

Chapter 20

EMERGENCY PREPAREDNESS

A comprehensive and well practised plan is essential if a terminal is to respond to emergencies in an orderly and effective manner. This Chapter deals with the preparation of terminal emergency response plans and with the provision of resources and training necessary to support them.

Actions to be taken by the terminal and the tanker in the event of an emergency at the tanker/shore interface are given in Section 26.5.

Additional information on fire protection in terminals is contained in Chapter 19.

20.1 Overview

All terminals should have procedures ready for immediate implementation in the event of an emergency. The procedures should cover all types of emergency that can be envisaged in the context of particular activities at the terminal, for example major oil spillage, gas leak resulting in an unconfined vapour cloud, fire, explosion and ill or injured persons. While the deployment of fire-fighting equipment is likely to be prominent in any emergency procedure, equipment such as breathing apparatus, resuscitation equipment, stretchers and means of escape or exit should also be covered.

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

Information on the hazards associated with products handled at the terminal should be immediately available in case of emergency. It is recommended that Material Safety Data Sheets (MSDS) are available to provide both workers and emergency personnel with procedures for handling or working with each particular product. The MSDS should include details of physical data (melting point, boiling point, flashpoint, etc), toxicity, health effects, first aid, reactivity, storage, disposal and the personal protective equipment to be used.

Sufficient manpower is necessary to initiate successfully and to then sustain any response plan. Therefore, a thorough study should be made to determine the total manpower requirements over the whole period of any emergency. Where appropriate, assistance may be obtained from local emergency organisations, nearby airports, industrial plants or military installations. However, it should be ensured that terminal manpower is sufficient to mount an initial response to any emergency.

In addition to addressing incidents which may occur during normal operational times, terminal emergency plans should also cover those which may occur outside normal working hours, when operations are continuing with reduced manpower on site.

The most important and critical elements of every emergency plan are the organisation and resources necessary to support it. The plan will only be effective if careful consideration has been given to these elements in its preparation so that it will fully meet the requirements of the individual terminal.

When drawing up the plan, all parties who are likely to be involved should be consulted.

It will be necessary to:

- Analyse probable emergency scenarios and identify potential problems.
- Agree on the best practical approach to respond to the scenarios and to resolve identified problems.
- Agree on an organisation with the necessary resources to execute the plan efficiently.

The plan should be reviewed and updated on a regular basis to ensure that it reflects any changes within the terminal, current best practice and any key lessons from emergency exercises/previous emergencies.

20.2 Terminal Emergency Planning - Plan Components and Procedures

20.2.1 Preparation

All terminals should develop an emergency plan, which should cover all aspects of the action to be taken in the event of an emergency. The plan should be drawn up in consultation with the port authority, fire brigade, police etc, and should integrate with any other relevant plans, such as the port emergency plan. The plan should include:

- The specific action to be taken by those at the location of the emergency to raise the alarm.
- Initial action 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, including specific roles and responsibilities.
- Communications systems.
- Emergency control centres.
- Inventory and location of emergency equipment.

Each terminal should have an emergency team whose duties include planning, implementing and revising emergency procedures, as well as executing them. An emergency plan, when formulated, should be properly documented in an 'Emergency Procedures Manual', which should be available to all personnel whose work is connected with the terminal.

The main elements forming the initial response to an emergency, such as reporting and action to contain and control, together with the location of emergency equipment, should be displayed conspicuously on notices at all strategic locations within the terminal.

Tankers alongside the terminal should be advised of the terminal's emergency plan, as it relates to the tanker, particularly the alarm signals, emergency escape routes and the procedure for a tanker to summon assistance in the event of an emergency on board.

The terminal emergency plan should harmonise and, as appropriate, be integrated with:

- Other parts of the company organisation and facilities; and
- Relevant outside organisations (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 exercises and drills.

The essential elements of a terminal emergency plan are summarised in Section 20.4.

20.2.2 Control

The terminal emergency plan should make absolutely clear the person or persons who have overall responsibility for dealing with the emergency, listed in order of priority. Responsibilities for actions to be taken by others within the terminal organisation to contain and control the emergency should also be clearly established.

Failure to define lines of responsibility can easily lead to confusion and to the loss of valuable time.

If there is no dedicated control centre, an office should be pre-designated for this purpose, and kept ready for use in the event of emergencies. The location of the control centre, and a list of those personnel assigned to it, should be clearly described in the plan. The control centre should be located at a convenient central point, not adjacent to likely hazardous areas, and possibly in the main terminal office.

During an emergency, the control centre should be manned by leading representatives from the terminal and, as relevant, by those from the port authority, fire brigade, tug company, police or other appropriate civil authority. If the emergency involves, or is likely to involve, a tanker, it may also be desirable that a Responsible Crew Member from the casualty tanker is in attendance at the control centre to give advice. An 'Information Officer' should be designated to relay information to the public, other port users and all involved parties.

During an emergency, it is important that key personnel are easily recognisable in the field, for example by wearing different coloured safety helmets. The emergency plan should include such details.

The plan should also identify those authorised to declare that an emergency is over.

20.2.3 Communications and Alarms

20.2.3.1 Alarms

All installations should have an emergency alarm system.

Alarm protocols will vary, depending on the terminal. For example, a single common alarm may be quite appropriate for a small terminal while a complex terminal/refinery may have to install a differentiated alarm system to reflect a hierarchy of possible emergencies.

It may be beneficial to include the option of a silent alarm, whereby no audible general alarms are raised, but a small number of key personnel are informed by telephone or portable radio and are put on alert. Typical applications would be in response to bomb threats and other forms of sabotage.

20.2.3.2 Contact Lists

The terminal emergency plan should include full contact details, both during and outside office hours, for those inside and outside the organisation who must be called in case of emergency.

The names of alternates, who will be available in the event that the appointed person is absent or unavailable, should be included. Alternates should be fully aware of their responsibilities and trained in the proper execution of their duties.

The contact list should be sufficiently comprehensive to eliminate the need to refer to other documentation, such as telephone directories.

20.2.3.3 Communication System Requirements

Reliable communications are essential for dealing successfully with an emergency situation. Alternative power supplies should be provided in case the primary system fails.

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

- Terminal emergency alarm.
- Summoning of assistance.
- Co-ordination and control of all emergency activities, including movement of tankers.

The communications system should have the flexibility to cover operations on the jetty, on a tanker, on adjacent waters or from elsewhere within the terminal.

Small terminals should, as a minimum, be able to sound an evacuation signal that is clearly identifiable as such. However, radio and telephone communications will be high on the list of priorities in most emergency plans.

Larger terminals should be equipped with a complete range of communication systems, which may include VHF/UHF radio and public address equipment. Key personnel should always be supplied with portable radio equipment. A communication centre should be established in the emergency control centre.

If special dedicated telephone lines are not used, the emergency communications system should be capable of suppressing other calls using the same line.

The emergency control centre should facilitate the direction, co-ordination and control of all emergency activities, including the provision of advice and information to other port users. For these purposes, it should have a suitable communications system linking it with all necessary contacts, both inside and outside the terminal.

20.2.3.4 Communications Discipline

All personnel should understand and appreciate the necessity for strict observance of established rules for the use of communications in an emergency, and should receive frequent instruction on the effective use of communications equipment and procedures.

The emergency plan should include a basic set of communication disciplines, including passwords for the various types or degrees of emergency.

Once mobilised, the key staff involved in actually combating and controlling the emergency should be kept free of communication requirements with other parties, other than those immediately required to handle central communications and press and public relations. The inclusion of an 'Information Officer' in the emergency plan is recommended (see Section 20.2.2).

A log should be kept at the control centre. Radio and telephone calls should be recorded.

20.2.4 Site Plans and Maps

Plans showing fire-fighting equipment, major facilities and road access should be kept up to date and be readily available for use in an emergency, with copies kept in the control centre.

The locations and details of fire-fighting and other emergency equipment on or near a berth should also be displayed on the berth.

20.2.5 Access to Equipment

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

20.2.6 Road Traffic Movement and Control

Roadways in the terminal approaches and areas in way of jetty heads should be kept free of obstructions at all times. Vehicles should only be parked in designated areas and ignition keys should be left in place.

During an emergency, traffic into a terminal or onto berths should be strictly restricted to those vehicles and people required to deal with the emergency or to render assistance. In allowing emergency vehicles access to jetty areas, due account must be taken of any limitations on vehicle weights related to deck loadings.

20.2.7 Outside Services

The terminal emergency plan should make the best possible use of external services. The success in responding to an emergency may depend on the degree of co-operation received from third parties and this will often be dependent on their familiarity with the terminal and its response procedures. It is important that external service providers are involved in joint training activities. Combined drills involving tugs, tankers and shore emergency services, as appropriate, should be conducted at least annually.

If the terminal is located in an area with other industry activities, it may be practical to sponsor the establishment of a mutual assistance plan.

20.2.7.1 Harbour Authorities, Vessel Traffic Control Centres, Police and Fire Services

The terminal emergency plan should make provision for the local harbour authority and vessel traffic control centre, if applicable, to be fully informed of any emergency involving the terminal, or tankers berthed or moored at the terminal, including:

- The nature and extent of the emergency.
- The nature of the tanker or tankers involved, with locations and cargo details.
- The nature of assistance required.

This information will enable the harbour authority and vessel traffic control centre to decide whether to restrict navigation within the port area or to close the port.

The emergency plan should also ensure that any emergency that requires, or might require, assistance beyond the resources of the terminal is immediately reported to the local fire services or the local police.

20.2.7.2 Pilots

If, in an emergency, it is decided to partially or totally evacuate jetties, the local pilot organisation may be called upon at short notice to provide several pilots to advise on the handling of tankers not directly involved in the incident. The emergency plan should make provision for this eventuality.

20.2.7.3 Rescue Launches

A launch or launches, if available, should be included in the plan to assist with:

- The recovery of personnel who may be in the water.
- The evacuation of personnel trapped on a tanker or on a berth.

Launches detailed for these duties should have the following equipment and supplies:

- A communication link capable of being integrated into the control centre's communication system.
- Fixed or portable searchlights for operations during darkness or periods of reduced visibility.
- Blankets, as personnel recovered from the water are likely to be suffering from cold and shock.
- Portable boarding ladders to facilitate entry into the launch, as personnel in the water may have little or no reserve energy and may be unable to help themselves.

- Self-contained breathing apparatus.
- Resuscitation equipment.

The crews of the launches should receive instruction in rescuing survivors from the water, bearing in mind that casualties may be seriously injured or suffering from extensive burns. Crews should also receive instruction in artificial respiration. Launch crews should be made aware that survival time in water could be very short and the prompt rescue of personnel is therefore important.

20.2.7.4 Medical Facilities

Depending on the nature of the emergency, it may be necessary to alert medical facilities within and outside the terminal. The emergency plan should make provision for this.

Medical facilities likely to be used will need to be told:

- The nature and location of the emergency.
- The likelihood or number of casualties.
- Whether medical staff are required at the location of the emergency.
- Actual details of the casualties, including their names, as soon as these are known.

20.2.8 Training for Emergencies

Training should be provided in the following emergency activities, as appropriate:

- Fire-fighting using equipment that will be available in an emergency.
- Transfer of hazardous materials away from the site of the fire.
- Fire isolation.
- Use of personal protective equipment.
- Co-ordinated operation with outside bodies.
- Rescue, including training for selected personnel in life saving from water.
- Spill containment and clean-up.

Unannounced drills should be held in different parts of the terminal, followed by discussions aimed at highlighting any deficiencies encountered. Evacuation drills are an essential part of training and help to minimise panic in an actual emergency.

Local operating procedures for use in an emergency should be available to all concerned, and thorough training given in their use. The terminal emergency plan should be exercised regularly.

Records should be kept and deficiencies or lessons learnt should be recorded and formally followed up.

20.3 Definition and Hierarchy of Emergencies

20.3.1 General

Whether a certain event would represent an 'emergency' or an 'operational incident' that requires swift action will depend on local circumstances. For instance, it may be possible for a large terminal, with adequate equipment and manpower, to deal with a local fire or similar event without calling the full terminal emergency plan into operation. The same incident at a small terminal might be classified as an emergency requiring activation of the emergency plan.

The following guidelines are not intended to be prescriptive, but are intended to provide a framework or starting point that can be customised to suit a particular terminal. For terminals that already have emergency plans in place, the guidance provides a check-list against which the existing plans can be assessed. It should be noted that the guidelines only provide a minimum basis for developing and sustaining an effective terminal emergency plan.

20.3.2 Hierarchy of Emergencies

Before establishing a terminal emergency plan, a study should be made of the terminal, available resources (both during and outside normal working hours) and the potential emergencies that are considered possible at the location. Based on this study, a hierarchy of emergencies should be established, for example:

- Local emergency.
- Terminal emergency.
- Major emergency.

20.3.2.1 Local Emergency

A local emergency is one of minor consequence for life and property that can be dealt with locally, for example at the jetty or on board a tanker, by available staff, with or without assistance. Such an emergency does not normally influence operations in other parts of the terminal or in the port.

20.3.2.2 Terminal Emergency

A terminal emergency is one that is more complex or of a larger size or scope that requires an emergency plan to be initiated. It influences operations in the whole terminal, or has the potential to do so, may affect more than one tanker and may influence the port environment.

20.3.2.3 Major Emergency

A major emergency is one that is similar to a terminal emergency but is of such size and scope, and of such serious consequence for life and property, that the whole terminal and the neighbouring port environment is involved, and/or greatly endangered.

20.3.2.4 Escalation

Not every operational incident should be handled as an emergency. However, an incident may develop into an emergency and the plan should clearly describe the procedures for escalating the response to a higher level.

20.3.3 Assessing Risks

In assessing the range of emergencies that a terminal may have to deal with, consideration should be given to incidents at the terminal itself and those in the port environment that may threaten the terminal, or would require major assistance from the terminal.

The suggested approach is to begin with a very broad view of risks and then to prioritise them by evaluating the potential effect on the terminal operation if the risk were to materialise, together with the likelihood of its occurrence. A review of incidents in the recent past can provide a guide.

20.3.3.1 Incident Check-List

Incidents that should normally be covered within the scope of the terminal risk assessment include:

- Fire or explosion at the terminal and on or around a berthed tanker.
- Major escape of flammable and/or toxic vapours, gases, oil or chemicals.
- Collisions, both ship-shore or ship-ship.
- A tanker drifting and breaking away from a jetty, dragging anchor or grounding.
- Major port accidents involving tankers, tugs, mooring boats, ferries etc.
- Meteorological hazards, such as floods, hurricanes, heavy electrical storms.
- Attack, sabotage and threat against tankers or the terminal.

20.3.3.2 Special Situations

The terminal emergency plan should apply to an otherwise normal operational environment. Special situations, such as acts of war, will require different responses.

20.4 Terminal Emergency Plan

20.4.1 Format

The format of the terminal emergency plan will depend on local circumstances, the scope of the plan and its relationship to other documentation. The following have proven useful in practice:

- Loose-leaf format to facilitate amendments.
- Bound in a distinctively coloured binder.
- Good quality paper of a strong texture.
- Each page dated and sequentially numbered.
- Written in more than one language, if necessary. All those involved should be able to read and understand the plan. If more than one language version of the plan is used, one version, usually the local language version, should be designated to be the original, in case of legal argument.

- Use of flow charts and decision diagrams with multicolour print symbols to minimise written text.
- Minimal use of cross-references to other parts of the plan.

20.4.2 Preparation

In developing a terminal emergency plan, it is important that the functions concerned, such as operations, engineering, marine and safety, are involved. This can best be achieved by way of a part time task force under appropriate leadership. However, one member of the task force should be retained full time, if possible, until completion of the plan. This person should also take care of the necessary liaison with outside parties who are included in the plan.

One of the greatest drawbacks of a terminal emergency plan is its potential for rapid obsolescence. As staff members and organisations change, the plan should be updated to accommodate such changes. It is recommended that one appointed staff member should be responsible for keeping the plan up to date, using a single master copy. Only the appointed staff member should be entitled to make changes to the emergency plan.

Every staff member with a specific role in the emergency plan should have their own copy of the plan. Furthermore, one or more copies should be available and always accessible in the relevant control rooms. Records should be kept of copies in circulation and of each revision issued (names, locations, contact details etc), receipt of which is to be acknowledged in writing.

Where plans are made available to all relevant personnel in electronic form, such as via a local server, the electronic copy is normally considered to be the controlled or extant copy and any printed versions are uncontrolled.

Unless other satisfactory arrangements exist, it is recommended that the plan administrator is also nominated as room manager for the emergency control centre. The role will include ensuring that the centre is kept stocked with emergency materials, up to date documents and other materials, and that it is kept clean and ready for immediate occupation.

20.4.3 Resource Availability

It may be necessary to plan for mobilisation of resources, such as materials, equipment and manpower, that are additional to those immediately available at a location. Should this be necessary, the plan should contain instructions regarding the accessibility and availability of such resources, both those owned by the terminal organisation and those available from outside.

The plan should include details regarding who is entitled to call on additional resources and information, such as who holds keys to the resources out of hours. The resources can include, but need not be limited to, the following:

- Craft for assistance, rescue and evacuation.
- Road transport, including buses and trucks.
- Earthmoving equipment.
- Aircraft for oil spill tracking and surveillance.

- Floodlights for night operation.
- Spill containment, pollution control and clean-up equipment.
- Sand, dispersants, fire hose and foam making equipment, fire extinguishers and additional stocks of fire-fighting foam concentrate.
- Breathing air equipment.
- Fire suits, helmets and other fire protective clothing.
- Rescue devices such as hydraulic spreaders and jacks, life lines, life buoys, ladders and stretchers.
- Medical resources and portable life support systems.
- Food and beverages.
- Human resources - drivers, electricians, mechanics and general manpower to enable deployment of the necessary material resources, for example.

For each resource group, the plan should list:

- Availability, amounts and numbers.
- Main characteristics and performance data.
- Accessibility on a 24 hour basis.
- Addresses of people and location of stores, telephones, radios, etc as applicable.
- Lead time for supply/mobilisation.

20.4.4 Miscellaneous Organisational Items

The following additional items are intended to assist terminals further with development of their emergency planning. In general, an emergency plan should:

- Be specific to the terminal and cover only those emergencies that are considered feasible.
- Not include references to unlikely occurrences, to products not handled and to resources that are not available.
- Be as complete as possible, but also as short as possible. Instructions should be to the point and not so elaborate that they detract from quick response.
- Not normally include instructions about how to combat the emergency physically, for example fire-fighting, pollution abatement, etc. It should be limited to people, equipment, organisation and communications. An exception to this can be more 'predictable' emergencies, such as hurricanes and/or flood warnings. In these cases, the plan can specify emergency precautions to be organised. This also applies to 'pre-planned' evacuation of personnel and similar activities.
- Allow operations and other activities not directly affected by the emergency to continue in an orderly and safe manner. Sufficient staff/supervision and resources should therefore be kept non-assigned for that purpose. If this is not possible, the plan should include safe shutdown procedures.

- Be integrated with, or at least be compatible with, other industry or port emergency plans. However, for the primary activities covered by the plan, reliance should always be placed upon in-house staff and resources and not on those from outside.
- Avoid overreaction in any part of the organisation.
- Contain an organisation diagram illustrating the key personnel involved and their immediate actions and communications. The extent and amount of detail in such a diagram should be limited to standard actions.
- Itemise actions in a proper sequence. For example, the priority action to protect life and thereafter property, and to terminate the emergency, must not be frustrated by communications with secondary parties such as the police, harbour authorities, etc.
- List the reporting line and authority of each key person mentioned both within and outside working hours. For each person, a short check-list of important actions and communications should be included.
- Ensure that key personnel have a manageable task and that they can be released to deal with an emergency on a full time basis, if necessary. Where required, replacement staff should be brought in to take over those operations of the terminal that are not directly involved or influenced by the emergency. All functions in the plan that require special abilities or skills, for example fire tender operation, boatmen and special radio operations, should be provided with backup.
- Specify that all staff and contractors not assigned duties in the plan must return to and remain available at their normal work location. Alternatively, certain staff should assemble at pre-nominated central locations.

Recommended pre-arrangements to be dealt with in the plan include:

- Tug/fireboats either on standby or ready to proceed at short notice.
- Craft for water-borne assistance or the evacuation of personnel, including designated landings, to be manned.
- Pilots on standby to assist in removing tanker(s) from berths.
- Cars, buses etc directed to evacuation collection points, including craft landing areas.
- Unmooring crew and transport on standby.
- Emergency traffic regulations.
- Properly manned reception points to be assigned to receive evacuated tanker crew and/or family members of terminal staff, press representatives etc.

It should be possible to test the effectiveness of the plan without causing undue disruption to day-to-day operations.

No emergency plan can embrace all factors and users should be made aware that the particular circumstances of an emergency might dictate that they or others have to deviate from the plan.

20.5 Emergency Removal of Tanker from Berth

When the emergency is on a tanker, it is recognised that, in the interest of the tanker, the safety of the shore installation, and often that of the whole port, the tanker should be kept alongside whenever possible. This would improve the possibility of shore based personnel and equipment being used to tackle an emergency on board.

However, if a fire on a tanker or on a berth cannot be controlled, it may be necessary to consider whether or not the tanker should be removed from the berth. Planning for such an event may require consultation between a port authority representative or harbour master, the Terminal Representative, the Master of the tanker and the senior local authority fire officer.

In the event that an incident escalates, the plan may invite consideration of removing other, presently unaffected, tankers from adjacent or downwind berths.

The plan should stress the need to avoid precipitate action that might increase, rather than decrease, the danger to the tanker, the terminal, other tankers or barges berthed nearby and other adjacent installations.

