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WORLD MARITIME UNIVERSITY
Malmö, Sweden

**AN INTEGRATED MANAGEMENT
APPROACH TO EMERGENCY RESPONSE AND
ITS APPLICATION TO MALAYSIAN PORTS**

By

CHARLES FERNANDES
Malaysia

A dissertation submitted to the World Maritime University in partial
fulfilment of the requirements for the award of the degree of

MASTER OF SCIENCE

in

PORT MANAGEMENT

1999

DECLARATION

I certify that all the material in this dissertation that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this dissertation reflect my own personal views, and are not necessarily endorsed by the University.

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Dedicated to...
My lovely wife Nance & our little boy, Malcolm.

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I would like to express my appreciation to the visiting professors of World Maritime University (WMU), and the various organisations and institutions that I visited during my field studies.

My profound gratitude to the IMO-Norwegian Technical Co-operation for providing me with the scholarship to study at WMU, and the management and staff of the Maritime Academy of Malaysia for their support and encouragement. A special thanks to the Port Authorities and Terminal Operators of Malaysia for their responses and guidance.

Above all, glory to God my saviour and protector, without whom nothing is possible.

ABSTRACTS

Title of Dissertation: **An Integrated Management Approach to Emergency Response and its application to Malaysian ports.**

Degree: **MSc**

This dissertation is the study of emergency management applicable in the port industry. It is intended for port authorities that are responsible for emergency preparedness in their community. Emergency planning is a wide field and the type of emergency a seaport may face is diverse. Emergencies most likely to occur are incidents involving hazardous materials, explosions, transportation accidents, uncontrollable fires, or combinations thereof, which may result in injuries, evacuations and/or mass casualties. The Emergency Response Plan has been designed as a generic document that is applicable to all of these types of emergencies or disaster situations.

The overall goal is to prevent loss of life and property, and to ensure environmental safety in the community. The basic approach used is to increase the knowledge in the community about the possible hazards and to develop integrated emergency response plans. Emergency Plan in itself cannot guarantee an efficient, effective response to an incident. It must be utilised as a tool to assist responders in their emergency response activities. The Plan must be flexible enough to adapt to a broad spectrum of emergencies and must be supported with adequate resources. Familiarity with the contents of the Plan by participating agencies, awareness and preparedness of the port, testing of the plan on regular basis, post incident review and the emphasis on training towards emergency response is paramount. It is important for emergency response agencies to be aware of their roles and responsibilities within an integrated response framework.

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LIST OF ABBREVIATIONS

AAPA	American Association of Port Authorities
APELL	Awareness and Preparedness for Emergencies at Local Level
ASEAN	Association of South East Asian Nations
CP	Cleaner Production Programme
CT	Crisis Team
DNV	Det Norske Veritas
DOE	Department of Environment, Malaysia
DSLMB	Domestic Shipping Licensing Board
EEZ	Exclusive Economic Zone
EIA	Environment Impact Assessment
EIS	Environment Impact Statement
EOC	Emergency Operation Centre
EQA	Environment Quality Act
FOSC	Federal On-Scene Co-ordinator
GEF	Global Environment Facility
Hazmat	Hazardous Material
ICHCA	International Cargo Handling Co-ordination Association
ICS	Incident Command System
IMO	International Maritime Organisation
MSO	Merchant Shipping Ordinance, 1952
OPP2	Malaysia's Second Outline Perspective Plan
OPRC	Oil Pollution Preparedness, Response and Co-operation
OSHA	Occupational Safety and Health Act
OSPAR	Oil Spill Preparedness and Response Programme
OSRAP	Oil Spill Response Action Plan
PPE	Personal Protective Material
PTP	Prevention through People

REMPEC	Regional Marine Pollution Emergency Response Centre for the Mediterranean
RP	Responsible Person
SOP	Standard Operating Procedures
SOSC	State On- Scene Co-ordinator
UNCED	United Nations Conference On Environment And Development
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USCG	United States Coast Guard
WMU	World Maritime University

CHAPTER I

Introduction

1.1 Background

Since the beginning of the industrial era, around the turn of the century and until just after the middle of this century, industrial activities were carried out by various private and government entities with little concern for the impact that these operations had on the environment. Priorities were different during this time and industry was mainly concerned with making a profit. Contributing to this seeming lack of concern for the environment was a general lack of understanding of the negative impacts from the industry and limited knowledge of natural systems. This has resulted to a handful of high profile sites, which includes industry-related events that cause serious damage to the environment and unacceptable loss of life and property such as:

- a) The dioxin containing release in Seveso in 1976,
- b) The propane explosion in Mexico City in 1984,
- c) The release of methylisocyanate at Bhopal in 1984,
- d) The fire and discharge of contaminated waters in the Rhine in 1986 from a warehouse in Basel.

Increasing public awareness has been directed at the various environmental issues facing modern society. It has been acknowledge that every disaster, whatever the cause of the emergency has an environmental impact. The most sweeping result of this increased awareness has been the passage of a large body of legislation, which

has created an entire industry of its own. This legislation, beginning in the 1970s and continuing through the 1980s and 1990s, has brought environmental issues to the forefront of national and global consciousness.

One industry that has received somewhat less attention concerning environmental issues until recently is the port industry. The reason for this is partly the higher priority of other sectors of industry; namely, some defence related activities and other industrial sites that pose an imminent threat to human health or the environment. Until fairly recently the main environmental issues facing the port industry have been the problems associated with the safe handling of hazardous cargoes and other emergency occurrences that poses threat to the port community. However, the industry is now being drawn into the environmental issue mainstream and is faced with complying with a host of existing and possibly proposed environmental laws. Clearly, adequate response to such an emergency calls for well co-ordinated actions of individuals, organisations and the authority within the port community. Awareness in the community to cope with all possible hazards and the need for mutual preparedness is essential.

In recent years, many new management terms were introduced to the public, one of which is the term 'emergency management'. Over the last two decades there has been a growing realisation that many top-down approaches to emergency management fail to address the specific local needs of vulnerable community, ignore the potential of local resources and capacities and may in some cases even increase people's vulnerability. In such a context, the relevance of integrated approach to emergency management is being recognised.

By the time of the World Conference on Disaster & Emergency Reduction was held in Yokohama, in 1994, abroad consensus was emerging in favour of emergency management approach and a large number of organisations had started implementing this programs in the field. However, there are still little systematised knowledge and

information on the emergency management system available to inform practitioners and even lesser learning opportunities on the theme.

Since the port sector is a service-orientated industry, the quality of production is the services rendered to the port users for the efficient and safe use of the port facilities. Emergency management began to be widely discussed and mentioned in many major ports nowadays. Emergencies can happen at any time and similarly, the possibility of an emergency is always present. Prudence dictates that possible risks are assessed and that mitigating measures to prevent an emergency are implemented. Organisation and management of resources for dealing with all aspects of emergencies within a port industry are crucial and the need to further develop the capabilities of emergency response is essential. At its most comprehensive, emergency management involves application of safety strategies, responding to reduce personal injury and losses of life, property and the environment. These activities require the combined expertise and resources of the port authority and user organisations of the port community.

1.2 Aim

The aim of this study is to enhance the understanding of emergency management approach to a port industry in Malaysia through the sharing of systematised knowledge, information and experiences from other major ports. To improve emergency management skills, particularly as they relate to a port community based emergency preparedness planning, risk assessment, safety management, personnel training, public awareness and networking. The importance of this concept are dealt in this study and recommendations made to establish such system within Malaysian ports to further improve the response strategy through a management system in an emergency.

Emergency management requires participation by organisations and individuals that understand their particular roles and responsibilities. This study highlights the

information on what emergency management arrangements are, the roles of various organisations within them, and the co-operative planning which bring all the different elements together. A requirement for high level of consistent preparedness and response within a port area is essential. Emergency plans should be made to cover any foreseeable incidents such as personal injuries, facility damages, fire and explosion, spillage of toxic or flammable substances, collisions and the various situations that may be caused by nature and human error.

The major functional areas that require necessary components to an integrated approach of emergency management are prevention, preparedness, response and recovery. Within these areas, the essential responsibilities of a port shall include:

- a) Planning – the analysis of requirement and the development of strategies for resource utilisation.
- b) Preparedness – the establishment of structures, development of systems, testing and evaluation by organisations on their capacity to perform the allotted roles.
- c) Co-ordination – the bringing together of organisations and resources to ensure effective emergency management.

The port authority should continue to be responsible as co-ordinator for emergency management arrangements. An emergency response plan should be designed and given appropriate legislation scope to allow co-ordination across the range of possible emergency incidents. The concept of an emergency management that includes prevention, preparedness, response and recovery programs would be discussed. As part of the process, this study focuses on the planning and implementation of an emergency response and its application to Malaysian ports. It is hoped that this study would provide essential understanding on the involvement and operation of emergency management especially within the port industry.

1.3 Methodology

When considering how best to research and write this dissertation, the author was guided by many factors. Some of these factors were obvious and includes the avoidance of plagiarism and trying best to keep the facts as accurate as possible. Although books on emergency and crisis management are important source of reference, they usually do not focus enough on the topic or tailor made for a port industry. Since, the port industry is undergoing such a rapid change in technology that books very often fall out of date and do not always give facts relevant to the present seaport environment. Many of the documentary sources would then have to come from articles published in journals, periodicals, conferences that were accessible through the World Wide Web. The best approach then would be to write in such a way as to keep the dissertation open for improvement and updating.

This study will focus on management approach for emergency response in a port. Many aspects of the existing arrangements in Malaysia, particularly in the area of response are effective, but require rationalisation in order to maximise their strengths and minimise their weaknesses. Thus, the comprehensive methods that are being applied in many major ports towards emergency management today are recommended. Since the port industry is increasingly being required to comply with the myriad environmental laws currently in force. Previous studies in different perspective in these issues are utilised as supportive material. Nevertheless, this study is based on:

- a) Reference materials available at the World Maritime University (WMU) library and materials available through the intra-library loan.
- b) Study material from and lectures by resident and visiting professors of WMU.
- c) Papers submitted by the various agencies in Malaysia in national and international environmental seminars.

- d) Materials obtained through survey questionnaire and email correspondence with Malaysian Port Authorities and Port Terminal Operators
- e) The World Wide Web of the various national, regional and international organisations for emergency response management.
- f) Related seminars and field studies to various port organisations in Europe.

The author felt it best not to confine the research and writing into just one style or standard of implementation for emergency management in the port industry. Indeed this view was supported by the knowledge gained during the field trips while pursuing the Master of Science (MSc) at the World Maritime University (WMU). A variety of management systems towards emergency response being practised by major ports were discovered during these field trips. Even some ports considering how best to implement emergency management, there was a wide range of views as to which system is best qualified.

CHAPTER II

Organisational & Regulatory Framework in Malaysia

Malaysia has all the makings of a maritime nation, strategically located at the centre of shipping lane and a large sea area rich in fishery, oil and gas resources. Efforts to transform Malaysia into a true maritime nation began about two decades ago. Since then the maritime industry has been recognised as an important sector in the Malaysian economy. Malaysia's Second Outline Perspective Plan (OPP2) clearly describes the potential role of the maritime sector to the long-term growth and development of the country especially in creating new and non-traditional marine based and related economic activities until the year 2000 and beyond. As Malaysia continues on the road to industrialisation, ports play a dominant role in our national economy as gateway for our domestic and international trade. Article 74 of the Malaysian Constitution states that Parliament may regulate any of the following matters concerning;

- a) shipping and navigation on the high seas and inland waters;
- b) ports, harbours, foreshores and light houses;
- c) wrecks and salvage and other measures for the safety of navigation;
- d) carriage of goods and passengers by sea.

2.1 Maritime Administration

The formulation of maritime policies and legislation in Malaysia came about from expansion of various activities in the maritime sector. The development of maritime

policy was officially enunciated in the Third Malaysia Plan 1976 - 1980 as 'maritime nation'. The Ministry of Transport defined its objectives as to develop;

- a) an efficient, well - diversified and modern merchant marine fleet,
- b) an efficient and economically viable shipbuilding and repairing industry,
- c) appropriate supporting services such as shipping services, marine law, insurance, banking and ports; and
- d) skilled and professional personnel to operate all aspects of the industry.

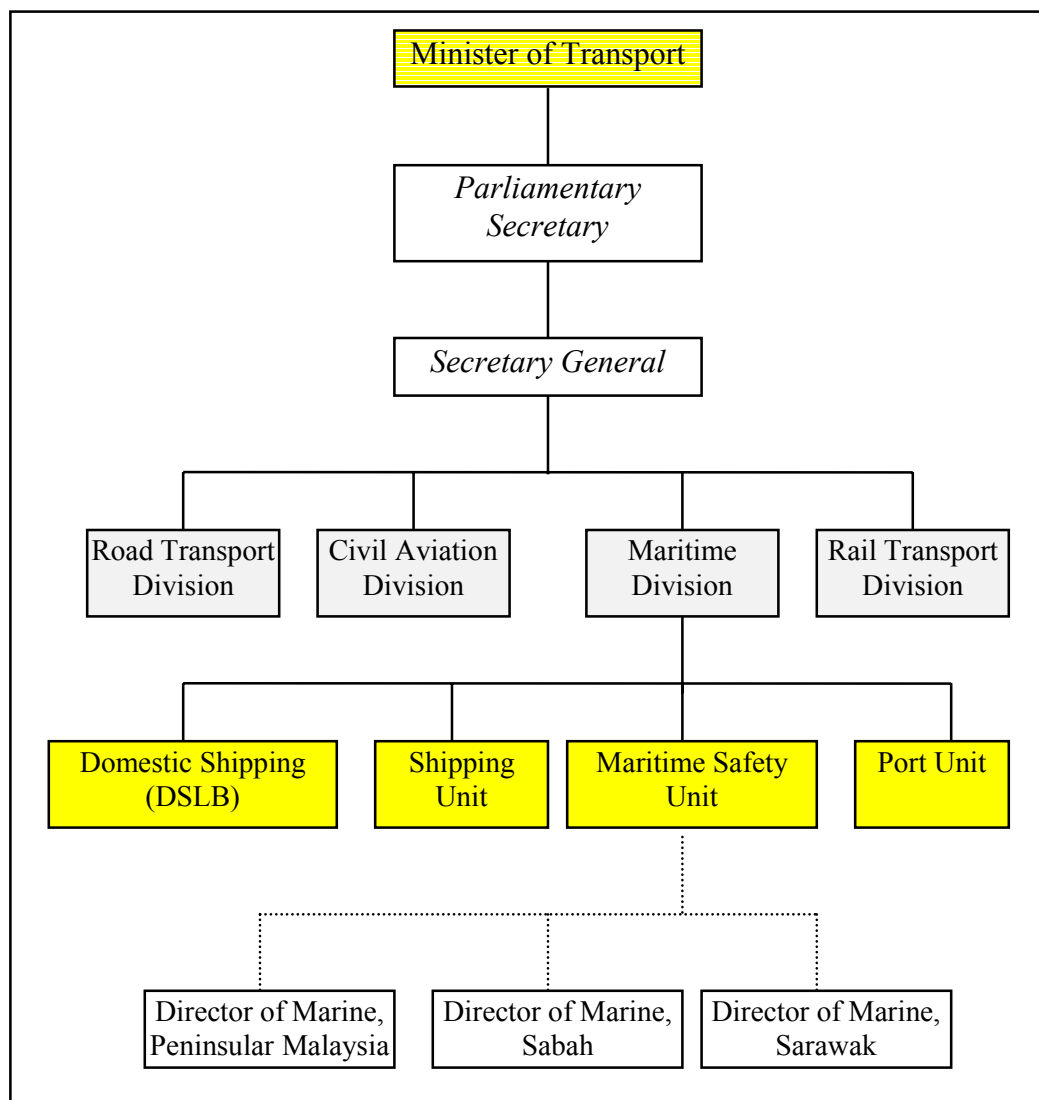


Figure 2.1: Present Organisation Structure of the Ministry of Transport, Malaysia

2.2 Maritime Division

This division is responsible for policy formulating, planning, research, co-ordinating and monitoring of all maritime matters, including port development, the shipping industry, licensing of domestic shipping and related maritime issues. The aim is to increase effectiveness and efficiency of utilising port facilities, encourage participation of Malaysian ships in domestic and international trade and to ensure the safety of navigation, in line with the objective to become a maritime nation. Lately, the scope of the maritime programmes has been expanded with the development of new projects, new research programmes and review of matters related to maritime laws. To implement these responsibilities, The Maritime Division is divided into 4 units namely;

- a) Port Unit - responsible for developing, co-ordinating and supervising research and development activities of all federal ports in Malaysia, including the privatising of ports.
- b) Shipping Unit - responsible for handling of matters pertaining to national and international shipping policies, including related International Conventions.
- c) Maritime Safety Unit - responsible for the formulation of policies pertaining to the safety of navigation, safety of property and lives at sea. The Unit contributes towards the prevention, combating of marine pollution including marine disasters, search, and rescue. In addition, the unit monitors developmental port projects and the operations of jetties under the Marine Departments of Malaysia. It is responsible for the ratification of International Conventions of IMO related to ports and shipping.
- d) Domestic Shipping Licensing Board (DSLBB) - responsible in providing secretariat services to the Domestic Shipping Licensing Board and the implementation of the Cabotage Policy.

2.3 Port System in Malaysia

Within the ambit of the Ministry of Transport, the regulatory bodies are the Marine Departments and the Port Authorities whose services are also dependent upon the support of other agencies such as the Customs, Immigration, Health, and Telecommunication. The clients served by the Port Authorities are the port operating companies, private terminal operators, operators of warehouses, liquid, solid and gas bulk terminal facilities to name a few. For ports not under the governance of the Port Authority Act, such clients would be legislated by the Merchant Shipping Ordinance (MSO) principally under the authority of the Marine Department.

Malaysian ports may be broadly classified as landlord ports, which are owned by state and being leased out to private port operators. Municipal ports, which are operated by the local authority; and trust ports, which are independent statutory bodies run by a Board of Trustees. About 91% of the Malaysia's international trade (by weight) pass through its ports, and any bottlenecks or inefficiencies have knock-on effects on costs and delivery times. The Port Unit liases closely with all sectors of the industry and is seeking to develop a more open relationship. It proposes a partnership with the whole ports industry aiming to meet the aspirations of ports, users and local communities, as well as the essential themes of wider transport and economic policies. The Unit also proposes that the use of powers and the operation of all ports should become a much more open process than in the past. By which to implement the principle that the costs of investment in port and maritime infrastructure including public funding should are recovered in port charges.

Malaysia has been having its share of adventuring in the exercise of reshaping of its port system. From an economy previously driven by natural resources and trading in consumer goods, the country has made great successive strides along the path of import substitution, down-stream processing of natural resources and most recently in becoming home for direct foreign investment and large-scale manufacturing for the global market. Quite logically, the port system of the country had to change

shape to become good enough and this was done in terms of quantity and quality. Malaysia's biggest ports as shown in *figure 2.2* are Kelang, George Town (Penang) and Johor. Other significant ports are Kuantan, Port Dickson, Melaka, Kuching, Bintulu, Miri, Pulau Labuan, Kota Kinabalu, Sandakan, and Tawau.



Figure 2.2: Ports in Malaysia

The Port Authorities together with the Marine Department are responsible for the safe operation of the seaports in Malaysia. These authorities are statutory organisations whereby each operates as a semiautonomous port authority. The federal-controlled port authorities have gone into planned capacity enhancement, all for a single reason of being good enough to support the inflow of foreign investment and technology attracted to on Malaysia's highly liberal and investor-friendly programmes of industrialisation. In terms of qualitative issues, this is perhaps best manifested by the government's willingness to take into partnership and confidence role-playing by private organisation in matter of ownership and management of port facilities and services. Port privatisation has gone full speed both in terms of acceptance as a policy and actual implementation. The approach towards port

management in Malaysia has taken new direction with concessionaire organisations holding court in servicing clients, where the port authority at one time used to be in the driver's seat and who is now pretty settled in the role of landlord and regulator.

2.4 The Marine Department

There are three departments namely:

- a) Marine Department of Peninsular Malaysia (*figure 2.3*)
- b) Marine Department of Sabah
- c) Marine Department of Sarawak

These departments are responsible for the administration of the Merchant Shipping Ordinances 1952 (MSO) and related marine and port activities. The Directors of Marine are prescribed by law to be the regulating authority of all matters pertaining to merchant shipping throughout the country. They are directly or indirectly responsible for the registration of Malaysian ships, survey and certification, licensing and registration of small ships, hydrographic survey, maintenance and operation of navigational aids, administration of ports, dangerous goods, wreck and salvage, pollution, maintenance and operation of launches, training and certification of seafarers and pilotage services.

The Marine Department also exercise authority under the Petroleum Act, the Explosive Act and Fisheries Act wherever related to safety in port, etc. Each of the three departments has port offices spread throughout the country. These offices carry out the day to day functions of licensing of small boats, maintenance of navigational aids, maritime safety, port safety and clearance of ships. The main aim of this department is to ensure the safety of shipping and the prevention of marine pollution. In prevention of pollution, the Department of Environment (DOE) delegates these departments with the responsibility of controlling marine pollution from ships.

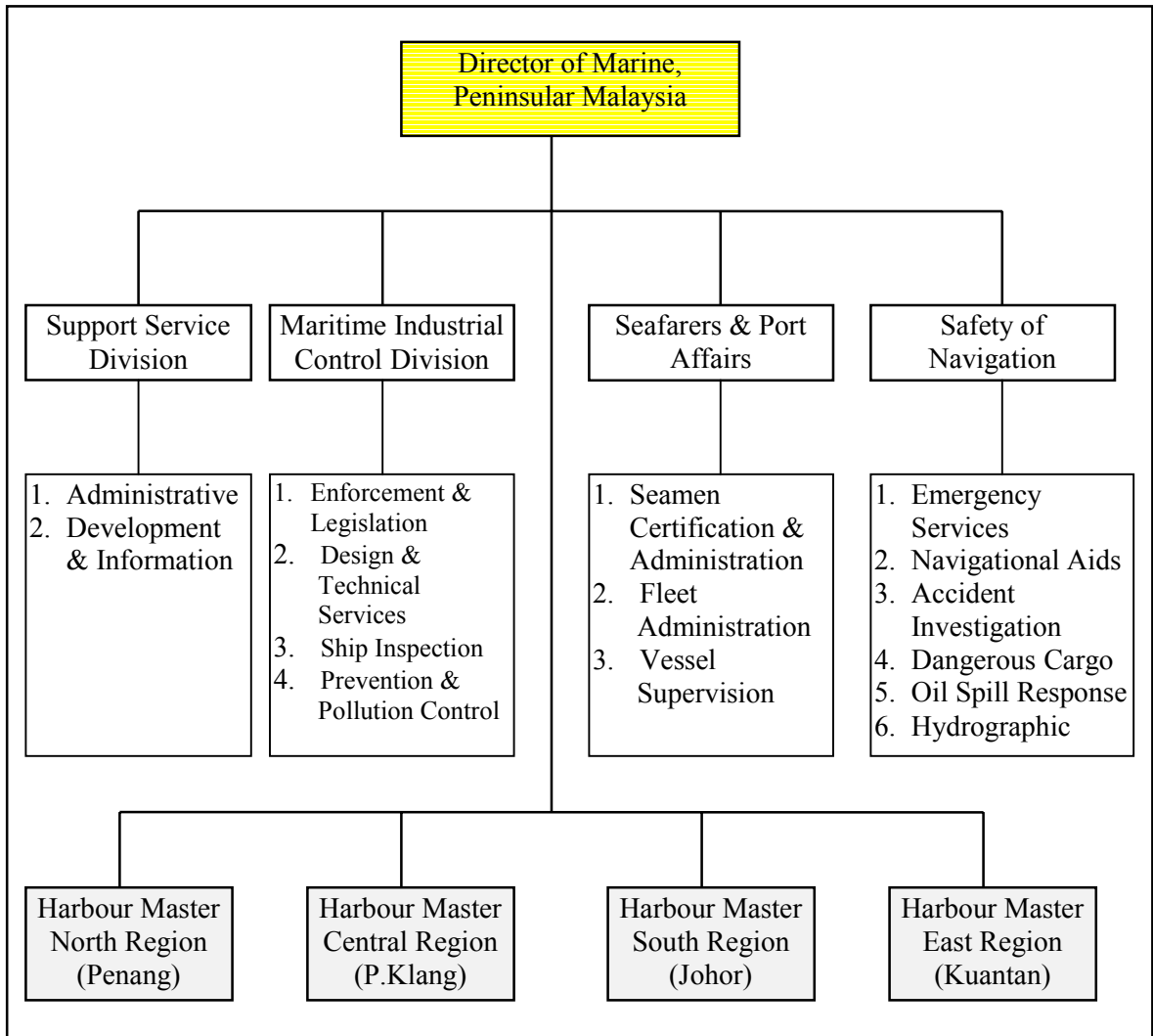


Figure 2.3: Present Organisation Structure of the Marine Department, Peninsula Malaysia

2.5 Department of Environment

Industrial advancement in Malaysia has transformed the economy from its agriculture-based roots into a fully diversified and thriving economy. In the early days of abundant resources and minimal development pressures, little attention was paid to growing environment concerns. Only since the enactment of the Environment Quality Act (EQA) in 1974, and the formation of a regulatory agency now known as the Department of Environment (DOE) under the Ministry of Science,

Technology and the Environment, has environmental management in Malaysia taken on a formalised and structured form up to this day. (Figure 2.4)

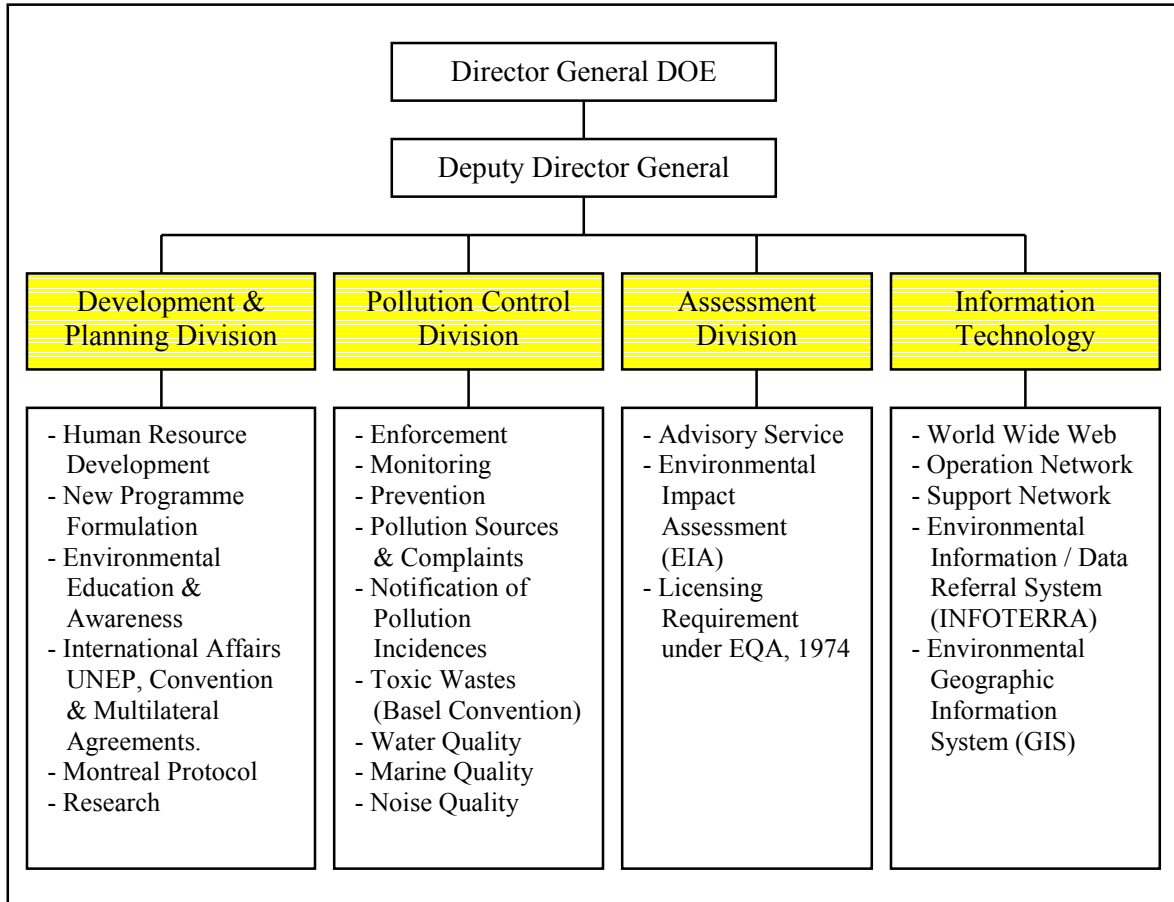


Figure 2.4: Present Organisation Structure of Department of Environment, Malaysia

The Department of Environment has to administer and enforce the Environment Quality Act, 1974 (Amendments 1985, 1996) and Section IV of the Economic Exclusive Zone Act, 1984. The DOE ensures that the uniqueness, diversity and quality of the environment are preserved towards maintaining health, prosperity, security and well being for the present and the future. Thus it is recognised that the maintenance and improvement of quality is the collective responsibility of all, both the private and the public sector, and the participation of everybody is necessary to enhance the quality of the Malaysian environment.

2.6 Environmental Law, Regulation & Policy

Malaysia's environmental policy objective since the Third Malaysian Plan (1976-1980) have always intended to bring a balance between the goals for socio-economic development to a wide spectrum of population against the benefits of sound environmental conditions. Further to this, the National Development Policy of the Second Outline Perspective Plan (OPP2 of 1991-2000) stated that adequate attention will be given to the protection of the environment and ecology so as to maintain the long term sustainability of the country's development.

"...in the pursuit of economic development, Malaysia's Vision 2020 envisages that the land should remain productive, fertile and rich in diversity, the atmosphere clear and clean, the water unpolluted."

As mentioned in the introduction, the port industry is being steadily drawn into environmental issues because of the enactment of many environmental laws, regulation and statutes (all hereafter referred to as laws). The system of environment laws is very diverse and complex. Compliance with these laws can be a great challenge to anyone who is legally bound to follow them. In short, the environmental law system is best defined as an organised way of actions, which damage or threaten the environment or public health and safety. In order to achieve the national environmental objectives, the Department of Environment (DOE) has adopted a strategy based on pollution control and prevention. Since April 1988, the Environmental Impact Assessment (EIA) Procedure has become a mandatory requirement through the 1985 Amendment to the Environmental Quality Act, 1974. DOE promotes a comprehensive and holistic approach in development planning by incorporating environmental factors into resource utilisation plans. The pollution control and prevention strategy is supported by other on-going environmental programs that includes training, environmental monitoring, environmental education, information dissemination, inter-agency and Federal State co-operation and co-ordination, and international environmental affairs.

Following are a brief summary of the process by which these laws are created and applicable to Malaysian industries:

- a) *Environment Quality Act, 1974* - is a classic document for establishing policies and national goals for the protection of the environment at large. This document represents the first stand on the part of Malaysia to protect the environment. Its primary impact stems from its goal of requiring industry to consider the impact that the activities had on the environment. This was primarily accomplished through a licensing procedure that also required Environment Impact Statements (EIS) to be prepared for major projects. These EIS must address such basic issues as the environment cost versus benefits of proposed projects, the ideal siting of proposed facilities in an attempt to minimise adverse impacts to the environment and the proposed use of best available technology to minimise the risk of accidents and adverse impacts associated with routine operation of facilities.

- b) *Clean Water Act, 1985* - the objective of this act and its amendments relate mainly to the cleanup and preservation of surface water quality. The primary goals were to restore the nation's rivers and lakes to a sufficiently safe quality for recreational uses and for the protection of fish and wildlife; and to eliminate discharge of pollutants into the nation's navigable waters. An important part of the Act relates to waste management, especially with regard to the liquid-component waste discharges from urban-industrial areas and includes treating and disposing of all residential and industrial waste.

- c) *Merchant Shipping Act (Oil Pollution), 1994* - which establishes pollution prevention as a national objective in order to develop and implement a strategy to promote source reduction. Pollution prevention is the highest tier in a hierarchy of acceptable practices. DOE further

states that if the pollution cannot be prevented, it should be recycled. If it is not feasible to prevent or recycle, pollution should be treated and disposal or other release into the environment should be used as a last resort. The Act defined pollution prevention to mean source reduction and other safety practices that reduce or eliminate the creation of pollutants through increased efficiency in handling and management.

- d) *Port (Safety of Workers) Rules, 1985* - under this rules the Occupational Safety and Health Administration (OSHA) was adopted for the setting of safety and health standards, their enforcement through federal and state inspectors and public education and consultation.

2.7 Marine Pollution Control and Prevention

Being a maritime nation, the government places high priority to the preservation of marine resources and environment. Although oil spills incidents are infrequent, the Department of Environment will continue its emphasis on the monitoring and controlling of oil & hazardous chemical spills in Malaysian waters. On January 1994, a Memorandum of Understanding on an ASEAN Oil Spill Response Action Plan (OSRAP) was signed by the Government of Malaysia to participate in the ASEAN Preparedness and Response Programme (OSPAR) sponsored by the Government of Japan. Under the programme, Malaysia was given a total of RM2 million for the acquisition of oil spill equipment to be located at Port Kelang, Johor Bharu, Penang and Labuan. The regional programme for prevention and management of marine pollution in the East Asian seas is a joint venture by IMO, the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF). Ratification of international agreements on marine pollution in Malaysia is few. The objective of the International Conventions is to assist participating Flag State in developing the necessary legislative and technical capability to ratify, as well as to implement efficiently. The following oil spill contingency plans are made as to ensure an effective response plan to combat oil

spill from shipping activity and to reduce environmental pollution. Three main maritime activities contribute to the pollution of Malaysian seas namely:

- a) Harbour and port activities. These include all pollutants generated from such activities as accidental oil discharges and hazardous solid waste discharges and due to accidents at port.
- b) Maritime traffic discharge. These may be either voluntary or accidental and includes the accidental discharge of oil at sea by collision and the disposal solid waste.
- c) Pollution due to discharge by fixed platforms at sea. This involves pollutant discharge from accidental handling of platforms and pipelines.

Table 2.1: Oil Pollution Contingency Plans

<p><u>REGIONAL</u></p> <p>1. ASIAN-OSPAR Contingency Plan</p>
<p><u>BILATERAL / MULTILATERAL</u></p> <p>1. Straits of Malacca Contingency Plan - Malaysia/Indonesia/Singapore 2. Sulu Sea Contingency Plan - Malaysia/Indonesia/Philippines 3. Brunei Bay Contingency Plan - Malaysia/Brunei</p>
<p><u>NATIONAL</u></p> <p>1. National Contingency Plan for the Control of Oil Spill - Malaysia Water /EEZ 2. Straits of Malacca Contingency Plan - Straits of Malacca 3. Area of Sabah Contingency Plan - Sabah 4. Area of Sarawak Contingency Plan - Sarawak 5. Area of Johor Contingency Plan - Johor 6. South China Sea Contingency Plan - South China Sea</p>

It has long been established that either accidental or deliberate discharge of pollutant in the port area is the most serious source of pollution in Malaysian waters. The scope of the Malaysian Oil Spill Response Contingency Plan covers all Malaysian waters and the Exclusive Economic Zone (EEZ) and the objective can be summarised as:

- a) To have a co-ordinated and rapid response system in combating any oil spill in Malaysian waters.
- b) To upgrade capabilities using available resources in combating oil spills.
- c) To avoid any harmful effects to the marine life by preventing and controlling oil spills.

On national level, the contingency plan is activated by the National Oil Spill Response Committee that is headquarters at the Department of Environment. At Local Port Level, the port authorities in Malaysia are responsible with the DOE to activate such emergencies and take measure to prevent and reduce to effects of such industrial hazardous and oil spills.

CHAPTER III

Emergency Preparedness & Response in Malaysia

Emergency preparedness and response in Malaysia as had been a shared responsibility of organisations, agencies, local authorities, state and the federal government. The division of responsibility amongst these shareholders is established in a wide range of legislation, regulations and by-laws, as well as custom and practice. Existing legislation and decisions define the regulatory, organisational, and procedural framework within which emergency preparedness and response are conducted at national and local levels.

3.1 Emergency Preparedness at National Level

The primary role of the federal government in an emergency is to provide the organisational framework within which the co-ordinated response will take place, thereby reducing the impact of the incident on the citizens of the municipality and returning to a state of normalcy as soon as possible. It is important for potential emergency response agencies to be aware of their roles and responsibilities within the response framework. Thus, legislation governing emergency services of various agencies is the responsibility of the Federal Government of Malaysia.

As for the National Security Division, Emergency Preparedness is governed by Directive No. 20 - "*Policy and Mechanism of Emergency Management and Relief Committee*". The emergency preparedness at national level is under the control of

the National Security Division of the Prime Minister's Department. The co-ordinating units within the division are:

- a) Emergency Co-ordinating Unit
- b) Crisis and Natural Disaster Management Unit
- c) Humanitarian Aid Agency

3.2 Emergency Preparedness at Local Level

Each organisation at the local level, i.e. port authority, should be prepared to initiate the first response to an event of emergency within their facility. As an emergency expands beyond individual capability, the responsibility devolves as appropriate to the situation onto the port authority, local authority, or the state governments and usually only in the direst circumstances, on the federal government.

"...when a port authority combine the efforts in the specification of the hazards within the port area that concern them, and in the development of prevention and contingent actions; they feel ownership and commitment towards the plans they helped develop and to safeguard their community." (ICHCA, 1994)

Through the so-called "all hazards" integrated approach to emergency preparedness, the port authority strive to optimise planning and response resources by basing the planning effort on the effects of emergency, rather than the causes. This would enable where possible to develop a generic set of emergency plans that has applicability in more than one circumstance. Planning is developed on a building-block approach whereby emergency plans and arrangements are built to the extent possible, in a graduated fashion upon existing plans, organisations and arrangements, thereby creating as little change as possible in time of emergency. Therefore, through emergency preparedness measures, elements of centralised co-ordination are provided to the port authority that facilitates planning and response for emergencies that are multi-dimensional in nature. The organisations in a port community should

participate in producing policies and procedural guidelines to assist the creation of the port emergency plans and their implementation, but their role in reality should be largely a supportive one and not a superior one. One of the keystones of success in having emergency preparedness plans is the need for the involvement of all interested and affected parties in the emergency management process. This will facilitate the utilisation of knowledge, skills and experience of the various activities involved in a port area.

3.3 Current Status of Emergency Preparedness & Response in Malaysian Ports

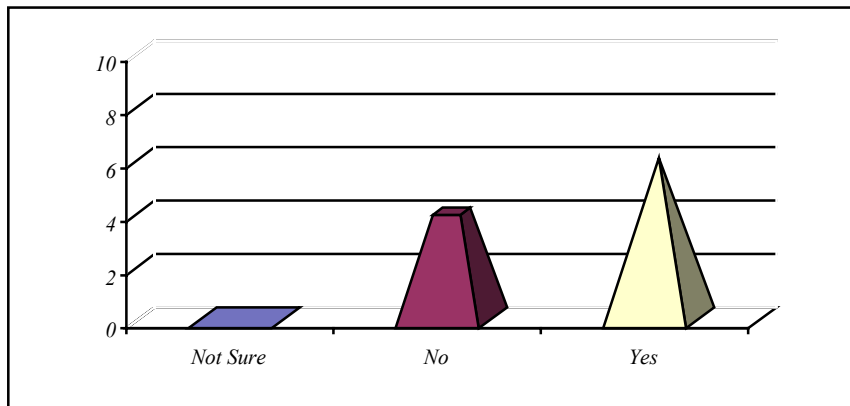
A questionnaire (*Appendix 1*) was prepared in order to make a survey on the status of Emergency Preparedness and Response in Malaysian Ports. This questionnaire was made up using similar guideline and idea in accordance to ICHCA Safety Panel Briefing Pamphlet No. 6 - *Guidance on the Preparation of Emergency Plans* (Evert, 1994). The questionnaire was circulated to various port authorities and terminal operators in Malaysia via mailing address (*Appendix 2*).

The responses received from this questionnaire did help to further compile an analysis of the survey. Difficulties were faced in obtaining statistics of emergency occurrences and recorded events of accident within the port area as this information were considered classified and only for insurance purposes. Many ports in Malaysia do not disclose the actual scenario of accident or emergency though such incidents do occur and are recorded but they are not transparent to the public due to commercial reasons. The author makes this statement based on the telephone interviews carried out to some of the organisations. Out of 18 list of correspondence whereby the questionnaire were addressed, only 10 respondents replied thus enabling the author to make only a brief analysis of the current situation in Malaysian ports, which may or may not be the actual case.

3.3.1 Results of Survey through the Questionnaire

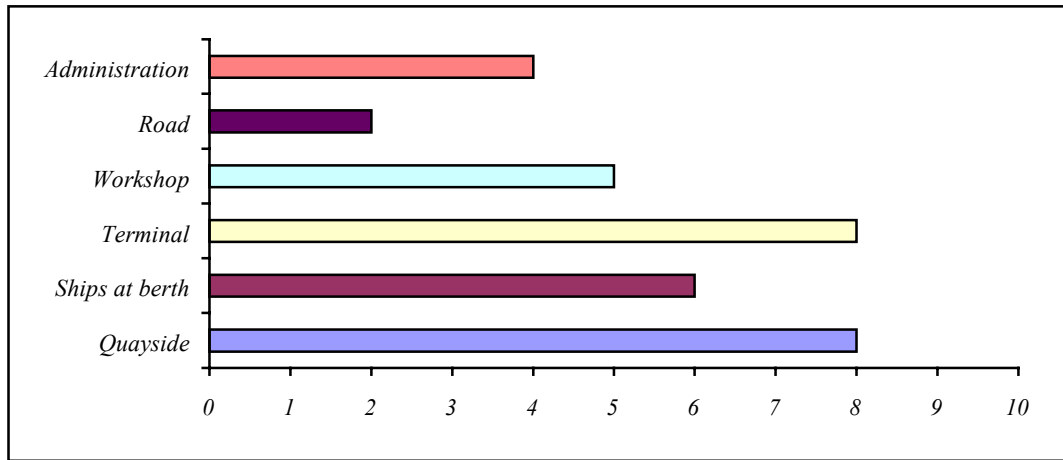
1. Analysis of the replies revealed that 60% of the respondents were in possession of a published emergency response plan for their port area. This left 40% who did not have a published plan but they do have some response capabilities in an event of emergency.

Table 3.1: Published Emergency Plan



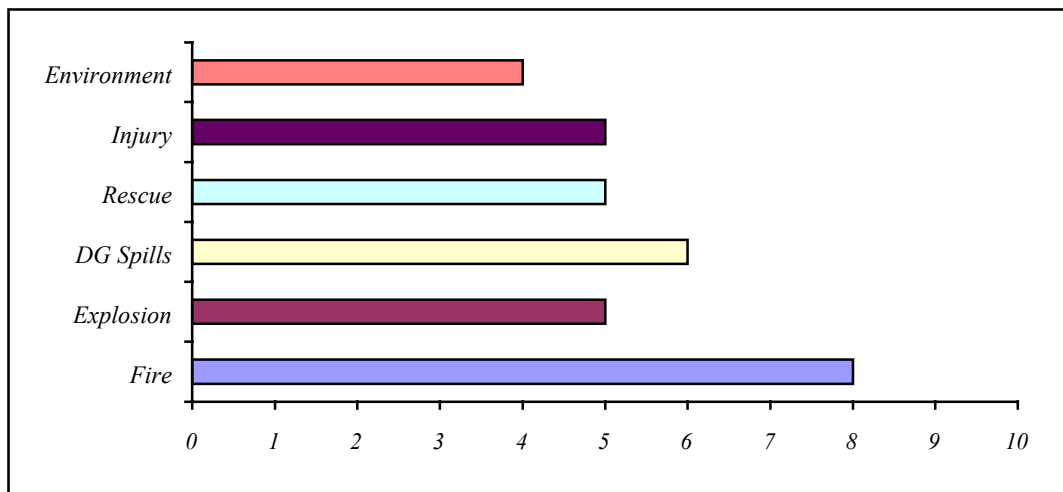
2. Out of the 10 respondents, 80% of the organisations conduct emergency response drill once in 2 years and 20% conducts it on a yearly basis.
3. Respondents indicate the areas within the port for which they are capable of responding to an emergency. 80% of respondents are well versed with the terminal and quayside operations area.

Table 3.2: Areas of Incidents



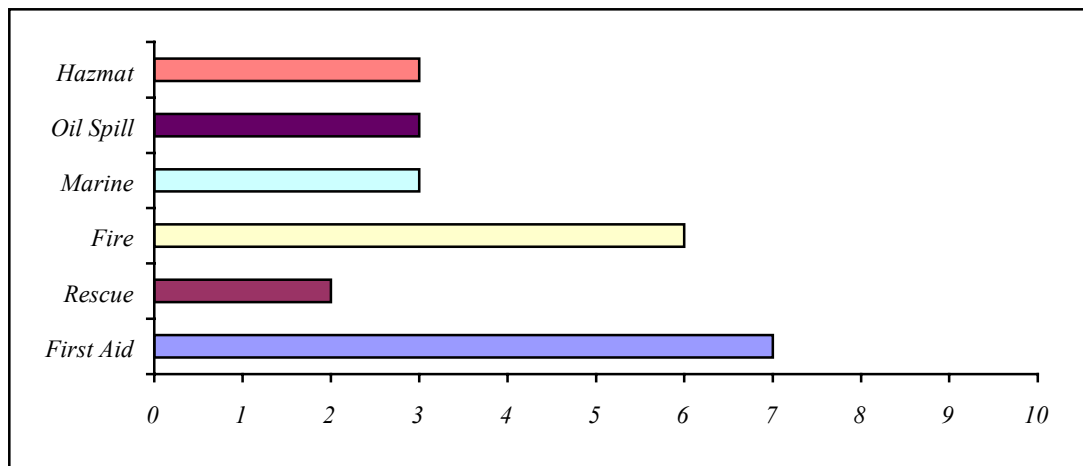
4. Respondents indicated the types of incidents that they are capable to response in the port area. 80% of respondents are well equipped for fire emergencies.

Table 3.3: Types of Incidents



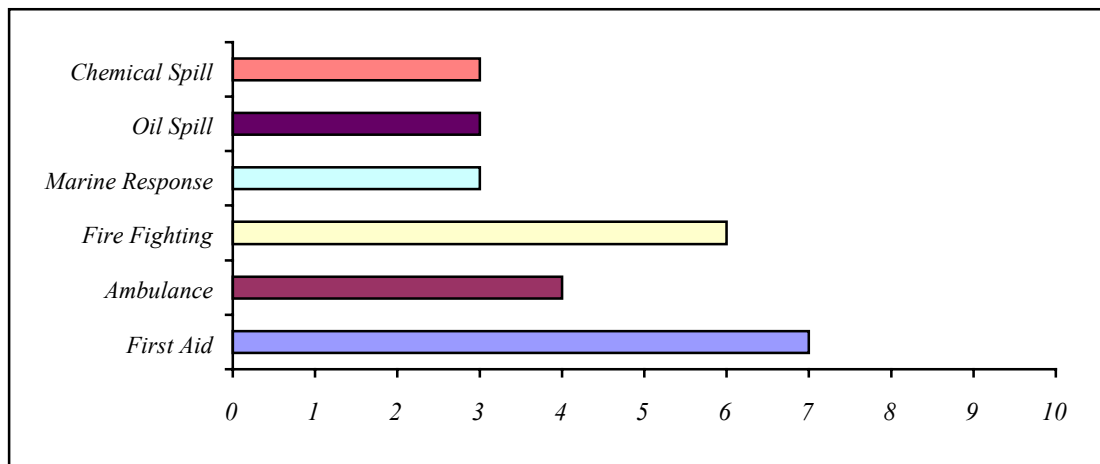
5. 20% of respondents say that their plan cater for extreme wind and heat conditions.
6. 80% of the respondents says that the Harbour Master is responsible for developing and updating the plan for their port area. 20% done by the Safety Officer and it was noted that they are from the private terminal operators.
7. 80% of the respondents reviews the plan once in 2 years and the rest yearly.
8. About 80% of the respondents carry out training for fire and first aid. Others areas on training carried out for port personnel on emergency response.

Table 3.4: Area of Training



9. Emergency response equipment owned and managed by the port on certain types of emergencies as shown. Noted that 70% of respondents have their own first aid equipment.

Table 3.5: Equipment owned by the port

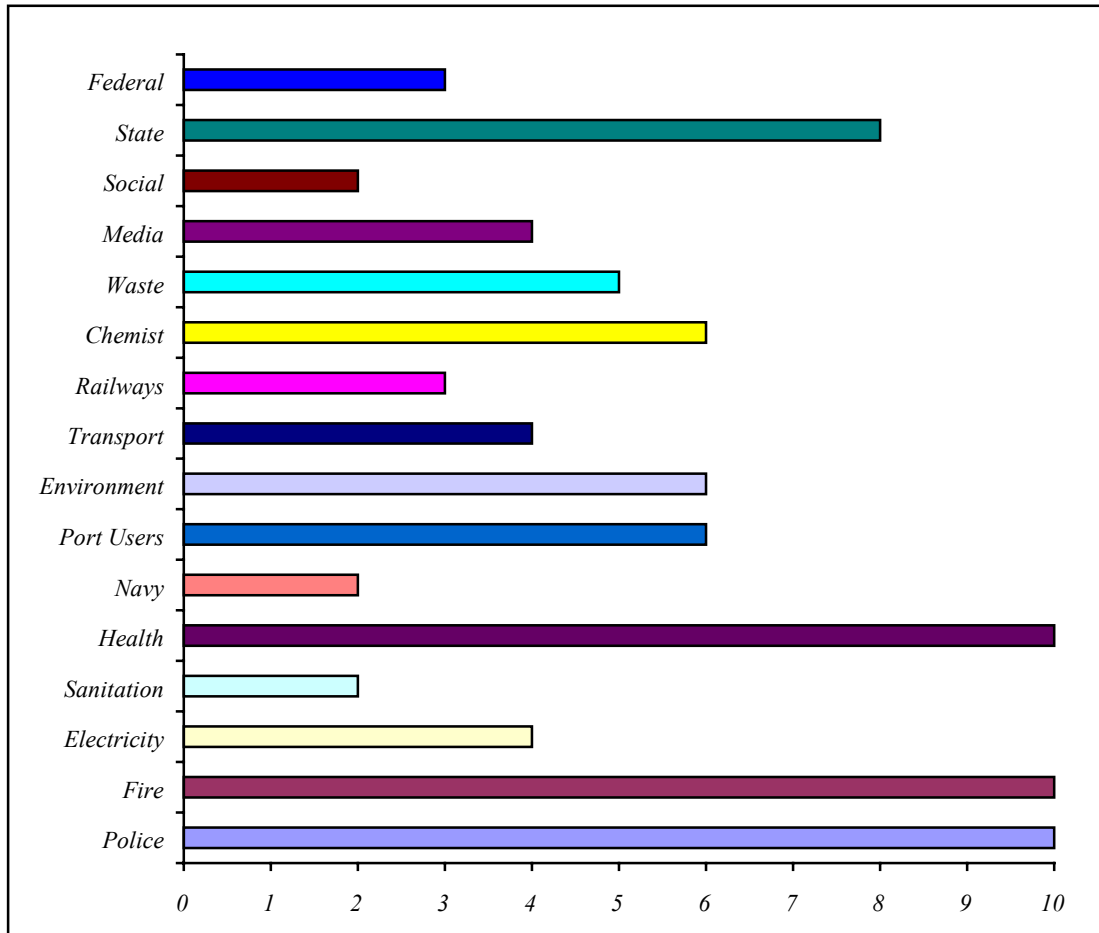


10. 60% believe that their port is effectively prepared and the remaining 40% do not know the level of preparedness.

11. 60% of the respondents were sure that their port is about 70% prepared to deal with any potential eventualities with emergency occurrence.

12. All respondents indicate that a joint effort is required from other agencies concerning the overall preparedness and response for any potential eventualities. All the 10 respondents work closely with the police, fire, and health department in an emergency.

Table 3.6: Agencies / Department involved in an emergency



3.4 Duty of Care

“Each port authority shall prepare an emergency plan to institute counter measures within its port area” (Port of Seattle, 1998)

Majority of the ports in Malaysia are currently in the process of implementing a proper emergency response system. From the survey, the Harbour Master is the person responsible in many ports in Malaysia for developing the response plan. It is worth noting that every facility within a port area is in someone’s jurisdiction or municipality. Awareness of the responsibility associated with a “duty of care” does exist within this community and the port authorities need to fulfil that obligation.

Increase urbanisation and global human activities has meant that the amount of damages being experienced by communities around a port area, from both natural and technological hazards is increasing steadily. This indicates the importance of counter measures by minimising the risk of hazards occurring and the consequences when they do occur. Port authorities as a regulator are under increasing pressure to produce emergency management plans to accommodate any incident that may occur within their area of jurisdiction.

With the pressure within a commercial port, emergency planning is one of those tasks which could be easily be put aside due to other priorities. Every organisation which has an involvement with ships and the sea need to have some arrangement which they can implement in the event of an emergency occurring. To a small marina harbour, this may be a plan to accommodate a fire on a pleasure craft while refuelling. A major commercial port needs to assess carefully the various types of incident that could occur. This could vary from a minor accident to a stevedore to a major incident where a gas tanker has exploded. There are numerous emergency incidents that could occur in a commercial port and thus the need to an emergency management system is vital. Emergency plans need to be prepared, integrated and promulgated to ensure legal responsibilities are complied with. Thus, the role of a port authority is to establish a system of managing emergency and potential hazards. It should be remember that many of the major accidents have occurred through a chain reaction and Murphy's law on the 'million to one chance' is going to happen at some time. (*Sullivan, 1995*) This implies that the port authority should be prepared for such incident that may occur. Therefore, the commitment of a port authority to developing emergency preparedness plan would address:

- a) The safety and security of the port employees, customers, visitors and member of the community.
- b) The protection of the environment.
- c) The protection of property.

- d) The orderly continuation of the mission of the port.
- e) The safe and orderly continuation of the business and their customers.

It must be recognised that it is virtually impossible to develop a plan, or a set of plans that will foresee and address all future emergency occurrences. In the dynamics of a major emergency, factors beyond the control of the port authority may limit the ability to provide a totally effective response. Following such major incident and for continual improvement on emergency preparedness, there should be a comprehensive review of policies and procedures to determine how similar situation can be handled more effectively in the future.

3.5 Economic Impacts of Accident on the Port Industry

The presence of significant commercial shipping activities within Malaysia and port based industries presents obvious risks to human safety and the environment. The range of hazards is diverse, and there are a series of specific needs for emergency plans to provide an effective response. Malaysian ports do play a critical role, as an economic catalyst to the country that creates high-paying jobs that otherwise would not exist.

The economic impact due to an accident in a commercial port are mainly a measure of cost that can be categorised as direct cost and indirect cost. In an event of emergency, the direct cost relate to the capital cost of assets, including infrastructure and inventories of finished, intermediate and raw materials, destroyed or damaged on actual impact of an emergency. In general, direct costs are those costs that are easily attributable to an accident which commonly include property and equipment damage, worker's compensation payments resulting from injuries, cleanup costs, lost income resulting from operating delays and interruptions.

Indirect cost refers to damage to the flow of services. They include lower output from damaged or destroyed assets and infrastructure, loss of income due to damage

of facilities, sheds and quays and the cost associated with the necessary utilisation of more expensive inputs following the destruction of normal sources of port services. Indirect cost are more difficult to measure but never the less they are real cost which contributes to productivity losses, costs of management and clerical time to investigate accidents and process information, absenteeism, impacts on public image and employee morale.

In practice, due to the difficulties in analysing economy-wide flow impacts, most assessments of emergency concentrate on the more easily quantifiable direct losses. These components can be divided into technological considerations and those that address human factor. A report by *U.S. Coast Guard 1998 - Prevention through People (PTP)* states that 80% of accidents are caused by human error at a work place and cost saving in an accident can be attributed to people-oriented program such as improved training on personnel. Each year, U.S. maritime related accidents cost the port industry over 1.1 billion dollars in lost lives, injuries and environmental damage. These costs offer absolutely no return on investment.

There is a need to understand the human element in maritime related accidents as *Ferry, (1988, page 5)* states that every accident, no matter how minor is a failure of organisation. Taking an active approach to safety saves lives, prevents injuries and protects the environment, offering the added benefit of cost savings and increased port competitiveness. As stated by the Norwegian Classification Society - "Safety pays for itself many times over" (*DNV - Det Norske Veritas, 1998*)

It has been said that the easiest way to make money is stop losing it, as the opportunities are clear. The immeasurable cost of a human life, damage to the environment, and public safety concerns dramatically raise the overall cost of an accident. Many financial factors of accidents are not even realised. Investing in safety measures to prevent and being prepared to respond to an accident that leads to an emergency makes sense. Safety is everyone's concern. A safety-oriented port

industry requires strong management commitment and employees involvement. Taking action to prevent accidents is the key to creating and maintaining a successful, safe workplace. Thus being prepared to respond in an emergency is the right thing to do for the employees, the environment, and the port industry's future.

3.6 *Role of the Port Authority in an emergency*

“The empowerment of port authorities to respond to an emergency within the limits of their own resources” (AAPA, 1997)

Emergency requires that some agencies and officials assume responsibilities, make decisions and are seen as legitimate. Naturally, if the exercise of port authority is weak during non-stressful periods, it will prove even weaker when an emergency strikes. If a port authority is weak in the first place, as the author thinks it is true, for many ports in Malaysia, it can completely disappear when an emergency strikes. However, even if we assume that the exercise of authority among agencies and officials during periods of normalcy are operating within a community, there will be problems during the emergency phases. The difficulties that surface, however are often not those commonly anticipated thus, the chain of command and lines of authority do not break down in well-established organisation. If inadequate communication does exist during an emergency, officials usually continue to exercise their formal authority and fulfil their normal duties and responsibilities when a clear-cut emergency that requires an immediate organisational decision or response.

3.7 *The Philosophy of Emergency Management*

There is not and could not be a single organisation solely and totally responsible for dealing with all aspects of emergencies. Emergencies touches people's experience in many different ways. The port authority's management task is to bring together in an integrated organisational network the resources of the many agencies and

organisations who can take appropriate and timely action. The Integrated Emergency Planning will minimise duplication in the preparation and use of emergency response plans at the port area and will improve economic efficiency for both the regulated and regulating authorities.

"...most [emergency management] is oriented toward increasing the centralisation of authority and the formulisation of procedures. In other words, co-ordination by plan is considered normative. This mode of co-ordination is seen as most appropriate, since a military model of organisational functioning in emergency is assumed to be most effective in such circumstances." (Dynes and Aguirre 1979)

Port community expenditures for the preparation, maintenance, submission, and update of an integrated emergency plan should be much lower than for multiple varied plans. The use of an integrated emergency response plan within a port will eliminate confusion for first responders who often must decide which of their plans is applicable to a particular emergency. The guidance is designed to yield a highly functional plan for use in varied emergencies while providing a mechanism for complying with multiple agency requirements. Therefore, the use of a single integrated plan should also improve co-ordination between port response personnel and port authority, state, and federal emergency response personnel.

3.8 Port Emergency Management Policy

A port area is very vulnerable to both natural and technological hazards. Natural hazards may include events such as earthquakes, severe weather and volcanic activity. Technological (man-made) incidents may include hazardous material spills, transportation accidents, bomb threats, explosion and fires. The port's first response to these possibilities is the development of a comprehensive and integrated emergency response. This plan describes the port policies to which the senior management and emergency response team will refer at the occurrence of a broad-based emergency. For the purpose of these emergency-operating procedures, an

emergency is characterised as an unforeseen or unexpected combination of circumstances that call for immediate and extraordinary actions.

The port authorities in Malaysia are mandated to establish policies and oversee all matters of operation encompassing every organisation within their port. However, as an emergency may occur at any time and, in all likelihood, without warning, it is prudent to have policies and procedures in place to assure an orderly operation and recovery. It is fundamental to effective emergency preparedness that everything that can be practically done to minimise the likely effects of an emergency be accomplished before the emergency occurs. This would include building and facilities construction, storage planning and practices, developing policies and procedures, the education of port personnel of appropriate actions during and following an emergency, and the training of critical port personnel for effective emergency response management. While it is expected that established policies and procedures will be adhered to, the responsibility for making decisions ultimately falls upon the port authority. For this reason, a hierarchy of incident command and emergency management system is recommended and to be established within a port area.

3.9 The need for planning in Emergency Management

Thus, the adoption of a standard plan should facilitate integration of plans within a port area, in the event that large facilities may need to prepare separate plans for distinct operating units. In this context, the term "facility" is meant to have a wide connotation and may include, but is not limited to, any mobile or fixed onshore or offshore building, structure, installation, terminals, equipment, pipe, or pipeline. Facility hazards need to be addressed in a comprehensive and co-ordinated manner. This concept should also allow co-ordination of facility plans with plans that are maintained by the port authority. In some cases, there are specific regulatory requirements to ensure that facility plans are consistent with external planning efforts. This will improve the level of emergency preparedness and in some areas, it

may be possible to go beyond simple co-ordination of plans and actually integrate certain information from facility plans with corresponding areas of external plans. The adoption of a single, common integrated emergency plan outline such as the one proposed in this study would facilitate a move toward integration of facility plans with local, state, and federal plans. The projected results described above will ultimately serve the mutual goal of the response community to more efficiently and effectively protect public health, worker safety, the environment, and property. Accordingly, this allows facilities to address a wide range of risks in a manner tailored to the specific needs of the facility. This includes both physical and chemical hazards associated with events such as chemical releases, oil spills, fires, explosions, and natural disasters.

“...give a man a fish and you feed him for a day, teach a man to fish and you feed him for lifetime.” (Chinese Proverb)

This proverb and the philosophy, which reflects the key to achieving meaningful emergency management plans. It was recognised that there existed a clear need to show people how to plan. For many years, the port organisations in Malaysia had been reminded of their responsibilities for emergency planning. The port authority kept telling them what they had to do, but no one was showing them how to do it. The first response based on local knowledge and resources is often the most critical factor in the effective management of an emergency. Therefore, Chapter III discusses the urgent priority to show the port community on ‘why an emergency plan is needed’ with an emphasis that any emergency starts in someone’s local community.

3.10 Co-Operative Efforts between Port Organizations

Emergency management usually calls for the co-operative efforts of the authority and a broad range of community agencies (*Comfort, 1990*). Typically, police, fire, search and rescue teams, ambulance and health facilities work together, but other support

services may be called upon to assist as required by circumstances. These may include utilities, sewerage, sanitation or commercial companies and industrial manufacturers. Local, state and even wider government structures are needed if the emergency is of a significant dimension. Frequently, welfare and health services, as well as community volunteers are called upon to help. In later rehabilitation and reconstruction, other sectors of the community like financial and insurance institutions or construction companies, may all be needed. Taken together, it is clear that a substantial number of diverse organisations are likely to be active in the various phases of emergency response. The overall objective of emergency planning is to contain and control emergency incidents, to safeguard people in port and neighbouring areas and to mitigate the effects in order to minimise damage to property and the environment.

3.11 Inter-Organizational relationships within a port community

A classic research on community organisations noted that competition and rivalry frequently mark democratic community life over public attention and available resources. This competition is usually subtle and hidden from public view but tends to surface when there are conflicts over domain (*Mulford, 1984*). Even when all organisations are skilled at what they are called upon to do co-ordinating their efforts is one of the most troublesome aspects of emergency management. Rivalry is not foreign to emergency services, where response agencies are under great pressure to prove themselves and in many communities, resources for emergency response are particularly short (*Yamamoto, 1981*).

Achievement of genuine co-operation among emergency responders must not be taken for granted by planners and cannot be overemphasised. Comfort (*1990*) pointed out that, "Conflict among organisations seeking to respond to the sudden, extraordinary demands generated by an emergency is a recurring and well-recognised problem." Although efficient rescue depends on co-ordination, Comfort (*1990*) observed that disrupted communication, differing priorities, inconsistent

procedures and contradictory observations generated delays in emergency response which leads to high levels of anxiety and depression.

Many difficulties arise from the co-ordination of emergency management, though it is easily said than done. The port authority should evaluate these problems and be prepared in an event of an emergency. Quarantelli (1982) called attention to three particular difficulties in co-ordinating emergency response:

- a) Public and private interest in an emergency has diverse perspectives;
- b) Co-ordination in an emergency is qualitatively different from day to day;
- c) Co-ordination can have a different implication to different organisations and even various departments of the same organisation, leading to considerable conflict over emergency roles and domains.

3.12 Basic Concept of Emergency Management System

Emergency management is a comprehensive system set up by most major industrial sectors in the world with the involvement of government, private agencies, private organisations and individuals to address natural and man-made hazards (Martin, 1992). It has four essential programs:

- a) Prevention – to prevent or mitigate the effects of emergencies and include measures such as regulations, zoning, public education, legislation, and tax and insurance incentives.
- b) Preparedness – to ensure that individuals and organisations will be ready to react effectively once emergencies have occurred and include measures such as emergency plans, mutual aid agreements, resource inventories, warning procedures, training exercise and communication.

- c) Response – to combat emergencies when they have occurred and include measures such as the implementation of emergency plans, activation of emergency operations centres, mobilisation of resources, issuance of warning and directions, provision of medical and social assistance, and declaration of emergencies as enabled by appropriate legislation.

- d) Recovery – to help restore the environment or port community to their pre-emergency condition and include measures such as physical restoration or reconstruction, economic impact studies, counselling, financial assistance programs, health and safety information.

A variety of these programs do not fully exist in Malaysia, but are currently being realised and undergoing examination with a view to integrating them into an overall emergency management system.

CHAPTER IV

Achieving Awareness & Preparedness for Emergency Response in Malaysian Ports

The goal of emergency awareness and preparedness in Malaysian ports is to promote business continuity, improve safety, minimise impact and assist in a speedy recovery of port operations. Preparedness is the thrust of a port authority. Planning for an emergency should be aimed at ensuring that the port personnel, facilities and business activities are prepared to meet emergency conditions. The emphasis in planning is to minimise potential for injury to employees/customers, evaluate hazards (identify, evaluate, review), reduce hazards, reduce expenses caused by loss and liability, put tested procedures and equipment in place and plan for business resumption immediately following an emergency.

“...the port authority must prepare emergency plans for response to and recovery from emergencies within its area of jurisdiction.” (AAPA - Environment Management Guidelines, 1998)

The reason for emergency awareness and preparedness is simply that it saves lives and saves money. The aim of a Port Emergency Plan is to reduce the risk of life and health the port personnel may face, and to reduce the damage to property and environment that often results from an emergency. It does this by allowing the port authority and other organisations in the port community to prepare calmly and realistically for likely emergencies. It allows locating the resources and the equipment that will be needed, to inform their personnel of the dangers and the ways to avoid them and to quickly arrange help when help is needed. Obviously, it is far

easier to do all this before an emergency strikes than during the confusion that normally accompanies quickly expanding and disastrous events.

4.1 Difference between Planning and Prevention

Prevention can reduce the risk of an emergency occurring. Planning can reduce the seriousness of the consequences. If the Titanic had been designed and built to withstand icebergs, it would not have sunk. That is prevention. If it had carried more lifeboats and conducted better lifeboat drills, lives would have been saved when it sank anyway. That is planning.

Some emergencies in a port area such as collision, chemical spills, train derailment and road accidents can be prevented if the right kinds of preventive measures are in place, if people are properly trained to follow them and if the safety rules are followed. Others like floods, blizzards, earthquakes and other Acts of God cannot be prevented and the consequences are usually serious. This will result to loss of life, injured or homeless people, and damage to property, damage to local economy and serious harm to the community's social and political organisations. Proper planning therefore would reduce the impact of both "person-caused" and natural emergencies and help the port community to recover faster. It will also help the port authority to avoid the mistakes that are often made when an emergency strikes.

The need to plan for an emergency is closely connected to the perception of risk. It is just not the perception that a risk exists but that it involves real and personal danger. It has a high probability of happening and it is imminent that it could occur tomorrow rather than some time in the infinite future. The emergencies that a port authority may likely to face can be sudden or instantaneous, such as fire or explosion. For example, an estimate made by *Canadian Emergency Planning Guide (1996)* says that 35% of all freight trains and 10% trucks carry hazardous material into a port area. This means if the port area straddles a major highway or rail line where hazardous materials are regularly transported, your port employees probably

believe there is a reasonable likelihood of a serious spill and with good reason of this occurring.

4.2 Murphy's Law of Emergencies

Good emergency planning almost always leads to the unpleasant realisation that the next emergency is almost certainly going to be worse than the last, a sort of Murphy's Law of increasing impact. A corollary of this grim proposition is that emergencies are almost certainly going to be more frequent in the future than they were in the past. Undoubtedly emergency planning helps port authorities anticipate problems and possible solutions. You will not be able to anticipate every contingency but you will be able to develop appropriate responses for a wide range of occurrences. Those responses will enable the port authority to react faster and more effectively especially during the critical early hours of an emergency. Simply knowing who should go where and who does what will help save lives and property, reduce damage and speed the port recovery. Many smaller port organisations act as though the risk of an emergency actually occurring is so remote that it is pointless to plan. A more realistic view is that smaller port organisations are more at risk from an emergency, simply because they have fewer resources and because their emergency services are likely to have less experience in dealing with unexpected events than similar services in a big organisation. Emergencies can occur in any organisations within the port community of any size.

4.3 The need for emergency planning

Local agencies such as police, fire, emergency health services are usually the first responders to an emergency and the port authority will be required to put their emergency preparedness measures into action ahead of any other organisation. The initial response is critical in an emergency and it is the local response that makes it. Therefore, the port authority has to prepare the emergency plan and to execute it

within the port community of various organisations. This does not mean that the port authority will be required to do everything alone.

The port authority is the first on the scene but not the last. The emergency plan should include provision for the sharing of resources and mutual assistance with other emergency agencies. It is recommended that an integrated emergency management system be developed within the port organisations forming a community. A system for responding to various emergencies that provides automatic notification to the local authority's Emergency Operation Centre (EOC) should be exercised and this is recommended in this study that such a system be implemented within Malaysian ports.

Such a system will be able to assist in co-ordinating support and resources to help the port deal with the incident. The EOC will co-ordinate the response of other agencies and of the government, if necessary. Thus, a network of emergency plans within the port community is required in order to promote awareness of the system that is existing and the emergency planning arrangements.

A trend towards emergency planning has to be developed in parallel with the growth in hazardous industry and commercial activities. Whilst the port area and nearby coastline are location of perhaps the majority of hazardous sites, the system would require to deal with most threats. The important issue concerning emergency planning is to ensure that effective plans for all foreseeable incidents are maintained and exercised.

4.3.1 Regulatory Plans

Planning falls into two categories:

- a) Plans required by regulations and
- b) Internal planning to improve response.

Plans required by regulation include the requirements of Malaysian Environmental Quality Act (*EQA, 1974*), Port (Safety of Workers) Rules (1985) and Occupational Safety and Health Act (OSHA). A well-prepared emergency response plan should adhere to these regulations. OSHA regulations require the port industry to cover certain essential elements in the emergency response plan that include:

- ✓ *Pre-emergency planning,*
- ✓ *Personnel roles, lines of authority and communication,*
- ✓ *Emergency recognition and prevention,*
- ✓ *Safe distance and places of refuge,*
- ✓ *Site security and control,*
- ✓ *Evacuation routes and procedures,*
- ✓ *Decontamination procedures,*
- ✓ *Emergency medical treatment and first aid,*
- ✓ *Emergency alerting and response procedures,*
- ✓ *Critiques of response and follow-up,*
- ✓ *Personal protective and emergency equipment,*
- ✓ *Site topography, layout and prevailing weather conditions,*
- ✓ *Procedures for reporting incidents to local, state and federal governmental agencies.*

4.3.2 Internal Plans

Internal planning should focus on improving the emergency response of the port. These plans should be brief and easy to use. A checklist format is often best. All employees must understand their role and the actions they must take when discovering an incident. Standard Operating Procedures (SOP) should be developed for activities that remain similar on any incident. For examples, a SOP regarding the selection and use of personal protective clothing and equipment will help the port personnel for better awareness.

4.4 APELL - Awareness and Preparedness for Emergencies at Local Level

Following various industrial accidents in both highly industrialised and industrialising countries, in 1988, UNEP in co-operation with governments and industry established APELL - Awareness and Preparedness for Emergencies at Local Level. APELL seeks to prevent industrial accidents and their impacts by assisting decision-makers and technical personnel to increase community awareness of hazardous installations and to prepare response plans in case unexpected events at these installations should endanger life, property or the environment. The Programme received the support of UNCED, and Agenda 21 called for it to be strengthened.

While the world marked the tenth anniversary of the chemical accident at Bhopal, 80 experts from 37 countries gathered at APELL's fourth biennial senior-level meeting to evaluate the results achieved by the programme. While participants reported significant progress in the world-wide implementation of APELL, they also identified the lack of institutional support mechanisms as one of the prime difficulties still to be overcome. It was agreed that awareness of accident prevention amongst top industry and government officials as well as the public must be enhanced.

4.4.1 APELL in Ports

Many have now recognised the need to extend and adapt the use of APELL to fields such as transport and ports. In 1994, APELL continued its co-operation on ports with the International Maritime Organisation. APELL also joined with REMPEC to organise a joint workshop in Barcelona on the implementation of APELL in Mediterranean ports. The expert group reviewed the 1995/1997 work programme and called for particular efforts in the field of chemical transportation; accident prevention in port areas; hazard identification and evaluation; and land-use planning to prevent the siting of hazardous installations in densely populated areas. With

current trends in population growth and industrialisation, waste and pollutants are released faster than the earth can absorb them, and natural resources are consumed faster than they can be restored. Production processes, products and services must be reoriented to new patterns if we are to alleviate environmental stress, bring better industrial productivity, and achieve sustainable development. This is the goal of the Cleaner Production Programme (CP), established in 1989 and strongly endorsed in Chapters 20 and 30 of Agenda 21.

4.4.2 APELL Guidelines on Achieving Preparedness for Emergencies

APELL is an ongoing process designed to become a self-sustaining local programme "owned" by the people within the community. The process is designed to improve the emergency response preparedness of local community, i.e. Port Community. It is based on the concept that a well-informed local community can develop an effective response plan co-ordinating local industry, authorities and other interested groups on a local, regional or national level. As stated in APELL (*Chapter 5 - Achieving Preparedness for Emergencies*), the 10 steps to address in an emergency preparedness planning are:

- ✓ *Identify local agencies making up the community's potential local awareness and response preparedness network.*
- ✓ *Identify the hazards that may produce an emergency.*
- ✓ *Establish the status of community planning and co-ordination for hazardous materials emergency preparedness and assuring that potential overlaps in planning are avoided.*
- ✓ *Identify the specific community points of contact and their responsibilities in an emergency.*
- ✓ *List the kinds of equipment that are available at the local level to respond to emergencies.*
- ✓ *Identify organisational structure for handling emergencies.*

- ✓ *Check if the community has specialised emergency response teams to respond to hazardous materials releases.*
- ✓ *Define the community emergency transportation network.*
- ✓ *Establish the community procedures for protecting citizens during emergencies.*
- ✓ *Set up a mechanism that enables responders to exchange information or ideas during an emergency with other entities.*

Though APELL project are currently being introduced in Malaysia, many industrial organisations still do not realise the benefits that is achievable from this implementation. Significantly in the port industry, efforts in achieving awareness and preparedness to emergency are undertaken. Regulatory authorities are to enhance the usefulness and the effective way of integrating emergency response plan within the port community in Malaysia.

4.5 Oil Pollution Preparedness, Response and Co-operation - OPRC (1990)

"...the purpose of the emergency plans is to provide direction and guidance to those involved in responding to an emergency incident and to set in motion all the necessary actions to stop or minimise the impact on casualty and to reduce its effect on the environment." (OPRC Guidelines, 1990)

The development of an emergency plan should be seen as a continual process by the Port Authority and the user organisations on which it highlights the planning required before an incident and the actions required in event of emergency occurrence. It should be an ongoing process that reviews and updates any deficiencies in its ability to respond and requires exercising, the process is shown in the figure below.

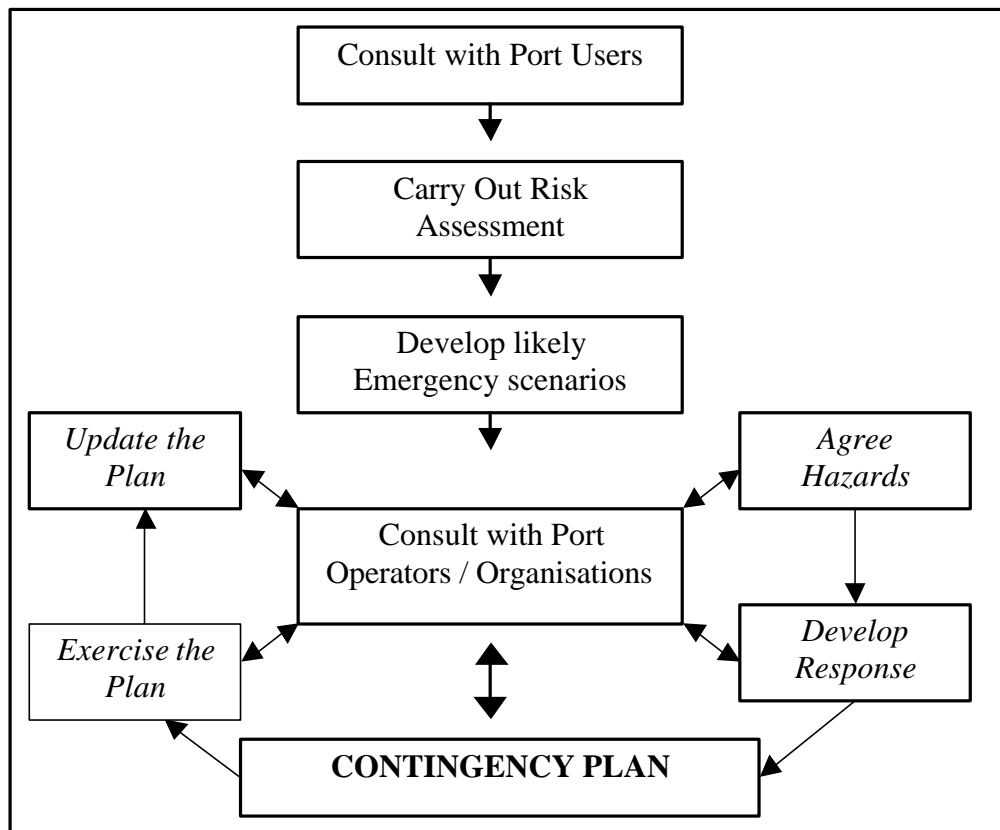


Figure 4.1: Contingency planning is a continual process (OPRC Model)

It is not possible to produce a standard plan to respond and thus each plan must be customised to suit the area for which it has been produced. The OPRC guidelines states that the essential elements for an effective emergency plan shall include the following:

- ✓ *Establish the community procedures for protecting citizens during emergencies.*
- ✓ *Responsible Authority and boundary of plan's operation.*
- ✓ *Command and Control arrangements.*
- ✓ *Notification procedures.*
- ✓ *Communication plan.*
- ✓ *Evidence of adequate risk assessment.*
- ✓ *Details of local sensitivities including environmental sensitivities.*
- ✓ *Pre-agreed response strategies.*

- ✓ *Detailed actions for individual during an incident.*
- ✓ *Health and safety aspects.*
- ✓ *Response capability listing (personnel and equipment).*
- ✓ *Contact directory.*
- ✓ *Interface with other local emergency plans.*
- ✓ *Training and exercise programme.*
- ✓ *System of updating and revision.*

4.6 Observation of Emergency Planning Procedures in European ports.

During the field trip to most European ports, it has been observed that an emergency plan is not a written document that is produced once and forgotten forever. Planning within the port area demands foresight and imagination in foreseeing the hazards and knowing the risks the community realistically, faces and the counter measures that might help overcome these situations. Then it requires a plan to train all of the potential personnel, so everyone knows what they are supposed to do. It requires testing, to be sure that the proposed counter-measures actually work. It will require revision to correct the deficiencies the test revealed. Then it will probably require additional training for the personnel, re-testing of the revised plan and further revisions.

Most industrial organisations in Malaysia already have a fire or evacuation plan for their facilities. This is obligatory under the Building Act and the Health and Safety in Employment Act. The issues to be considered on a suggested plan outline are:

- a) Are you organised for Emergency Planning?
- b) How vulnerable are you to damage, injury and business loss?
- c) What can be done to reduce risks?
- d) What will organisation do when an emergency strikes?
- e) How soon will your organisation be able to resume business?

Table 4.1: Emergency Planning Checklist

<i>Written Plan</i>	<i>CHECK LIST</i>
Introduction	<ul style="list-style-type: none"> ✓ <i>Purpose of Plan</i> ✓ <i>Objective of Plan</i> ✓ <i>Company Policies</i> ✓ <i>Emergency Preparedness Summary</i>
Risk Assessment	<ul style="list-style-type: none"> ✓ <i>Types of Hazards</i> ✓ <i>Degree of Risk / Exposure</i>
Emergency Preparedness	<ul style="list-style-type: none"> ✓ <i>Organisation</i> ✓ <i>Mitigation and elimination of hazards</i> ✓ <i>Utilities, records & essential services</i> ✓ <i>Employee awareness, training & procedures</i>
During an Emergency	<ul style="list-style-type: none"> ✓ <i>Response</i> ✓ <i>Life saving actions</i> ✓ <i>Damage Assessment</i> ✓ <i>Notification & Mutual Aid</i> ✓ <i>Utilities</i>
Business Recovery	<ul style="list-style-type: none"> ✓ <i>Prioritisation of tasks</i> ✓ <i>Staff availability, facility assessment & security</i> ✓ <i>Staffing call back scheme</i> ✓ <i>Data systems & Communication</i>

A plan is only a hard copy part of what should be a broader total program of preparedness. It should be aimed at ensuring staff awareness about the possibilities of an emergency occurring, and about the organisational approaches to anticipating and responding to such an emergency. The overall objective in managing emergency operations is to ensure effective and efficient response to emergencies resulting from natural or technological disasters. Specifically this will include:

- a) Policy direction of emergency operations.
- b) Overall management and co-ordination of emergency operations.
- c) Co-ordination of request for assistance and allocation of resources and support.
- d) Establishment of priorities and resolution of conflicting demands for support.
- e) Co-ordination, direction and distribution of emergency public.

- f) Collection, evaluation and distribution of damage reports and other essential information for internal use, as well as for the wider emergency response action.

The author considers that undue reliance on Emergency Services may be unrealistic, as they will be committed to essential life-saving tasks. For example, you will probably need to be self reliant for a minimum of 72 hours after a major earthquake in the case of Port of Kobe. There is likelihood that essential lifeline such as roads, bridges, transit systems, telephones and power could be severely disrupted during a major disaster such as an earthquake. Therefore, the continuity of management must recognise and plan for disruption of normal lines of authority.

Emergency preparedness will probably not become the port's full time occupation, although many port authorities do have a full-time emergency planning co-ordinator who is responsible for developing the emergency plan, planning training exercises and making revisions to the plan as necessary. Other port authorities may assign a civic employee, perhaps the police, the fire department or public works to work on emergency planning either full or part time. In some cases a consultant may be hired for a specific period especially when the plan is first established. Whether or not Malaysian port community takes any of those steps, it is important to realise that emergency planning is a process, not a product. Planning is not a spasmodic activity and it can not be regarded as something we do once and never do it again. Every emergency is different but every one shares some common characteristics:

- a) it involves some unusual abnormalities and very often unexpected situation;
- b) the situation has the risk of harm to health and safety or the potential for damage to property;
- c) reducing that risk requires a prompt response from port authorities;
- d) That response will involve extraordinary procedures and actions from other agencies.

Similarly every emergency plan is different but all of them have some common features that it should:

- a) Contain some system for notifying the officials and agencies who must respond;
- b) Describe emergency operation procedures;
- c) Describe the structure of the organisation which will deal with the emergency;
- d) Describe the line of communication system;
- e) Assign responsibilities for various aspects of the emergency response;
- f) Produce a resource list for finding information, contacts and equipment;
- g) Have some provision for dealing with the media and notifying the public.

4.7 Steps to Effective Emergency Planning

The process of developing an effective emergency plan begins and ends with the port authority. The port authority must support the idea of emergency planning, provide funding for it, and appoint the members of the emergency planning committee, who is committed and will initiate the process. There is no such thing as perfect foresight and no emergency plan drafted without divine assistance that can predict every eventuality. The purpose of the planning process is to produce a realistic assessment of the hazards the port industry faces and develop a program for emergency responses that will deal with those hazards. Those same emergency responses will also enable the port authority to deal effectively with other hazards that has not been anticipated. Thus from the research and knowledge gained from APELL, OPRC (1990) and Canadian Emergency Planning Guide (1996), the author summarises the following steps to the process of developing an effective emergency plan for Malaysian ports.

4.7.1 The port authority must pass a by-law

The port authority must pass a by-law authorising the development of an emergency plan. This by-law should enable the port authority to appoint an emergency planning

committee and to allocate of financial support for expenses incurred during emergency conditions. The by-law provides the legal basis for the establishment of the emergency plans and support for effective planning within the port communities in Malaysia.

4.7.2 Appoint an Executive Board

Once the by-law is passed, appoint an Executive Board that will oversee and develop the plan. As well, they may negotiate a mutual aid agreement with neighbouring communities to share resources during an emergency.

4.7.3 Appoint an Emergency Co-ordinator

Ideally, the Emergency Co-ordinator should be a full time employee who possesses sound knowledge of the port community's resource facilities and agencies. The co-ordinator's duties are to:

- a) Co-ordinate and advice upon the emergency plans created by the various departments and port organisations.
- b) Prepare an estimate of expenses required to operate and maintain the emergency program.
- c) Co-ordinate training programs exercise and prepare information forums.
- d) Make recommendations on the effectiveness of the emergency program to the Executive Board.
- e) Develop plans for handling unusual emergency activities (e.g. containing chemical spillage) not normally handled by existing local services.
- f) Co-ordinate with municipal and regional counterparts.
- g) May act as an Incident Commander during the actual event of an emergency.

4.7.4 Appoint an Emergency Planning Committee

Developing an integrated emergency response apparatus is a complex business and cannot be worked out by a single individual. Obviously enough no single individuals will have all of the information required for developing an effective plan. An effective emergency planning will require close co-operation between a number of agencies. It is easier to get that co-operation if those agencies are involved in the process from the beginning. The port authority should appoint the emergency planning committee and it should report to them. It may include a member of the executive board, but also a representative of the police, fire, administration, port community, public works department, emergency social service, communications, search and rescue, emergency health services and ambulance.

The members of the committee should be committed and convinced of the need for emergency planning. They will be the principal supporters of the emergency plan when it is presented to the Executive Board, Municipal Council, Port Community and the public. The committee should be aware of the risk the port industry faces and the benefits of a well thought out emergency response procedure. During an emergency that requires implementation of the emergency plan, the Emergency Operations Centre (EOC) may need to be established. Individuals required to attend the EOC should be heads of the various response and support agencies who are familiar with the port. The members should be of such stature as to have the authority to make policy and decisions relating to the response of the emergency. The establishment of an EOC will depend on the size and nature of the emergency.

4.7.5 Consult the Municipal Emergency Program

The port emergency plan will need to be integrated in the chain of similar plans produced on a municipality, state and federal level. However the port authority has to develop its own emergency plan as they are acquainted with its facilities and resources as well as the local geographic, industrial, meteorological and other

conditions. Thus, the port authority is the best judge of what should be included in the emergency plan. The aim should be to reinforce the preservation of life, protection of property and the environment.

4.7.6 Perform a Hazards Analysis, Risk and Impact Assessment

Performing a hazards analysis, risk and impact assessment that the port community faces is the beginning of emergency preparedness. Without knowing what your community is preparing for, makes planning an impossible and worthless task. The real work of planning process involves assessing the circumstances and facilities of the port community and trying to foresee the probable effects of something going seriously wrong. The process would consist of looking around at the port industries operating in the port and asking... "What would we do if...?"

Typically, this type of analysis and assessment will indicate that some aspects of the emergency plan will require a generalised response that is more or less the same in all circumstances. In addition, there may be a limited number of scenarios in which specialised responses are required, for example the existence of a port industry using hazardous material and the handling systems use in the port for such hazardous cargoes. Every community has hazards and risks that are specific to it; the port authority has to identify and provide the basis for dealing with it. Once the risks are identified, the planning committee must provide a list of actions required combating each effect.

4.7.7 Evaluate Resources

The port emergency plan is only good as that port community's ability to carry it out. The authority knows in theory how it would handle a variety of emergencies. Therefore, the resources to support the task should be identified in the plan. The planning committee would therefore discuss the following items and perform further research where required:

- a) Can you respond to more than one emergency at a time?
- b) Where could you obtain additional people and equipment, if needed?
- c) Could your medical support system handle emergencies?
- d) Have you efficient communications and transportation systems in place?

Emergency preparedness usually does not involve buying new equipment specifically for emergency response purposes; instead, it focuses on making the best use of existing resource. A resource directory should show where such equipment can be obtained and the directory is an essential component of the emergency plan. The resource directory should list everything and everyone likely to need in an emergency and means of reaching them around the clock. This directory is essential and should be checked and up dated at least once every year.

4.7.8 Responsible Person(s) in the Chain of Command

The emergency plan provides a concept of operations and outlines a chain of command and guidelines for implementation, direction and control. It will also lists responsibilities, names, addresses and telephone numbers. The following is required from other agencies integrating the system:

- a) Responsibilities and actions of that agency / departments.
- b) List of available personnel and other resources and how they would be activated during an emergency.
- c) State of duties of all personnel involved.
- d) Outline alerting and assembly instructions.

Further education and training would be required for personnel to feel competent and comfortable with their roles in the plan. Educating the port community, increasing their awareness and enhancing their support is an important element in emergency management. In addition, the emergency plan must include provisions for disseminating information to the public during an emergency and for securing public co-operation.

4.8 Exercise, Learning and Testing the Plan

"Exercises are designed to reveal planning weaknesses, reveal resource gaps, improve co-ordination, clarify roles and responsibilities, improve individual performance, develop enthusiasm, knowledge, skill and willingness to participate in emergencies and gain public recognition of the emergency management program" (Canadian Emergency Planning Guide, 1996)

Exercising the plan is just as important as writing it. An emergency plan is only good if the port community is able to carry it out. Thus, exercising the plan is important. The emergency plan is just a blueprint for the port community's response to a major occurrence and like any blueprint it has to be verified. The port community should develop an exercise program that begins with an orientation of the plan to applicable personnel involved within the plan, to a full-scale "field exercise" in which resources are actually mobilised and deployed. The exercise should test each component of the plan in isolation, as well as co-ordination of the various components including the notification system. It is true that substantial work is needed to properly test an emergency plan but the effort put into handling an exercise incident will be repaid many times over, should the port face the real thing. This will eventually save lives and property in the port.

The port authority should just not sit back and feel secure that if an emergency arises that requires significant response from all agencies; your plan will pull the port community through. Testing of the emergency plan and all personnel involved must be exercised to ensure that the plan has an opportunity to succeed when implemented.

"No plan is complete unless learned and tested" (Port of Seattle, 1998)

As observed in the Port of Rotterdam, frequent exercise activities are designed to promote emergency preparedness; evaluate emergency operations; train personnel in

emergency duties and demonstrate operational capabilities of the sustainability of the port in an emergency. Exercises consist of the performance of duties, tasks or operations very similar to the way it would have been performed in a real emergency.

The author suggests that it is important to understand that exercises are only a part of the overall emergency preparedness program. All too many times, the zeal to create an exercise will lead participants into a developmental process that has neither rhyme nor reason. Consequently, the exercise becomes itself a "disaster." Exercises must meet the individual needs of the port community. They should be tailored to fit the various participating levels of the port industry and the local agencies. This is true whether you develop your own exercises or packaged exercise provided by an outside source. In either case, the exercise must be responsive to the specific objectives of your port and to the particular hazards and emergency response capabilities of the port community.

The goal of emergency management exercises is to improve operational readiness of the port. The exercise program should consist of several types of exercises chosen to develop and reinforce emergency response, knowledge, skills and abilities of the port. In conclusion to Chapter IV, the types of exercise that the author recommends on a yearly basis for Malaysian Port Authorities in achieving awareness and preparedness for emergency response are:

- a) *Orientation Seminar* - that introduces the participants to plans and procedures by lectures, panel discussions, media presentations or talk through. All level of personnel (policy, co-ordination, operation and field) is involved.
- b) *Drill* - it test a single emergency response function. It involves actual field response. Its effectiveness lies in focusing on a single or relatively limited portion of the overall response system in order to evaluate and improve it.

- c) *Tabletop Exercise* - whereby actions and discussion are based on a described emergency situation plus a series of messages to players. Participants practise problem solving for emergency situations through on-going discussion and critique of the appropriateness of actions taken and decision made. Participants also practise co-ordinated and effective response. The tabletop permits breaks before new messages are delivered to discuss proper response. It will involve policy and/or co-ordination in personnel.

- d) *Functional Exercise* - is a simulation of an emergency that includes a description of the situation, a timed sequence of messages and communication between players and a simulation group. For example, EOC members could practise co-ordinated, effective response in a time-pressured, realistic emergency situation. Individual and system performance is evaluated. It will involve policy and co-ordination personnel.

- e) *Full-scale Exercise* - that adds a field component to interact with a functional exercise through actual and simulated messages. It tests the deployment of seldom-used resources and will involve policy, co-ordination, operation and field personnel of the port.

CHAPTER V

Developing an Emergency Response Program for Malaysian Ports

Current trends to the environmental regulations in Malaysia make an emergency response team a necessary part of many industrial operations. The formation of an in-house response capability in Malaysian ports must be enhancing through the management concept of awareness and preparedness as mentioned in Chapter IV. However, the need for prompt response to emergencies and proper mitigation of these incidents often makes having your own response team a necessity in the port. Starting a team and managing the operation of the team are critical tasks. During a start up we must organise resources, plan for handling emergencies, evaluate and purchase equipment and train response personnel. These tasks must also be part of a continuing management program to keep the team ready for emergencies. This chapter will look at the basics of starting and running an emergency response team and identify some essential elements that must be handled to maintain a quality team.

5.1 Commitment of the Port Authority

The commitment of the port authority is a major issue in starting a response program. The response team requires continuing training, equipment must be purchased and maintained and many other items need addressed. If the personnel of the port lack the commitment to the team, it will not be effective. It is worse to have a team on paper only than not have a team at all. Top management must understand the role and responsibilities of this type of team and commit the necessary support. Once the

port has determined that it require a team, the next major decision is what level of response the team will provide. Response teams can vary from initial first response only up to a capability to handle large-scale incidents. From the survey, most teams in Malaysian ports fall in the middle to low range of response. Each increase in the level of response therefore carries with it the need for additional training and equipment.

5.2 Organization

Organising the response group requires the port authority to prepare several structures. OSHA regulations require that incident management use the Incident Command System (ICS). The ICS is a method for organising and managing emergency response resources that permits more effective control of the operations and insures greater safety for response personnel. An Emergency Operations Centre (EOC) should be organised. The EOC provides command and control of the actual emergency response. It is a central clearinghouse for information, resources and decision-making personnel. It functions as a command post and provides the control point for all operations directly linked to the emergency. Another group that should be available is the Crisis Team (CT). The crisis team includes upper level management personnel and other resources people that may be needed to handle the larger, long-term aspects of the emergency.

For example, during an incident involving a leak of hazardous substances from a tank container both groups will have different responsibilities. The EOC would control the operations involving evacuation if needed, stopping the leak and other emergency specific items. The CT would evaluate and make decisions in areas affecting business operations, public relations and return to production. The larger the emergency the more involved the CT will become. On many small emergencies, the CT may not be needed. The EOC however should always be used.

5.3 Incident Command System in Emergency Response

Significantly, emergencies involve numerous agencies and hundreds of people supporting the efforts. To promote effective and quick co-ordination during emergency responses, the Marine Department jointly with the Port Authorities in Malaysia should use an emergency management system called the Incident Command System (ICS). Many ports in Europe and North America have adopted ICS to improve co-ordination of response efforts. This provides a comprehensive framework for managing emergency and non-emergency events. Originally created to co-ordinate fire fighting efforts at forest fires, it has been expanded to an all-hazards, all risk management system. Many applications exist for ICS because of its flexibility, including oil spill response, fires, hazardous material and multi-casualty incidents; multi-jurisdictional and multi-agency disasters; search and rescue and transportation incidents.

5.3.1 ICS Management Activities

With reference to the USCG and their Marine Environment Protection methods of organisation, the ICS is built around five major management activities;

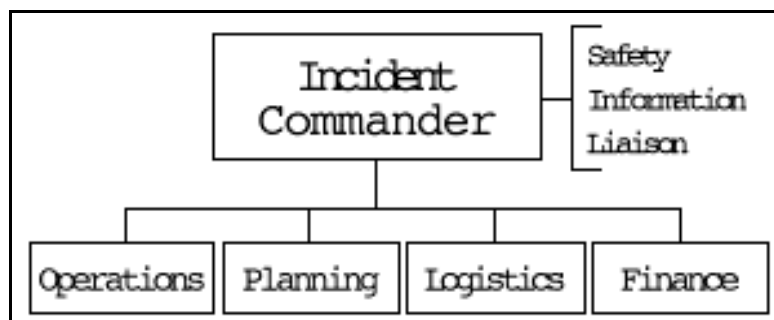


Figure 5.1: ICS Management Activities.

(USCG Marine Environment Protection @ <http://www.uscg.mil>)

***Incident Command** sets objectives and priorities, has overall responsibility at the incident or events. Certain functions, such as safety, information and liaisons are assigned to command staff officers who report directly to the incident command.*

***Operations** conduct tactical operations to carry out an action plan, develop the tactical objectives and organisation and directs all resources.*

***Planning** develops the action plan to accomplish the objectives, collects and evaluates information, tracks resource status and documents the response effort.*

***Logistics** provides support to meet incident needs, provides resources and all other services needed to support the incident.*

***Finance/Administration** monitors costs related to incident, provides accounting, procurement, time recording and cost analysis.*

The adaptability of ICS stems the ability to expand the port authority's flexibility with other agencies. The port authority may manage small incident in a port. Larger incidents may require the functions of ICS to be set up as separate sections, which may be subdivided to other agency involvement. ICS has the advantage of combining different Federal, State and Local agencies and the Responsible Party (the Port Authority) into the same organizational system maximizing coordination of response activities and avoiding duplication of efforts.

A structure called Unified Command allows the Incident Command position of the Port authority to be shared among several agencies and organizations that have jurisdiction. For instance, an oil spill in the port area, the Unified Command is typically comprised of the Federal On-Scene Coordinator (FOOSC), the State On-Scene Coordinators (SOSC) and a Responsible Party representative (RP) of the port. This group sets overall incident objectives and guides and approves the incident action plan. The Unified Command members retain their authority, but work to resolve issues in a cooperative fashion to response efforts.

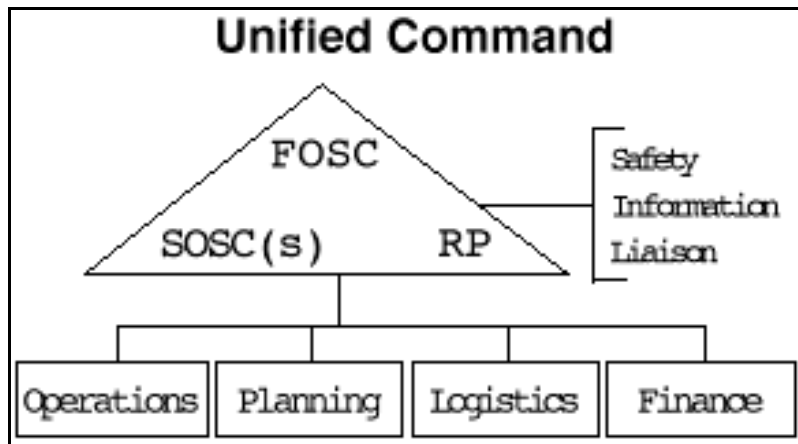


Figure 5.2: Unified Command System
 (USCG Marine Environment Protection @ <http://www.uscg.mil>)

ICS has grown into an incident management system that is widely adopted and used. Because of its flexible nature, low cost of implementation and widespread use, it is an ideal system for emergency response

5.4 Training Requirements for Response Team Personnel

Training is the most critical individual area when developing an effective and quality response team. All the other steps we have discussed will be completed for nothing if training is not effective. Training can be divided into two main phases; initial and continuing. Initial training will need to bring response personnel from a baseline of little or no knowledge of emergency response up to the point of being able to handle, at least the first phase of incidents effectively. Continuing training is required to maintain proficiency in skills and cope with changes in operations. Training is also required by regulation.

Properly trained personnel can perform many activities at an incident within the port area. They can have a major effect on the outcome of the incident and the risk to fellow employees, port assets and the environment. Without proper training, the response team is a risk to itself and everyone else. There is no substitute for

adequate training. Therefore, the port authority must maintain a minimum initial training program to cover all the functions that the response team will be expected to perform. Training must provide sufficient competence that response personnel can safely perform their tasks.

Incident Command personnel should receive additional training specifically aimed at developing their command ability. This training is required for all personnel that will function in a command role. Training records should be maintained on all team members. These records should contain sufficient detail to establish what topics were covered, time spent, who instructed the program and demonstration of competency. An exercise to test the team's readiness should part of the annual training program which currently only 20% of Malaysian ports conduct it on a yearly basis. A realistic situation can be simulated in the port and the team allowed responding. The exercise should then be critique looking for areas where improvement may be needed and additional training required. Instructors must be able to demonstrate competence in the subject matter to be covered and in instructional techniques. The port authority may use in-house personnel or outside resources but nevertheless a basic training on awareness to emergency response must be given to all employees within the port community.

OSHA regulations divide responders into four levels:

- a) First responder awareness,
- b) First responder operation,
- c) Hazardous material awareness, and
- d) Hazardous material specialist.

5.4.1 First Responder Operations Personnel

It is the minimum of 8 hours training annually required by OSHA and thus personnel only engage in defensive techniques at incident such as evacuation of personnel and containment activities that can be conducted outside the hazard area within the port.

This is a very basic level of response and such training should be given to all port personnel in Malaysia.

5.4.2 Hazardous Material Training (Hazmat)

A minimum of 24 hours training annually required by OSHA. In most industrial settings forty hours is more appropriate and in some situations, more may be needed. These personnel are engage in offensive operations that involve attempting to contain and stop the release and will often require entry into hazardous area. This option involves more time and commitment but is usually the best selection if the port have determined that a team is necessary. Training must cover hazard identification, selection and use of Personal Protective Equipment (PPE), understanding of hazardous materials terms, confinement and containment operations, familiarisation with plans and procedures and basic decontamination.

"Training shall be based on the duties and function to be performed by each responder of an emergency response organisation." (OSHA)

The catchall statement in the regulations puts the responsibility for a complete and comprehensive training program solely on the employer. This statement makes it clear that if the port is going to have personnel operating hazardous material emergencies they must have had sufficient training to work properly and safely.

Development of an emergency response program for Malaysian ports can be a challenging project. Thus, the port authority must evaluate and analyse the hazards, risks and resources to determine if the port needs a team. Is so, personnel need to be trained and all this effort and expense may seem too much to ask but, the port is responsible for the safe handling and transportation of cargoes which can be hazardous chemicals. Thus, an effective emergency response is a critical part of that responsibility.

CHAPTER VI

Recommendation and Conclusion

Managing a harbour emergency response, especially a complex one can be a challenging task for a port authority. No doubt, that we do not anticipate for such occurrences by prevention but it is only prudent that the port authority is also aware of the required planning and preparedness to cope with such incidents if at all it happens. In this study, the author highlights the organisational management concept of integrating the contingency planning and forming a Unified Command as it fits within the Incident Command System for emergency response. Unified Command is a necessary tool for effectively managing oil spills or hazardous substance releases. It is hope that this study will increase awareness, improve integration and training, help develop a common language and response culture, and help achieve consistent, effective and efficient response among the ports in Malaysia.

6.1 Integrated Emergency Management System

In order to provide a mechanism for consolidating multiple facility response plans into one plan that can be used during an emergency, it is recommended that Malaysian port authorities establish an Integrated Emergency Management System. This will improve co-ordination of planning and response activities within the port and its facilities and with public and commercial responders. Thus minimising the duplication of effort and unnecessary paperwork burdens and simplify plan development and maintenance.

It can be argued that there will always be a need for the emergency services to be delivered by local public agencies. Major emergencies have wide-ranging effects on people and their environment, not always simply around the site of the incident. The response must therefore combine the knowledge, skills and resources of many organisations, public, private and voluntary. The port authorities are the best agency to pull these strands together in respect of its own community. Therefore, the Integrated Emergency Management System focuses on the co-ordination of, the planning for, and the exercising of, the combined response to any incident, whatever its cause, and this is fundamental to the achievement of a successful outcome for all who are caught up in an incident.

6.2 Unified Command within an Incident Command System.

The system to achieve the co-ordination necessary to carry out an effective response. (USCG, 1998)

In Malaysia, the responsibility of responding to various emergencies falls within a broad variety of government departments and agencies, thus the author would recommend an Incident Command System (ICS) led by a Unified Command (as discussed in Chapter 5) to be used to manage incidents in the port. The government believe that there is no doubt about the responsibility of every organisation to ensure that it is prepared for emergencies, but that there may be a case for legislation to distinguish more clearly between service delivery and co-ordination. The advantages to using the ICS Unified Command system include:

- a) Optimization of combined efforts,
- b) Elimination of duplication efforts,
- c) Integration of various authorities and agencies,
- d) Establishment of one command post,
- e) Development of collective approval of shared operations, logistics, planning and finance,

- f) Encouragement of co-operative response environment,
- g) Allowance for shared facilities, which not only reduces costs for those responding, but also maximise efficiency and reduces communications breakdowns.

The ICS Unified structure itself outlines responsibilities and functions (not people), therefore reducing potential conflicts and improves information flow among all organisations. The ICS maintains its modular organisational structure, so that none of all advantages of the ICS is lost by the introduction of a Unified Command. It is recommended that Malaysian Port Authorities should take advantage of this system since the organisation is flexible and thus allow the integration at the decision making and operational levels and to expansion and contraction when needed. A commitment to co-operation by all involved parties is necessary for the creation of improved organisational and operational process. Federal, state and port authorities should jointly plan and conduct simulation exercises to ensure an effective and efficient emergency response are applied to all ports in Malaysia.

6.3 Port Policy and the Legal Framework in Malaysia

Port safety is paramount and cannot be left to chance. Lives and property must be protected. So must the port environment because many port facilities are close to important and sensitive habitats. There must be a more considered approach to port safety if acceptable standards are to be achieved throughout the industry and the potential catastrophic consequences of a major accident in a port avoided.

The Port Authorities in Malaysia must accept that they have a central responsibility for ensuring the safety of their ports, which they cannot rely on their customers to perform this vital function. Emergency management and its applications should be part of the operations code within the port system which will eventually promote awareness and preparedness for all port facilities and thus will scrutinise any port

development which does not take full account of the local environment. The author propose the following legal instruments be implemented in Malaysia:

- a) An instrument for Resource Conservation and Recovery with a primary goal of protecting the environment from accidental and unregulated activities of transportation, discharges, spills and releases.
- b) An instrument for Emergency Planning and Community Right-to-Know which is a requirement for port industry to establish a process for developing emergency preparedness and response programs in their community.
- c) An instrument under Port (Safety of Worker) Rules to make mandatory training for emergency responders within Malaysian ports. Awareness training shall be provided to all port personnel. An establishment of Port Institute can further enhance the training standards and quality of port personnel.

6.4 Conclusion

To achieve an integrated management approach in emergency response requires the best mechanisms to be place for both planning and management of the system. The level of resources should be sufficient to enable both functions are attained. The author recognises that there should be a link between the port organisations and the pattern of statutory responsibilities in Malaysia to provide the framework for integration of planning and emergency management. Conflicting approaches between different interest may arise with diverse range of issues, authorities and responsibilities. This study cannot be excessively prescriptive and must take into the account of established systems of planning and emergency management, which have been developed over the years.

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APPENDIX 1

Charles Fernandes,
Port Management Course (1999)
World Maritime University
PO Box 500, S-201 24
Malmö, Sweden

12 December 1998

To : List of correspondence (*Appendix 2*)

Dear Sir,

Questionnaire on Emergency Preparedness and Response in Malaysian Ports

I am a post-graduated student at the World Maritime University. Currently, I am conducting a survey for my dissertation on 'An integrated approach to Emergency Response in Malaysia' and I would appreciate just a few minutes of your time.

This questionnaire is intended to gauge the levels of awareness, preparedness and planning for an emergency in the port-related industry in Malaysia. Please feel free to redistribute this to other departments/responders, so that they might provide their responses and thus giving me the widest possible cross-section of responses.

All replies will be maintained in the strictest confidence and no entity-specific information will be released to any other person or agency. Rest assured that you would not receive any advertising or unsolicited materials as a result of completing this questionnaire.

(Please pick the "best" choice and place an "X" next to your answer:)

1. Do you have a published Emergency Response Plan for your port?
(choose the single best answer)

Not sure No Yes

2. How frequently do you conduct an emergency response drill?
(choose the single best answer)

Never Once a year Once in 2 years

3. What are the main areas for which the emergency plan covers?
(tick whichever appropriate)

- | | |
|--|--|
| <input type="checkbox"/> Quayside Area | <input type="checkbox"/> Ships at berth |
| <input type="checkbox"/> Terminal Area | <input type="checkbox"/> Engineering Areas |
| <input type="checkbox"/> Road ways in the port | <input type="checkbox"/> Administrative Area |

4. Which are the main types of incidents for which the contingency plan covers?
(tick whichever appropriate)

- | | |
|--|---|
| <input type="checkbox"/> Fire | <input type="checkbox"/> Explosion |
| <input type="checkbox"/> Spillage of dangerous goods | <input type="checkbox"/> Rescue of personnel |
| <input type="checkbox"/> Injuries | <input type="checkbox"/> Environmental hazardous spills |

5. Does your Emergency Response Plan cater for incidents or potentially dangerous incidents brought about by extreme climate and geological events such as?
(tick whichever appropriate)

- | | | | |
|-------------------------------|-------------------------------|---------------------------------|-------------------------------------|
| <input type="checkbox"/> Wind | <input type="checkbox"/> Heat | <input type="checkbox"/> Floods | <input type="checkbox"/> Earthquake |
|-------------------------------|-------------------------------|---------------------------------|-------------------------------------|

6. Who is responsible for developing and updating the Emergency Response Plans?
(choose the single best answer)

- | | | |
|-----------------------------------|---|---|
| <input type="checkbox"/> Managers | <input type="checkbox"/> Harbour Master | <input type="checkbox"/> Safety / Training Officers |
|-----------------------------------|---|---|

7. How frequently do you review and update your Emergency Response Plans?
(choose the single best answer)

- | | | |
|--------------------------------|--------------------------------------|--|
| <input type="checkbox"/> Never | <input type="checkbox"/> Once a year | <input type="checkbox"/> Once in 2 years |
|--------------------------------|--------------------------------------|--|

8. Do you carry out training for your personnel in the area of emergency responses, if yes, indicate in which areas:
(tick whichever appropriate)

- | | |
|---|--|
| <input type="checkbox"/> First Aid Training | <input type="checkbox"/> Rescue |
| <input type="checkbox"/> Fire Fighting Training | <input type="checkbox"/> Marine Training |
| <input type="checkbox"/> Oil Spills Response | <input type="checkbox"/> Hazardous Cargo Spills (Hazmat) |

9. What is the emergency response equipment your port owns?
(tick whichever appropriate)

- | | |
|---|--|
| <input type="checkbox"/> First Aid | <input type="checkbox"/> Ambulance |
| <input type="checkbox"/> Fire Fighting | <input type="checkbox"/> Marine Response |
| <input type="checkbox"/> Oil Spill Response | <input type="checkbox"/> Chemical Spill Response |

10. I/We believe that our port is now effectively prepared to deal with any eventualities relating to emergency response?
(choose the single best answer)

- | | | |
|------------------------------|-----------------------------|-------------------------------------|
| <input type="checkbox"/> Yes | <input type="checkbox"/> No | <input type="checkbox"/> Don't know |
|------------------------------|-----------------------------|-------------------------------------|

11. At this time, I/We believe that our port is ___ % prepared to deal with any potential eventualities associated with emergency occurrence?
(choose the single best answer)

- | | | | |
|-------------------------------|------------------------------|--|------------------------------|
| <input type="checkbox"/> 100% | <input type="checkbox"/> 90% | <input type="checkbox"/> 80% | <input type="checkbox"/> 70% |
| <input type="checkbox"/> 60% | <input type="checkbox"/> 50% | <input type="checkbox"/> Less than 50% | |

12. Please place an "X" next to all other agencies with whom your port is working in regard to overall preparedness and response for any potential emergency eventualities that might present itself.

(Please check all that pertain to your plans)

- Police Department
- Fire Department
- Power / Electricity Board
- Water & Sanitation Department
- Health Authorities / Hospital / Ambulance
- Navy
- Major Port Users (Cargo Owners)
- Environmental Agencies
- Transport Department
- Railways Authorities
- Chemist Department
- Waste Disposal Authorities
- Telecommunication / Radio / TV / Media
- Social Services
- State Emergency Planning Agency
- Federal Emergency Planning Agency

Thank You¹

¹ Tel: +46 - 40 - 35 63 00

Fax: +46 - 40 - 12 84 42

E-mail: s99094@wmu.se

APPENDIX 2

List of Port Authorities / Terminal Operators (Sea Transport) in Malaysia.

No	Port Authority & Terminal Operators	Postal Address	Contact
1	Johor Port Authority	P.O.Box 151 81700 Pasir Gudang, Johor	Tel: 607-251 2617 Fax: 607-252 5582
2	Langkawi Port Authority	Marine Department Teluk Ewa Port Office 07000 Langkawi, Kedah	Tel: 604-959 1505 Fax: 604-959 1354
3	Melaka Port Authority	Pelabuhan Tanjung Bruas Tanjung Kling, 76400 Melaka	Tel: 606-511 766 Fax: 606-511 216
4	Kuantan Port Authority	P.O.Box 161 Tanjung Gelang 25720 Kuantan, Pahang	Tel: 609-583 3201 Fax: 609-583 3866
5	Lumut Port Authority	Lot 1, Lumut Port Industrial Park Mukim Lumut, 32000 Setiawan, Perak	Tel: 605-692 8111 Fax: 605-692 8120
6	Penang Port Commission	3A-6, Bangunan Sri Weld Jalan Pengkalan Weld 10300 Penang	Tel: 604-263 3211 Fax: 604-261 3336
7	Sabah Port Authority	Wisma Pelabuhan Jalan Tun Fuad, Tg. Lipat, 88617 Kota Kinabalu, Sabah	Tel: 6088-211 511 Fax: 6088-223 036
8	Bintulu Port Authority	P.O.Box 296, 97007 Bintulu, Sarawak	Tel: 6086-251 001 Fax: 6086-252 929
9	Kuching Port Authority	P.O.Box 530, 93710 Kuching, Sarawak	Tel: 6082-482 144 Fax: 6082-481 696
10	Miri Port Authority	P.O.Box 1179 Jalan Bendahara, 98008 Miri Sarawak	Tel: 6085-416 168 Fax: 6085-417 191
11	Rajang Port Authority	96000 Sibu, Sarawak	Tel: 6084-319 009 Fax: 6084-318 754
12	Klang Port Authority	Mail Bag Service No.202 Jalan Pelabuhan 42005 Port Klang, Selangor	Tel: 603-368 8211 Fax: 603-367 0211

13	Kemaman Port Authority	Bangunan Dermaga Timur Telok Kalong, 24000 Kemaman Terengganu	Tel: 609-531 590 Fax: 609-531 599
14	Johor Port	P.O.Box 151 81707 Pasir Gudang, Johor	Tel: 607-252 5888 Fax: 607-251 0291
15	Kelang Container Terminal	North Port, P.O.Box 234 42009 Port Klang, Selangor	Tel: 603-376 7000 Fax: 603-376 6400
16	Kelang Multi Terminal	Pulau Indah, P.O.Box 266 42009 Port Klang, Selangor	Tel: 603-301 1020 Fax: 603-301 1082
17	Kelang Port Management	Block A, Administration Building, Jalan Parang North Port, 42005 Port Klang, Selangor	Tel: 603-376 7411 Fax: 603-376 7422
18	Penang Port	P.O.Box 1204 10710 Penang	Tel: 604-210 2211 Fax: 604-263 4792