2]	0.014	M.II [t*m]	3.444	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Phi</td> <td>0.00</td> <td>5</td> <td>10</td> <td>15</td> </tr> <tr> <td>Lever</td> <td>0.017</td> <td>0.017</td> <td>0.017</td> <td>0.017</td> </tr> </table>	Phi	0.00	5	10	15	Lever	0.017	0.017	0.017	0.017				
Wind load																													
Total surface [m2]	62.00																												
Wind lever [m]	2.48																												
Factor C	1.6																												
Wind force	Bf. 5-6																												
Wind pressure [t/m2]	0.014																												
M.II [t*m]	3.444																												
Phi	0.00	5	10	15																									
Lever	0.017	0.017	0.017	0.017																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left;">Summary</th> </tr> <tr> <td>Inclination angle [deg.]</td> <td>1.30</td> </tr> <tr> <td>T Aft</td> <td>1.32</td> </tr> <tr> <td>T Forward</td> <td>1.29</td> </tr> <tr> <td>T max. [m]</td> <td>1.32</td> </tr> <tr> <td>Depth [m]</td> <td>2.20</td> </tr> <tr> <td>Width [m]</td> <td>9.9</td> </tr> <tr> <td>Loss of freeboard</td> <td>0.11</td> </tr> <tr> <td>Leftover freeboard</td> <td>0.77</td> </tr> </table>	Summary		Inclination angle [deg.]	1.30	T Aft	1.32	T Forward	1.29	T max. [m]	1.32	Depth [m]	2.20	Width [m]	9.9	Loss of freeboard	0.11	Leftover freeboard	0.77	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Phi</td> <td>0.00</td> <td>5</td> <td>10</td> <td>15</td> </tr> <tr> <td>Lever</td> <td>0.098</td> <td>0.097</td> <td>0.096</td> <td>0.094</td> </tr> </table>	Phi	0.00	5	10	15	Lever	0.098	0.097	0.096	0.094
Summary																													
Inclination angle [deg.]	1.30																												
T Aft	1.32																												
T Forward	1.29																												
T max. [m]	1.32																												
Depth [m]	2.20																												
Width [m]	9.9																												
Loss of freeboard	0.11																												
Leftover freeboard	0.77																												
Phi	0.00	5	10	15																									
Lever	0.098	0.097	0.096	0.094																									

Appendix D – Load case III

	Stability Calculation			
	Project : se-21072		Originator : LLU	
	Doc. No :		Checked :	
	Subject/Remarks : Case III		Revision : A1	

Loading table								
Description	Weight [ton]	LCG [m]	TCG [m]	VCG [m]	FS.corr	X MOM [tonm]	Y MOM [tonm]	Z MOM [tonm]
Lightship	164.50	12.68	0.00	1.86		2085.86	0.00	305.97
Crane parking position	-7.00	22.77	3.87	4.50		-159.39	-27.09	-31.50
Crane at max outreach	7.00	22.77	8.37	4.50		159.39	58.59	31.50
Crane load	4.00	22.77	20.87	7.50		91.08	83.48	30.00
Additional Cargo	30.00	15.00	0.00	4.20		450.00	0.00	126.00
Nifty-lift-HR21	6.89	10.10	2.35	3.29		69.59	16.19	22.67
Total	205.39	13.13	0.639	2.36	0.00	2696.53	131.17	484.64


Floating position	
Draught	1.33 [m]
Trim	0.14 [m]

Critical angles	
Max. angle water entrance deck	10.00 degree
Max. angle of kim	15.00 degree

Transverse stability	
KG =	2.36 [m]
GG' =	0.000 [m]
KG' =	2.36 [m]
KMt =	6.47 [m]
GM' =	4.11 [m]
Longitudinal stability	
LCB	12.88 [m]
MCTC	368.32 [m]
LCG-LCB	0.24 [m]
Trim mom	50.15895 [t*m]

GZ values	
Heeling Angle [degrees]	GZ [m]
0	0.00
5	0.36
10	0.71
15	1.06

GZ in range 0°-15°			
Angle	GZ	SF	GZ*SF
0	0.000	1	0.00
5	0.358	4	1.43
10	0.713	2	1.43
15	1.063	4	4.25
Total			7.11

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5" style="text-align: left; padding: 2px;">Stability Calculation</th> </tr> <tr> <td style="width: 15%; padding: 2px;">Project :</td> <td style="width: 45%; padding: 2px;">se-21072</td> <td style="width: 15%; padding: 2px;">Originator :</td> <td colspan="2" style="width: 25%; padding: 2px;">LLu</td> </tr> <tr> <td style="padding: 2px;">Doc. No. :</td> <td style="padding: 2px;"></td> <td style="padding: 2px;">Checked :</td> <td colspan="2" style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Subject/Remarks :</td> <td style="padding: 2px;">Case III</td> <td style="padding: 2px;">Revision :</td> <td colspan="2" style="padding: 2px;">A1</td> </tr> </table>	Stability Calculation					Project :	se-21072	Originator :	LLu		Doc. No. :		Checked :			Subject/Remarks :	Case III	Revision :	A1	
Stability Calculation																					
Project :	se-21072	Originator :	LLu																		
Doc. No. :		Checked :																			
Subject/Remarks :	Case III	Revision :	A1																		

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Asymmetrical load</th> </tr> <tr> <td style="width: 60%; padding: 2px;">GM Trans. [m]</td> <td style="width: 40%; padding: 2px;">4.11</td> </tr> <tr> <td style="padding: 2px;">Displacement [t]</td> <td style="padding: 2px;">205.39</td> </tr> <tr> <td style="padding: 2px;">TCG [m]</td> <td style="padding: 2px;">0.639</td> </tr> <tr> <td style="padding: 2px;">M.I [t*m]</td> <td style="padding: 2px;">131.1715</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Wind load</th> </tr> <tr> <td style="width: 60%; padding: 2px;">Total surface [m2]</td> <td style="width: 40%; padding: 2px;">62.00</td> </tr> <tr> <td style="padding: 2px;">Wind lever [m]</td> <td style="padding: 2px;">2.48</td> </tr> <tr> <td style="padding: 2px;">Factor C</td> <td style="padding: 2px;">1.6</td> </tr> <tr> <td style="padding: 2px;">Wind force</td> <td style="padding: 2px;">Bf. 5-6</td> </tr> <tr> <td style="padding: 2px;">Wind pressure [t/m2]</td> <td style="padding: 2px;">0.014</td> </tr> <tr> <td style="padding: 2px;">M.II [t*m]</td> <td style="padding: 2px;">3.444</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Summary</th> </tr> <tr> <td style="width: 60%; padding: 2px;">Inclination angle [deg.]</td> <td style="width: 40%; padding: 2px;">9.07</td> </tr> <tr> <td style="padding: 2px;">T Aft</td> <td style="padding: 2px;">1.40</td> </tr> <tr> <td style="padding: 2px;">T Forward</td> <td style="padding: 2px;">1.26</td> </tr> <tr> <td style="padding: 2px;">T max. [m]</td> <td style="padding: 2px;">1.40</td> </tr> <tr> <td style="padding: 2px;">Depth [m]</td> <td style="padding: 2px;">2.20</td> </tr> <tr> <td style="padding: 2px;">Width [m]</td> <td style="padding: 2px;">9.9</td> </tr> <tr> <td style="padding: 2px;">Loss of freeboard</td> <td style="padding: 2px;">0.79</td> </tr> <tr> <td style="padding: 2px;">Leftover freeboard</td> <td style="padding: 2px;">0.01</td> </tr> </table>	Asymmetrical load		GM Trans. [m]	4.11	Displacement [t]	205.39	TCG [m]	0.639	M.I [t*m]	131.1715	Wind load		Total surface [m2]	62.00	Wind lever [m]	2.48	Factor C	1.6	Wind force	Bf. 5-6	Wind pressure [t/m2]	0.014	M.II [t*m]	3.444	Summary		Inclination angle [deg.]	9.07	T Aft	1.40	T Forward	1.26	T max. [m]	1.40	Depth [m]	2.20	Width [m]	9.9	Loss of freeboard	0.79	Leftover freeboard	0.01	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px;">0.00</td> <td style="width: 15%; padding: 2px;">5</td> <td style="width: 15%; padding: 2px;">10</td> <td style="width: 15%; padding: 2px;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px;">0.639</td> <td style="padding: 2px;">0.636</td> <td style="padding: 2px;">0.629</td> <td style="padding: 2px;">0.617</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px;">0.00</td> <td style="width: 15%; padding: 2px;">5</td> <td style="width: 15%; padding: 2px;">10</td> <td style="width: 15%; padding: 2px;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px;">0.017</td> <td style="padding: 2px;">0.017</td> <td style="padding: 2px;">0.017</td> <td style="padding: 2px;">0.016</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px;">0.00</td> <td style="width: 15%; padding: 2px;">5</td> <td style="width: 15%; padding: 2px;">10</td> <td style="width: 15%; padding: 2px;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px;">0.655</td> <td style="padding: 2px;">0.653</td> <td style="padding: 2px;">0.645</td> <td style="padding: 2px;">0.633</td> </tr> </table>	Phi	0.00	5	10	15	Lever	0.639	0.636	0.629	0.617	Phi	0.00	5	10	15	Lever	0.017	0.017	0.017	0.016	Phi	0.00	5	10	15	Lever	0.655	0.653	0.645	0.633
Asymmetrical load																																																																									
GM Trans. [m]	4.11																																																																								
Displacement [t]	205.39																																																																								
TCG [m]	0.639																																																																								
M.I [t*m]	131.1715																																																																								
Wind load																																																																									
Total surface [m2]	62.00																																																																								
Wind lever [m]	2.48																																																																								
Factor C	1.6																																																																								
Wind force	Bf. 5-6																																																																								
Wind pressure [t/m2]	0.014																																																																								
M.II [t*m]	3.444																																																																								
Summary																																																																									
Inclination angle [deg.]	9.07																																																																								
T Aft	1.40																																																																								
T Forward	1.26																																																																								
T max. [m]	1.40																																																																								
Depth [m]	2.20																																																																								
Width [m]	9.9																																																																								
Loss of freeboard	0.79																																																																								
Leftover freeboard	0.01																																																																								
Phi	0.00	5	10	15																																																																					
Lever	0.639	0.636	0.629	0.617																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.017	0.017	0.017	0.016																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.655	0.653	0.645	0.633																																																																					



Appendix E – Load case IV

	Stability Calculation			
	Project : se-21072		Originator : LLU	
	Doc. No :		Checked :	
	Subject/Remarks : Case IV		Revision : A1	

Loading table								
Description	Weight [ton]	LCG [m]	TCG [m]	VCG [m]	FS.corr	X MOM [tonm]	Y MOM [tonm]	Z MOM [tonm]
Lightship	164.50	12.68	0.00	1.86		2085.86	0.00	305.97
Additional Cargo	30.00	15.00	0.00	4.20		450.00	0.00	126.00
Nifty-lift-HR21	6.89	21.80	0.00	3.29		150.20	0.00	22.67
Total	201.39	13.34	0.000	2.26	0.00	2686.06	0.00	454.64


Floating position	
Draught	1.31 [m]
Trim	0.25 [m]

Critical angles	
Max. angle water entrance deck	11.00 degree
Max. angle of kim	15.00 degree

Transverse stability	
KG =	2.26 [m]
GG' =	0.000 [m]
KG' =	2.26 [m]
KMt =	6.57 [m]
GM' =	4.31 [m]
Longitudinal stability	
LCB	12.89 [m]
MCTC	366.80 [m]
LCG-LCB	0.45 [m]
Trim mom	90.42483 [t*m]

GZ values	
Heeling Angle [degrees]	GZ [m]
0	0.00
5	0.38
10	0.75
15	1.11


GZ in range 0°-15°			
Angle	GZ	SF	GZ*SF
0	0.000	1	0.00
5	0.375	4	1.50
10	0.748	2	1.50
15	1.115	4	4.46
Total			7.46

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5" style="text-align: left; padding: 2px;">Stability Calculation</th> </tr> <tr> <td style="width: 15%; padding: 2px;">Project :</td> <td style="width: 45%; padding: 2px;">se-21072</td> <td style="width: 15%; padding: 2px;">Originator :</td> <td colspan="2" style="width: 25%; padding: 2px;">LLu</td> </tr> <tr> <td style="padding: 2px;">Doc. No. :</td> <td style="padding: 2px;"></td> <td style="padding: 2px;">Checked :</td> <td colspan="2" style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Subject/Remarks :</td> <td style="padding: 2px; text-align: center;">Case IV</td> <td style="padding: 2px;">Revision :</td> <td colspan="2" style="padding: 2px;">A1</td> </tr> </table>	Stability Calculation					Project :	se-21072	Originator :	LLu		Doc. No. :		Checked :			Subject/Remarks :	Case IV	Revision :	A1	
Stability Calculation																					
Project :	se-21072	Originator :	LLu																		
Doc. No. :		Checked :																			
Subject/Remarks :	Case IV	Revision :	A1																		

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Asymmetrical load</th> </tr> <tr> <td style="width: 70%; padding: 2px;">GM Trans. [m]</td> <td style="width: 30%; padding: 2px; text-align: right;">4.31</td> </tr> <tr> <td style="padding: 2px;">Displacement [t]</td> <td style="padding: 2px; text-align: right;">201.39</td> </tr> <tr> <td style="padding: 2px;">TCG [m]</td> <td style="padding: 2px; text-align: right;">0.000</td> </tr> <tr> <td style="padding: 2px;">M.I [t*m]</td> <td style="padding: 2px; text-align: right;">0</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Wind load</th> </tr> <tr> <td style="width: 70%; padding: 2px;">Total surface [m2]</td> <td style="width: 30%; padding: 2px; text-align: right;">62.00</td> </tr> <tr> <td style="padding: 2px;">Wind lever [m]</td> <td style="padding: 2px; text-align: right;">2.48</td> </tr> <tr> <td style="padding: 2px;">Factor C</td> <td style="padding: 2px; text-align: right;">1.6</td> </tr> <tr> <td style="padding: 2px;">Wind force</td> <td style="padding: 2px; text-align: right;">Bf. 5-6</td> </tr> <tr> <td style="padding: 2px;">Wind pressure [t/m2]</td> <td style="padding: 2px; text-align: right;">0.014</td> </tr> <tr> <td style="padding: 2px;">M.II [t*m]</td> <td style="padding: 2px; text-align: right;">3.444</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Summary</th> </tr> <tr> <td style="width: 70%; padding: 2px;">Inclination angle [deg.]</td> <td style="width: 30%; padding: 2px; text-align: right;">0.23</td> </tr> <tr> <td style="padding: 2px;">T Aft</td> <td style="padding: 2px; text-align: right;">1.43</td> </tr> <tr> <td style="padding: 2px;">T Forward</td> <td style="padding: 2px; text-align: right;">1.18</td> </tr> <tr> <td style="padding: 2px;">T max. [m]</td> <td style="padding: 2px; text-align: right;">1.43</td> </tr> <tr> <td style="padding: 2px;">Depth [m]</td> <td style="padding: 2px; text-align: right;">2.20</td> </tr> <tr> <td style="padding: 2px;">Width [m]</td> <td style="padding: 2px; text-align: right;">9.9</td> </tr> <tr> <td style="padding: 2px;">Loss of freeboard</td> <td style="padding: 2px; text-align: right;">0.02</td> </tr> <tr> <td style="padding: 2px;">Leftover freeboard</td> <td style="padding: 2px; text-align: right;">0.75</td> </tr> </table>	Asymmetrical load		GM Trans. [m]	4.31	Displacement [t]	201.39	TCG [m]	0.000	M.I [t*m]	0	Wind load		Total surface [m2]	62.00	Wind lever [m]	2.48	Factor C	1.6	Wind force	Bf. 5-6	Wind pressure [t/m2]	0.014	M.II [t*m]	3.444	Summary		Inclination angle [deg.]	0.23	T Aft	1.43	T Forward	1.18	T max. [m]	1.43	Depth [m]	2.20	Width [m]	9.9	Loss of freeboard	0.02	Leftover freeboard	0.75	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.000</td> <td style="padding: 2px; text-align: center;">0.000</td> <td style="padding: 2px; text-align: center;">0.000</td> <td style="padding: 2px; text-align: center;">0.000</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> </tr> </table>	Phi	0.00	5	10	15	Lever	0.000	0.000	0.000	0.000	Phi	0.00	5	10	15	Lever	0.017	0.017	0.017	0.017	Phi	0.00	5	10	15	Lever	0.017	0.017	0.017	0.017
Asymmetrical load																																																																									
GM Trans. [m]	4.31																																																																								
Displacement [t]	201.39																																																																								
TCG [m]	0.000																																																																								
M.I [t*m]	0																																																																								
Wind load																																																																									
Total surface [m2]	62.00																																																																								
Wind lever [m]	2.48																																																																								
Factor C	1.6																																																																								
Wind force	Bf. 5-6																																																																								
Wind pressure [t/m2]	0.014																																																																								
M.II [t*m]	3.444																																																																								
Summary																																																																									
Inclination angle [deg.]	0.23																																																																								
T Aft	1.43																																																																								
T Forward	1.18																																																																								
T max. [m]	1.43																																																																								
Depth [m]	2.20																																																																								
Width [m]	9.9																																																																								
Loss of freeboard	0.02																																																																								
Leftover freeboard	0.75																																																																								
Phi	0.00	5	10	15																																																																					
Lever	0.000	0.000	0.000	0.000																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.017	0.017	0.017	0.017																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.017	0.017	0.017	0.017																																																																					



Appendix F – Load case V

	Stability Calculation			
	Project : se-21072		Originator : LLu	
	Doc. No :		Checked :	
	Subject/Remarks : Case V		Revision : A1	

Loading table								
Description	Weight [ton]	LCG [m]	TCG [m]	VCG [m]	FS.corr	X MOM [tonm]	Y MOM [tonm]	Z MOM [tonm]
Lightship	164.50	12.68	0.00	1.86		2085.86	0.00	305.97
Crane parking position	-7.00	22.77	3.87	4.50		-159.39	-27.09	-31.50
Crane at max outreach	7.00	22.77	8.37	4.50		159.39	58.59	31.50
Crane load	4.00	22.77	20.87	7.50		91.08	83.48	30.00
Additional Cargo	30.00	15.00	0.00	4.20		450.00	0.00	126.00
Nifty-lift-HR21	6.89	21.80	0.00	3.29		150.20	0.00	22.67
Total	205.39	13.52	0.560	2.36	0.00	2777.14	114.98	484.64

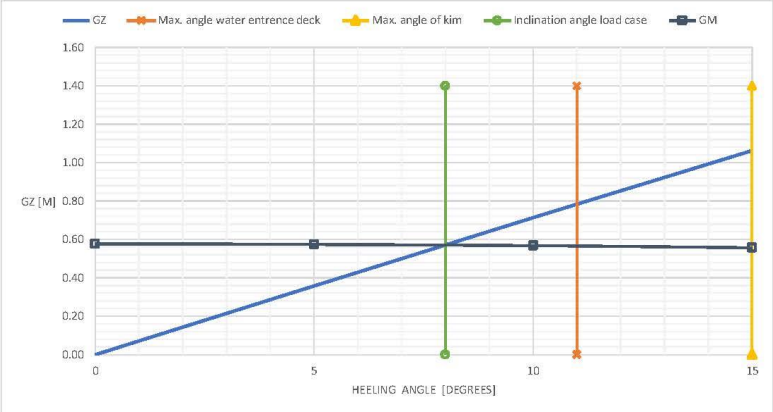
Floating position	
Draught	1.33 [m]
Trim	0.36 [m]

Critical angles	
Max. angle water entrance deck	11.00 degree
Max. angle of kim	15.00 degree


Transverse stability	
KG =	2.36 [m]
GG' =	0.000 [m]
KG' =	2.36 [m]
KMt =	6.47 [m]
GM' =	4.11 [m]

Longitudinal stability	
LCB	12.88 [m]
MCTC	368.32 [m]
LCG-LCB	0.64 [m]
Trim mom	130.772 [t*m]

GZ values	
Heeling Angle [degrees]	GZ [m]
0	0.00
5	0.36
10	0.71
15	1.06




GZ in range 0°-15°			
Angle	GZ	SF	GZ*SF
0	0.000	1	0.00
5	0.358	4	1.43
10	0.713	2	1.43
15	1.063	4	4.25
Total			7.11

	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="5" style="text-align: left; padding: 2px;">Stability Calculation</th> </tr> <tr> <td style="width: 15%; padding: 2px;">Project :</td> <td style="width: 45%; padding: 2px;">se-21072</td> <td style="width: 15%; padding: 2px;">Originator :</td> <td colspan="2" style="width: 25%; padding: 2px;">LLu</td> </tr> <tr> <td style="padding: 2px;">Doc. No. :</td> <td style="padding: 2px;"></td> <td style="padding: 2px;">Checked :</td> <td colspan="2" style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">Subject/Remarks :</td> <td style="padding: 2px; text-align: center;">Case V</td> <td style="padding: 2px;">Revision :</td> <td colspan="2" style="padding: 2px;">A1</td> </tr> </table>	Stability Calculation					Project :	se-21072	Originator :	LLu		Doc. No. :		Checked :			Subject/Remarks :	Case V	Revision :	A1	
Stability Calculation																					
Project :	se-21072	Originator :	LLu																		
Doc. No. :		Checked :																			
Subject/Remarks :	Case V	Revision :	A1																		

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Asymmetrical load</th> </tr> <tr> <td style="width: 60%; padding: 2px;">GM Trans. [m]</td> <td style="width: 40%; padding: 2px; text-align: right;">4.11</td> </tr> <tr> <td style="padding: 2px;">Displacement [t]</td> <td style="padding: 2px; text-align: right;">205.39</td> </tr> <tr> <td style="padding: 2px;">TCG [m]</td> <td style="padding: 2px; text-align: right;">0.560</td> </tr> <tr> <td style="padding: 2px;">M I [t*m]</td> <td style="padding: 2px; text-align: right;">114.98</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Wind load</th> </tr> <tr> <td style="width: 60%; padding: 2px;">Total surface [m2]</td> <td style="width: 40%; padding: 2px; text-align: right;">62.00</td> </tr> <tr> <td style="padding: 2px;">Wind lever [m]</td> <td style="padding: 2px; text-align: right;">2.48</td> </tr> <tr> <td style="padding: 2px;">Factor C</td> <td style="padding: 2px; text-align: right;">1.6</td> </tr> <tr> <td style="padding: 2px;">Wind force</td> <td style="padding: 2px; text-align: right;">Bf. 5-6</td> </tr> <tr> <td style="padding: 2px;">Wind pressure [t/m2]</td> <td style="padding: 2px; text-align: right;">0.014</td> </tr> <tr> <td style="padding: 2px;">M II [t*m]</td> <td style="padding: 2px; text-align: right;">3.444</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">Summary</th> </tr> <tr> <td style="width: 60%; padding: 2px;">Inclination angle [deg.]</td> <td style="width: 40%; padding: 2px; text-align: right;">7.99</td> </tr> <tr> <td style="padding: 2px;">T Aft</td> <td style="padding: 2px; text-align: right;">1.50</td> </tr> <tr> <td style="padding: 2px;">T Forward</td> <td style="padding: 2px; text-align: right;">1.15</td> </tr> <tr> <td style="padding: 2px;">T max. [m]</td> <td style="padding: 2px; text-align: right;">1.50</td> </tr> <tr> <td style="padding: 2px;">Depth [m]</td> <td style="padding: 2px; text-align: right;">2.20</td> </tr> <tr> <td style="padding: 2px;">Width [m]</td> <td style="padding: 2px; text-align: right;">9.9</td> </tr> <tr> <td style="padding: 2px;">Loss of freeboard</td> <td style="padding: 2px; text-align: right;">0.70</td> </tr> <tr> <td style="padding: 2px;">Leftover freeboard</td> <td style="padding: 2px; text-align: right;">0.00</td> </tr> </table>	Asymmetrical load		GM Trans. [m]	4.11	Displacement [t]	205.39	TCG [m]	0.560	M I [t*m]	114.98	Wind load		Total surface [m2]	62.00	Wind lever [m]	2.48	Factor C	1.6	Wind force	Bf. 5-6	Wind pressure [t/m2]	0.014	M II [t*m]	3.444	Summary		Inclination angle [deg.]	7.99	T Aft	1.50	T Forward	1.15	T max. [m]	1.50	Depth [m]	2.20	Width [m]	9.9	Loss of freeboard	0.70	Leftover freeboard	0.00	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.560</td> <td style="padding: 2px; text-align: center;">0.558</td> <td style="padding: 2px; text-align: center;">0.551</td> <td style="padding: 2px; text-align: center;">0.541</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.017</td> <td style="padding: 2px; text-align: center;">0.016</td> </tr> </table> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 15%; padding: 2px;">Phi</td> <td style="width: 15%; padding: 2px; text-align: center;">0.00</td> <td style="width: 15%; padding: 2px; text-align: center;">5</td> <td style="width: 15%; padding: 2px; text-align: center;">10</td> <td style="width: 15%; padding: 2px; text-align: center;">15</td> </tr> <tr> <td style="padding: 2px;">Lever</td> <td style="padding: 2px; text-align: center;">0.577</td> <td style="padding: 2px; text-align: center;">0.574</td> <td style="padding: 2px; text-align: center;">0.568</td> <td style="padding: 2px; text-align: center;">0.557</td> </tr> </table>	Phi	0.00	5	10	15	Lever	0.560	0.558	0.551	0.541	Phi	0.00	5	10	15	Lever	0.017	0.017	0.017	0.016	Phi	0.00	5	10	15	Lever	0.577	0.574	0.568	0.557
Asymmetrical load																																																																									
GM Trans. [m]	4.11																																																																								
Displacement [t]	205.39																																																																								
TCG [m]	0.560																																																																								
M I [t*m]	114.98																																																																								
Wind load																																																																									
Total surface [m2]	62.00																																																																								
Wind lever [m]	2.48																																																																								
Factor C	1.6																																																																								
Wind force	Bf. 5-6																																																																								
Wind pressure [t/m2]	0.014																																																																								
M II [t*m]	3.444																																																																								
Summary																																																																									
Inclination angle [deg.]	7.99																																																																								
T Aft	1.50																																																																								
T Forward	1.15																																																																								
T max. [m]	1.50																																																																								
Depth [m]	2.20																																																																								
Width [m]	9.9																																																																								
Loss of freeboard	0.70																																																																								
Leftover freeboard	0.00																																																																								
Phi	0.00	5	10	15																																																																					
Lever	0.560	0.558	0.551	0.541																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.017	0.017	0.017	0.016																																																																					
Phi	0.00	5	10	15																																																																					
Lever	0.577	0.574	0.568	0.557																																																																					

Appendix G – Load case VI

	Stability Calculation			
	Project : se-21072		Originator : LLu	
	Doc. No :		Checked :	
	Subject/Remarks : Case VI		Revision : A1	

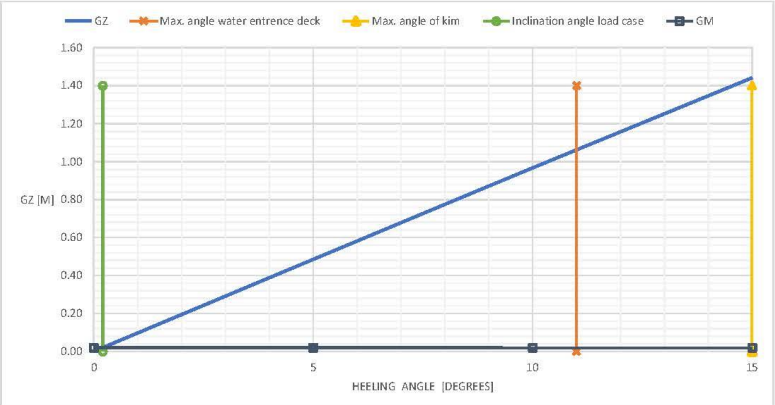
Loading table								
Description	Weight [ton]	LCG [m]	TCG [m]	VCG [m]	FS.corr	X MOM [tonm]	Y MOM [tonm]	Z MOM [tonm]
Lightship	164.50	12.68	0.00	1.86		2085.86	0.00	305.97
Additional Cargo	30.00	15.00	0.00	4.20		450.00	0.00	126.00
Nifty-lift-HR21	6.89	21.80	0.00	3.29		150.20	0.00	22.67
Spud pole upper position	-6.00	12.52	0.00	4.00		-75.12	0.00	-24.00
Spud pole lower position	6.00	12.52	0.00	-2.00		75.12	0.00	-12.00
Spud pole ground force	-29.80	12.52	0.00	3.20		-373.10	0.00	-95.36
Total	171.59	13.48	0.000	1.88	0.00	2312.97	0.00	323.28

Floating position	
Draught	1.16 [m]
Trim	0.26 [m]


Critical angles	
Max. angle water entrance deck	11.00 degree
Max. angle of kim	15.00 degree

Transverse stability	
KG =	1.88 [m]
GG' =	0.000 [m]
KG' =	1.88 [m]
KMt =	7.45 [m]
GM' =	5.57 [m]
Longitudinal stability	
LCB	12.92 [m]
MCTC	365.27 [m]
LCG-LCB	0.56 [m]
Trim mom	96.29603 [t*m]

GZ values	
Heeling Angle [degrees]	GZ [m]
0	0.00
5	0.49
10	0.97
15	1.44



GZ in range 0°-15°			
Angle	GZ	SF	GZ*SF
0	0.000	1	0.00
5	0.485	4	1.94
10	0.967	2	1.93
15	1.441	4	5.76
Total			9.64

	Stability Calculation				
	Project :	se-21072		Originator :	LLu
	Doc. No. :			Checked :	
	Subject/Remarks :	Case VI		Revision :	A1

Asymmetrical load	
GM Trans. [m]	5.57
Displacement [t]	171.59
TCG [m]	0.000
M.I [t*m]	0

Wind load	
Total surface [m2]	62.00
Wind lever [m]	2.48
Factor C	1.6
Wind force	Bf. 5-6
Wind pressure [t/m2]	0.014
M.II [t*m]	3.444

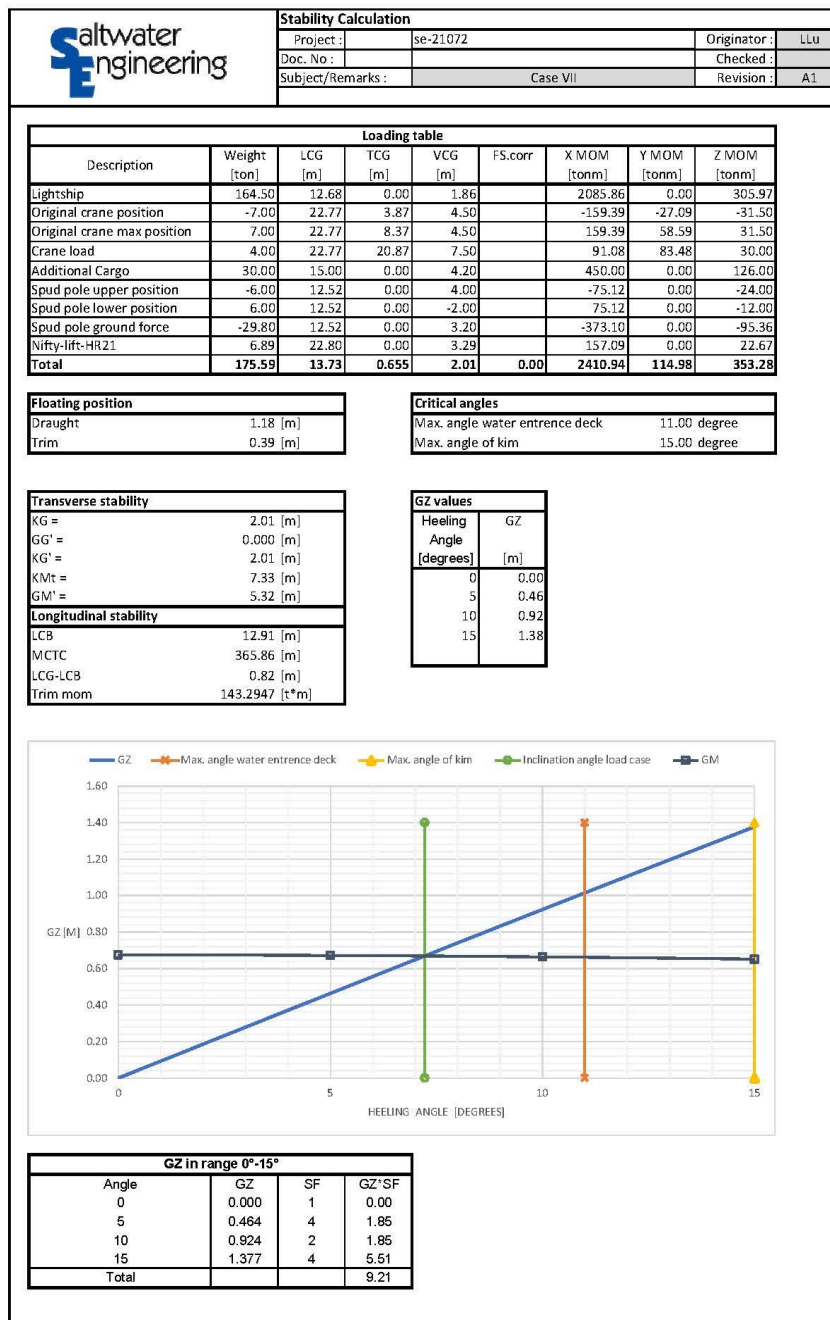
Summary	
Inclination angle [deg.]	0.21
T Aft	1.29
T Forward	1.03
T max. [m]	1.29
Depth [m]	2.20
Width [m]	9.9
Loss of freeboard	0.02
Leftover freeboard	0.89


Phi	0.00	5	10	15
Lever	0.000	0.000	0.000	0.000

Phi	0.00	5	10	15
Lever	0.020	0.020	0.020	0.019

Phi	0.00	5	10	15
Lever	0.020	0.020	0.020	0.019

Appendix H – Load case VII



	Stability Calculation					
	Project :	se-21072			Originator :	LLu
	Doc. No. :				Checked :	
	Subject/Remarks :	Case VII			Revision :	A1

Asymetrical load	
GM Trans. [m]	5.32
Displacement [t]	175.59
TCG [m]	0.655
M.I [t*m]	114.98

Wind load	
Total surface [m2]	62.00
Wind lever [m]	2.48
Factor C	1.6
Wind force	Bf. 5-6
Wind pressure [t/m2]	0.014
M.II [t*m]	3.444

Summary	
Inclination angle [deg.]	7.22
T Aft	1.37
T Forward	0.98
T max. [m]	1.37
Depth [m]	2.20
Width [m]	9.9
Loss of freeboard	0.63
Leftover freeboard	0.20

Phi	0.00	5	10	15
Lever	0.655	0.652	0.645	0.633

Phi	0.00	5	10	15
Lever	0.020	0.020	0.019	0.019

Phi	0.00	5	10	15
Lever	0.674	0.672	0.664	0.651