





01	21.08.2018	For use	Intermoor A/S	Rune Smenes 	Einar Framnes 
Revision:	Date:	Reason for issue:	Prepared by:	Verified by:	Approved by:

Title:

Review of mooring analysis for TOA at the Brasse East location.

Document number: BRSE-FPNO-D15-00015



To:	Well Expertise
From:	Intermoor AS: Paul I Fevang
Date:	21.08.2018
Copy to:	Rune Smenes and Mike Simpson
Our Ref.:	30326-REP-001 Rev 1
Review of:	M-016-2018R0 Mooring Analysis for Transocean Arctic in 123m Waterdepth (Field: Brasse East, Season: All-year)
Number of pages:	2 + Review check list
Subject:	Review of Mooring Analysis

Summary:

The mooring analysis "Transocean Arctic in 123m Waterdepth" is reviewed according to our internal checklist for mooring analysis. Please see attachments. The main findings are listed below:

1. All safety factors and offsets are within the requirements given in NMA2009.
2. Transocean Arctic is planned moored at Brasse East, using minimum 1250m 84mm R4 on seven lines and 250m 84mm + 250m 125mm chain on line 4. Four lines will have 800m fiber inserts and four lines will have 1200m fiber insert. All lines will have 4 buoys.
3. The mooring analysis is valid for the whole year.
4. The maximum installation tension at the anchor is 367 Te.
5. Anchor #4 are planned located 100m from a pipeline.

Comment:

1. Metocean report is not field specific, but for "One location in North Sea". It is not possible to check that this report is applicable for the Brasse East location. Location coordinates should be stated. Additional information needed.
2. The rig will use its own chain on the location i.e. 7 x 1300m and 1 x 1250m. This should be reflected in the mooring analysis. Please update.
3. The fiber rope lengths comes in 400m and 800m segments. Thus, a 1200m length fiber rope should be modeled as 800m + 400m rope, with a connection weight of approx. 2Te and length of 8m. This must be reflected in the buoyancy calculations.



Adaptors, shackles, thimbles and assemblies

Component	Length [m]	W _{dry} [kg]	W _{wet} [kg]
Fibre shackle	-	280 ¹⁾	243
Fibre thimble	-	230 ²⁾	200
84mm 11-link adaptor	~4	~600	~522

Fibre-fibre connection

Thimble ⇒ Shackle ⇒ Adaptor ⇒ Kenter ⇒ Adaptor ⇒ Shackle ⇒ Thimble

Length: ~ 8 m

Dry weight [kg]:

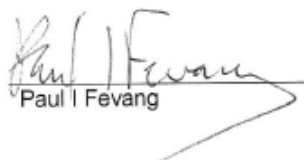
- Thimbles: 2 x 230 = 460 (weighed in Dusavik 25.05.2018)
- Shackles: 2 x 280 = 560 (weighed in Dusavik 25.05.2018)
- 84mm adaptor: 2 x (10 x 50 + 80) = 1200
- Kenter link: 80
- Total: 2300

Dry weight pr. m: 2300 / 8 = 287 kg/m. Wet weight pr. m: 267 x 0.869 = 250 kg/m

Please update.

- The Hs/Tp combinations for 262.5° given on page 9, does not include any Tp values higher than 17.7s which is the value corresponding to the highest Hs. It is common practice also to check for higher Tp values. The give Hs/Tp contour does not fit the maximum Hs of 17.1m. Please update.
- There is a misprint in table 9 for the "Horizontal distance Fairlead-Anchor". The table should also be updated with actual chain lengths and adaptors, chaser stoppers and chain tails should be included. Please update.
- Anchor coordinates should be updated to reflect actual lengths. It should also be stated what is acceptable installation tolerances for the anchors (+/-50m?) and how it affect vertical clearances. Please update.
- Chapter 9; it is assumed that it should state "4 thrusters can be run at 100%...". Please confirm.

Regards,


 Paul I Fevang

20.8.2018

engineering:checklist_offshoremooring [iPortal Documents]



iPortal Documents

Check list for offshore mooring

The purpose of this check list is offshore mooring of drilling rigs

Document: M-016-2018 R0

Fill out the checklist using Y, N or N/A (not applicable), as appropriate.

Project	Orig.	Check.
Scope of work compliance		Y
Comments (client, operator, 3rd party etc.) implemented		Y
Comments:		

Document format	Orig.	Check.
Title sheet details correct?		Y
Client title sheet, if required?		Y
Contents format?		Y
Legibility?		Y
Diagrams clear?		Y
Tables clear and complete?		Y
Correct page numbering?		Y
References and cross references correct?		Y
Appendices correct?		Y
Comments:		

Design input	Orig.	Check.
Are the correct set of rules applied and referred to?		Y
Correct vessel position and heading?	192.5°	Y
Correct water depth at each anchor?	123m	Y
Correct reference system referred to?	ED 50	Y
Correct soil information?		Y
Correct metocean data applied and referred to?		Y
Vessel RAOs correct and applicable?		Y
Correct mooring component properties? NB fibre surv vs. oper	Fiber 8100kN	Y
	MBSL	

http://docs.iportal.no/doku.php?id=engineering:checklist_offshoremooring

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engineering/checklist_offshoremoooring [iPortal Documents]

Design input	Orig.	Check.
Comments: Fiber should have MSL of 8000kN. Actual lengths should have been used.		

Mooring spread	Orig.	Check.
Good symmetry and even pretensions?		✓
Minimal use of fibre and buoys?		✓
Sufficient rig chain/wire for skidding?		✓
Sufficient clearances to structures and corals/sponges?		✓
Comments: symmetry is as good as possible. Seabed infrastructure does affect symmetry. Wrong distance in Table 9.		

Analysis and parameters	Orig.	Check.
All design cases included (intact, line failure, thrust failure)?		✓
Correct weather applied?		✓
Correct Code setting in GMoor (=ISO)?		NA
Correct wave spectrum and spreading?		✓
Correct damping?		✓
Correct viscous correction?		✓
Correct thrust reduction?		✓
Correct fibre stiffness surv/opet?		✓
Comments: "Spelling-error" in Chapter 9, should say 4-thrusters.		

Results and recommendations	Orig.	Check.
Safety factors comply with the rules?		✓
Anchor loads correct and acceptable?		✓
Acceptable transient offset?		✓
Recommendations for fluke, tensioning and DIGIN correct?		✓
Comments:		

Originator signature and date:

Checker signature and date: 21/8-18



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