

Notifiable incident

Incident ID [5415](#)

Duty holder: Shell Australia Pty Ltd
Facility/Activity: Prelude FLNG
Facility type: Floating liquefied natural gas facility

Incident details	
Division	Occupational Health and Safety
Notification type	Incident
Incident date	19/05/2018 07:40 PM (WST)
Notification date	19/05/2018 10:15 PM (WST)
NOPSEMA response date	20/05/2018 08:48 AM (WST)
Received by	[REDACTED]
Nearest state	WA
Initial category type <i>(based on notification)</i>	Dangerous Occurrence
Initial category <i>(based on notification)</i>	Other kind needing immediate investigation
3 Day report received	21/05/2018
Final report received	20/06/2018
All required data received	20/06/2018
Final category type <i>(based on final report)</i>	Dangerous Occurrence
Final category <i>(based on final report)</i>	Other kind needing immediate investigation
Brief description	OHS-OKNI-Mooring line failure on offload tanker whilst alongside facility
Location	
Subtype/s	Near miss / high potential
Summary <i>(at notification)</i>	Operator advised the offload tanker (LNGC Gallina) was alongside the facility. At 1940hrs during routine checks in preparation for the connection of the loading arms it was identified that one of the forward mooring lines had parted. At 1950hrs following further checks, concerns were raised over the condition of other forward mooring lines. At 1958hrs a decision was made to carry out a controlled release of the vessel. At 2015hrs the vessel left the facility and returned to the holding area. An investigation will be conducted of the matter. Cronin tried to return the operators call but could not get through or leave a message.

<p>Details (from final report)</p>	<p>Operator advised that while the offload tanker (LNGC Gallina) was alongside the facility at 19:40 hours, during routine checks in preparation for the connection of the loading arms, it was identified that one of the forward mooring lines had parted. At 19:50 hours following further checks, concerns were raised over the condition of other forward mooring lines. At 19:58 hours a decision was made to carry out a controlled release of the vessel. At 20:15 hours the vessel left the facility and returned to the holding area. An investigation will be conducted into the matter. Cronin tried to return the operator's call but could not get through or leave a message.</p> <p>The LNG carrier Gallina had successfully completed berthing trials was therefore alongside and moored at Prelude FLNG at ~5pm on 19/05/18 with 16 mooring lines in place. At this stage, none of the loading arms were connected. During surveillance, an anomaly was observed on the loading on mooring line 3 (loading reduced from 10% to 5% to 0% of maximum break limit) and a field verification at 19:40 was undertaken to check if there was slack in the rope. Upon inspection, mooring line 3 was found to have parted (failed) and some abrasion damage was observed on other mooring lines attaching the Gallina to FLNG.</p> <p>Based on the observed failure of mooring line 3, and some damage to the other mooring lines, the decision was made to undertake a controlled release of the Gallina from FLNG and to move her to the designated holding area. No loading arms had been attached and no hydrocarbon transfer had commenced. At no time during the event were personnel on FLNG or the Gallina placed at risk.</p> <p>Subsequent inspection of the mooring lines showed significant damage to all mooring lines and most fairlead Nylacast inserts.</p> <p>Key observations from the incident were:</p> <ul style="list-style-type: none"> • All 16 mooring lines have been damaged (to various extent) • Damage correlates with load (load on lines vary from 6T to 20T) <ul style="list-style-type: none"> o Typical load of ~6-12T o Failed line had highest load (at 22T. All other lines < 15T) • Damage on lines correlates with location of Prelude mooring Nylacast inserts in fairleads • All mooring Nylacast inserts marked/damaged to various extent (~ 50% showed damage and pickup)
<p>Immediate cause/s</p>	<p>It is currently suspected that the mooring line that failed has chaffed to the point of failure, and that the other mooring lines have chaffed causing damage.</p>
<p>Root cause/s</p>	<p>ED - DESIGN - Design specs - specs NI</p>
<p>Root cause description</p>	<p>Incompatibility of nylon rope with nylon liner on FLNG fairlead. Tight radius edge on nylon liner of fairlead. Dynamic load on nylon rope due to relative motions of LNGC and FLNG results in continuous movement of rope through fairlead.</p> <p>The mooring line technical failure causes are believed to be as follows:</p> <ul style="list-style-type: none"> • The elasticity of nylon pennants meant that the mooring line tails were working continuously over the Nylacast inserts. • Most (but not all) mooring chocks fairleads have lips on the inboard edge. This coupled with lead of mooring lines between the fairleads and the hooks, resulted in small radius pressure points between the rope and the liner resulting in the generation of excessive heat & abrasion, when the nylon lines stretch under tension. <p>Prior to continuing operations, all required modifications were implemented in accordance with an approved MOC (CP305).</p>

<p>Duty inspector recommendation</p>	
<p>Date</p>	<p>21/05/2018</p>
<p>Duty inspector</p>	<p>██████████</p>
<p>Recommendation</p>	<p>Do not conduct Major Investigation</p>
<p>Reasoning</p>	<p>Does not meet MI threshold based on information received</p>
<p>Supporting considerations</p>	<p></p>

Major investigation decision	
Date	21/05/2018
Decision	Do not conduct Major Investigation
Reasoning	Does not meet MI threshold based on information received
Supporting considerations	

Non-major investigation review and recommendation	
Date	21/05/2018
Inspector	
Risk gap	Moderate
Type of standard	Established
Initial strategy	Investigate

Recommended follow up strategy	
Recommended strategy	Investigate within 45 days
Supporting considerations	Parting of a mooring line has the to potential to cause multiple line failures leading to complete mooring failure. During import/export this has the potential for serious consequences. NMI procedure leads to "investigate". Notification #5400 dated 10/05/2018 reported a towing line failure at the facility involving the same gas carrier, recommended strategy elevated to "investigate within 45 days".

Non-major investigation decision	
Date	21/05/2018
RoN	
RoN review result	Agree with recommendation
Strategy decision	Investigate within 45 days
Supporting considerations	

Associated inspection	
Inspection ID	1797