SOUTH HOOK
LNG TERMINAL COMPANY LTD

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SHLNG Terminal Marine Information

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System Administrator				
Title:	Process Superintendent	Name:	Christopher O'Donovan	Signature:
System Owner				
Title:	Operations Manager	Name:	Ken Hurley	Signature:

Rev. No.	Date	Description	Review Date
00 Draft F	29/11/2018	Additional information from IMT Review	

REV. NO.	DATE	DESCRIPTION
00		
Draft A	03/09/2018	First draft received from Supply Chain Co-ordinator
Draft B	07/09/2018	Review and amendments by Superintendents
Draft C	11/09/2018	Additional information on ship sizes and berthing details
Draft D	27/09/2018	Additional information from Jetty Operations Manual
Draft E	17/10/2018	Additional information from IMT Review
Draft F	29/11/2018	Information on LNGC Bunkering updated – currently Not Allowed at Terminal

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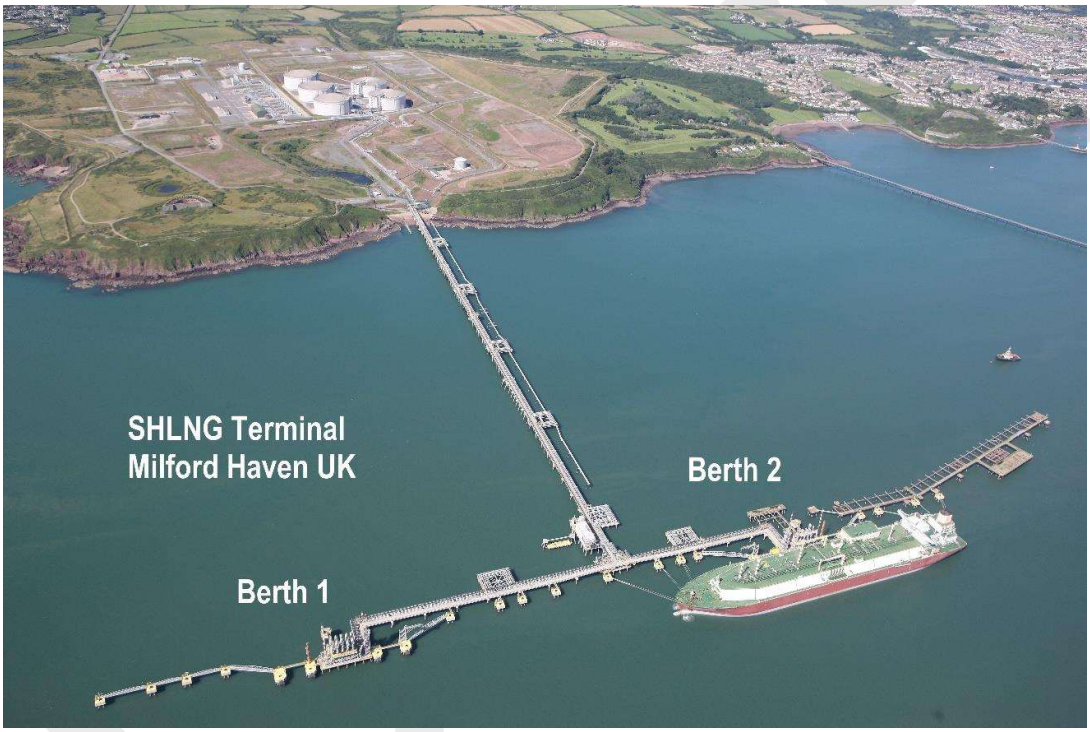
1. Overview

1.1 Introduction

General

The South Hook LNG Terminal Company Ltd (SHLNG) operates a Liquefied Natural Gas (LNG) Terminal at Milford Haven, which receives import cargoes of LNG and regasifies the natural gas for export into the UKs National Gas Grid (NGG) system.



The Terminal is located near Milford Haven in Pembrokeshire, South Wales, UK.

Coordinates

Latitude 51° 41' 55" N Longitude 05° 04' 48" W

Point of Contact

Supply Chain Coordinator

SHLNG Terminal Co. Ltd

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1.2 Scope

This procedure is applicable to all LNG Carriers (LNGC) that intend to Berth at the SHLNG Terminal.

1.3 Objectives

This procedure is intended to provide rudimental information regarding the mooring of LNGC's at the SHLNG Terminal Jetty

1.4 Acronyms and Definitions

The acronyms and definitions listed below apply throughout this document.

Term	Definition
South Hook	South Hook LNG Terminal Company Ltd.
SHEMS Document	Any document developed by South Hook to support and satisfy the SHEMS expectations and guidelines. i.e. any document forming part of the SHEMS Documentation Suite.
System Owner	The individual accountable for the implementation of a specific SHEMS System and fulfilling the responsibilities assigned to them.
System Administrator	The individual responsible for the implementation and maintenance of a specific SHEMS System.
Terminal	South Hook LNG Terminal.
C.D.	Chart Datum
DfT Transec	Department for Transport, Transport Security and Contingency Directorate
ESD	Emergency Shut Down
ERS	Emergency Release System
HSSL	High Speed Serial Link
IALA	International Association of Marine Aids and Lighthouse Authorities
ICSS	Integrated Control and Safety System
JCR	Jetty Control Room
JIR	Jetty Instrument Room
LED	Light Emitting Diode
LNG	Liquefied Natural Gas
LNGC	LNG Carrier
LOA	Length Over All

Term	Definition
MHPA	Milford Haven Port Authority
MLWS	Mean Low Water Spring. The average height of low waters occurring at the time of the spring tides
NGG	National Gas Grid
OCIMF	Oil Companies International Marine Forum
PABX	Private Automatic Branch Exchange. The internal telephone system at SHLNG
PEC	Pilotage Exemption Certificates
PERC	Powered Emergency Release Coupler
SIGTTO	Society of International Gas Tanker and Terminal Operators
VTS	Vessel Traffic Control System

2. Responsibilities

Operations Manager

The Operations Manager is responsible for ensuring that the resources are available for the management and updating of this procedure.

Process Superintendent

The Process Superintendent is responsible for acting as Administrator for this document.

Supply Chain Co-ordinator

The Supply Chain Co-ordinator is responsible for ensuring that the information contained within this procedure is accurate and up to date.

3. Process and Procedure

3.1 Hazards and Precautions

Hazards

Hazards associated within the Terminal are not discussed within this procedure.

Environmental

Environmental requirements in line with SHLNG and MHPA environment permits

3.2 South Hook Berth Data

3.2.1 Philosophy for LNG Discharge Berths

The SHLNG Jetty includes 2 LNG berths (Berths 1 and 2) to unload LNG Carriers in the capacity range of 125,000 m3 to 266,000 m3. LNG carriers can be moored to both berths simultaneously. However, only one LNGC can be unloaded at a time.

Maximum Dimensions	
LOA:	350m
Beam:	No limit
Draught:	13.5m
Displacement:	180,000t

Water Depth

Berth	Required UKC	Maximum Draft	Control Water Depth
Berth 1	1.5 m	13.5 m	17.2 m
Berth 2	1.5 m	13.5 m	18.3 m

Note: Water Depths are referred to Chart Datum (C.D.) which is -3.71 m below Ordinance Datum (Newlyn). MLWS is 0.7 m. C.D. and the Lowest Astronomical Tide is -0.2 meters C.D.

Wind Limits for Cargo Transfer Operations (5 Minute Average Wind Speed)

Wind Limit	Action
35 knots (18 m/sec)	Stop cargo transfer
40 knots (20 m/sec)	Manoeuvring gangway (off or on)
40 knots (20 m/sec)	Disconnect cargo transfer equipment
40 knots (20 m/sec)	Review need for further action
43 knots (22.5 m/sec)	Loading arm operating limit
45 knots (23 m/sec)	Take further action (e.g. tugs to push up)

Note: Prevailing wind is from the South West

Wave Limits for Cargo Transfer Operations

Ships can remain alongside in all wave conditions.

In extreme swell or wave conditions, the decision whether to start or continue with cargo operations will be made after consultation between the Master and Loading Master and will depend on the prevailing circumstances and conditions.

3.2.2 Mooring Layout & Design

Separation Distance Between Ships

The minimum separation distance acceptable between two LNG Carriers simultaneously berthed at Berths 1 and 2, shall **not be less** than 100 meters.

Layout of Mooring Points

The Berths layout allows LNG Carriers to berth either starboard side to or port side to at both Berth 1 and Berth 2

Each LNG Berth includes four forward mooring dolphins and four aft mooring dolphins, each mooring dolphin being equipped with Triple Quick Release Hooks. Each LNG Berth also includes two forward breasting dolphins and two aft breasting dolphins, each breasting dolphin being equipped with Double Quick Release Hooks for spring lines.

The mooring pattern for LNGC's intending to berth at SHLNG will require prior approval from SHLNG. At least 48hrs before the scheduled berthing time mooring pattern configuration is to be forwarded to the SHLNG Terminal.

Mooring Tension Monitoring System

SHLNG Terminal uses the Harbour Marine tension monitoring system

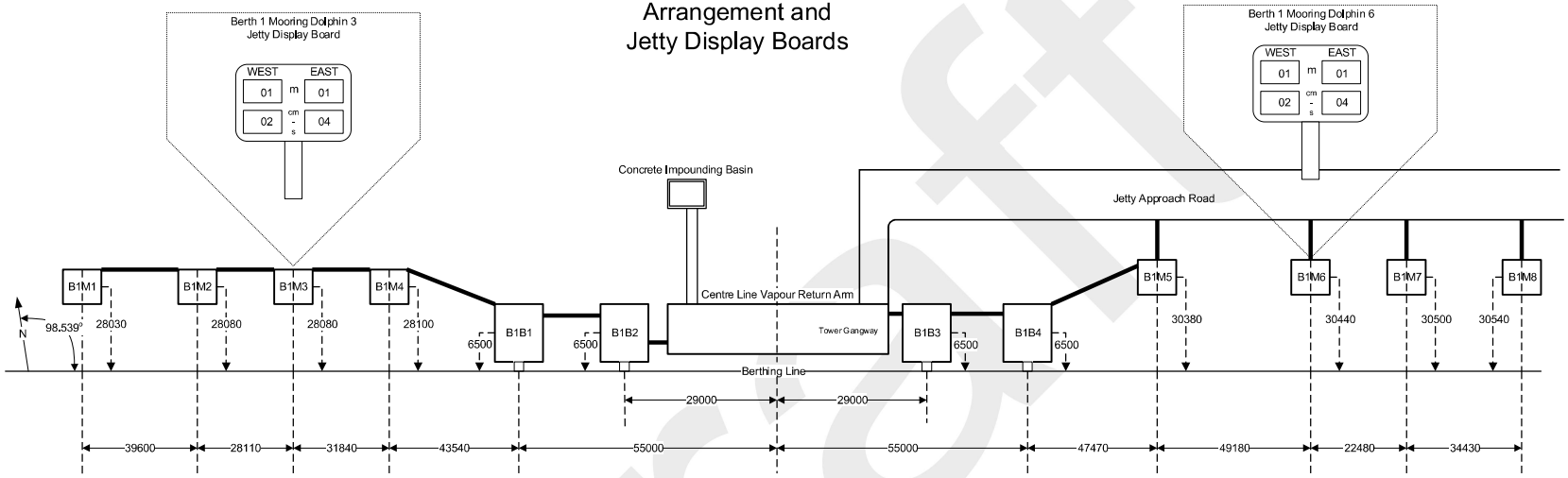
Shore Augmentation

There is no requirement to provide shore-augmented mooring.

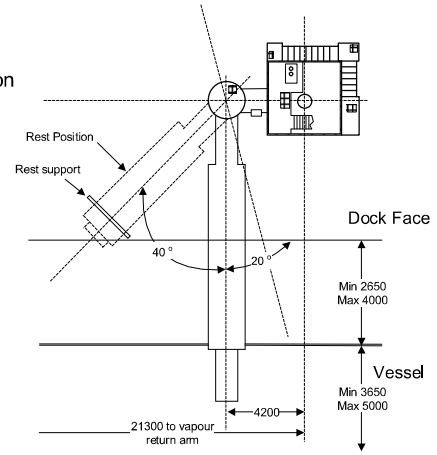
Jetty layout

See Berth 1 and 2 layout below (showing Fender positions and Jetty Display Boards)

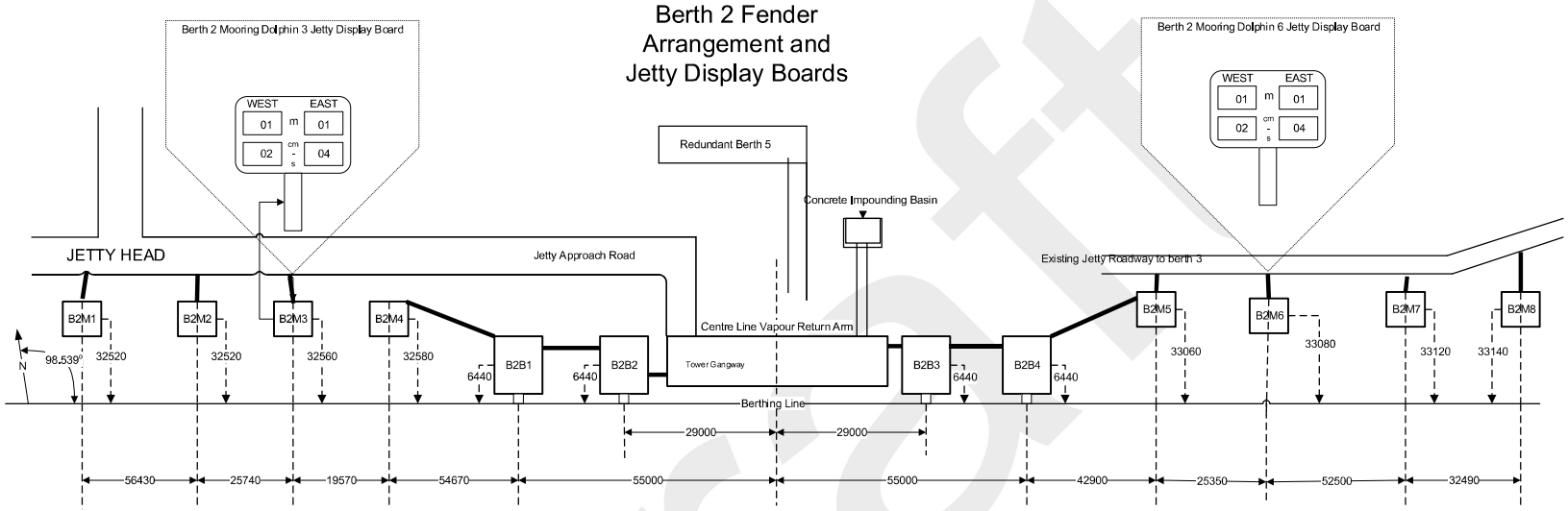
Berth 1 Fender Arrangement and Jetty Display Boards



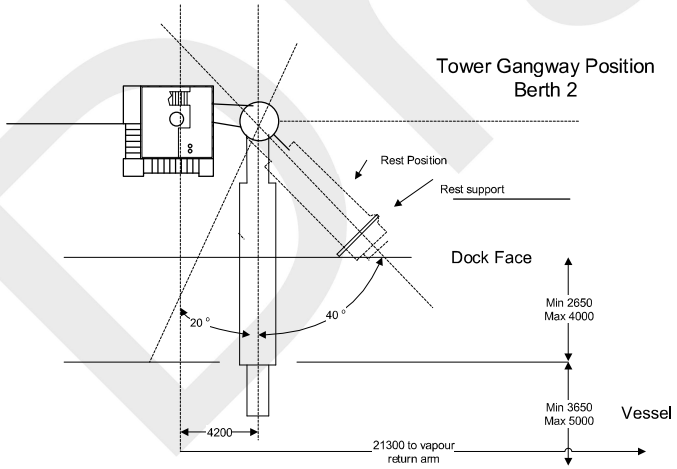
Tower Gangway Position
Berth 1



Berth 2 Fender Arrangement and Jetty Display Boards



Tower Gangway Position Berth 2



3.2.3 Berthing System

The Berthing System is composed of Marine Fender Arrangements to allow for the berthing and breasting of LNG Carriers at Berths 1 and 2.

Each of the LNG berths feature two outer berthing dolphins and two inner berthing dolphins to cover the range of LNG ships. Fentek Super Cone fenders SCN 1800 E2.9 are provided on each of the dolphins. The design is based on berthing an 180,000 tonne displacement LNG carrier at 0.15 m/sec approach speed.

Each LNG Berth is equipped with a Berthing Velocity Monitoring System, which provides information on vessel approach speed, angle and distance from berthing line, to both jetty operators and vessel.

Fenders are designed to keep the pressure against the ship's hull below 20 tonnes/m^2.

Prior to Berthing, SHLNG must be made aware of the mooring operation and mooring plan, SHLNG will communicate these details to the contracted mooring agent.

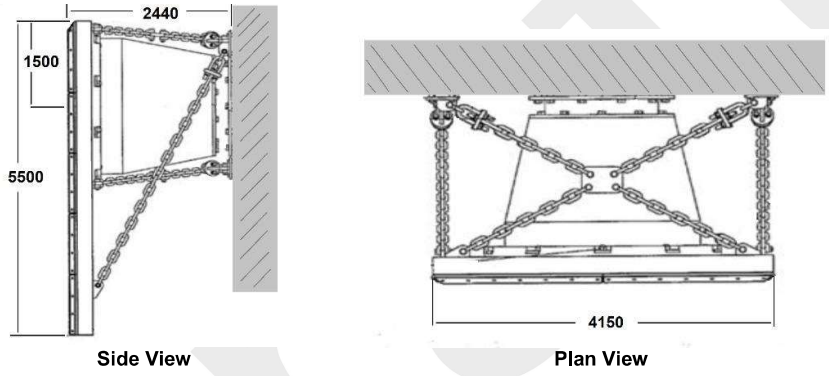


Figure 1. Typical Fender Arrangement

3.2.4 Gangway/ Tower

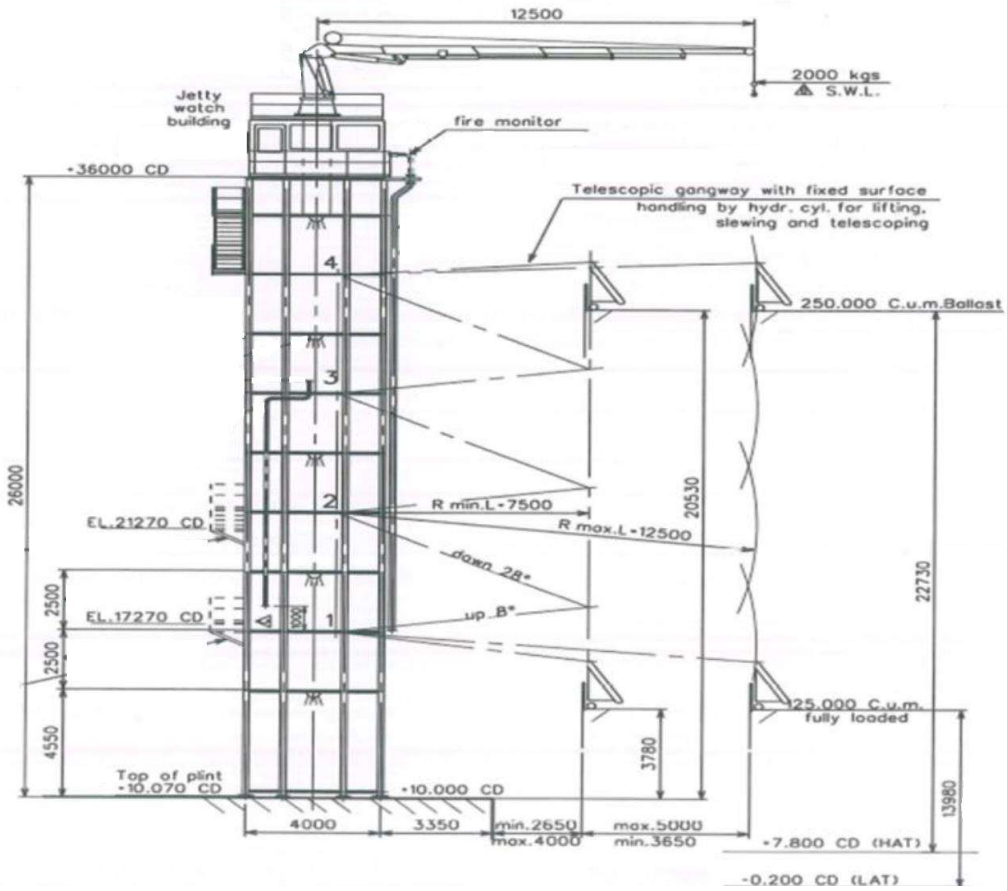
The gangway towers are designed to accommodate the LNG Carriers design range. LNG Carriers will moor either side to the jetty depending on tidal current conditions at arrival. However, the preferential direction is starboard side to at Berth 1 and port side to at Berth 2. This is to position the gangway aft of the manifold area near the accommodation block.

One tower is located on the East End of Berth 1 and the West End of Berth 2. Each gangway is telescopic with hydraulic controls in order to provide safe access to and from the ships to personnel, within the environmental operating conditions.

Emergency egress, in the form of a column gangway, will be provided at Berth 1 and Berth 2. These column gangways will be for use in emergency only and during normal berth operations will not be connected to the LNG ships. One column gangway is installed on the easternmost berthing dolphin of Berth 1 and the other column gangway is installed on the westernmost berthing dolphin of Berth 2.

Gangways will only be remove after the disconnection of the Ship to Shore links and immediately prior to disembarkation of the LNG Carrier

Diagram of Gangway



3.2.5 Discharge System

LNG Discharge Arms

LNG arms are fitted with range monitoring, emergency release system (ERS), and quick connect/disconnect couplings (QCDC).

The following arms are available on both the LNG berths:

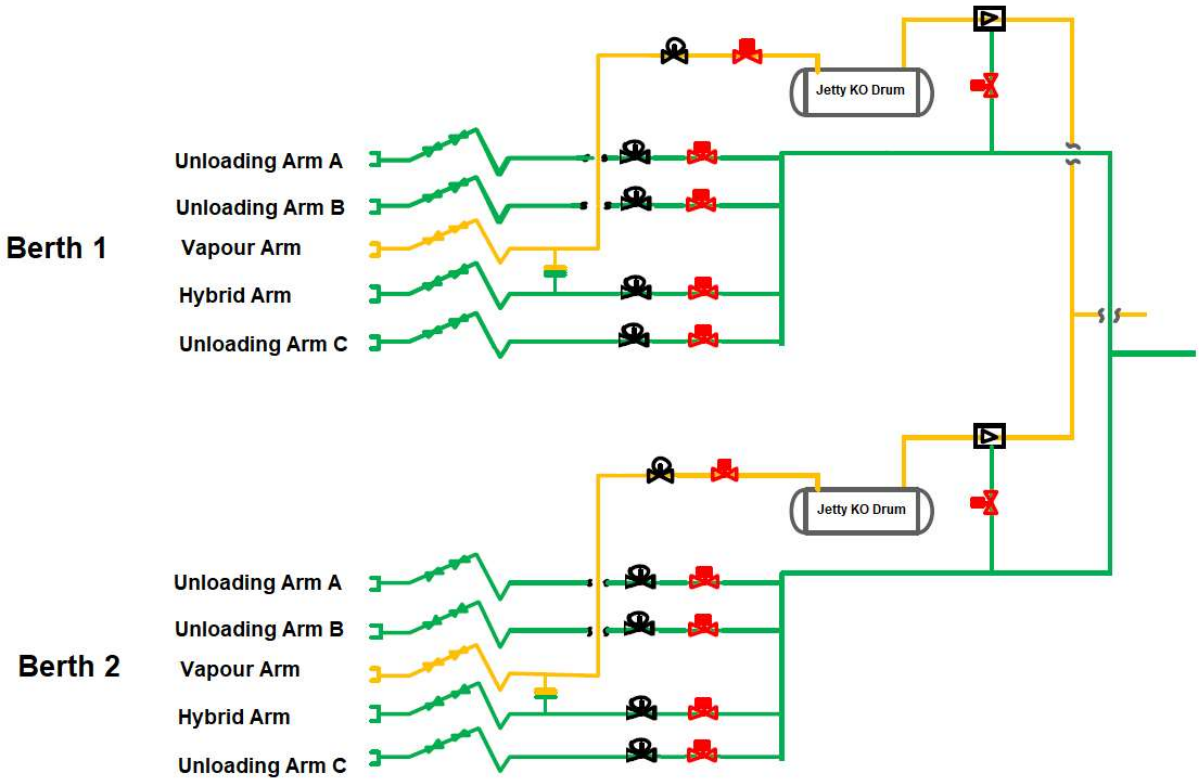
Arm Diameter	Liquid	Vapour	Liquid + Vapour (Hybrid)
20 inch	3	1	1

Notes: Four Liquid arms to be connected to achieve the maximum permitted discharge rate at SHLNG.
SHLNG's Nominal target receiving rate shore-side is 14,000m3/hr (once ramp-up stage completed) at 5 barg manifold pressure.
Unloading Arms have 16 " PERC to presentation flange.

Layout of Discharge Arms

The vapour arm is located in the center of the LNG liquid arms in compliance with OCIMF "*Recommendations for Manifolds for Refrigerated Liquefied Natural Gas Carriers" (LNG*, Category (B) for ships 60 – 149,000 m^3 and Category (C) for ships over 150,000 m^3).

All LNG Unloading Arms are spaced 4.50 m to each other. Center line of Vapour Arm is the spotting line for both Berths 1 and 2.



Ship/ Shore Communications and ESD System

Electric System

A Primary Hardwired System (HSSL) is the Primary Ship/Shore Communication System, and provides the following means of communication:

- Ship and shore activation of the ESD, including shut-down of all LNGC pumps
- Loading arm range monitoring data to LNGC
- Mooring line load data to LNGC
- Communications systems connections

The ship to shore only carries the ESD, Plant Telephone and Mooring Line Tension. The range monitoring for the loading arms is a direct connection from the control panel at each berth to the Jetty Control Room.

Note: In case of primary communications systems failing VHF would be the fall back option.

Fibre Optic System

A Secondary Fibre Optics System as a back up to the Primary System, Providing the same capabilities.

Pneumatic System

Provision for the connection of a pneumatic hose as ESD back up system, including the necessary electro-pneumatic valves.

ESD communication system are designed in accordance with SIGTTO “Recommendations and Guidelines for Linked Ship/Shore Emergency Shutdown of Liquefied Gas Carriers.”

The Ship/Shore Communications and Emergency Shutdown System link are positioned close to the shore manifold to align with the ship connector located in the vicinity of the ships’ manifold.

3.2.6 Pre and Post Discharge Cargo Meeting

Pre-Discharge Cargo Meeting

Before the commencement of discharging a formal meeting between SHLNG and a representative from the LNG carrier will take place covering the following aspects:

- Ship/shore Safety Inspections (as per ISGOTT 5th edition Ship/shore Safety checklist and SHNLG *LNG Carrier Vetting Procedure OP.06A.00.018*).
- Fire Plan
- Custody Transfer Measurement
- Notice of Readiness
- Complete Ship/Shore Safety Checklist
- SHLNG Discharge Agreement
- Safety Declaration
- Safe Mooring
- Unloading / discharge information
- Milford Haven Port Authority (MHPA) notices
- Latest weather forecast
- Tide tables and tidal stream information
- SHLNG Terminal Contact Numbers

Post-Discharge Cargo Meeting

The finalising of documentation between SHLNG and the LNG Carrier will take place in the Post Discharge Cargo Meeting including the return of the Fire Plan.

Finally the both parties are in agreement the ship to shore connections will be removed.

3.2.7 Connecting the Unloading / Vapour Arms

Connection

Connection of the Unloading/Vapour arms to the LNG Carrier will be carried out by SHLNG.

Connection to the ships manifold will be via a QC/DC Connection. Once connected the arms will be protected from over-reach and slew by a Powered Emergency Release Coupler (PERC).

Pressure Test and Purge

Pressure testing with nitrogen of the connection to prove a leak free connection will take place by SHLNG Process Operators, this pressure test will also purge any oxygen from the connection.

ESD Checks

SHLNG will proof test the operation of Emergency Shutdown (ESD) equipment that will be required on the ship and at the Terminal.

These checks will be carried out at ambient temperature (Warm) and once the arms have been cooled down to LNG Temperature (Cold)

Note: The Cooldown process is performed by passing LNG from the Ship to the Terminal

3.2.8 Discharging LNG

The LNG Carrier will discharge through the Terminals Unloading Arms. Initially at a pressure of approx. 1.5 barg and as flows are established ramping up to a discharge pressure of max 5 barg.

The Ship may need to take vapour whist discharging via the Vapour Arm, a notice period of 15 minutes must be given before taking vapour.

Four hourly checks are to take place during ‘discharging’ following the current ISGOTT Ship Shore Safety Checklist.

Regular monitoring of mooring line hook strain gauges and loading arm position will be undertaken.

Note: During discharging operations communications between Ship and Terminal must be maintained.

3.2.9 Completion of Discharge

Completion

The LNG Carrier will inform the Terminal

- 6 hours before the completion of discharge
- 1 hour before ramping down of the discharge
- Start of ramp down – completion of discharge

Draining and Purging of Arms

SHLNG Process Operators will drain LNG from the Arms back into the Terminal before using nitrogen to purge & hydrocarbon free the Unloading & Vapour arms back to the LNG Carrier.

3.2.10 Disconnecting of the Unloading Arms

Once discharging is complete, each unloading arms will be disconnected from the LNG Carrier by SHLNG Process Operators in the following sequence:

- Disarm PERC
- Disconnect QC/DC coupling from Ships Manifold
- Refit Flange Plate to Ships Manifold with ships personnel
- Move unloading arm to parked position on SHLNG berth

A Post Discharge Meeting will take place once the LNG Carrier has been disconnected from the Terminal

3.2.11 Stores

Some stores may be provided to the LNGCs berthed alongside via a stores barge/boat. All stores transfers are to be completed outside of cargo operation hours. Stores will not be provided from the shore-side i.e. across the berth heads.

3.2.12 Utilities

No utilities are provided to ships.

3.2.13 Garbage Facilities

Where disposal of solid waste and waste oils from LNGCs is required at the South Hook LNG Terminal, this will be carried out using a barge or other suitable vessel alongside the LNGC. No disposal of solid waste or waste oil will take place across the berths

3.2.14 Bunker Fuel and Lubricating Oil

Bunkering of LNGC is currently not allowed at SHLNG Terminal at any time.

3.2.15 Security

Port Security is provided in accordance with the requirements of the Department for Transport, Transport Security and Contingency Directorate (DfT Transec) and recommendations from the Ministry of Defence.

The SHLNG Port Facility Security Plan has been developed as required by the International Ship and Port Security Code and approved by DfT Transec.

Access to the jetty is controlled by a security gatehouse and restricted to authorised persons only.

LNG carriers alongside the jetty will control and restrict access on board ship in accordance with the vessels Ship Security Plan.

Small craft approaching the jetty will be monitored and controlled by the guard/standby tug and Milford Haven Port Authority.

3.2.16 Steel Trestle

The steel trestle between the shore and the jetty head provides a safety barrier to the pipelines along the east side of the jetty approach against small craft impact. Expansion loop support structures also have rubber fendering to protect against small craft impact.

3.2.17 Control Building and Watch Shelters

The Jetty Control Building (JCB) is used for the monitoring and control of jetty operations.

The JCB control facilities are made up of two sections:-

Jetty Control Room (JCR) equipment.

- Independent hotline telephones are located on the console for each berth.
- The hotline provides a direct line to the tanker, independent of the PABX.
- The tanker is also allocated two analogue telephone extensions from the plant's PABX for routine calling to the tanker from outside the JCR.
- Status of the ESD functions is provided by the ICSS.

Jetty Instrument Room (JIR) equipment.

A system status panel is provided on the front of each rack (each berth has a dedicated system cabinet). The panel features:

- A rotary switch for the selection of the Electric, Fibre or Pneumatic systems. A green selected LED illuminates for the appropriate selected system.
- Each system has an ESD status LED, which will illuminate Green if the ESD functions are in a healthy state and Red to indicate a fault.
- An inhibit switch is provided for each system to override the ESD input from the ICSS.
- Fibre optic interface, indicating ESD status and diagnostics relating to the 4 telephone/modem (data) channels.

Following rectification of an ESD fault the appropriate reset button must be pressed to clear the fault. Further push buttons are provided to simulate a Pneumatic ESD for testing purposes and for lamp/LED testing.

A watch shelter is provided on each of the unloading platforms of Berths 1 and 2. These provide weather shelter for the berth operators and contain equipment for controlling the operations of the unloading arms.

3.3 South Hook Port Infrastructure

3.3.1 Environmental limits for Port Entry and Berthing

Environmental limits for port entry and berthing are determined by Milford Haven Port Authority, Pilots and Port Control and are subject to revision.

The limits given below are not definitive and are provided for guidance only.

The final decision as to whether or not a LNGC bound for SHLNG Terminal can safely enter the port and berth at the terminal will be made by the ship's Master, assisted and guided by the pilots, port control, tugs and the terminal.

Limiting factors include:

- Wind strength and direction
- Prevailing sea state
- Tidal stream
- Swell height and direction
- Visibility
- Primary considerations include:
- Ability of pilots to board LNGC safely
- Ability of escort tug to safely pass tow line for active escort at pilot station before vessel commences inward transit.
- Ability of the inbound LNGC to safely manoeuvre in prevailing conditions. LNGC have a large windage area so wind strength is the major consideration.
- Ability of tugs to safely make fast forward and aft while LNGC is in west channel prior to reaching Angle buoy.

Note: Milford Haven Port Authority (MHPA) General Directions require that all vessels of 50,000 tonnes deadweight and above must be escorted in the Haven, either passively or actively. MHPA Entry and Departure Guidelines for Vessels state that LNGC will be provided with 4 tugs, one of which will be an active escort. Thus if sea or swell conditions in the pilot boarding area are such as to prevent the escort tug from safely passing a tow and conducting active tethered escort the LNGC may not enter the port.

Wind

The anticipated maximum sustained wind, at 10 meter elevation, in which a LNGC is allowed to berth at SHLNG Terminal corresponds to the values in the following table.

Direction	N	NE	E	SE	S	SW	W	NW
Sustained wind speed	25 knots	25 knots	25 knots	25 knots	20 knots	25 knots	25 knots	25 knots
Gust wind speed	30 knots	30 knots	30 knots	30 knots	25 knots	30 knots	30 knots	30 knots

Table 1. Max Sustained Wind Speed for LNGC Berthing

Note: Prevailing wind is from the South West.

Swell

The anticipated swell limit for pilot boarding at the Pilot Station is anticipated to be 2.5 to 3.5 meters depending upon direction and frequency. The swell limit for escort tug active escort tow connection is anticipated to be 3.5 meters or greater as determined by the tug master at the time of LNGC approach.

Current / Tidal stream

Current is not considered a limiting condition but will determine whether the ship is berthed on its Port or Starboard side.

Note: The direction of the tidal stream in relation to wind and swell will influence wave height and sea conditions.

3.3.2 Navigation Channel

LNG carriers will navigate to/from the SHLNG Terminal via the West Channel (a deep draft channel at the western side of the entrance to Milford Haven). According to Admiralty Chart No 3274, the minimum navigable depth is 15.6 m. C.D. The depth of this deep draft channel is sufficient so as not to impose tidal restrictions on LNG carriers.

The navigation channel to the south of the South Hook LNG Terminal jetty has been widened by dredging to provide an increased area with sea bed level – 10.0 m CD for smaller passing ships.

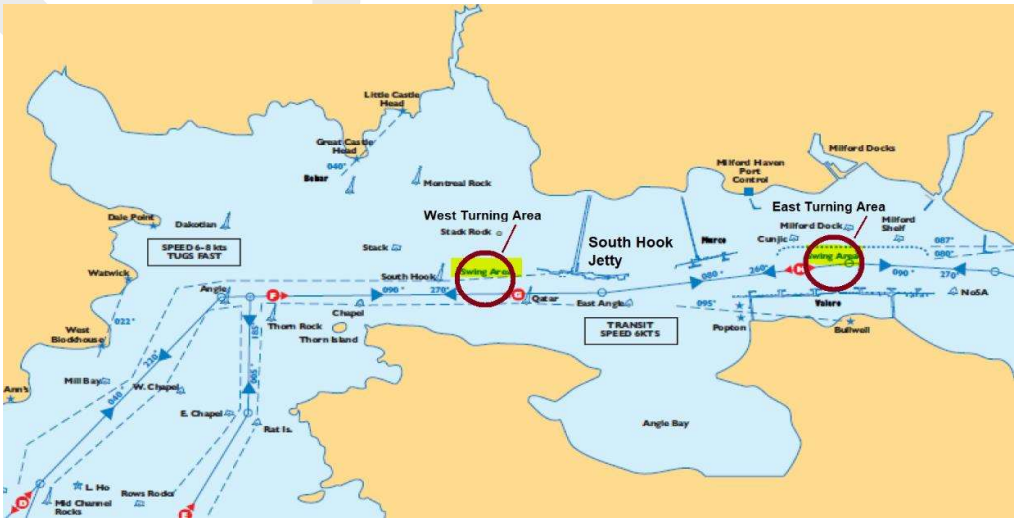
There is a split channel opposite South Hook LNG which forms 2 channels with a 10.0 m control depth in the South Channel and at least 15.6 m in the deep draft channel.

3.3.3 Turning Area(s)

Two turning areas are provided:

- West of the Jetty (Maximum size Q-Max, approx. 345m LOA)
- East of the Jetty (Maximum size Q-Flex, approx. 315m LOA)

Chart datum depth is reported to be –10.5 meters. This may result in tidal restrictions on LNG carriers, depending on actual tidal conditions.



3.3.4 Passing Ships

Milford Haven Port Authority has an established program requiring tug escort for identified vessels types and sizes prior to passing the SHLNG jetty inbound and from un-mooring to beyond the SHLNG jetty outbound.

MHPA has established that unescorted passing ships shall limit their speed to 6 knots, and a minimum passing distance of 72 m.

A 100m controlled zone is established around the South Hook LNG Terminal jetty and moored LNGC. Other vessels may only enter this zone with the prior permission of MHPA.

Fishing Vessel Navigation Permits are required for fishing vessels departing during the hours of darkness.

All vessels over 20m in length are required to report to Milford Haven Vessel Traffic Control System (VTS) when navigating within the port of Milford Haven.

3.3.5 Navigation Aids

The Jetty Navigation Lights and a Fog Signal, are in accordance with IALA Guidelines and MHPA Regulations.

There are 4 buoys marking the turning area and 2 buoys marking the South Channel.

The turning circle is also be marked by buoys.

3.3.6 Tug Boats

Manoeuvring studies have shown that four tugboats will be required to manoeuvre and berth a LNG carrier at the SHLNG Jetty.

The Terminal has a fleet of five dedicated Tugs:

Name	Bollard Pull	HP	Fire-fighting Y/N	Propulsion
Kilroom	117	8186	Y	ASD (GE/Schottel)
Lindsway	98	7716	Y	ASD (GE/Schottel)
Musselwick	86	5917	Y	ASD (Niigata)
Watwick	87	5917	Y	ASD (Niigata)
Gelliswick	83	5917	Y	ASD (Niigata)

Communications with Guard Tug

Calls to the Guard Tug should initially be made on **VHF Channel 12.**

The Guard Tug maintains a listening watch on VHF Channels: 16, 14 & 12.

3.3.7 Pilotage

Pilotage supplied by MHPA is compulsory. LNG carriers are within the established size and vessel criteria requiring the need for two pilots to board the vessel for all transit movements to/from the SHLNG Terminal. The pilot boarding area is approximately 5 miles off the entrance to Milford Haven.

Boarding Position for Large Vessels

4 miles South West of St. Ann's Lighthouse:

51° 36'.80 N. 05° 13'.50 W.

Note: All vessels to wait at least 5 miles off until called by their Pilot.

3.3.8 Port Operating Limits

Survival conditions at the berths are the combination of the following:

- Maximum wind speed 60 knots
- Maximum current:
  - 1.5 knots flood, aligned 5° off Berth 1, and in line with Berth 2
  - 1.6 knots ebb, aligned 5° off Berth 1 and Berth 2
- Swell: H_s 0.5m, T_p 16.3 s, with direction 5° onto the berth

Note: Berth operating conditions (weather limits for discharge) are defined by the Operating Company.

3.3.9 Tides

According to Admiralty Chart No. 3274 for Milford Haven - St. Ann's Head to Newton Noyes Pier, tidal data for Milford Haven is as follows:

- Mean High Water Spring: 7.0 meters C.D.
- Mean High Water Neap 5.2 meters C.D.
- Mean Low Water Neap 2.5 meters C.D.
- Mean Low Water Spring 0.7 meters C.D.

Note: Chart Datum (C.D.) is 3.71 meters below Ordinance Datum (Newlyn).

3.3.10 Currents

For reference on Tidal Streams at Milford Haven, the following sources shall be consulted: Admiralty Chart No. 3274 for Milford Haven - St. Ann's Head to Newton Noyes and Tidal Stream Atlas for Milford Haven, Volume 2.

3.3.11 Maximum Allowable displacement

Vessel Acceptance Criteria		
	Maximum	**Minimum**
Rated capacity (cubic metres):	270,000m^3	125,000m^3
Displacement (metric tonnes):	180,000MT	
Length overall (metres):	350m	270m
Draught (metres):	13.5m	

3.3.12 Maximum Speed of Approach for Safe Berthing

Maximum speed of approach for berthing 0.15 meters per second (0.29 knots)

Maximum fender loading is 20 metric tons per square meter.

The Trelleborg Marine Smart Dock Docking Aid System (DAS) uses lasers situated on the breasting dolphins to measure the distance off and speed of approach of the ship. This information is presented on the VDU in the Jetty Control room and via the Display Boards on the mooring dolphins east and west of the berth.

The Display Boards are located and sized so that they may be easily read by the Pilot, Master and Officers on the LNG Carrier bridge during the final stages of berth. In addition to numerical indication of lateral speed of approach and distance from the berth the Display Boards use a traffic light system to indicate whether the speed of approach is within the required range.

- Green indicating permissible speed.
- Amber indicating warning alarm.
- Red indicating over speed alarm.

Permissible speed and therefore warning and over speed alarm values decrease as distance to the fenders decreases.

Permissible speeds, warning alarm speeds and over speed alarm values are presented below.

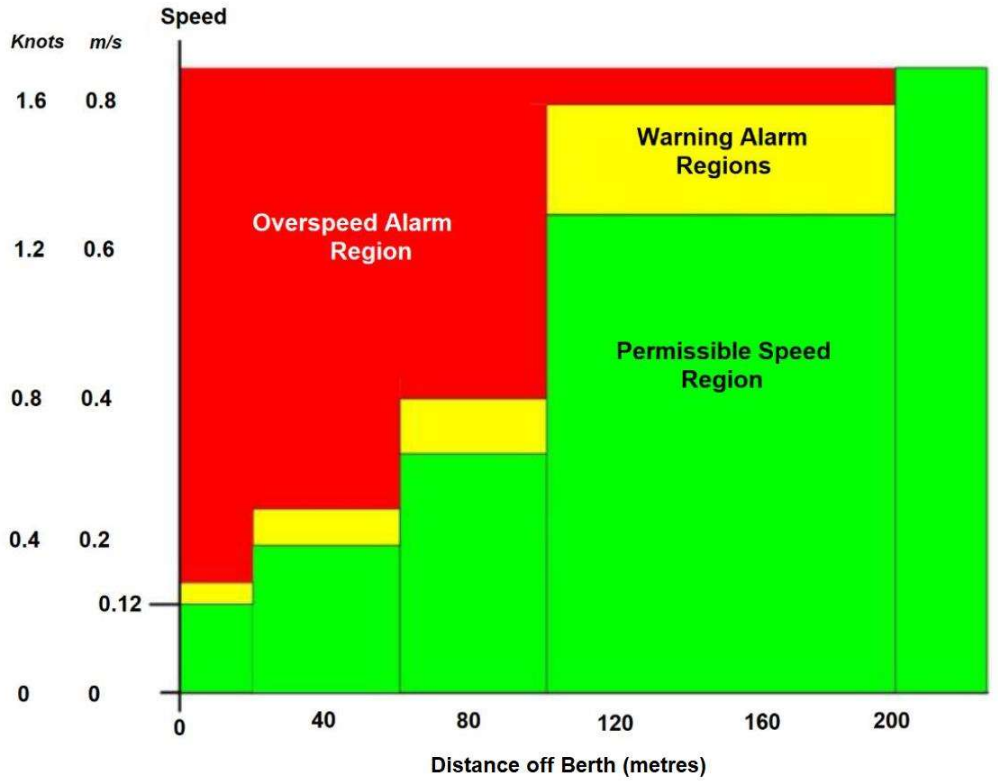


Table 2. LNGC Permissible Speed

Note: LNG Carriers should be parallel to the berth during the final stages of berthing and ideally touch all fenders simultaneously. Approaching the berth at an excessive angle can result in damage to fenders and the hull of the ship and must be avoided.

4. Appendices

Contents

Appendix 1 Reference Documents

SHEMS Documents

Number	Title
FK.000.00.001	SHEMS Framework Document
SD.04A.00.000	4-A System Document
SM.04A.01.000	Document & Record Management Manual

SHEMS Forms

SHEMS forms applicable to this procedure are listed in the table below.

Number	Title

Additional Reference Documentation

Additional reference documentation applicable to this procedure is listed in the table below.

Number	Title
N/A	SHLNG Glossary
	Port of Milford Haven - Entry and Departure Guidelines for Vessels

Appendix 2 Brief Overveiw of Safety / Emergency Protocol for Ship Along Side.

Pre-arrival requirements

1. Vessels must be equipped with fittings suitable for tug escort and pull-back that comply with the recommendations of OCIMF Mooring Equipment Guidelines 3rd edition (MEG3). In particular fixed gear such as strong points, fairleads (chocks), foundations and associated supporting structure should be demonstrated as adequate for the loads imposed.

   All LNG Carriers proceeding to and from South Hook LNG Terminal must be actively escorted. The designated Escort Tugs are “SVITZER KILROOM” and “SVITZER LINDSWAY” operated by Svitzer Marine Ltd. Svitzer Kilroom has a rated bollard pull of 117 tons and the Svitzer Lindsway has a rated bollard pull of 100 tons. Steering pull when operating in dynamic or indirect mode may be much higher than rated bollard pull; the MBL of the towline is 357 tons (68mm HMPE).

   It is imperative that the Escort Tug is always made fast through the designated tug escort and pull-back fairlead to the designated tug escort and pull-back strong point. The location and SWL of this chock and strongpoint must be conveyed to both tug and pilot and discussed at the Master/Pilot information exchange. The escort tug must be assured that the tow line is correctly secured to the correct strongpoint through the correct fairlead and if such assurances are not received may refuse to pass the towline until the towing arrangement is confirmed as acceptable.

2. Vessels fitted with side doors for pilot boarding must have an acceptable alternative means of pilot boarding such as a combination of pilot ladder and accommodation ladder that provides safe access in loaded and ballast condition.

   The lower platform of the accommodation ladder must be as high as possible, preferably more than 7m above the waterline, but not more than 9m above the waterline.

3. Vessels equipped with re-liquefaction systems should test the Gas Combustion Unit in all modes to full capacity 72 hours prior to arrival and must confirm that the test was successful to Port Control and Terminal via Agents.

   The Gas Combustion Unit must be available for use throughout the period that the vessel is alongside the terminal.

4. Conventional vessels with no re-liquefaction systems are required to arrive with deck cargo lines cold. Vessels with re-liquefaction systems are required to arrive with deck lines warm.

5. Cooling down of shore cargo arms will take 1.5-2 hours and will commence after connection of unloading arms, CTMS and warm ESD tests 2-4 hours after all fast. Cooling of vessels deck cargo lines may take place concurrently with cooling of unloading arms and jetty unloading lines.

6. Vessels equipped with re-liquefaction systems should arrive with the system in operation and cargo tank pressures reduced. It is expected that the re-liquefaction plant will be ramped down to standby mode after arrival for warm ESD test. Re-liquefaction system may then be operated as required during cool down of unloading arms to maintain tank pressures and may be placed in standby mode prior to cold ESD test and commencement of bulk discharge. If necessary or preferred the GCU may be used to maintain tank pressure during cool down and commencement of bulk discharge.

   The re-liquefaction system will remain on standby throughout bulk cargo discharge and the system will be ramped up to full operation prior to the completion of cargo discharge and commencement of stripping.

7. South Hook LNG Terminal is an import and re-gasification terminal only. The terminal can provide LNG vapour to the ship during unloading operations and a vapour arm will be connected for this purpose. The terminal is not able to offer the facility for a ship at the berth to send boil-off gas to shore whilst berthed at the terminal before, after or during routine cargo operations.

8. Mooring tails have to be of 22m length

Daylight restrictions

There are no daylight restrictions for berthing and un-berthing

Repairs whilst alongside

For any expected potential repairs whilst alongside require Terminals review & approval prior arrival. It is also required to inform Port Control in such cases as well prior arrival

Safety Zones around LNGC / Controlled Zone

The Controlled Zone is an area around the SHLNG Jetty structure that extends a distance of one hundred metres (100m) either side of the Jetty structure100 exclusion zone around South Hook Jetty

- No other ship movement when LNG/c are moving
- Jetty is protected by Guard/Standby tug on station all the time.
- When LNGC is berthed alongside tug is on immediate notice and will escort all passing vessels

..... END OF DOCUMENT .....