



OIL COMPANIES INTERNATIONAL MARINE FORUM

Manning at Conventional Marine Terminals

June 2008

OCIMF's mission is to be the foremost authority on the safe and environmentally responsible operation of oil tankers and terminals, promoting continuous improvements in standards of design and operation

*Issued by the
Oil Companies International Marine Forum*



OIL COMPANIES INTERNATIONAL MARINE FORUM

29 QUEEN ANNE'S GATE
LONDON SW1H 9BU
ENGLAND
TELEPHONE: +44 (0)20 7654 1200
FAX: +44 (0)20 7654 1205
E-Mail enquiries@ocimf.com
www.ocimf.com

REGISTERED OFFICE:
CLARENDON HOUSE
CHURCH STREET
HAMILTON 5-33
BERMUDA

© Oil Companies International Marine Forum

The Oil Companies International Marine Forum (OCIMF) is a voluntary association of oil companies having an interest in the shipment and terminalling of crude oil and oil products. OCIMF is organised to represent its membership before, and consult with, the International Maritime Organization (IMO) and other government bodies on matters relating to the shipment and terminalling of crude oil and oil products, including marine pollution and safety.

Terms of use:

The advice and information given in this information paper ("Paper") is intended purely as guidance to be used at the user's own risk. No warranties or representations are given nor is any duty of care or responsibility accepted by the Oil Companies International Marine Forum ("OCIMF"), the membership or employees of OCIMF or by any person, firm, company or organisation (who or which has been in any way concerned with the furnishing of information or data, the compilation or any translation, publishing, supply or sale of the Paper) for the accuracy of any information or advice in the Paper or any omission from the Paper or for any consequence whatsoever resulting directly or indirectly from compliance with, adoption of or reliance on guidance contained in the Paper even if caused by a failure to exercise reasonable care on the part of any of the aforementioned parties.

Manning at Conventional Marine Terminals

Contents

Introduction	3
Section 1 - Control of Shipping Activities	5
Section 2 - Terminal Manning	8
Section 3 - Revised Levels of Jetty Manning Alternative Technological Applications	10
Section 4 - OCIMF Position	13
Definitions	14
Appendix 1 - External Controls Applied to Shipping.....	15
Appendix 2 - Personnel Providing Input to Port Operations.....	17
Appendix 3 - Available Technology.....	19
Appendix 4 - Process Controls.....	22
Appendix 5 - Tasks Undertaken by Terminal/Shore Personnel	24
Appendix 6 - Manning Levels.....	26

Introduction

There is a growing industry trend towards rationalising the manpower employed at marine terminals. Terminals are looking at achieving reductions in manning levels by De-manning berths when ships are not alongside, reducing manning during the time when a ship is alongside, or by having personnel only attending the berth when needed for specific operations that require manual intervention or surveillance.

The purpose of this paper is not to advocate a standard for jetty manning but to provide guidance to ensure that terminal operations are carried out safely irrespective of the manning philosophy adopted.

The paper will look at the tasks normally carried out at the berth by terminal staff and other associated operators, and consider the process required to determine an adequate level of berth supervision during the various stages of its operation. The paper will also provide guidance on equipment that can be considered for modern jetties and docks.

The paper uses the operator owned terminal with a permanently manned jetty as the baseline case.

Scope

This paper is intended to cover all the manning levels for all types of cargo transfer operations carried out at all berths/docks including jetties, wharfs, piers and sea-islands i.e. conventional terminals.

The controls at off-shore berths such as Single Point Moorings (SPMs), including Single Buoy Moorings (SBMs) and Tower Moorings; Conventional Buoy Moorings (CBMs), Tandem Moorings to FPSO and FSU facilities and the various facility specific technologies used in certain off-shore locations e.g. Submerged Turret Loading (STL), are not addressed in this paper but may be found in other OCIMF and other industry publications.

Section 1 - Control of Shipping Activities

The activities which are undertaken to manage the safe turnaround of a ship at a marine terminal are quite complex, involve numerous organisations and commence a number of days before the ship is due to arrive at the berth.

The activities carried out by the organisations involved are directed towards the safe and efficient turnaround of the tanker at the terminal. Each organisation provides some degree of control over the overall operation.

The control methods employed can be categorised as follows:

1. *External Controls*
2. *Human Controls*
3. *Technological Controls.*
4. *Process Controls*

1.1 External Controls

These are the systems and processes that gather information on ships and shipping companies to enable terminal operators to manage or control the quality of ships nominated to visit the terminal.

1.1.1 Controls applied to Shipping

Ships standards are controlled by International Conventions legislated through the International Maritime Organisation (IMO) and implemented by the National Flag State administration for the ship and the ship's Classification Society.

To ensure that ships are operated correctly and therefore safe to berth at their refineries, terminals and other facilities, such berth operators routinely inspect vessels to verify that their statutory certification is up to date and that operational practices on board are satisfactory.

Although these controls are implemented at an industry level the effectiveness of these controls impact on the safe operation of ships at terminals and therefore the level of control necessary for safe operations.

(Details of the controls applied to Shipping can be found in Appendix 1).

1.1.2 Controls Applied to Terminals

International guidelines such as IMO Recommendations on the Safe Transport of Dangerous Cargoes and Related Activities in Port Areas (IMO-290) provide outline information on the control of shipping activities in ports. However, each National Administration usually determines the mandatory regulations applicable to its ports.

These regulations can be promulgated through such national organisations as the Health and Safety Executive and local government body in the UK and by Federal and State regulators in USA.

These regulations are usually implemented by the Port Administration organisation though in some instances, such as a single terminal port, this may be undertaken by the terminal operator on behalf of the local authority.

Best practice is that Industry Guidelines from OCIMF and SIGTTO form the base reference documents for operational activities and should be consulted prior to any decision on reduction in manning levels. These guidelines include the “International Safety Guide for Oil Tankers and Terminals” (ISGOTT) and OCIMF Publication “Marine Terminal Baseline Criteria and Assessment Criteria” and the International Ship and Port Facility Security Code (ISPS).

The level of manning adopted at a terminal will need to satisfy the regulations in force in the port.

1.2 Human Controls

These are the activities of the shore personnel involved in the management of a tanker during its stay at the terminal

The activities of ships’ personnel and the training they are required to undertake is determined by the implementation of International Maritime Organisation (IMO) legislation. Ship Inspections carried out for ship vetting and clearance purposes pay particular attention to the effectiveness of how this legislation has been implemented by the ship’s flag state and the owner/operator. This is to verify that ship operations, especially in port, are undertaken by personnel who are competent in those operations.

The provision of appropriately trained and experienced terminal staff as required by national and local regulations will similarly ensure that the terminal aspects of the operations are conducted safely.

A list of personnel normally involved in the port operations related to a tanker are contained in Appendix 2

1.3 Technological Controls

These comprise of the systems and equipment that assist in the management of the ship/shore interface during the vessel’s stay at the berth, such as fire and gas monitoring, environmental measuring, closed circuit televisions, Doppler docking systems and mooring tension monitoring systems.

Appendix 3 provides a list of the equipment and systems that may be employed to support the tanker operation at the terminal.

1.4 Process Controls

These are the management procedures that control the activities of people and the use of equipment to ensure the safe and effective control of operations

These are the documents that are used to ensure that all operations undertaken by tankers when at a terminal are carried out safely. They

comprise of the Ships' and Terminal's operating manuals which should satisfy the common operating guidelines such as "International Safety Guidelines for Oil Tankers and Terminals" (ISGOTT) and the requirements of the Ship/Shore Safety Checklist.

The methods of developing Process Controls and their implementation are contained in Appendix 4

This Section has identified the four control methods that help to deliver safe port operations from both the ship and shore perspectives. These have been further expanded in the Appendices to provide detailed guidance on the use of these controls specifically for the management of the Ship/Shore interface and the related operations.

Section 2 – Terminal Manning

The principle personnel associated with port operations and their duties are detailed in Appendix 2

The manning levels at marine terminals can vary considerably and are dependent upon a number of factors such as:

- The National regulations in force
- The Port management structure
- The number and sizes of berths at the terminal
- The terminal throughput both in grades handled and tonnage.
- Physical size of the terminal,
- Equipment fitted at the terminal
- Levels of instrumentation and automation
- Throughput and type of oil, import and export
- Handling and type of other products such as chemicals, LPG and LNG
- Integration of the workforce. Are the personnel multi tasked or specialised in certain operations?
- Skill levels of available staff
- The policy for the use of contractors and sub-contractors
- Emergency cover required to be provided
- Security

Before the initial manning level can be determined a task analysis should be carried out for all the areas of the operation that will be controlled by the terminal operator. This should identify:

- All the tasks that are to be carried out.
- The frequency of identified tasks being undertaken.
- The skills needed for these tasks to be competently and safely undertaken.
- The number of men needed to perform each task safely
- The periods of time (Shifts) when operations will be conducted.

(*A summary of the tasks carried out by jetty personnel is contained in Appendix 5)

Once these tasks have been identified they should be subjected to an operational risk assessment as mentioned in Appendix 4. This will assist in determining the level of manning needed to deliver the operational integrity desired.

A manning scale can then be established which should also take into account manpower need for covering holidays, illness and training requirements.

The task analysis information can also be used for determining shift rosters, establishing a skills/training matrix and identifying training gaps and opportunities.

The allocation of the tasks will vary according to the size of the terminal and how the port infrastructure management is organised. The terminal's ability to control operations on the berth will be dependent upon the port management organisation. In some ports the berths may be owned and operated by the port authority, at other ports the berth may be owned by the port authority and operated by the terminal and some terminal's own and operate the berths.

There may also be traditional trade associations, which must be used as contractors such as boatmen and linesmen.

All these factors will determine the resources that will need to be provided and will impact on the level of direct control of the operation enjoyed by the terminal operator

Section 3 – Revised Levels of Jetty Manning Alternative Technological Applications

This section addresses how the application of instrumentation and equipment may be implemented to allow a reduction in manning levels in terminals.

Due to the changing nature of ship/shore operations there is restricted scope to substitute human supervision with technology. However, in some areas the provision of such technology may allow more effective use of manpower in the jetty and general foreshore area.

The provision of a berth operator at the interface should be considered as a basic necessity for any cargo transfer operation involving shipping. Only when this is established can technological enhancements in the scope of the berth operator's duties be assessed.

The reduction of manpower supervision at individual jetties may be achieved through the installation of appropriate monitoring and control systems.

In order to fully ensure that the revised manning levels at jetties are adequate, a formal risk assessment should be carried out to determine that the equipment provided will deliver at least the same degree of monitoring and security as the base case of a manned jetty.

It is important that this risk assessment process should be undertaken by representatives of all the organisations affected by the proposed changes including ship operators.

The information and processes to be risk assessed should include the following as a minimum:

- The hazards associated with the types of cargoes handled.
- Competence of ship and terminal staff to conduct the operation.
- Quality / reliability of ships and barges received by the terminal.
- Impact of external factors including high winds, lightening, tidal variation, current flow etc.
- Monitoring of ship berthing.
- Monitoring of moorings while alongside the berth.
- Monitoring of weather.
- Monitoring and control of ship movement at the berth.
- Provision and maintenance of safe ship shore access.
- Monitoring of cargo transfer rates and pressures.
- Activation of Emergency Shut Down systems.
- Raising of the alarm for fire, pollution, accident etc.
- Jetty equipment defect identification and reliability of maintenance regimes (*See Note 1*).
- Clarity and appropriateness of jetty signs.
- Security issues including theft, malicious damage, unauthorized access, egress etc.

- Provision and control of emergency escapes including identification of routes.
- Control of authorised personnel including ships staff, visitors etc.
- Fire, flame, smoke detection.
- Liquid or gas release detection.
- Monitoring of communications (*see Note 2 and 3*).
- Emergency response capability.
- Personnel working alone.7-Jun-06

Remarks:

Note 1 - *If equipment or device presents malfunction or is defective it must be substituted immediately by another one (back-up) or by manpower until the system is again functioning normally. Meanwhile operations at that berthing should be shut down.*

Note 2 - Communications: *It must be guaranteed a clear and a high quality voice signal during all the time between pump room center (both in the Ship and in the Terminal) and man close to Ship manifold as well. If such guaranteed is not achieved due to any cause operations should be interrupted until the problem is solved.*

Note 3 - Communications: *It must be guaranteed a perfect and clear comprehension in a common language without risk of misunderstanding during all the time between pump room center (both in the Ship and in the Terminal) and man close to Ship manifold as well. If such guaranteed is not achieved due to any cause operations should be interrupted until the problem is solved.*

As a result of the risk assessment additional control measures may be identified to allow reduced manning to be further considered. Procedures should be reviewed and amended appropriately to reflect the changes associated with the reduced-manning at the jetties. Some of these controls may require the installation of additional equipment at the jetties and at appropriate monitoring locations.

Where remote monitoring of jetties by Closed Circuit Television (CCTV) cameras is considered appropriate, the monitoring locations or control rooms will require to be manned continuously whilst the jetties are unmanned and transfer operations are in progress. CCTV screens should be placed where they are visible to the operator at all times whilst performing their normal duties. For larger control rooms it may be necessary to have more than one screen. If CCTV is used to monitor multiple berths there should be one display for each berth i.e. operator should be able to constantly monitor all berths at one time.

Where duties normally associated with the berth/dock operator are moved to other personnel it must be ensured that these duties can be effectively

conducted in addition to the original duties. As example; where CCTV is being monitored by other staff within the terminal/refinery, can adequate and continuous attention be given to the berth/dock watch-keeping duties in addition to the normal duties conducted by these personnel? The function and duties of these affect personnel should be included in the task assessment conducted as part of a manning level considerations.

Other Factors for Consideration

Terminal Layout

The physical layout of the terminal will be important when considering whether rationalisation of manpower can be achieved and how it may be put into effect.

Adjacent berths on a finger pier may be adequately monitored from a single jetty office, whilst adjacent dolphin berths on a foreshore may be impractical to monitor or attend from a single location due to the distance between berths and limited access routes.

Environmental Conditions (1)

Berths located in places that are subjected to severe environmental conditions such as squalls, swell and strong tides may be difficult to monitor remotely due to the rapidly developing situations.

Environmental Conditions (2)

Berths located inside/close by to environmentally preserved areas (i.e. Eco sanctuary) should also be considered due the possibility and consequences of an environmental accident.

Changes in Operation

Terminals where cargo operations have extended periods of steady state operations will be more easily automated than terminals where small product parcels are handled which require a high degree of attendance by the shore operator.

Safety Performance

Reduced manning levels should not result in any reduction in the level of safety performance or security enjoyed under the conventionally manned berth.

Section 4 – OCIMF Position

Technological applications may be employed to provide additional capability and effectiveness in the role of the berth operator. However, the application of improved technology should not be seen as a means to eliminate what is generally perceived to be a lowly valued operator. Manpower reductions will generally be more readily achieved by the combined application of technology, improved training to allow multi-tasking and by integration of the work force across the facility.

The principle objective when introducing technology in industrial locations should be the improvement of operational standards and performance and the improvement of safety and not primarily for commercial economy.

All terminals should establish their baseline manning levels using process described in Section 2.

When considering the reduction of manpower through the application of technology the risk assessment process described in Section 3 should be used and include the participation of the external parties, such as the shipping industry, to ensure that all safety aspects are addressed.

Whatever procedures are put into effect to reduce the manning levels on terminal berths, they should not result in any expectation that ship's personnel can be used to undertake activities or provide surveillance duties that come within the responsibility of the terminal operator.

The operation of the tanker and the terminal remain the responsibility of the respective management organisations, with the management of the ship/shore interface be achieved by mutual agreement. The ship/shore interface agreement should not be used to transfer surveillance of the jetty and its equipment to the ship's watch-keepers or require the ship to be the sole initiator of emergency actions.

Definitions

Term	Description
Berth	Any location where a ship can be moored to handle cargo, may be alongside or stern to
Berthing or Breasting Dolphin	Piled structure with fendering which ships rest against when tied up. Usually part of a jetty, pier or sea island.
Dock (US)	Berth where a ship can be moored for handling cargo, usually alongside
Dock (UK)	An artificial enclosure of water contained by a lock to maintain a controlled depth of water
Finger Pier	Piled structure usually at right angles to the shore with berths for vessels on either side of the pier
Jetty	Usually a piled structure built out into deep water to allow the vessel to be tied up parallel to the shore.
Loading Arms	Fixed metal arms on the berth used for transferring the cargo between ship and shore during loading or discharging operations
Mooring Dolphin	Piled structure upon which mooring hooks or bollards are fitted, usually part of a jetty, pier or sea island.
Sea Island	A piled structure sited in deep water with berths on both sides. All services and pipelines are routed to the structure on the sea bed.
Wharf	A continuous straight-sided shore structure with fendering against which ships can tie up. A controlled depth of water is maintained alongside, usually used for dry cargo or dry bulk vessels
SPM	Single Point Mooring, either a buoy or tower sited offshore to which a vessel moors at the bow and connects to cargo hoses attached to the SPM
CBM	Conventional Buoy Mooring. A berth where a ship moors with both anchors deployed forward and the stern is tied up to buoys. Cargo hoses connected to subsea pipelines are recovered from the sea bed to connect to the ship.

Appendix 1 – External Controls Applied to Shipping

Vessel Acceptance Criteria for Terminal

Ships standards are controlled by International Conventions legislated through the International Maritime Organisation (IMO) and implemented by the National Flag State administration for the ship and the ship's Classification Society.

All ships are surveyed to verify compliance with these IMO Conventions. These surveys are undertaken by Flag State surveyors or by a Classification Society Surveyor authorised to act on behalf of the Flag State. These are called Flag State Inspections and are mainly focused on safety equipment, safety management and manning.

Other ship surveys are carried out by Classification Society Surveyors to verify the ship's compliance with the construction requirements of the International Conventions that are implemented through the Classification Societies. These surveys cover the structure of the ship and loadline issues.

Oil tankers are also inspected by their charterers, such as integrated oil companies and oil trading companies. These voluntary inspections are used to check the ship's certification, maintenance records and its operational standards. In the case of oil companies, these inspections are undertaken to a common standard defined by the OCIMF Ship Inspection Report Exchange (SIRE) system. These inspections are carried out using a unified Vessel Inspection Questionnaire (VIQ) and the results of the inspections are placed on the OCIMF SIRE database. These inspections are accessible to members of SIRE with such membership being available to any organisation with a 'genuine interest in the safety of shipping'. Membership is not normally available where there is a conflict of interest between ship owning or oil trading activities. Inspection reports are usually accessed by the ship vetting organisation within a company to assess a ship's suitability for carrying a cargo or for visiting a terminal that is owned or operated by that company.

The physical description (dimensions, equipment and capabilities) of a tanker is contained in a Vessel Particulars Questionnaire (VPQ) completed by the ship owner/manager that can be used by a company's Vetting and Clearance Department to determine its physical suitability to visit a specific berth, dock or terminal.

The national administration in a country may also operate a ship inspection programme aimed at foreign flag vessels visiting its ports; these are termed Port State Inspections. The need to undertake these inspections is recognised internationally and supported by Flag States under the auspices of the Paris and Tokyo Memorandums of Understanding (MOU), and other nations individually (e.g. the USA). The baseline criteria for the inspections are the IMO Conventions. Although the MOUs expect each State to inspect 25% of the average number of foreign vessels calling at national ports in the last 3

years to be inspected by its Port State Control (PSC) each year. Inspections are focused to the determined high risk ship groups and the results of these inspections, and resulting detentions, are published and available on MOU and USCG internet websites.

Appendix 2 - Personnel Providing Input to Port Operations

Pilots

The provision of pilots is normally under the control of the local Port or Pilotage Authority. However, some oil companies provide their own pilots for berthing ships at their terminals. Where these pilots operate within a port area they may be required to meet levels of competency determined by the local Port or Pilotage Authority.

As a normal part of its operations, terminals should have routine contacts with the Port or Pilotage Authority to discuss matters relevant to the operation of shipping at the facility. In some cases there may be considerable advantages in agreeing to use selected pilots for berthing and unberthing of shipping at the terminal. This is particularly important in large ports with many pilots where the size of the vessel, its cargo or the constraints of the port makes the pilotage and/or berthing operation particularly high risk. The advantages of this are; the pilots familiarity with the facility; the improved contact that can be made between terminal management and the pilots, regarding the berthing operation and ship quality, and the possibility of focused investment in the training of these pilots.

Mooring Crews

The provision of well-trained mooring crews is essential to the safe berthing of the ship at the terminal. It is a high-risk operation for the ship, the terminal and the mooring crew. An inefficient mooring operation will at least create a delayed berthing operation and at worst a loss of vessel control with potential of vessel and ship damage, and consequential risk of injury and pollution. The mooring crews are those most exposed to risk both from environmental conditions and physical hazard

Marine Superintendent/Supervisor

The provision of a senior mariner within or reporting to the leadership team at a larger terminal or in the controlling business provides the core expertise with which to control the marine/shipping risks associated with its operation. This role will establish the core principles (usually defined in Terminal Information and Port Regulations) with which visiting ships must comply and will be the guiding influence for the terminal and berth operations falling within his scope of influence.

Berthing Masters/Marine Officers

The provision by the terminal of marine expertise on board the vessel prior to commencement of operations, serves several purposes.

It is a clear message to visiting shipping that the terminal will enforce a high standard of operation.

It allows a final assessment of the ship quality and its preparedness prior to the cargo operation commencing.

In organisations with Vetting and Clearance Department it provides valuable feedback into the company's vetting processes on ships that they have approved for use.

Berth/Jetty Operator

The jetty operator must be adequately trained in marine terminal and jetty operations and be conversant with shipboard operations to ensure the safe management of the ship/shore interface.

Supporting Services

Depending on the size of the terminal, there will be manpower indirectly involved in the support of the ship's visit to the terminal these include:

- Fire-fighters
- Security Officers
- Control Room Operators
- Maintenance Personnel
- Tank farm Operators
- Cargo surveyors
- Customs and Excise
- Port Quarantine Officers
- Ships Agents

Appendix 3 Available Technology

Environmental Monitoring

This can be done by the terminal or by accessing local facilities such as airports and port authority equipment. Information could be obtained on wind speed and direction, current direction and strength, swell, tidal height and weather forecasts. It should be noted that all these criteria may not be relevant to all berths.

Navigation Aids

The port authority will usually provide navigational aids within the port as part of the port infrastructure. These will vary in complexity depending on the size and type of vessel (e.g. VLCC and LNG) and the risk associated with their handling.

Remark: *Environmental Monitoring (i.e. information) and Navigation Aids (infrastructure) must be provided at the required level to conduct safe operation.*

Berthing Aids

Equipment specific to the berth and type of vessel handled e.g. Speed of Approach instruments, directional lights, berthing angle indicators, current meters, loading arm monitoring systems and vessel proximity measuring devices such as Drift off Monitors.

Mooring Tension Monitoring

Tension in mooring lines can be measured and monitored to determine the security of moorings and warn of any of mooring line exceeding its design load or the failure of a mooring line or hook.

Marine Loading Arm Alarms

Marine Loading Arms should have visual and audible alarms to advise when they are approaching the limit of their operating envelope due to vessel movement during cargo operations and the effects of tide or freeboard changes or due to movement of the tanker off or along the berth.

Fire and Gas Detection Alarms

The jetty area may be provided with automatic fire and gas detection equipment to provide early warning of these emergency situations. These systems could be incorporated into emergency shut down procedures, which could be automated. Where operational security depends on such systems, redundancy and system integrity issues should be considered.

Emergency Alarm Points

Push buttons or special switches should be used for initiating an emergency alarm which should sound at the jetty office, in the control room *and outside*. It may be stand alone or be part of the fire alarm system and may be connected to the ESD system. The location of the activated alarm point should be identifiable in the control room. Remote systems can be placed on board the operating ship which enables ship board activation of the shore alarm systems. Shipboard remote systems can be combined with “Vigilance Systems” which require interactions between shipboard watchmen and the vigilance systems at set time intervals. If there is no interaction at the set time, alarms and eventually ESD systems are activated.

Emergency Shut Down Systems (ESD)

These systems enable the cargo transfer to be stopped by either the ship or the terminal and may incorporate the closing of essential isolation valves on the jetty and the ship.

Pressure Relief System

A PSV (Pressure Safety Valve) or Surge Tank System must be installed in order to relieve the hydraulic transient to a safe location if the pressure resulted due to emergency shut down (a quick interruption of the flow) exceeds the pressure for which the installation was projected. In the case of LNG carriers, the requirements for the ESD system have been clearly defined and are quite sophisticated. ESD systems for tanker berths vary according to the activity on the berth. Loading berths may provide an emergency stop either at the end of the jetty or on a box placed onboard in the vicinity of the manifold. Modern tankers are now being provided with an emergency pump stop button at the manifold for use in an emergency when discharging.

Cargo Transfer Monitoring

The jetty cargo lines may be provided with pressure gauges or sensors or flow meters. This equipment may be used to provide both operational information and information which may be used to provide indication of line failure. The ship and terminal should compare their figures for the quantity of cargo transferred on an hourly basis. This will highlight any discrepancies and alert both parties to possible losses either ashore or onboard.

Inline Cargo Sampling

A continuous automatic sampling of product, during loading or discharging.

Surveillance Systems

Closed circuit television systems may be used at jetties to widen the area of surveillance of personnel. Their use for security purposes is good and can

provide useful cover over such areas as gangways, moorings, fences and seaward approaches. Their use for detecting leaks and spillages is limited, particularly with gases, chemicals and clean products

High Level Alarms

The use of high level alarms within sumps or bunds will provide indication of loss of containment prior to serious escalation to water pollution.

Emergency Panel

A hard wired panel that can be placed onboard the tanker to provide selected emergency functions such as:

- Emergency/Fire alarm
- Telephone Link
- Jetty/Pump trips

Integrated Monitoring, Control and Alarm System

Many of the above systems can be integrated into a single system to provide the users with a single operating interface station in the control centre. These systems can also provide satellite terminals in a jetty cabin or foreshore office and may additionally be accessed by hand held UHF transceivers.

Enhanced Communication

It is usual for primary and secondary means of communication to be established and agreed during the pre cargo transfer conference between ship and shore representatives

The use of an intrinsically safe, portable radio transceiver using a dedicated frequency for the operations within the terminal can be used as one of these methods. The terminal usually places a transceiver onboard the tanker along with spare batteries or a battery charger. This usually provides direct communication between the tanker's control room and the jetty or terminal control room. Other communication methods can be either: purely verbal, the ship's whistle, marine VHF, a hardwired telephone or a hardwired talkback system.

Multi Berth terminals may require more than one frequency to avoid cross communications.

Remotely Controlled Fire Monitors

The provision of remotely controlled fire monitors, usually installed on towers adjacent to the jetty head, improves the fire-fighting capability of the terminal whilst providing added security for the operators of the equipment.

Appendix 4 - Process Controls

Documents that are used to deliver a Safe System of Work when tankers are operating at marine terminals.

The Safe System of Work delivered by these documents should be derived from hazard identification and risk assessment processes undertaken during the design phase of the ship or the terminal and following any modifications. Where a ship or terminal passes into the control of new management, a new risk assessment should be undertaken taking into account existing operating procedures and the new management's safety culture.

An operational risk assessment should also be carried out to address the risks to personnel, whilst carrying out their allocated tasks when operating the terminal equipment. It is used to determine the operational procedures adopted

The risk analysis should consider exposures to the terminal and terminal operator in the following categories:

- Environmental
- Operational
- Reputation
- Commercial
- Legal

Terminal Operating Manuals

The operating manuals for the jetty area and associated systems will take account of how the system is designed and the operating instructions for vendor equipment such as pumps, loading arms, mooring equipment etc.

They will also contain procedures that will define the safe operation of plant and systems and will have elements that are included as recommendations from the operational risk assessment that will have addressed all aspects of the facilities operation. These manuals should be reviewed and updated when changes are made to equipment, operating procedures or changes in Port Regulations.

Ship Operation Manuals

These manuals provide the ship's staff with the information needed to operate the ship safely as required by the International Safety Management Code.

Permit to Work and Log Out Tag Out Systems

Activities which present risk due to them being carried out in a hazardous area such as hot and cold work, or which present inherent risk due to their nature, such as hull diving or tank entry, should be controlled by the use of a

Permit to Work System. These systems provide a structured method of identifying risk and providing control measures to allow the work to be undertaken safely. They place controls on the plant under repair, the equipment used and the personnel undertaking the tasks and provide the communications medium for ensuring observance of the safety measures put into effect.

Emergency Plan

This defines how emergency events will be managed and identifies the personal responsibilities of terminal staff. It also identifies how external bodies and support services can be contacted and the services they can supply.

The content of the Emergency Plan will take into account any emergency that the Risk Assessment identifies and recommends that contingency planning should be put in place.

The execution of this plan in how it affects the ship should be communicated to the ship at the pre-cargo transfer conference when written instructions should be passed to the ship's staff and the emergency notification and alarm procedure noted in the Ship/Shore Safety Checklist

Regulations and Guidelines

Activities in harbours and at terminals are subject to control under National legislation implemented by such bodies as the Health and Safety Executive in the UK and Federal Regulations (CFR) in the USA. These are influenced by International organisations such as the IMO, who have provided Guidelines on the Safe Transportation of Dangerous Goods and Related Activities in Port Areas.

Other countries will be governed by local and state laws and regulations.

Appendix 5 – Tasks Undertaken by Terminal/Shore Personnel

The activities carried out by the shore personnel when a ship visits a terminal to load or discharge a bulk oil cargo are listed below –

- Communication with a vessel prior to its arrival alongside
- Positioning the vessel in the correct position
- Handling mooring lines, including the operation of mooring boats
- Ensure vessel is Safely Moored
- Deploying the shore gangway (if fitted)
- Valve and line setting on the berth
- Participating in the pre cargo transfer conference
- Completing the Ship/Shore Safety Checklist
- Conducting and agreeing the Pre-Cargo Conference
- Connection of the flexible cargo hoses or loading arms
- Sampling ship cargo tanks
- Taking ullages, temperature, cargo sampling and water dips of ship's cargo tanks.
- Continuous monitoring of communicating between ship and terminal control room to initiate and undertake cargo transfer
- Carrying out Ship/Shore Safety Checklist Repetitive Checks
- Monitoring of vessels position alongside – No excessive movement
- Monitoring Ship's moorings for correct tension.
- Monitor position of hoses and hard arms to ensure no breach of operating envelope
- Monitoring jetty valves and pipe work for integrity/leaks
- Regular checking of sump levels
- Regular checking of dock water surface around vessels for any sign of pollution
- Control access to and from jetty head/ship and from the seaboard side on vacant berths.
- Monitor wind speed/direction and weather to ascertain parameters are acceptable for operations.
- Monitoring and communicating weather forecasts
- Visually inspect shipside for leaks from scuppers, overboard discharges etc.
- Ensure no excessive funnel smoke from vessel.
- Ensure vessel is adopting closed operations at all times
- Ensure early notification and response to any accidental spillage to jetty head or dock.
- Monitor all communications between ship and shore
- Monitor pressures and flow on product lines at jetty head
- Line sampling with auto samplers
- Log/Timesheet entries
- Ensure vessel is complying with Port and Jetty Regulations.
- Emergency shutdown initiation
- Emergency response initiation to:

- Fire on Vessel or Berth
- Vessel Breakout
- Gas/Vapour release
- Bomb and Terrorist Threat
- Cargo loading in still air conditions (Less than 5mph)
- Communications with Harbour Authority – Normal/Emergency
- Arrangements for vessel evacuation in the event of a major emergency
- Adverse weather – Lightning, Fog etc.
- Control and management of maintenance activities on ship and berths
- Security of property on jetties.
- Controlling the activities of personnel on the jetty such as ship storing.
- Monitoring the passage of visitors to the ship and ship staff going ashore across the jetty
- Securing of shore lines on completion of cargo operation.
- Disconnection of cargo hoses or loading arms
- Recovery of the shore gangway.
- Unmooring operations

Appendix 6 Extracts from publications giving Guidance on Manning Levels

It may be appreciated that all the below Guidelines are open to varying degrees of interpretation.

a) ISGOTT (International Safety Guide for Oil Tankers and Terminals)

Every terminal should establish manning levels to ensure that all operations related to the ship/shore interface can be conducted safely and that emergency situations can be managed.

Guidance

Terminals should establish manning levels to ensure that all operations and activities related to the ship/shore interface can be conducted safely and that emergency situations can be managed.

Personnel should be trained in the operations undertaken and have site specific knowledge of all safety procedures and emergency duties.

Terminals should provide sufficient manpower to ensure that all operational and emergency conditions can be conducted in a safe manner, taking into account:

- Effective monitoring of operations.
- The size of the facility.
- Volume and type of products handled.
- The number and size of berths.
- Number, type and size of ships visiting the terminal.
- The degree of mechanisation employed.
- **The amount of automation employed.**
- Tank Farm duties for personnel.
- Fire-fighting duties.
- Liaison with port authorities and adjacent/neighbouring marine terminal operators.
- Personnel requirements for port operations including pilotage, mooring boats, line handling, hose handling.
- Fluctuations in manpower availability due to holidays, illness and training.
- Personnel involvement in emergency and terminal pollution response.
- Terminal involvement in port response plans, including mutual aid.
- Security.

In establishing manning levels, due account should be taken of any local or national legal requirements. Consideration should be given to the avoidance of fatigue that may result from extended hours of work, or insufficient rest periods of time off between shifts.

De-manning of Berths

Terminal operators may wish to reduce manning levels by de-manning berths during cargo transfer operations. Where this is undertaken, terminals should continue to ensure that all operational and emergency conditions can be conducted in a safe manner.

Key Question	Y	N	NS	NA
1.6 Does the level of terminal manning ensure that all operations related to the ship/shore interface are conducted safely and that emergency situations can be managed?				
The terminal has no experienced Marine trained operators. The handling of the ship shore interface is handed to TIS for line handling and connection and disconnection of loading arms. A reliance is made on the USCG to do checks prior to discharge but nothing on going during the discharge and no use of a ship shore safety checklist – with terminal and ships staff carrying out the checks.				

Guidance Questions	
1.6.1 Are personnel trained in the operations undertaken, including site specific knowledge of all safety procedures and emergency duties?	
1.6.2 Does the available manpower meet all operational and emergency conditions, in accordance with the Guidance?	
1.6.3 Are manpower levels adequate to prevent or avoid fatigue?	
1.6.4 Do any de-manning initiatives ensure that all operational and emergency conditions can be conducted in a safe manner?	

b) UK Health and Safety Executive publication “The Transfer of Dangerous Liquids and Gasses between Ship and Shore” (HSG 186).

At a conventionally manned berth continuous monitoring should take place during cargo and dirty ballast transfer between ship and shore. A competent representative of the berth operator and a competent ship’s officer should be present, with sufficient crew on board to deal with the operation and safety of the ship.

The berth operator should ideally remain close to the ship-to-shore connections, for carrying out any duties effectively. These duties will include:

- a) Supervising the cargo transfer (including flow rates and pressures);
- b) Ensuring cargo hoses or articulated cargo arms are kept properly adjusted;
- c) Preventing unauthorised access to the jetty by other people;
- d) Controlling the activities of personnel on the jetty including off-duty members of the ship’s crew;

- e) Assisting in preventing unauthorised approach by other ships;
- f) Ensuring the immediate raising of the alarm and shutdown of shore-based cargo handling equipment in the event of an incident;
- g) Preventing minor incidents escalating into major ones;
- h) Monitoring the ship's position in relation to the jetty and moorings.
- i) Monitoring of Security in the immediate area of the berth.

In some cases particularly at large jetty complexes, monitoring by closed circuit television and control of cargo transfer is carried out remotely from a control room. This has the advantage that no shore-based person is present at the site of any incident. On the other hand, someone in the vicinity can often detect problems at an early stage, by noticing unusual movements or noises etc.

c) SIGTTO Liquefied Gas Handling Principles on Ships and in Terminals (3rd Edition), provides the following guidance:

Chapter 6 The Ship/Shore Interface page 143

A competent member of the terminal organisation should be on continuous duty in the vicinity of the cargo connections. Supervision should be aimed at preventing the development of hazardous situations. If, however such a situation arises, the controlling personnel should have adequate means available to take corrective action. Supervision by systems incorporating television should only be used where they give effective control over the cargo operations and these systems cannot be regarded as satisfactory when cargo operations are at a critical phase or during adverse weather conditions.

d) US Federal Regulations 33 CFR 156

Defines the requirement for a Facility Person in Charge (FPIC) of a transfer operation. **33 CFR 154** defines how that person is designated his duties by the facility owner and the level of training and qualification he must have achieved.

The expectation is that the FPIC will be present at the site for the cargo transfer. The 'site' is considered to be at the transfer point whereby the FCIP can view the transfer manifolds.

The local Captain of the Port may issue Letters of Alternative Compliance allowing the FPIC to supervise multiple vessel transfers providing certain guidelines are followed.