

## Unit 23

### BERTHING



Ship handling operations include manoeuvring and controlling the vessel by means of engines, helm movements and tug assistance. Berthing means bringing a vessel to her berth until the ship is made fast. A ship may berth port or starboard side on or bow or stem on.

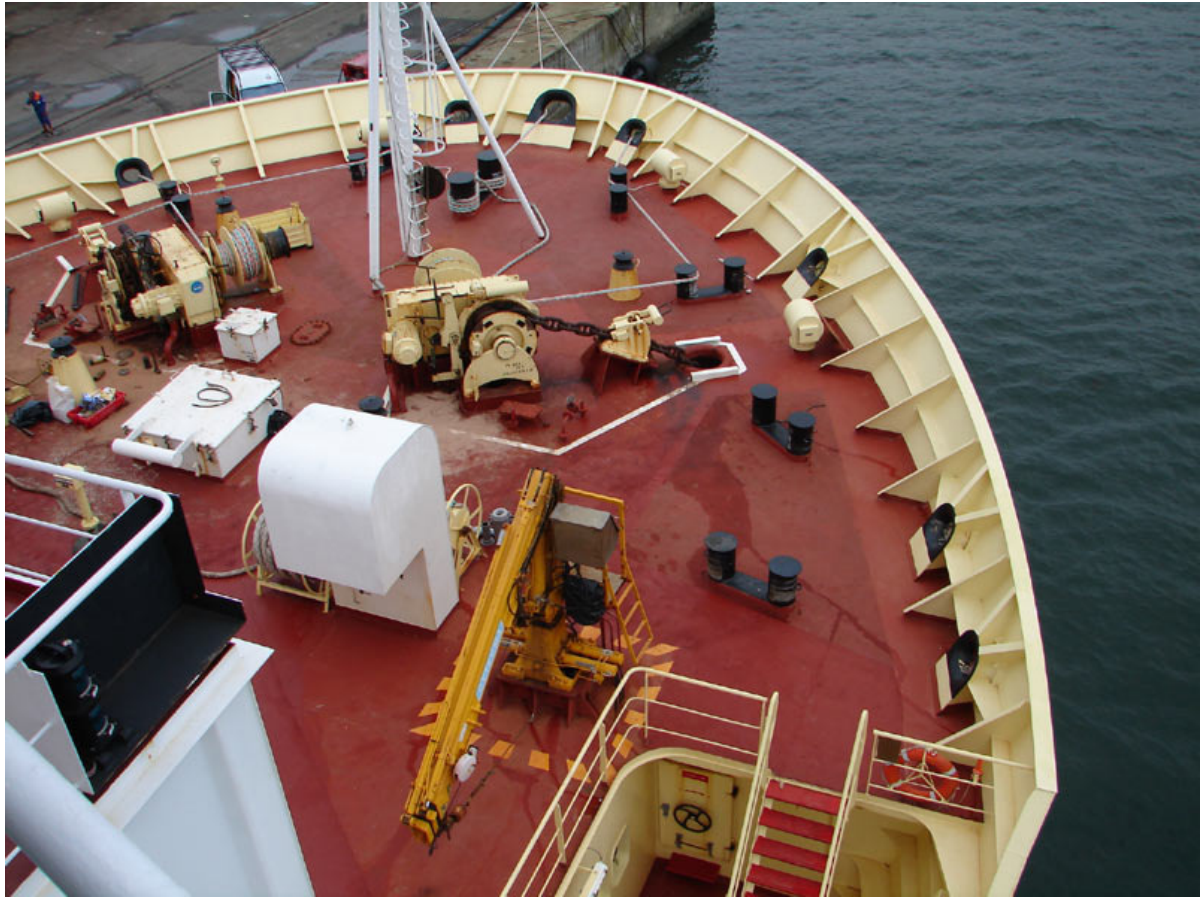
The term “berth” refers to the quay, or wharf, or pier or jetty where the ship comes alongside, but it may also mean a place in which a vessel is moored or anchored.

The berthing and unberthing manoeuvres require great knowledge and skill by the master, officers and the crew, as well as an excellent team-work with the rope-runners and the mooring party ashore.

A ship may berth port or starboard side to, with no wind or tide, with the tide ahead, with the wind onshore or offshore. The master, the pilot and the tug skippers must have good local knowledge of the tides, wind conditions, depths and aids to navigation, but they also have to take into consideration the transverse and axial thrust of the propeller, how the ship responds to the rudder and how much power she develops when running astern.

The **MEDITERRANEAN MOOR** consists of making a ship fast stem-on to a berth with the bows held in position by the anchors. Usually about four shackles of cable are used on each anchor and it is preferable although not always possible, to achieve a reasonable spread between the anchors so that the bows are held securely in a beam wind. The approach is best made with the berth on the port side and the starboard anchor should then be dropped-with the vessel two ship lengths off the berth and about half a ship length before the line of the berth. After proceeding slow ahead and paying out cable, the engines should be stopped and put astern when half a ship length past the line of the berth. (*see Fig. 1*). As the vessel gathers sternway the port anchor should be let go. The effect of transverse thrust as the vessel goes astern paying out cable is to cant the stem to port towards the berth. (*see Fig. 2 p. 195*). Stem lines are passed out on the cross and when turned up on the bitts they may be set up tight by heaving in a few links of cable (*see Fig. 3 p. 195*).

In some cases, in exposed positions, a buoy is provided on each quarter. Since the vessel is made fast at right angles to the line of the shore, the mediterranean moor is not suitable for use in tideway. It may be used where cargo ships discharge into lighters or for tankers using their stem discharge line.



**Forecastledeck – Mooring and Anchoring Gear**



**Unmooring manoeuvre**

## **Berth Manager – Jetty Management System**

Based on over 40 years of experience in load and force measurement, Strainstall's Berth Manager system is designed to assist the mooring master by providing comprehensive surveillance of mooring and vessel-related parameters during approach to the berth, and while moored. Sensors monitor speed of approach, mooring loads, weather conditions, oceanographic parameters and detect any drift off. All of these values are processed and presented on a PC based control room display system, which provides graphics and lists of all critical data, and which is available on screens in the harbour office and via fibre-optic link or radio to the ship.

The Berth Manager jetty management system integrates a number of sub-systems which are all available as stand alone packages. These systems are:

- a) DockAlert vessel approach monitoring - provides speed, distance off and drift-off data
- b) MoorAlert mooring load monitoring - provides mooring set-up, mooring tension and alarm data
- c) Meteorological/oceanographic monitoring - provides weather and sea-state information for reference

## **MoorAlert – Mooring Load Monitoring**

Straininstall's MoorAlert mooring load monitoring system provides an accurate indication of mooring loads in multi-line mooring spreads. A vessel's mooring lines are measured and monitored by strain gauged load measuring pins, installed in the quick release mooring hooks. This enables each mooring line to be pre-tensioned according to each vessel's individual mooring scheme. The load pins detect any deviation from these defined values and indicate any alarm conditions. The instrumented hooks and electronics can be supplied in hazardous area certified form for use on oil and gas jetties, and have been supplied to many port and harbour installations world-wide.



## **DockAlert – Vessel Approach Monitoring**

The Straininstall DockAlert vessel approach system uses distance-measuring lasers on the mooring jetty to compute the speed of approach, angle of approach and distance off for a vessel being manoeuvred onto a dockside mooring. The vessel approach parameters can be displayed in the harbour office and can also be made available to the ship's master via a large digit display on the jetty which is visible from the ship, or via a data link. With the vessel moored alongside, DockAlert can provide information on drift-off and fender compression. External items can be supplied certified for hazardous areas to meet the requirements of oil & gas jetties.



## **Towing Load Monitoring**

The Strainstall towing load monitoring system is designed to give towing vessel masters a direct reading of tension in a towing hawser. It consists of load cells or a load measuring pin fitted to the towing hook, quick release mooring hook or winch, plus a readout/alarm warning unit which can be set with overload thresholds to suit the gauge of rope or wire being used for the towing operation.

There are 3 typical towing load monitoring configurations:

- A single channel system with the load pin designed for incorporation into a swivel joint of a tugboat quick release mooring hook
- For double drum winches, with both outputs leading to a single display unit with a switch to select the desired measurement channel
- For marine towing winches, with the load being measured by load cells in the brakestay or under the bed of the winch.

Key features of towing load monitoring include simple installation, full environmental sealing, accurate readings, easy maintenance and optional additional readouts.



Bitts & bollards

## IMO STANDARD MARINE COMMUNICATION PHRASES (IMO SMCP 2001)

### IV-A/5.7.2 -Berthing

*Are there any berthing instructions? I What are my berthing instructions?*

- No berthing instructions.
- Berthing on arrival.

*Your orders are to berth on... .*

*Your orders changed.*

*Proceed to ... for orders.*

*You may enter at... UTC.*

*You may proceed at... UTC.*

*Vessel turning/manoeuvring in position... .*

*MV... will turn in position... .*

*MV... will leave... at... UTC.*

*MV ... leaving ... .*

*MV ... entered fairway in position... .*

*Your berth is not clear (until... UTC).*

*Your berth will be clear at... UTC.*

*You will berth/dock at... UTC.*

*Berthing delayed by ... hours.*

*Be ready to get underway.*

*Move ahead... metres.*

*Move astern... metres.*

*Have fenders ready fore and aft.*

*We will berth port / starboard side alongside.*

*We will moor to buoy(s) ahead and astern.*

*We will moor alongside.*

*We will moor to dolphins.*

*Send out head/stern/ breast lines.*

*Send out... spring(s) forward / aft.*

*Do you have tension winches?*

- Yes, we have tension winches (forward and aft).
- No, we have no tension winches.

*Have heaving lines ready forward and aft.*

*Send heaving/ head/ stern/ breast line ashore.*

*The linesmen will use shackles/lashings for securing mooring.*

*Use centre/ Panama lead.*

*Use how lead.*

*Use port quarter/starboard quarter lead.*

*Heave on ... line(s)/... spring(s).*

*Pickup slacken ... line(s)/... spring(s).*

*Heave away.*

*Stop heaving.*

*Slack away... line(s)/... spring(s).*

*Stop slacking ... line(s)/.. spring(s). Hold on... line(s)/... spring(s). Heave in easy.*

*Heave alongside.  
Keep lines tight.  
We have to move ... metres ahead/aft.  
Your vessel in position - make fast.  
We are in position.  
Make fast fore and aft.  
Fast forward.  
Fast aft.*

*Is propeller clear?*  
- Yes, propeller clear.  
- No, propeller not clear.

*Keep propeller clear.*



**Line handlers take in mooring lines**



**Singling up the mooring lines**



**Mooring winches**



**Capstan**



## ***A. Comprehension & vocabulary***

### ***A.1 Supply the appropriate term:***

- ***berthing*** • ***mooring gear*** • ***berth*** • ***berthing operation***
- ***mooring lines***

Coming along any 1. \_\_\_\_\_ can be a very difficult operation and is always potentially dangerous. The ship's anchor and 2. \_\_\_\_\_ must be made ready for use. Most frequently tugs are used to assist the ship's 3. \_\_\_\_\_. The Master decides which 4. \_\_\_\_\_ are to be used. Each officer must know exactly his own role in the 5. \_\_\_\_\_.

### ***A2. Explain the movement of the vessel in the following sentences:***

1. Take all the way off.
2. The vessel starts gathering sternway.
3. The vessel moves bow first.

**A.3 Sort out the verbs below into two groups:**

A. - verbs referring to a movement of the line towards the person handling the line

B. - verbs referring to a movement of the line from the person handling the line

• ***pull the line on board*** • ***cast off the line*** • ***run the line out***

• ***tighten the line*** • ***pay out the line*** • ***heave on the line***

• ***slack away the line*** • ***haul in the line*** • ***send away the line***

• ***set the line tight, pass the line down to the tug*** • ***heave the line*** • ***take the slack back***

<b><i>A (Movement towards the person working the line)</i></b> <b><i>A &lt;=====</i></b>	<b><i>B (Movement away from the person working the line)</i></b> <b><i>B =====&gt;</i></b>
<b><i>Pull the line on board</i></b>	<b><i>Cast off the line</i></b>

***A.4 State which of the following terms is described in the sentences below:***

- *moor* • *Mediterranean moor* • *berth* • *mooring buoy*
- *aids to navigation* • *heaving line* • *mooring gear*

1. \_\_\_\_\_ : the place in harbour in which a ship rides to her anchor or is secured alongside.
2. \_\_\_\_\_ : space around a vessel at anchor, and in which she will swing freely.
3. \_\_\_\_\_ : buoy securely moored so that a vessel can be attached to it and lie safely.
4. \_\_\_\_\_ : a type of berth where the ship's stern is secured to the quay and two anchors are laid ahead.
5. \_\_\_\_\_ : a light rope used to haul in a heavier one.
6. \_\_\_\_\_ : buoys, light houses, seamarks, landmarks etc.
7. \_\_\_\_\_ : deck and shore fittings for making fast the rope.



*A.7 Match the pairs of sentences in the two columns below.  
The first one has been done for you:*

<b>Berthing at an oil terminal</b>				
<b>A</b>	At the VLCC Jetty there are four	<b>1</b>	loading arms (16 inch diameter) for crude oil discharging and 2x12 inch loading arms for bunker loading.	<b>A1</b>
<b>B</b>	Unberthing and berthing is possible only	<b>2</b>	-12 C Pressure: 11 kg/sq.cm.	
<b>C</b>	The crude oil unloading capacity is	<b>3</b>	10.0 Million Tons/year.	
<b>D</b>	"T " Jetty: 4x12 in. FMC loading arms are available for crude discharge or	<b>4</b>	during daytime.	
<b>E</b>	If LOA is more than 200m,	<b>5</b>	is 0.6 Million Tons/year.	
<b>F</b>	LPG Platform; 1x8 in. FMC loading arm for LPG, berthing only during daytime. Temperature:	<b>6</b>	and their lifting capacities are up to 1.5 tons.	
<b>G</b>	The LPG unloading capacity	<b>7</b>	berthing is allowed only during daytime.	
<b>H</b>	Height of vessel's discharge manifold above sea level at the end of discharge (with permanent ballast) should not	<b>8</b>	to avoid causing damage to FMC loading arm.	
<b>I</b>	Ship's height should not be more than 18 m. in order	<b>9</b>	be more than 22 m. for VLCC Jetty No.1	
<b>J</b>	Fixed cranes are available at all berthing points	<b>10</b>	loading of black product.	

*A.8 Speaking skills. Work in pairs and talk about what you should know when you are docking at each berth below:*

<b>BERTHS</b>	<b>LOA (m)</b>	<b>DRAFT (m)</b>	<b>D.W.T.</b>	<b>PRODUCT</b>
VLCC JETTY (a) "T JETTY": (b)Berth No.1	360	-19.2	250.000	Crude
Berth No.2	180	-12	60.000	White products & Lub oil
Berth No.3	100	-8	5.000	Products
Berth No.4	100	-6	3.500	White products & Lub oil
Cargo Pier 95	95	-6	3.000	Black & white products, lub oil,asphalt
LPG Platform: (c) Berth No.1 Berth No.2	230 103	-13 -6.5	44.000 5.000	LPG LPG

*(Alternatively students can be given only partial information about the berths and they should find the student who has the missing parts of the information)*

## **B. Grammar**

### **B. 1 Choose the suitable verb in the brackets and the right verb form to fill in the blank spaces:**

The pilot is explaining the berthing plan at the mooring Conference:

**PILOT** - We'll 1. \_\_\_\_\_ heading up stream and 2. \_\_\_\_\_ the tide. The tugs will be used just to 3. \_\_\_\_\_ her alongside (stem, push, berth).

- **CHIEF OFFICER** - Where will the tugs 4. \_\_\_\_\_ (make fast)?

**PILOT** - Starboard side, fore and aft on the main deck.

- **CHIEF OFFICER** - Tug's lines?

**PILOT** - Yes, they 5. \_\_\_\_\_ you a light wire to help them

6. \_\_\_\_\_ in position (give, stay). They 7. \_\_\_\_\_ us in, so there 8. \_\_\_\_\_ no need for a heavy towing spring (be, push,). When we 9. \_\_\_\_\_ to the berth, we just 10. \_\_\_\_\_ the current off the jetty and 11. \_\_\_\_\_ her ease gently down on to the berth (stem, get up, let). The first lines 12. \_\_\_\_\_ ashore, via the mooring boat 13. \_\_\_\_\_ two headlines (send, be).

***B.2 Supply the right preposition or adverb:***

**CHIEF OFFICER** - Take the headlines 1. \_\_\_\_\_ the drum-ends; no more 2. \_\_\_\_\_ three turns, and heave 3. \_\_\_\_\_ (Talking 4. \_\_\_\_\_ the Bridge). Taking the slack 5. \_\_\_\_\_ on the headlines now.

**CAPTAIN** - Heave easy 6. \_\_\_\_\_ the headlines. When the mooring boat arrives send 7. \_\_\_\_\_ the spring. Send 8. \_\_\_\_\_ the breast line and heave it clear 9. \_\_\_\_\_ the water, but don't put any weight 10. \_\_\_\_\_ it. We have 15 metres to come 11. \_\_\_\_\_ . Heave 12. \_\_\_\_\_ the after back spring. Slack 13. \_\_\_\_\_ the headropes. Dead 14. \_\_\_\_\_ ahead.



### *B.3 Supply the correct prepositional phrase*

*(equipped with, with drafts up to, according to, just south of, on the outer side, parallel to, in the center of)*

#### **BERTHING:**

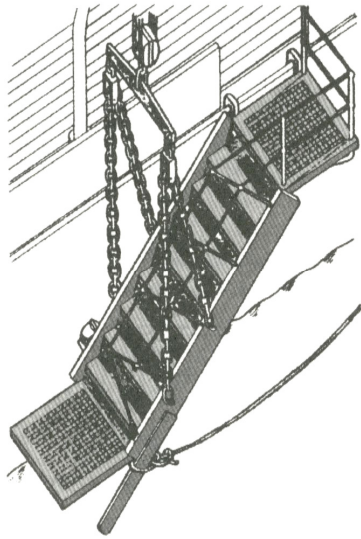
Tankers should ask for the berthing time and act \_\_\_\_\_ instructions given by the port. Two berths are available for LPG, four berths for product , two berths for crude (Max. vessel size : 250,000 DWT). Incoming tankers discharge at a "T" type oil jetty \_\_\_\_\_ the Tasli Burnu Light. The jetty runs \_\_\_\_\_ the coastline and is approximately situated 39° 39' 30" N, 26° 57' 30" E. The outer arm of the jetty, 317 m. long, is designed for crude oil tankers 100.000 DWT \_\_\_\_\_ and for tankers os 25.000 DWT on the inner. The outer SE arm is designed for product tankers up to 22.000 DWT an the inner berth for small tankers of up to 5.000 DWT. The crude oil berth is roughly \_\_\_\_\_ the NW arm and has 4 loading arms. The jetty is protected by 4 pivotal concrete buffers. The product berth is similarly in the center of the arm and is \_\_\_\_\_ flexible hoses. Crude oil pumping rate is about 3.000 tons/hour. Vessels \_\_\_\_\_ 16.5 meters are allowed to berth at the crude oil wharf.

## ***D. Writing skills***

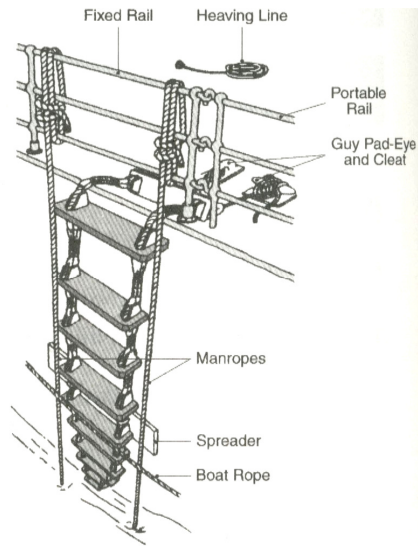
***D.1*** Use the questions below to summarize the reading text:

1. What do the ship handling operations include?
2. What is berthing?
3. What does the term *berth* refer to?
4. What do the berthing and unberthing operations require?
5. What must the Master and tug-skippers take into account when berthing a ship?
6. What are the main mooring lines?
7. What is the heaving line used for?

*Gangway*



*Pilot Ladder*



## ***Further reading***

### **SHIPMASTER'S REPORT**

Port. *Vada.*

Location. *15 miles South of Livorno.*

Chart. *Chart No. 131.*

Documents:

*-8 copies Crew List;*

*-2 copies Crew Declaration;*

*-2 copies Manifest;*

*-1 copy Health Declaration;*

*-3 copies Cargo Manifest;*

*-3 copies Italian Port Authority Inward and Outward Forms.*

Anchorage. *Anchorage is 1.2 miles SSW of the pier face.*

*In poor weather Secche Di Vada Lt. 248° x 1.4 miles found to provide good holding ground in West winds of Force 7.*

Pilotage. *Pilots are supplied from Livorno. Vessels should call Livorno Pilot on VHF Channel 12, 2 hours before arrival at Vada.*

*Pilot boards from a mooring boat about 0.5 miles SW of the pier.*

Restrictions. *Daylight berthing only and after 0730 hrs. Departure is possible 24 hours without a Pilot.*

VHF. *Livorno Information Service on VHF Channel 10. They are very helpful.*

Tugs. *No tugs available.*

Berthing. *The berth accepts vessels up to 30,000 cu.m. with a draft 11.0 m.*

*Vessels normally berth port side alongside. The mooring boat comes from the nearby general cargo harbour.*

*It is possible to berth starboard side to but this makes departure difficult.*

*The Pilot likes to use the anchor when berthing, however, he should be persuaded not to use it as it makes departure difficult and sometimes hazardous.*

*Moorings in good weather consist of 3 head/stern lines and 2 springs forward and aft. An additional forward back spring is provided by the shore.*

*Depth alongside is about 42ft.*

*Shore gangway used.*

*The berth is very exposed and berthing delays often occur especially in winter. If the weather deteriorates while the vessel is alongside the berth the vessel may have to leave in a hurry.*

*The fenders are good.*

Cargo. *There is a single ethylene Chicksan of 8 in. which can take the ship's maximum pumping rate (pressure about 2-3 Bar).*

*Sampling takes about 4 hours.*

*The capacity of the shore tank for ethylene is approximately 4,800 tonnes. The maximum single intake is 4,000 tonnes. The plant uses about 300 tonnes per day for plastics.*

General. *The receiver of the cargo was Solvay, Telex No. 500127 Solvri, at Vada.*

*Very few services available at the rigid pier. No store trucks are able to come down the pier. The Pier Manager will assist in getting down the pier (length of pier 1 mile) in a service car.*

*Crew changes are not normally allowed, however, it would be possible to make one or two changes as long as prior permission had been given by the terminal. Crew members arriving have to go to the Agent's Office in Livorno during working hours (between 0800 and 1700).*

*The nearest airport is at Pisa which is about 1 hour by car. It is about 40 minutes walk from the vessel to the town, which is a pleasant tourist town. Money can be changed at the bank and exchange bureau next door to the bank between 0800-1300 hrs. and 1600- 1800 hrs.*