

## DETAILED REPORT - Dynamic Calculation

Berth: Demo Terminal  
North Berth [test] 120°

Vessel: Flex Polaris [test] 7654321  
Port Side, Fully laden, MEG 4

Date and Time: 03 Sep 2021 15:00 LT

Wind: 30 knot(s) 215° (from True N)  
From 095° relative to ship  
at 10 metres, steady wind. No gusts

Current: 0.5 knot(s) 190°N (to) At half draught  
From 250° relative to ship

<u>Waves</u>	<u>Heading</u>	<u>Significant Height</u>	<u>Period</u>	<u>Spectrum</u>	<u>Gamma</u>
Primary	230°	0.92 m	7.66 sec	JONSWAP	3.3
<i>No Secondary Waves</i>					

Water/Tide Level: 1.00 m from LAT (vertical datum)

Controlled Depth: 11.7 m (below vertical datum)

Draught: 12.10 m Trim: 0.00 m UKC: 0.60 m

Water Depth/Draught: 1.05

**Hull Current Coefficients:**

Coefficient Set: MEG4 LNG Carrier 1.1

**Hull Wind Coefficients:**

Coefficient Set: MEG4 SIGTTO 2007 Prismatic

## Definitions

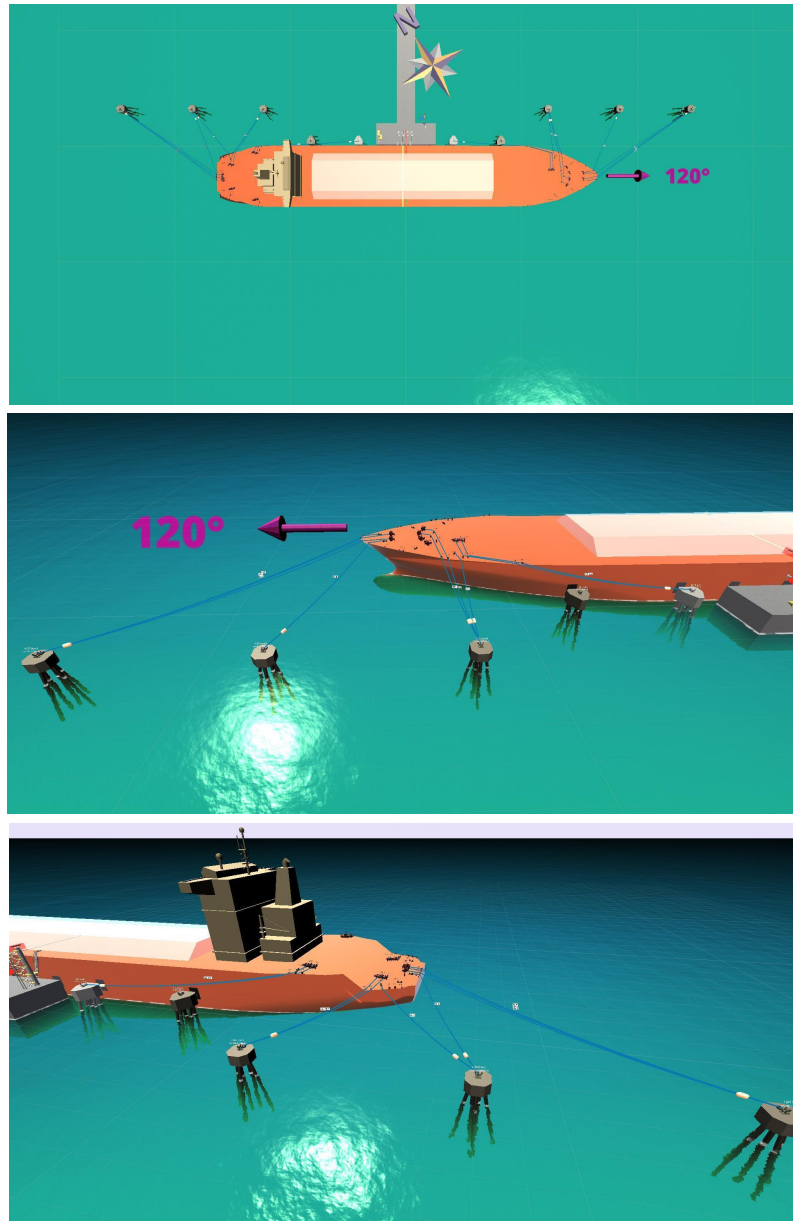
The Minimum, Significant and Maximum values referred to in this report are defined as:

<b>Minimum</b>	Minimum motions (movement and rotation), line loads, fender loads, etc. These are the minimum values reached for the full 3-hour time-series results.
<b>Significant</b>	Motions (movement, velocity, acceleration and rotation), line loads, fender loads, etc. corresponding to the mean of the highest third of peak to trough events over the full 3-hour time-series, usually defined as four times the standard deviation and, in the case of waves, corresponding to the height that a skilled observer would perceive.
<b>Maximum</b>	Maximum motions (movement and rotation), line loads, fender loads, etc. These are the maximum values reached for the full 3-hour time-series results.

**The full time-series results are available in HTML format from:**

<https://www.shipmoor.com/admin/Report.aspx?SessionID=VXFLHOWB-2-4-4-9-000001&ReportType=DynamicTimeSeries>

Selected mooring configuration:



	Head Lines	Fwd Lines Breast	Spring	Aft Lines Spring	Breast	Stern Lines	Total Lines	Capacity
<b>Selected Configuration</b>	4	3	2	2	3	4	18	
Terminal Requirement	4	3	2	2	3	4	N/A	$\leq 217000 \text{ m}^3$

### Vessel motion at spotting line:

#### Surge:

Minimum	-0.1 m (AFT)
Significant	0.1 m
Maximum	+0.1 m (FWD)

#### Sway:

Minimum	0.0 m
Significant	0.3 m
Maximum	+0.8 m (INWARD, TO PORT)

#### Heave:

Minimum	-0.1 m (DOWN)
Significant	0.1 m
Maximum	+0.1 m (UP)

#### Yaw:

Minimum	-0.2° (STBD)
Significant	0.2°
Maximum	+0.1° (PORT)

#### Roll:

Minimum	-0.1° (PORT)
Significant	0.1°
Maximum	+0.3° (STBD)

#### Pitch:

Minimum	-0.1° (AFT)
Significant	0.1°
Maximum	+0.1° (FWD)

Maximum permissible values at berth:

Surge	±2.00 m	Sway	±2.00 m
Heave	±1.00 m	Yaw	±3°

### Static Environmental Load

- 1 t applied to the stern
- 91 t applied to the starboard side
- 1887 t·m to port

### Wind Load

- 1 t applied to the bow
- 121 t applied to the starboard side
- 2454 t·m to port

### Current Load

- 2 t applied to the stern
- 31 t applied to the port side
- 567 t·m to starboard

**Main Deck Elevation:**

Minimum heave	7.83 m above central jetty
Maximum heave	7.97 m above central jetty

**Gangway vertical range above central jetty:**

Shore Gangway (1)	2.0 m to 17.0 m
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**Ship Target Manifold:**

	Displacement [m]			Velocity [m/s]		Acceleration [m/s <sup>2</sup> ]	
	Minimum	Significant	Maximum	Significant	*Absolute Maximum	Significant	*Absolute Maximum
X	-0.07	0.10	+0.10	0.03	0.03	0.02	0.02
Y	0.00	0.25	+0.73	0.10	0.10	0.07	0.07
Z	-0.07	0.10	+0.12	0.06	0.06	0.04	0.04

*\* The higher of the absolute value of the maximum and minimum values*

Mooring Line (Pre-Tension)	From Winch	Via Fairlead	To Berth Mooring	Material (Line / Tail)	Line LDBF [t]	Line tension [t]	Line % LDBF	
Headline 1 (0t)	1	1	10 [E5 (hook)] on 6 [MD-6]	Dyneema/Nylon Tail	93	0	0%	Minimum Significant <b>Maximum</b>
Headline 2 (5t)	3	0	10 [E5 (hook)] on 6 [MD-6]	Dyneema/Nylon Tail	93	0 4 5	0% 4% 6%	Minimum Significant <b>Maximum</b>
Headline 3 (5t)	4	2	10 [E5 (hook)] on 6 [MD-6]	Dyneema/Nylon Tail	93	0 3 5	0% 4% 5%	Minimum Significant <b>Maximum</b>
Headline 4 (0t)	2	4	9 [E4 (hook)] on 5 [MD-5]	Dyneema/Nylon Tail	93	0 0 0	0% 0% 0%	Minimum Significant <b>Maximum</b>
Fwd Breast 1 (5t)	7	12	8 [E3 (hook)] on 4 [MD-4]	Dyneema/Nylon Tail	93	0 1 4	0% 2% 5%	Minimum Significant <b>Maximum</b>
Fwd Breast 2 (5t)	9	14	8 [E3 (hook)] on 4 [MD-4]	Dyneema/Nylon Tail	93	0 1 4	0% 1% 5%	Minimum Significant <b>Maximum</b>
Fwd Breast 3 (0t)	16	16	8 [E3 (hook)] on 4 [MD-4]	Dyneema/Nylon Tail	93	0 0 0	0% 0% 0%	Minimum Significant <b>Maximum</b>
Fwd Spring 1 (5t)	18	18	6 [E1 (hook)] on 3 [BD-3]	Dyneema/Nylon Tail	93	1 2 5	1% 2% 5%	Minimum Significant <b>Maximum</b>
Fwd Spring 2 (5t)	22	20	6 [E1 (hook)] on 3 [BD-3]	Dyneema/Nylon Tail	93	1 2 5	1% 2% 5%	Minimum Significant <b>Maximum</b>
Aft Spring 1 (5t)	116	120	5 [W1 hook] on 2 [BD-2]	Dyneema/Nylon Tail	93	1 2 4	2% 2% 4%	Minimum Significant <b>Maximum</b>
Aft Spring 2 (5t)	118	122	5 [W1 hook] on 2 [BD-2]	Dyneema/Nylon Tail	93	1 2 4	1% 2% 4%	Minimum Significant <b>Maximum</b>

Aft Breast 1 (5t)	114	118	3 [W3 hook] on 3 [MD-3]	Dyneema/Nylon Tail	93	0 1 4	0% 1% 4%	Minimum Significant Maximum
Aft Breast 2 (5t)	112	116	3 [W3 hook] on 3 [MD-3]	Dyneema/Nylon Tail	93	0 1 4	0% 1% 4%	Minimum Significant Maximum
Aft Breast 3 (0t)	110	114	2 [W4 hook] on 2 [MD-2]	Dyneema/Nylon Tail	93	0 0 0	0% 0% 0%	Minimum Significant Maximum
Sternline 1 (5t)	103	103	1 [W5 hook] on 1 [MD-1]	Dyneema/Nylon Tail	93	0 3 4	0% 3% 5%	Minimum Significant Maximum
Sternline 2 (5t)	101	101	1 [W5 hook] on 1 [MD-1]	Dyneema/Nylon Tail	93	0 3 4	0% 3% 5%	Minimum Significant Maximum
Sternline 3 (5t)	106	102	1 [W5 hook] on 1 [MD-1]	Dyneema/Nylon Tail	93	0 3 4	0% 3% 5%	Minimum Significant Maximum
Sternline 4 (0t)	102	104	2 [W4 hook] on 2 [MD-2]	Dyneema/Nylon Tail	93	0 0 0	0% 0% 0%	Minimum Significant Maximum

Berth Mooring Point	Hook Nr		* Horiz / Vertical Direction (Static) [°]	Horizontal Force [t]	Uplift Force [t]	Total Force [t]	% SWL	
1 [W5 hook] on 1 [MD-1]	1	Sternline 1	156	4	0	4	3	Significant
			1	6	0	6	5	Maximum
1 [W5 hook] on 1 [MD-1]	2	Sternline 2	155	4	0	4	3	Significant
			1	6	0	6	5	Maximum
1 [W5 hook] on 1 [MD-1]	3	Sternline 3	154	4	0	4	3	Significant
			1	5	0	5	5	Maximum
2 [W4 hook] on 2 [MD-2]	1	Sternline 4	188	0	0	0	0	Significant
			2	0	0	0	0	Maximum
2 [W4 hook] on 2 [MD-2]	2	Aft Breast 3	170	0	0	0	0	Significant
			2	0	0	0	0	Maximum
3 [W3 hook] on 3 [MD-3]	1	Aft Breast 2	243	1	0	1	1	Significant
			3	3	0	3	2	Maximum
3 [W3 hook] on 3 [MD-3]	2	Aft Breast 1	241	1	0	1	1	Significant
			3	3	0	3	2	Maximum
5 [W1 hook] on 2 [BD-2]	1	Aft Spring 1	295	1	0	1	1	Significant
			5	3	0	3	2	Maximum
5 [W1 hook] on 2 [BD-2]	2	Aft Spring 2	295	1	0	1	1	Significant
			6	2	0	3	2	Maximum
6 [E1 (hook)] on 3 [BD-3]	1	Fwd Spring 2	126	2	0	2	1	Significant
			8	4	1	4	3	Maximum
6 [E1 (hook)] on 3 [BD-3]	2	Fwd Spring 1	126	2	0	2	1	Significant
			7	4	1	4	4	Maximum
8 [E3 (hook)] on 4 [MD-4]	1	Fwd Breast 3	210	0	0	0	0	Significant
			12	0	0	0	0	Maximum
8 [E3 (hook)] on 4 [MD-4]	2	Fwd Breast 2	203	2	0	2	2	Significant
			12	6	1	6	5	Maximum
8 [E3 (hook)] on 4 [MD-4]	3	Fwd Breast 1	200	2	0	2	2	Significant
			11	6	1	6	5	Maximum
9 [E4 (hook)] on 5 [MD-5]	1	Headline 4	237	0	0	0	0	Significant
			8	0	0	0	0	Maximum
10 [E5 (hook)] on 6 [MD-6]	1	Headline 3	267	0	0	0	0	Significant
			4	0	0	1	0	Maximum



10 [E5 (hook)] on 6 [MD-6]	2	Headline 2	266 4	0 1	0 0	0 1	0 1	Significant <b>Maximum</b>
10 [E5 (hook)] on 6 [MD-6]	3	Headline 1	265 4	0 0	0 0	0 0	0 0	Significant <b>Maximum</b>

\* Force directions are based on the static equilibrium position and does not consider ship motions caused by dynamic loading

Excessive vertical line inclinations are highlighted in red. Horizontal directions outwith the OCIMF recommended limits are highlighted in orange

Deck Mooring Point	% Max Brake Load	% SWL	Total Force [t]	
1 (Bollard)	-	0	0	Significant
	-	0	0	<b>Maximum</b>
2 (Bollard)	-	0	0	Significant
	-	0	0	<b>Maximum</b>
3 (Fwd mooring (SB))	6	4	4	Significant
	9	5	5	<b>Maximum</b>
4 (Fwd mooring (PS))	6	3	3	Significant
	9	5	5	<b>Maximum</b>
7 (Fwd Anchor 2 (SB))	3	1	1	Significant
	8	4	4	<b>Maximum</b>
9 (Fwd Anchor (SB))	2	1	1	Significant
	8	4	4	<b>Maximum</b>
16 (Bollard)	-	0	0	Significant
	-	0	0	<b>Maximum</b>
18 (Fwd (centre))	3	2	2	Significant
	9	5	5	<b>Maximum</b>
22 (Fwd (centre))	3	2	2	Significant
	9	5	5	<b>Maximum</b>
101 (Aft Centre)	5	3	3	Significant
	8	4	4	<b>Maximum</b>
102 (Aft Centre)	-	0	0	Significant
	-	0	0	<b>Maximum</b>
103 (Aft Centre)	5	3	3	Significant
	8	4	4	<b>Maximum</b>
106 (Aft Centre)	5	3	3	Significant
	8	4	4	<b>Maximum</b>
110 (Aft PS)	-	0	0	Significant
	-	0	0	<b>Maximum</b>
112 (Aft PS)	2	1	1	Significant
	7	4	4	<b>Maximum</b>
114 (Aft PS)	2	1	1	Significant
	7	4	4	<b>Maximum</b>
116 (Aft Spring (PS))	3	2	2	Significant
	7	4	4	<b>Maximum</b>
118 (Aft Spring (PS))	3	2	2	Significant
	7	4	4	<b>Maximum</b>

Fender	Buckling Exceeded	Max Reaction Exceeded	Reaction Force [t]	Compression [m]	% Buckling Compression	* Hull Pressure [t/m <sup>2</sup> ]	** Contact Area % (Static)	
1 (F1)	No	No	5.7	0.09	11	0.4		Minimum
	No	No	16	0.25	31	1.1	100	Significant
	<b>Yes</b>	<b>No</b>	<b>39</b>	<b>0.79</b>	<b>100</b>	<b>2.5</b>		<b>Maximum</b>
2 (F2)	No	No	5.6	0.08	10	0.4		Minimum
	No	No	15	0.22	28	1.0	100	Significant
	<b>Yes</b>	<b>No</b>	<b>39</b>	<b>0.79</b>	<b>100</b>	<b>2.5</b>		<b>Maximum</b>
3 (F3-Jetty)	No	No	5.5	0.08	10	0.4		Minimum
	No	No	15	0.22	28	1.0	100	Significant
	<b>Yes</b>	<b>No</b>	<b>39</b>	<b>0.79</b>	<b>100</b>	<b>2.5</b>		<b>Maximum</b>
4 (F4-Jetty)	No	No	5.4	0.08	10	0.4		Minimum
	No	No	15	0.22	28	1.0	100	Significant
	<b>Yes</b>	<b>No</b>	<b>39</b>	<b>0.79</b>	<b>100</b>	<b>2.5</b>		<b>Maximum</b>
5 (F5-Jetty)	No	No	5.3	0.08	10	0.4		Minimum
	No	No	16	0.23	30	1.0	100	Significant
	<b>Yes</b>	<b>No</b>	<b>39</b>	<b>0.79</b>	<b>100</b>	<b>2.5</b>		<b>Maximum</b>
6 (F6)	No	No	5.3	0.08	10	0.3		Minimum
	No	No	17	0.25	32	1.1	100	Significant
	<b>No</b>	<b>No</b>	<b>38</b>	<b>0.75</b>	<b>95</b>	<b>2.5</b>		<b>Maximum</b>
7 (F7)	-	-	-	-	-	-		Minimum
	-	-	-	-	-	-	No Contact	Significant
	-	-	-	-	-	-		<b>Maximum</b>

\* Hull pressure is approximated based on contact area at the static equilibrium position and does not consider changes to the contact area that may occur due to movements of the fender or the ship due to dynamic loading

\*\* Fender contact areas are based on the static equilibrium position and do not consider ship motions caused by dynamic forces.

