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An integral approach to the protection of the Malaysian marine environment against oil pollution : its impact on Akademy Laut Malaysia

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AN INTEGRATED APPROACH TO THE PROTECTION OF THE MALAYSIAN MARINE ENVIRONMENT AGAINST OIL POLLUTION: ITS IMPACT ON AKADEMI LAUT MALAYSIA

by

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[MALAYSIA]

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

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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 upon me.

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

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The modern age

has a false sense of superiority

because of the great mass of data at its disposal,

but the principal advantage of mankind is rather

the extent to which he knows

how to form the material

at his command.

Goethe

Specially dedicated to:

****

my inspirational *parents*
Hajah Zaharah and Haji Yaacob

my beloved, compassionate and patient *wife*
Aisha Begum Mir Alam

my dear and loving *children*
Muhammad Farhan, Muhammad Irshad, Muhammad Imran,
Maryam Azraa, Muhammad Asyraf and Muhammad Azri

my cherished *sisters*
Faezah, Latifah and Fauziah

my motivating *brothers*
Zainuddin, Abdul Rashid and Azman

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Professors and Lecturers in various institutions worldwide

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Bruce, Dinh, El-Ashmawy, Mauricio, Neejat, Shariat, Soko,
Starling and Valentino

the wonderful *Malaysians* and *people of the world*
who genuinely appreciate nature and care
for the
planet
earth
and the
life
within.

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ABSTRACT

This dissertation is a study of the various aspects of oil pollution in the Malaysian marine environment. The rich Malaysian maritime heritage provides the background and highlights the significance of the notable topic in question.

The sensitive and high pollution potential areas are identified. This corresponds to the problems of piracy, vessel traffic management and the management of the marine biodiversity. The associated issues are examined to provide deeper understanding of the problems faced by the policy makers and their efforts to find appropriate solutions.

The global marine environment protection framework is discussed and comparison made to the Malaysian scene. The major pollution incidents and the international regulatory responses are expounded. Development of legislation in recent years and its effect on training and education is reviewed, taking into consideration the varying views of the different parties involved in the maritime field.

The configuration of a strategic oil spill contingency plan is deliberated with reference to the global perspective. The national and regional oil spill response capabilities are explored and analyzed, while the various approaches adopted by successful organizations in the protection of the marine environment against oil pollution are examined.

Proposals and recommendations are made to improve the safety of navigation and protection of the Malaysian marine

environment. A significant area addressed is the importance of training and education. This has coerced a direct impact on the pivotal role of Akademi Laut Malaysia in the integrated and professional approach required for the interest of sustainable development and the conservation of the seas and the coastal fringes of Malaysia.

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LIST OF ABBREVIATIONS

ALAM	Akademi Laut Malaysia
AMOSC	Australian Marine Oil Spill Center
ASEAMS	Association of Southeast Asian Marine Scientists
ASEAN	Association of Southeast Asian Nations
CBT	Dedicated Clean Ballast Tank
CEPET	Venezuela's Oil Spill Response Training Center
COBSEA	Coordinating Body on the Seas of East Asia
COW	Crude Oil Washing
DOE	Department of Environment
DSLB	Domestic Shipping Licensing Board
EEZ	Exclusive Economic Zone
EIA	Environmental Impact Assessment
EQA	Environment Quality Act
ESSD	Environmentally Sound and Sustainable Development
GDP	Gross Domestic Product
GESAMP	Joint Group of Experts on the Scientific Aspects of Marine Pollution
GMDSS	Global Maritime Distress and Safety System
IACS	International Association of Classification Societies
IAEA	International Atomic Energy Agency
ICS	International Chamber of Shipping
IGS	Inert Gas System
IKMAL	Institut Kelautan Malaysia (Malaysian Nautical Institute)
IMB	International Maritime Bureau
IMO	International Maritime Organization
INMARSAT	International Maritime Satellite Organization
ITOPF	International Tanker Owners Pollution Federation
LNG	Liquified Natural Gas
MAFF	Ministry of Agriculture, Fisheries and Food

MARPOL	International Convention for the Prevention of Pollution from Ships
MATES	Malaysian Training and Education for Seamen
MBO	Management By Objectives
MEPC	Marine Environment Protection Committee
MET	Maritime Education and Training
MISC	Malaysian International Shipping Corporation
MPCU	Marine Pollution Control Unit of United Kingdom
MSO	Merchant Shipping Ordinance
MSRC	Marine Spill Response Corporation of U.S.A.
MTC	Melaka Training Center
NEP	National Economic Policy
NMC	National Maritime Council
NPWO	National Parks and Wildlife Office
NSC	National Shipping Council
OCIMF	Oil Companies International Marine Forum
OPA	Oil Pollution Act
OPP	Outline Perspective Plan
OPRC	International Cooperation on Oil Pollution Preparedness and Response.
OSC	On Scene Commander
OSMT	Oil Spill Management Trainer
OSPAR	Oil Spill Prepardness and Response
PNSL	Perbadanan Nasional Shipping Line
PSC	Port State Control
RCC	Rescue Coordination Center
RSRO	Regional Spill Response Organization
SAR	Search and Rescue
SBT	Segregated Ballast Tank
SOLAS	International Convention for the Safety of Life at Sea
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
TARC	Tierred Area Response Capability

TET	Total Education and Training
TSPP	International Convention on Tanker Safety and Pollution Prevention
TTEG	Tripartite Expert Group on the safety of navigation in the Straits of Melaka and Singapore
WMO	World Meteorological Organization
WMU	World Maritime University
WHO	World Health Organization
UNCLOS	United Nations Conference on the Law of the Sea
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNDP	United Nations Development Program
UNEP	United Nations Environmental Program
VLWT	Very Large Water Tanker
VTS	Vessel Traffic System

Chapter 1

INTRODUCTION

1.1 BACKGROUND

More than 30 years ago, the international community recognized the need for cooperative action in preventing marine pollution. Today, there are almost 50 agreements (including conventions and protocols)[1] that are of regional or global scope ranging in focus from the control of specific contaminants, such as oil and radionuclides, to more broadly-based agreements on regional cooperation (e.g. conventions concluded under the Regional Seas Program of the United Nations Environment Program).

Although good progress has been made, much work remains to be done in extending the scope and application of agreements to achieve more comprehensive control of environmental pollution worldwide. The 1990 Report on the State of the Marine Environment[2] highlights the rapid deterioration in the coastal areas of the world's oceans. Unless strong, coordinated national and international action is taken now, the marine environment will be subjected to significant harm.

Human activities cannot be managed successfully if they are dealt with in isolation. Legal instrumentations for protection of the environment therefore need to take account of interactions, both between different practices and environments and between the various mechanisms developed for regulatory and protection purposes. This requires a process of planning and review that is not easily achieved in the international arena.

Most of the world's population lives on or near the coasts.

Every nation not completely landlocked has used the sea as its supposedly self-cleansing garbage dump. Sewage, oil, plastics, industrial effluent, and radioactive waste have been added to ungoverned development, all of which are busily destroying otherwise robust inshore eco-systems.

In Southeast Asia, more people than ever before are now dependent upon coastal areas for their livelihoods: for fishing, mariculture, forestry, building materials, agriculture and tourism. In most of the countries, the very resources they depend on for survival are being needlessly over-exploited and destroyed.[3]

The geography of Southeast Asia is of coasts, more so than perhaps any other region in the world. The seas are dotted with islands. Situated in the midst of the highly sensitive and enigmatic region exist the Malaysian waters. The pollution in these waters is liked to terrestrial, freshwater and maritime activities. A great deal of importance is attached both by the Government and the public to the protection of the marine environment and its natural resources from the adverse consequences of oil pollution.

The location of the islands and peninsular states has forged the region into one of the world's predominant trading crossroads. Today the region finds itself on a major oil route.

An important international waterway, the Strait of Melaka is one of the most congested. A number of serious accidents have confirmed its designation as one of the world's highest risk areas for collisions and groundings. The convergence of ocean-going traffic makes this area of significant risk, a fact supported by accident statistics.

1.2 THE ISSUES

The major sources of marine pollution are well known and their effects fairly well documented. Several issues are seen to dominate Malaysia's marine pollution problem. Solutions however, are hard to come by. This results partly from gaps in existing legislation and in the coordination of enforcement activities. Some of the issues which need addressing are:

1. Not having sufficient baseline data to determine what are the natural levels of materials in the water in both space and time.

2. There are jurisdictional barriers between state and federal laws in Malaysia. The land is a state matter while marine areas fall under the jurisdiction of the Federal Government.

3. The setting of different standards for different waters (coastal and others) is not yet implemented.

4. Routine monitoring and surveillance are not carried out effectively at various strategic locations.

5. The oil spill response capabilities in Malaysian waters are limited and need improvement.

These issues involve the assessment of activities within the Malaysian waters and the need for identification of outstanding problems in the preventive and curative measures for marine environment protection. It includes the need to evaluate the related international marine environmental protection framework, to review the strategic approaches,

and exploring insights as how best to resolve the issues.

In the desire to achieve greater depth for the vast scope of this dissertation, the author has put emphasis on ship-sourced oil pollution. Nevertheless, associated land generated pollutions are also mentioned superficially of which the repercussions on the coastal waters cannot be ignored. The context of oil spill response, contingency planning and training are also stressed.

1.3 OBJECTIVES

The objectives of this study can be summarized in the following broad spheres:

* To identify the sources and associated problems of oil pollution in Malaysian waters.

* To identify the international marine environment protection framework and its association and influence on Malaysia.

* To examine the various approaches adopted by successful international organizations in the protection of the marine environment against oil pollution.

* To accentuate the significant role of Akademi Laut Malaysia (ALAM) in providing effective training and education of all personnel involved.

* To make proposals and recommendations in improving the overall national marine environmental protection framework by integration of efforts and approach of the various agencies involved.

1.4 METHODOLOGY

This study is basically a general orientation on the approaches made for the protection of the Malaysian marine environment. Previous studies in different perspective on these issues are utilized as supportive material. Nevertheless this study is based on:

* Reference materials available at the World Maritime University (WMU) library and materials available through the intra-library loan.

* Study materials from and lectures by resident and visiting professors of WMU.

* Papers submitted by the various agencies in Malaysia in national and international seminars.

* Materials obtained through correspondence from various national, regional and international organizations.

* Related seminars and field studies to various organizations in Europe and the United States of America.

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Chapter 2

MALAYSIA AND ITS MARITIME ENVIRONMENT

2.1 MALAYSIA IN SYNOPSIS

2.1.1 Brief History

Historians believed that the earliest organized political states first emerged in the northern part of the Malay Peninsula. In the ninth century some of these states came under the influence of the Sri Vijayan Empire whose dominance later was supplanted by the Javanese Majapahit and the Thai Empires at the end of thirteenth century. Subsequently, the era of the Melaka Empire in the fourteenth century marked the golden age of Malay political power.[1]

The beginning of European incursions into Melaka was marked by the capture of Melaka by the Portuguese in 1511. Melaka then fell to the Dutch in 1641. British commercial interests from India extended to Pulau Pinang which Britain acquired from the Sultan of Kedah in 1786. In 1819, the British acquired Singapore from the Sultan of Johor. Five years later Britain acquired Melaka from the Dutch.[2] Historically Malaysia is renowned as 'The British East Indies' and 'The Fabled Spice Islands of the East'.

By the middle of the nineteenth century, under the British administration, the economic invasion of the Peninsula began. Large numbers of Chinese tin mining laborers and rubber plantation workers from India poured in.[3] Malaya and the Borneo Territories were ruled by the Japanese from 1941 till their surrender in 1945.[4] In 1957 Malaya gained its independence from the British. Malaysia was then founded on September 16, 1963, as a federation of the State of Malaya, Sabah, Sarawak and Singapore. On August 9, 1965, Singapore

Figure 2.1 Southeast Asia

Source: Atlas for marine policy in Southeast Asia

separated from Malaysia.

2.1.2 Country

As can be seen in figure 2.1, Malaysia is situated in the heart of Southeast Asia; sharing its frontiers with all the six member countries of the Association of South East Asian Nations (ASEAN). Its latitude spans between one to seven degrees North and longitude 100 to over 119 degrees East. Peninsular Malaysia is separated by about 750 kilometers of the South China Sea with East Malaysia on the northwestern coast of Borneo.[5]

Malaysia encompasses 13 states. Johor, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Pulau Pinang are situated on the Peninsula while Sabah and Sarawak on the island of Borneo. Kuala Lumpur, the capital city, became the federal territory in 1974 while the Federal Territory of Labuan was established in 1984.

The country covers an area of 330,434 square kilometers.[6] Its coastline extends nearly 4,830 kilometers from the Indian Ocean to the South China Sea.[7]

Malaysia's climate is hot and wet, subjected to maritime influences and the interplay of wind systems originating from adjacent ocean and seas. The year is divided into the southwest and northeast monsoon seasons. Average annual rainfall is between 2,032 to 2,540 millimeters and average daily temperature in the lowlands varies from 21 to 32 degrees Celsius.[8]

In 1993, tropical rain forest covered 64 percent of Malaysia.[9] Over 80 percent of the country is green as the

Government supports a large agricultural-based industries. Malaysia's rich natural resources earned it the reputation of being a veritable 'Garden of Eden' on earth.[10] It is the world's largest producer and exporter of palm oil, rubber, pepper and tin. Cocoa, timber, wood products, crude petroleum and liquefied natural gas (LNG) jointly head the export list. Malaysia has now progressed from mainly dependent on her raw commodity exports to a nation which has successfully diversified to become a leading exporter of manufactured goods.[11]

The thrust of development policy in Malaysia is to narrow the socio-economic differences of the people. The New Economic Policy (NEP) objectives adopted in 1971 were implemented through rapid economic growth, so that the distribution goals were achieved in a dynamic setting. The private sector provided a major role in the attainment of the NEP. The Second Outline Perspective Plan (OPP2) replaced the NEP which expired in 1990 to be the national development plan for the next ten years. It will chart the country's development up to the year 2000. It embodies the guidelines of the Sixth Malaysia Plan (1991 -1995).

The economic growth for 1991 to 1993 was 8.1 percent with an inflation rate of well below 4 percent; which ranks Malaysia as having one of the most remarkable economic performances by world standards. About one million registered foreigners work in Malaysia, significantly more than 5 percent of Malaysia's multi-racial population.[12] In diversity there is unity in that Malaysians, who are made of Malays, and other indigenous people, the Sea Dayaks (Bidayuhs), Kadazans, Kenyahs, Melanaus and Muruts (who are known as bumiputeras), as well as Chinese, Indians, Eurasians and many others, survive and strive together.

2.2 MALAYSIA'S MARITIME HERITAGE

The activities of the sea-faring Malaysians were documented explicitly in the early history of Malaysia. In their special 'perahus', the Malaysians used to roam the South China Sea, the Pacific and the Indian oceans. The cornerstone of successive Malay empires had been the ascendancy and decline of their maritime power.[13]

The Exclusive Economic Zone of Malaysia is about 450,233 square kilometers, accommodating about 1000 islands.[14] By all definitions, Malaysia is a maritime nation. It has become heavily dependent on the sea for resources, communication, commerce and security. With the discovery of oil and natural gas, the sea has become an asset previously overlooked by Malaysians.

2.2.1 Oil and Gas

The earliest official record of oil finds in the country was made in July 1882 in Sarawak. Commercial oil exploitation only began in 1909. The industry continued to grow from then on as more companies began exploring for oil under the concession system. The system offered generous terms to the companies with minimal government control over levels of production or prices.

The Malaysian oil industry's strength is derived from the way it is planned, structured and managed on a national and integrated basis to ensure its optimum, controlled and orderly development.[15] This involves a number of interacting agencies coordinated by the Government at the policy level, and by the national petroleum corporation of Malaysia (Petronas) at the executive level. This has certain clear

advantages . Planning for the oil industry takes place at the macro-level, where social as well as economic objectives can be taken into account.

Petronas was incorporated on 17 August 1974. A rather unique creation, it is a state-owned company registered under the Companies Act, therefore operating under commercial terms, but accountable to government and imbued with national purpose. The Petroleum Development Act was passed in the same year. Vested in Petronas is the entire ownership of oil and natural gas resources in the country. The Act also gives Petronas the power to process or refine petroleum, to manufacture petrochemical products and to market these items.

The other principal bodies which impinge on petroleum development are: the Ministry of Energy, the Cabinet Committee on Energy, the Economic Planning Unit (EPU) of the Prime Minister's Department, the Socio-Economic Research Unit within EPU, the state governments and authorities of the oil-producing states, and the Ministry of Science, Technology and the Environment. Malaysia is also a member of ASCOPE, the ASEAN Committee on Petroleum.

A fully integrated oil company today, Petronas is engaging in all spheres of petroleum operations:

* Exploration and production
* Rig management and operations
* Oil refining
* Marketing and distributing crude oil and petroleum products
* Natural gas processing and distribution
* Natural gas liquefaction

* Manufacture of fertilizers and petrochemicals

Malaysia's petroleum reserves currently total some 4.3 billion barrels of oil and some 76.7 trillion standard cubic feet of gas. These reserves are found offshore Peninsular Malaysia, Sabah and Sarawak. It is ranked 20th in the world in terms of oil reserves, which are found in 56 oil fields. Thirty-two of the fields are currently in production. In terms of gas reserves, Malaysia is ranked 12th in the world, with natural gas found in 168 offshore fields. Seven of these are currently in production.[16]

Petronas has to date signed 37 Production Sharing Contracts with 43 oil companies for the exploration and production of oil and gas. Abroad it is exploring for oil and gas in Vietnam, China, Syria and Yemen, and eagerly pursuing stakes in petroleum companies in developing countries. Petronas has grown into one of the world's biggest and most profitable state enterprises.[17]

Malaysia has six refineries. Shell and an Exxon subsidiary own three of the facilities and Petronas the others. In 1997 it is expected that Malaysia will be able to process 475,000 barrels per day (bpd).[18]

2.2.2 Fishery

The importance of the fisheries sector to the Malaysian economy is widely acknowledged. By and large its significance lies in four main areas: as a source of food and protein; as a small but significant contributor to GDP; as a source of employment; and as a generator of foreign exchange earnings.

Fish constitutes almost two-thirds of animal protein supply and slightly more than half of the total protein supply in the country (Labon, 1974). Since it is generally acceptable to all ethnic groups, fish consumption is high relative to other ASEAN countries with an annual average per capita consumption of about 40 kilograms.

The fisheries sector contributed 2.6 per cent of the gross domestic product (GDP) of the agriculture sector in 1990. During the same year this sector employed about 88,495 fishermen.[19]

In 1990, Malaysia exported about 163,170 tonnes of fish and fish products valued at MR 577.2 million.[20] In terms of the overall national foreign exchange earnings, this value is a small 0.7 percent of total export earnings.

Marine or capture fisheries is primarily carried out in the coastal waters within the 0-30 mile limit from the shoreline. Fishing methods employed are varied, ranging from simple, labor-intensive traditional gears such as lift net (pukat hanyut), bag net (pukat bakul), barrier net (pukat rentang), push net (pukat surung), traps (bubu) and hook-and-line (pancing) to more modern, highly non-selective gears like trawling and purseining. While the traditional gears are operated using mainly small (below 40 GRT) non-powered or outboard-powered fishing vessels, trawling and purseining, on the other hand, employed larger (above 40 GRT) and more capital-intensive fishing vessels.[21]

In view of the overfishing problem in the Malaysian inshore fisheries, several management regimes have been instituted by the fisheries management authority. The major strategy in reducing the stress on the fisheries resources is effort

reduction in the inshore areas and promotion of effort in the offshore areas of the EEZ. Malaysia in its efforts to transform itself from a coastal fishing nation to an offshore fishing nation is however not without problems; the main being the lack of willing local crew to stay longer periods at sea. Joint venture schemes with neighboring countries is one option adopted, enhancing Malaysia's effort in utilizing some of the abundant labor supply within the region.

2.2.3 Ports

Malaysia's ports' policy-makers face three major problems. The first is that Singapore is the natural intermodal port for Peninsular Malaysia. The second is the desire of virtually every state to have its own port. The third is the political necessity to promote Malaysian ports, rather than accept the dominance, by virtue of its geographical position, of Singapore.[22]

The Ports Unit of the Maritime Division of the Transport ministry is responsible for developing, coordinating and supervising research and development activities of all federal ports in Malaysia, including the privatization of ports.

Malaysia's biggest ports are Kelang, Pulau Pinang and Johor. The total cargo throughput at the end of 1992 was 28.4 million, 13.2 million and 10.7 million tonnes respectively.[23] Other significant ports are Kuantan, Bintulu, Kuching, Miri, Rajang, Port Dickson, Kemaman, Sandakan, Labuan, Kota Kinabalu and Tawau.

2.2.4 Shipping

The Shipping Unit of the Maritime Division is responsible for the handling of matters pertaining to national and international shipping policies, including related International Conventions. It is also the Secretariat to the National Shipping Council.

While it is true that the Malaysian International Shipping Corporation (MISC) and Pernas National Shipping Line (PNSL) are substantial and diversified shipping companies, there is a widespread perception that Malaysia is missing out in shipping. Malaysian-flag tonnage lifts only about fifteen percent of the country's trade. According to deputy finance minister Datuk Mustapha Mohamed, the cost of using foreign vessels was US$ 1.9 billion in 1993. On present trends this figure could be doubled by year 2000.[24]

In 1992, the total number of ships registered by type was as follows:

* Oil Tankers - 72
* Liquified Gas Carriers - 8
* Ore/Bulk/Oil Carriers - 30
* General Cargo - 206
* Passenger/Cargo Carriers - 90
* Container Ships - 24
* Vehicle Carriers - 5
* Others - 791

The total gross registered tonnage is 2,367,770 as of 1992.[25] The Domestic Shipping Licensing Board (DSLB) issued 1033 licenses in 1992 as compared to 895 in 1991. 47.4 percent of these are Malaysian registered and the others foreign

registered vessels. DSLB continues to issue licenses to foreign vessels due to the shortage of Malaysian registered vessels in handling offshore activities as well as the transportation of goods which require specialized vessels such as chemical, methanol and urea formaldehyde.

Malaysia is also embarking on the first historic, massive water transport project the world has ever known. It is the carriage of potable water from Kenyir, a man-made lake (almost the size of Singapore) in Terengganu state, to the Middle East. The water is to be pumped through a 80 kilometers pipeline to the coast where it will be loaded on very large water tankers (VLWT). It is expected to come on stream in 1996.[26]

2.2.5 Tourism

Malaysia is a tropical Paradise with golden sandy beaches and emerald seas. Remote coral islands offer a fascinating variety of marine life. The glassy quality of the waters makes these reefs in Malaysian waters ideal for snorkeling and scuba diving. The underwater treasures of Malaysia offer photographers fascinating photography and enchanting opportunities of exploring the secrets of the deep.

Most states in the country have beautiful beaches and remote islands to call their very own - each with their own unique attractions and charm. To quote Luciano Pavarotti, a recent visitor to one of the islands, 'I almost cried to see how beautiful God has made this paradise'.

Malaysia has in the past been promoting itself as a beach destination with exotic Asian culture, while in the last few years it is fast gaining the image of an adventure jungle

land. The celebrated E & O Express train which plies its leisurely journey from Singapore, via Kuala Lumpur, to Bangkok fascinates travellers with the lush Malaysian tropical countryside, described as 330,000 square kilometers of Kew Botanical Gardens.

Increasing awareness of environment conservation is beginning to affect the decision making process of holiday destination selection. The element of Malaysia's environment conservation program, that is sustainable development and its wealth in nature is incorporated into the tourism marketing activities.[27]

Malaysia is slowly becoming a market for cruise lines as well as a destination. In the near future cruises will feature the more unusual destinations of the smaller islands. Port Klang Authority has announced that it is considering to build a cruise terminal at its West Port to be adapted from one of its existing berths. It would be able to accommodate ships of up to 80,000 grt.[28]

2.3 PIRACY

IMO assembly resolution A.545 (13) of November 1983 notes with great concern the increasing number of incidents involving piracy and armed robbery and recognizes the grave danger to life and the grave navigational and environmental risks to which such incidents can give rise. This danger is considered the greatest in the waters of Southeast Asia where the navigational channels are often very narrow and shallow and the traffic heavy (In 1993, close to 100,000 vessels used the Melaka Straits).[29]

In Southeast Asia, nearly all the incidents reported have

involved ships that are underway. The attack invariably takes place at night and the pirates usually board the ship at the stern. Although this is the nearest point to the bridge and crew accommodation, it offers the best opportunity of getting aboard undetected. It is reported that crews of ships have been tied up with nobody in control of the ship steaming at full power, while the robbers make their escape. The possibility of collision and catasthropic environmental damage is very real; especially if the ship is a fully-laden tanker. Pirates are often equipped with fast motor boats, making it easy to even overhaul full sea speed ships, especially tankers having little freeboard.[30]

In August 1992, the Secretary General of IMO, Mr. William A. O'Neil proposed that Governments use the communications system established by the 1979 International Convention on Maritime Search and Rescue (SAR) to provide assistance to ships involved in attacks. This can be done by enabling masters whose ships are threatened to contact the nearest rescue coordination center (RCC). The information can then be passed to the nearest anti-piracy authorities and where necessary can also alert neighboring States to the danger.

The use of the SafetyNet system established by the International Maritime Satellite Organization (INMARSAT) and other means of communications provided under the Global Maritime Distress and Safety System (GMDSS), which came into effect in February 1992 are further recommended.

The Regional Piracy Center in Kuala Lumpur however has received only eight armed attack reports in 1993 compared with 73 in 1992 and 107 in 1991. The International Maritime Bureau which operates the Malaysian center also registered fewer pirate attacks. The center received 103 reports in

1993, against 107 in 1992 and 115 in 1991.[31]

The marked reduction was judged by the IMO Working Group due to the following factors:

* the coordinated patrol and counter-measures implemented by the three States in the region since May/June 1992; and

* the improved protective measures taken by many ships navigating through the area, which appear to act as an obvious deterrent to the Low Level Armed Robbery (LLAR) groups.

2.4 SENSITIVE AND HIGH POLLUTION POTENTIAL AREAS

The pollution facing the Malaysian marine environment can be broadly categorized into two classes with respect to the pollution source. These are:

* Coastal pollution
* Pollution caused by maritime activities.

The majority of Malaysia's population live by the coast. The increase in population, industrialization and the demand for land has placed the coastal areas under the threat of pollution. In Malaysia the route of coastal pollutants is generally through:

* Water channels (rivers, canals, estuaries) that discharge pollutants directly into the sea.

* Direct dumping of pollutants into the marine areas from coastal settlements.

* Disturbance of the natural systems increasing the levels of waterborne materials.

There are three main maritime activities that contribute to the pollution of Malaysian seas namely:

* Harbor and port activities. These include all pollutants generated from such activities as oil discharges, sewage and solid waste discharges and discharge due to accidents at port.

* Maritime traffic discharge. This may either be voluntary or accidental and includes the accidental discharge of oil at sea by collision and the disposal of food and solid wastes at sea.

* Pollution due to discharge by fixed platforms at sea. This involves pollutant discharge from oil platforms and pipelines.

It has long been established that either accidental or deliberate discharge of oil by vessels is the most serious source of pollution in the Straits of Melaka. It has had the highest rate of maritime accident in the world (Royal Institute of Navigation, UK from Hindle 1985). As shown in figure 2.2, the percentage of samples, taken regularly along the west coast of the Strait, exceeding the standard for oil and grease has been on the increase since 1985.

An analysis of oil pollution data as shown in figure 2.3, shows that 50 percent of the time, oil is hardly detected in the estuaries of rivers draining the west coast of the Peninsular Malaysia, but in the open coastal waters and far away from the nearest estuaries, oil is detected in high

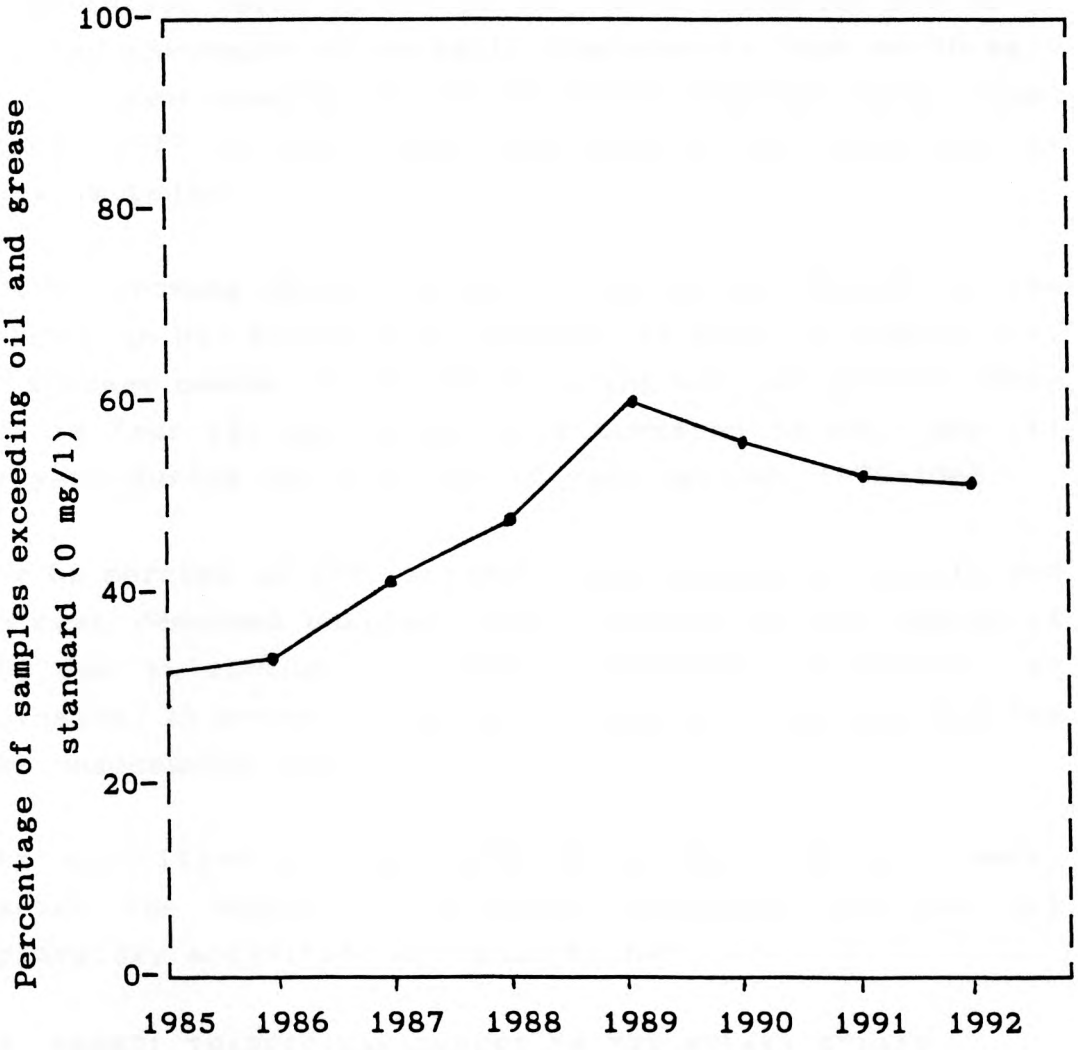

Figure 2.2 Strait of Melaka: Oil pollution along the west coast of Peninsular Malaysia, 1985-1992

Source: Malaysian paper on the safety of navigation in the Melaka Strait during the 18th TTEG meeting on February 1993.

concentrations. The expected mean value is over 4 milligrams of oil per liter of water (mg/l). Figure 2.3 also shows that the pollution level in any of the three estuaries has never exceeded the value of 16 mg/l, compared to that of 30 mg/l in the open coastal waters.[32] These figures were taken between 1979 to 1982, when the traffic was still not as heavy as today.

Another growing threat of pollution in the Strait is the increase in oil spills from tankers. As shown in figure 2.4, the average number of incidents during the last period 1986-1992 is four (4) spills per year compared to only one (1) per year during the previous 10 year period, 1976-1985.

Over 82 percent of the incidents were caused by vessels and the rest remained unknown. Fifty percent of the incidents were due to accidents: vessel collisions, grounding. or explosion; 25 percent relating to tankers' cleaning, and the rest unaccounted for.

Port activities on the South China Sea side are lower. However the number of drilling platforms and the oil exploratory activities are much higher.

2.5 VESSEL TRAFFIC MANAGEMENT IN THE MELAKA STRAIT

The Strait of Melaka has a special significance. It is the longest in the world,[33] approximately 520 miles in length and varies in width from 200 miles in the north to 11 miles at the southern extremity. This seaway is also the shortest route for tankers trading between the Persian Gulf and East Asian countries.

Depths within the straits are irregular and there are many

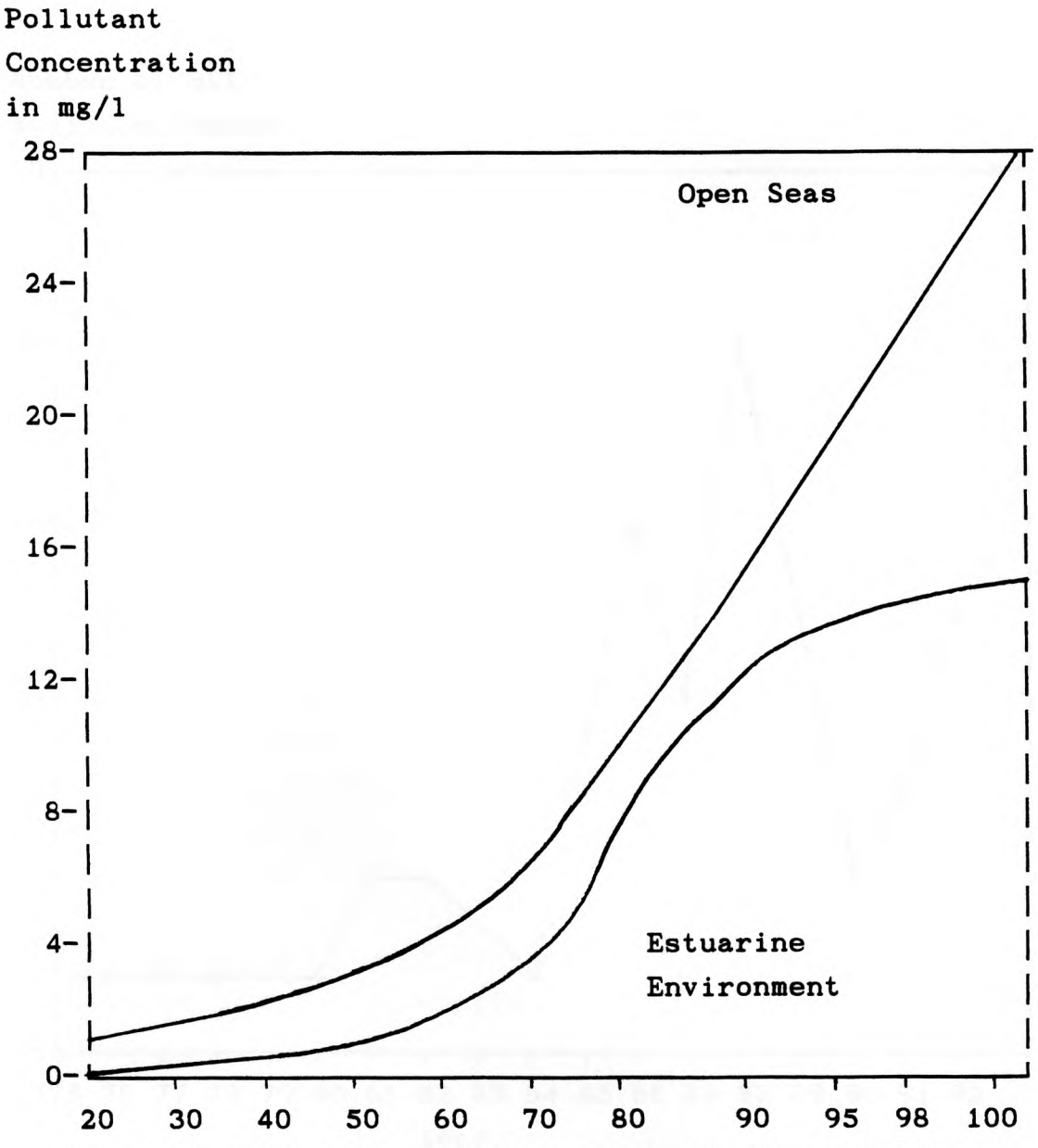

Figure 2.3 Distribution characteristics of oil pollution in the Estuarine environment and in the Open coastal waters, 1979-1982.

Source: Malaysian paper on the safety of navigation in the Melaka Strait during the 18th TTEG meeting on February 1993.

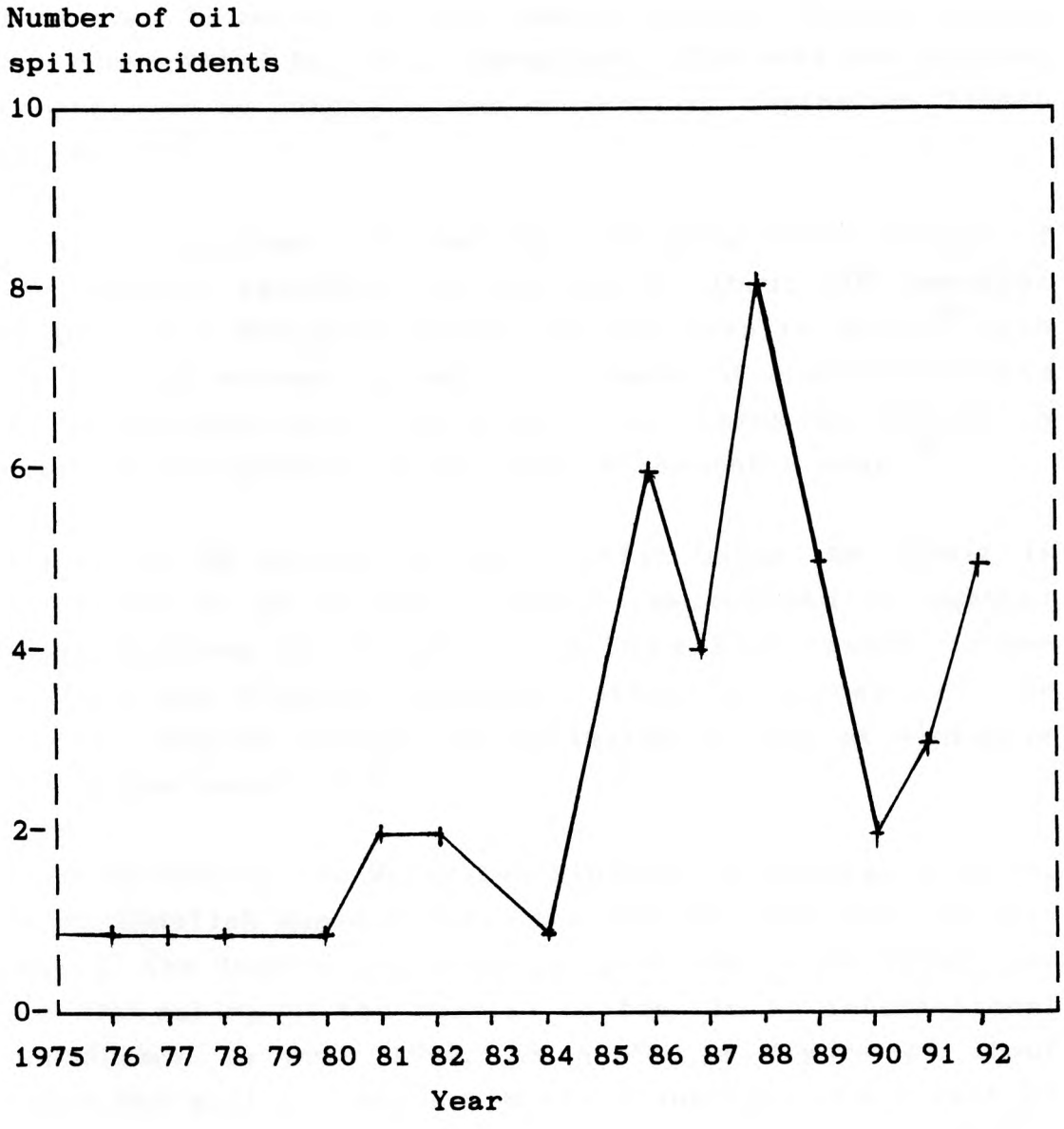

Figure 2.4 Strait of Melaka: Oil spill incidents, 1975-1992

Source: Malaysian paper on the safety of navigation in the Melaka Strait during the 18th TTEG meeting on February 1993.

areas of sandwaves. Depths in the main shipping channel vary from over 73 meters to less than 25 meters. Through routes are constricted by local topography. Channels are further constricted by sandbanks and controlling depths are liable to change.[34]

It is an important international shipping route and one of the busiest waterways in the world. About 300 merchant ships* and 1,800 minor crafts use the straits daily.[35] With the vibrant economic growth environment of countries within ASEAN and East Asia, the traffic utilizing the strait is expected to increase by at least 8 percent a year.[36]

A much as 90 percent of the traffic using the strait is estimated to be transit traffic (as opposed to coastal shipping along the Malaysian and Indonesian coasts, cross-traffic and fishing vessels). About 80 percent of the vessels passing through are estimated to call at Singapore for bunker supplies.[37]

As mentioned by the Malaysian Minister of Foreign Affairs, Datuk Abdullah Ahmad Badawi, the sad and true fact is that many of the dangers and potential problems to the Strait are not the making of the coastal states. In an international conference in June 1994, he quoted a figure of about US$60,000 million which vessels transiting the Strait of Melaka have been estimated to save annually compared to the cost of using the nearest alternative route. This runs east of the Indonesian island of Bali, through the Straits of Lombok and Makassar and the Celebes Sea, and could add as much as one and a half to two and a half days to the voyage of a ship en route to Japan (see figure 2.5).

Malaysia's most highly developed industrial and commercial

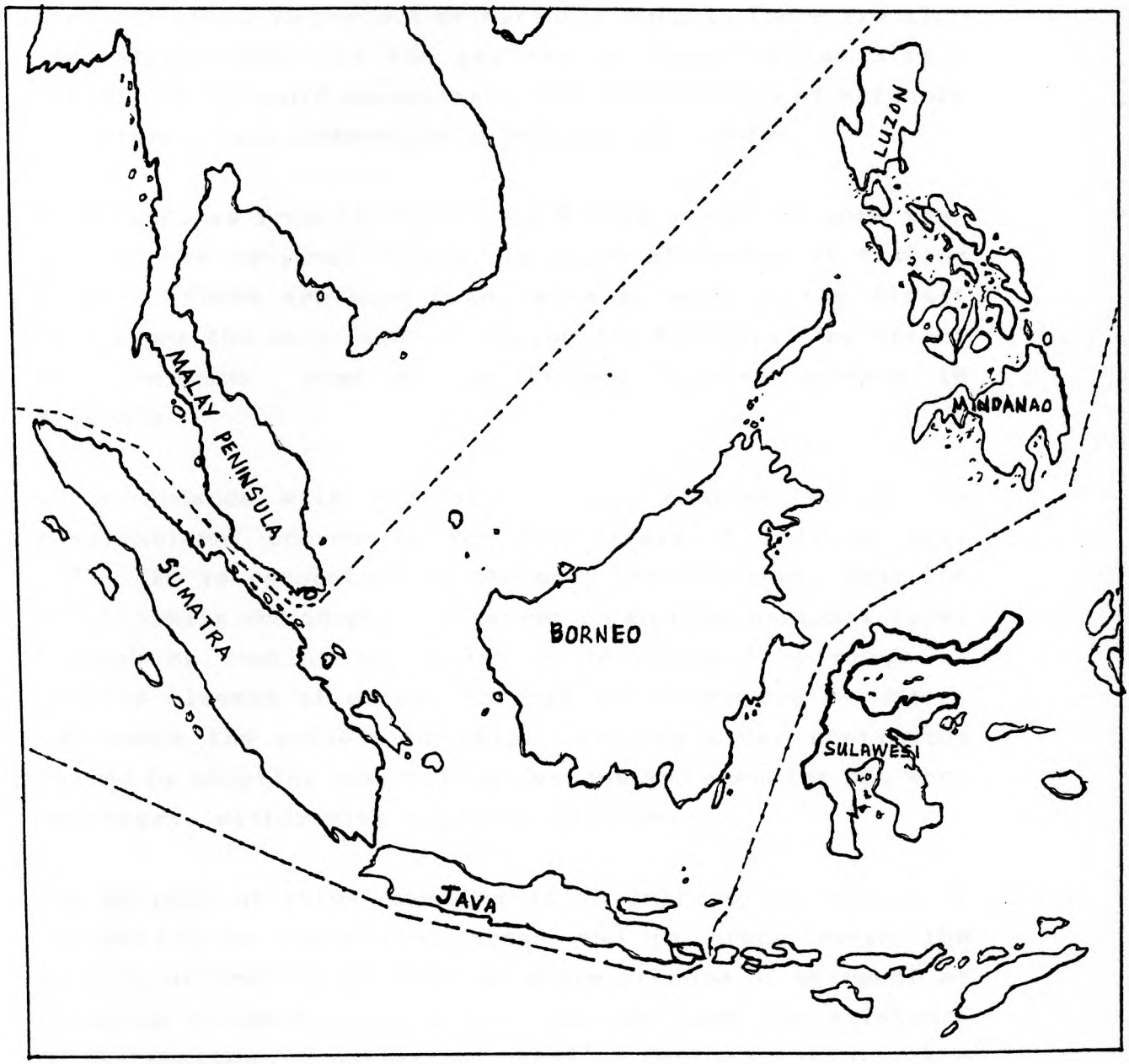

Figure 2.5 Comparison between the routes via Melaka Strait and via the Lombok and Makassar Straits.

Source: Author

centers are located along the Strait of Melaka. About 65 percent of Malaysia's population lives in this area which produces about 70 percent of national output. There are also indications that oil and gas may be found in the Strait itself, which would necessitate the construction of offshore structures, and underwater pipelines and cables.

Fish landings from the Strait of Melaka amount to more than half of the national output. In terms of number of fishing vessels, there are more than twice as many in the Strait than along the east coast of Peninsular Malaysia. The Strait also contains some of the largest tourism centers in Malaysia.

In accordance with regulation 8(b), chapter V, of the International Convention for the Safety of Life at Sea, 1974, IMO is recognized as the only international body for establishing and adopting measures on an international level concerning routing and areas to be avoided by ships or certain classes of ships. Through its appropriate bodies, IMO keeps the subject of ships' routing under continuous review by adopting new routing systems and amending or, when necessary, withdrawing existing systems.

The purpose of ships' routing is to improve the safety of navigation in converging areas and in areas where the density of traffic is great or where freedom of movement of shipping is inhibited by restricted sea-room, the existence of obstructions to navigation, limited depths or unfavorable meteorological conditions.

The precise objectives of any routing system will depend upon the particular hazardous circumstances which it is intended to alleviate, but may include some or all of the

following:

* the separation of opposing streams of traffic so as to reduce the incidence of head-on encounters;

* the reduction of dangers of collision between crossing traffic and shipping in established traffic lanes;

* the simplification of the patterns of traffic flow in converging areas;

* the organization of traffic flow in or around areas where navigation by all ships or by certain classes of ship is dangerous or undesirable;

* the reduction of risk of grounding to providing special guidance to vessels in areas where water depths are uncertain or critical;

* the guidance of traffic clear of fishing grounds or the organization of traffic through fishing grounds.

Traffic separation schemes have been established off One Fathom Bank and in the north west approach to Singapore Strait. There is no routing system between these two schemes. The latter leads into a further scheme in Singapore Strait and thence to South China Sea in the vicinity of Pulau Batu Putih (Horsburgh Light). Refer to appendix 2.1.

In addition to Rule 10 (Traffic Separation Schemes) of the International Regulations For Preventing Collisions At Sea, there is a special rule for vessels navigating through the Straits of Melaka and Singapore. Refer to appendix 2.2.

In June 1989, the Malaysian Ministry of Transport, in an endeavor to promote the safety of navigation and to improve the protection of the environment, entered into a cooperation agreement with Canada for the conduct of a feasibility study for a Vessel Traffic System (VTS) for the Malaysian Straits. These straits consist of the Straits of Melaka, Johor and Singapore. The general policy for the recommended VTS ascertained by the study group was stated as follows:

> The system shall provide for the regulation and control of vessels using the waters and ports of Malaysia, the minimizing of pollution caused by vessels and other matters affecting vessels and navigation in the waters of Malaysia.

The study group also determined that the system major objective was the reduction of risks to life, the environment and property which are posed by the potential for the marine accidents within Malaysian waters. The system was to have the general objectives of:

* assisting and enhancing the safe and expeditious movement of shipping within Malaysian waters,

* providing, as may be considered appropriate support to other interested parties as they pertain to marine activity.

A general risk assessment was made by the study team to determine the areas of the waterways which represents the highest risks to navigation so that effective planning of the VTS can be undertaken.

The rapid growth and development of tanker traffic through the Melaka Strait has heightened the concern of Malaysia, Singapore and Indonesia on the threat of oil pollution arising from ship accidents. The three major shipping accidents in 1992 within three months of each other, and five more in 1993 prompted the three littoral states to highlight the need for stronger and more effective measures to protect the environment.

The concern of the states was reflected in the convening of the 18th meeting on February 1993 of the Tripartite Technical Expert Group on the Safety of Navigation in the Straits of Melaka and Singapore. Suggestions were made that the Traffic Separation Scheme introduced in 1980 was no longer adequate to meet the current situation.

Malaysia is now in the process of implementing the VTS system. It has recently firmed up contracts for the installation of 10 radar and communications stations to be installed from One Fathom Bank to Tanjong Piai in Johor.[38]

Professor Edgar Gold of Canada, a law adviser to the Malaysian authorities, told in a recent international conference that Malaysian costs for installation of present navigational aids exceed US$16.5 million with an annual maintenance costs of close to US$3.8 million. In addition, hydrographic surveying and related costs incurred by the Royal Malaysian Navy are estimated at over US$4.6 million. But by far the greatest cost relates to surveillance in the Melaka Strait. In 1993, this cost amounted to some US$385.5 million.[39]

2.6 MALAYSIA'S MANAGEMENT OF MARINE BIODIVERSITY

A paper presented by A. Sasekumar of the University of Malaya states that the marine biodiversity has been explicitly described by Grassle et al. (1991) in the following manner:

> Diversity is a basic property of life. It is clearly displayed at all levels of organization in undisturbed natural ecosystems and is usually considered to be essential for the survival of these ecosystems. It provides the variability needed to cope with the changes implicit in nature.

He mentioned further that Ishwaran (1992) alluded that to protect and sustain biological diversity, it is essential to maintain a system of large national parks or Biosphere Reserves in all major marine environments such as coral reefs, mangrove forests, seagrass beds and others. Each Biosphere should consist of a core area, buffer and transition zones.

The major marine ecosystems in the Malaysian marine environment comprise the open sea, mudflats, sandy shores, rocky shores, coral reefs, estuaries and mangrove forests. The shallow coastal ecosystems which harbor much of the nation's marine diversity are unevenly distributed along the coastline.

To protect some of the areas mentioned above, Malaysia has gazetted representative habitats under several protected area categories as (i) Marine parks and protected areas and (ii) Forest Reserves, Wildlife Sanctuaries/Reserves and

National Parks.

So far the waters of twenty-two islands off the coast of Peninsular Malaysia have been gazetted as 'Marine Parks'. The management of these parks is however impeded by the fact that the land on the islands at the center of the marine park is not gazetted under the jurisdiction of the Department of Fisheries, despite being an integral part of the parks itself. This anomaly has led to problems in controlling human activities on the island which can have detrimental impacts on the park ecosystem. There are currently three State parks in Sabah which encompasses major marine areas and several islands within these areas. Sarawak has a park which includes the Turtle Islands to be managed by the National Parks and Wildlife Office (NPWO).

A. Sasekumar added that Gan (1993) elaborated that Malaysia is endowed with 767,566 hectares of mangrove forests. The trees are mostly harvested on a rotational basis every 30 years. Annually approximately 1,000 hectares are harvested, and the timber mainly used for charcoal production and piling in the construction industry. Regeneration of the forests occurs naturally or through manual replanting. The management of mangroves aims to meet the twin objectives of maximizing wood production to meet the requirement of the coastal industry as well as sustaining the viability of the mangrove ecosystem as nursery and feeding sites for marine life including commercially important marine fish and prawns.

Although the management of the mangroves in some states is among the best in the world, in some areas the mangrove forests are being destroyed through reclamation at a rapid rate. Presently the Forest Department is on a course of

maintaining the successful strategy of only allowing reclamation of mangrove land for vital national projects.[40]

Reportedly, the mangrove forests contained 127 species of birds, not to mention the migratory birds which use the Malaysian coast as resting and feeding places during their seasonal migration. Approximately 200,000 waders of 30 species reportedly fly twice a year along the west coast of Peninsular Malaysia. The protection of threatened habitats and species is in line with the recommendations of the Convention of Biodiversity of which Malaysia is a signatory.

Scenic areas of the coastline including coral reefs may be best managed by being declared national parks. A management plan has been implemented for Malaysian Marine Parks similar to the one adopted by the Great Barrier Reef Authority of Australia. The coral reefs are divided into management sections:

* General use 'A' zones in which commercial fishing is permitted.
* General use 'B' zones in which only recreational fishing is permitted.
* A marine national park in which all fishing is prohibited and access limited to designated tourist boats.
* A scientific research zone which allows for conduct of a research station.
* A preservation zone of prohibited access and in addition specified areas in which there would be intermittent and seasonal restrictions on fishing.

Appendix 2.3 shows the areas identified for fisheries activities, turtle landing, recreational activities, and the

coral and mangrove areas.

CHAPTER 2 - Endnotes

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2. In 1819, the British acquired Singapore from the Sultan of Johor. In 1824 Britain acquired Melaka from the Dutch in exchange for Bencoolen in Sumatra. Two years later Pulau Pinang, Melaka and Singapore became collectively known as the Straits Settlements. Malaysia, Malaysia in Brief: 1991 (see above No. 1), p. 17.
3. Malaysia, Malaysia in Brief: 1991 (see above No. 1), p. 17.
4. Malaysia, Malaysia in Brief: 1991 (see above No. 1), p. 20.
5. Peninsular Malaysia has a land frontier with Thailand in the north; south it is linked to Singapore by a causeway. To the west of the Peninsula and south of East Malaysia is Indonesia; while east of Sabah is Philippine separated by the Sulu Sea. Malaysia, Malaysia in Brief: 1991 (see above No. 1), p. 1.
6. Peninsular Malaysia has an area of 131,587 square kilometers while Sabah and Sarawak cover 74,398 and 124,449 square kilometers respectively. Malaysia, Malaysia in Brief: 1991 (see above No. 1), p. 1.
7. The west coast of Peninsular Malaysia is most accessible because the Strait of Melaka is sheltered. Access to the east coast during the northeast moonsoon period (october - February) is difficult. Malaysia, Malaysia in Brief: 1991 (see above No. 1), p. 2.
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32. Protection of the Marine Environment in the strait of Melaka and Singapore. (1993, February). 18th Tripartite Technical Experts Group Meeting on the safety of navigation in the Straits of Melaka and Singapore (TTEG) 25-27 February 1993, Kuala Lumpur. Malaysian paper.

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Chapter 3

MARINE ENVIRONMENTAL PROTECTION FRAMEWORK

3.1 MARINE POLLUTION

In the shipping industry, marine pollution is generally understood to mean oil pollution. The joint Group of Experts on the Scientific Aspects of Marine Pollution (GESAMP) which is drawn from various United Nations (UN) agencies, including the International Maritime Organization (IMO) has attracted attention to Principle 6 of the UN Conference on the Human Environment which states that:

> The discharge of toxic substances or of other substances and the release of heat, in such quantities or concentrations as to exceed the capacity of the environment to render them harmless, must be halted in order to ensure that serious or irreversible damage is not inflicted upon ecosystems.

In this chapter the author will focus on oil pollution, of which the main concerned source is ship related.

Oil input into the sea has fortunately declined over the years, despite an increase in the world energy consumption. Oil's share of the energy provider has remained relatively balanced at about 39 percent, with 60-70 percent being carried by sea. Table 3.1 itemized the level of seaborne trades in the period 1984-90.

Table 3.2 demonstrates that over the years 1975 to 1988, there was an obvious improvement in the general safe management of oil shipped by sea. About 75 percent of the tanker spillage recorded in the table is accounted as small

Table 3.1
SEABORNE OIL TRADES, 1984-90
(Millions of tonnes)

Year	Crude	Products	Total
1984	1,099	260	1,359
1985	1,028	242	1,270
1986	1,182	267	1,270
1987	1,197	273	1,470
1988	1,254	294	1,548
1989	1,311	290	1,601
1990	1,370	283	1,653

Source: Drewry Shipping Consultants Ltd.

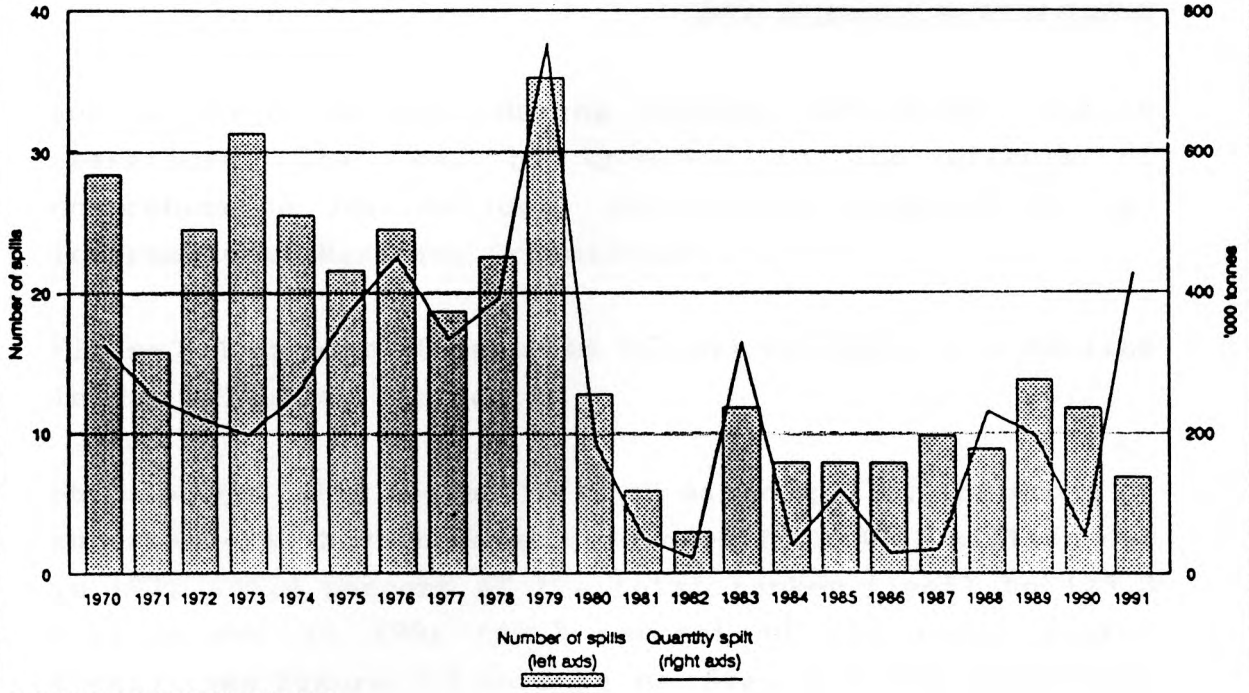
Table 3.2
INPUTS OF PETROLEUM HYDROCARBON INTO THE MARINE ENVIRONMENT FROM MARINE TRANSPORT (Millions of tonnes per annum)

	1975	1985	1988
Tanker operations	1.08	0.7	0.4
Drydocking	0.25	0.03	0.024
Marine terminals	0.003	0.02	0.022
Bilge and fuel oils	0.5	0.3	0.28
Tanker accidents	0.2	0.4	0.09
Non-tanker accidents	0.1	0.02	
Total	2.133	1.47	0.816

Source: United States National Academy of Science
IMO Manual on Oil Pollution
Drewry Shipping Consultants Ltd.

Figure 3.1

WORLDWIDE INCIDENCE OF OIL SPILLS OVER 5,000 BBLS AND ESTIMATED QUANTITY SPILLED*

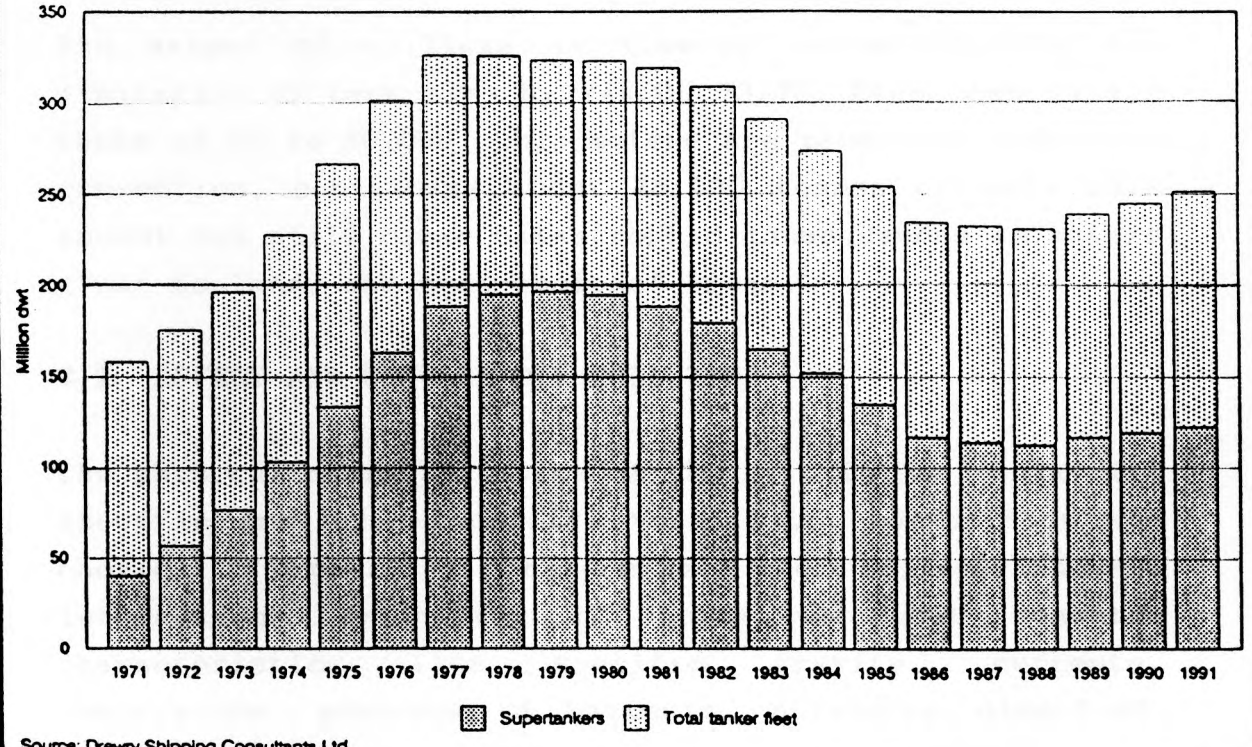


* Spills from tankers, combis and barges.
Source: Drewry Shipping Consultants Ltd.

Figure 3.2

DEVELOPMENT OF THE SUPERTANKER FLEET

As at mid-year



Source: Drewry Shipping Consultants Ltd.

and occurred in port during loading and other routine operations. This may be credited to the effects of comprehensive international regulations promoted by the International Maritime Organization.

Figure 3.1 on page 40 depicted further evidence of a decline in oil pollution incidents.

Ships potentially responsible for major spills, the group of supertankers, have however developed from 40.1 million dwt in 1971 (25.4 percent of the total tanker fleet) to 123.3 million dwt in 1991 (49.3 percent of the total tanker fleet). See figure 3.2 on page 40. Even with the relatively good safety record of the world tanker fleet, the sensitive areas of the world are at great risk if one or more tanks of a nearby supertanker is breached. Major spills have occurred with devastating effects in locations where the public have protested forcefully.

The extent of spillage is however minimized with the limitation of tank size by MARPOL 73/78. Even then single tanks of up to 50,000 cubic meters are permitted under the convention, containing about 45,000 tonnes of oil. This amount can still cause catastrophic consequences in waters close to land, and semi-enclosed areas.[1]

3.2 EFFECT AND COST OF OIL POLLUTION

The physical characteristics of the oil, in particular its specific gravity, viscosity, volatility, composition and chemical properties determine the oil-environment interaction. Meteorological conditions and seawater characteristics like specific gravity, currents, temperature, presence of bacteria, nutrients, dissolved

oxygen and suspended solid also determine the interaction process.

In the initial stage, the most significant factor in the spread of oil is the volume of oil spilled. A large immediate spill will spread more rapidly than a slow discharge. Other considerations such as surface tension, temperature and weather conditions will soon have an influence.

For effective cleanup measures, the oil slick needs to be tackled without delay. After a few hours the oil slick will begin to break up into bands, or 'windrows', parallel to the wind direction. Dispersion will occur through evaporation. The rate depends upon the volatility of the oil, the temperature and wind speed. Emulsification also takes place. Under some circumstances water-in-oil emulsions may be formed of the 'chocolate mousse' type. They become thinner when stirred by waves but revert to high viscosity when still, in which case they may become so dense through absorption of seawater that they eventually sink.[2] The prevailing winds and current will then determine the slick movement.

The extent of damage that may occur may briefly be summarized as follows:

* Ecological effects resulting in physical and chemical changes in habitats, toxicity and increased mortality; also giving rise to changes in growth, physiology and behavior in individual species or entire communities of organisms.

* Physical contamination by floating oil or water-in-oil

emulsions of mammals, birds and fish. The effects can be particularly severe to life in still, shallow water and near beaches of pebbles or coarse sand and in sheltered tidal flats or mangroves.

* Ecotoxicology effects due to toxic compounds in the oil. These effects may be acute during the early stages of a spill.

* Bioaccumulation and tainting which contaminate seafood and may last for months.

* Fouling of recreational, commercial and industrial facilities may have grave economic effects and pose dangers to the public, vessels or industrial plants depending upon seawater for cooling or other purposes.

The expenditure incurred following an oil spill need not be over-emphasized. In 1967 the Torrey Canyon was wrecked off the coast of England with a loss of over 100,000 tonnes of crude oil, and cleanup costs were estimated at $16 million in 1967 US dollars. The local ecology deteriorated severely from the oil spillage, and from the effects of the harmful dispersant used at that time, over a period of several years.[3]

In 1978, the Amoco Cadiz grounded off the coast of France. However evidence of oiled beach sediments was found to be still present in 1989. This resulted in a US Federal Appeals Court awarding over $253 million in damages against Amoco. See table 3.3.

The 214,861 dwt Exxon Valdez ran aground off the port of Valdez, Alaska, on 24 March 1989, rupturing eight of its 11

Table 3.3
SUMMARY TOTAL OF RECOGNIZED CLAIMS ARISING FROM 'AMOCO CADIZ' SPILL

Claims	Value FFr
Republic of France	201,933,707.39
Communes	46,191,289.00
Calvez claimants	2,273,468.00
Speizer & Krause claimants	841,576.73
Sterns, Walker and Grell claimants	259,000.00
Oyster growers	813,327.00
Fishermen's Association	00.00
Local Fishing Committee of Brest	165,000.00
Environmental Associations	300,457.00
Total	252,837,825.12

Calculation of principal and interest
Beginning December 31, 1979, compounded annually at 7.22 percent.
Exchange rate 6.28 FFr = US$1.00 (September 1988 rate)

Date	Francs	US Dollars
31 December 1979	252,837,825.12	40,260,800.18
31 December 1988	473,504,675.76	75,398,833.72

Source: 1989 Oil Spill Conference

cargo tanks and spilling 10.8 million gallons (36,000 tonnes) of crude oil into Prince William Sound. It was a costly affair for Exxon, with the settlement made between Exxon and the Federal Government and the State of Alaska agreed in October 1991 at US$1.25 billion for criminal and civil fines for damage to natural resources.

Oil companies and the shipping industry have suffered

stupendous costs, not only in cash terms but also as regards legislative regulation and consequential expenditures. The following table 3.4 outlines prominent incidents and the resultant series of international regulations.

3.3 MAJOR POLLUTION INCIDENTS AND INTERNATIONAL REGULATORY RESPONSE

Since the last few years, the issue of marine pollution has become much more fundamental. Table 3.4 enumerates the events and ramifications of the major oil pollution incidents since 1967.

Table 3.4

CALENDAR OF MAJOR POLLUTION INCIDENTS AND INTERNATIONAL RESPONSE

Year	Events and Ramifications
1967	*Torrey Canyon* ran aground near south coast of England spilling 120,000 tonnes of oil. Grave environmental damage to south coast of England, clean-up costs of $16m.
1969	International Conference relating to Intervention on the High Seas in Cases of Oil Pollution - Gave right to coastal states to intervene to protect their coasts.
1969	International Conference on Civil Liability for Oil Pollution Damage (CLC) - Provided for uniform rules for compensating victims of oil pollution.
1971	Conference on the Establishment of an International Compensation Fund for Oil Pollution Damage - Gives compensation and indemnification to supplement CLC.
1973	International Conference on Oil Pollution (MARPOL) covering tanker design equipment and operation.
1978	*Amoco Cadiz* ran aground on north coast of France spilling 232,000 tonnes of oil - grave environmental damage to French coastlines. France introduces supervision of tankers off her coast - Amoco ordered to pay damages of $200m.
1978	*Andros Patria* ran aground on coast of Spain spilling 47,000 tonnes of oil.
1979	*Burmah Agate* collision and fire, Texas, 35,000 tonnes of oil burnt and spilled.
1988-89	*Karin B* with a cargo of toxic waste from Nigeria, where it had been dumped, was refused entry

into British ports. Outcry about waste led to Basle Convention.

1989 *Exxon Valdez* ran aground off the coast of Alaska spilling 35,000 tonnes of oil causing grave environmental damage, total cost of clean-up $1bn with further heavy costs for fines, damages and precautionary measures.

1989 *World Prodigy* grounded south of Newport RI, USA spilling 1,400 tonnes of oil, great threat to Narragansett Bay rich in sealife.

1989 *Khark 5*, 248,000 dwt exploded off north-west coast of Africa, 70,000 tonnes of crude oil spilled, had to be towed 1,500 miles to south for remaining cargo transferral because no nearby nation would allow her near their coasts.

1989 International Conference on Salvage - New convention and rules on the law of salvage.

1990 Basle Conference on the Transboundary Movement of Hazardous Waste - Defines and controls movement of a wide range of waste.

1990 US OPA 90 calls for double hull tankers and other stringent anti-pollution requirements.

1990 International Conference on Oil Pollution Preparedness, Response and Cooperation - Calls for worldwide organization against oil spillage.

1990 *Mega Borg* caught fire in Gulf of Mexico threat to valuable oyster and shrimp beds.

1992 International moves for double hulled tankers and possibly alternative design. Tightening up of MARPOL and SOLAS requirements.

1992 EC has 137 environmental proposals in train, some dealing with water pollution. USA, Australia and other nations introducing strict environmental laws affecting shipping.

Source: 1993 Drewry Shipping Consultants Ltd.

3.3.2 Regulatory Response

One of the International Maritime Organization's (IMO) major aims is to adopt 'the highest practicable standards in matters concerning maritime safety and the prevention and control of marine pollution from ships and related activities'. Most international legislation is now based on conventions held by IMO. There are three major international conventions: MARPOL, concerned with marine pollution; SOLAS, concerned with the safety of life at sea; and STCW, concerned with optimizing crewing standards.

Present pollution legislation dates mainly from the MARPOL Convention of 1973 as amended in the Tanker Safety and Pollution Protocol Prevention (TSPP) Convention of 1978. The resultant combined instrument is commonly referred to as MARPOL 73/78, of which Annex I is concerned with crude oil.

On October 2nd 1983 the MARPOL legislation became effective when installation of Dedicated Clean Ballast Tanks (CBT), Segregated Ballast Tanks (SBT) or Crude Oil Washing systems (COW) became mandatory for all existing crude tankers over 40,000 dwt. Existing products tankers over 40,000 dwt were required to have either SBT or CBT. All new crude tankers of 20,000 or over are to be fitted with SBT and COW. SBT is required on all new products tankers in excess of 30,000 dwt while COW is required on such vessels exceeding 20,000 dwt.[4]

Additional MARPOL regulations set acceptable levels of operational discharge and require the government of each contracting party to 'ensure the provision at oil loading terminals, repair ports, and in other ports in which ships have oily residues to discharge, of facilities for the reception of such residues and oily mixtures as remain from oil tankers and other ships ...'. The Convention was amended in 1984, with new requirements detailed for the carriage of oily-water separating equipment and oil discharge monitoring systems.

Prevailing safety legislation dates partly from the 1974 SOLAS Convention and partly from the TSPP Convention of 1978. The most important structural requirement under SOLAS is for the installation of the inert gas system (IGS), with which all crude and products carriers of over 20,000 dwt must now be fitted. Other requirements relate to minimum

levels of life-saving appliances, navigational equipment and general vessel structure requirements.

Amendments to SOLAS were adopted in both 1981 and 1983. The first set of alterations, which came into force in September 1984, was concerned chiefly with the duplication of control systems on steering gears and a tightening of rules on IGS. The 1983 changes, which took effect in July 1986, were mainly concerned with the location and separation of spaces on tankers and with life-saving appliances and arrangements. The period 1992-1999 is seeing the phasing in of the Global Maritime Distress and Safety System (GMDSS).

Present IMO legislation in relation to crewing standards dates mainly from the 1978 International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention) which entered into force in April 1984. The purpose of the convention is to set minimum international standards for seafarers. This sphere will be touched further in section 3.6 dealing with training and qualifications.

Via other conventions, some from quasi-official organizations such as the International Association of Classification Societies (IACS), and some from representative organizations such as the International Chamber of Shipping (ICS) and the Oil Companies International Marine Forum (OCIMF), additional regulations have been imposed. Some of the codes having their origin in, and enabled under international conventions, have the full force of law. Many of the codes, recommendations and guidelines, however, although not having the full backing of law, nonetheless gain effectiveness from being made a requirement under a commercial contract or being cited as

good practice by courts and arbitrators.

Since accidents may not be terminated by regulations, a wide range of containment and cleanup devices and techniques have been devised. Everyone responsible for handling oil on or near the marine environment has a legal duty to take all reasonable care to ensure that it is handled safely, and in the event of a spillage to respond in an effective manner. To be effective, preparation and training are necessary. Basically, the requirements for a contingency plan are the same at local or ship level, or on a regional or national basis. The strategy of the plan will cover policy, responsibilities and rationale, whilst the operational plan itself will give details of procedures to be followed, and will serve as a check list, training aid and information source. Chapter 4 will deal further on the aspect of an oil spill response contingency plan.

3.4 REGULATORY SUPERVISION

IMO stipulates that the hull and machinery of a ship are to be completely surveyed within a five-year cycle to conform with Classification and Safety Construction certification requirements. Annual inspections and surveys of certain features are also required for classification, safety construction, safety equipment, safety radio, loadline, marine pollution prevention, chemical and gas certification.

During the 1980s, with the accelerated movement of ships to flags of open registry, much direct flag state supervision was renounced in favor of a more direct involvement of the classification societies. There was also a continuing movement of ships away from shipping companies and independent tanker owners, leading to scattered safety

standards.[5]

Many States later became dissatisfied with the standards of safety of ships calling at their ports. This led to the introduction of an extensive system of random surveys by government surveyors. These Port State surveys ensure that all classification and statutory certificates are in force and that the required safety publications are on board. Additionally, manning, officer certification, identification documents and crew accommodation are covered, also log book entries, navigational aids, and navigational charts, publications and records. General safety matters such as emergency instructions, fire control plans and safety equipment are required to be satisfactory. The situation of Port State Control for the Asia-Pacific region will be dealt with in section 3.11.

Malaysia is not considered as an active member of IMO in terms of ratification or accession to IMO's conventions. At the end of 1993, Malaysia had become a contracting party to only seven of IMO's instruments, all of which are in relation to the safety of shipping. In practice, the implementation of IMO's conventions in Malaysia may be categorized into three groups. They are:

(a) conventions that have been accepted and enforced through national legislation;

(b) conventions that have been accepted but have yet to be enforceable through national legislation; and

(c) conventions which Malaysia is not a party to, but is incorporated into national legislation.

Malaysia has become a contracting party to a number of IMO conventions but missing are those concerning the prevention of marine pollution. Nevertheless it is preparing to accept these marine pollution related conventions in the hope of plugging a huge gap with respect to the prevention of pollution and matters related to it in Malaysia.[6] Along with it, there is also the need to tackle the anticipated adversity of supervision.

3.5 RESPONSIBILITIES AND THE VARYING VIEWS

The shipowner has a multitude of responsibilities to ensure the safety of his operations, including the maintenance of the vessel, her machinery and equipment. Failure to meet proper standards may involve a shipowner in civil or criminal liability, or other consequences of a lapse in safety.

Squeezed on the one hand by tight economic constraints, and on the other by international pressure to improve safety and environmental standards, the shipowner seek to place responsibility upon classification societies; to limit their liability in case of accidents. Classification societies who are competing with each other, maintain that they are doing their best to improve ship surveys, and try collectively to improve the ground rules. Many Port States demand higher structural and operational standards. Some States under domestic political pressure demand standards too high for the majority, and threaten unilateral action.

Flag states, in contention for tonnage, are torn between maintaining sufficiently high standards and providing an appealing package to shipowner. Ship managers attempt to lay down common standards to cover official and legal

requirements within their limited cash capability. Insurance underwriters and P&I Clubs viewing the level of rising claims with alarm, try to raise premiums, limit cover and take unilateral action to introduce new survey requirements. Environmentalists call for more drastic action while shippers seek lower freights.

The threat of regulatory action by IMO and some states surpasses all. Shipowner, faced with unlimited liability for oil pollution claims, seek ways of trading to the USA without risking everything. Maritime law however, has not always provided the best course in safety matters. Measures devised with the best of intentions by IMO have not always been implemented in a similar spirit.

The National Academy of Sciences (Washington D.C.),[7] in its report on implementation of MARPOL discovered that among other things:

(a) there is a lack of worldwide enforcement of the MARPOL Convention;
(b) there ia a lack of worldwide efficient monitoring;
(c) there is difficulty in identifying the source of oil spillage; and
(d) there is a lack of worldwide port state control systems.

With the multifarious problems, the future is still unclear.

3.6 TRAINING AND QUALIFICATIONS

The prevailing opinion amongst industry sources is that training and qualifications are far more important than design in abating the potential for accidents. Although

almost impossible to put a figure on the level of marine accidents attributable to human error, it is apparent from a number of separate reports produced that the vast majority of accidents result from human error.

The UK Mutual Steam Ship Assurance Association study in October 1991 found that human error was an identifiable cause of 58 percent of claims. The human element identified would have been even higher but for casualties caused by equipment failures arising from human error being classified as having mechanical causes. 25 percent of the casualties examined were attributed to officer error, while pilots whose job it is to aid safe navigation were found to have erred in 7 percent of cases. In January 1991 Colin Johnston of Gard (UK) claimed that as many as 90 percent of all marine disasters could be attributed to human error of one kind or another.[8]

Experts are increasingly claiming that working practices aboard vessels are becoming as substandard as the ageing world tanker fleet. While owners seem ready to spend large sums of money on quality vessels, it would appear that they are not willing to spend a relatively small amount on ensuring that quality ships are manned by quality crew members. Due to this, some of the problems emerging are identified as follows:

* Most deficiencies on substandard ships are due to the lack of proper maintenance or poor maintenance work by ship's personnel.

* Safety equipment is often neglected when the crew are able to deal only with the simple execution of a voyage using only the ship's main engines, navigation

equipment and cargo gear.

* Considerable knowledge and experience is needed to ensure operational readiness and crew efficiency. Unless the crew is well trained, panic will set in during an emergency.

* Enhancement of skills-on-the-job training according to ship type and size is missing. This is more crucial in reduced manning and shorter turn-around times.

* When crews encounter social, cultural and religious barriers in modern working practices, it is likely to discourage professionalism, commitment and true motivation.

Although the problems listed previously are serious, international regulatory moves to curb human error have been slow to develop. The 1978 International Convention on Standards of Training, Certification and Watchkeeping (STCW) aims to set global minimum professional standards for seafarers. Although the Convention only entered into force in April 1984, the fact that most of the research was carried out in the 1970s makes little of the Convention relevant to shipping today. However, it is worth noting that the Convention is under review and will be revised in the near future.

The aspect of training and preparedness in relation to oil spill response will be discussed further in Chapter 4. The focus on the role that the Akademi Laut Malaysia, being the premier maritime education and training institution in the country, can perform in the context of the Malaysian panorama will be dealt with in Chapter 5.

3.7 DEVELOPMENT OF LEGISLATION IN RECENT YEARS

In the 1990s, ship casualties have been on the increase. The recent few years have seen considerable change in maritime regulations relating to maritime safety and pollution. The turmoil truly began on 18 August 1990, when President George Bush signed the 1990 US Oil Pollution Act (OPA), generally regarded as the most radical response by a single nation to tackle the problem of marine pollution on its shores. The document involves two main policy strands:

* Unlimited liability - 'Any person owning, operating, or demise chartering' a vessel is deemed liable in the event of an oil spill. While federal limits of liability are imposed, liability is unlimited if the incident was caused by negligence or violation of regulations. In addition, states are free to impose their own liability levels.

* Double hulls - For all tank vessels over 5,000 gross tons serving the United States, a phasing out of single hull vessels and the phasing in of double hull vessels is required. All tankers must be fitted with double hulls by the year 2015.

The principle of unlimited liability received almost universal criticism. However the imposition of OPA enabled the increasingly large pro-double hull lobby across the world to gain a tremendous momentum, which eventually led to a draft IMO resolution being formulated in July 1991. Within nine months came the establishment of the first international framework for the introduction of double hulls on all new tankers and the gradual phasing-out of single hulls on existing vessels. The changes, adopted at a session

of the Marine Environment Protection Committee in March 1992, added two extra regulations to the MARPOL 73/78 document:

(a) Regulation 13F, where all oil tankers of 5,000 dwt and over must be fitted with double hulls, or mid-deck structure or any equivalent design accepted by IMO. See appendix 3.1.

(b) Regulation 13G, relating to enhanced program of inspection, and upgrading of ships.

These moves may lead to an improvement in tanker safety and help to achieve the aim of a world fleet of secure and well maintained vessels.

3.8 MALAYSIA'S ENVIRONMENTAL POLICY

Malaysia's overall environmental policy objectives since the Third Malaysia Plan (1976-1980) have always intended to '... balance the goals for socio-economic development and the need to bring the benefits of development to a wide spectrum of population ... against the maintenance of sound environmental conditions.' Further to this, the National Development Policy of the Second Outline Perspective Plan (OPP2)(1991-2000) categorically states 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'. Also outlined in the First Statement in Malaysia's Vision 2020[9] is that in the pursuit of economic development, Malaysia will also:

> ensure that her invaluable natural resources are not wasted. The land must remain productive and

> fertile, the atmosphere clear and clean, the water unpolluted, the forest resources capable of regeneration, able to yield the needs of the national development. The beauty of the land must not be desecrated for its own sake and for its economic advancement.

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 of 1974. As at 31 December 1991, 331 major projects have been subjected to the mandatory Procedure. The Environmental Quality Order 1987 specifies 19 broad categories of activities requiring EIA prior to project approval or implementation. This strategy requires commitment and close cooperation of all parties involved namely, the project proponent, the assessor or consultant, the relevant approval authority, the enforcement agency (DOE), experts and specialists as well as the public and public interest groups.

DOE promotes a comprehensive and holistic approach in development planning by incorporating environmental factors into resource utilization plans. The pollution control and prevention strategy is supported by other on-going environmental programs that include training, environmental monitoring, environmental education, information dissemination, new program simulation, inter-agency and Federal State cooperation and coordination, and international environmental affairs. Nevertheless the author would like to point out that the training on the oil spill

response part is very much lacking. This aspect will be dealt with in Chapter 4 and 5.

3.9 IMPLICATIONS OF CHAPTER 17 OF AGENDA 21 ON THE MANAGEMENT AND CONSERVATION OF THE MALAYSIAN MARINE ENVIRONMENT

The seventeenth chapter of Agenda 21 is titled 'Protection of the Oceans, All Kinds of Seas, Including Enclosed and Semi-enclosed Seas, and Coastal Areas and the Protection, Rational Use and Development of their Living Resources'. One of the program areas of Chapter 17 identifies the need for an integrated policy and decision making process as its main objective. Key to achieving this and integrated management and sustainable development of coastal area and resources management in general is the existence of a cohesive body of policies and legislation. These institutional tools are important as guidelines for resource management and development; and as instruments for enforcing environmental and developmental standards to control such processes.

Muhammad Nizam Basiron (1993) of the Malaysian Institute of Maritime Affairs states in his paper that in Malaysia, there is presently no one policy which governs the management and development of coastal resources and areas. However this is provided by sectoral policies which govern developmental activities occurring in coastal areas or control the exploitation of coastal resources. Some of the activities and respective policies are listed below:

* Industries - the Industrial Masterplan
* Urbanization - the National Urban Policy
* Tourism - the National Tourism Masterplan
* Agriculture and fisheries - the National

Agricultural Policy

* Forestry - the National Forestry Policy

He further stressed that these policies provide a fairly adequate coverage of developmental activities and programs. They are however lacking in their input towards the conservation of the marine environment.

The management and development of coastal resources are also governed by various action plans or programs developed at State level. Although these documents are sectoral in nature and are aimed at developing a specific sector or resource, many States now have sectoral development plans reflecting the plans or policies at National level.

One of the challenges facing planners in the marine resource management sector therefore lies in the need to try and reconcile different sectoral needs with the need to sustainably develop the country's marine and coastal resources.

3.10 DRIVING FORCES FOR REFORMS

In Malaysia, the situation regarding the legislative arrangements for the control of activities in coastal areas, and the exploitation of resources and conservation of marine resources mirrors that of the policy scenario. Laws governing the above issues are essentially sectoral in nature (the National Land Code 1965, the Exclusive Economic Zone Act 1984, the National Forestry Act 1984, the Fisheries Act 1985, the Petroleum Mining Act 1972, the Navigation Act 1965 and the Port Authorities Act 1963), except perhaps the Environmental Quality Act (in particular the Environmental Impact Assessment Order).

These laws provide a comprehensive coverage of activities within the marine sector. One important concern which is not sufficiently addressed in the present body of legislation is the relationship or exchanges between the land and the sea or freshwater bodies and the seas. Factors that should be considered include the flow of chemicals, nutrients, and sediments from rivers to the sea; and the impact of development activities such as the construction of infrastructure and resorts. Attention should also be given to the impact of recreational activities on the marine environment.

Equally important is the issue of enforcing the above laws particularly those relating to environmental quality. Much has been done to improve the cooperation between agencies involved in enforcing laws related to the marine environment particularly the Environmental Quality Act (EQA), and the Fisheries Act. With regard to the EQA, a control center was established at the Department of Environment (DOE) to coordinate enforcement activities at sea which is carried out mostly by the Marine Department. There is however still a need to enhance the capability of the Marine Department as well as other relevant agencies such as the Royal Malaysian Police and the Royal Malaysian Navy in the area of pollution detection.[10]

Chapter 17 of Agenda 21 identifies several key areas crucial to the sustainable development of marine resources. Generally, these areas can be divided into the following activities designed to alleviate some of the problems facing managers of the marine environment:

* The development of extensive monitoring systems for the collection and analysis of data and information.

* The prevention, reduction and control of degradation of the marine environment from land-based activities.

* Prevention, reduction and control of degradation of the marine environment from sea-based activities.

* Conservation and protection of threatened habitats and species.

* Evaluation of potential marine living resources.

Given the multitude of agencies responsible for the management of the Malaysian marine environment, and possibly for the implementation of some of the management actions mentioned previously, there is foreseeable need for a national level body to coordinate the different activities.

In an effort to strengthen Malaysia's position as a maturing maritime nation, the Malaysian Institute of Maritime Affairs was set up in 1993. It has successfully organized national and international conferences addressing the multifarious maritime related issues. The institute is expected to formulate concrete advice to the government, in particular the National Maritime Council in the Prime Minister's Department, on the best and most viable course of action in five main areas:

* Maritime security and diplomacy including piracy, naval strategies and merchant navy policies.
* Shipping safety and pollution prevention.
* Marine and coastal environmental protection.
* Maritime economics (e.g. fisheries) and ocean related industrial policy (e.g. port development).
* Ocean law and policy and, in particular, the

implications for Malaysia of the 1982 United Nations Convention on the Law of the Sea (UNCLOS) which is due to enter into force worldwide on 16 November 1994.

3.11 PORT STATE CONTROL

Most of IMO's conventions set forth two underlying concepts, i.e. flag state jurisdiction and port state jurisdiction. Flag state jurisdiction is the process of contracting governments enforcing the provisions of conventions on their own ships, and also sets the penalties for infringements. Whereas, port state jurisdiction, is the process of contracting governments exercising certain limited powers (which is provided under the conventions) in respect of ships of other contracting governments when visiting their ports.

The concepts as indicated previously are now the dominating features to ensure a much more global implementation of international conventions. A lot of innovative progress has been made to elaborate the duties of port states with regard to the enforcement of IMO's conventions. What materialized is a system of ship inspection known as 'port state control'. It is the exercise of port state jurisdiction by states' parties to convention, on foreign ships that are calling at their ports. Within IMO this has been recognized as an important aspect for the effective implementation of conventions.

Signed in Tokyo on December 1, 1993; the Asian-Pacific Memorandum on Port State Control was a document that has significance for marine safety, environmental protection and overall shipping standards in a region where there remains enormous disparities between the best, and the worst of

shipping. Based on the highly successful Paris Memorandum, which is currently being enhanced by its European signatories, the Asia-Pacific accord is a more ambitious document, in both the geographic dimensions of the region to be covered by its provisions, and the variety of shipping standards which are commonly to be found in this vast area.

The memorandum, which was signed by representatives of 18 nations[11] including Malaysia, may not be a legally binding document, but nevertheless implies certain responsibilities to inspect ships visiting their ports. There is a shared purpose in wishing to remove sub-standard ships from the region. The memorandum also provides a means of achieving this purpose through close communication between the subscribing parties.

A point to note is that most of the vessels transiting the Melaka Strait fly foreign flags. This means that Malaysia has little or no control over the standards of these vessels if they are not calling at its ports.

The anticipated problems identified by the memorandum are the understanding of a common language, sufficient knowledge of practical implications for maritime administrators, and a uniformity in inspection standards.[12] The Tokyo signatories have decided that one of the major priorities must be the development of uniformly high standards of technical expertise. It is hoped that the better-off members will help to train those from nations less able to provide suitable facilities.[13]

Chapter 3 - Endnotes

1. Experience of such casualties as the Torrey Canyon, Amoco Cadiz and Exxon Valdez shows that even low impact groundings of such ships lead to holing in more than one tank. Some of the damage and resultant pollution has been caused by hasty action in attempting to refloat the ship, and in other unwise actions.
2. Such sinkage perhaps being permanent in nature or perhaps taking place from time to time over hours or days. The buoyancy of the emulsion alternates between positive and negative values relative to temperature changes.
3. Additionally there are many outstanding claims for restitution by local interests amounting to millions of dollars.
4. For crude tankers the CBT option was withdrawn under the IMO schedule on 2 October 1985 for vessels over 70,000 dwt, and on 2 October 1987 for vessels between 40,000 and 70,000 dwt.
5. Supporters contend that open registries now comply with international regulations. Most states with a maritime tradition take an ambivalent view towards flag policy; while decrying the shrinkage of their national fleets and seeking to enhance safety at sea. They are unable to give economic support to their ships and also wish to continue to be involved in shipping activities even though this means that the activity is carried on under offshore, foreign or open registry flags.
6. Saripulazan, R. M. (1993). Principal Conventions, Standards and Codes for Safety of Shipping. pp. 4-5. In Proceedings of the National seminar on Maritime Safety, the Implementation of International Standards in Malaysia. Melaka: Akademi Laut Malaysia.
7. The MARPOL Convention: Implementation and Effectiveness, Gerard Peet, International Journal of Estuarine & Coastal Law Vol.7, No.4 Nov. 1992.
8. Training and Qualifications. (1992, September). Marine Pollution and Safer Ships: Implication for the Tanker Industry, p. 75. London: Drewry Shipping Consultants Ltd.
9. Environmental Policy. (1992, March), p. 3. Progress in Malaysia Towards Environmentally Sound and Sustainable Development. Kuala Lumpur: Ministry of science, Technology and the Environment.
10. Worries abound as port state control goes global. (1994, January). Lloyd's List Maritime Asia, p. 19.

11. The memorandum was signed by representatives of Australia, Canada, the People's Republic of China, Fiji, Hong Kong, Indonesia, Japan, the Republic of Korea, Malaysia, New Zealand, Papua New Guinea, Philippines, the Russian Federation, Republic of Singapore, Solomon Islands, Thailand, Republic of Vanuatu and Vietnam.

12. The Tokyo Memorandum of Understanding (MOU) has an ambitious target inspection rate of 50 percent of the total number of ships operating in the region by the year 2000. The area covered by the memorandum includes 40 percent of the world container port throughput, 33 percent of the world bulk import tonnages and 16 percent of the world bulk export tonnage.

13. Under the direction of the Marine Safety Committee (MSC) requirements are being developed to cover the 'human factor' in an update of the STCW convention.

Chapter 4

DETERMINING A PRAGMATIC CONFIGURATION IN STRATEGIC OIL SPILL RESPONSE CONTINGENCY PLAN

4.1 GLOBAL PERSPECTIVE

The 24th March 1989 Exxon Valdez oil spill of nearly 11 million gallons into the pristine waters of Prince William Sound, Alaska, USA, dramatically illuminated the gap between the assumed and actual capability of industry and government to respond to catastrophic oil spills. Prior to the incident, the US public and its officials were complacent about oil spill preparedness. Major damaging spills had occurred infrequently, and almost never in the United States.

Although the spill shattered the complacency of the public and captured the attention of the world, that particular incident ranked only thirty-fifth in terms of volume of oil spilled since the grounding of the Torrey Canyon in 1967. The grounding of the Torrey Canyon generated worldwide awareness of the hazards of ship-sourced oil pollution.

Aware that oil spills are inevitable, continuing emphasis must be put on the institution of known, effective preventive measures, as well as research into and development of new prevention techniques. Coastal nations, whether actively involved with the oil trade or just merely existing adjacent to passing traffic, should be prepared to deal with oil spills. The development of well designed contingency plans could be the most effective way of doing this. Along with it there is also the need for the development of efficient, operable response structures; procurement and maintenance of effective response equipment; and the training of response personnel, particularly through

drills and exercises.

It is common knowledge that the availability of comprehensive contingency plans is one of the most important prerequisites of a successful oil spill response. Contingency planning, in its ideal form, can best be defined as a behaviorally or scientifically designed approach of decision making predicated on an event that is of possible but uncertain occurrence and the determination, in advance, of the optimum course of action consistent with established goals.

Procurement and stockpiling of cleanup equipment in itself is not sufficient. The key to effective preparedness for oil spills appears to be the advance planning for an effective response structure. Preparing response even for minor spills involves an extremely large investment in equipment, personnel, and advance planning. Many nations have looked at what the most likely type of spill might be for their own particular situation, considering the amount of oil transported in their waters, their geographical locations, and what the likely impact on the environment will be.

Due to limited budgets, many current contingency plans contain only advisory information that is of little assistance in an actual spill emergency. Although it takes only one catastrophic spill to devastate the economy and the environment, such spills are considered to be statistically unlikely to occur (apart from in narrow, shallow and busy channels or straits).

In the case of the Exxon Valdez incident, the contingency plan (and its associated response equipment and personnel) that was in effect in the initial response, assumed a spill

of only 84,000 gallons. This was the spill size that Alyeska's consultant, Woodward-Clyde, considered to be the 'worst possible scenario' likely to occur once in 30 years. Such an incident occurred in Prince William Sound when the tanker Thompson Pass spilled 71,400 gallons of oil in January 1989. Less than three months later, the Exxon Valdez spilled 10.9 million gallons, creating a spill of a magnitude that Woodward-Clyde had previously calculated would occur only once in 241 years.[1]

Many nations have implemented changes in contingency plans and response capabilities in response to oil spills closer to their own shores. The Regional Marine Pollution Emergency Response Center for the Mediterranean Sea for example, has reacted not to the few accidents in the Mediterranean Sea, but the major spillages that occurred in the past in other parts of the world that have emphasized the risk.

4.2 PRESENT MALAYSIAN STRUCTURE

The scope of the Malaysian Oil Spill Response Contingency Plan covers all Malaysian waters including the exclusive economic zone in the Strait of Melaka, South China Sea, Brunei Bay, waters of Sabah and Sarawak, and the Sulawesi Sea. Its objectives can be summarized as:

* To have a coordinated and rapid response system in combating any oil spill in Malaysian waters.

* To upgrade capabilities using available resources in combating oil spills.

* To avoid any harmful effects to the marine life by preventing and controlling oil spills.

On a national level, the Contingency Plan is activated by the National Oil Spill Response Committee which is headquartered at the Department of Environment. The Committee consists of the following agencies:

* Department of Environment (Chairperson)
* Ministry of Home Affairs
* Ministry of Foreign Affairs
* Ministry of Defense
* Ministry of Transport
* Ministry of Housing and Local Council
* Department of Public works
* Oil Companies representative
* Shipowner representative

The Oil Spill Contingency Plan organization is very similar to the version recommended by the International Tanker Owners' Pollution Federation Ltd. (ITOPF). The plan is divided into two parts - a strategy and an operational plan. The strategy defines the policy, responsibilities, and rationale for the operational plan, which consists of a checklist of actions to be taken, and reference to the appropriate information sources. The response structures contain three main facets - advice, operations, and support.

The on-scene commander (OSC), who oversees and directs the actual operations of both shoreline and on-sea crews, receives information and advice on issues of salvage, firefighting, technical, scientific, legal, and insurance issues from individuals or agencies that specialize in these areas. Information obtained on-scene by the OSC is transmitted to the appropriate agencies to assist in decision-making, as well as for the proper documentation required by national, state, local, or industry regulations.

The OSC also receives support for cleanup operations in the form of communication, administration, public relations, and logistics. The logistics for an oil spill response are quite complicated, entailing the procurement of response vehicles, vehicles for road transport, vessels, aircraft, equipment, and materials from many sources, and some from distant locations, more so between east and west Malaysia. There are three levels of response, namely Local, Area and Regional.

The effectiveness of the Malaysian National Oil Spill Response Contingency Plan was put to the test when the 96,000 dwt Nagasaki Spirit spewed about 13,000 tonnes of oil in Malaysian waters. With oil slicks threatening to reach Malaysia's treasured island, Pulau Langkawi, the plan was activated and a major disaster averted.[2]

The author does not wish to elaborate on the responsibilities of each agency and how they fit into the structure of the National Plan. Nevertheless he would like to highlight the fact that it is stated in the Plan that the role of training is the function of the Department of Environment.

For effectiveness, training programs should be developed at all levels. The author is of the view that this is the major weakness of the overall structure and would therefore concentrate on the aspect of training within the context of the contingency plan in the following section. Chapter 5 will also elaborate on the reasons as to why Akademi Laut Malaysia should be given this role.

4.3 TRAINING AND PREPAREDNESS

To carry out a successful and rapid oil spill response, all

levels of responders must be prepared - from the on-scene commander or coordinator to the cleanup workers who operate the equipment. Each responder must be familiar with the procedures called for in a contingency plan, and must have expertise in operating cleanup equipment and vehicles, as well as knowledge about the relevant environmental, economic, and practical issues.

The successful implementation of the contingency plan is dependent on how conversant the user is with the plan. Some people have questioned the need for using elaborate contingency plans on-scene. Many individuals merely rely on their accumulated experience in responding to oil spills.

Studies have shown that a strong commitment to response training will lead to a higher level of preparedness by personnel at all levels. For a country like Malaysia, there will be a need to train a high number of personnel. This is taking into account its central geographic location amongst its ASEAN neighbors, long coastline and vast Exclusive Economic Zone (EEZ). Other factors include the population concentration along the coast, the high offshore and marine traffic activities, and high dependency of the country on the marine resources and coastal tourism industry.

The International Tanker Owners Pollution Federation Limited (ITOPF) has determined that training of personnel through the use of practical exercises is essential for effective contingency planning.

> The mobilization and deployment of equipment under controlled conditions, in fair weather, with no oil, will test planned procedures and strategies and may highlight some of the

> difficulties likely to be encountered in a real spill.
>
> ITOPF (1987) manual

Training sessions give local cleanup crews, who often form the bulk of the labor in a spill situation, the opportunity to learn new skills and rehearse basic principles.

Contingency plans should consider the extraordinary resource demands placed on the response system in major oil spill accidents. Accordingly, plans should be improved through regular exercises and training. Oil spill preparedness is a constantly evolving process of incorporating lessons learned from simulated spills and actual incidents. Contingency planning grows from this continuing distillation of experience, shaping new requirements for response training, drills and exercises, equipment, and other resources.

During the response to the Exxon Valdez spill, valuable time was lost in training inexperienced workers. Some response personnel and governmental representatives did not fully understand the response structure and how it works, reducing the effectiveness of available on-scene organizations and resources through unrelated or overlapping efforts and management claims.

For the purpose of comparison, the Australian and Venezuelan systems of training are selected as follows:

The Australian Marine Oil Spill Center (AMOSC) provides the industry with a capability to respond to all industry spills and assist Government in responding to major oil spills. It is equipped with an extensive range of pollution response equipment and provides training as part of the National Plan

program. Three levels of training are conducted, namely for:

* senior government and industry management personnel, responsible for high level decision making and including Commonwealth/State appointed oil spill commanders,

* middle management personnel, responsible for managing operational responses, on scene coordinators, their deputies and scientific support coordinators,

* operator level personnel, those undertaking on-site clean up operations. In a major incident this would also include supervisors appointed as site managers.

The Australian National Plan has adopted a competency-based approach to training, which requires training strategies to be set for each of the three training levels, including the establishment of measurable objectives.[3]

Venezuela's national oil company and its branch companies opened a training center (CEPET) that established an integral training program for industry personnel and members of other organizations that participate in the national contingency plan. CEPET offers three levels of training courses - a three-day course for operators on spillage fighting; a five-day course for supervisors on spillage control; and a one-day course for managers of spillage analysis and decision-making.

In the Malaysian context, Akademi Laut Malaysia initiated a meeting in December 1992 inviting representatives from Petronas, Department of Environment and Marine Department. The meeting addressed the need to have a systems approach

towards establishing a national training scheme for oil spill response. This aspect will be further discussed in chapter 5.

4.4 CURRENT NATIONAL OIL SPILL RESPONSE RESOURCES

The national oil spill response resources are shared mainly by the government agencies, and the major oil companies operating in Malaysia. These resources are distributed at strategic locations all across the coast and at offshore platforms. Some are also placed onboard vessels serving the government agencies and supply vessels and tugs operating offshore.

For bigger spills, the Tiered Area Response Capability (TARC) headquartered in Singapore is available to assist due to the very good cooperation between the two countries and the close proximity. Since TARC is a private organization shared by the oil majors which are also operating and having interests in Malaysia, its capability of cleaning up 10,000 tonnes of oil spills can be further utilized.

In most of the annual exercises conducted in Malaysia, the TARC has always participated actively, indicating their strong support while taking the opportunity to exercise their skills in responding. However, considering the increasing number of loaded tankers moving through the Melaka Strait, this present capability would not be sufficient to manage a potential catastrophic spill although it is similar to the Australian capability.[4]

4.5 REGIONAL COOPERATION AND SYNERGY

Asian governments, committed to developing their economies, traditionally view environmental protection as a luxury they cannot afford.[5] But attitudes towards environmental and resource management are changing. When UNEP suggested forming a regional seas Action Plan, the governments of the region agreed. Southeast Asian countries saw a regional organization as a way to deal with common resource problems.

After a series of preliminary meetings, the East Asian Seas Action Plan was adopted in April 1981 at an inter-governmental meeting in Manila. The Action Plan aims to provide a framework for a comprehensive and environmentally-sound approach to coastal area development. In order to oversee its implementation the Coordinating Body on the Seas of East Asia (COBSEA) was established. This coordinating body, with representatives from each participating government, has overall authority to identify priorities and determine the budget. In 1987 COBSEA proposed a long-term strategy for managing the region's marine and coastal resources. At the same time UNEP helped launch the Association of Southeast Asian Marine Scientists (ASEAMS), in order to involve the science community and provide a mechanism for inter-regional cooperation.

The governments of Malaysia, Indonesia and Singapore have also acknowledged the urgent need for a systematically coordinated joint effort to enhance and improve all measures to protect the marine environment of the Straits. They have developed appropriate national oil spill response contingency plans to meet the threat to their environment. There has been cooperation among the national committees when called upon by each other. In view of the sharing of

the border in the Straits a coordinated post-spill response has been initiated. In January 1994 Malaysia entered an agreement with Brunei to jointly combat oil spill in the South China Sea. With it, the Malaysian oil spill response plan would have the most complete link in the Southeast Asian region.[6]

Japan has also donated 1 billion yen worth of equipment to the six ASEAN countries under the OSPAR (Oil Spill Preparedness and Response) project. OSPAR provides the financial assistance to establish 10 bases in the six ASEAN countries. Each base will have a stockpile of oil spill combat equipment to enhance response capability. The project also provides for an information network system linking the six countries.

Regional plans will have to embrace a wide range of individuals, organizations, equipment and materials. In doing so, there are ten questions that need to be answered:

1. Has there been a realistic assessment of the nature and size of the possible threat, and of the resources most at risk, bearing in mind the probable movement of any oil spilled?
2. Have priorities for protection been agreed, taking into account the viability of the various protection and clean-up options?
3. Has a strategy for protecting and cleaning the various areas been agreed upon and clearly explained?
4. Has the necessary organization been outlined and the responsibilities of all those involved been clearly stated with no 'grey areas' and will all who have a task to perform be aware of what is expected of them?
5. Are the levels of equipment, materials and manpower

sufficient to deal with the anticipated size of spill? If not, have any back-up resources been identified, and are they known to be available at short notice?

6. Have temporary storage sites and final disposal routes for collected oil and debris been identified?
7. Have the alerting and initial evaluation procedures been fully explained as well as arrangements for continual review of the progress and effectiveness of the clean-up operation?
8. Have the arrangements for ensuring effective communication between shore, sea and air been described?
9. Have all aspects of the plan been tested and nothing significant found lacking?
10. Is the plan compatible with plans for adjacent or overlapping areas and other activities?

4.6 ROLE MODELS

Some organizations have taken the lead to show their seriousness and concern for the protection of the marine environment. Worth noting are the following.

4.6.1 Marine Pollution Control Unit (MPCU) in the United Kingdom.

Following the 'Torrey Canyon' casualty in 1967, a system to respond to oil pollution was set up throughout the UK. Presently the MPCU, which is headquartered in London, is responsible when oil or other dangerous substances spilled from ships at sea threatens the coast or environmentally sensitive areas. It maintains a national contingency plan and resources to cover its sea clean-up responsibilities.

Local authorities responsible for the clean-up of the shoreline are provided advice and assistance by the Unit. It has a research program and organizes training sessions in clean-up techniques and organization.

Being a small unit; MPCU relies upon other government organizations for support. These include HM Coastguard and the Marine Survey Organization, Local Authorities, Port and Harbor Authorities, the National Rivers Authority, Nature Conservancy Council, and the Ministry of Agriculture, Fisheries and Food (MAFF). A government laboratory also provides research and scientific expertise on pollution problems. The UK has agreements and joint pollution contingency plans with all neighboring and North Sea states.

In case of an incident, MPCU relies heavily upon a fleet of aircraft for surveillance and assessment of the quantity and movement of spilled oil. This includes counter pollution measures. Due to the inclement nature of the seas around the UK and the importance of acting quickly to a spill if it is considered to pose a threat, aerial dispersant spraying is considered the most effective method where the toxicity of the dispersant will not cause harm to sensitive areas.

Stockpiles of specialized equipment are kept at salient points around the country, and records of where back-up supplies may be had in an emergency are kept. Government assistance is also given towards fitting out suitable tugs for spraying dispersants where it is seen that they may be able to play a significant part in local clean-up operations. MPCU has also a supply of oil transfer equipment which can be lifted by helicopter to a pollution scene.

4.6.2 Marine Spill Response Corporation (MSRC) of the USA.

The US Coastguard is made responsible by the US Oil Pollution Act 1990 (OPA 90) for directing all federal, state and private response action if a spill in tidal or coastal waters threatens the public health or US welfare. The spiller is responsible for cleanup by the legislation.

Since large-scale operations to clean up major spills require a single decision maker and organization, the US oil companies have responded by setting up MSRC which will work under contract to the Marine Preservation Association (MPA). MPA has a subscription membership of over 20 oil companies. In the event of a spill, MSRC will respond with its resources and work under the direction of the USCG. The oil company responsible for the spill will then be charged for the cleanup to the limits of its liability. If the spiller cannot be identified the cost will be borne by an oil spill compensation fund, specially set up for the purpose.

The headquarters of MSRC is in Washington DC. It has five regional centers concentrated near main oil production areas and oil movement routes. A budget of $800 million has been committed to a five year plan. More than $300 million are spent on equipment, which include vessels (16 offshore response vessels) and barges, trucks, skimmers, booms, communication equipment, dispersant, wildlife/shoreline rehabilitation equipment and lightering equipment. They are easily transported by air, truck and vessel.

4.7 RESTRUCTURING TO ACCOMMODATE THE FUTURE

The Strait of Melaka has witnessed a significant number of major collisions in the recent past. The current episode of

massive oil spillage, resulting from the collision and subsequent fire on the Maersk Navigator,[7] has underscored the urgency for a safety plan for the Strait. Establishing a regional oil spills clean up capability is an essential part of a comprehensive safety plan in safeguarding the future environmental and economic interests of the littoral nations in the Strait of Melaka and to a lesser extent the South China Sea.

The regional concept is designed to address the following issues over oil spills clean up capability:

* Increasing Marine Traffic in the Strait
  The increasing marine traffic will increase the probability of ship accident and oil spill incident in the Strait.

* Potential Catastrophic Spills and Oil Spill Response Capacity
  The increasing potential for catastrophic oil spills is attributed to the proliferation of petrochemical and oil industries in Southeast Asia, and the increasing size and number of oil tankers moving through the Strait, (e.g. the Maersk Navigator carries 2 million barrels of oil). Currently, the Tiered Area Response Capability (TARC) in Singapore, the largest private spill response organization in this region, has the capability of cleaning up 10,000 tons of oil spills. This capability would not be sufficient to manage a potential calamitous spill.

* Cost Factor
  An oil spill in the narrow Strait may impact upon several littoral countries at the same time. Instead of

the setting up of an oil spill response capacity by each country in the region, it should be more cost effective to institute a regional program to cover any oil spill in the region, whether originating in international or sovereign waters.

* Strengthening the Existing Capability
  By integrating resources from public and private sectors, a regional center will strengthen and enhance the existing spill response capability in the region.

The regional structure for Southeast Asia can be called a Regional Spills Response Organization (RSRO), equivalent to that of the Marine Spill Response Corporation (MSRC) in the United States, which currently has the largest oil spill response capability in the world. It can be based in Malaysia due to its leadership role in environmental protection and its experience in handling recent oil spills.

As regards to education and training center, please refer to Chapter 5 and Chapter 6 on Akademi Laut Malaysia.

Chapter 4 - Endnotes

1. Etkin, D. S. (1990). Oil Spill Contingency Planning: A Global Perspective, p. 3. Arlington: Cutter Information Corporation.
2. The efforts were aided by the support from major oil companies, including Shell and Petronas, additional manpower support from the navy and army, and the cooperation from Indonesia National Search and Rescue Agency, and Pertamina. (Lloyd's List Maritime Asia: 1994, February. p. 39)
3. Oil Spill Recovery Survey: AMSA's National Plan to combat oil pollution. (1994, May), p. 26. Australasian Ships and Ports.

4. In 1991 the Kirki lost its bow and dumped some 17,000 tonnes of light crude into the sea off Western Australia. Australia's national plan has since been reviewed and now provides for a planning figure of 10,000 tonnes as the size of likely spillage. This was based on the size and types of oil tankers visiting Australian ports. According to Mike Julian, the manager of the Marine Environment Protection Services of Australian Maritime Safety Authority (AMSA), the review of the national plan and the changes recommended by the working party will provide assistance to neighboring countries under OPRC arrangements should a major oil spill occur in the region of Southeast Asia and the South West Pacific. (Asian Shipping: 1994, January. p. 28).

5. Hinrichsen, D. Our Common Seas: Coasts in Crisis. (1990). p. 118. London: United Nations Environment Program.

6. Malaysia, Brunei to jointly fight oil spills. (1993, October 29). Bernama News Service for Malaysian Diplomatic Missions.

7. On 21st January, 1992, the Singaporean tanker (263,980 dwt), carrying 250,000 tonnes of Oman Export crude, collided with an unladen Singaporean tanker Sanko Honour, in the Melaka Straits, 40 miles off the coast of Northern Sumatra, Indonesia. Both vessels caught fire, although the fire aboard the unladen tanker was soon brought under control by the crew. The Maersk Navigator was taken under tow whilst on fire and leaking burning oil. More than 25,000 tonnes of cargo was lost. The fire aboard the tanker was extinguished on 26th January and a ship-to-ship transfer of the remaining cargo was carried out offshore. (Ocean Orbit Newsletter. Response to oil spill. ITOPF: 1993, April. p. 3).

Chapter 5

AKADEMI LAUT MALAYSIA - ITS ROLE AND POTENTIAL

5.1 BACKGROUND

In 1976, the national shipping line, Malaysian International Shipping Corporation (MISC), together with the Kuok Foundation and the International Maritime Carriers of Hong Kong initiated the incorporation of a foundation to be known as the MATES (Malaysian Training and Education for Seamen) Foundation. The foundation then established the Maritime Training Center (MTC) at Melaka in the same year, primarily to train Pre-Sea Deck Cadets and Ratings for MISC. This brought about the first formal MET institution in the country. The Radio and Engineering Cadets' courses followed suit thereafter.

With the increasing demand for qualified officers for the Merchant Navy and the anticipated requirement for such seafarers in the industry ashore, the government upgraded the status of the MTC to an academy in 1981. Through the award of a government charter, the academy is to function as an institution whose main purpose is '...the development and the enhancement of the education and training...' of the Merchant Navy personnel. In line with this, the academy is empowered[1] to conduct the relevant shipping courses and the associated examinations, publication of reading materials related to shipping and the conduct of research on shipping matters.

5.2 ORGANIZATIONAL CULTURE

The culture of ALAM is interrelated with most other concepts in educational and training administration, including organizational structures, motivation, leadership, decision

making, communications, and change. ALAM imports energy from the environment in the form of information, people, and materials.

ALAM's strong culture provides support for improvement to the organization. The author observed that there is a system of shared beliefs that provides a sense of common direction for employees' behavior. There is a vision that imbues the culture of ALAM with a purpose of what is important, providing a mental picture or an image of the future. There are guiding beliefs that form the heart of the academy, setting the tone for the academy and influencing the management involving all the staff, listening to them and responding as much as possible to their needs.

To help solidify the acceptance of the values and ensure that ALAM's culture is maintained or reinforced (organizational socialization), a number of mechanisms are instituted:

* Careful selection of entry-level candidates. Trained recruiters use standardized procedures and focus on values important in the culture. Those candidates whose personal values do not fit with the underlying values of the academy are given ample opportunity to opt out (deselect).

* After the chosen candidate is hired, considerable training ensues to expose the person to the culture. Humility-inducing experiences, which cause employees to question prior beliefs and values, are assigned, thereby making new employees more receptive to the values of the new culture.

* As employees move along a career path, the academy assesses their performance and assigns other responsibilities on the basis of their progress.

* The academy always tries to pay meticulous attention to measuring operational results and to rewarding individual performance.

* As personnel continue to work for ALAM, their behavior closely matches the underlying values of the culture. Identification with underlying values helps employees reconcile personal sacrifices caused by their membership in the academy.

* The academy exposes its members to rites and rituals, and stories that portray and reinforce the culture.

* Those individuals who have performed well in the organization serve as role models to newcomers to the academy.

With time, the management has attempted to improve the organization culture. Although some people resist change, the management has found some keys to success. It has tried to understand the old culture first; as it felt the necessity to chart a course from a known position. Employees who have new practicable ideas are backed up. Good subcultures are identified and held up as an example from which others can learn. Employees are given assistance to find their own new ways to accomplish their tasks; promoting a better culture. Time is also allowed for significant, organizationwide improvement. Last but not least, the management has striven to live the culture aspired, as actions speak louder than words.

The author also observed that the academy has striven to:

* review the emphasis on serving students. Lecturers/instructors continually communicate to students the idea that the students are important and that the faculty is there to serve them;

* emphasize sales skills with all faculty members. There is an ongoing effort to sell the vision of where ALAM is going. Each time an accomplishment moves the academy to a new image, it is communicated to students, sponsors, industries and the community;

* enhance communications among the staff. Staff are encouraged to have as much information as possible about ALAM's achievements, new policies and procedures, programs, and anything affecting them;

* be dedicated to the principles of the Board of Governors. Team effort is stressed;

* use the ideas of the staff in developing peer-recognition activities. At times staff are given the opportunity to determine the criteria for recognition;

* position the academy so that staff are recognized as leaders in targeted academic and professional fields. Staff are provided opportunities to lead in staff-development sessions, serve on state or national committees, attend professional workshops and encouraged to produce external contributions with national or ALAM's interest;

* maintain the acceptable level of student performance consistent with the academy-improvement plan. Strategies are put in place to maintain strong academic and practical performance and overcome weaknesses;

* pursue more intensively on research and development fields.

5.3 TOTAL EDUCATION AND TRAINING WITH QUALITY ASSURANCE

The definitions of the terms education and training given by the Department of Employment 'Glossary of Training Terms' (1978, 2nd Edition) are:

> Education is a process and a series of activities which aim at enabling an individual to assimilate and develop knowledge, skills, values and understanding that are not simply related to a narrow field of activity but allow a broad range of problems to be defined, analyzed and solved.
>
> Training is a planned and systematic effort to modify or develop knowledge /skill /attitude through learning experience, to achieve effective performance in an activity or range of activities. Its purpose, in the work situation, is to enable an individual to acquire abilities in order that he or she can perform adequately a given task or job.

In the Glossary, the definition of training is enlarged upon with an explanation that the words 'learning experience' emphasize that there is no clear dividing line between training and education. It also stresses the importance of

the integration of these two concepts.

Quality assurance, in respect of teaching and learning systems, is concerned with the way in which an institution (or training unit in a shipping enterprise) is achieving its stated aims and objectives, is discharging its responsibility for the program it operates, and is satisfying itself that it has effective structures and mechanisms in place to monitor the 'quality control' procedures which it employs.

Quality control is an operational function applied at all levels by an institution to its teaching activities. It is concerned in detail with the way these are organized, undertaken and evaluated in order to ensure fitness for the purpose of the achievement of their identified goals. It is the function of the 'quality audit' to monitor the above structures and mechanisms.

Apart from finance, questions of 'quality' and 'accountability' in MET are inevitably the principal themes in the current policy debate and in the future years. Issues such as accountability to students, meeting the needs of industry and other employers, maintaining academic and professional standards, and financial accountability to the government and funding bodies will attract much attention.

Accountability involves rendering some form of account that an activity is being carried out effectively and efficiently. Those who are affected by it are entitled to demand that it be carried out effectively and those who provide the resources have a right to see that they are used efficiently.

Quality education and training means that it is both effective (the aims and objectives of the course are met) and efficient (the resources used to achieve effectiveness are not excessive). In order to meet these criteria, ALAM has endeavored to be clear about its strategic aims and the operational objective against which performance is to be judged in relation to the quality of teaching and learning. It is also reviewing the procedures and processes by which quality and standards are assessed and maintained.

ALAM is presently determined to demonstrate the operational effectiveness of the academy's quality assurance procedures, including the ways in which problems are identified and corrective action taken, and how good practice is identified and disseminated.

ALAM realizes that it needs to be able to show how it analyses the relationships between resource utilization and both the quality of learning experience of students (process) and the standards they achieve (product). It aspires to demonstrate that the career development needs of staff are identified. The needs for enhancement of academic and professional qualifications, the improvement of teaching effectiveness, and professional and industrial updating are also under constant scrutiny. These are then prioritized in relation to the aims of the academy and the personal development of staff.

The outputs of various quality control and assurance mechanisms feeding back into decision making procedures will ensure appropriate action is taken to maintain and enhance the quality of teaching and learning. ALAM is continuously monitoring its quality control and assurance procedures to ensure that they are effective and efficient.

Quality in MET is largely intangible and unquantifiable. Nevertheless, there is an obvious link between resources and quality. In principle, the higher the unit of resource the greater are the possibilities for improving quality. The link however is by no means automatic. In ALAM, courses have been conducted with the optimum number of staff. In reality, the increase in the staff strength does not correspond to the increase in the number of courses conducted and additional developmental activities required. Questions of quality arise in any consideration of such matters as professional integrity, fiduciary responsibilities of professional and academic staff to their students and the intrinsic worth of academic excellence and professionalism.

In its ongoing endeavor to enhance the quality of MET and in response to the concern of the standards of seafarers, ALAM has recently taken a prominent step to review its own system and curriculum. Several initiatives have been taken such as:

* ALAM in conjunction with the Nautical Institute Malaysia (IKMAL) carried out a training survey among professionals serving onboard and in the industry.

* The Faculty has made a major curriculum review.

* Established an important Advisory Council for all core courses with representatives from a wide spectrum of the industry and government agencies.

In addition, regular discussions with the authorities and related industries towards improving courses and programs were held. Revision was made to curriculum and syllabus contents with joint consultation of the Marine Department. ALAM has always maintained a close liaison with the industry

through regular meetings with sponsors where feedback on students' performances onboard is obtained.

In late 1993, the 'Total Education and Training' (TET) concept was implemented. It reviews the entire philosophy, approach, system and structure of Malaysian MET. TET attempts to address the human element (students' development) in its entirety. It emphasizes not only knowledge and skills but equally important, attitudinal development and value enhancement through a balanced and integrated curriculum. TET is designed to provide competent and resilient mariners. It also aims to cultivate and promote a strong sense of responsibility, determination, endurance and team spirit to ensure safe and efficient shipping.

In addition to the assessment of students' achievements, there is a continuous evaluation of the program itself. Output is measured and outcome evaluated. Shortcomings are fed back to the system and remedial measures taken. For this purpose, a system of quality loop incorporating both assessments and evaluation is used.

As stressed by the Principal of ALAM, Captain Wan Shukry Wan Karma;[2] although TET may not guarantee an accident-free environment, it should at least help produce students and trainees who are knowledgeable, and skilled with the right attitudes and strong values.

5.4 STAFF DEVELOPMENT AND EXPERTISE

The cost of hiring, training, and orienting a new person is far higher than most people realize. Moreover, if the the turnover rate among the staff is significant, such costs can

be quite painful. Such is the case in ALAM. The academy recognizes the fact that experiences during the initial period with an organization can have a major impact on a new employee's career. They need to be incorporated into the 'interior' as quickly as possible. This is the critical period during which a staff member will or will not learn to become a high performer. Careful matching of organization and employee expectations during this orientation period can result in positive job attitude and high standards, which then can be reinforced in new and more demanding jobs.

ALAM's management strongly believes that new technology exerts a continual need for employee training and retraining. At a general level, training needs are analyzed against the backdrop of organizational objectives and strategies. Analysis of the academy's external environment and internal climate is made from time to time.

In evaluating training programs, measures of change fall into four categories: reaction, learning, behavior, and results. Measures of the impact of training on organizational results are the 'bottom line' of training success; although at times difficult to gauge.

The author observed that the management has always been dynamic in its approach to adapting changes in the maritime environment. The change in leadership also provides the impetus to new spirit in creating transformation to suit the varying influences. In the past for instance, the management has practiced the management by objectives (MBO) concept, which is based upon setting goals and tracking progress towards them. Research has shown that the process is motivating. MBO seems to enhance the quality of supervisor-subordinate relationships. Amongst others the management

aspires the senior staff to possess integrity, self-confidence, physical and mental fitness, the ability to think strategically, and a facility for communicating ideas.

The academy has a staff appraisal system to serve two major purposes:

* to improve the job performance of employees and
* to provide information to employees and managers for use in making decisions.

Although performance appraisal is officially done once a year in ALAM, some of the Sectional Heads do it upon the completion of projects or upon the achievement of important milestones. The management also places importance on career planning as the consequences of career success or failure are closely linked with an individual's self-concept and identity, as well as with career and life satisfaction.

The management is continuously working on suitable formulas to enable it to show how and in what proportion staff contributions to teaching and to research and scholarship are rewarded and used as a basis for staff development needs.

In general however, the author believes that the human resource development in ALAM is considered insufficient, especially for the senior lecturing and management staff. They are the personnel who should lead by example. In the past there were never really excellent role models that could transfer their knowledge, expertise and attitudinal values to their subordinates. Many senior staff (especially expatriates) are seen to be busy with their own responsibilities or had left the academy for better

pastures, taking with them their expertise and experience.

5.5 PROFESSIONAL RESOURCES AND INTERNATIONAL STRATEGIC ALLIANCES

It is worthy to emphasize that the trainers and educators (both instructors and lecturers) are the backbone of the academy. They are involved with helping people to learn and develop. They not only promote learning, but spend the bulk of their time on tasks related to:

* identifying training/learning needs and gathering and processing information on these needs,
* designing training/learning events,
* preparing for training/learning events,
* instructing/lecturing face to face or through distance learning, and
* evaluating the effectiveness of training/teaching.

Presently there are 37 lecturers and 15 instructors in ALAM. This falls short by more than 10 percent of the targeted figure determined for 1994. Of the 37 lecturers, 16 are expatriates. This blend of qualified and highly experienced professionals of varying backgrounds has been an instrumental basis for generating a unique group of lecturers who are resilient, versatile, innovative and resourceful. No where in Asia is a maritime institution so well endowed.

Despite the shortage of lecturers/instructors, the quality of the courses has not been much affected so far due to the dedication and esprit de corps existing between the staff. This is augmented by the fact that the management has tried all avenues to motivate the staff concerned. In fact many

have left the academy due to not withstanding the amount of commitment required in stretching their efforts coping with the rapid changes and development, and the escalating demands of the profession.

In trying to minimize both the strain on the staff and the lack of expertise in certain specialized fields, the academy has actively sought cooperation and assistance from reputable organizations both locally and abroad. Presently the academy is a branch of the World Maritime University, and twinned or has very strong links with universities/institutions in Canada, Australia, United Kingdom, United States, Poland, Chile, Korea and Southeast Asia. Many of the section heads and senior lecturers also have very good contacts with strategic maritime organizations, institutions and maritime experts throughout the world. These global linkages will enhance further ALAM's potential in being an international player and a major cotributer to the MET world.

5.6 FACILITIES AND INFRASTRUCTURE

The facilities and infrastructure of the academy is modest by world standards. Although it is the biggest maritime academy in Southeast Asia, it deserves to be more prestigious considering its true potential. It is located in a spacious and beautiful environment setting. Adjacent to the campus is the Strait of Melaka with white beach frequented by turtles laying eggs; a fishing village with houses on stilts under coconut trees; rubber plantations where cows and buffaloes take shade and shelter from the weather when the padi fields are dry; and light jungle full of monkeys, birds, monitor lizards and snakes. The campus area within is adorned mainly with fruit trees and beautiful

gardens maintained by the dedicated gardeners who are mostly part-time fishermen.

ALAM's location is however quite remote being about 50 kilometers from Melaka city. Recently a strategic bridge linking ALAM to a tourist resort area in Port Dickson was completed. New highways and good roads connecting ALAM to Kuala Lumpur and the other big towns coupled with the fact that industries are mushrooming in the outskirts, are all good signs that ALAM's distant presence will be more felt by the outside world.

Presently ALAM has one bridge navigation simulator with four own ships; a VTS trainer; a library; a computer, science and language laboratory; a swimming pool, auditorium, workshops and other basic facilities to conduct the various modular courses. A jetty will be built alongside the beach, and the government has approved funding of US$3.8 million for the acquisition of a training ship.

ALAM can accommodate up to about five hundred students at a time. With the steadily increasing student numbers (about 600 students in training at any one time and a turn-over of some 2,700 students annually) and varieties and frequencies of courses; projects are now undertaken to expand its capabilities to satisfy the needs of the near future. Presently there are about 47 different courses conducted by ALAM, compared with less than 10 courses in 1981. Most of these courses are for the merchant navy. They are also offered to other government agencies such as the military, fisheries, customs and marine police; port and pilotage authorities; local universities and institutions; oil and shipping related companies; and other shore-based organizations.

5.7 OPRC MODEL TRAINING COURSES

The Conference on International Cooperation on Oil Pollution Preparedness and Response, which adopted the OPRC Convention in November 1990, emphasized the need of a comprehensive training program in the field of oil pollution preparedness and response. This should be developed in cooperation with interested Governments, oil and shipping industries, with a view of assisting developing countries. In that respect, the Marine Environment Protection Committee (MEPC) endorsed a Global Strategy for Oil Pollution Preparedness, Response and Cooperation at its 35th session. The development of an oil spill response training program is one of the keystones of this strategy. A strategy for the Implementation of the IMO Model Training Courses and Trainer Training on Oil Pollution Preparedness and Response was adopted by the MEPC at its 36th session.

The model courses established for oil spill response will address all levels of the response structure and provide a world-wide standard for training. The goal is to ensure that all countries potentially at risk will be able to access and provide those programs intended to enable them to meet their commitments under OPRC.

The model courses will be developed in the field of IMO training courses. Three response levels have been identified:

- Level 1: Operational staff - First Responder
- Level 2: On Scene commander - Operational Supervisor
- Level 3: Manager - High level decision maker

Each course will be developed in a modular form in order to

comply with the needs of each country. The design of Level 1 and 2 courses has been submitted to MEPC. The target for completion of the technical review is by September 1994. It should be finalized and then ready for implementation in the latter half of 1995.

In December 1992, ALAM initiated the first ever meeting involving PETRONAS (national oil company), Marine Department and the Department of Environment (DOE) in the effort to set up a national training program similar to the OPRC model training courses. A proposal was put up by ALAM to lead the initiation of the national training program with the assistance of various related agencies. The course is expected to have started recently with Level 1.

5.8 TRAINING ENHANCEMENT THROUGH TECHNOLOGY

5.8.1 Computers

Computer-based technology for contingency planning and response systems is available and can substantially improve actions to mitigate an incident. Keeping this in mind, ALAM has been keeping close contact with several organizations worldwide which can provide excellent packages for training at reasonable cost. ALAM is also working closely with Petronas and DOE to keep pace with new developments.

With microcomputers, the speed and efficiency required for contingency planning and response can be increased. They can provide rapid access to large volumes of useful planning and response information, and equip mechanism to perform complex data manipulations. They can also facilitate cooperation during planning by providing a framework for organizing different information sources. It is important however, to

avoid the expectation that microcomputers are a substitute for planning.

5.8.2 Simulators

Simulation technology is based on the imitation of natural and technical processes. The various phenomena are made to interact with the operating actions of the human being in real time. This requires the use of fault-tolerant process computers of high throughput. The greater the desired realism of the simulation, the higher the computing power required.

Shipboard competence measurement in maritime academies has its limitations and continues to be quite distant from shipboard practice. The gap between training and job requirements, between theory and practice, can now be reduced by the use of simulators. Simulation equipment has been accepted by the education world as a powerful, versatile and efficient training tool. This is certainly the case for the maritime training world as the implementation of simulator systems in maritime training institutions is rapidly taking place.

Some of the objectives and conditions for using simulators as a training tool are:

* for powerful teaching impact,
* real life situations become available in a format which is practical for instruction,
* non routine situations can easily be created and practiced,
* highly motivating teaching device,
* various levels and types of training can be performed,

* instruction on operation and maintenance,
* skills and system management training, and
* research studies into part tasks or entire systems.

Advantages offered by this method of training are numerous. There is no need for long journeys to the exercise location or for waiting times. Weather and other ambient conditions too are immaterial, so no training time is lost. Wear and tear on the actual plant or equipment is avoided, as is the necessity to take a plant out of operation for training. Various scenarios with multitudinous configurations can be projected without having to risk real life and facilities.

Simulators are superior substitutes for the real thing and are effective teaching tools leaving strong and lasting impression. They can be on fast time presentation and freeze mode of dynamic processes. Simulator time replaces real time for acquiring certificates of competencies and can cause overall reduction of training costs. Simulators can certainly be very cost effective if properly utilized by well trained instructors.

With reference to the topic of this dissertation, the author would like to highlight and concentrate on the most relevant simulator, the Oil Spill Management Trainer (OSMT).

The OSMT consists of up to six trainee positions, three instructor positions, a full communication system, relevant databases and modules, a navigation system and a visual system with screens on which the training scenarios are presented.

The OSMT is designed to allow trainees to practice at stations that parallel their actual task during a real

disaster. Information about the pollution site, extent of the spill and other relevant on-scene data are provided to the on-scene response teams. They are able to initiate the first line of response to stop or prevent further spilling of oil. This includes initial notification of the regional response teams and mobilization of the entire spill response organization. This call-up procedure is provided by OSMT through a series of real communication channels such as telephone, telefax, mariphone, etc.

In the Operation Control Center room, the Operational Control staff assesses the spill situation based on input from the On-Scene Commander and/or air surveillance. This assessment includes review of available response resources, equipment depots and associated mobilization and response times. They will also be given contiguously, feedback with relevant information of the effect of the equipment in action, through the visual system and through communication with the instructor.

They also assess impacts on sensitive areas including recreational areas, bird feeding and nesting areas, fish farms, etc. Based on these assessments, the Operational Control staff determines the resources to be mobilized and allocation of available resources (ships, booms, skimmers, people, etc.) in order to minimize the damage and expedite clean up.

To make the situation as close to real life as possible, a simulation staff will, during an exercise, play roles as journalists, authorities, local representatives, 'green' organizations, private persons affected, etc. This will give the trainees real training in handling adequate situations.

As the Instructor controls all resources put into action, he/she also has the opportunity to introduce failures and malfunctions on the equipment, engine failure to ships, injuries to personnel, alterations to local environmental conditions, like wind, current and temperature, etc. All these inputs will force the trainees to be alert and to change both strategies and tactics.

The OSMT provides the opportunity to train even senior and management personnel from the various marine related organizations. It will be a useful tool in contingency planning. By running and evaluating different scenarios for the actual area, the possibilities of making the right decision can be improved. During a real disaster, the OSMT can serve as a decision support system, by using the computing power and the actual databases of the training system to assist the decision makers.

The OSMT is designed to train personnel who participate in an oil spill recovery operation, safety personnel in oil companies, ship officers and/or officials responsible for the cleaning operations of the sea and coastline following an oil spill. The OSMT can also be used as a Search and Rescue simulator.

There are also other simulators such as the VTS Trainer and Liquid Cargo Handling Trainer which are marine environmentally related and gaining importance as training tools.

ALAM is presently the best and most competent center in Malaysia to utilize marine related simulators. Most of its staff are not only exposed to the most modern of simulators; some have been under the tutelage of the world's best

simulator experts from all over the globe. They have also established strong contacts and relationship with the best of the marine simulators manufacturers.

5.9 AREAS FOR CONCERN

The world of MET is currently undergoing rapid changes in line with new demands for cost optimization in maritime activities. Nevertheless, the importance of MET institutions has always been underestimated. Institutions often face difficulties in obtaining full support enabling it to keep pace with changes and developments, to suit the requirements of the 'real' world.

Presently there is a shortage of staff available in relation to the requirement of running and developing ALAM effectively. Understandably this will also be the cause of many other related problems. Amongst others, the absence of a few staff (especially the lecturers) either for training, or conducting courses externally, will mean a lot of maneuvers and changes to be made in the managing of the courses in the academy, which can at times affect its quality. This to some extent retards and discourages the training and developmental programs of the staff despite the willingness for some of the staff to put in extra effort covering and substituting for the period they are away for a particular short course.

Most of the local staff in the academy are not as experienced as the expatriates. The majority have not been formally trained to be trainers (apart from shipboard practice) before starting to teach. They are also not highly qualified and none has reached the highest level of academic excellence such as PhD or extra master. It is often

difficult to provide a good base for in-depth maritime studies without staff who can do research into the respective fields effectively. As some of the staff could not be sent for regular and intensive training or attachment for obvious reasons, they are not able to keep abreast with changes as they would like to be as true professionals in the training institution. This at times demotivates them; more so if they are expected to contribute their expertise externally.

With regards to acquiring and maintaining experienced and highly qualified expatriates, the package offered by ALAM is still not very attractive. Some of the excellent staff that joined the academy are thus using ALAM as a stepping stone for better prospects elsewhere. The author also feels that the duration of the contract of service should vary, corresponding to the potential of each staff member. Previous experience has shown that more often the staff are not being fair to the organization by breaching the contract for better offers elsewhere.

With few staff to choose from, most of the lecturers are rotated to teach in many changing subjects. This adds to the problem of little time that a lecturer can be conversant in a particular topic. Although many of the lecturers are versatile after some time, few will actually become an expert in any particular field. This also causes frustration to some staff in not having sufficient time to self-develop in disciplines of special interest which can be valuable to the organization.

The administration department has been supportive with the needs of the training department. However they seemed to lack in-depth understanding as to the genuine and more

dynamic education and training requirements. Only one of the many administration staff executives has been an experienced trainer before.

The speed of administrative operational transactions has improved but is still tedious. Data research by the administration staff has not been profound to expedite transactions, control and planning. The information management system is presently inadequate. The author feels that there is a lack in effective utilization of the computing capabilities of the department.

Public relations is considered vital for an organization which provides services. More need to be effected so that ALAM can integrate well with the various elements of the maritime environment. The public relations division however appears to lack the zest and professionalism demanded for a premier national and dynamic institution such as ALAM.

At the moment the facilities and infrastructure need improvement. The number of students and courses conducted have increased at a rate where the facilities and infrastructure have lagged behind. Technological development has also necessitated higher resolution multi-purpose simulators and other advanced teaching aids. Added affluence to life has also demanded better living conditions for the students.

Although ALAM's atmosphere is conducive to living on campus, the accommodation allotted for the staff is insufficient. As expatriates are given the privilege of residing on campus, many of the locals are forced to stay off campus. Since most staff find difficulty in integrating fully with the society outside the campus, many choose to stay far from the academy

in the city, where the facilities are also better with the likes of schools and clinics.

Some staff are prepared to spend additional hours on the road, wasting valuable time that could otherwise be utilized for more meaningful occupation needed by the academy. More importantly, the intellectual atmosphere of the campus is under-utilized by the staff. Within the campus, knowledgeable colleagues, a resourceful library, comfortable offices and key personnel staff are all within reach well after office hours. Enriching informal get-togethers or group discussion can be easily promoted. Opportunity to the truly committed staff to work during odd hours in the privacy of their own office is also facilitated.

5.10 INTO THE FUTURE

Being in a tough and competitive world, organizations today are making major changes. Continuous and overlapping change has become a way of life in the corporate environment. Change continues to shrink our global boundaries and push businesses to new competitive limits. Leaders who want to get ahead in today's marketplace must learn to respond to a growing number of changes in how they structure companies, conduct business, implement technology, and relate to customers and employees.

To successfully implement major change, companies must find the connection between the organization, the worker, and the change initiatives being introduced. That connection is achieved by fostering resilience among individuals in the organization.

In Malaysia's Vision 2020, all sectors of the economy

including and importantly the maritime industry need to be suitably developed. To achieve the targeted ambition, ALAM has a vital role to play.

In line with ALAM's mission to fulfill the objectives of the Charter with notable impact, the management is proposing restructuring of the organization. Reference should be made to appendix 5.1 for the proposed new organizational structure. To better meet future challenges, the author observed that ALAM's management is seen to continue:

* anticipating and fulfilling the needs of the Malaysian and regional community with regards to education, training, research and development of the maritime related fields;

* being committed to the pursuing of standards of excellence and their implementation;

* ameliorating its integration with, and management of the maritime environment, and further develop synergy and strategic alliances with all the elements involved;

* enhancing and augmenting the international role of Malaysia as a developing maritime nation;

* encouraging the development of the 'full potential of the individual'; and

* devoting recognition that the most valuable asset of the academy is the human resource.

Chapter 5 - Endnotes

1. The pronouncement was published in the Malaysian Government Gazette, [Pekeliling P. U. (B) 82; KP (Pentadbiran) 5051; PN. (PU2) 383; dated 18 January 1983] under the authority of the Minister of Education as per Act of Parliament A329 of 1983 and sect. 3 of the Akta Kontrak (Pindaan) 1976.
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Chapter 6

CONCLUSION AND RECOMMENDATIONS

6.1 SUMMARY

Although few Malaysians recognize their long established maritime heritage, with the discovery of oil and natural gas, the sea has become Malaysia's new real estate. The extensive varied coastline and vast EEZ holds a priceless treasure that Malaysia can no longer permit to be abused. Every aspect of the Malaysian seas and coastal zones is significant to the well-being of the country; be it the economy, politics, security or environment. The problems and issues associated are multifarious, as diverse and complex as the marine environment itself.

The parallel aims of further human development and environmental protection can only be satisfied through the adoption of an integrated and comprehensive management strategy, based on common principles, agreed goals, and scientific methods. The marine environment needs to be protected against the adverse effects of human activities so as to conserve the ecosystems and to safeguard human health while providing for rational use of living and non-living resources. The viability of marine ecosystems and the legitimate uses of the sea must also be sustained for the benefit of present and future generations.

In Malaysia, despite a clearer sense of direction now than ever before, there is still a lack of marine experts to tackle the enigmas faced. There has been a conscious effort however, to start a database of baseline information on the coastal environment. The picture is far from complete, hampered by both restrictions in resources and expertise. Routine monitoring is carried out at various locations to

determine the existing marine water quality. Samples collected however are needed to be sent to distant centralized laboratories for analysis. The monitoring of marine vessels and offshore structures has never been adequate.

A more important issue to consider is the lack of integration between all the ten related agencies involved in the enforcement of marine regulations in Malaysia. This multi-agency enforcement body now in operation has never been quite effective in pollution abatement. Every agency is understaffed and lacks facilities.

Sharing the waters of a principal trade route for oil tankers has also awaken Malaysia to realize the threat that oil can pose to its shores and seas. Ideally, preventive measures, such as better tanker construction, expert navigation and pilotage on all tankers carrying petroleum products, and proper maintenance on tankers and pipelines, would minimize the chances of an oil spill ever occurring. But these measures are not always carried out, and often oil is spilled in situations beyond the control of those transporting the oil.

Piracy although not completely eliminated, has markedly reduced. This is another example of how cooperation between regional countries can be effectively implemented. The enforcement agencies have not only developed new strategies, but the use of the SafetyNet system and GMDSS has also been effective.

The ongoing process of implementing the VTS system in the Melaka Strait is a positive step towards achieving an improvement in the safety of navigation. This complements

the inadequate traffic separation schemes introduced in 1980, and the unreliability of outdated surveyed data in certain areas of the Melaka Strait. At the same time, the system incorporates the advantages of radar surveillance.

Despite catastrophic oil spills worldwide within the last decade, Malaysia is fortunate to have not yet experienced a devastating oil spill. Nevertheless, it was shown that the damage done to the environment by uncontrolled oil discharged from passing ships is of greatest concern.

As oil spills are inevitable, continuing emphasis must be put on the institution of known, effective measures, as well as research and development of new prevention techniques. Since Malaysia must be prepared to deal with oil spills, the most effective way to do this is with advance preparation; through the development of well-designed contingency plans. The development of efficient, operable response structures, procurement and maintenance of effective response equipment, and training of response personnel through drills and exercises have proven not only essential but critical.

With limited response capabilities, Malaysia has recognized the importance of coordination and cooperation not only between different agencies, but countries, especially those in the Southeast Asian region. With improved relations and regular joint exercises, the response capabilities have improved tremendously. This by no means demonstrates that Malaysia can cope with big oil spills. The present regional capabilities are only sufficient to reduce the anticipated considerable damage of a major spill, given the complicated geographical extent of the country. The need for more elaborate oil spill response equipment is imperative at various strategic locations. The configuration of the oil

spill response contingency plan needs further improvement in order to rapidly respond effectively. Research and development on the trajectory modelling, into indicator species biology and into the behavior of pelagic ecosystems are to be encouraged as these are the critical areas in assessment of spill damage.

The basis of effective cleanup response is a combination of good contingency planning, organization and control. The successful implementation of the contingency plan is dependent on how conversant the user is with the plan. Research worldwide has shown that the strong commitment to response training has led to a higher level of preparedness by personnel at all levels. Training and practical exercises have shown to greatly improve the readiness of a particular locality to deal with oil spill emergencies.

Although Malaysia has little experience in oil spill cleanup technology, some of the staff in several leading agencies are exposed sufficiently to provide adequate training and education. A few ad-hoc seminars and workshops have been organized by the Department of Environment and oil companies. Oil spill response courses have also been conducted internally by few agencies of the government and the oil industry. There are however overlapping efforts and varying standards when it comes to training and education, which could otherwise be coordinated by a national body.

With the rapid evolution of technology, a competent and professional nationally approved institution should be given the training and education responsibilities. Amongst others, the institution must be able to keep abreast with developments, have adequate modern facilities, quality assured training and education programs, research

capabilities, and a pool of dedicated professionals with high level relevant experience and up to date technical knowledge.

The highest decision making body concerning the Malaysian marine sector presently is the National Maritime Council (NMC). In cooperation with other relevant government agencies, research institutions, non-governmental organizations (NGOs) and training institutions, NMC could lead in seeking to identify priority areas for the implementation of Chapter 17 in particular, and the agenda 21 in general within the context of the Malaysian marine environment.

Realizing the need to strengthen Malaysia's status of a maturing maritime nation, the Malaysian Institute of Maritime Affairs was set up in 1993. Its major role has been to act as a central focus for independent research, by bringing together available expertise both from within Malaysia and abroad, and to promote open discussion between public and private interests with the aim to contribute to the development of a coherent national maritime policy.

The tasks of management - education, extension, surveillance, enforcement, monitoring, and review - involve sustained action. It is futile, and often damaging, to establish an environmental protection regime if there is no commitment to a mechanism that ensures sustained management. The intention of this dissertation has been to introduce and discuss some of the key issues. The hope is that it will play a part in developing a professional approach for sustainable development and conservation of the seas and the coastal fringes of Malaysia.

6.2 CONCLUSION AND RECOMMENDATIONS

The environmental policy objectives of the Sixth Malaysia Plan (1991-1995) has clearly reasserted the importance of environment viz-a-viz enhancement of science and technology development. Vision 2020 targets at a completely modern Malaysia in terms of technological advancement, giving priority to 'responsible and well-balanced exploitation of natural resources to safeguard the requirements of future generations'. This not only parallels the concept of Environmentally Sound and Sustainable Development (ESSD) but, in emphasizing strategies for environmental protection plus nature and natural resources conservation into all development plans and programs, would serve decision-makers well in making Vision 2020 a balanced reality. Achieving the Vision however, is no easy task. Total support from all parties is required; from the fishermen to the shipowners to the politicians.

With the need for an integrated approach to the protection of the Malaysian marine environment the following steps are recommended:

6.2.1 The government should consider:

- integrating and synthesizing the various enforcement agencies related to the marine affairs into a single formidable organization such as the coastguard;

- setting up a national level body to coordinate the implementation of the management actions towards the marine environment by the various agencies;

- cooperating further with the public sectors in investing more toward research into the maritime matters to review its policies and management strategies of the marine environment;

- seeking additional technical assistance and funds from other user nations of the Melaka Strait to conduct research, fitting of new position-fixing and surveillance systems, and training for the overall safety aspect of the strait;

- adding and redefining the traffic separation schemes in several critical areas of the Malaysian waters;

- introducing a compulsory VTS reporting system and compulsory pilotage for certain vessels when passing certain stretch of critical areas;

- restructuring the present National Oil Spill Response Contingency Plan; and

- encouraging greater exchange between countries, of technical information and experiences resulting from research and development programs and from the combat of major oil spills.

6.2.2 ALAM should consider:

- reshaping the organizational structure and obtain more support from the government and industry to better serve the nation in a more dynamic manner, particularly in the marine environmental protection framework;

- seeking the training role in the national oil spill response contingency plan;

- setting up an Environmental Section in the Research and Development Department;

- gaining nomination as the center for research in the operational response for oil spill and the management of vessel traffic in the Southeast Asian region;

- acquiring an Oil Spill Management Trainer, full mission Shiphandling simulator, and Liquid Cargo and Ballast Handling simulator;

- establishing a network of computerized data information system;

- placing more importance on staff welfare and enhancing efforts in promoting a higher sense of belonging to the academy;

- enhancing staff motivation to work by coordinating the various elements of human resource management into a unified program, in particular encouraging the pursuit of knowledge; and

- providing a broader base of performance definition, facilitation and encouragement to retain and support progression of competent staff members but allowing those less adept to leave.

6.2.3 The Oil Spill Response Contingency Plan should be revised to:

- identify ALAM as the approved institution to undertake the education and training role for oil spill response;

- improve planning at local, national and regional level to cover such aspects as location of resources, priorities for protection, policy for response, risk assessment studies, location of equipment and identification of suitable procedures for the disposal of recovered oil and oily debris and examination of criteria for determining termination of cleanup operations;

- provide a detailed and rapid evaluation of the threat of the actual spill to local resources to ensure that the most appropriate response is selected;

- improve the level of organization, coordination and cooperation between agencies responsible for cleanup in order to achieve a better control of all operations;

- improve the training of those personnel likely to be called upon to supervise cleanup operations, especially in inshore waters and on shorelines;

- improve regional cooperation between governments on such aspects as equipment availability, cleanup policy, compatibility of techniques, materials and communication systems, training and contingency planning; and

- harmonize testing procedures and specifications for oil spill equipment and materials, to facilitate international cooperation, to increase the availability of products and to encourage manufacturers to standardize specifications and design features.

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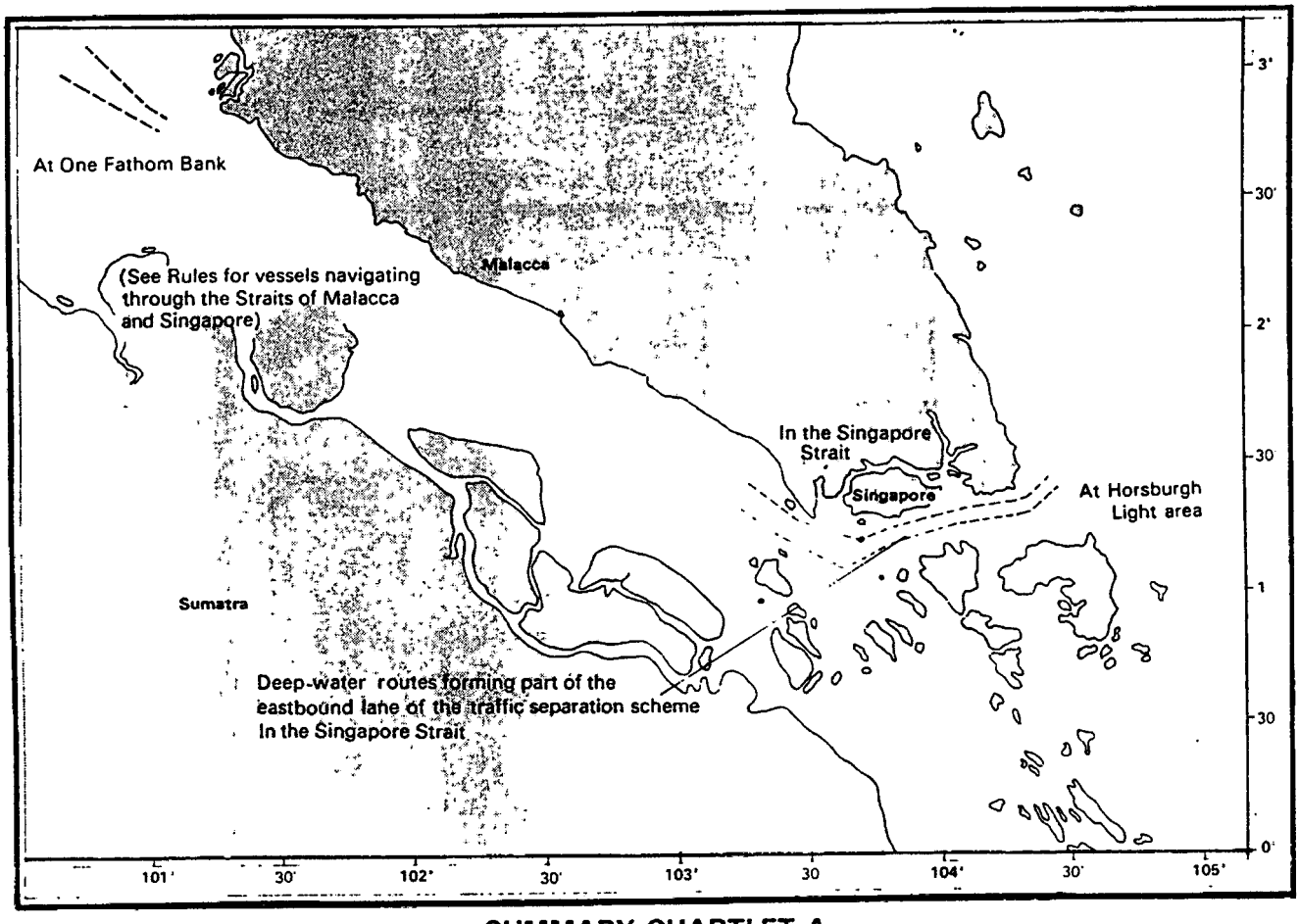
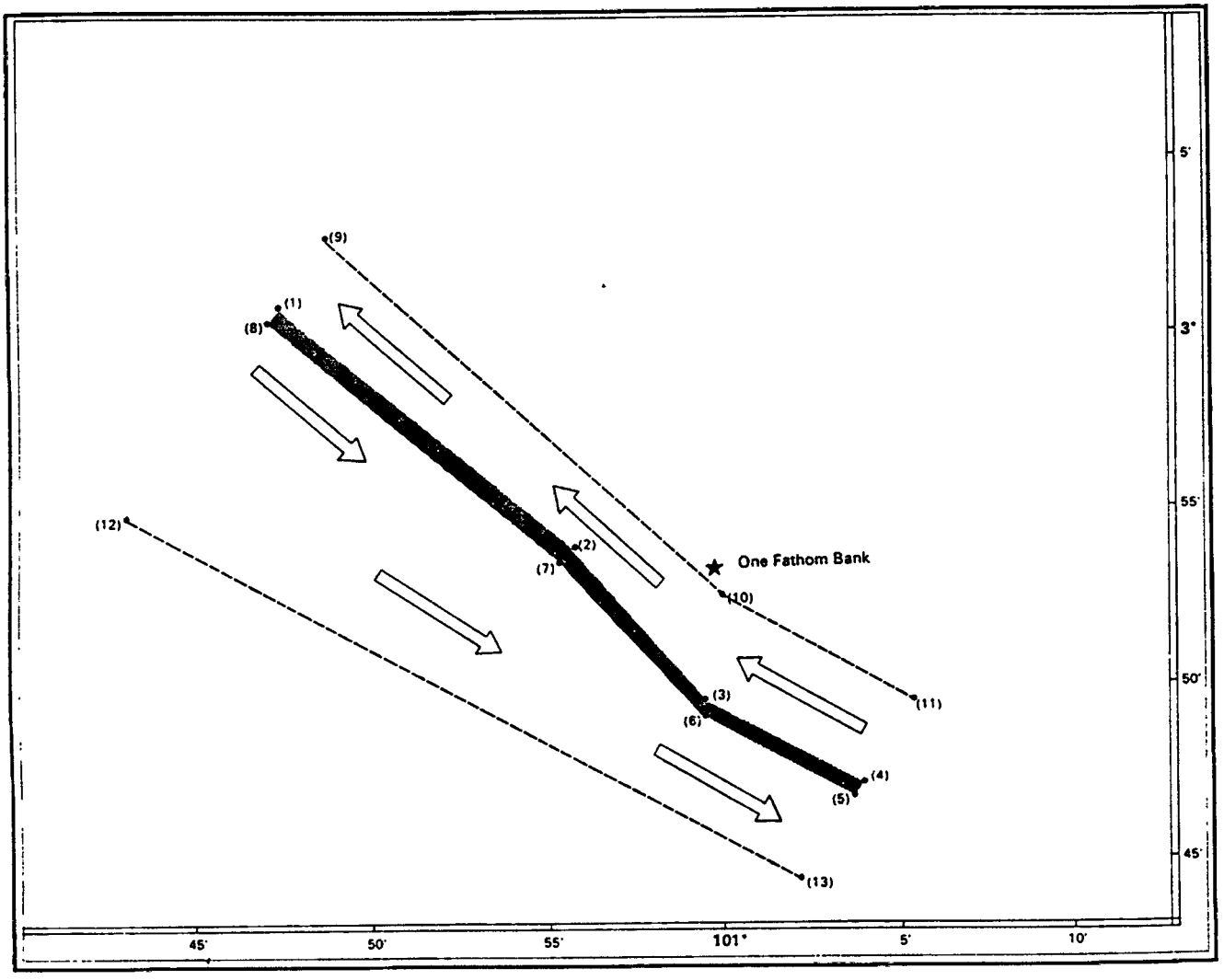
Appendix 2.1 a



SUMMARY CHARTLET A

Appendix 2.1 b



AT ONE FATHOM BANK AREA

Description of the traffic separation scheme

(a) A separation zone is bounded by a line connecting the following geographical positions:

(1) 3°00'.7 N,	100°47'.3 E	(5) 2°46'.7 N,	101°03'.6 E
(2) 2°53'.7 N,	100°55'.7 E	(6) 2°49'.0 N,	100°59'.4 E
(3) 2°49'.5 N,	100°59'.4 E	(7) 2°53'.4 N,	100°55'.3 E
(4) 2°47'.1 N,	101°03'.9 E	(8) 3°00'.3 N,	100°47'.0 E

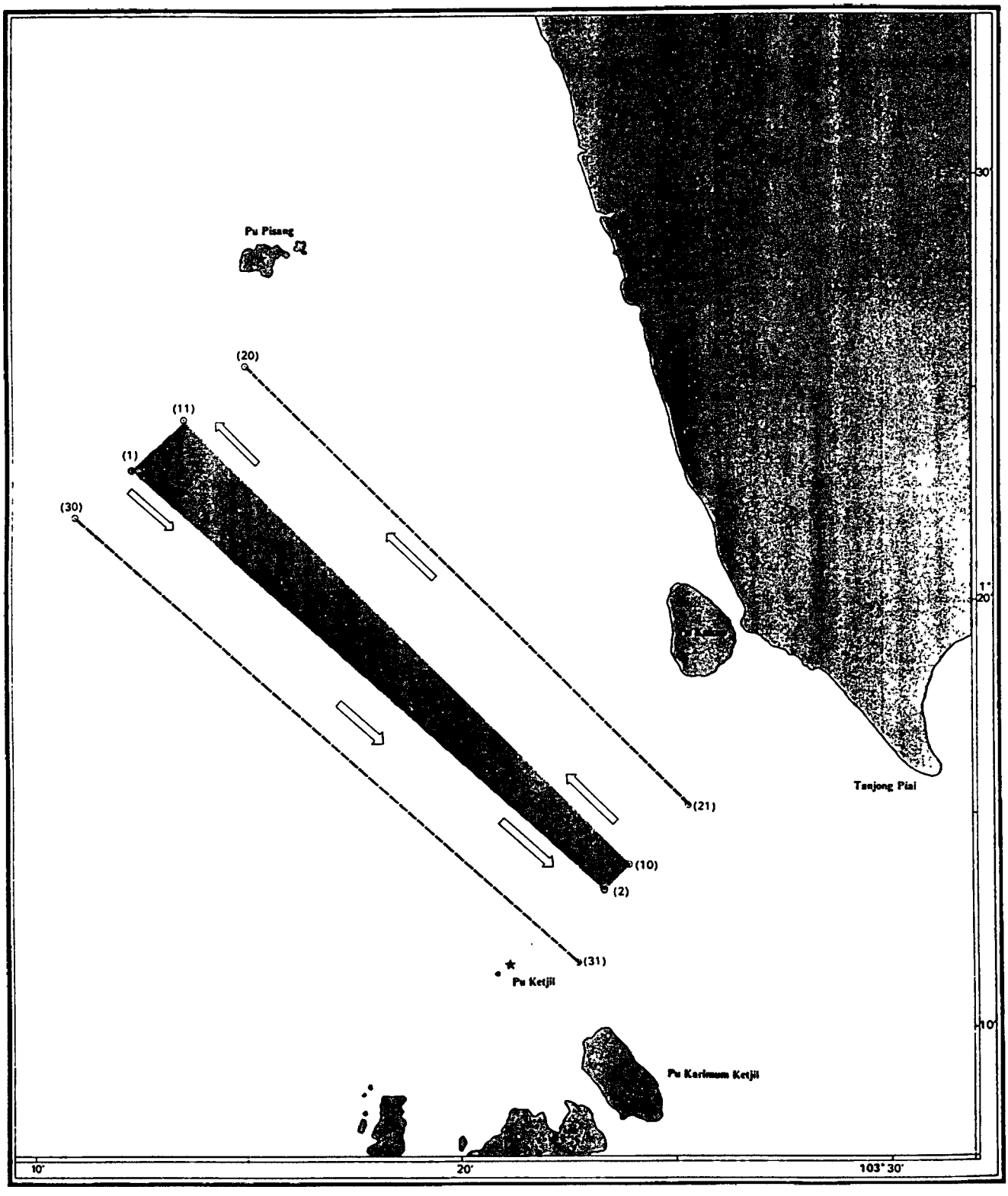
(b) A traffic lane for north-westbound traffic is established between the separation zone and a line connecting the following geographical positions:

(9) 3°02'.7 N,	100°48'.7 E	(11) 2°49'.4 N,	101°05'.3 E
(10) 2°52'.5 N,	100°59'.9 E		

(c) A traffic lane for south-eastbound traffic is established between the separation zone and a line connecting the following geographical positions:

(12) 2°54'.7 N,	100°43'.0 E	(13) 2°44'.4 N,	101°02'.1 E

Appendix 2.1 c



IN THE SINGAPORE STRAIT

Appendix 2.1 d

AT HORSBURGH LIGHT AREA

(Reference charts: Japanese 621, 1982 edition; 749, 1981 edition.
Note: These charts are based on World Geodetic System 72 Datum.)

Description of the traffic separation scheme

(a) A separation zone is bounded by a line connecting the following geographical positions:

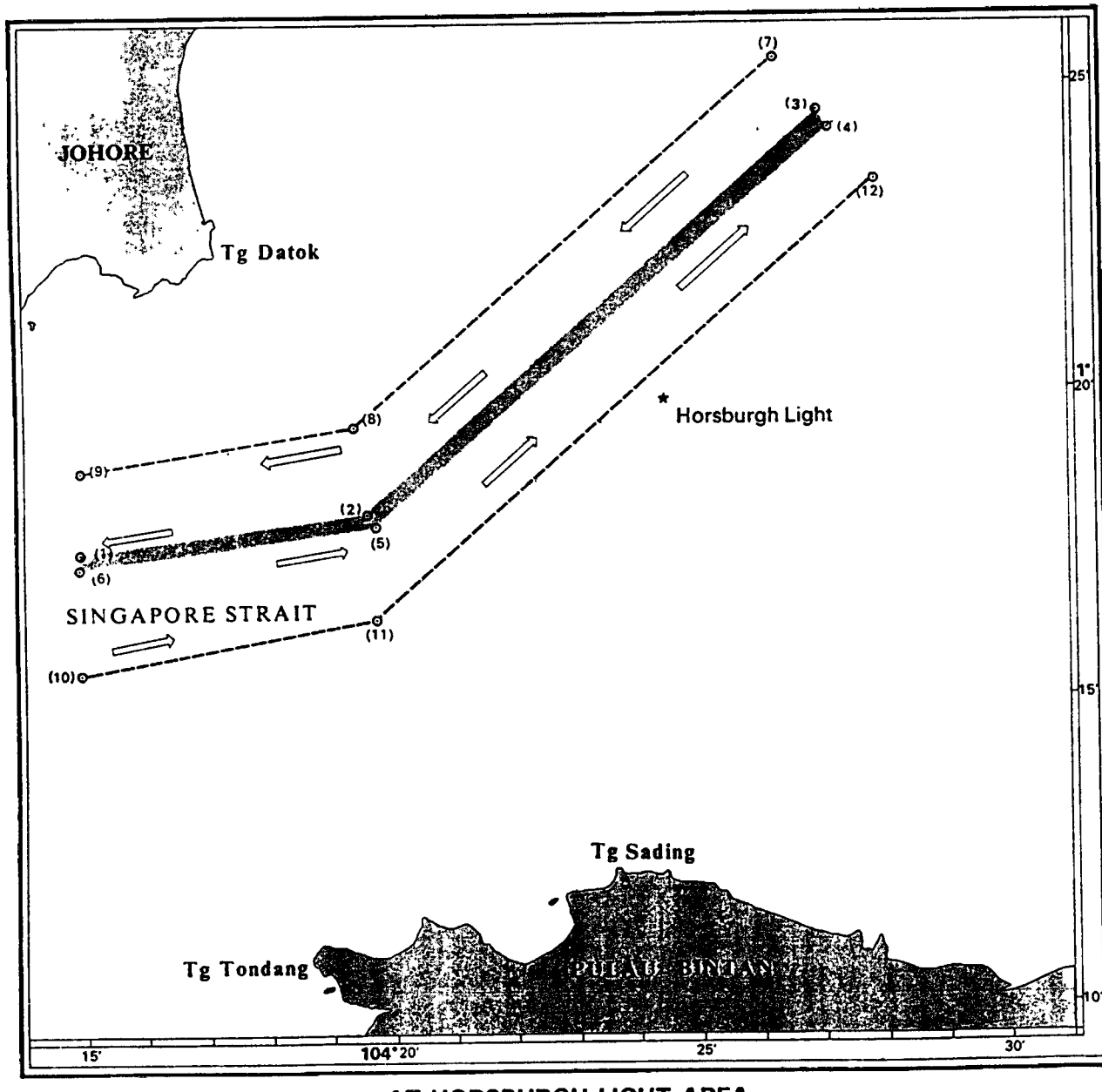
(1)	1°17'.32 N, 104°14'.90 E	(4)	1°24'.30 N, 104°27'.15 E
(2)	1°18'.00 N, 104°19'.60 E	(5)	1°17'.80 N, 104°19'.75 E
(3)	1°24'.55 N, 104°26'.95 E	(6)	1°17'.10 N, 104°14'.90 E

(b) A traffic lane for south-westbound traffic is established between the separation zone and a line connecting the following geographical positions:

(7)	1°25'.40 N, 104°26'.22 E	(9)	1°18'.63 N, 104°14'.90 E
(8)	1°19'.40 N, 104°19'.40 E		

(c) A traffic lane for north-eastbound traffic is established between the separation zone and a line connecting the following geographical positions:

(10)	1°15'.40 N, 104°14'.90 E	(12)	1°23'.40 N, 104°27'.85 E
(11)	1°16'.30 N, 104°19'.75 E		



AT HORSBURGH LIGHT AREA

Appendix 2.2 a

RULES FOR VESSELS NAVIGATING THROUGH THE STRAITS OF MALACCA AND SINGAPORE

I. Definitions

For the purpose of these Rules the following definitions should apply:

1. A vessel having a draught of 15 metres or more shall be deemed to be a deep draught vessel.
2. A tanker of 150,000 dwt and above shall be deemed to be a Very Large Crude Carrier (VLCC).

Note: The above definitions do not prejudice the definition of "vessel constrained by her draught" described in Rule 3(h) of the International Regulations for Preventing Collisions at Sea, 1972.

II. General provisions

1. Deep draught vessels and VLCCs shall allow for an Under Keel Clearance (UKC) of at least 3.5 metres at all times during the entire passage through the Straits of Malacca and Singapore and shall also take all necessary safety precautions especially when navigating through the traffic separation schemes.
2. Masters of deep draught vessels and VLCCs shall have particular regard to navigational constraints when planning their passage through the Straits.
3. All deep draught vessels and VLCCs navigating within the traffic separation schemes are recommended to use the pilotage service of the respective countries when they become available.

III. Rules

Rule 1 – (a) Deep draught vessels shall use the designated Deep Water Route (DWR) between positions 01°09′57″ N., 103°48′17″ E. and 01°02′58″ N., 103°39′06″ E. Other vessels should, as far as practicable, avoid the deep water route.

(b) Deep draught vessels are advised to use the deep water route between Buffalo Rock and Batu Berhanti.

Rule 2 – Deep draught vessels navigating in the deep water route shall, as far as practicable, avoid overtaking.

Rule 3 – All vessels navigating within the traffic separation scheme shall proceed in the appropriate traffic lane in the general direction of traffic flow for that lane and maintain as steady a course as possible consistent with safe navigation.

Rule 4 – In the event of an emergency or breakdown of a vessel in the traffic lane it shall, as far as practicable and safe, leave the lane by pulling out to the starboard side.

Rule 5 – Westbound vessels when approaching Raffles Lighthouse in the Strait of Singapore shall proceed with caution, taking note of locally established signals, and give way to deep draught vessels approaching the Single Buoy Mooring facility (in approximate position Latitude 1°11′25″ N., Longtitude 103°47′30″ E.) from Phillip Channel.

Rule 6 – VLCCs and deep draught vessels are advised to navigate at a speed of not more than 12 knots over the ground.

Rule 7 – All vessels navigating in the traffic separation scheme shall maintain at all times a safe speed consistent with safe navigation, shall proceed with caution, and shall be in a maximum state of manoeuvring readiness.

Appendix 2.2 b

Rule 8 - VLCCs and deep draught vessels navigating in the Straits of Malacca and Singapore are advised to participate in the existing voluntary ships' reporting system. Under this system, such vessels broadcast eight hours before entering the Straits/traffic separation schemes navigational warnings giving names, deadweight tonnage, draught, speed and times of passing One Fathom Bank Lighthouse, Raffles Lighthouse and Horsburgh Lighthouse. Difficult and unwieldy tows also broadcast similar warnings giving the type, length, speed of tows and times of passing the three above-mentioned areas.

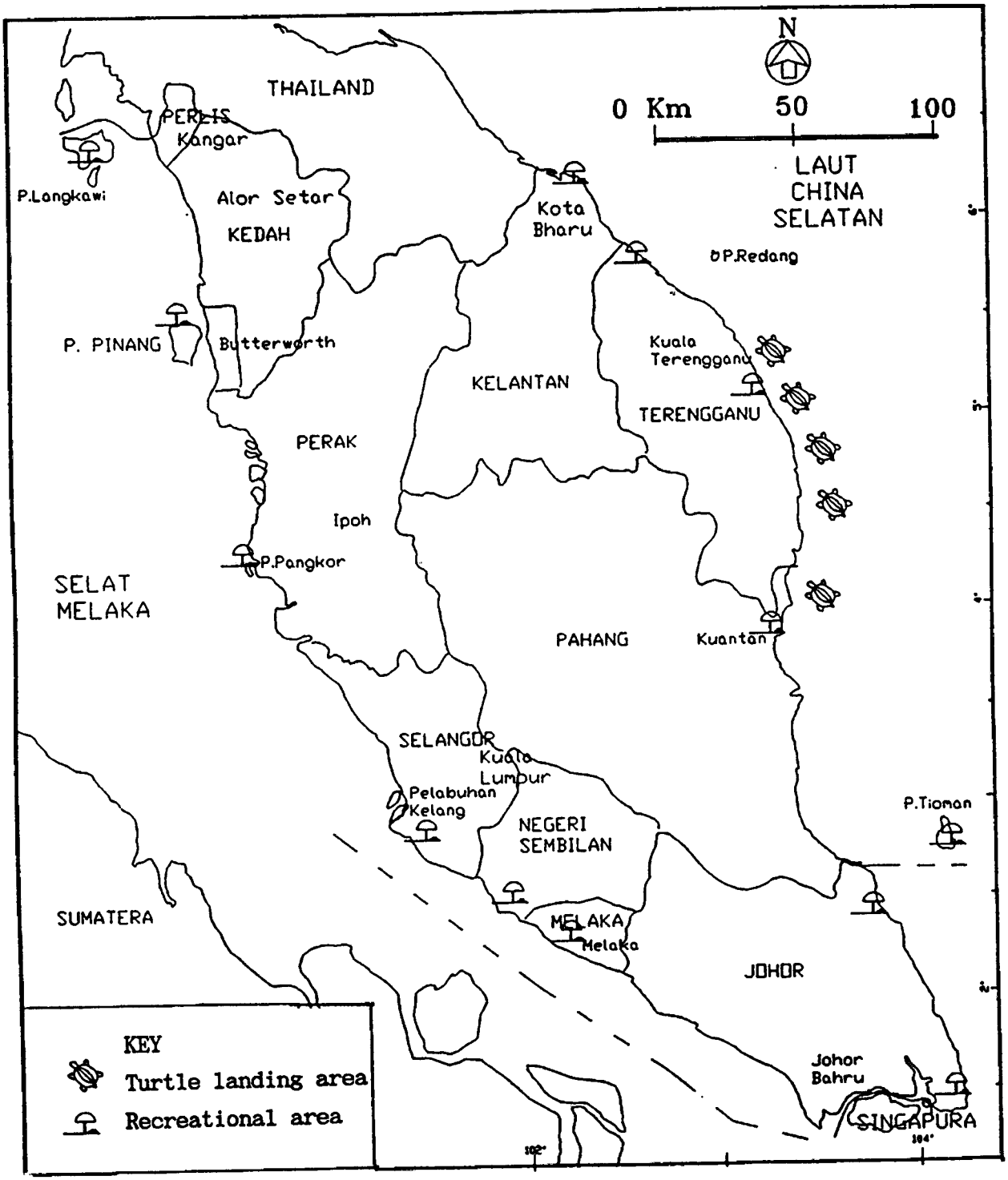
Rule 9 - All vessels navigating in the Straits of Malacca and Singapore are requested to report by radio to the nearest shore authority any damage or malfunction of the aids to navigation in the Straits, or any aids out of position in the Straits.

Rule 10 - Flag States, owners and operators should ensure that their vessels are adequately equipped in accordance with the appropriate international conventions/recommendations.

IV. WARNING

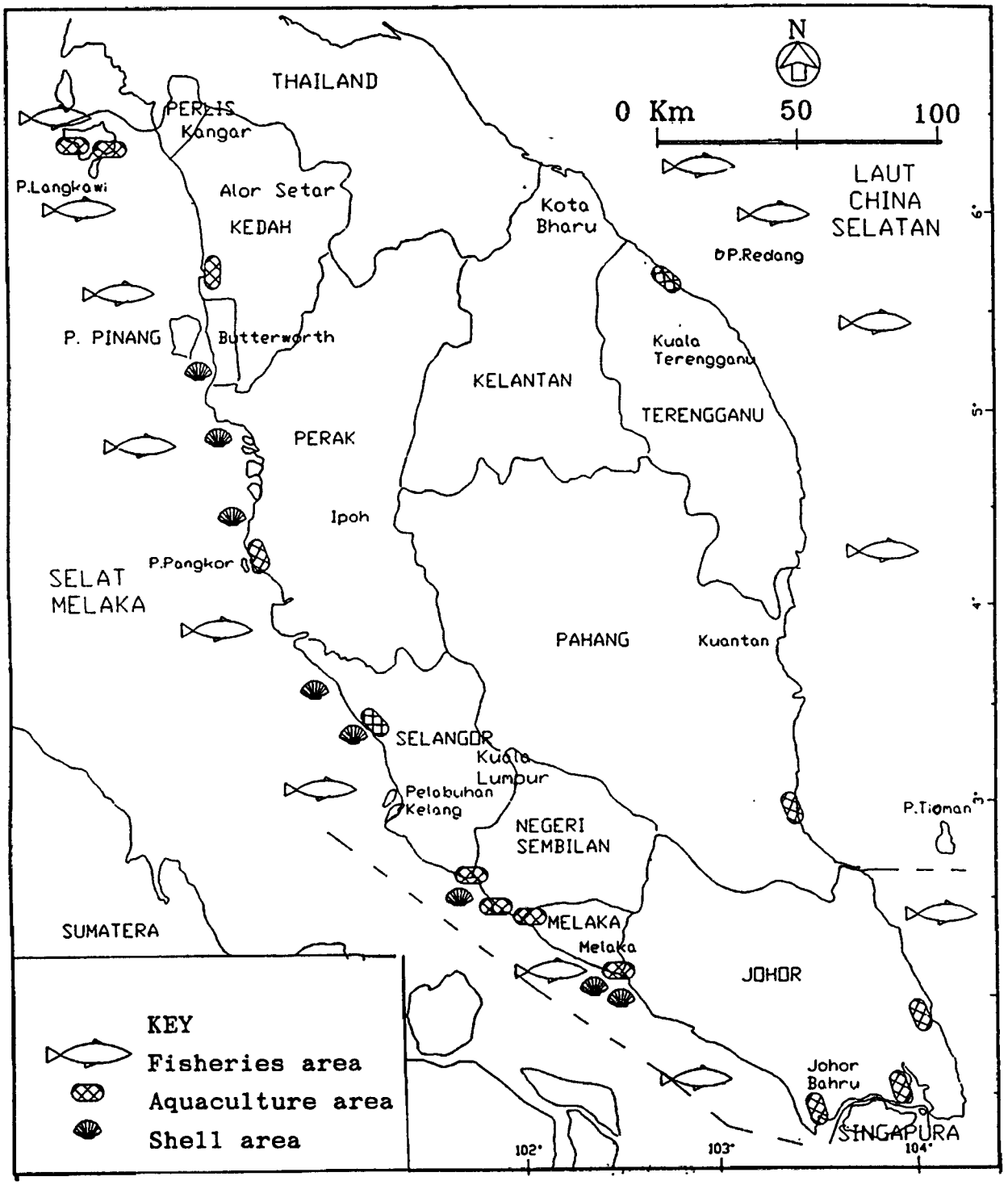
Mariners are warned that local traffic which could be unaware of the internationally agreed regulations and practices of seafarers, may be encountered in or near the traffic separation schemes, and should take any precautions which may be required by the ordinary practice of seamen or by the special circumstances of the case.

Appendix 2.3 a

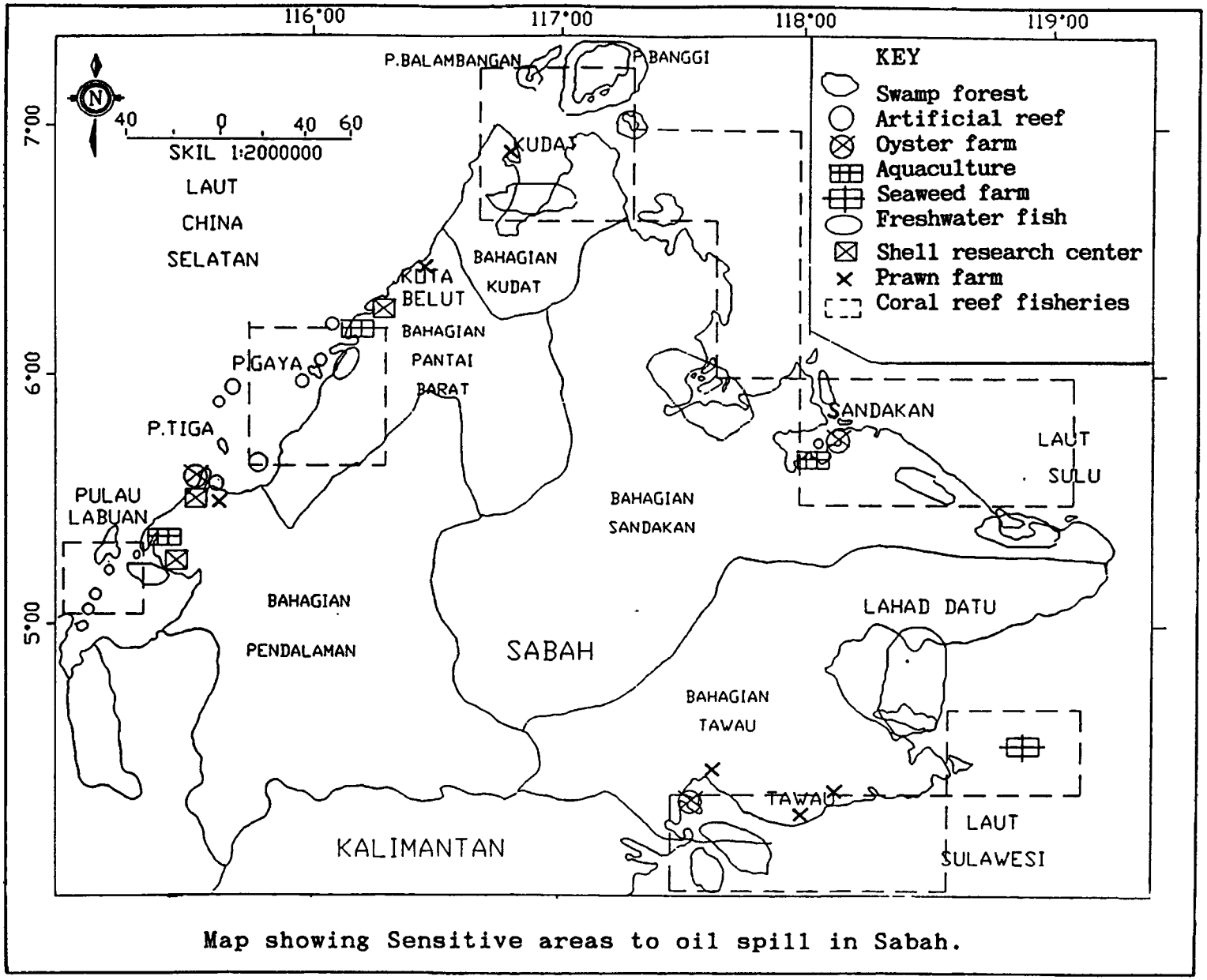


Map showing Turtle Landing and Recreational Area in Peninsular Malaysia.

Appendix 2.3 b

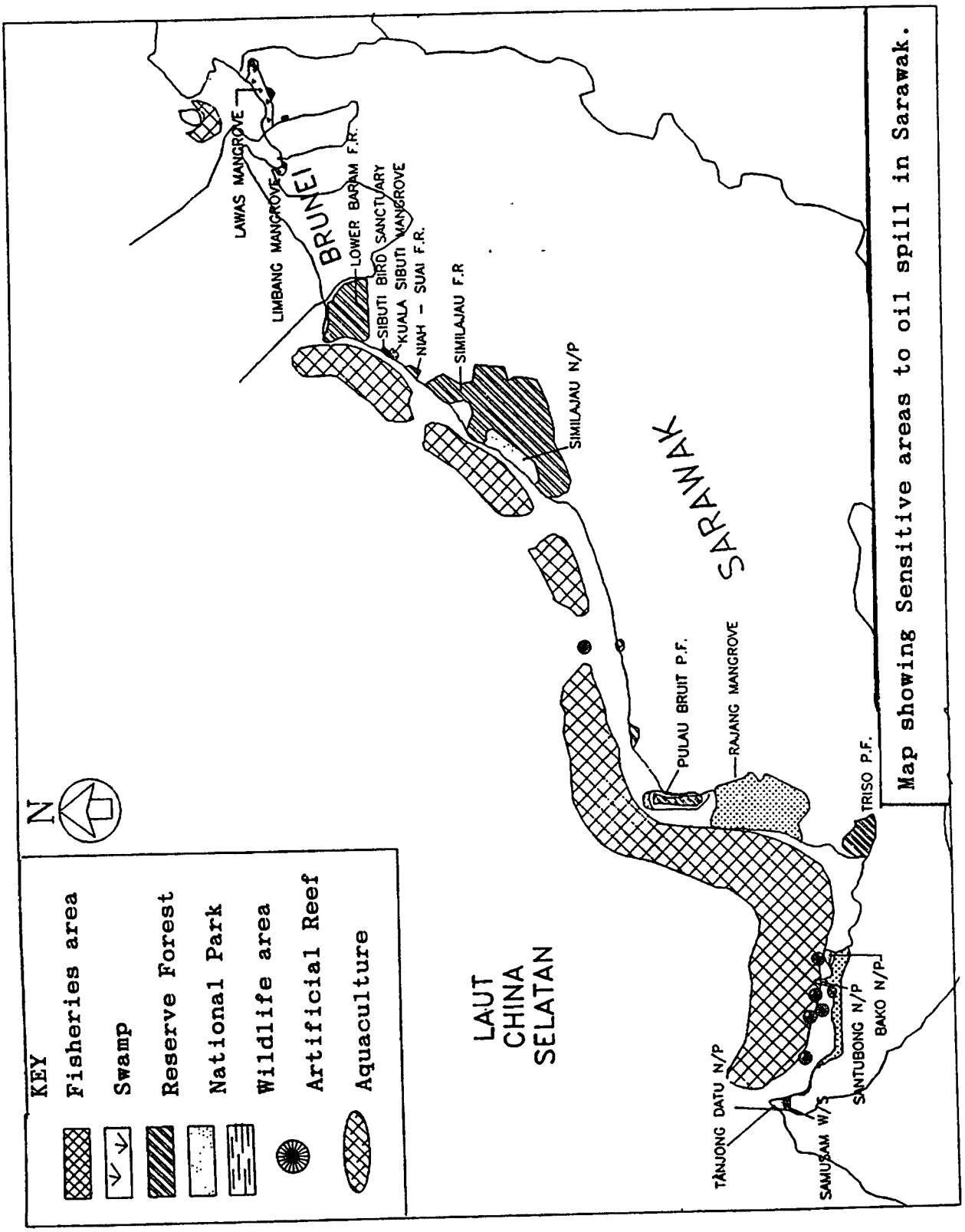


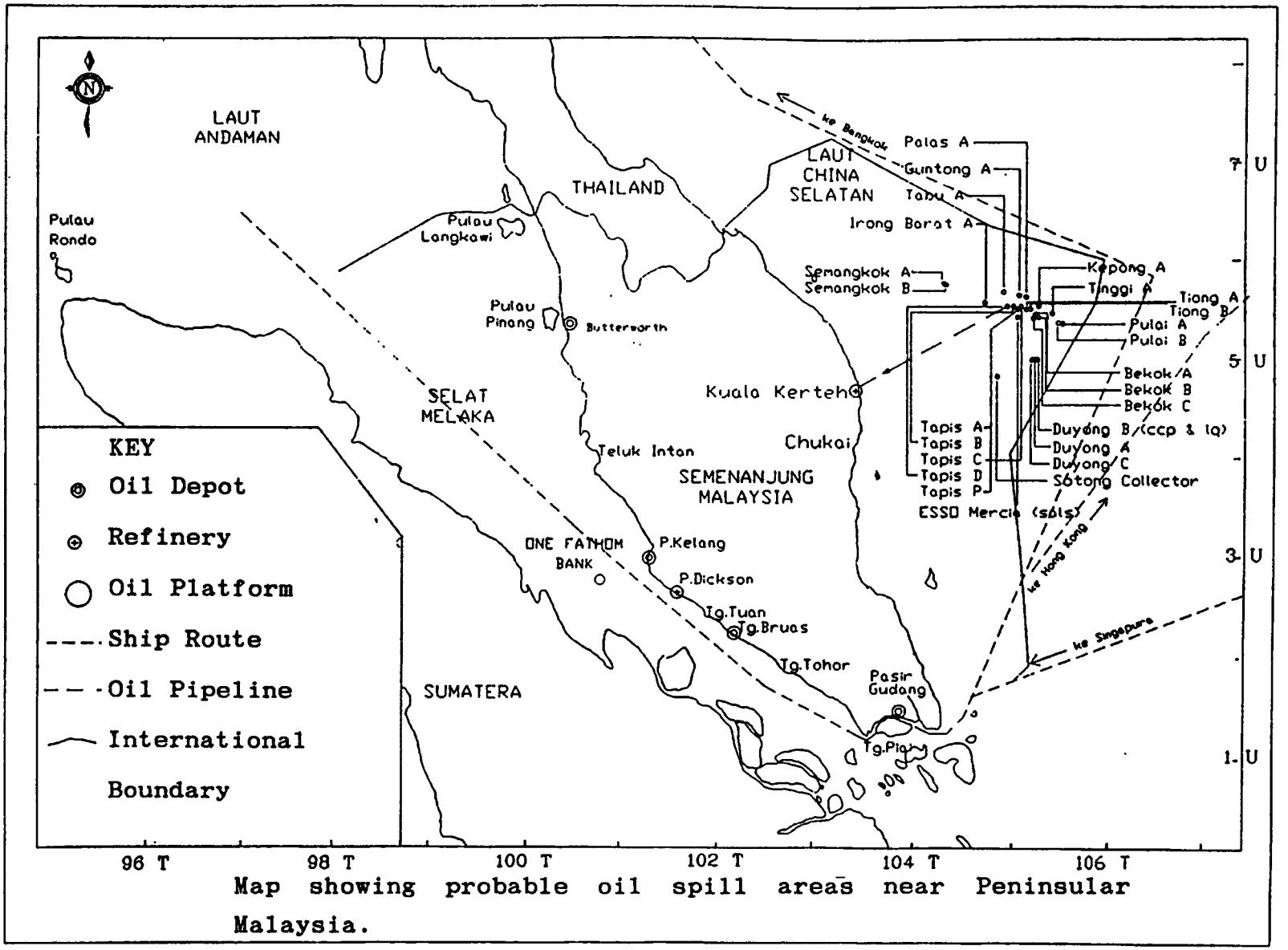
Map showing Fisheries, Aquaculture and Shell area in Peninsular Malaysia.



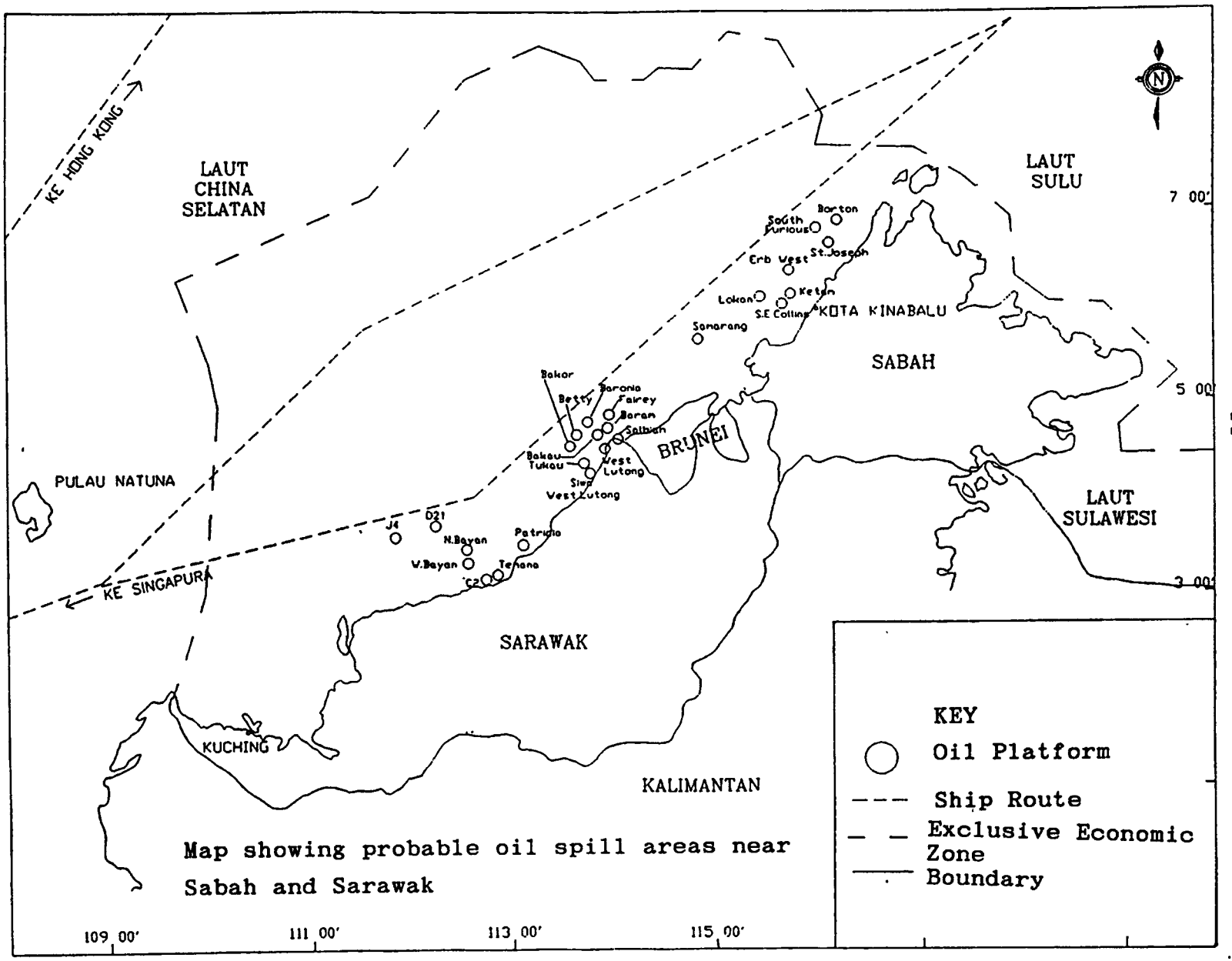
Map showing Sensitive areas to oil spill in Sabah.

Appendix 2.3 d





Map showing probable oil spill areas near Peninsular Malaysia.

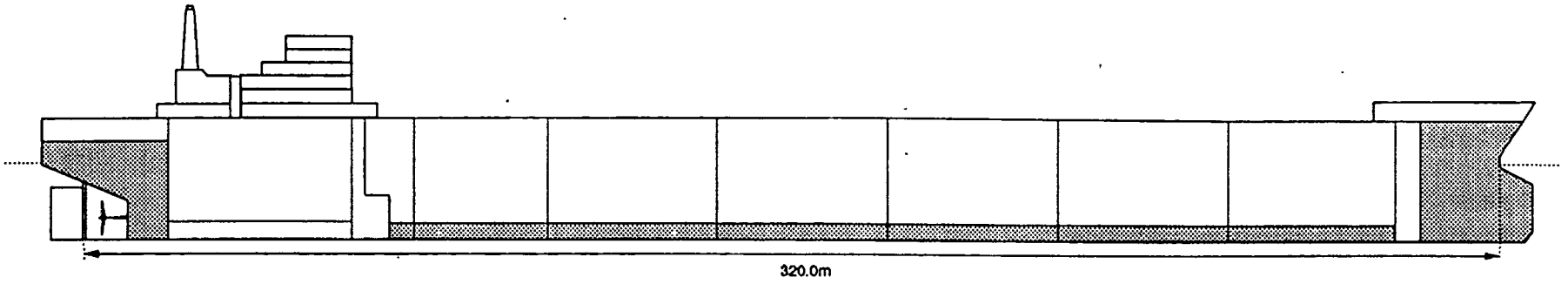


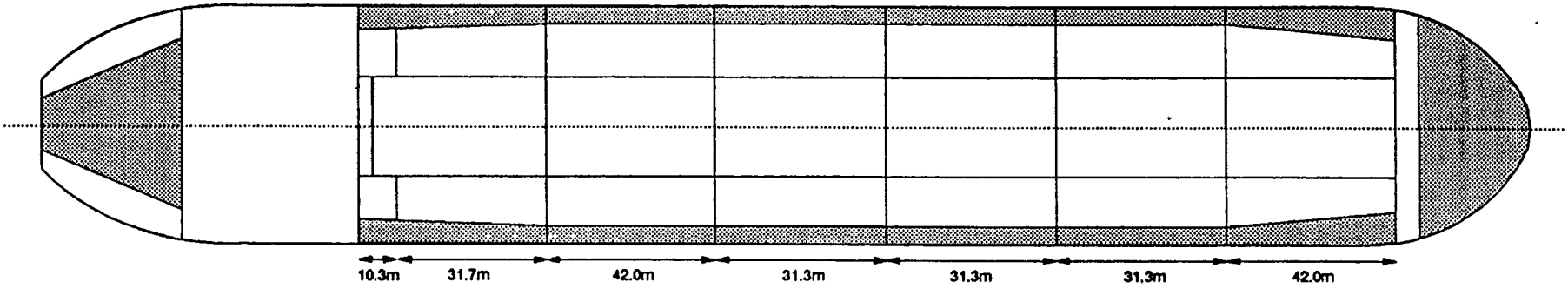
Map showing probable oil spill areas near Sabah and Sarawak

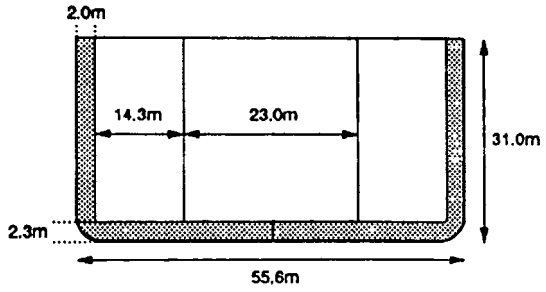
Appendix 3.1 a

DOUBLE HULL TANKER DESIGN

2.0m side tanks





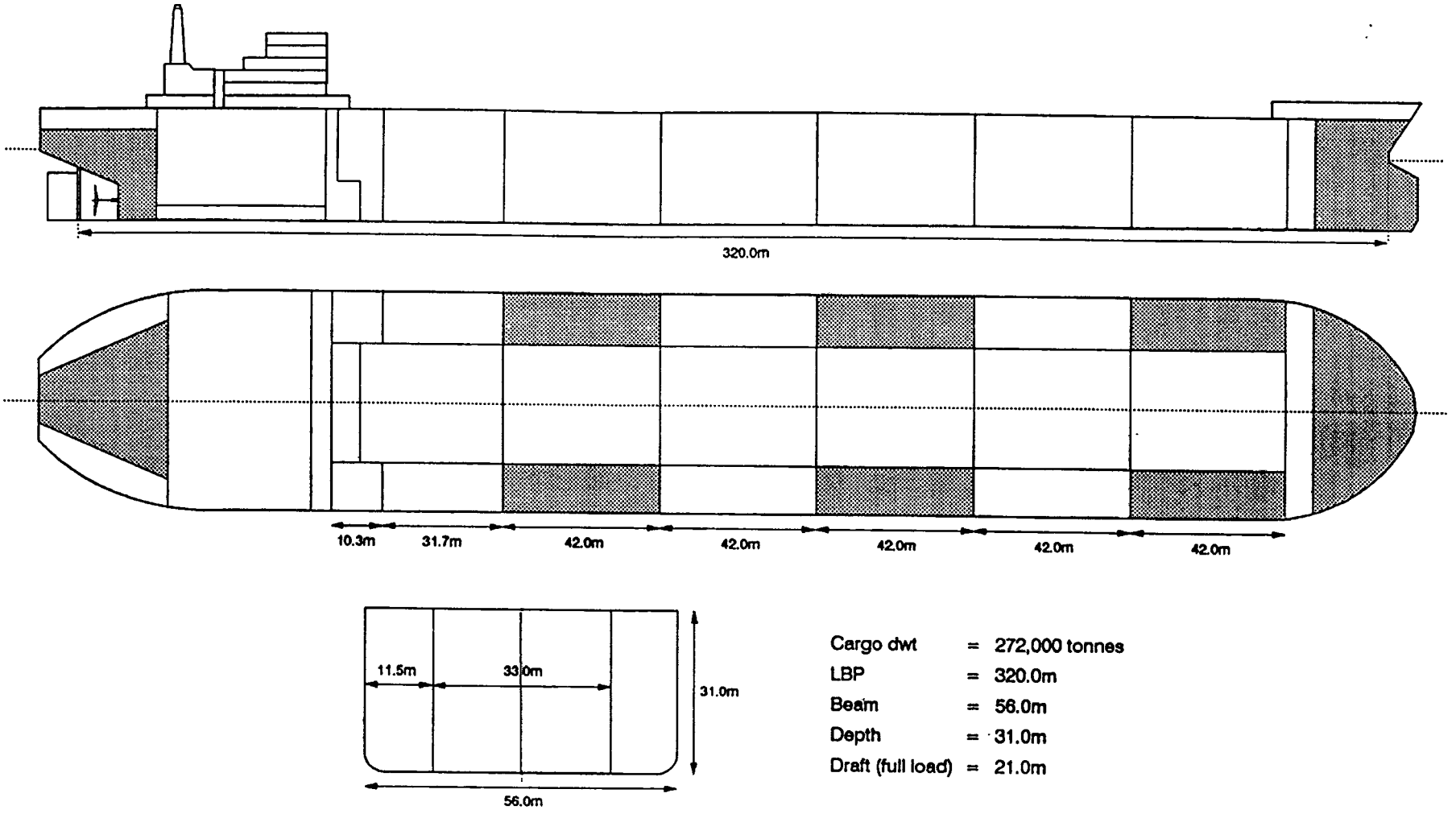


Cargo dwt	=	272,000 tonnes
LBP	=	320.0m
Beam	=	55.6m
Depth	=	31.0m
Draft (full load)	=	21.3m

Source: Drewry Shipping Consultants Ltd.

Appendix 3.1 b

MARPOL TANKER DESIGN

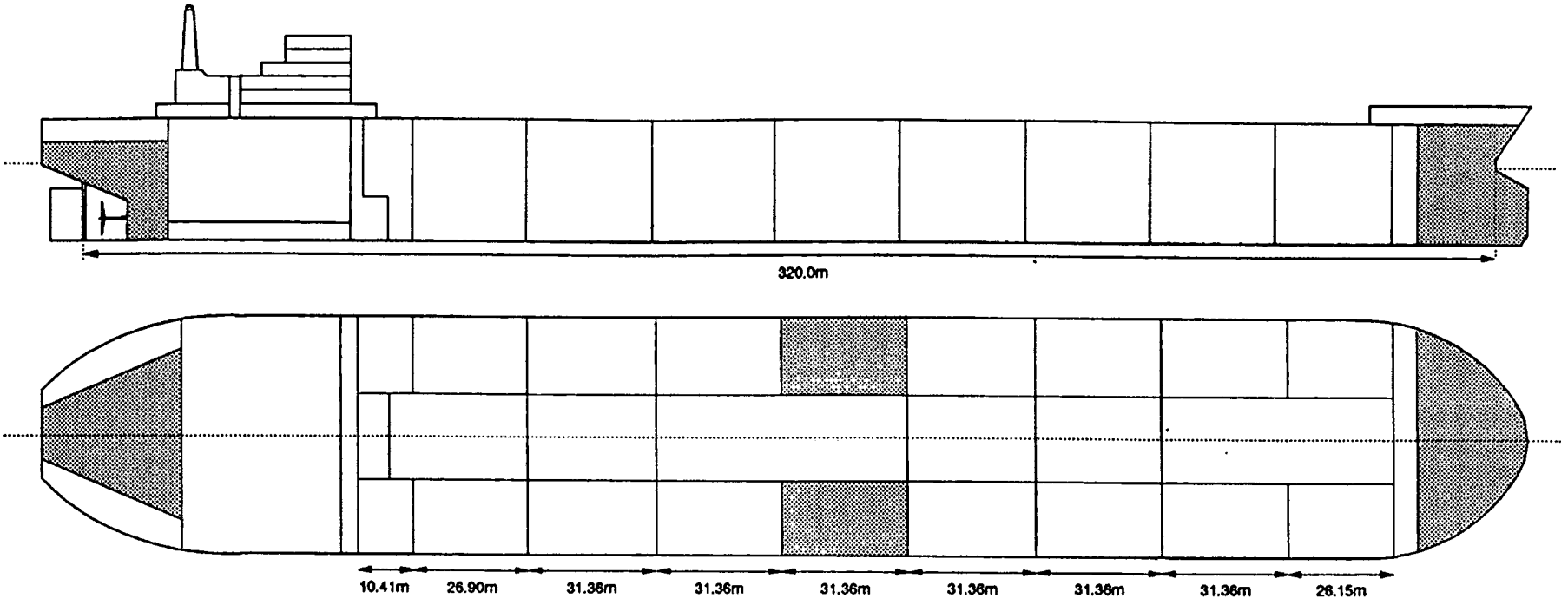


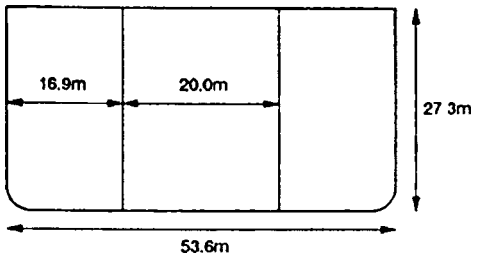
Cargo dwt	=	272,000 tonnes
LBP	=	320.0m
Beam	=	56.0m
Depth	=	31.0m
Draft (full load)	=	21.0m

Source: Drewry Shipping Consultants Ltd.

Appendix 3.1 c

PRE MARPOL TANKER DESIGN

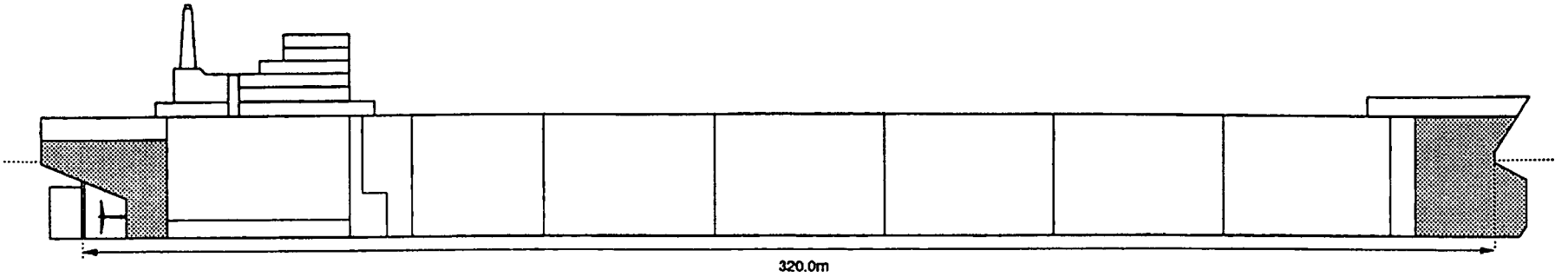


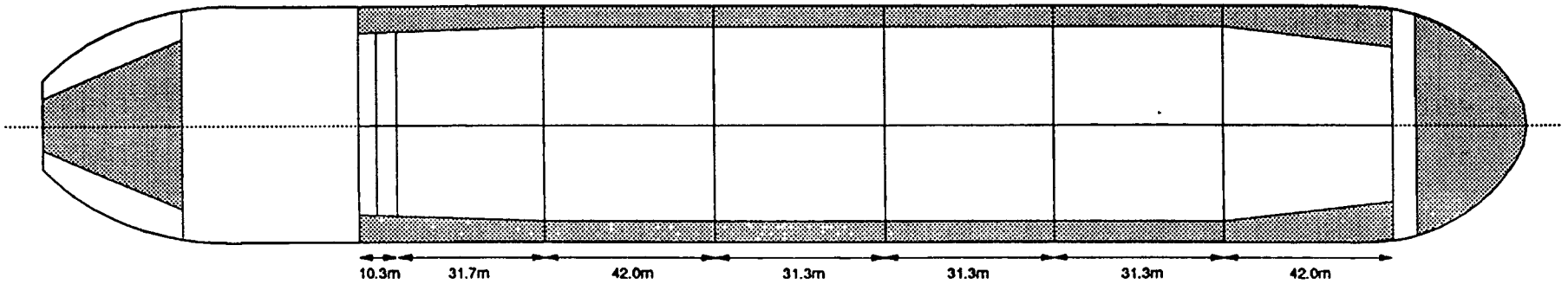


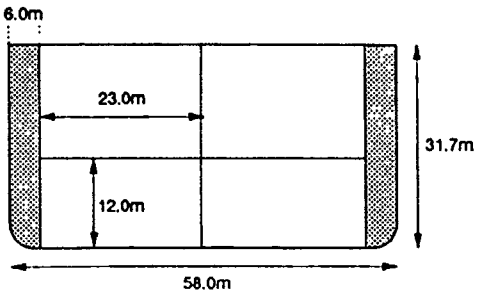
Cargo dwt (full load)	=	272,000 tonnes
Cargo dwt (light load)	=	251,000 tonnes
LBP	=	320.0m
Beam	=	53.6m
Depth	=	27.3m
Draft (full load)	=	21.2m

Source: Drewry Shipping Consultants Ltd.

MID-DECK TANKER DESIGN



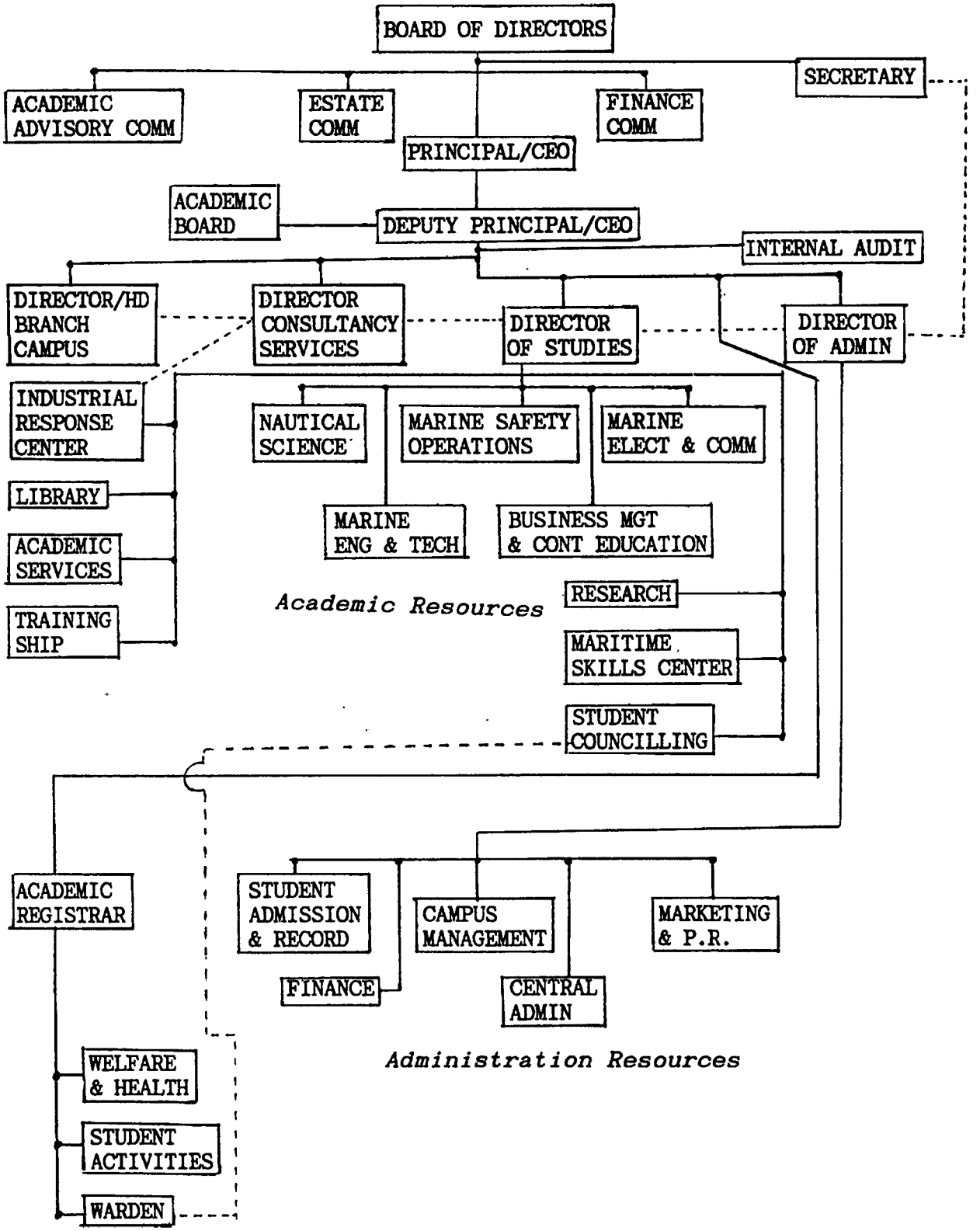




Cargo dwt	=	272,000 tonnes
LBP	=	320.0m
Beam	=	58.0m
Depth	=	31.7m
Draft (full load)	=	20.7m

Source: Drewry Shipping Consultants Ltd.

Appendix 5.1



Proposed New Organizational Structure of ALAM