PORT QASIM AUTHORITY

STANDARD OPERATING PROCEDURES FOR OPERATING LNG CARRIERS

PQA Notice 001/ 15 Dated 11th April 2015

(Addendum to Port Qasim Regulations 1981)

The following Standard Operating Procedures (SOPs) have been developed for the operation of Liquefied Natural Gas (LNG) vessels within the limits of Port Qasim and its approaches.

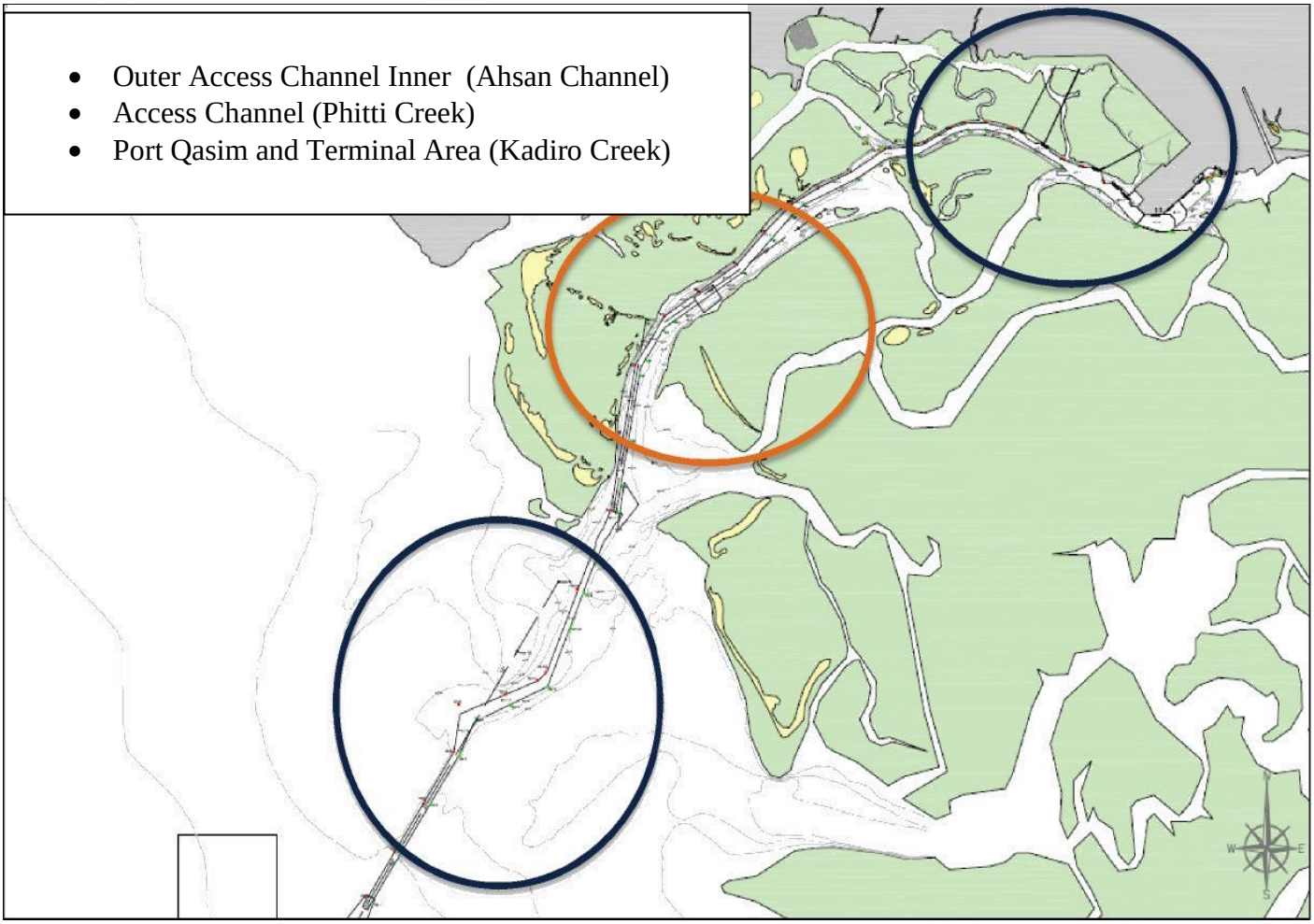
These SOPs have been developed for LNG carriers calling at Port Qasim. In order to remain compliant with the Pakistan LNG Policy at this time, the LNG carriers with dimensions given below can enter the Port without any waivers from the Government of Pakistan:

- Maximum LOA 295 Meters
- Maximum Beam 40 Meters
- Maximum Draft 12 Meters.

In special cases, the Government of Pakistan can grant waiver from compliance with to Port Qasim Authority to allow larger ships to enter the channel and berth at the LNG Terminals located within the Port.

Based on recommendations of simulation study carried out at "SiPORT 21" in February 2015, the LNG vessels of up to 217,000 m3 cargo capacity having maximum LOA of 315 meters and maximum Beam of 50 meters with arrival laden drafts varying from 10.8 meters to 11.50meters were considered. The corresponding wave heights at these drafts were limited between 2.0 meters to 1.2 meters respectively prevailing at the mouth of the channel entrance (Ahsan channel). Other factors including the existing port regulations, practices and traffic patterns of the port were also considered in the development of these SOPs.

These SOPs are to be read in conjunction with the existing Port Qasim Regulations 1981 and PQA act 1973and are to be incorporated in the comprehensive Operations Manual to be prepared, duly approved by the PQA and issued by each of the LNG Terminals located within the jurisdiction of Port Qasim Authority.



Masters of all ships' using LNG Terminal will be required to sign a copy of the Conditions of Use (COU) and the Marine Services Certificate (MSC) in acknowledgment of the ship's responsibilities and liabilities whilst using the Tug boats, Pilot boats and Terminal etc. prior transiting the Port channel. Copies of both these documents are attached to this document as Appendix 1 & 2. For tandem tethered towage the vessels will be equipped with adequate bollards and fairleads with the required capacity and configuration for indirect mode of operation of the escort tugs;

1. Upon departure of LNG carriers from the load port the Master shall communicate arrival information to the Port Qasim Control through local Agents according to the following requirements:
    - Name and particulars of the LNG Carrier with arrival draft
    - Loading port of the LNG Carrier
    - Time and date when LNG loading was completed

- The quantity and quality of LNG loaded and the portion of such quantity to be unloaded at the terminal in Port Qasim, if less than the full quantity
- ETA Notice of the LNG Carrier shall be updated (as the case may be) at intervals of 72, 48, 24, 12& 6 hours prior to vessel's arrival at Port Qasim.

2. If the cargo to be unloaded has been acquired or diverted to the Terminal in Port Qasim, after the departure of the LNG Carrier from the load port or after the relevant time specified above, then the ETA Notice shall be submitted as soon as possible after such acquisition or diversion, but in any event taking into account any applicable requirement for the final time by which the arrival of LNG Carrier shall be notified to the Port Qasim Authority.

3. When in VHF range of the Port Qasim Control, the LNG Carrier shall contact and maintain a listening watch on the Port Qasim Control VHF Operating Channels.

4. Upon arrival at Pilot Station: Notice of Readiness (N/R)
   The notice of readiness is issued by the Master of the Vessel on behalf of the Shippers, Charters or Owner, when the Vessel has arrived at the Arrival Point, has received all necessary Port Clearances and is ready in all respect to proceed to the berth for unloading operations.
   - Vessel's name and IMO number.
   - Date and Time.
   - All equipment's are in good order.
   - Vessels ready to unload in all points.

5. Communication Information

- All communications between the Ship and shore shall be conducted in the English language.
- All pre-arrival information shall be communicated by the Master of the vessel to the Port Qasim Authority through the local shipping agent of the vessel.
- VHF "Operating Channels" Channel 10 or 16 all round the clock.
  Port Qasim Call Sign: PORT QASIM PORT CONTROL
- Harbor Master Office:+92-21-99272172
  Office Hour Phone: +92 21 – 9927 2111-20 Ext. 4294
  Mobile No. : 0092-3012490108 for local dialing: 0301-2490108
  Dock Master Office: 92-21- 99272111-20 Ext. 4295

Operation Room Officer (ORO): 92-21-99272174 99272111Ext. 4269

- PORT FACILITY SECURITY OFFICER' (PFSO)

  PFSO Name: Colonel (Retd) Tanveer Farooqui
  Title: Director Security
  Address: PQA, Bin Qasim Karachi
  Telephone: +92 21 99 272 163 (Office),
  +92 21 99272111 Ext 4627
  (Mobile) +92 305 399 4684 Fax: +92 21 3473 0108
  Email: tanveerfarooqui95@gmail

6. The LNG carriers calling at Port Qasim shall have an International Association of Classification Societies, (IACS) Rating of a minimum Condition Assessment Program (CAP) 2 for vessels 15 years and older. The following checks and tests shall be carried out successfully on board the LNG Carrier according to the specified intervals and duly recorded one day prior to the estimated time of arrival at the Fairway buoy:
   - IMO Water Spray systems ……Within three months prior to vessel's arrival
   - Fire pumps…….Within one week prior to vessel's arrival
   - Inert condition of annular space, primary and secondary space if applicable ……..……At all times
   - Operation of cargo system remote control valves and their position indicators …Within one week prior to vessel's arrival.
   - Alarm function of fixed gas detection equipment Within one week prior to vessel's arrival
   - Primary custody transfer and alarm set points……Within one week prior to vessel's arrival
   - Operation of the ESD system…… Within 48 hours prior to vessel's arrival

7. Through the vessel's Agents, the Masters are obliged to immediately report to the Harbor Master any defects or deficiencies that may affect the safety or the performance of operations to be conducted while the LNG Carrier is within the Port limits/or when the LNG Carrier is at the Terminal.

8. LNG vessels may arrive at Port Qasim Anchorage at any time of the day or night. If required to await berthing at the anchorage, the vessels

are to drop their anchors at the designated anchorages for LNG vessels at positions shown below:

- PETROLEUM WAITING ANCHORAGE
  - LAT: 24° 30'.00 N -- LONG: 066° 56'.00 E
  - LAT: 24° 30'.00 N -- LONG: 066° 58'.00 E
  - LAT: 24° 28'.00 N -- LONG: 066° 56'.00 E
  - LAT: 24° 28'.00 N -- LONG: 066° 58'.00 E

- GAS TANKER WAITING ANCHORAGE
  - LAT: 24° 28'.00 N -- LONG: 066° 56'.00 E
  - LAT: 24° 28'.00 N -- LONG: 066° 58'.00 E
  - LAT: 24° 26'.00 N -- LONG: 066° 56'.00 E
  - LAT: 24° 26'.00 N -- LONG: 066° 58'.00 E

The Master of the LNG ship will tender his Notice of Arrival at the Gas Tanker Anchorage or on boarding of the Pilots – whichever is earlier, for registration with PQA Control. Embarkation of Pilots onboard the LNG carriers will take effect prior to vessel's entry in the Ahsan channel about 2.5 miles SW of the Fairway Buoy. During the South West Monsoon season or in bad weather conditions, the Pilots may board the inbound vessel through Tugboats instead of Pilot Boats.

9. Pilot allocation will be two Pilots for the transit (in and out). A third berthing pilot will embark on the vessel while she approaches the harbor area to safely berth the vessel alongside. Depending on the duration of the stay of Pilots onboard a due consideration will be given to their rest period and if necessary they will be relieved accordingly without causing any delays to the vessel.

10. As shown in the picture on top of this document, the Port Qasim navigation channel is divided in three legs. The outermost leg (Ahsan Channel) starts from the entry in the Port near the Fairway Buoy and connects with the Phitti Creek at Buoy # B-1/B-2. Phitti Creek (Inner channel) ends in the Kadiro Creek at Buoy G-1/G-2, which extends into Gharo Creek where the Terminal, Turning Basins and the berthing areas of the Port are located.

11. LNG vessels shall transit the Channels escorted by a speed boat carrying armed guards and two tugs at speeds up to about 10 knots with the stern tug made fast, the decision as to when and where to make the tugs fast will be made after consultation between the Pilots

and the Master. Preferably, one of the escort tugs to be attached on the stern for inbound and outbound transits of the Port.

12. Based on the results of the navigation simulations with LNG vessels up to 217,000 m3 cargo capacity, the following procedures for entering and navigating the three legs of the channel have been developed and to be complied with:
    a. The LNG carrier to enter the Ahsan channel about one hour prior to the top of the High Water provided the transit through the channel to the berth can be completed during daylight hours.
    b. The LNG carrier is allowed to enter the channel all-round the year including the South West Monsoons (approximately 15th May – 15th September) under controlled and closely monitored conditions.
    c. The water density of the PQA channel varies with the location and environment ranging between 1.023 to 1.027.
    d. Draft of the vessels have to be controlled to meet the PIANC guidelines for the channel which gives the guidance for under-keel clearance depending on High Water Level linked to the height of waves that can exceed 2 meters during the SW Monsoon season. After boarding of the Pilots and prior to commencing the passage in Ahsan channel, the escort tugs to be in attendance at the astern. For the tugs to render effectively they have to operate during wave heights limited to 2 meters. A second escort Tug will lead ahead of the vessel to keep the channel clear and render any required assistance in case of emergencies. The draft of the LNG vessel has to be maintained between 11.5 meters to 10.8 meters at the starting point of Ahsan Channel according to the following scale of wave heights:
        i. Wave Height 2.0 Meters ……. Arrival Draft 10.8 meters
        ii. Wave Height 1.2 Meters……Arrival Draft 11.5 meter

    The speed limit of the vessel at the starting point of the Ahsan Channel is about 10 knots. For Ahsan Channel arrival maneuvers the wind is to be 20 knots (mean).

14. LNG vessels will not be handled in weather conditions that make operations hazardous (typically wind speeds in excess of 25 knots and wave heights constantly above 2.0m). The actual weather conditions to

be determined at the time of the maneuver. Initiating of transit is prohibited if the visibility is less than 2 mile.

15. If weather conditions deteriorate in the Channel, where wave exposure is higher (wave conditions greater than Hs 2.0m) such that there is a concern over the safety of tugs, a single escort tug attached to the transom may be deployed with the second tug in passive escort mode. One or more of the following practices shall also be adopted:
    - the speed through the water is reduced to 8 knots or less in the outer channel transit; OR
    - the planned transit of the outer channels will be undertaken on a stemming tide; OR
    - the LNG vessel waits until weather conditions improve.

16. No passing shall take place between an LNG vessel and any vessel other than controlled craft/s during the transit through the Channel area. However, controlled passing with other vessels may be permitted by the PQA under special circumstances provided the LNG vessel is anchored at the side of the channel at passing bay or at turning basin and is attended by tugs.

17. Separation between LNG vessels and other vessels in the Channel in the same direction shall be minimum one (1) hour for all type of vessels throughout the transit. The draft of the vessel and the escort tug assistance allows for the option of safely aborting the transit at either IOCB or QICT turning basins, being the contingency anchorages or awaiting in channel with tugs in attendance.

18. LNG vessels to have Electronic Chart Display and Information System (ECDIS).

19. During passage through Phitti Creek the limits of environmental conditions, vessel movement and Tugs assistance is expected to remain as above. However, the senior Pilot and Master will make necessary adjustments depending on the actual conditions prevailing in the channel during passage.

20. On transiting from Phitti Creek to Kadiro Creek the speed will be maintained between 10 to 6 knots at the discretion of the Senior Pilot in conjunction with the Master taking in to account the prevailing weather conditions. The two escort tugs will follow and assist in swinging and berthing the vessel. In addition, two other LNG Tugs will join to assist with the swinging and berthing the vessel as per the requirements of the Pilots.

21. By the time the LNG carrier arrives near the Terminal located within the Gharo Creek, there will be strong ebb tide running which would not be suitable to swing the vessel for bringing her in the required starboard side alongside to the FSRU for discharging her cargo in a ship to ship mode. This is also necessary in order to have the vessel heading in outward bound direction, in case she has to depart during an emergency.

22. The Pilot to make a careful assessment of the prevailing wind, wave, tide and the current condition. If considered safe, the Pilot after consulting with the Master of the ship may decide to swing the vessel in slight ebb tide on arrival at the turning basin without awaiting the floodtide. Otherwise, the vessel to be anchored at the turning basin waiting for the Flood tide.

23. Whether the LNG vessel is swung to port or starboard is at the discretion of the ship's Pilot and Master.

24. For normal operations a minimum Under Keel Clearance (UKC) of 10% of the vessel's arrival draft shall be retained throughout vessel arrivals and departures in fair weather. During SW monsoons or bad weather when wave heights 2.0 M, then this requirement will increase to 15% when entering the Ahsan Channel. A UKC of 1.2m is the minimum deemed satisfactory for swinging on arrival and departure for LNG vessels with drafts up to 11.50 meters.

25. A berthing display board (rate, angle, distance off berth) located on wharf shall be provided to be visible from the LNG vessel's bridge in all conditions of daylight and dark. However, since this cannot be arranged on an FSRU for STS operation. The LNG vessel shall carry

reliable PPU or other equipment to assist the Pilot in determining the distance of the berth and the speed of the vessel while approaching the FSRU/Berth for mooring.

26. On departure from the Terminal, two tugs will be released in the vicinity of Turning Basin. The remaining two tugs will escort the vessel outbound.

27. While the FSRU is in operation alongside the Terminal jetty, a Tug with firefighting capabilities will remain stand-by at all times with a 30 minutes response time.

28. An additional tug- Guard tug with full fire-fighting capability will be on station at the Terminal whilst an LNG vessel is at the berth alongside the FSRU Pilots will not be required to remain onboard an LNG vessel whilst alongside the FSRU but must be available within the time specified for the second tug to be in attendance.

29. In the short term, the passing ship's speed is to be managed as per conclusions of the Artelia study* copied below.

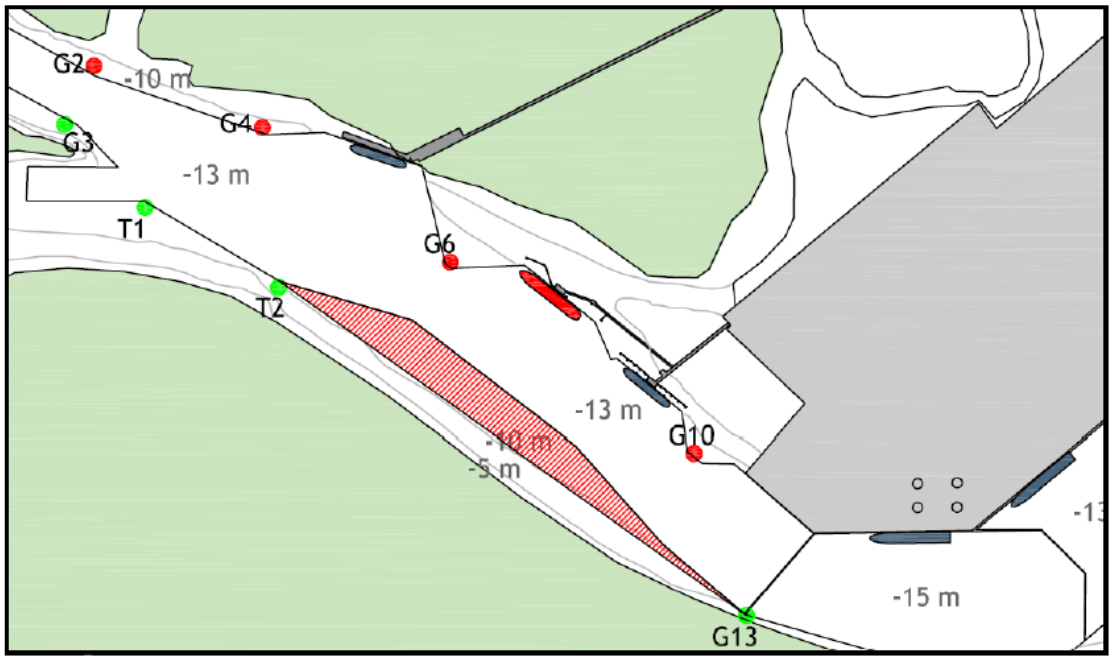
Passing distance (from toe line)	Passing by Speed (Ground Speed)	Differential motion in reference to the berth	Max wind speeds	Remarks
0 meters	**6kts**	**0.6 meters**	**25kts from SW**	**-**
0 meters	**8kts**	**< 2 meters**	**25kts from SW**	**-**
0 meters	**8kts**	**< 2 meters**	**25kts from any direction**	**-**

Passing distance (from toe line)	Passing by Speed (Ground Speed)	Differential motion between the 2 moored vessels	Max wind speeds	Remarks
0 meters	**6kts**	**1 meters**	**25kts from SW**	**-**
40 meters	**6kts**	**< 2 meters**	**15kts from any direction including NE**	**Will be confirmed in final version of study**

** Study conclusions received by Qatargas on 16th March'15*

This limitation is for the vessel greater than or equal to 310 meters LOA vessel, for smaller vessel (total 85% of Port Operations) results for passing by vessels will be much better.

In the longer term, recommendations are to perform dredging operations opposite of the terminal (Buoy T2 to G13) in order to increase the width of the fairway in front of ETPL jetty. This will allow increased passing distances for vessels in this area.



Recommended channel modifications to increase navigable area

FMBS studies of Feb'15 recommend additional dredging in the longer term to increase the navigable area at the

30. In case where an emergency departure from the berth is necessary, two tugs and a Pilot will be required to un-berth the LNG carrier. Since the vessel will be undergoing cargo operations, she would be pulled away from the FSRU by the two attending tugs after the activation of ERC (to release cargo discharge hoses) and the quick release of mooring hooks on the mooring dolphins and the FSRU, within a short time. The LNG vessel will be removed from the FSRU berth and held in the Turning Basin (contingency anchorage) to await the arrival of additional tugs and Pilots to safely assist her in holding the vessel or for safe departure from the Turning Basin, as necessary. The LNG carrier and the FSRU shall have a dedicated Pilot cabin available for the Pilot at all times.

31. Operating parameters covering LNG vessel e.g. draft/daylight hour, operation/environmental conditions etc. will be set at a restricted level in the early stages of an LNG Operations. These parameters will be reviewed during the 'settling in period'(after monsoon) where the working results can be validated against the simulation results in order to mirror or modify the "operational condition requirements" determined during simulation.

32. Once validation has been completed, then it is expected that LNG vessels will be handled during the hours of darkness subject to suitable weather conditions (simulated first).

33. On departure of LNG Carrier from the Terminal during SW Monsoons or bad weather conditions, the LNG carrier shall provide good lee for the disembarkation of Pilots off the Fairway Buoy. In case, the Pilots are unable to disembark safely from the LNG carrier outbound, then the Pilots will remain onboard and repatriated from the next available disembarkation point with minimal deviation and delay to the vessel on Owner's account. This arrangement, if found necessary, will be made in close coordination between the PQA, the vessels Agents and the Owners of the LNG Carriers.

34. Subject to meeting all the other requirements, the entry of the vessel into the PQA channel on her arrival and the departure from the berth will only commence during daylight hours when it is estimated that the vessel transit will also be completed during daylight hours.

35. Vessel scheduling:
    Priority of shipping will remain as per published Port Regulations 1981. Ship scheduling will be carried out as at present by the PQA ship schedulers and in accordance with the following principles:
    a. LNG Vessels will advise their ETAs 48/24/12 and 6 hours prior to arrival at the Fairway Buoy..
    b. The ship scheduler will schedule the berthing of the LNG vessel after vessel's ETA is confirmed by the vessel's local agents requesting berth and embarkation of the pilot. This would however depend on the availability of the time slot in consultation with the port and the required environmental conditions.

c. All vessel movements shall be subject to the approval of the PQA. LNG vessels that miss their time slot will be allocated the next available time slot that fits in with other port movements;

36. Additional parameters may be placed on operations at individual terminals as circumstances dictate.

37. These SOPs will be reviewed on a regular basis as the LNG trade continues to develop and may be varied from time to time as considered necessary.

38. Emergency Procedures: The following Terminal information related to "Emergency Signals and Procedures" should be made available to all personnel, on board, involved in the cargo handling or de-ballasting operations at the LNG terminal:
    (a) Fire in the terminal
    (b) Major Emergency requiring evacuation of terminal
    (c) Fire On Board
    (d) Medical Emergency On-Board
    (e) Emergency Escape Route
    (f) Lightening
    (g) Safety Clothing: All ship's personnel working on deck must wear the appropriate Personal Protective Equipment

39. Emergency (remote) Mooring Hooks Release: The Terminal Operator is responsible for the operation of the mooring hooks. Under normal circumstances, only manual (local) activation of the hook releases is permitted and this operation is to be conducted by the mooring crew of Terminal Operator. In emergency situations, the mooring hooks may be remotely released by the Terminal. For emergency releases, the following procedure must be complied with:

    - The Terminal, after receiving clear instructions from the Master shall immediately request verbal confirmation for the emergency release from the Harbor Authorities, or PQA Operation Room Officer (ORO).
    - The Harbor Authorities or Port Operation Room Officer (ORO) shall confirm emergency release.

- The sequence of hook release indicated by the Ship's Master/Pilot must be strictly adhered to.

40. Emergency Contact Numbers (From Ship to Shore)

Hot line between Ship and

1. Operations Room Officer	: 021-99272174
2. Jetty Control Room	: 021-34730114, 021-34243230
3. Fire Station	: 021 99272145
4. Medical Centre	: 021 99272111-30 (Ext 4275)
5. Security (Main Gate)	: 021 9927214511-30 (Ext) 4482