

PILOTAGE ADVISORY COMMITTEE WORKING GROUP

Review of the Berthing Guidelines for Hong Kong Offshore LNG Terminal

Purpose

The purpose of this paper is to seek members' advices and comments on the review of the Berthing Guidelines (BGL) for the east and west berths of the Hong Kong Offshore Liquefied Natural Gas (HKOLNG) Terminal (i.e., HKOLNG(E) and HKOLNG(W)).

Background

2. The BGL for HKOLNG(E) and HKOLNG(W) was consulted by Pilotage Advisory Committee (PAC) in its meeting held on 2 December 2022. The meeting concluded that 2 pilots are required for berthing and 1 pilot is required for unberthing, with a 12-month trial period¹. The Pilotage Authority (i.e. Director of Marine) endorsed the meeting's proposal and it came into effect on 9 January 2023.

3. The first Floating Storage and Regasification Unit (FSRU) vessel and LNG Carrier (LNGC) berthed at the east berth and west berth of HKOLNG on 13 April 2023 and 6 May 2023 respectively.

The Review

4. A meeting was held between Marine Department (MD) and Hong Kong Pilots Association Ltd. (HKPA) to review these BGLs on 14 December 2023. The existing operational parameters in respects of LOA, Draft, and Time are considered appropriate; and in order to make better use of towage resources, the

¹ For information, the PAC meeting voted on the issue of the number of pilot required for LNG vessels for berthing and unberthing the Terminal, and the trial period. The PAC Chairman, 3 official members of MD and licenced pilots were not included in the voting.

description of tugs in the general remarks should be amended to read “2 x 5,000 HP or 70T BP and 2 x 6,500 HP or 80T BP”.

5. However, no consensus was reached on the minimum number of pilot for berthing. While MD opined that the minimum number of pilot to comply with compulsory pilotage should be one (1), HKPA insisted to require two (2) pilots for berthing.

HKPA’s View on Number of Pilot

6. HKPA submitted that:

- (a) For the minimum number of pilots to be deployed for any compulsory pilotage service, considerations should be given to the risk factors of pilotage operations which affecting the safety of a ship in the compulsory pilotage waters.
- (b) Risk factors mainly include human, ship, environment and management factors, plus 4 other aspects. Of which:
 - (i) Human factors include professional quality of pilots and the crew members, operational errors, etc.;
 - (ii) Ship factors include the ship’s working condition, operational performance, etc.;
 - (iii) Environmental factors mainly are the navigational environment conditions, natural environment such as hydrology and meteorology, etc.;
 - (iv) Management factors include pilotage management system and the management of pilotage equipment; and
 - (v) Other aspects are the terminal staff, tug operations, Vessel Traffic Service staff, and those directly related to the pilotage operations.
- (c) In order to minimise these risks, considerations have to be given to the use of tugs inclusive of the number of tugs to be employed and their power, allowable ship’s draft, time for berthing/unberthing, tidal windows, and most importantly, the number of pilot(s) to be deployed.
- (d) The advantage of deploying more than one pilot for certain class of ships such as large oil tankers, LNG carriers and bulk carriers is very obvious, as well as the following favourables:
 - (i) More favourable to the safety of pilotage operations;

- (ii) More positively overcoming impacts of complex navigable waters;
and
- (iii) More effective handling of emergencies.

7. Details of HKPA's submission is attached at **Annex I**.

8. HKPA opined that, with the experience gained in the past 10 months, two (2) pilots should be required for berthing of LNGC, berthing and unberthing of FSRU; and one (1) pilot should be required for unberthing of LNGC.

MD's View on Number of Pilot

9. MD opined that:

- (a) Given the fact that the entire classification, training, standards of competency and examination of pilot is based on one licensed pilot, the minimum number of pilot that would be sufficiently and effectively safe in meeting with the requirement of compulsory pilotage should be one (1);
- (b) The Pilotage Authority would have no objection to any voluntary employment of additional pilot(s);
- (c) Information from the International Maritime Pilots Association (IMPA) to HKPA dated 24 April 2024 stating the number of pilot for LNGC should be 2 is contradictory to its early advice to MD in 2022 that 2 pilots may not be necessary²; and
- (d) A scientific approach, such as simulation, should be adopted in determining the sufficiency/insufficiency of engaging 1 pilot.

The Simulation

10. In May and June 2024, MD has conducted a series of simulation runs³ to

² On 29 November 2022, IMPA advised MD that, in general, the number of maritime pilots used by LNG carriers is two (2). On the other hand, the unique circumstances of LNG terminals around the world and the systems of pilotage in individual States means that two (2) may not be a necessary or appropriate risk control measure at HKOLNG Terminal.

³ On 14 December 2023, MD advised HKPA to quantify their statement that deploying only 1 pilot on pilotage service for LNG carrier is not safe enough by scientific approach, for instance conducting simulation, however, HKPA suggested that if MD would guarantee full indemnification for all possible losses, HKPA might consider

evaluate the sufficiency of 1 pilot for berthing and unberthing of LNG vessels at the HKOLNG(E) and HKOLNG(W) terminals. Simulated scenarios included general arrival and departure of LNGC and FSRU under 20 knots cross wind and flood/ebb tide of 0.7 knots as well as an emergency of one tug failure as described by HKPA.

11. The purpose of the simulation run was to test whether the situations could be handled effectively without jeopardizing the navigational safety of the vessel and the tugs if the minimum number of pilot was one.

12. The simulation was conducted by MD's training Section at the Full Mission Bridge Simulations in the Marine Department Training Centre. An officer of MD played the role as the sole pilot, another officer of MD played the role as master of the ship. 4 tugs were made fast to the vessel in the same configuration in use, i.e. one each at the center-lead fore and aft; the third and fourth tugs were made fast on the starboard bow and quarter for LNGC; and on the port bow and quarter for FSRU. The proposal on 1 pilot was assessed against relevant regulations, scientific/meteorological data available, and in relation to prescribed operating limits.

13. The simulation runs conducted with general situations for arrival and departure of LNGC and FSRU as well as emergency situations illustrated that it is viable to engage 1 pilot in meeting the requirement for compulsory pilotage, provided that the pilot concerned is able to effectively and professionally implement bridge resource management and preparedness for emergencies.

14. The detail report on the simulation run is attached at *Annex II*.

The Proposals

15. Taking the key outcome of the simulation run into consideration, MD proposed to amend the BGL for the HKOLNG(E) and HKOLNG(W) terminals as marked in red at the *Annex III*.

to carrying out trials on piloting a LNGC with just 1 pilot in order to substantiate that it is not safe enough.

Presentation

16. This paper will be presented by Marine Manager/Pilotage.

Advice Sought

17. Advices and comments from members are sought on the proposals above.

Marine Department
July 2024

HKPA's Submission to Pilotage Advisory Committee Working Group

HKPA's Views on Number of Pilots to be Deployed

1. For the minimum number of pilots to be deployed for any compulsory pilotage service, considerations should be given to the risk factors of pilotage operations which affecting the safety of a ship in the compulsory pilotage waters.

2. Risk factors mainly include human, ship, environment and management factors, plus 4 other aspects. Of which:

- a) Human factors include professional quality of pilots and the crew members, operational errors, etc.;
- b) Ship factors include the ship's working condition, operational performance, etc.;
- c) Environmental factors mainly are the navigational environment conditions, natural environment such as hydrology and meteorology, etc.;
- d) Management factors include pilotage management system and the management of pilotage equipment; and
- e) Other aspects are the terminal staff, tug operations, Vessel Traffic Service staff, and those directly related to the pilotage operations.

3. Each of the above-mentioned risk factors, or a combination of two or more factors, would easily become potential hazards to pilotage safety and consequentially likely become disastrous to life, property and environment, if not properly handled or even undetected during the course of the pilotage operation.

4. In the meantime, risks in pilotage operations arise mainly from weather changes, marine hydrography, port facilities, ship's structure, fairway/ channel conditions, also human error and/or unforeseen circumstances. In order to minimise these risks, considerations have to be given to the use of tugs inclusive of the number of tugs to be employed and their power, allowable ship's draft, time for berthing/unberthing, tidal windows, and most importantly, the number of pilot(s) to be deployed.

5. Considering the above-mentioned risks and potential hazards to pilotage operations, the advantage of deploying more than one pilot for certain class of ships such as large oil tankers, LNG carriers and bulk carriers is very obvious, as well as the following favourables:

- a) More favourable to the safety of pilotage operations
When two or more pilots on board a ship, they could communicate with each other at any time when encountering difficult operations, and carrying out the operation with the best plan.
- b) More positively overcoming impacts of complex navigable waters
Large oil tankers, LNG carriers and bulk carriers, due to their maneuvering performance characteristics, are more subject to shallow water effects and narrow channel effects; Two or more pilots on board would help to better overcome the impact of complex navigable waters.
- c) More effective handling of emergencies
Emergencies are always sudden and critical, only one pilot is often difficult to respond effectively, but two or even more pilots on board simultaneously could be more comprehensive and co-operate with the ship's crew to take all means to maintain the ship's safety.

6. As a matter of fact, the co-pilot has a very important role to play which would not be limited to the followings:

- a) Mater-Pilot Information Exchange
- b) Bridge Resource Management
- c) Deployment of tugs
- d) Give directions to the guard boat, linesmen boat, etc.
- e) Communicate with the Terminal
- f) Communicate with VTC, whenever necessary
- g) Immediate taking over of the Chief Pilot, when necessary
- h) Sudden change of adverse environment condition
- i) Monitor whole pilotage passage
- j) Handling emergency

7. If the tasks mentioned in Para. 6 above are to be taken by only one pilot on board a mega sized LNGC for a period of time, the heavy burden could easily be imagined especially should there be any problem(s) encountered during her voyage towards the Terminal. Indeed, trying to do two things at once is usually a recipe for doing both badly, according to a long line of research. We're slower and less accurate when we try to juggle two things.

8. An incident in October 2023 happened during the process of berthing an LNGC to the Terminal may endorse the paramount importance of the deployment of 2 pilots. During the incident, when she was to take a 90 degree turn into the approach channel towards the Terminal, one of the four tugs was having power failure and her tug line was unable to release. Not only because of language problem that the ship's master and crew was unable to help, also they were not trained to handle this kind of emergency. Luckily there were 2 pilots on board and the Co-pilot immediately exercised his function to communicate with VTC and assisted to releasing the tug in trouble, while the Chief pilot was focusing on navigation. Therefore the incident did not become a tragedy.

9. Findings of the International Maritime Pilots' Association's Professional Standards and Qualifications Sub-Committee, may substantiate the need to deploy more than one pilot for LNG carriers, particularly for the Hong Kong Offshore LNG Terminal (see Attachment), which suggests "The Sub-Committee considered that where the need for two (2) maritime pilots had been established, any proposal to have fewer maritime pilots for each act of pilotage must be supported by objective evidence that navigation safety would not be compromised. Moreover, the proponents of a reduction should be responsible for using a robust risk assessment methodology to provide that evidence".

HKPA's Findings during the Trail period

10. The Terminal came into operation since July 2023. During the past 10 months, there were 8 berthing/unberthing operations for the LNGCs, and 14 unberthing/berthing operations for the FSRU. Ever since their first movements, 2 pilots were deployed for LNGC's berthing operation while only 1 pilot was deployed for their unberthing operation. However, for the purpose of safe and efficient operations, both the FSRU's owner and the Terminal operator all along require two (2) pilots for the vessel's berthing and unberthing operations.

11. The rationale behind is easily understandable. East berth of the Terminal where the FSRU (max. breadth of 55m) used to berth to was merely 300 metres from the boundary of the Dumping Ground, within which was shallow waters together with lots of uncharted shallow spots. During unberthing operation, the FSRU might easily drift towards the boundary which should best be avoided for safety reason. Also, it was less than 500 meters (less than 1.5 ship's length) from the ship's bow to the boundary of HKSAR where the pilot(s) would have left the ship before crossing it. Given the very restricted sea room, she had to first steam backward immediately after casting off the berth, thence sail southwest keeping well clear of the Terminal. The duty pilot has to exercise highly professional skill together with extreme caution during the operation.

12. Experience has revealed that, for the LNGCs, the deployment of 2 pilots for its berthing operation was deemed necessary even only one pilot for its unberthing operation might be acceptable. Whereas for FSRU, given her sluggish manoeuvrability and the very close proximity of the dumping ground immediately east to her berth, the deployment of 2 pilots whether for berthing and unberthing operations was considered necessary both for the safety of the ship and the environment.



International Maritime Pilots' Association
30 Millbank, London SW1P 4DU
office@impahq.org +44(0)20 7240 3973 www.impahq.org

24 April 2024

MK Chan
Project Manager
Hong Kong Pilots' Association Limited
1601-6 Hong Kong Plaza
186 Connaught Road West
HONG KONG

Dear MK Chan,

THE NUMBER OF MARITIME PILOTS FOR LNG CARRIERS

In the 91st session of the IMPA Executive Committee, the Professional Standards and Qualifications Sub-Committee considered the Hong Kong Pilots' Association (HKPA) request for further advice on the minimum number of maritime pilots for LNG Carriers.

The Executive Committee endorsed the Sub-Committee's conclusion that IMPA should clarify the advice provided in November 2022 concerning the Hong Kong Offshore LNG Terminal.

Risk assessment, including simulations, should objectively determine the appropriate number of maritime pilots for a particular ship type in a specific mandatory pilotage area. When simulations have indicated that the minimum number of pilots required for an act of pilotage is two (2), this is the number of maritime pilots that should be used to ensure the safety of navigation and protection of the marine environment and infrastructure.

In addition, the Sub-Committee:

1. Recalled that two (2) maritime pilots are common for acts of pilotage involving LNG carriers in ports around the world;
2. Noted that simulations during the Hong Kong Offshore LNG Terminal project had determined that two (2) maritime pilots would be required for each act of pilotage; and
3. Reviewed the information on the maritime safety incident in December 2023 and concluded that the compelling need for two (2) maritime pilots for each act of pilotage had been demonstrated.

The Sub-Committee considered that where the need for two (2) maritime pilots had been established, any proposal to have fewer maritime pilots for each act of pilotage must be supported by objective evidence that navigation safety would not be compromised. Moreover, the proponents

of a reduction should be responsible for using a robust risk assessment methodology to provide that evidence.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Mr. Williams.", with a horizontal line under the "s" in "Williams".

Matthew Williams
Secretary General
International Maritime Pilots' Association

Simulation Runs for FSRU and LNGC Berthing and Unberthing at Hong Kong Offshore LNG Terminal

Purpose

The simulation runs are to study on the viability to engage one pilot as meeting with the requirement of compulsory pilotage for berthing and unberthing operations of Floating Storage Regasification Unit (“FSRU”) and Liquefied Natural Gas Carrier (“LNGC”) at Hong Kong Offshore LNG Terminal.

Background

2. The berthing guidelines (“BGL”) for Hong Kong Offshore LNG Terminal east/west berth (“HKOLNG(E)” and “HKOLNG(W)”) was endorsed and put on trial by Pilotage Authority in January 2023 subject to review after one year in operation. Marine Department (“MD”) and Hong Kong Pilots Association (“HKPA”) have discussed and reviewed the situations. While the existing operational parameters in respects of Length overall (“LOA”), draft, and time are considered appropriate, the minimum number of pilot(s) for berthing and unberthing (2 pilots and 1 pilot respectively) need further consideration to determine the number of pilot required in meeting with compulsory pilotage.

Current Situation

3. Noted that no simulation had been conducted to test on the minimum number of pilot required for both berthing and unberthing at HKOLNG(E) and HKOLNG(W), the MD has taken the initiative to conduct the simulation runs to simulate berthing and unberthing of LNGC and FSRU with the minimum number of pilot, which was one pilot in each case, on 21 May, 30 May and 12 June 2024.

4. For the testing purpose, the arrival runs of the FSRU and LNGC mostly commence at the south of Shek Kwu Chau and north of the Dumping Ground (“DG”), then turning south into a corridor between the northwest corner of the DG and the eastern limit of the South Lantau

Marine Park (“SLMP”), and head south to either HKOLNG(E) or HKOLNG(W). For the departure simulation runs, both the directly southern approach and passing through SLMP approach had been conducted (see Figure 1-1).

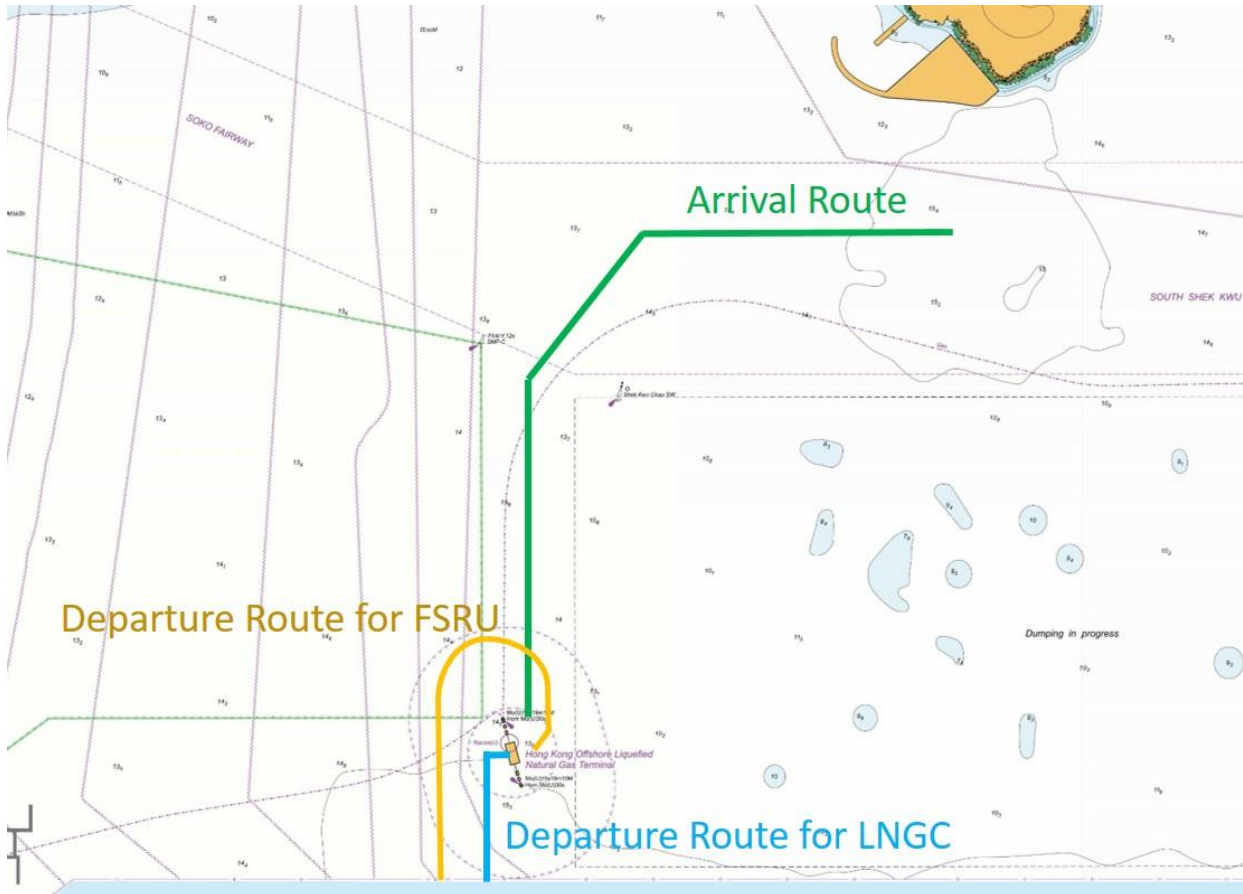


Figure 1-1 Arrival and Departure Routes of FSRU and LNGC

5. It is also noted that the HKPA requests a minimum of two pilots to handle emergencies and to share workload, two simulation runs are designed to simulate the incident happened in December 2023 in which the LNGC was making the 90-degree turn into the approach channel towards the HKOLNG Terminal, and one of the four tugs had power failure and the tug’s line was unable to release immediately. It was reported at that time, the Chief pilot was focusing on navigation and the Co-pilot communicated with VTC and assisted to releasing the tug concerned. The purpose of the simulation run was therefore to test whether the situation could be handled effectively without jeopardizing the navigational safety of the vessel and the tugs if the minimum number of pilot was one.

Simulations

6. In order to evaluate this proposal, a berthing plan / passage plan was prepared after taking into account of the following:

- Relevant BGLs shown in *Appendix 1*;
- Past record of the arrival and departure of LNGCs and FSRUs to / from HKOLNG(W) and HKOLNG(E) between April 2023 and June 2024 shown in *Appendix 2*;
- The 90-degree turn into the approach channel towards the HKOLNG Terminal;
- The existence of SLMP where no anchoring is allowed; and
- The existence of DG where water depth is uncertain.

7. The evaluation of the proposed number of pilot for manoeuvres to the HKOLNG Terminal was primarily carried out on the basis of navigational safety at the Full Mission Bridge Simulations in the Marine Department Training Centre. An officer of MD played the role as the sole pilot, another officer of MD played the role as master of the ship. 4 tugs were made fast to the vessel in the same configuration in use, i.e. one each at the center-lead fore and aft; the third and fourth tugs were made fast on the starboard bow and quarter for LNGC; and on the port bow and quarter for FSRU. The proposal was assessed against relevant regulations, scientific/meteorological data available, and in relation to prescribed operating limits.

8. On 21 May, 30 May and 12 June 2024, 12 scenarios were simulated to test the viability to engage one pilot for the arrival and departure manoeuvres. These runs were at the extreme limit of wind and tidal current condition, i.e. 20 knots and 0.7 knot respectively, in accordance to the relevant berthing guidelines endorsed. In addition to arrivals and departures of both the LNGC and FSRU, emergency scenarios were also simulated, the details are shown in *Appendix 3*.

9. Key outcomes for the arrival and departure manoeuvres for LNGC and FSRU shown in *Appendix 4* suggest that it is viable to engage one pilot for the berthing and unberthing operations for LNGC and FSRU at HKOLNG(W) and HKOLNG(E) when a berthing plan is properly prepared and executed. In addition, the results of the simulated emergencies showed that with a minimum of one pilot, the emergency situations could be handled effectively and the navigational safety of the vessel and the tugs were not jeopardized, provided that the pilot concerned is able to effectively implement bridge resource management and preparedness for emergencies.

Conclusions

10. The simulation runs conducted with general situations for arrival and departure of LNGC and FSRU as well as emergency situations illustrated that it is viable to engage 1 pilot in meeting the requirement for compulsory pilotage, provided that the pilot concerned is able to effectively implement bridge resource management and preparedness for emergencies.

Way Forward

11. Engaging one (1) pilot should be sufficient for LNGC or FSRU in meeting the requirement of compulsory pilotage.

Marine Department
June 2024

Appendix 1

Berthing Guidelines

w.e.f. 09 Jan.2023

ON TRIAL (for 12 months)

Location: **HKOLNG(E)**

Hong Kong Offshore LNG Terminal east berth
(Declared Depth: 15.5 m)

010 Berthing LOA: Max 350m
Draft: Max. 12.5m (min 15% UKC)
Time: Day HW-2 to HW+1
Tugs: 4
Remarks: 2 pilots
Starboard side to.

011 Unberthing LOA: Max 350m
Draft: Max. 12.5m (min 15% UKC)
Time: Day
Tugs: 4
Remarks: 1 pilot

General Remarks:

1. Berthing/unberthing operations shall be postponed when wind force in the area is greater than 20 knots from any direction, and/or strong monsoon signal is hoisted.
2. Berthing/unberthing operations shall be postponed when visibility is less than 1.0 nautical mile.
3. Berthing/unberthing tugs (x 4) employed must be at least 2 x 5,000 HP and 2 x 6,500 HP.

ON TRIAL (for 12 months)

Location: **HKOLNG(W)**

Hong Kong Offshore LNG Terminal west berth

(Declared Depth: 15.5 m)

010 Berthing LOA: Max 350m
Draft: Max. 12.5m (min 15% UKC)
Time: Day HW-2 to HW+1
Tugs: 4
Remarks: 2 pilots
Port side to.

011 Unberthing LOA: Max 350m
Draft: Max. 12.5m (min 15% UKC)
Time: Day
Tugs: 4
Remarks: 1 pilot

General Remarks:

1. Berthing/unberthing operations shall be postponed when wind force in the area is greater than 20 knots from any direction, and/or strong monsoon signal is hoisted.
2. Berthing/unberthing operations shall be postponed when visibility is less than 1.0 nautical mile.
3. Berthing/unberthing tugs (x 4) employed must be at least 2 x 5,000 HP and 2 x 6,500 HP.

Records of Wind and Sea Condition at HKOLNG Terminal

Arrival of FSRU at HKOLNG Terminal

FSRU: BAUHINIA SPIRIT (C6CL5) LOA 345m / Breath 55m

Date	Time when Vessel off Shek Kwu Chau	Wind and Sea Condition When vessel off South of Shek Kwu Chau	
		Wind Direction / Speed (Beaufort Force) recorded at Cheung Chau	Current Speed in knots / Direction
18.04.2023	07:20	Southeast, Force 2	No available data
21.07.2023	08:30	East, Force 1	0.5 / 292 degrees
04.09.2023	11:00	Northwest, Force 3	0.47 / 289 degrees
11.10.2023	14:38	East, Force 2	0.08 / 223 degrees
19.10.2023	14:35	East, Force 4	0.03 / 249 degrees
27.11.2023	09:30	Northwest, Force 2	0.45 / 280 degrees
18.01.2024	14:30	East, Force 3	0.33 / 292 degrees
02.06.2024	12:10	Southwest, Force 3	0.24 / 109 degrees

Departure of FSRU at HKOLNG Terminal

Date	Reported Departure Time	Departure Route (SLMP / Directly South)	Wind Direction / Speed (Beaufort Force) recorded at Cheung Chau	Current Speed in knots / Direction
16.07.2023	06:09	SLMP	North, Force 4	0.27 / 297degrees
31.08.2023	08:11	SLMP	North, Force 4	0.62 /288 degree
06.10.2023	15:21	Directly South	North, Force 3	0.26 / 283 degrees
16.10.2023	10:06	SLMP	Northeast, Force 3	0.31 / 284 degrees
24.11.2023	08:14	SLMP	Northeast, Force 4	0.04 / 216 degrees

15.01.2024	15:36	Directly South	East, Force 4	0.21 / 100 degrees
31.05.2024	12:04	SLMP	East, Force 5-6*	0.28 / 325 degrees

*HKOLNG MTIA Update for Navigation Routings: Para. 3.5 "...It is assumed the FSRU Vessel will depart from the Terminal under the condition when wind speed exceed 20 knots...", mean wind speed of 17 knots to 21 knots is categorized as Beaufort Force 5.

Arrival of LNGC at HKOLNG Terminal

Date	Vessel Name	Call Sign	LOA / Breadth / Reported Draft (m)	Time when Vessel off Shek Kwu Chau	Wind and Sea Condition When vessel off South of Shek Kwu Chau	
					Wind Direction / Speed (Beaufort Force) recorded at Cheung Chau	Current Speed in knots / Direction
11.05.2023	MARAN GAS CORONIS	SXLQ	285.4 /43.4 /11.2	09:48	East, Force 3	No available data
08.07.2023	MARAN GAS AMPHIPOLIS	SVC13	294.9 / 46.4 / 10.75	10:25	South, Force 3	0.18 / 317 degrees
30.07.2023	AI RAYYAN	V7A5140	297.5 / 45.7 / 10.8	09:22	Southeast, Force 3	0.55 / 112 degrees
06.09.2023	AL BIDDA	V7A5144	297.5 / 45.8 / 10.8	09:34	South, Force 2	0.18 / 277 degrees
14.10.2023	BROOG	V7A5125	297.5 / 45.8 / 11.2	09:25	North, Force 3	0.22 / 277 degrees
19.11.2023	SM BLUEBIRD	3E3651	299 / 46.4 / 11.9	09:20	North, Force 3	0.11 / 242 degrees
10.01.2024	KOOL HUSKY	V7AF4	280 / 43.4 / 11.6	09:17	North, Force 4	0.45 / 279 degrees
01.03.2024	LNG RIVER ORASHI	ZCDL8	285.5 / 43.4 / 11.2	10:26	North, Force 5	0.55 / 285 degrees
21.04.2024	AL DEEBEL	C6UU5	283 / 43.4 / 11.6	08:57	Southeast, Force 5	0.23 / 279 degrees

09.06.2024	MARAN GAS DELPHI	SVBW3	294.2 / 44 / 10.6	09:11	West, Force 3	0.38 / 294 degrees
------------	------------------	-------	-------------------	-------	---------------	--------------------

Departure of LNGC at HKOLNG Terminal

Date	Vessel Name	Call Sign	Reported Departure Time	Wind Direction / Speed (Beaufort Force) recorded at Cheung Chau	Current Speed in knots / Direction
15.05.2023	MARAN GAS CORONIS	SXLQ	05:51	North, Force 2	No available data
10.07.2023	MARAN GAS AMPHIPOLIS	SVCI3	06:46	Southwest, Force 3	0.16 / 298 degrees
01.08.2023	AI RAYYAN	V7A5140	06:00	North, Force 2	0.6 / 286 degrees
08.09.2023	AL BIDDA	V7A5144	07:07	Southeast, Force 4	0.39 / 112 degrees
15.10.2023	BROOG	V7A5125	15:48	East, Force 3	0.08 / 189 degrees
20.11.2023	SM BLUEBIRD	3E3651	15:21	East, Force 4	0.31 / 288 degrees
12.01.2024	KOOL HUSKY	V7AF4	07:28	East, Force 4	0.49 / 279 degrees
03.03.2024	LNG RIVER ORASHI	ZCDL8	06:56	East, Force 3	0.13 / 246 degrees
23.04.2024	AL DEEBEL	C6UU5	06:51	East, Force 3	0.58 / 283 degrees
11.06.2024	MARAN GAS DELPHI	SVBW3	05:54	Southeast, Force 3	0.09 / 284 degrees

Appendix 3

Simulation runs

Ex.	Run	Ship Type	LOA / Draught	From	To	Tide / Wind	Notes	Initial Speed	Remarks
1	LNGC ARR 1	LNGC	320m / 12m	SCC PS	HKOLNG-W	Flood tide 0.7kn / E'ly 20kn	4 tugs	4 knots at PBS	Commence from anchorage; Turn onto W'ly leg made using rudder and engine movements. 4 tugs made fast at Shek Kwu Chau. Turn to southerly approach to Terminal used engine and rudder movements. Approach berth at around 2kts and berthing with assistance of 4 tugs. Controlled by 1 person assessment - Successful.
2	LNGC ARR 2	LNGC	320m / 12m	SKC	HKOLNG-W	Ebb tide 0.7kn / W'ly 20kn	4 tugs	8 Knots, all tugs fast	4 tugs made fast at Shek Kwu Chau. Turn to southerly approach to Terminal used engine and rudder movements. Approach berth at around 2kts, berthing with assistance of 4 tugs and ebb tide. Controlled by 1 person assessment - Successful.
3	LNGC DEP 1	LNGC	320m / 11m	HKOLNG-W	Departure	Ebb tide 0.7kn / SW'ly 20kn	4 tugs		4 tugs made fast at berth. Pull out by tugs. Used engine to have headway and with sufficient time for disembarkation of pilot before the boundary. Controlled by 1 person assessment - Successful.
4	LNGC DEP 2	LNGC	320m / 11m	HKOLNG-W	Departure	Flood tide 0.7kn / NE'ly 20kn	4 tugs		4 tugs made fast at berth. Pull out by tugs and aid of tide. Sufficient time for disembarkation of pilot before the boundary. Controlled by 1 person assessment - Successful.

5	FSRU ARR 1	FSRU	345m / 12m	SKC	HKOLNG-E	Flood tide 0.7kn / E'ly 20kn	4 tugs	8 Knots, all tugs fast	4 tugs made fast at Shek Kwu Chau. Turn to southerly approach to Terminal used engine and rudder movements. Approach berth at around 2kts, berthing with assistance of 4 tugs and flood tide. Controlled by 1 person assessment - Successful.
6	FSRU ARR 2	FSRU	345m / 12m	SKC	HKOLNG-E	Ebb tide 0.7kn / W'ly 20kn	4 tugs	8 Knots, all tugs fast	4 tugs made fast at Shek Kwu Chau. Turn to southerly approach to Terminal used engine and rudder movements. Approach berth at around 2kts. Berth against ebb tide with assistance of 4 tugs. Controlled by 1 person assessment - Successful.
7	FSRU DEP 1	FSRU	345m / 12m	HKOLNG-E	Departure	Ebb tide 0.7kn / W'ly 20kn	4 tugs		4 tugs made fast at berth. Pull out by tugs and aid of tide. When cleared from the berth, used astern engine to move backwards. Awarred of ebb tide and did not enter the dumping ground. Moved westwards and allowed sufficient time for disembarkation of pilot before the boundary. Controlled by 1 person assessment - Successful.
8	FSRU DEP 2	FSRU	345m / 12m	HKOLNG-E	Departure	Flood tide 0.7kn / E'ly 20kn	4 tugs		4 tugs made fast at berth. Pull out by tugs. When cleared from the berth, used astern engine to move backwards. Moved westwards and allowed sufficient time for disembarkation of pilot before the boundary. Controlled by 1 person assessment - Successful.

9	LNGC ARR T1	LNGC	320m / 12m	SKC	HKOLNG-W	Flood tide 0.7kn / E'ly 20kn	4 tugs	Using tugs' power only	4 tugs made fast at Shek Kwu Chau. Turning to southerly approach to Terminal used engine and rudder movements at around 6 kts but LNGC backout. With assistance of 4 tugs, slowed down and pushed to the safe waters. Maintained in safe position by tugs for repairing. Controlled by 1 person assessment - Successful.
10&11	LNGC E2 & E3	LNGC	320m / 12m	SKC	HKOLNG-W	Flood tide 0.7kn / E'ly 20kn	4 tugs	7 Knots, all tugs fast	4 tugs fast. When LNGC approaching to SCK SW buoy 7 knots and Rate of Turn over 7 degrees to port, the Fore CL tug blackout on port side alongside towards aft direction. Used engine to slow down and stop ASAP in safe waters. Released the hampered tug and used remaining tugs to turn back to the fairway and proceed to the anchorage. Wait for new tugs. Controlled by 1 person assessment - Successful.
12	FSRU E1	FSRU	345m / 12m	SKC	HKOLNG-E	Flood tide 0.7kn / E'ly 20kn	4 tugs	7 Knots, all tugs fast	4 tugs fast. FSRU approaching to SCK SW buoy 7 knots with a Rate of Turn over 7 degrees to port, FSRU blackout. Rudder locked at Port 10. Used aft tug slow down and stopped at the safe waters. Used all tugs to turn back to the fairway and proceed to the Anchorage. Controlled by 1 person assessment - Successful.

**Key Outcomes for
the Arrival and Departure Manoeuvres for LNGC and FSRU**

Presumption

- It is assumed that the master-pilot exchange will take about 2 minutes, where traffic is essentially light and vessel has not yet speeded up, to account for any deficiencies, where on the ship the 4 tugs should be made fast before turning, beware of the no-go areas, speed control at certain areas respectively, the need for additional lookouts on the bridge/forecastle, preparation anchors for emergencies use, etc.
- Prior to the vessel approaching the berth, the master will be advised to slow down below 7.0 knots for turning into the corridor located between the DG and the SLMP towards the HKOLNG Terminal.

Arrival Manoeuvres for LNGC / FSRU

- Before making the 90-degree turn into the corridor located between the DG and the SLMP towards the HKOLNG Terminal, all 4 tugs were fasted at speed. [1 for Centerlead forward (“Fore’ CL”), 2 for pulling and pushing alongside, 1 for Centerlead aft (“Aft’ CL”).]
- When making the 90-degree turn towards the HKOLNG Terminal, the ship used own engine and steering and commenced to reduce speed to about 5.0 knots. 4 tugs were made fast before the turning and standby for emergency / assistance.
- Vessels approaching HKOLNG(W) or (E) may enter the SLMP with speed of reducing to about 2.0 knots by using engine.
- Dumping ground was marked as no-go area. The ship’s position was frequently checked.
- For approaching both HKOLNG(W) or (E), tugs’ power were used when the ship was about 500 to 600 metres away from the berth with approaching speed reduced to about 1 knot for bring the ship alongside safely.

Overall, no specific problem was identified and safe approaches were made to berth the ship when the simulation runs were conducted by 1 person.

Departure Manoeuvres

(LNGC)

- 4 tugs were made fast at berth before departure HKOLNG(W). [1 for fore' CL, 2 for pulling and pushing alongside, 1 for aft' CL.]
- All lines cast off and pulling out by tugs.
- When the vessel has a sufficient clearance from the berth, engine is used to move the vessel ahead.
- Passing clear off the berth with minimum speed which can maintain the ship's heading.
- Pilot handover to master and disembark before reaching the boundary.

(FSRU)

- 4 tugs were made fast at berth before departure HKOLNG(E). [1 for fore' CL, 2 for pulling and pushing alongside, 1 for aft' CL.]
- All lines cast off and pulling out by tugs.
- Once cleared from berth, engine astern to bring the vessel moving astern.
- When the vessel's bow has a sufficient clearance from the berth, using the engine ahead and tug's assistance and turning to starboard.
- While passing clear off the berth, maintain a safe speed once there is sufficient sea room and that allows the ship to steady maintain her heading for manoeuvring.
- Pilot handover to master and disembark before reaching the boundary.

Emergency Situations

(LNGC)

- Before making the 90-degree turn into the corridor between two buoys located between the DG and the SLMP and towards the HKOLNG Terminal, all 4 tugs were fasted at speed about about 6.0 knots.
- When making the 90-degree turn, the fore' CL tug suddenly blackout and dragging the vessel to aft direction on port side. Speed is dropping down caused by the movement of the fore' CL tug.
- LNGC also used the engine to slow down and stop as safety and

practical in safe waters.

- The berthing operation was immediately suspended, and the LNGC remained in a safe water position at the suitable location.
- Released the hampered tug (fore' CL) once available and used remaining tugs to turn the vessel back to the fairway after stopped.
- LNGC proceeded to the anchorage according to VTC's instruction for safety reason. The ship's position was frequently checked.
- The vessel successfully turned back to the channel by using engine / remained tugs and heading to the anchorage.

Overall, no specific problem was identified and safe approaches were made to berth the ship when the simulation runs were conducted by 1 person.

(FSRU)

- Before making the 90-degree turn into the corridor between two buoys located between the DG and the SLMP and towards the HKOLNG Terminal, all 4 tugs were made fasted at speed about 6.0 knots.
- FSRU approaching to SCK SW buoy about 7 knots with a Rate of Turn over 7 degrees to port. At the material time, FSRU was suddenly blackout and the rudder is also out of order which stuck at port 10-degree position. As a consequence of the blackout and rudder malfunction, the vessel's speed decreased since there were no engines available for propulsion and no functioning rudder for steering
- The berthing operation was immediately suspended, stopped the vessel ASAP and remained in a safe water location with the assistance of tugboats.
- FSRU used the tugs for towing the vessel back to the fairway and proceed to the anchorage according to VTC's instruction for safety reason. The ship's position was frequently checked.
- The vessel successfully turned back to the fairway by tugs and heading to anchorage.

Overall, no specific problem was identified and safe approaches were made when the simulation runs were conducted by 1 person.

End

Berthing Guidelines

Proposed March 2024

~~ON TRIAL~~

Location: **HKOLNG(E)**

Hong Kong Offshore LNG Terminal east berth

(Declared Depth: 15.5 m)

010	Berthing LOA: Max 350m	011	Unberthing LOA: Max 350m
Draft:	Max. 12.5m (min 15% UKC)	Draft:	Max. 12.5m (min 15% UKC)
Time:	Day HW-2 to HW+1	Time:	Day
Tugs:	4	Tugs:	4
Remarks:	2 1 Starboard side to.	Remarks:	1

General Remarks:

1. Berthing/unberthing operations shall be postponed when wind force in the area is greater than 20 knots from any direction, and/or strong monsoon signal is hoisted.
2. Berthing/unberthing operations shall be postponed when visibility is less than 1.0 nautical mile.
3. Berthing/unberthing tugs (x 4) employed must be at least 2 x **either 5,000 HP or 70T BP;** and 2 x **either 6,500 HP or 80T BP.**

~~ON TRIAL~~

Location: **HKOLNG(W)**

Hong Kong Offshore LNG Terminal west berth

(Declared Depth: 15.5 m)

010	Berthing LOA: Max 350m	011	Unberthing LOA: Max 350m
Draft:	Max. 12.5m (min 15% UKC)	Draft:	Max. 12.5m (min 15% UKC)
Time:	Day HW-2 to HW+1	Time:	Day
Tugs:	4	Tugs:	4
Remarks:	2 1	Remarks:	1
	Port side to.		

General Remarks:

1. Berthing/unberthing operations shall be postponed when wind force in the area is greater than 20 knots from any direction, and/or strong monsoon signal is hoisted.
2. Berthing/unberthing operations shall be postponed when visibility is less than 1.0 nautical mile.
3. Berthing/unberthing tugs (x 4) employed must be at least 2 x **either 5,000 HP or 70T BP;** and 2 x **either 6,500 HP or 80T BP.**