



HANDLING BULK LIQUIDS AT A JETTY

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SUMMARY

This Guide covers the situations that can arise at a berth or jetty when dealing with vessels (tanker or barges) handling bulk liquid cargoes. The Guide is written for the OPU/JV operating the installation, not the vessel owner or Master. Thus shipboard emergencies are not considered in detail, except so far as they can affect the berth or jetty.

This Guide contains a full bibliography and the text is written with frequent reference to the bibliography. It is strongly recommended that users consult the reference given in the bibliography, indeed many of them should be standard location reference sources already. In many countries there are statutory regulations, national codes of practice or other legal requirements covering this area. These requirements need to be identified and met within the overall outcome of the exercises outlined in the Guide. If there is a point upon which the advice in the Guide and national regulations differ the more stringent requirement should be adopted.

The Guide is set out in three main sections:

Prevention of emergencies

Planning for emergency situations

Action in emergencies

The first section - Prevention of Emergencies - deals with the general safety management of the terminal, and covers items such as organisation, responsibilities, training, and design and operating standards. It sets out the mechanics of safe working practices - maintenance, permit-to-work systems, safety auditing, security and the use of contractors. Such aspects are common to many areas of Group activity. The section that is of more specific application to berths and jetties is the one on communication and liaison - and sets out the requirements for information exchange between the shore installation and an arriving vessel.

The second section - Planning for Emergency Situations - introduces the Terminal Emergency Plan (TEP) and sets out the aspects that need to be covered for the various types of emergency that can be envisaged for the particular terminal. These aspects include availability of people, equipment, materials, managerial control, communication, fire-fighting plans, medical facilities, traffic control, outside services (both land and water based), communication with the media, etc. The points to be considered in setting up a TEP are set out in an appendix. The need for regular realistic rehearsal of the TEP is stressed as is the need to keep it up-to-date.

The third section - Action in Emergencies - lays down sequential actions to be taken by terminal operations staff in the event of fire and spillage. It furthermore deals with tactics relating to fire and spillage and also covers major gas releases and other emergencies. The principles of firefighting are dealt with in an appendix.

The Guide concludes with emphasis on the need for thorough investigation and follow-up of incidents which occur and stresses the importance of remedial action to prevent recurrence.

1. INTRODUCTION

This Guide concerns possible emergencies, such as fire or spillage, associated with the loading and unloading of tankers and barges at jetties. It gives advice, for the company operating the jetty, on the prevention of such emergencies and on the actions to be taken during and after any incident which does occur. It covers the handling of bulk liquids (oil, chemicals and liquefied gases) but not solids or packed products.

Local conditions at jetties may vary considerably, for example in the size and frequency of the tankers handled, the design of the jetty facilities, the products loaded or unloaded, the weather and the surroundings of the jetty. The Guide is intended to assist Operating Companies in drawing up plans and procedures to suit their local conditions.

The principle followed in writing the Guide has been to omit detailed information which is readily available in other publications which users could be expected to have; PETRONAS publications for example are available from the Corporate HSE. Reference is made to these source in the text and a Bibliography has also been included, which users are strongly recommended to consult. Where the inclusion of detail has been considered necessary, it has been put in Appendices.

In those countries where matters dealt with in this guide are governed by statutory regulations or national codes of practice, these must of course be observed. Subject to this proviso, it is recommended that, where the advice in this Guide and national regulations differ, the more stringent requirement should be adopted.

For the purposes of this Guide, the following meanings are given to the terms used:

Berth	-	A place for a ship to moor at a jetty.
Jetty	-	A structure alongside or projecting into the water, having one or more berths, for loading or discharging tankers.
Wharf	-	Same as jetty.
Terminal	-	An installation comprising one or more jetties and associated on-shore handling and storage facilities.
Emergency	-	A place set up at a convenient central point, away from likely hazard
Control Centre	-	areas, to direct, co- ordinate and control all emergency activities.

2. PREVENTION OF EMERGENCIES

The primary objective must be to prevent emergencies such as fires, spillages and their effects and to promote the safety of all persons who could be affected by an emergency at a jetty.

2.1 ORGANISATION

Good organization will minimize accidents.

Organization for safety of operations will depend on the size and scope of activity being carried out; therefore, no single pattern can be recommended which will meet all possible situations. The organizational scheme for carrying out the company's safety policy should clearly define the relationship and reporting lines between operating, engineering, and other departments, as well as specialist advisers (e.g. Safety, Marine, Medical and Fire Service). The persons involved should ensure that they are fully cognisant of their positions within the organization, and equally important, that they understand their relationship with others in the organization so that in the event of an emergency they can carry out their tasks without hesitation.

Clear definition of ship/shore relationships is an important part of the overall organization.

It is essential that the organization be kept under constant scrutiny and that it be modified without delay whenever this is necessary.

2.2 DEFINITION OF RESPONSIBILITIES & ACCOUNTABILITIES

The responsibility and accountability for safety at all levels within the organization must be clearly defined, established and recorded. The necessary authorization must be given to those in charge to act in an emergency as they see fit.

The allocation of responsibility must be clearly understood and should be at the level where the most effective action can be taken, with the senior management level personally involved and setting the proper example.

Line management/supervision, although assisted by Safety and other specialists acting in an advisory capacity, remain accountable for the operation under their control.

Failure to define lines of responsibility can easily lead to confusion and hence promote accidents.

2.3 PERSONNEL & TRAINING

It is essential that all personnel involved in cargo handling and related activities, including maintenance and contractor personnel, should be of a calibre appropriate to the complexity of these operations and should have undergone appropriate formal training.

2.4 DESIGN STANDARDS

It is assumed that new jetties will have been designed and constructed by experienced engineers to current PETRONAS or national/ international standards, whichever are the more stringent. In the case of jetties constructed to older standards, if upgrading is impracticable, special operating procedures will be required to safeguard against any deficiencies.

Any modification to the installations, equipment or operational procedures must be given careful prior consideration to determine the effects such changes may have. Some of the major factors to consider in the modification of jetties are:

Vulnerability - Is the installation vulnerable to outside factors, such as weather or security risks, beyond the company's control?

Hazards to/from neighbours - Is there anything adjacent to the installation which may present fire, pollution or toxic hazards?

Legal requirements - Does the installation meet all national requirements?

Spillage prevention and containment - Has consideration been given to suppressing or controlling operational and accidental spillage, including volatile or toxic materials? Have adjacent areas been surveyed for possible ignition sources?

Fire protection - Is there sufficient and effective fire protection for critical and vulnerable equipment and facilities? Has adequate access for fire fighting been provided?

Escape routes - Are there suitable access and escape routes for both ship and shore personnel under all conditions? Consideration should be given to alternative routes of escape if the normal route is not available in the emergency.

Vessels - Has account been taken of all possible effects of changes in frequency, size, and type of vessels using the berth, and in the cargoes handled? Has the maximum permissible approach velocity at the jetty taken into account any change in ship size?

2.5 OPERATING STANDARDS

Good housekeeping is an essential part of good operating standards.

Formal procedures should be established and followed for operations on the jetty in order to minimize the risk of accidents. For this purpose reference should be made to the relevant PETRONAS codes of practice and international publications such as the International Safety Guide for Oil Tankers and Terminals (*see Bibliography, reference A.1*).

It is at the ship/shore interface that responsibilities of a different nature merge and it

is here that operating and safety procedures should be clearly understood and enforced.

Responsibility does not stop at the ship's manifold, either for the ship or for the shore.

Communication is essential to ensure close cooperation and an understanding of the respective problems on ship and on shore. This cooperation and information exchange should start before the ship appears outside the loading or discharge port. *(See Bibliography reference A.1 ISGOTT, chapter 5).*

In consideration of the particular difficulties and the types of incident which can occur within the jetty environment, it is essential that the system laid down should include the provision and use of a ship/shore safety check list. This should be used before operations start to check the equipment and procedures to be employed. An example of such a check list is given in Appendix A *(see Bibliography reference A.2)*

2.6 MAINTENANCE

Proper maintenance of equipment and other facilities is necessary for the continued safe and efficient operation of the installation. There should be a programme of regular inspection and maintenance, with special attention given to the emergency equipment and facilities. Full records should be kept.

In addition, there should be an effective system for reporting and correcting defects in equipment and facilities as they occur.

Particular attention should be given to electrical equipment which, if not properly maintained and earthed, can cause electrocution or become a source of ignition.

2.7 MOBILE EQUIPMENT

There should be a system for inspection and control of access of vehicles and other mobile equipment to the berth or jetty during operations. The safety aspects of such mobile equipment should be regularly checked.

2.8 WORK PERMITS

An effective Work Permit system is essential for the avoidance of accidents. See PTS 60.2001 Permit to Work

2.9 COMMUNICATION (SHIP/ShORE INTERFACE)

The provision of reliable and safe means of communication between ship and shore is the responsibility of the terminal *(Bibliography reference A.1 - ISGOTT).*

An appropriate communication procedure should be established to ensure that work is carried out in a safe manner and that immediate action can be taken if there is an emergency.

Wherever practicable, the terminal should provide a safe, reliable telephone link or

UHF/VHF radio transceivers for communication between the terminal control centre, the jetty and the vessel. Portable walkie-talkies should be of an intrinsically safe design. The communication system should be tested before operations begin and a fallback procedure agreed for use in case of failure. The terminal facilities should, wherever possible, be compatible with those of any third parties who would take part during emergencies.

Particular care should be taken when language problems could cause misunderstandings in communication.

The ship should be informed in writing of the operational and emergency communication procedures in use at the terminal and between ship and terminal, and these should be discussed between the latter parties.

2.10 ASSURANCE

The safety of the operations and the state of the equipment (normal and emergency) should be subjected to assurance process at least once per year. In addition to self-assurance, people from outside the terminal should be regularly involved.

2.11 SECURITY

Terminals and jetties, being large open installations handling commercially and politically valuable products, are potential targets; therefore, measures must be taken to protect them against penetration by individuals or small groups intent on damage or destruction. The local security authorities should be involved in drawing up and executing protection plans.

In addition, thought should be given to possible damage from or harm to outside people, such as ships' crews, who may be present on the terminal.

2.12 CONTRACTORS

Equal attention should be paid to all the above aspects when contracting out work on jetties. See PTS 60.0305 Contractor HSE Management.

3. PLANNING FOR EMERGENCY SITUATIONS

3.1 GENERAL

All tankers and terminals should have ready for immediate implementation procedures to be adopted in the event of an emergency. The procedures should anticipate and cover all types of emergency which might be encountered in the particular activities of the tanker or terminal. Whilst the main thrust of the procedures will be to respond to a fire emergency, all other possible emergencies such as hose or pipeline bursts, cargo overflow, pump room flooding, men overcome by gas within tanks, breakaways, bad weather, power failure and bomb threats should be covered. Similarly, whilst the deployment of fire-fighting equipment will be prominent in any

emergency procedures, equipment such as breathing apparatus, resuscitation devices, stretchers, medical aids and means of escape should also be covered.

The procedures should be familiar to personnel involved, who must be adequately trained and clearly understand the action they would be required to take in responding to the emergency. This should include the sounding of alarms, the setting up of a control centre and the organization of personnel to deal with the emergency.

Information on the hazards of the products present should be immediately available in case of emergency (*see Bibliography references A.1, A.3, B.1, B.2, F.1, H.1, H.2*).

Manpower is required to carry out any plan to a successful conclusion; therefore in the assessment of possible events a careful study should be made to determine the total manpower requirements. Where appropriate, assistance may be obtained from local emergency organizations, nearby airports, industrial plants or military installations; however, care should be taken that terminal manpower is sufficient for initial response to emergencies.

Emergency plans should cover not only those incidents which may occur during normal operational times, but also those which may occur outside normal working hours when operations are continuing, but when reduced manpower is available on site.

3.2 TERMINAL EMERGENCY PLAN

3.2.1 Preparation

An emergency plan, which covers all aspects of the action to be taken in the event of an emergency, should be developed by all terminals.

This plan should be drawn up in consultation with the port authority, fire brigade (Bomba), police, etc., and should fit into the port emergency plan, if there is one. The plan should include:

- The specific action to be taken by those at the location of the emergency in raising the alarm.
- Initial action required to contain and overcome the incident.
- Procedures to be followed in mobilising the resources of the terminal as required by the incident.
- Evacuation procedures.
- Assembly points.
- Emergency organisation, giving specific roles and responsibilities.
- Communication systems.

- Setting up of emergency control centre(s).
- Inventory and location of emergency equipment.

Each terminal should have an emergency team whose duties involve planning, implementing and revising emergency procedures as well as executing them. An emergency plan, when formulated, should be properly documented in a Terminal Emergency Plan (TEP) which should be available to all personnel whose work is connected with the terminal. The main points of the initial response to an emergency, such as reporting and action to contain and control, together with the location of all emergency equipment should be conspicuously displayed on notices at all strategic locations within the terminal. Ships alongside the terminal berths should be advised of the terminal's emergency plan, particularly the alarm signals, emergency escape routes, and how the ship can summon assistance in the event of an emergency on board.

The Terminal Emergency Plan should harmonize with and, as appropriate, be integrated with:

- Other parts of the company organization and facilities
- Relevant outside organizations (other companies, public bodies, etc.)

Those outside bodies which may be involved in an emergency should be familiar with all appropriate parts of the Terminal Emergency Plan and should participate in joint practices.

The essential elements of a Terminal Emergency Plan are summarized in Appendix B.

3.2.2 Control

It is essential that the Terminal Emergency Plan should make absolutely clear the person, or persons in order of priority, who has overall responsibility for dealing with the emergency. The responsibility, under him, for the actions of the various parts of the terminal organisation which may be called upon in emergency situations should also be clearly laid down. Failure to define lines of responsibility can easily lead to confusion and to the loss of valuable time.

At major terminals an office should be pre-designated as a control centre ready for use in the event of emergencies. The control centre should be located at a convenient central point not adjacent to likely hazard areas, possibly in the main terminal office. During an emergency such a control centre should be manned by a leading representative from the terminal, port authority, fire brigade, tug company, police or other appropriate civil authority. When possible, it may also be desirable that a responsible ship's officer from the casualty vessel be in attendance at the control centre to give advice. A "press officer" should be designated to relay information to the public.

3.2.3 Communications

The emergency control centre should be capable of directing, co-ordinating and controlling all emergency activities, including giving advice to other port users. For these purposes it should have a suitable communications system linking it with all functions necessary, both inside and outside the terminal.

It may not in practice be necessary for some terminals to implement all the recommendations regarding communications which follow but they should have a communications system adequate for their requirements. All installations should have an emergency alarm.

Reliable communications are essential in dealing successfully with an emergency situation; suitable backup arrangements should therefore be made for use in case the primary system fails or is put out of action.

3.2.4 Communications system

There are three basic elements which the system should be able to handle:

Terminal emergency alarm

Summoning of assistance

Coordination and control of all emergency activities, including movement of vessels.

The communications system should be have the flexibility to cover operations:

On a tanker.

On the jetty.

On adjacent water.

Elsewhere in the terminal.

Most of the equipment should therefore be portable or mobile, particularly that for use by a forward control; moreover it should be of a type approved for any location in which it may be used. The most satisfactory system to meet all the requirements is a UHF/VHF radiotelephone system.

3.2.5 Communications discipline

All personnel should understand and appreciate the necessity for strictly observing rules laid down for using communications in an emergency and should receive frequent instruction on the effective use of such communications equipment and procedures. A log of the emergency events should be kept at the control centre, possibly on a tape recorder.

3.2.6 Fire fighting equipment plan

Plans showing the location and type of fire-fighting equipment, major facilities and road access should be kept up-to-date and readily available for use in an emergency, for example in the control centre. The location and details of emergency equipment on or near a berth should also be displayed on the berth.

3.2.7 Access to equipment

All emergency equipment should at all times be readily accessible and kept free of obstructions.

3.2.8 Traffic movement & control

Jetty-approaches and jetty heads should at all times be kept free of obstructions to the movement of vehicles. Vehicles brought to a jetty or on a jetty approach should not be immobilized and ignition keys should not be removed.

During an emergency, traffic into a terminal or onto berths should be strictly limited to vehicles and people required to deal with the emergency or to render assistance.

3.2.9 Personnel escape routes

All emergency access and escape routes for personnel should be clearly marked and kept free of obstructions.

Berths and jetties can be particularly difficult to escape from in the event of fire or other emergency and careful thought should go into providing more than one means of escape. The following should be considered:

- Access ways to and from off-shore berths and dolphins. Personnel must not be left on isolated dolphins.
- A boat with both motor and oars in case oil spillage makes use of motor unsafe.
- Life belts in prominent and accessible positions.
- Steps or steel ladders between berth and water level.

Clear notices detailing actions to be taken in an emergency as well as indicating escape routes should be prominently displayed.

3.2.10 Outside services

A Terminal Emergency Plan should make the best possible use of services which can be relied upon to be available. In such circumstances success in dealing with an emergency could depend upon the degree of co-operation achieved and upon prior combined training carried out with these services. Combined exercises simulating terminal emergencies should be carried out at least once per year. These exercises