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THE ESTABLISHMENT
OF
A RESEARCH & DEVELOPMENT DEPARTMENT
AT
THE AKADEMI LAUT MALAYSIA

BY
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MALAYSIA

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

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

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**THE ESTABLISHMENT
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Dedicated to my parents

my beloved wife and my children, Poppet and Leklek

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FOREWORD

My aim in this dissertation has been to impress upon the relevant persons in authority and in the maritime industry in Malaysia of the urgent need in establishing a Research and Development department at the Akademi Laut Malaysia [ALAM].

Traditionally, the role of an MET institution is to prepare its students to become future officers on merchant ships. With the continuous upgrading of technology, not only in the offices ashore but also on board these ships; this upgrading having been dictated by new and constant changes to the global socio-economic and political climate, the roles and functions of these officers become more challenging. In some of the developed maritime nations today, professional mobility is incorporated in their MET programme objectives. Ship's officers are equipped with the knowledge and skills required for shore-side management staff and *vice versa*.

At the international scene, the whole world has been, for the past four decades, geared to the noble idea of ensuring safety at sea and the preservation of the marine environment. Member governments of the International Maritime Organization, have co-operated through IMO's various conventions, resolutions, and recommendations to ensure that these twin objectives are being met. Simultaneously, through other conferences e.g. the Law of the Sea and the Earth Summit, these objectives are also pursued. It is therefore imperative and expedient for any MET institution to maintain pace with these

new demands through the revision and/or introduction of new training schemes.

These changes too, affect the overall management of the maritime industry, both public and private. Gone are the days, when each sector of the industry paid heed only to its specific specialisation. Today, the industry certainly requires experts in each field. For the industry to remain buoyant and dynamic, it has to be more innovative in its approach. There is now a need in the planning and implementation of maritime policies and in the management of business, by the government and private sectors respectively, to utilise new technology and management systems. These necessitate the acquirement of a new level of knowledge and skill by the relevant personnel in both the aforementioned sectors in order to be innovative and simultaneously be able to operate and utilise modern technology [hardware and software].

An efficient and responsible government, will give due cognisance to the fact that all affairs and activities of the maritime industry need to be co-ordinated and invigorated at the national level. This will ensure the competitiveness and stability of the industry which will then be able contribute to the national socio-economic development.

This dissertation, attempts to highlight the roles and functions of R & D in MET and relate these to the socio-economic development of the country and the preservation of the marine environment. It is very pertinent that ALAM, being the only MET institution in the country, should take the lead by establishing the first maritime R & D department in the country.

In the introductory Chapter, the history of the development of merchant shipping in Malaysia is presented. This is correlated to other developments in the maritime industry e.g. ports, offshore industry, national policies, shipbuilding, etc. The current deficiencies, are also highlighted.

The history and current status of MET in Malaysia are dealt with in Chapter 1. Also included are the contributions and future role of ALAM in MET; these being discussed against the government's goal of making Malaysia a "Maritime Nation", and "Vision 2020".

Chapter 2 focuses into the need, prioritization and methodology of research in MET. Following this, the subject, scope, depth of R & D activities within the government administration and maritime industry, are identified. The rationale for R & D participation and the ensuing benefits in each subject matter are also dissertated.

Chapter 3 describes the establishment of a R & D department at ALAM. This details out the organisation, manpower requirements, project scheduling, financing, facilities and infrastructure needed for embarking into research.

The last chapter provides a summary of the dissertation; the appropriate recommendations and time schedule for their implementation are also described.

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LIST OF ABBREVIATIONS

ALAM	Akademi Laut Malaysia
ASEAN	Association of South East Asian Nations
BIMCO	Baltic and International Maritime Council
CIT	Chartered Institute of Transport
COST 301	European Co-operation in the Field of Scientific and Technical Research
COW	Crude Oil Washing
EC	European Community
EDI	Electronic Data Interchange
EDIFACT	Electronic Data Interchange For Administration, Commerce and Transport
EFTA	European Free Trade Area
ESCAP	Economic and Social Commission for Asia and Pacific
GMDSS	Global Maritime Distress and Safety System
HRD	Human Resources Development
ICD	Inland Container Depot
ICS	International Chamber of Shipping
IGS	Inert Gas System
ILO	International Labour Organisation
IMLA	International Maritime Lecturers Association
IMDG Code	International Maritime Dangerous Goods Code
IMO	International Maritime Organization
ISF	International Shipping Federation
LNG	Liquefied Natural Gas
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships, 1973 and of the Protocol of 1978

MATES Foundation	Malaysian Training and Education for Seamen Foundation
MET	Maritime Education and Training
MISC	Malaysian International Shipping Corporation Berhad
MSO	Merchant Shipping Ordinance
NAFTA	North America Free Trade Area
PNSL	Perbadanan Nasional Shipping Lines Berhad
R & D	Research and Development
SOLAS 74	International Convention for the Safety of Life at Sea, 1974
STCW 78	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978
TRAINMAR	Inter-regional pilot project for training development in the field of maritime transport
WMU	World Maritime University
UNCLOS	United Nations Convention on the Law of the Sea
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme
VTs	Vessel Traffic Services

INTRODUCTION

MERCHANT SHIPPING IN MALAYSIA

Malaysia is comprised of the 11 states of the Peninsular Malaysia and the two states of Sabah and Sarawak on the island of Borneo, the Federal Territories of Kuala Lumpur, the capital and Labuan; the whole country lying between the latitudes of one degree north and seven degrees north of the Equator. Peninsular Malaysia forms the southern tip of the Asian mainland, bordered by Thailand to the North and Singapore to the South. It is separated from Indonesia on its western and eastern side by the Strait of Melaka and the South China Sea respectively. Sabah and Sarawak on their eastern side are flanked by Indonesia; in the West they share a common border with Brunei.

Peninsular Malaysia covers an area of 131,598 sq.km and has a coast-line of about 2000 km, whereas Sabah and Sarawak occupies 198,160 sq.km and their combined coastlines total more than 1500 km.

Historically, merchant shipping activities have existed from the early days of the Melakan Sultanate c. 1400 AD when this Malay state became the dominant trad-

ing centre in South East Asia. During the heyday of this empire until its capture by the Portuguese in 1511, traders in their sailing ships from Europe and the Middle East, were engaged in barter trading with their counterparts arriving in Melaka from the Orient and the rest of the Malay Archipelago.

The Portuguese and subsequently [from 1641] the Dutch quest for political and commercial hegemony in the East Indies prevented the rise of this Sultanate to its earlier prominence and hence its role as a major commercial centre; with this merchant shipping and related activities too, further declined. With the advent of the British in the late 18th century which resulted in the Malay Peninsula coming under their sphere of influence until the granting of independence for Malaya⁽¹⁾, the major shipping activities were purely British owned and operated. The few local shipping firms concentrated their operations mainly in the waters of South East Asia.

National infrastructure such as ports, the transport system, maritime administration (at the national and regional centres), etc., were only primordial as there never existed a policy for such development when the country was under colonial rule. It was only in the post-independence period that a proper national maritime policy be it still in its infancy was formulated. This resulted in vigorous developmental programmes for the maritime sector in the government and in the industry.

Under the Third Malaysia Plan 1976-1980⁽²⁾, it was realised by the government of the day of the importance of Malaysia being a maritime nation viz. the role that the maritime sector can play in the national development

of the country. Towards this end the development of the maritime sector specifically on matters related to shipping was made a main priority; the prime rationale for this was due to the imbalance in Malaysia's balance of payment due to all but total reliance on foreign shipping for her trade. Ironically, the maritime policy ".....planners were very flexible as to the time frame for implementation.....nor did they specify as to what is meant by "maritime status"....." (3).

To the government's credit however, was the incorporation of the first national shipping line; the Malaysian International Shipping Corporation Berhad (MISC) in 1968 and a little more than a decade later, a second one, the Perbadanan Nasional Shipping Line Berhad (PNSL) was formed. MISC is to become the country's flagcarrier whilst PNSL vessels serve the domestic routes and lift state cargoes. By 1989, the total number of merchant ships registered reached 916 with a total GRT of 2.02 million tons (4).

Various financial schemes and tax incentives were created by the government to promote the shipping industry, viz. corporate taxation exemption for a five year period after the incorporation of a shipping/shipping-related enterprise, income tax exemption for seafarers sailing on Malaysian ships, soft loans for ship purchase, etc.

Other policies to protect and promote local shipping interests were planned and implemented e.g. the Cabotage policy (5), privatisation of port and port facilities. To further improve shipping business and additionally, to instil professionalism in the management of shipping enterprises, foreign equity participation in

ownership of Malaysian registered vessels was permitted⁽⁶⁾. This hopefully, will act as a conduit for technology transfer and enable Malaysian shipping to operate competitively in the global shipping market.

The UNCTAD Code of Conduct for Liner Conferences was adopted in August 1982; the main benefits being the reduction in outflow of freight and insurance in the country's balance of payments and the equitable participation of Malaysian vessels, in the carriage of cargo made available by the shippers to the conference. Full implementation has not been effective⁽⁷⁾ due to various reasons; even MISC, being the national operator for the Malaysian liner trade, was unable to fully utilise the Code to acquire cargo allocation within the liner conferences.

The government is also active in promoting bilateral trade and shipping agreements not only with her neighbours, but also with other trading partners e.g. the Benelux countries, Japan, Romania, and Turkey.

All these are precursors to the rapid development of shipping *per se* and shipping related activities for the country, particularly for the decades of the 70's and 80's. Major ports viz. Port Klang and Pulau Pinang, on the peninsula and Labuan, Kota Kinabalu, and Kuching in East Malaysia have undergone rapid changes; new ports viz. Kuantan and Pasir Gudang were created to service the rapid economic development of the the country.

To reduce congestion in the sea port areas and upgrade efficiency in port operations, two Inland Container Depots [dry ports] were established; the one at

Ipoh in 1988 being the first, followed by Kuching in 1990⁽⁸⁾. However, these depots do not utilise an Electronic Data Interchange [EDI] system such as EDIFACT⁽⁹⁾ to facilitate efficient cargo documentation and inventory in their operations due to the non-existence of the same.

In addition to Port Dickson, the port of Kerteh and Tanjung Berhala supply base, both on the East coast of the peninsula catered for the newly created oil industry [Malaysia is also a net importer of petroleum products] and likewise Bintulu in Sarawak for the handling of liquefied natural gas [LNG] exports. Through the machinery of the Cabotage policy, there is also a marked increase in the number of locally owned and operated tankers in the domestic trade.

In the field of LNG production, Malaysia currently exports 7 million tonnes annually to the Japanese and the South Korean markets; this figure is expected to increase two-fold⁽¹⁰⁾ over the next few years. To complement this new demand, the number of LNG vessels on orders from various overseas yards and to be operated under the Malaysian flag is expected to increase to nineteen by the year 1995⁽¹¹⁾. The national oil company, PETRONAS, has even set up their own shipmanagement arm in anticipation of this lucrative market.

A National Port Council whose main function is to co-ordinate the development programmes and activities of every port, has also been established. The members are drawn from the port authorities and government agencies having particular responsibility or interest in port and shipping matters, such as the Customs, Immigration, Marine and the Treasury departments. Strangely enough,

the port users were not invited to participate [actively] in the deliberations of this body on a regular basis; hence relevant and reliable feedback from the industry very much necessary for the efficient management and operation of any port and the subsequent development, is missed.

In the support industry, shipbuilding and shiprepair facilities were also established, most of them commencing operations in the 70's and 80's. However, only five of these can be considered to have any impact on this sector of the industry. Only the Malaysia Shipyard and Engineering Sendirian Berhad [MSE], located in the southern part of the peninsula is capable of building ships of up to 14,000 DWT; it also possesses a repair dock having the capacity to handle VLCCs.

As mentioned earlier, the government had promulgated a shipping policy under the Third Malaysian Plan with a view to promote and establish the country as a maritime nation. Towards this end, a maritime division was established in the Ministry of Transport in 1982⁽¹²⁾ as an indication of the government's commitment to the aforementioned objective. The posts of Maritime Research Officers [four in number] were also created within this division to assist the Secretary [head of division], who in turn advises the Minister with regard to port and shipping matters. The function of the research officers were primarily to compile shipping statistics initially, then later to develop them into a complete maritime database.

Sadly, this and many other functions of these officers were gradually diminished to be replaced by pure administrative duties. Currently, maritime statis-

tics are being co-ordinated through the Statistics Department; this department not being a part of the Ministry of Transport.

On the legislative front, the regulating and administration of merchant shipping activities are very much left to be desired as the enabling legislation, the Merchant Shipping Ordinance 1952 is primarily based and modelled on the United Kingdom Merchant Shipping Act of 1894. Drafting work on a new comprehensive legislation covering all aspects of current and future requirements in merchant shipping is now completed; this work was started in 1982. This legislation hopefully will enable the conduct of safe, reliable and efficient shipping activities. Until today, this draft legislation has not been promulgated by the Parliament; this is mainly due to the lack of maritime legislative knowledge in the country.

The Ministry of Transport has defined the National Shipping policy⁽¹³⁾ to be as follows:-

To develop *inter alia*

- a) an efficient, well diversified and modern shipping fleet;
- b) an efficient and economically sound shipbuilding and shiprepair industry;
- c) appropriate supporting services such as shipping agencies, maritime law, insurance, banking, ports;
- d) a corps of skilled and professional manpower to operate all aspects of the industry.

All of the aforementioned are of interest to this dissertation as they are among the reasons for the

establishment of any national maritime education and training institution and its associated policies [including R & D activities], regardless of whether the said institution is government or privately owned.

In March this year the government had announced⁽¹⁴⁾ the allocation of Malaysian Ringgit 1 billion for the promotion of shipping activities. No details are available yet. There is no proper co-ordination and planning at the national level not only in maritime matters which is a very vast project to embark upon; this is also non-existent at a lower level for port and shipping matters. Currently, all national maritime administration viz. the planning, operating, implementing, regulating and in addition, co-ordinating where this is applicable, are executed by no less than fourteen different departments or agencies of the government at the federal level [the country is governed according to the federal system of government]. At the state level, one can imagine the ramifications of such bureaucracy.

It is therefore imperative that assistance is provided to the industry to extract itself out of this quagmire. One of the avenues that can be sought is through the non-remitting support of both the government and industry for the establishment of an R & D department at the MET institution in the country [ALAM] and the activities that it intends to carry out. This dissertation therefore intends to shed some light on the importance of R & D in the development of the maritime industry and the role that it can and should undertake to bring closer the concept of "maritime nation" into reality.

NOTES & REFERENCES

1. Prior to the formation of Malaysia on 16 March 1963, the Malay peninsula was known as Malaya. Malaya acquired independence from the British on 31 August 1957 and was comprised of the former British Straits Settlements of Penang and Malacca, the four Federated Malay States [coming under the British sphere of influence] and the five Unfederated Malay States. Singapore, Sarawak and Sabah agreed to join the new federation in 1963, but Singapore seceded in 1965 due to political reasons.
2. The government, since the formation of Malaysia, *supra* note 1, has promulgated and implemented an overall national development policy; each policy contains specific developmental programmes addressing different sectors of the country, geographically and economically that will be implemented throughout that period. Under the Third Malaysia Plan, one of the priorities of the country, was to achieve the status of a maritime nation.
3. see ESCAP, "National Planning for Shipping Policy", [prepared by the Shipping Unit, Maritime Division of the Malaysian Ministry of Transport], in "Report and Technical Papers of the Country-Level Workshop on Shipping Statistics", held in ASEAN capitals between 13 July and 11 August 1983. p.53
4. Source: Jabatan Laut Malaysia
5. The Cabotage policy, a form of shipping and trade protectionism, was introduced in 1980. This policy allows the monopoly in the carriage of cargo between Malaysian ports, to Malaysian ships only. Three types of licences are issued by the Domestic Shipping Licensing Board [DSLBB] viz.,
 - a) unconditional or permanent licences are issued to Malaysian owned and registered vessel; 70% of the crew complement must be Malaysian;
 - b) conditional or provisional licences are issued to Malaysian vessels that do not comply with the full provisions of the policy; and
 - c) temporary licences granted to other vessels whenever domestic tonnage is deemed insufficient. [* item (c) was withdrawn in 1980]
6. see s.11(1) of the Merchant Shipping Ordinance 1952 as amended by the Merchant Shipping Act [Amendment and Extension] 1977 [Act 393]. This section stipulates *inter alia* the rules on registration, entitlement of ownership, equity allocation of the enterprise, etc.
7. There are many obstacles to the implementation of the UNCTAD Code of Conduct for Liner Conferences and therefore the Malaysian shipping industry was in the main deprived of the benefits that the code could offer. The reasons quoted were *inter alia* the lack of shipping expertise among the implementors [in the government], the absence of enabling legislation incorporating the code, the absence of a proper study on the implications of the code to the Malaysian shipping industry, etc.
8. The Ipoh ICD provides a cargo transit and co-ordinating centre for the ports of Port Klang and Pulau Pinang through the participation of Malayan Railways and Kontena Nasional [main container operator], whilst the ICD at Kuching services the Sarawak hinterlands. With this implementation, Full Container Load [FCL] services and Multimodal Transport Operations are able to be provided for the shippers.
9. Please refer to section 2.4.3.4 of this dissertation for more information on EDIFACT and its role and function in telematics. *op.cit.*
10. Lloyds Maritime Asia, February 1990. p.31.
11. *ibid.* p.33.
12. Source: Shipping Unit, Maritime Division of the Ministry of Transport, Malaysia.
13. ESCAP, *supra* note 3.

14. Source: Bernama abstracts of national newspapers for the Malaysian diplomatic corps overseas.

CHAPTER 1

MARITIME EDUCATION AND TRAINING IN MALAYSIA

1.1 History

From the pre-independence era up to the middle of the 1970's, there never existed a formalised MET training institution, nor was there a proper training scheme for entrants to the merchant navy, established in the country. Those aspiring to be one, had to commence shipboard service in local or foreign companies, directly from the lower ranks, as a rating without any pre-sea training. Formalised education and training [including upgrading courses] was available only in a neighbouring country or overseas.

Some organisations e.g. the port authorities, the Marine Department and the Customs and Excise Department, had provided their marine personnel specialised training appropriate to the operational requirements of their respective organisations. The aforementioned training did incorporate, to a certain extent, special lessons necessary for the acquirement of the relevant certificates of

competency, under the Merchant Shipping Ordinance 1952 [MSO 1952].

However, in order to fulfil the coastal trade manning and certification requirements, various Boards of Examiners⁽¹⁾, were established in the country. The Board of Examiners for Masters and Mates were established at Penang in 1953. Simultaneously, for the purpose of granting certificates of competencies for helmsmen, steersmen and lifeboatmen, Boards of Examiners were also established at the Marine Departments of the following ports, i.e. Penang, Port Swettenham, Telok Anson and Johore Bahru⁽²⁾. On the Marine Engineering side, the first Board of Examiners was set up at Penang in the same year to examine and certify Engine Drivers.

The first examinations ever to be conducted by the abovementioned boards, were carried out in 1953⁽³⁾; today, this function includes examinations for all grades of certificates of competencies for the merchant navy [up to Masters Foreign-Going and Class 1 Marine Engineer, respectively]. The only exception to this, is the certification for operators of maritime communication equipment⁽⁴⁾ which is under the authority of the Telecoms Department.

1.2 Establishment of ALAM

1.2.1 Corporate History

As had been mentioned in the introductory chapter, the government had promulgated a shipping policy under the Third Malaysia Plan with a view to promote and establish the country as a maritime nation. The shipping

companies were also aware that savings could be made on their staff training expenditure through the establishment of their own training centre for seafarers.

Encouraged by the support shown by the government as indicated in the aforementioned shipping policy , in 1976 the national shipping line i.e. 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 Foundation [Malaysian Training and Education for Seamen Foundation]. In the same year, the foundation established the Maritime Training Centre [MTC] at Melaka, primarily to train Pre-Sea Deck Cadets and Ratings for MISC; a pre-sea course for Radio Officers' later followed suit. Thus, the first formal MET institution in the country was launched.

The demand for highly qualified officers for the Merchant Navy and the anticipated demand for such former seafarers in the industry ashore, prompted the then government in 1981 to upgrade the status of the MTC to that of an academy [The organisation chart of the academy is shown in ANNEX A]. It was executed *inter alia* through the award of a government charter[ANNEX B]; henceforth the MTC was to be known as the "Akademi Laut Malaysia" [ALAM].

The academy is to function as an institution whose main purpose is "...the development and the enhancement of the education and training...." of Merchant Navy personnel. In line with this the academy is empowered ⁽⁵⁾ to conduct the relevant shipping courses and the associated examinations, publication of reading materials

related to shipping and last but not least, the conduct of research on shipping matters .

1.2.2 ALAM'S contribution to the Malaysian Shipping Industry

Directly after the establishment of ALAM as the national MET institution, the academy proceeded with the introduction and conduct of all courses in compliance with the manning and certification requirements of the MSO 1952 as amended. Even though Malaysia acceded to the STCW 78 Convention [International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978] only in 1991, all the courses conducted at ALAM prior to and after this date, have been in strict compliance with the stated convention. During the first two years of the academy's development [1981-1983], a training consultant from IMO was utilised in the curriculum development; after which all further work in this area was undertaken by ALAM's own staff.

Today, ALAM conducts per term, on a regular basis, thirty two different courses [mandatory courses], as compared to only one [GP Ratings] in 1977. The total number of students that had enrolled at ALAM from 1977 to end of 1991 for the aforementioned courses is about 13,200 [see Fig. 1 p.5].

The majority of these students are destined for service on Malaysian merchant ships, whilst about 15% comprise of marine personnel in service with the government departments e.g. the Marine Police, the Customs and Excise, and the Marine Departments. Since 1987, a number of ALAM's former students have aspired to command and

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TOTAL STUDENT ENROLMENT (1977-1991)

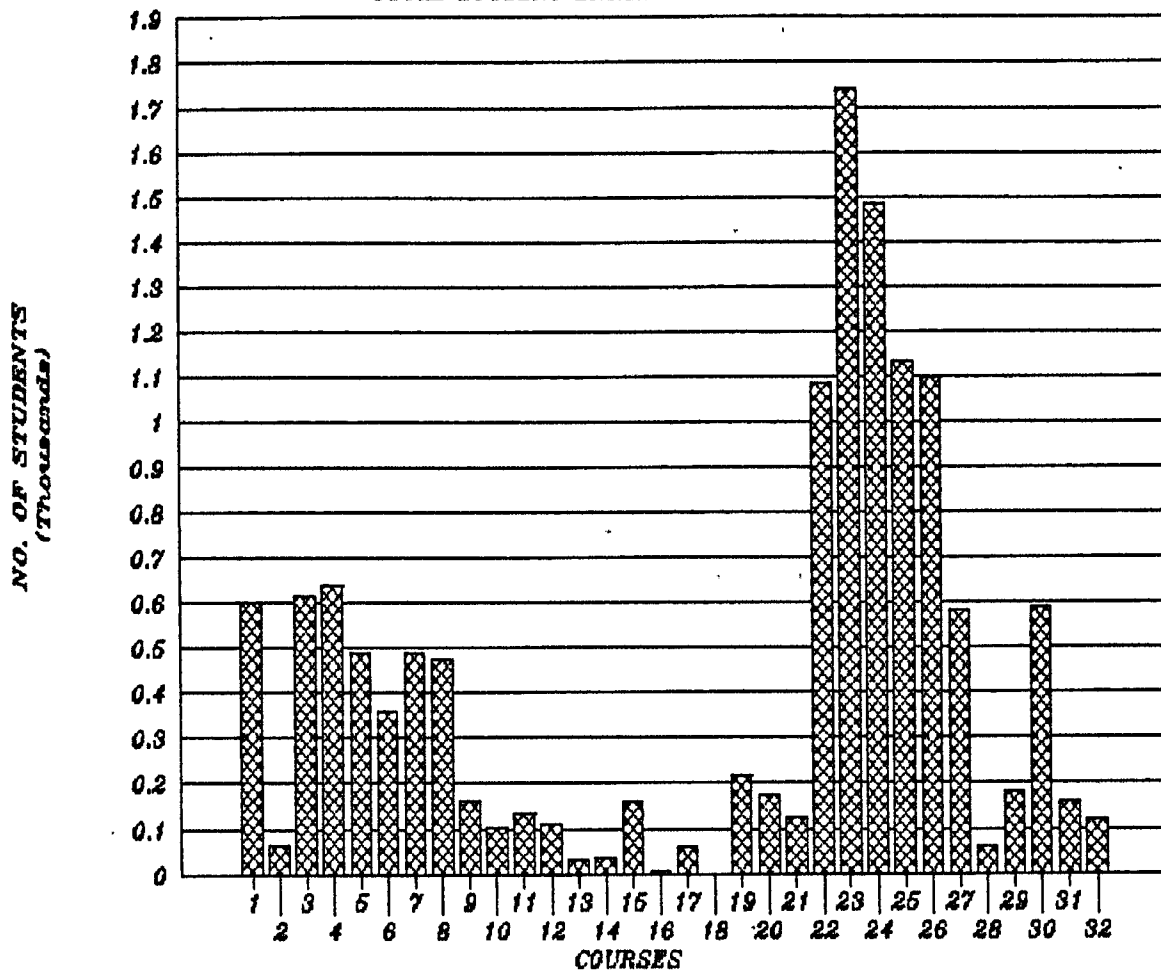


Fig. 1

KEY

- | | |
|------------------------------------|--|
| 1. Pre-Sea Deck Cadets (from 1979) | 17. 1/E Pt.B [Motor] (from 1983) |
| 2. Marine Radio (" 1978) | 18. " " [Steam] (" 1991) |
| 3. Deck Ratings (" 1982) | 19. Engine Driver I (" 1985) |
| 4. Engine " " " | 20. " " II " " |
| 5. Catering " " " | 21. " " III " " |
| 6. G.P. " (1977-1982) | 22. Personal Survival (" 1983) |
| 7. 3/Mate FG (from 1983) | 23. Fire-fighting Basic " " |
| 8. 2/Mate FG " " | 24. 1st Aid " " " |
| 9. 1/Mate FG (from 1984) | 25. Survival Craft " " |
| 10. Master FG (from 1985) | 26. R/Telephony [Restr'd] (" 1984) |
| 11. Mate LT " " | 27. Radar Observer " " |
| 12. Master LT " " | 28. " Operator " 1985 |
| 13. Mate HT " " | 29. " Simulator " " |
| 14. Mate HT " " | 30. ENA [Operational] (" 1984) |
| 15. 2/E Pt.B [Motor] " " | 31. Ship Capt. Medical (" 1985) |
| 16. " " [Steam] (from 1991) | 32. Other courses e.g. Radio Surveyor, Ship-
ping Agency, Man O'board rescue, Oil
Cargo survey, etc. |

senior positions at sea. Some have also gained employment in the shore-based sector of the maritime industry, e.g. as harbour pilots, shipping company executives, surveyors and maritime lecturers.

As an institution, ALAM has also been given the recognition as the national MET institution. Not only was it gazetted⁽⁵⁾ as such, it was also inferred in the MSO⁽⁶⁾ that candidates attending the relevant preparatory courses at ALAM comply with the requirements of the Examinations Rules. Internationally, the academy is now a branch of the World Maritime University, since April 1991. With this recognition, the academy is therefore authorised and accepted by the IMO, to conduct the various IMO model courses, particularly in the South East Asian region.

Looking at the non-legal aspects of recognition, the academy has always been invited and has participated actively in various fora pertaining to the maritime industry, both at the governmental and non-governmental levels. Examples of these are:-

- i) a member of the National Shipping Council; a body whose main function is the co-ordinating of all the major organisations, both government and private, that are involved in shipping matters;
- ii) together with other bodies under the chairmanship of the Dewan Pustaka, a government body that is the guardian of the national language [Bahasa Malaysia], the collation, translation, publication and promotion in the use of Bahasa Malaysia nautical terms;

iii) member of the Consultative Committee on the Welfare and Discipline of Seafarers;

and many other *ad hoc* bodies in the country, including participating in the promotion of tourism through sea sports.

1.3 ALAM's MET programmes

1.3.1 An Outline

The MET programmes of ALAM are fully directed towards the development of human resources [HRD programmes] to fulfil the general requirements of the national maritime industry, and in particular, those of the shipping sector. In implementing its MET programmes, ALAM is therefore fulfilling the role that has been entrusted to the academy upon its inception [as implied in its Charter]; such a role to be construed as being responsive to the national economic development programme.

The current MET programmes, projects and activities are also in compliance with the policies of the national maritime and maritime safety administration as reflected in the relevant guidelines, recommendations and legislations. At the international level, these also comply and subscribe to the requirements and guidelines issued by the IMO, in particular the STCW 78 Convention and other resolutions, in order to promote safety at sea and the protection of the marine environment.

1.3.2 Objectives

Consequent to the aims of the academy's MET programmes as described in the preceding sub-topic, their objectives be summarised as follows:

- i) to equip new entrants to the maritime industry in the necessary skills, knowledge and attitude relevant to their needs, i.e. shipboard, off-shore, and shore-based activities, both in the public and private sectors;
- ii) to provide a continuous education and training programme for those already in service in the industry, so as to constantly upgrade their level of knowledge and skills abreast of technological developments in the industry; and
- iii) to enable these personnel to be safe, efficient and cost effective in the conduct of their activities, for the particular sector of the industry that they are engaged in.

To satisfy the abovementioned objectives, all of ALAM's current and future MET programmes can be broadly classified into two categories as described in the following paragraphs.

1.3.3 Statutory requirements

All the courses listed in ANNEX C [excluding course no. 6.13] are in compliance with the MSO 1952 and the STCW 78 Convention, both legislations as amended from time to time. This will also be true for all new

courses that will be implemented under the Sixth Malaysia Plan⁽⁷⁾. These courses are listed below:-

.1 Pre-Sea Cadets

- i) Diploma in Marine Technology [Marine Engineering]
- ii) Front-ended course [integrated training] lasting 3-4 years, leading to an equivalent academic award in addition to any one of the following professional qualifications, viz. Deck Officer or Marine Engineer or Commercial qualifications

.2 Marine Communications

The courses listed below will be introduced in lieu of the requirements under current Malaysian legislation with those of SOLAS 1974 as amended by the Protocol of 1988⁽⁸⁾ viz.,

- i) GMDSS
- ii) Maritime Electronics Officer [in compliance with SOLAS 1974]

.3 Preparatory(Nautical and Marine Engineering)

- i) Revalidation of Certificate of Competency for all grades [Deck Officers and Engineer Officers]
- ii) Refresher courses for those candidates who are not successful in the examinations of the respective certificate of competency
- iii) Special Preparatory Courses for both Deck and Marine Engineering disciplines, to cater for the marine personnel in government agencies [see note below]

- iv) Revalidation courses for (iii) above [see note below].

NOTE:

These courses are specially designed for marine personnel in government service e.g. the Marine, Marine Police, Customs and Excise, and the Fisheries departments. These personnel do not possess actual sea service on board merchant ships, and neither will they serve on these ships upon successfully passing the respective examinations. The maritime administration will be expected to issue special certificates [exemption] for this purpose.

.4 Modular Courses

- i) Advanced Fire-Fighting
- ii) General Tanker Safety Induction
- iii) Oil, Chemical and Liquefied Gas Tanker [Familiarisation]
- iv) Oil Tanker [Advanced Operation]
- v) Chemical Tanker [Advanced operation]
- vi) Liquefied Gas Tanker [Advanced Operation]
- vii) Refresher courses for First Aid, Fire-fighting and Personal Survival
- viii) Small Vessels Navigation and Radar Training

1.3.4 Non-statutory requirements

These courses are intended for the overall maritime industry, including the shipping sector both ashore and afloat, offshore exploration and exploitation, fisheries, government agencies, *et al.* . As stated earlier,

these courses are needed to fulfil the specific needs of the industry. In the absence of specific legislation, safe operational aspects as recommended or established in any specific sector of the industry [e.g. Code of Safe Working Practice, Company Safety Manual *et al*], will be featured prominently, in the contents of these courses.

Some of these courses will be described in detail in items 2.3.1 to 2.3.3 [both inclusive] of this dissertation; it is therefore not necessary to list them here. As a supplement to these, the following additional courses should also be offered:-

.1 for Shipboard Personnel

- i) Bridge Management Teamwork
- ii) Maritime Search and Rescue
- iii) Breathing Apparatus Advanced Operation & Maintenance
- iv) Basic Swimming
- v) Handling of Dangerous Goods [IMDG]
- vi) MARPOL 73/78 ANNEX I [including COW and IGS]
- vii) MARPOL 73/78 ANNEX II
- viii) Planned Fleet Maintenance
- ix) Automatic Radar Plotting Aid [ARPA]
- x) Shiphandling Simulator

.2 for executives in the Shipping sector

- i) Port State Control
- ii) Basic VHF Communications
- iii) Planned Fleet Maintenance
- iv) Marine Accident and Incident Investigation

.3 for personnel in the fishing industry

- i) Basic VHF Communications
- ii) Basic Safety Course
- iii) Basic Stability
- iv) Small Vessels Navigation and Radar Training

1.4 Meeting the challenges of the 21st century

1.4.1 Future trends in the Maritime industry

As the world approaches the 21st century, one is expected to see new developments in the political and economic fronts . New markets will be opened up as a result of the proliferation of new nation-states emerging from the collapse of previous monolithic systems, to join the world community [as with the Soviet Union]. With this, one can expect the nascent of political and economic reforms globally. Developed states that have always been the controller of market forces, now have to consolidate all their efforts [e.g. the EC, EFTA, NAFTA] to counter or even join forces with new and upcoming economic blocs [e.g. ASEAN, EAEG] to improve domestic economic performance and stability of trade.

Malaysia has been recognised globally as one of the new economic wonders. UNCTAD statistics⁽⁹⁾ published in 1990 reflects tremendous growth for the country in agriculture, manufacturing, etc.; it also noted the increase in investments from abroad [particularly in electronics] and higher import figures. The government has the confidence that this *continuum* will be maintained beyond the year 1999 and into the next century. Within the past two years, the government has been

making frequent exhortations via the media, that...."all sectors of the country must harness their efforts to ensure that Malaysia will achieve the objective of being a developed nation by the year 2020....." This is known as the "Vision 2020".

The country has been urged to participate and develop in all sectors of national development through the conduct of R & D and its associated activities. The government has indicated that R & D will be given a high priority in any project planning and implementation⁽¹⁰⁾.

Of prime importance to this dissertation is the priority to be given to ensure "....self sufficiency in shipping...." under Vision 2020. One of the many avenues to achieve this will be the developments in MET systems; simultaneously, innovations in technology [especially information technology and expert systems] must also be present, to assist the policy makers and implementers in all spheres of maritime activity. A perusal of the past economic performances and the subsequent prognosis for the next five years, indicate the importance of utilising and expanding our national tonnage. The maritime transportation management and operations systems will be required to adapt to these new situation for their own benefit. This will also be true for other shipping related sectors, e.g. shipbuilding and repairs, ship financing, ports, forwarding, transportation infrastructure, the government's shipping policy planning and implementation, etc.

Shipping services are also needed to support the rapid growth in the offshore industries in particular, the petroleum and gas industries. New oil wells are

being drilled around the coasts; on the LNG side, an increase in production is needed to fulfil the increase in demand from the Japanese and South Korean markets.

There is also an increase in deep-sea fishing activities off the Malaysian coasts and beyond. A joint-venture arrangement with a neighbouring country, to harvest the fish stocks is now in operation. There should be no reason for Malaysia, not to proceed independently in this field in the near future so as benefit from the spin-offs, i.e. employment, shipbuilding and repairs, MET, R & D, marketing, etc.

Internationally, merchant vessels will be equipped with the latest technology, to reduce crew costs and improve safety record. Integrated Officers will be the norm; there will be a radical change to the shipboard management and operating system. The new breed of officers will be more educated and better trained in comparison to their present counterparts, and will be more adaptable to utilise modern technology in their daily work.

Demand for seafarers from the developing countries to serve on ships belonging to traditional maritime nations will be on the increase⁽¹¹⁾, due to the high crewing costs of the latter. ALAM should also aim to be a supplier of these human resources, for the local as well as the world markets.

In the field of safety, to satisfy the requirements of international and national standards of certain countries [e.g. Port State Control], IMO and other relevant bodies, demand new knowledge, skills and improve-

ments in various management and operating systems of merchant ships, including the professional standards to be displayed by the seafarers [improvements in MET systems, Quality Assurance in Management, etc.].

1.4.2 The future role of ALAM in MET

Having dealt with the status of Malaysian shipping in the introductory chapter, and MET in Malaysia in the preceding paragraphs of this chapter, it is therefore expedient, to describe the future role of ALAM in MET within the context of achieving "Vision 2020" for the country.

The availability of a well-educated and trained workforce [corps of professionals], not only for ship-board service, but also for the whole range of maritime industry's activities, will enable all the aforementioned targets are achieved. Certainly, this statement will only hold true if the proper infrastructure is present. Thus, it is the prime role of the MET system to ensure that the appropriate education and training of this workforce is being provided and constantly upgraded.

The MET system [certification and examination] in Malaysia has been set up purely to train [not educate] Officers and Ratings for the Malaysian shipping fleet. From the pre-independence days up to the present days, the only changes that are visible are in the syllabuses of the certificates of competency. This was mainly due to the requirements of the STCW 78 convention, and it only addresses the safety aspects of shipboard operations.

For the future, ALAM needs to restructure the current preparatory courses to include not only a broader knowledge in the various disciplines [integrated training]; there exists also the need to incorporate in the future curriculum, knowledge and skills compatible with the requirements of professional mobility whether afloat or ashore⁽¹²⁾. Due to the ageing of the world fleet, the new fleet of ships equipped with modern technology that are replacing them, will have reduced manning levels. [These new officers will therefore be expected to possess a higher degree of training and competence.] Additionally, the technical managers and superintendents, who are in the shore management team, needed to be exposed to these innovations at a much earlier period than these officers.

There is the potential for ALAM through the utilisation of R & D, to initiate innovative systems and programmes so that new ideas can be injected into the current MET system. The involvement in R & D will ensure that ALAM will always be in the forefront of MET and coupled with the much heralded changes in the future shipping environment, the academy will be able to reduce, if not completely eliminate the precarious gap between what is available in MET and the needs of the industry.

NOTES & REFERENCES

1. See L.N. 81 and L.N. 83 of 1953 and Sections 79 (2) and 80 (2) of The Merchant Shipping Ordinance 1952 (No. 70 of 1952).
2. These ports have now been renamed viz., Pulau Pinang, Port Klang, Teluk Intan and Johor Bahru respectively.
3. However, the first examination ever conducted was in Penang on 7 April 1948 [1st Class Engine Driver]. the first examination being conducted by the Board of Examiners was on 4 March 1953 [Helmsman]. Source: Marine Department Peninsular Malaysia.

4. The certification of maritime communication radio equipment as stated here includes the certification system as stipulated under the current Radio Regulations as well as those that will be implemented as per the requirements of the Global Maritime Distress and Safety System [GMDSS]. The introduction and implementation of the GMDSS in Malaysia is currently being studied by the relevant authorities.
5. 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.
6. See section 79(4) of the Merchant Shipping Ordinance 1952, *inter alia* ".....the Minister may make rules.....examinations for the certificates of competency...." and the subsidiary legislations under this sub-section i.e. "Examination (Deck) Rules" and "Examination (Engine) Rules".
7. See ALAM's publication "*Anggaran Belanjawan Rancangan Malaysia ke 6 (1991-1995) Dasar, Akademi Laut Malaysia*".
8. See *supra* note 4.
9. UNCTAD, "Current Trends and Prospects for the World Economy" in Report by the Secretariat "Trade and Development Report, 1990", UNCTAD TDR/10, UNITED NATIONS, New York, 1990.
10. Source: *Bernama* abstracts of national newspapers for the Malaysian diplomatic corps overseas.
11. See "BIMCO and ISF joint research on Manpower and Training for the 90's" released in November 1990 by BIMCO, Bagsvaerdvej 161, DK-2880, Denmark. The study had two main purposes, viz.,

i) to provide the industry with an overview of the current situation regarding world-wide supply of and demand for qualified seafarers;

ii) to provide future supply and demand up to the year 2000.

The report concludes *inter alia*, that there will be a requirement of around 35,000 new officers per annum; a similar figure for the ratings is also established.

12. Zade, G. "Education and Training for Professional Mobility - Luxury or Necessity?", Sixth IMLA Conference on Maritime Education and Training, Bremen, FRG, 10-14 September 1990. pp.3 to 5. In the paper, Zade had outlined the relationship of MET vis-a-vis professional mobility, the various choices of syllabuses and the benefits of being mobile. *Ibid.* In an adjoining paper, Horrocks, C. postulated on, "Views of a Shipowner Representative on Maritime Training and Professional Mobility of Ship's Officers" where the shipowners and the MET institutions are urged to consider professional mobility in the design of syllabuses and strategies in career development.

CHAPTER 2

RESEARCH & DEVELOPMENT

VIS A VIS

MARITIME EDUCATION AND TRAINING

2.1 Research and Development

2.1.1 Definition

The definition of the word, "research" as explained in Webster's⁽¹⁾ viz.,

" A studious inquiry or examination especially critical and exhaustive investigation or experimentation; having for its aim the discovery of new facts and their correct interpretation, the revision of accepted conclusions, theories or laws in the light of newly discovered facts "

" the practical application of such new or revised conclusions, theories or laws ".

The word "development" is explained in Chamber's⁽²⁾ to mean "the act or process of bringing to a highly ad-

vanced, or organised state".

The first definition for research as stated earlier is the one that is being normally adhered to in most higher education institutions throughout the world as the objective for the establishment of R & D units or departments in the various faculties in connection with the seeking of academic excellence in a particular field of study or discipline (fundamental or basic scientific research). In addition however, it is also a common feature for these units, particularly for those belonging to universities in developed countries, to undertake research projects as consultants for the industry e.g. in engineering, agricultural, pharmaceutical and transport sectors, to list a few. The latter statement agrees with the second definition (action /applied research) ⁽³⁾. Again, by definition action research is "a small scale intervention in the functioning of the real world and a close examination of the effects of such intervention" ⁽⁴⁾.

The author of this dissertation espouses the establishment of the " consultancy and action research " model of a R & D unit at the Akademi Laut Malaysia; the rationale for this choice will be delivered in the latter parts of this chapter.

2.1.2 The Need for R & D

Education relates to the strengthening of the powers of the body and mind of a human being in the quest for knowledge. The society of which these educated humans are a part of, will benefit by achieving refinement in knowledge, arts, sciences, culture, and acquir-

ing the ability for development in the fields of human endeavour; this will then lead to civilisation and betterment in the quality of life in general.

Following the same principle, a society in order to achieve advancement in technology is required to possess certain skills relevant to the particular field or sector of the industry; training provides the avenue for the development of these skills.

It is an accepted fact that in the maritime industry as inherent in any other industry, there must exist a symbiotic relationship between the education and training on one hand and the development of the industry on the other, regardless of the sector that is being addressed e.g. shipbroking, port operations, marine sciences, navigation, offshore gas and petroleum exploration/production (the list is non-exhaustive). This relationship enables the maritime industry to be efficient, safe and developed; this is a fundamental feature for any country that aspires to be a maritime nation. To maintain this status quo, various avenues are sought and in this respect, it has been proven that the field of research and development has a major role to play.

MET should always be in a dynamical state, i.e. in pace with or even better, a step ahead of the developments of the maritime world both at industry and government (national and international) levels. It is therefore congruent that the application of R & D is not only limited to industry per se but also pursued in the field of MET, where it serves to fulfil the following needs viz.,

.1 to maintain and develop educational and training standards:-

.1.1 as the field of MET is eclectic, constant review of the curricula and syllabi is necessary to satisfy the current and future requirements not only of the industry but also those of political and social pressures. The implementation of such reviews will ensure that the personnel undergoing the relevant updated programmes or courses will achieve the required knowledge advancement in addition to the acquisition of highly developed skills, which can later be appropriately applied in the sectors of the industry they served;

.1.2 to encourage learning effectiveness of students by determining, utilising and evaluating the contents and appropriate methodology to a particular programme. In addition, the learning achievement of the students should also be assessed through various methods. An analysis of the results should then be carried out so as to determine the remedial measures that can be taken, if any non-standard deviation is detected;

.1.3 the availability of R & D and its corollary will provide the students with the environment and consequently to enable them to utilise the appropriate tools in order to achieve a heuristic learning approach in education;

.1.4 the teachers themselves need to attend further upgrading or refresher courses as to acquaint themselves with the relevant needs of the curriculum

or syllabi revision. This will enable them to carry out appraisal and modification of their current presentation skill/style, use of teaching aids, class management techniques, etc.;

- .2 to provide the decision makers and educators in MET organisations with the necessary information and the means to respond to any related issues that arises from time to time in the management of training institutions and programmes;
- .3 in the formulation of MET policy proposals, R & D greatly assist in providing the rationale for such a policy to be undertaken and once approved and implemented, R & D again will be utilised to evaluate the policy's efficaciousness;
- .4 the pursuit of quality knowledge in education justifies and necessitates research co-operation with other institutions or bodies, particularly with those that are involved in MET. Joint R & D projects or programmes for example may be considered as one of the many options available to achieve the objective mentioned heretofore;
- .5 to provide the necessary information such as a recommended action plan; analysis of past and current performance/status, work programmes, etc., to enable the industry to formulate policies and strategies as well as viable alternatives, in the industry's struggle for efficiency;
- .6 to undertake research activities or to act as a lobby for the government in issues pertaining to

maritime affairs, both at the national and international scenes e.g., maritime developmental policies, law of the sea (UNCLOS 1982)⁽⁵⁾, trade, international relations, socio-economics, etc.

To conclude, the parallel conduct of research and development will undoubtedly lead to effectiveness and efficiency not only in the said MET organisation or institution, but also in the overall national maritime sector.

2.1.3 The Prioritization of R & D

The next aspect of R & D in MET that needs to be delved into is the weighing of priority that is being accorded to it. Marten Shipman in his treatise on "The Contribution of Research to Decision Making in Education" stated that "research in general is a daily routine activity"⁽⁶⁾. This statement gives credence to the importance or weightage of R & D and its implication in MET. However, the role of R & D in MET is not accorded this status as we would like to believe, if comparison is to be made with the academic or the applied scientific field of the general education curricula in existence.

In MET, R & D activities exist in a handful of MET institutions, mainly in the developed maritime countries. However, the scope of R & D activities of each of these individual institutions is restricted to only a small segment of the total sphere of R & D applications that the maritime sector can offer. Various plausible reasons can be attributed to this low level participation, amongst others viz.,

.1 a lack of awareness on the part of the management:

to most people, mention of the very word 'research' conjures an environment, where it is expected that in such a realm only boffins are found to exist and operate. It is therefore, unwarranted to allow such a misconception to exist in some countries especially in the mind of the very persons that hold the reins of power in the management of MET institutions. This hopefully can be rectified by the inclusion of 'The implication of R & D in Education and Training' and treating it as an integral component of the syllabi in management courses for the top echelon/policy makers of the said institutions. The media can also be a useful tool to disseminate such information.

.2 the absence of sympathetic political, social and educational climate⁽⁷⁾:

in some countries, the aforementioned statement holds true due to the low priority being placed not only on MET itself, but even more basic, the role and the importance of maritime affairs to national development. The benefits to the socio-economic aspect of national development have been dealt with in an earlier chapter.

On the other hand, it will be unjustified to place the blame on the politicians totally for this state of affairs; in most developing countries, there are other matters that need to be tackled first, e.g. health care, agriculture, security, etc.

To foster a healthy research environment, there must be a political will on the part of the government, to encourage research, in line with educational reforms that arise from social reforms and industrial needs. Only then, will there be interdependence and interaction in the total relationship of research, policy and practice, as epitomised by John Nisbet⁽⁸⁾.

In the majority of cases, MET institutions cater primarily for the education and training of personnel for service on board merchant ships, i.e. at the pre-sea level, the upgrading of certificates of competency of those with sea-going experience, and specialised training as per statutory [STCW, national] or trade requirements. Therefore, there is no specific provision made for research; it is expected that there are in existence other bodies already involved in research activities e.g. in the Netherlands. [Please see item 2.1.4.4]

.3 the lack of adequate resources and appropriate organisation⁽⁹⁾;

diverse reasons can be attributed to the lack of resources, amongst them viz., lack of necessary funds; the dearth of local expertise for the purpose of conducting research in addition to establishing the appropriate infrastructure which includes support services; etc.

Certainly, the previous statements of 2.1.3.1 and 2.1.3.2 do have a direct bearing in this regard,

notwithstanding the fact that these two reasons have been fully explained.

2.1.4 The Methodology of Research in MET

The author has listed below some of the MET institutions and the scope of R & D that each has been or is involved:-

.1 Danish Maritime Institute, Lyngby, Denmark [DMI]⁽¹⁰⁾

This institute is not an MET organisation in the strict sense of the word, even though there are training courses being carried out on an ad hoc basis for certain clients. Established since 1959, by the shipowners' organisation and academicians from the technical disciplines, it is one of the 19 institutes in Denmark, affiliated to the Danish Technical Sciences Academy. With this affiliation, the institute is accorded recognition by the Danish government as one of the major research organisations in the country.

The main objective of DMI is to provide consultancy services within the fields of hydrodynamics, aerodynamics, marine-based and industrial technologies.

The DMI is self-funding; in addition a support grant equivalent to 7% of the institute's annual turnover is awarded by the Danish government annually. The annual budget requirement being in the region of D.Kr. 45 million [for the year 1992].

Additional funding from the European Community [EC] is also made available for the implementation of EC regional projects involving the participation of two or more member countries. Each member country that participates is allocated a specific task within the whole programme and the budget being shared accordingly.

Organisation Structure

The DMI is organised along the following structure:-

- (i) the Marine Operations Simulations division
- (ii) the Wind, Ocean and Information Technology division
- (iii) the Ship Technology department and
- (iv) the Shipyard department

There are 50 full-time researchers for the various disciplines out of a total staff strength of 80 persons; to be a researcher at the DMI one must possess a good basic degree in addition to having a background in research work.

Listed below are the R & D facilities available at DMI together with the activities that have been or capable of being conducted:-

.1 The DMI Manoeuvring Simulation System

The specialty of this system in comparison to other similar systems elsewhere, is the availability of a comprehensive mathematical model that is able to simulate the dynamic behaviour of any floating

object in any environment and under the influence of external forces.

- towing tank for manoeuvring dynamics testing, viz. determination of forces and moments on the hulls and rudders as functions of rpm., engine power, heeling angle, water depth, etc.
- wind tunnel (3 in number) for determination of the aerodynamical characteristics of vessels and offshore structure with regard to stability criteria
- co-relation of complicated harbour manoeuvres
- simulation of offshore vessels handling characteristics
- training simulations based on standard type ships and ships of a novel design.

.2 Optimum Ship Performance - the DMI Concept

- initial design viz. hydrostatic data, damage stability report, hull form
- determination of optimum propulsion system of any vessel relevant for all weather and loading conditions
- determination of seakeeping qualities
- accurate prediction of ship steering and manoeuvring performance
- assessment of wind forces acting on ship's superstructures and their effects on the vessel's manoeuvring characteristics in harbour areas and for efficient funnel smoke dispersal

In addition, the DMI also conduct joint or multidisciplinary research projects with other organisations e.g. effects of the use of demersal fishing gear in

the vicinity of sub-sea oil bore holes' caps which was conducted jointly with the Fisheries Institute; cooperation with the Danish Hydraulic Institute was set up in relation to harbour, inland waterway and offshore engineering; etc.

.2 Department of Maritime Studies, Hamburg Polytechnic, Germany⁽¹¹⁾

The major role of the above department is to provide the relevant course of study in the field of MET, for the maritime industry both ashore and afloat.

Three of the staff members are involved in the following specialties of R & D i.e. manoeuvring, stability and research project management since the seventies for various clients and government organisations. These activities include:-

.1 Shiphandling Simulator (SUSAN)

- manoeuvring tests of ship models based on various criteria e.g. stability, hull form, propulsion systems, etc.
- study using simulation models, on the strength and effectiveness of harbour structures such as wind barriers in the port of Rotterdam.
- study on mental stresses experienced by seafarers serving on board ships with reduced manning, such as the one-man bridge; bridge ergonomics; and their response level quality to external stimuli e.g. in the exigencies of navigation. This was a multi-disciplinary study involving psychologists.

.2 Environmental Protection/Pollution Control

This study was conducted on behalf of the Federal Ministry of Environment, Germany with emphasis in the aspects of:-

- transportation of Dangerous Goods
- prevention of accidents
- counter-measures contingency planning in the case of accidents involving dangerous goods

.3 Man-Machine interface

- Electronic Chart Display and Information System (ECDIS), re system design that includes functions, layout, operation, data, etc. (ongoing project).
- Intelligent ship project for "ship of the future" ⁽¹²⁾ where all shipboard functions and activities are computer-controlled/computer-supervised with minimum or no human intervention. This is a similar concept to the Japanese "Intelligent Ship" and the European Community "Efficient Ship" projects where it is anticipated that there will be a full utilisation of modern technology on board merchant ships in order to improve and optimise the economics of ship operation.

.4 European Regional Transport study [EURET]

This European Community project is a successor to an earlier project known as "COST 301" ⁽¹³⁾ which was set up in 1984, as a ".....cooperative programme of research, applied to the safety and

efficiency of maritime traffic and the reduction of pollution risk, in European waters in the specific field of VTS....."(14). Unlike COST 301, the the EURET project in which Hamburg Polytechnic plays a part tackles not only the maritime traffic sector, but the gamut of European transport activities i.e. land, water including inland waterways, and air.

.3 Department of Nautical Studies, Bremen Polytechnic, Germany

The research activities are mainly conducted by the faculty members utilising the department's own simulators and inputs from students' projects; these may involve whenever applicable, the cooperation from other departments within the polytechnic. Previous projects include:-

- assisting the government of the Federal Republic of Germany, in the calculation of effects of wind and sea sloshing, for submission to the IMO Subcommittee on Containers and Cargoes Working Group, for the purpose of promulgating the Code of Safe Practice for Cargo Stowage and Securing⁽¹⁵⁾.
- applied research for clients which may include a training package for their personnel utilising own Shiphandling, Radar, Navigation Light (nocturnal), and Liquid Cargo Handling Simulators.

.4 The Netherlands⁽¹⁶⁾

None of the MET institutions are involved in R & D. However, there are other fully and semi-government bodies that undertake these activities:-

a. The Maritime Department, Delft University

The faculty staff and undergraduate/postgraduate students participate in the following main activities:-

- Ship manoeuvring tank: performing tests re hydrodynamics, stability criteria, etc.
- port/harbour projects
- management of shipping companies

b. Maritime Research Institute Netherlands (MARIN), Wageningen.

In addition to being an institution fully dedicated to maritime R & D, this institute also participates actively in international fora on behalf of the Dutch government in all matters pertaining to maritime affairs.

Facilities & projects

- Shiptowing tank: tests on ship models and offshore structure, seakeeping qualities of ocean yachts
- Simulators: shiphandling, safety parameters of offshore structures particularly in the North Sea, hydrodynamics study of the English Channel. The research in hydrodynamics is also jointly conducted

with Hydrodynamics Engineering and Waterloopkundig Laboratory, both semi-government bodies.

.5 AMC Search Ltd., Launceston, Tasmania, Australia.

This company is a wholly-owned subsidiary of the Australian Maritime College [AMC]. The AMC staff is heavily represented on the company's Board of Directors.

Staff Organisation

The daily management of the company is supervised by a manager assisted by a skeleton administration staff. The manager also co-ordinates all R & D activities; the activities themselves being conducted by AMC staff on 'loan' basis to the company from the various departments of the college, in addition a part of or occasionally the whole project itself will be contracted out to external expertise from within the country or from abroad.

This organisation has been very active in the diverse field of R & D which includes research, consultancy, and training for commerce, industry, and for the government at national and international levels particularly for the Asia-Pacific region. The various programmes that it has undertaken exemplifies the scope in R & D that any enterprising organisation blessed with the appropriate support of the government and industry, in addition to the entrepreneurship of its staff, should be capable of achieving.

Facilities

Among the facilities available are:-

- i) Shiphandling simulator
- ii) Radar/ Integrated Navigation simulator
- iii) Towing tank
- iv) Flume tank
- v) Diesel engine simulator
- vi) Computer facilities

Projects

The range of projects undertaken have included among others: hydrodynamics study for hull design of various types of water crafts, effects of interaction, seakeeping qualities and stability characteristics of all vessels including offshore structures, port, terminal and waterway design, hydrographic surveys, marine sciences, engine performance diagnosis, maritime economics, operational safety training, etc.⁽¹⁷⁾

.6 Department of Maritime Studies and International Transport, University of Wales College of Cardiff, United Kingdom

The above department is one of the few MET units that exists as part of an academic institution of higher learning, that has been very active in the field of R & D for the maritime industry.

Projects

The R & D activities undertaken by the department involves the full participation of the faculty members together with other experts in the respective fields both from the university and the industry, in addition to the research programmes of the undergraduate and post-graduates students [as part of their academic programmes]. The projects themselves can be of pure academic content or for the purpose of servicing the needs of the industry. In the latter case, the projects are financed by the industry.

Some examples of the above are :-

- training programmes utilising computers for cargo management and other maritime related computerised applications e.g. charterparty calculations, planned maintenance, voyage optimisation, main engine performance, etc., for shore management and shipboard operations
- research in maritime economics, information technology, transport, VTS, ports, etc.
- the publication of an international journal⁽¹⁸⁾ that covers a broad spectrum of shipping and port activities. Articles are contributed by renowned specialists of the various disciplines in the industry.

.7 Centre of Maritime Studies, Hong Kong Polytechnic⁽¹⁹⁾

The area of research and development that this centre has undertaken, has been of the "contract-research"

type; the product being delivered to the client as a package. In the case of designing an equipment, this will range from the mathematical models for the design parameters to the product-testing utilising simulation techniques or real operating conditions and finally, developing the relevant sources and conducting the training for the personnel that will be operating the equipment. Some clients however prefer to engage another organisation to undertake the training portion.

The centre also undertake consultancy services for various projects, in particular those related to the forthcoming development of new port and airport facilities in Hong Kong.

A few examples of the above are as follows:-

- aetiology of collision of licensed crafts in Hong Kong waters for the period 1982-1985
- The Passive Nocturnal Detection system which will enable the automatic/manual scanning of the horizon under conditions of near darkness for the purpose of navigation and collision avoidance by the operator of a high speed craft
- visual augmentation for the NMS-90 radars
- a multi-module study to enhance the inter-personal relationship aboard ship with reduced manning. This includes the stress level of personnel serving on board with modern technology, etc.

.8 The Maritime Division, Southampton Institute of Higher Education⁽²⁰⁾

The Maritime Research Service section of this division, duly assisted by the Marine Operations centre has been involved in the following research activities:-

- collision avoidance behaviour of bridge watch keepers
- Project Management in the UK and abroad
- consultancy, e.g. port approaches and harbour design, hydrographic surveys, bridge management procedures, etc.
- designing and implementing training schemes including the conduct of courses for local and overseas clients, such as harbour pilot training, management courses for port and shipping personnel, training in maritime law, training and operation manuals, etc.
- research on engine performance and fuel optimization
- conduct safety audits, etc.

Facilities

Among the facilities available are:-

- i) a research, hydrographic survey and training vessel
- ii) a maritime model ship facility for training in the manoeuvring of large-sized vessels
- iii) shiphandling and radar simulators

- iv) engine room simulators
- v) liquid cargo-handling simulator

The conduct of R & D are an inherent part of the job requirements of the training staff of the institute; whenever it is deemed necessary, joint research with other bodies will be conducted or the assistance of external expertise employed. The research activities in the main, are for the purpose of generating revenue for the institute.

A conclusion can therefore be made that the R & D activities that most of the MET institutions undertake [see aforementioned examples] are mainly very technical in nature and action-research oriented viz., hydrodynamics re vessel's and waterway design, safety training in shiphandling and navigation using simulators; there are a few that undertake consultancy projects for the industry or public sectors.

Only a handful of MET institutions if any engages in pure research. MET institutions in the main have been established primarily to train officers and ratings to man the merchant vessels. In most cases separate bodies exist to train the above two groups. There are only a few that were established either at its inception as an advanced centre for the pursuit of maritime knowledge e.g. as a university [The Kobe and Tokyo Universities of Merchant Marine] or as part of a polytechnic [which is common in Europe], or at a later date upgraded to that status. There are also institutions that are annexed to or made an adjunct of a university. The quantum of funds allocated to the said institution/unit is therefore in

some ways determined by its status, this is the situation in most cases regardless of whether the benefactor is the government or industry.

Bearing this in mind, it is not surprising that nearly all maritime institutions as a necessity, have to operate on a "shoestring" budget from year to year. If any R & D activity is possible under this tight financial regime, then one of the main reason for venturing into this area will be for the purpose of generating supplementary income to the institutions. This can only be made a reality by undertaking action-based R & D either on an ad hoc or a long term contractual basis. This can take the form of course development and the conduct of training, project consultancy, testing of designs and products, joint research, etc. for the clients concerned.

It must be mentioned here that the initiative of establishing the various R & D units [in the MET institutions] and the projects which have been successfully implemented by these units as described earlier, were due to the great foresight, initiative and dedication of the faculty members of the MET institutions. In all these examples, the management of these institutions have also provided the necessary support [not necessarily financial].

It is hoped that in the near future, the governing bodies of all MET institutions will formulate and implement policies that are conducive to research, in order to remedy the current situation of meagre budgets which is deemed insufficient to promote R & D and hence tends to retard progress. Once this is rectified, the

scope of R & D activities by MET institutions will hopefully with the presence of the the right environment, be able to develop and diversify in the maritime research arena.

2.2 Maritime R & D in Malaysia

In Malaysia, Maritime R & D *per se* has never been properly established yet, therefore the country as a whole has been unable to reap the benefits that research can offer. One of the plausible causes for this has been the low priority being accorded to the conduct of MET by the government and industry alike.

Since independence, the government has always placed rural area socio-economic development at the top of the hierarchy of priorities in national development planning and implementation⁽²¹⁾. Towards this end, the main thrust of the developmental programmes were mainly concentrated in agriculture (this includes fishery), education, health care, transportation and employment [not necessarily in this order of priority]; the objective in the main being the eradication of poverty, illiteracy, and to ensure self-sufficiency for the rural population. However, the inference must not be made that developmental programmes in other sectors which are also prerequisites for nation building were placed in abeyance; as the maxim goes "the proof is in the pudding". Concurrently, developments in other sectors except shipping, have also contributed their share for a prosperous Malaysia.

In the decade of the 70's, one of the priorities of the then government was to embark on a policy

of promoting Malaysia as a maritime nation. As stated in the previous chapter, this manifested in the establishment of ALAM for the purpose of providing the relevant education and training for sea-going personnel. This is also reflected in the current National Development Policy for the 1991-2000 decade where in order to "bring about a more balanced development" the strategies of "promoting human resource development..... to meet the challenges of an industrial society" and "making science and technology integral components of socio-economic planning and development.....promoting a science and technology culture compatible with the process of building a modern industrial economy" (22).

The shipping sector of the maritime industry in Malaysia has always, with the exception of MISC and PNSL [where the government has a major share of equity in both], approached the question of investing in MET as a "necessary evil". The availability of cheap labour from the other ASEAN and neighbouring non-ASEAN countries even to this day, further exacerbate this status quo. This hopefully will diminish as Malaysia has recently acceded to the STCW Convention and ALAM having being accorded the recognition as a branch of the WMU [this enables ALAM to conduct short courses on behalf of the WMU for the Asia-Pacific region] in September 1991.

The commercial sector that forms or provides the direct or adjunct support services for shipping, fares no better, where complacency towards the training and education of their personnel is concerned. This is of particular importance in the case of personnel that are engaged directly in the day to day responsibilities of providing shipping services e.g freight forwarding,

shipping documentation, ships husbanding, agency, crewing, chartering, broking [this list is non-exhaustive], has always been expected to learn the trade upon joining the organisation concerned. Depending upon each person's initiative and capability, the employee will then be able to attain proficiency and hopefully contribute to the efficient running of the company or establishment.

Prior to the establishment of ALAM, there have never been any formalised training schemes designed or implemented nor the relevant institution to cater for the requirements of both the shipping and commercial sectors, by or for the industry albeit the existence of awareness towards training, with the exception of small training units set up by the major port authorities and the Chartered Institute of Transport courses [UK] organised by the MARA Institute of Technology a few years ago. The port authorities have also acquired assistance through UNCTAD in organising certain TRAINMAR⁽²³⁾ training packages by TRAINMAR for their staff.

ALAM is the only institution in Malaysia, that offers the whole range of courses, which will enable any suitable person who wishes to embark on a seagoing career, to pursue the education and training appropriate to the particular job requirements, on board a merchant ship. An outline of the various courses currently being offered had been listed in Chapter 1 [the list also includes courses for other sectors of the maritime industry which had been organised on an ad hoc basis]. Due to multifarious reasons, ALAM has not ventured into the field of R & D yet. This dissertation intends to provide the insight, of one of the approaches that can

be taken to establish such a department.

In addition to ALAM, there are other institutions of higher education or units within such an institution that offer specific programmes within the broad range of maritime-based knowledge. Listed below are the institutions, the course(s) of study [maritime/maritime related] and the date when the first of such course(s) was/were offered :

a) Universiti Teknologi Malaysia [UTM] (1975)

- Marine Technology at Diploma and Degree levels. These cover naval architecture, the design of marine engines [including auxiliary machinery] and associated studies.
- Degree in Petroleum Engineering

b) Universiti Pertanian Malaysia [UPM] (1974)

- The School of Marine Sciences offers a Fishery Science programme at the Diploma level. This covers amongst others marine biology, oceanography, meteorology and related studies.

c) Universiti Sains Malaysia [USM] (1990)

- A Degree in Oceanography and related studies.

d) Universiti Kebangsaan [UKM] (1984/85)

- Degree in Marine Science.
- Degree in Marine Biology

e) Politeknik Ungku Omar [PUO] (1972)

- offers a Diploma in Marine Engineering; this qualification enables the graduate to proceed to the 2/Class Marine Engineer Certificate of Competency course if he so wishes, after a satisfactory performance of the required shipboard service.

f) Institut Teknologi MARA [ITM] (1969)

- Courses leading to the various qualifications based on the syllabi of The Chartered Institute of Transport [CIT] of the United Kingdom.

g) Institut Kemahiran MARA

- A proficiency Certificate in Marine Mechanics. The trainees once suitably qualified, are mainly employed on board government crafts and private inshore vessels and marine craft repair facilities. A very small number embarked on a career in the Merchant Navy.

2.2.1 Basic Scientific Research

Of the abovementioned institutions only UPM, USM and UKM, conduct basic scientific research within their own speciality, i.e. purely inclined towards the academic direction. Normally, the output of such a research is not for the maritime industry's direct utilisation; its published works were circulated for consumption in the respective academic coterie and the relevant government department or agency.

Within the Ministry of Science, Technology and Environment, there exists the National Scientific Research Council⁽²⁴⁾, its primary objective being the development and enrichment of scientific knowledge for the country. In this instance the approach is more of a research policy-making body i.e. determining the priority of a project or study (including the financing of such project) as the case may be, or acting as a coordinator in any research activity that has as its objective and/or its result, which is of direct relevance to a current policy for national development.

2.2.2 Action-Based Research⁽²⁵⁾

The UTM is the only local institution that is conducting action-based research [utilising computer facilities only], primarily for the fishery industry, port authorities and the Navy. Currently only the faculty staff drawn from various departments in the university dealing with maritime matters. The project financing is through the university's grants system or by the client concerned.

Some of the projects that have been implemented for the fishing industry include refrigeration equipment for inshore fishing boats [motorised sampans] and a novel design for a fishing boat constructed of ferro-concrete.

2.3 R & D and the Development of Courses for the Maritime Industry in Malaysia

The trend in economic growth for Malaysia for this decade has been promising⁽²⁶⁾; for Malaysia in terms of

total real product i.e the annual average growth rates and per capita real domestic products at market prices was 8.5% for 1989. This figure has shown a steady increase from a negative 1.1% in 1985⁽²⁷⁾, agricultural output had increased by 5.5%, imports grew more in 1989 due to "growing investment.... and as a result of higher wages"⁽²⁸⁾ and the increase of Malaysian exports to the Japanese market⁽²⁹⁾ augur well for the shipping community engaged in international trade, as this can be a good indicator of increase in shipping activities..

Such an increase coupled with the absence of other impediments such as political or high capital/ operating costs will therefore encourage shipowners and other shipping services entrepreneurs, as well as ports to expand their business activities; no doubt this is too simplistic an inference. For these entrepreneurs, the utilisation of R & D facilities and know-how, will definitely assist them to optimise their investment and gain maximum profit.

In the field of petroleum and natural gas exploration, exploitation and production, the country too has shown a tremendous potential provided the market demand remaining stable/indicating an increase from current levels.

The rationale of utilising R & D to sustain maximum profit at minimum costs also holds true during the period of economic slow down e.g. the efficient deployment and allocation of staff, efficient use of logistics, etc.

At this stage, it is therefore purely academic and

may be regarded as superfluous to re-emphasise the need and benefits of maritime education and training for all personnel in the industry whose duties and responsibilities relate specifically to the maritime industry.

The aforementioned needs are not only prerequisites for the new entrants to the industry, but also highly appropriate to those in service. In the bygone era, it was sufficient for any person ashore or afloat to ably conduct a maritime function and being able to generate the profits or revenues dependant on whether one is in the commercial sector or in the government, purely relying on one's experience. In most of the maritime/maritime related professions then, there was no need for formal education and training.

Today, the above situation is no more desirable as the whole industry worldwide is constantly undergoing rapid technological developments and with modern communications readily at hand, the presence of stiff business competitions. Managers in shipping companies for example operate daily in an international business environment and these personnel must be able to analyse the current market conditions and hopefully produce a suitable forecast with minimal margin of error for the efficient and safe operation of the vessels and at the end of the day to ensure a handsome profit for the shareholders. Similar scenarios are present in the rest of the commercial sector related to shipping e.g. firms involved in freight forwarding, shipping agencies, port authorities, commodity producers and last but not least the shippers organisations.

The various government agencies that deal with

commercial shipping should have as one of their main objectives to provide the necessary support and to encourage the proliferation of trade. The personnel concern should therefore have as a minimum, a basic understanding of the world that shipping operates.

All these necessitate the introduction of new or the modification of presently organised courses, re-training of personnel, the organising of seminars and conferences where new experiences and ideas can be shared, etc., as previous knowledge and skills are deemed insufficient and even obsolete for the present day. Other than just profit-oriented, the world today is very sensitive to issues pertaining to safety and the preservation of the environment. R & D will therefore be an important vehicle to satisfy these requirements.

This section will be devoted only to non-mandatory courses i.e. fulfilling the needs of the industry which are either the manifestation of past experiences, or the product of a well-planned strategy for future developments in the industry. Prior to the conduct of the actual courses, R & D will be required to determine the curricula, the learning and course objectives, training schemes, etc.

Courses that are within the ambit of national statutes and supranational requirements such as conventions, codes and treaties will not be delved into in this section as the rationale, requirements and the decisions to implement these courses, have not usually been the result of any action-based research nor were they fulfilling the industry's specific requirements.

They were in the main based upon the resolutions [international political consensus] adopted by the plenary sessions or by one of the many meetings of the committees and sub-committees of the United Nations agencies dealing with matters pertaining to the sea, such as the:-

- i) International Maritime Organization [IMO]
- ii) International Labour Organization [ILO]
- iii) the United Nations Conference on Trade and Development [UNCTAD]
- iv) Law of the Sea Conference [LOS] etc.

2.3.1 Courses for the Shipping Sector

Listed below are some of the courses intended mainly for the shore personnel of shipping companies. [Note: The classification "shipping companies" as used here by the author refers to both shipowning enterprises and shipmanagement companies; other commercial organisations appear under the listing of "commercial sector" which appears after this sub-topic]. Modifications to the curriculum are necessary whenever a particular course is deemed suitable for more than one target group. These courses also include those that were recommended by UNCTAD⁽³⁰⁾ for developing countries. The list is non-exhaustive viz. :-

- i) Corporate Planning in shipping companies [a,b]
- ii) Technical management * [b]
- iii) Financial management [a,b]
- iv) Operational management [fleet & terminal operations] * [b,c]
- v) Shipping law [b,c]

- vi) Human resources management [a,b]
- vii) Human resources development * [a,b]
- viii) Shipbroking [b,c]
- ix) Charter parties [b,]
- x) Bills of lading [b,]
- xi) Cargo bookings and documentation [c]
- xii) Marine insurance [b]
- xiii) Shipping operations for tanker cargoes. This will include handling of petroleum, liquid chemicals, liquefied natural gas, liquefied petroleum gas, crude oil washing, inert gas, vegetable oil and related environmental protection measures and legislations i.e. SOLAS and MARPOL @ [c]
- xiv) Shipping operations for dry bulk cargoes which include the handling of ores, grains, solid chemicals, and other solid bulk. Related legislations and code of practices will also be included, such as Grain Rules, etc. @ [c]
- xv) Containerised cargoes' shipping operations @ [c]
- xvi) Break-bulk cargoes' shipping operations including the handling of heavy lifts and cargoes having special features @ [c]
- xvii) Multimodal transport seminar [a,b]
- xviii) Shipping agency [b,c]
- xvix) Computerisation in shipping practice * [a,b,c]
- xx) Maritime conventions, notably those of the IMO but also cover those adopted by other UN agencies whose responsibilities include maritime/maritime related affairs. * [b,c]
- xxi) Shipboard management * [b,c]
- xxii) Transport management [c]
- xxiii) The transport and handling of dangerous goods * [b,c]
- xxiv) "Inmarsat" seminar for fleet management and oper-

ation executives [a,b,c]

Notes:

@ The shipping operations courses are designed primarily for the junior level executives and operational teams involved in the actual cargo planning and/or cargo operations in the office and/or at the loading or discharging terminals.

* also suitable for senior members of the shipboard management team

[a] senior managers

[b] middle managers

[c] junior managers and operational personnel

2.3.2 Courses for the Commercial sector

The courses listed are a sample of those that should be recommended for the Commercial sector [including those that were part of the UNCTAD⁽³¹⁾ training proposals] which for the purpose of this paper refers to ports and associated organisations viz., shipping agencies, trading houses, shippers, freight forwarders, ship pilots' associations, stevedoring companies and others that provide support services to the shipping industry; offshore mining including the offshore petroleum industry, etc.

Following the same principle being adopted in the previous sub-heading, the necessary modifications to the curriculum, etc. will be required where the intended target group for a particular course is not identified i.e. the course is suitable for all levels including the labour force of the said organisation.

- i) The transport and handling of dangerous goods [b,c,d]
- ii) Shipping operations for tanker cargoes [c]
- iii) " " " dry bulk " [c]
- iv) " " " containerised " [c]
- v) " " " break-bulk " [c]
- vi) Multimodal transport seminar [a,b]
- vii) " " " course [c]
- viii) Port planning and operations [a,b]
- ix) Port management [a,b]
- x) Transport management [b,c]
- xi) Basic training on trade legal rules and practices covering such matters as bills of lading, charter parties, Incoterms⁽³²⁾, the work of UNCITRAL [United Nations Commission on International Trade Law], documentary credits, etc. [b,c]
- xii) Marine insurance [b,c]
- xiii) National port policy [a,b]
- xiv) International maritime conventions [a,b]
- xiv) Ship handling simulator training for pilots
- xv) ARPA training for pilots
- xvi) Marine Safety training programme for offshore petroleum industry personnel. The training will be conducted in separate modules viz., survival, proficiency in survival craft, firefighting, first aid, and helicopter rescue
- xvii) Communication operator training for the relevant ports and offshore industry personnel

Notes:

[a] senior managers

[b] middle managers and shippers

[c] junior managers and operational personnel.

For the aforementioned courses (i) until (v), both numbers being inclusive, the term under "Operational personnel" specifically refers to cargo traffic officers and their teams that usually comprise of cargo supervisors, foremen, but excluding stevedores, etc., who are directly involved in the actual cargo operations.

[d] stevedores

2.3.3 Courses for the Government agencies

It is highly desirable that the personnel of the various government agencies that:

- deal directly with the movement of goods and passengers by sea at the national and of a greater importance at the international levels;
- ensuring safety of merchant shipping, passengers and cargoes at sea and in ports;
- prevention of pollution and protection of the marine environment;
- maintenance of security in the territorial waters;

to understand and appreciate the multifarious aspects of maritime matters that is constantly undergoing rapid changes due to economics, political and social factors. The agencies being addressed here are the Ministries of Transport, Finance, Trade and at a different hierarchy the Marine, Customs, Immigration, Marine Police and the Port Health departments.

With the knowledge thus gained by these officers, there will exist a better understanding of the roles that each individual department can play by encouraging

inter-departmental cooperation and coordination, thus fostering international trade. This will therefore bring economic benefits for the country and enhance its international standing.

The courses listed below are not to be construed as being applicable to all the abovementioned agencies. For the purpose of this dissertation, it will not be necessary to detail out the specific course objectives. As had been stated earlier in this chapter, the necessary modifications will be made to the curriculum, etc., relevant to the needs of each department and the target group being addressed.

- i) Introduction to port and shipping operations.
[b,c]
- ii) National port and shipping policy [a,b,c]
- iii) International maritime conventions [a,b]
- iv) Introduction to trade legal rules and practices
[b] *
- v) The role of IMO and other UN agencies related to maritime affairs [b,c]
- vi) National maritime legislation [a,b,c]
- vii) Introduction to general shipping terms [c]
- viii) Ship construction [@]

Notes:

[a] senior grade officers

[b] medium " "

[c] junior " "

[@] applicable only to junior grade ship inspectors at the Marine department

* applicable also to the Customs department

2.4 Consultancy Services for the Maritime Industry

The growth of the maritime industry in Malaysia, particularly in the field of maritime transport, was the result of the forces acting within a free market economy and has never been based upon a direct government prescription. This status quo was maintained from the period prior to independence up to the inception and implementation of the Third Malaysia Plan⁽³³⁾.

Since then, the government has embarked in pursuing the objective of establishing Malaysia as a maritime nation in the true sense of the word. The industry too, has responded positively to this since the government has been providing various incentives such as pioneer industry status, soft loans, government cargo contract, et cetera to the budding entrepreneur willing to venture into the maritime industry such as shipowning, shipping agency, etc.

At this moment, all these efforts are still deemed insufficient for the country to really achieve its objective before the turn of this century. To surpass the present achieved stratum and to gain an upper edge in the highly competitive world of maritime business, any remedial action or strategy to be implemented must be based upon well researched data that is able to produce viable and feasible alternatives, so that all valuable time, efforts and expenditure are not wasted.

It can be shown that in the maritime industry like in other highly competitive industries, consultancy services play a central role in the collating, sorting, analysing and evaluating of all relevant data to enable

the coordination of all activities whenever and wherever appropriate of the private and public sectors of the industry. Simultaneously optimisation of public funds and private capital can then be made viable by the adoption of the correct strategies for the purpose of achieving productivity and efficiency. Across the globe, the involvement of the industry [this includes the maritime industry in particular], in R & D sponsorship and its related activities has generally been governed "principally by the expectation of financial gain" (34).

The important role of R & D in national development and the ensuing benefits it will realise, prompted the Malaysian government in 1990 to explore the feasibility of setting up a Transport Research Institute⁽³⁵⁾. To date nothing concrete has materialised out of this study. This was mainly due to the following maladies being in existence then namely ".....lack of perception in the requirements of the industry....." much of which can be blamed ".....to the lack of expertise in the government....." (36) thereby affecting specific plans that if they had been implemented could have rejuvenated the ports and shipping tremendously.

Various consultancy services and R & D projects i.e. "contract research" can be undertaken in the Public and Private sectors either in the form of turnkey projects or as the only contractor/provider of services.

An alternative approach will be in the form of a joint venture/project with other organisations e.g. research organisations, companies, etc., at the national and international levels. The signing of a memorandum of

understanding [MOU] between the participating parties will be necessary where the project involves the participation of a commercial entity.

2.4.1 Studies on Port and Shipping

.1 Scope and level of consultancy services

The variety, scope and level of consultancy services that can be offered are amongst others in the following areas or specialities viz.,

- Analysis of port and shipping operations
- Maritime Business and Economics
- Cargo Transport and Management systems
- Marine Terminal planning and development
- Port and Shipping policy
- Maritime sector telematics⁽³⁷⁾
- Maritime affairs resource centre with extensive database and national think tank
- Human Resources Management and Development

.2 Marketing of services

The products of these services is targeted not only for the maritime business community to establish, maintain and develop efficient management of port and shipping in the country but also simultaneously enable them to provide high quality service to their clients.

The recipients of such a study will include port authorities and terminal operators, freight forwarders, shipowners and operators, shipping agencies, stevedoring firms, shippers, investors, transport operators and

other port users. They will benefit greatly by the appropriate use of the latest and most efficient technology and systematic methodologies available and utilised by the researchers to sieve through the maze of data available in the maritime world and henceforth produce the required analysis for the benefit of the recipients.

The study will also cater for the statisticians, transport studies educators and students, economists and other related disciplines or associated industries e.g. shipbuilding and repairs, marine equipment manufacturers, etc., for suitable applications in design and manufacture and their marketing strategies.

Additionally, due to the extensive database available and its status as a maritime affairs resource centre, its capability and effectiveness to undertake the role as a national maritime think tank should not be overlooked particularly by the the policy makers at any relevant ministry or government department whose responsibilities include the planning, co-ordination and implementation of a national port and shipping policy, regulatory body for shipping activities, MET, etc.

The think tank acting as consultant to the industry particularly to shipowning organisations, shippers councils including assisting in the establishment of a forum between them ⁽³⁸⁾, ports and the rest of the shipping community will enable them to establish themselves and streamline their operations in order to improve service, maximise profit and assist in corporate planning so that these organisations/enterprises will be able to adapt to the volatility of the shipping business

and remain competitive. The activities of European maritime research institutes⁽³⁹⁾, COST 301⁽⁴⁰⁾ and its successor EURET [see item 2.1.4.2.4 of this paper] exemplifies the many ways in which R & D can contribute to the survival of shipping.

.3 Methodology

The approach to be taken by such a study will be directed towards but not necessarily limited to :-

- .1 a continuous collation, sampling, database management and analysis of all operational data such as cargo throughput; systematic utilisation and optimization of manpower, equipment and material; cost benefit analysis; fleet development; human resources management and development; freight levels and performance trends in the liner shipping and chartering markets; economic, organisational and social aspects of port and shipping activities;
- .2 the need, prioritization and process for a two-way technical co-operation and transfer of technology [distinction must be made here between technological services *per se* and service technologies]⁽⁴¹⁾ between Malaysia and other countries from within and outside the ASEAN⁽⁴²⁾ region vis-a-vis port and shipping development viewed from the national perspective⁽⁴³⁾. UNCTAD⁽⁴⁴⁾ stated that currently there exist quote "..... a scarcity or absence of indigenous innovation efforts locally....." which can definitely be rectified through..... " the enhancement of R & D efforts....." unquote.

Matters that can be resolved via this avenue include amongst others viz. a joint manpower development programme⁽⁴⁵⁾ to produce quality seafarers for regional and global needs, the revamping of curriculum/methodology and infrastructure upgrading⁽⁴⁶⁾;

- .3 comparative study of previous and current national policies on port and shipping and their impact on current and future national development. The availability of such a study will enable the promulgation of alternative plans and strategies to modify the current ones as well as for future implementation within the context of national development planning;
- .4 the development of a total maritime sector telematics not only for the rapid, safe and efficient commercial communications and movement of goods in the shipping and shipping related industry. Needless to say, telematics is also a major function of any established maritime affairs resource which encompasses a total maritime database management and its application are numerous e.g. in environmental protection and management, safety of navigation including VTS and search and rescue, security and defence, coastal and offshore resources management, marine national disaster contingency planning, etc.

The government since the end of the decade of the 80's has encouraged the implementation of Electronic Data Interchange [EDI] in the maritime industry, particularly in the ports and shipping

sector⁽⁴⁷⁾. The availability of an efficient telematics infrastructure being efficiently fed by the extensive database made available through the maritime affairs resource centre is imperative for the successful implementation of EDI processes; at the global level for example, UNCTAD's formulated EDI process and network i.e. EDIFACT [Electronic Data Interchange for Administration, Commerce and Transport], which has been implemented in a lot of countries for facilitating trade and passenger movements. This will ensure that all documentation work required to facilitate cargo and passenger movements and other port and shipping activities within the domestic as well as for the international markets will be efficiently executed.

The availability and feasibility of the above services will certainly be dependant on the co-operation of the overall port and shipping business community, the relevant government and inter-governmental agencies, other R & D institutions which are related to port and shipping, etc.: these services should therefore be undertaken as a joint venture project with the industry and government.

2.4.2 Hydrographic Survey and Channel Design

This service caters for the port authorities and terminal operators. Survey of an existing body of water can easily be conducted by own or chartered-in hydrographic survey vessel. Simulation programmes consisting of softwares available in shiphandling and manoeuvring simulators will be utilised in the design formulation of new navigation channels and/or modifications to existing

ones. This takes into consideration the types, sizes and hydrodynamics of vessels that are expected to navigate the channel, the channel surface and bottom configuration and the predominant wind and current velocities present in the locality.

2.4.3 Marine Engineering

Among the activities envisaged for shipboard and offshore applications are:-

- .1 research into the design and operating parameters of ships' main engine and auxiliary machineries, both for shipboard and offshore industry applications. This should also include the associated control systems hardware and software. An extensive and specialised knowledge in the marine engineering field must be available in the MET institutions if meaningful research this activity is to be taken up; currently in the developed and industrialised countries, such research, design and manufacture are only available and made feasible by the equipment and plant manufacturing industry, usually based on their own initiatives;
- .2 the research into and design of expert systems or [ES]⁽⁴⁸⁾ for shipboard and offshore marine engineering total management and operations e.g. planned maintenance, propulsion monitoring system, optimum utilisation of fuel and lubricants, fire detection and control, etc.;
- .3 the research, design, testing and the possibility of production of new materials not only dedicated

to the hulls and appurtenances of all vessels but also for maritime equipments taking into considerations wherever and whenever applicable factors such as effects of hydrodynamic and associated stresses, climatic and meteorological operating environments, availability of materials and financial resources, operating economics [cost benefit], etc., for the maritime industry;

- .4 marine electrical systems and electronics. This requires thorough investigation into the aspect of systems' efficiency and safety parameters, e.g. the transmission of voltages and currents, data transmission and linkages [as in control engineering].

2.4.4 Naval Architecture

The above field will encompass all structures at the marine subsurface, semi-submerged or afloat for marine applications. This covers all known vessel types used in transportation of cargoes and passengers; defence and security surveillance; scientific research; and pure industrial utilisations such as oil rigs and exploratory vessels.

The consultancy approach in this field will be either dedicated towards producing a novel concept in structural design or modifications made to current ones already in service or existing on the drawing board. Operating aspects such as hydrodynamics, weather and climatic conditions, stability, cost effectiveness, safety and minimisation of pollution threat, etc. are among those that should be considered in the overall

analyses and the ensuing recommendations made to the aforementioned designs.

2.4.5 Marine Sciences

A coordinated effort by educational institutions and the relevant sector of the industry concern in the development of marine sciences such as marine biology, fishery, oceanography and meteorology [to name a few], is very important not only for pure academic purposes such as the study of the ecosystem [eutrophication, fish migration, current and tidal movements including upwelling, effects on the global climate and environment, etc.], but the application of this knowledge will be very beneficial for the national development e.g. to the fishing industry in ensuring sustainable growth of fish stocks so as to avoid depletion and later economic ruin to the industry.

In the offshore industry, certain prospecting and mining activities will be economically viable when through industrial research activities, site identification, grading and quantity of mineral deposits available [and hence the means of production] are made possible.

Following the same line of argument, effects of environmental pollution are known: hence a systematic approach can be formulated for the purposes of preventing/reducing such an occurrence and the implementation of effective countermeasures to be undertaken for the containment of pollutants and hence minimising damage.

2.4.6 Maritime Law

In the vast field of maritime law, the availability of an R & D department [read maritime resource centre] not only serves as an adjunct to the already available efficient legal system established in the country since the colonial era; it will also be able to tackle and study other pertinent current and contingent issues. Added to this, wherever and whenever appropriate, it will act as a lobby and initiate the necessary and required action for the individual or the country as a whole. Examples of some of the work that can be undertaken within the ambit of maritime law are defined below viz.,

- .1 in particular, such issues concerning the welfare of seamen as clearly laid out -in various international conventions, e.g. the International Labour Organization [ILO] Merchant Shipping Minimum Standards Convention no. 147 of 1976, which specify *inter alia* the legal steps that ratifying state parties are required to undertake in ensuring the condition of work and life of seamen aboard ships, including the provision of social security. Other ILO conventions covered matters such as security of employment, training, prevention of occupational accidents, medical facilities, etc. Currently, there exists no national seamen association or government body that is able to effectively protect seamen from and advise them about the excesses and abuses by employers, especially those serving under ships registered in the flag of convenience countries. A discourse into the non-effectiveness of existent agencies empowered or

entrusted to look into the aforementioned matters, will not be ventured within the context of this dissertation;

- .2 the existence of a maritime resource centre will enable certain inequities that have evolved regarding the territorial status of certain islands and the sea borders' delineation [see UNCLOS and other international maritime laws pertaining to subject matter]. If these matters remain unsolved or unsettled, inter-state disputes ensue, to the detriment of all parties concerned. Since these involves sovereignty, these disputes will have far reaching economic and security consequences particularly for those states whose economic policies dictate the exploration and subsequent exploitation of all available natural resources present off their coasts;
- .3 additionally, a R & D unit can assist on a regional basis in combating maritime fraud through case studies and proposing steps that could be taken to minimise future occurrences. The unit will initiate co-operation and exchange of information with international organisations having the same objectives e.g. the Maritime Advisory Exchange [MAE] of UNCTAD, The Baltic and International Maritime Council [BIMCO], the International Maritime Bureau, Lloyd's Maritime Information Services, etc.;
- .4 intra-regional co-operation for ASEAN within the purview of providing maritime law services by the R & D unit can include research into the various

maritime legislations and regulations of member countries. A detailed study of the legislations and how their interpretation and implementation can affect the smooth and efficient conduct of maritime affairs among member states will be undertaken.

Problems faced by all parties which may be affected by these legislations will be compiled by the unit, the detailed analyses made and submitted to the ASEAN secretariat for action. One of the solutions that can be thought of will be the harmonisation of these legislations and their interpretations throughout the ASEAN region by the responsible ministries.

The scope of such a study encompasses all aspects of the maritime industry e.g. trade, navigation, shipping, human resources development and optimisation, fisheries, offshore exploration and exploitation, etc. Certainly, the conduct of the study will require the joint co-operation by similar research institutions in the region.

- .5 in matters of international maritime legislation e.g. conventions, codes, maritime treaties, agreements, etc. of which Malaysia intends to be a party; the maritime resource centre will be able to assist the government by participating fully and effectively through various means. This can be effected through the conduct of a detailed study of the document and its implications to the country be it sovereignty, economic rights, political expediency, security, etc. and where applicable

the impact on the relevant industry; by being invited to join the government negotiating team preferably having observer or consultant status, etc.

The maritime legal experts from the resource centre will then be able to submit their proposals or analyses through any *ad hoc* or readily established mechanism of the government's administrative machinery e.g. to a ministry or committee.

A maritime resource centre possessing the above capabilities in the field of maritime law, augurs well for the academic pursuit of such specialisation since the law department of the institutes of higher education in the country today does not provide such opportunity. Malaysia should emulate one of her neighbours where such a faculty in one of their prominent universities has existed for a considerable period.

The benefits that can be reaped by such an existence will be the state of readiness of a particular country's administration; be well equipped and capable of submitting cogent and matured arguments whenever required to defend/advocate her national and sovereign interests. This is very much desired for any country today so as to avoid being the inferior in any disputes caused by geopolitical, economic or any other factors.

2.4.7 Shipping and Offshore Safety

This subject is foremost in the mind of anyone today who is concerned with the preservation of the

planet Earth from the excesses of mankind own undoings which have gone unchecked for the past millennium, in the name of development. The International Maritime Organization has from the days of its inception taken up the crusade of educating the user of the oceans and all waters connected to them of ways and means of protecting the sea environment ["safer shipping and cleaner oceans"]. This was done via the various international conventions, resolutions, guidelines, codes of practice, etc., addressing all aspects of the use of the sea.

Through R & D, the furtherance of such crusade was and will be maintained. Within the context of shipping and offshore safety; R & D activities in the following areas will contribute to the achievement and maintenance of this objective viz.,

- .1 a feasibility study on the establishment and implementation of a Vessel Traffic Services [VTS] system around the coasts and approaches to major ports of the country. Such a detailed study will involve the co-operation of the other littoral states within the particular sea area. The first area to be targetted will be the Strait of Melaka and the South China Sea areas, the former being the second busiest waterway in the world.

Factors to be considered will be but not limited to the existing dangers of navigation and their removal and/or the means of notification to mariners of such dangers, upgrading of current and the installation of new navigational aids, establishment of traffic routeing and monitoring systems, designation of special channels for ves-

sels carrying hazardous cargoes and ships of specialised nature, compulsory pilotage, hydrographic survey and production of new charts and sailing directions, search and rescue, contingency plans for combatting and minimising effects of pollution, etc.;

- .2 in the prevention and reduction of marine casualty it is envisaged that the maritime resource centre will be assisting the investigating body, be it the marine department that is charged with the administration and the execution of regulatory functions of merchant shipping in Malaysia [authority derived from the Merchant Shipping Ordinance] or any other investigative body fulfilling such a role.

The form and nature of assistance are varied: the resource center will appoint personnel to assist the investigative body in the collation of all material facts, documentation, and other evidence pertaining to the incident. It will be much better if such personnel is duly and legally appointed to this function, but he or she must not be given the authority to interview witnesses as this will be *ultra vires* the legislation.

Through the appropriate utilisation of simulators e.g. radar navigation, visual shiphandling, engine room, liquid cargo handling and towing tank, the data collected which reflect the actual operating environment existing during a pre-determined time prior to and until the occurrence of the incident, can then be fully analysed. All results will then

be submitted to the proper authorities for their necessary actions.

In addition, a compilation of all marine incidents and recommendations that were formulated, will be stored in the database. Retrieval will be very much easier whenever the need arises to publish these information for any interested parties. Additionally, certain parties may have access to the data on-line.

- .3 whenever a new type of vessel, excluding those to be used for defence and security roles, is introduced and to be operated, the resource centre can undertake the design of codes of practice. These codes will address not only the shiphandling and onboard machinery utilisation, but also the whole operating system of the vessel including the handling and maintenance of cargoes.

Currently, the maritime safety administration in the country is relying purely on codes produced by other developed countries, particularly those of the United Kingdom. Some items or procedures in these codes are deemed irrelevant to Malaysian merchant shipping as the parameters or technology that these were based on or envisaged, presently do not reflect the actual operating environment e.g. manning levels, technology available onboard and ashore, shipboard and shore-based management systems, etc. of the current state of shipping in Malaysia;

- .4 the concept of safe working practice should also

be implemented not just for shipboard purposes, but also for the overall maritime industry. This will include but not be limited to all operations in the sectors of offshore exploration and exploitation, fisheries, marine/water based recreational activities, carriage of passengers and goods in riverine areas, total port operations [cargo handling practice and use of cargo gear and equipments] as there is due to the dearth of such safe operating systems in the industry today;

- .5 prior to the country becoming a party to any maritime convention, the research unit can participate together with or offer its services to the maritime administration for the sole purpose of determining the implications of such international legislation to the Malaysian maritime industry.

If engaged by the administration for this purpose, the maritime law unit of the resource centre, will fulfil this task by carrying out an in-depth study of the document; any section or part that is deemed to be non-beneficial to the industry in particular and the country as a whole will be noted and the appropriate recommendations will then be submitted to the administration. In conjunction with this study, opinions of the industry will be sought through various means e.g. seminar, questionnaire survey, articles and feedback via shipping publications, etc.;

- .6 in line with IMO's aspirations for "safer shipping and cleaner oceans", the research unit can play the important role of being the custodian of data-

base of all ships within the purview of Malaysia's own system of Port State Control.

The unit can at the initial stage of this project, undertake to study similar systems already in operation worldwide for the purpose of assisting the maritime safety administration to streamline the current system albeit ineffective, already available in the country. With the establishment of a proper system of ship inspections and record-keeping, it is envisaged that through regional co-operation, an ASEAN Port State Control can then be initiated and co-ordinated;

- .7 last but not least, the resource centre can conduct, again on behalf of the maritime administration, an ongoing nationwide publicity campaign for maritime safety. This campaign is not only directed to those who are already *au fait* with such matters i.e. the port and shipping industry, but more towards the operators and users of small crafts operating in harbours, coastal sea areas and inland waterways [rivers and lakes], water sport enthusiasts, schoolchildren, and the public at large. If and whenever needed, safety training for this group can also be co-ordinated and conducted through the assistance of the maritime resource centre.

2.5 Summary

In summary, this chapter highlights the importance of and the conduct of R & D in MET institutions and the subsequent supportive role of R & D in a country's

development programme. An attestation to this fact, are the benefits to MET and the maritime industry that were derived through the efforts of research activities conducted by the European MET institutions.

In Malaysia, maritime R & D can be considered to be minimal; only basic scientific research were conducted by the universities. These currently, have not produced direct benefits to the maritime industry.

With the establishment of a R & D department in an MET setting [read ALAM], two main activities can be pursued :

- i) Course Development for the government and/or industry. This includes the identification of training needs, curriculum design and subsequently, providing the appropriate training.
- ii) Consultancy services for the maritime industry, both for the private and government sectors encompassing diverse areas e.g. port and shipping studies, maritime law, maritime resource centre, shipboard and offshore safety, Naval Architecture, port and terminal development, etc.

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9. Shipman, M., *op.cit.*
10. The activities of the Danish Maritime Institute are based on an interview with Mr. Eric Kasper, Manager, R & D, Ocean, Wind and Information Technology division, DMI.
11. The information presented are based on an interview and correspondence with Prof. Dr. Bernhard Berking of Hamburg Polytechnic and a Visiting Professor at the WMU.
12. Froese, J. "Requirements for the bridge of the ship of the future", Second International Conference on Human Factors at Sea, Plymouth, United Kingdom, October 1981.
13. See The Commission of the European Community, (1987) Ref. No.COST 301/FR 2.00 [AN 0102] Issue C/06/87 "COST 301 Final Report on Shore-Based Marine Navigation Aid Systems [Main report]", item 0.1.2 re the 'objectives and nature of the project' pp.0-2 to 0-3
ibid., p.3-10: COST is the acronym for European Cooperation in the Field of Scientific and Technical Research; "a forum to coordinate research activities between participating countries, predominantly European. COST 301 is a major example in the maritime field. For an insight of this topic see also Salvarani, R. "An Introduction to COST 301....shore-based marine traffic assistance system and procedures" presented at the "Conference on Sea Technology Europe", Brussels, October 1983.
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"A VTS is any service implemented by a competent authority, designed to improve safety and efficiency of traffic and the protection of the environment. It may range from the provision of simple information messages to extensive management of traffic within a port or waterway."
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16. The information on research activities in the Netherlands are based on an interview with Captain S.Cross, lecturer, at the WMU.The Hydrodynamics Engineering and the Waterloopkundig Laboratory are based at Delft and Emmeloord, respectively.

17. Information presented are based on an interview with, and publications of Australian Maritime College received from, Mr. John T. Foster, Manager cum Company Secretary, AMC Search Ltd. during his visit to WMU.
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23. UNCTAD, "Report on Maritime Management Training in Developing Countries" TB/B/C.4/189, 7 May, 1980 for the Trade and Development Board, Committee on Shipping, 9th Session, Geneva, 1 September, 1980. pp.38-41
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28. UNCTAD, "Current Trends and Prospects for the World Economy" in Report by the Secretariat "Trade and Development Report, 1990", UNCTAD TDR/10, UNITED NATIONS, New York, 1990. p.46
29. *ibid.*, "Selected Issues in International Trade". p.93
30. UNCTAD, "Report on Maritime Management Training in Developing Countries", supra note 23, Annex III pp.7-49
31. UNCTAD, *ibid.*
32. See "Incoterms" and "Guide to Incoterms", publication numbers 350 and 354 respectively, International Chamber of Commerce, Paris and New York, 1980. Incoterm is the acronym for international commercial terms.
33. The Third Malaysia Plan [1976-1980] is the third in the continuous series of governmental programmes under the national development policy, which is activated every five years. The first plan was for the 1966-1970 period, and currently the country is implementing the sixth plan. Under each plan, the aims, objectives and the level of priori-

- tization for each sector of national development were decided upon; and the specific strategies, target dates, budgets and the executing agency, etc., spelt out.
34. See "The Roles of Government and Industry in Research And Development for the Maritime Industry" , an interim report of the committee established by the Marine Board Commission on Engineering and Technical Systems, National Research Council, USA, published by the National Academy Press, Washington, D.C. 1986.
The overall objective of this committee was to identify, appraise, and recommend alternative approaches to improving the health and status of R & D in the maritime industries.
 35. see Lloyds Maritime Asia, February 1990 publication. p.17
 36. *ibid.*
 37. Telematics is an activity whereby the entry, transport, processing and presentation of data are automatically executed via a telecommunications medium. In telematics therefore it is necessary that computers, information links and computer languages are used and the rules [protocol] of automation adhered to. In Europe, the Ministry of Transport and Public Works of The Netherlands has been the main catalyst and coordinator for the promotion of this new field for the transport industry. For further reading please refer to "Telematics in the Transport Sector" published by The Central Information Bureau Telematics Traffic and Transport, of the aforementioned ministry at Plesmanweg 1-6, The Hague, The Netherlands.
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N.B. ECAFE is now known as Economic and Social Commission for Asia and Pacific [ESCAP] having its headquarters at Bangkok, Thailand.
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 40. See *supra* note 13.
 41. See *supra* note 34, p.43. Technology is in its broadest sense the organisation of both empirical and theoretical knowledge into a consistent and systematic entity. The entity may take the specific form of equipment or devices, but also encompasses "how-to-do", including the organisation of work and also computer programs.
As defined in UNCTAD, "Transfer and Development of Technology in Developing Countries", see *infra* note 43, "technological services" include design, engineering, consultancy, management, etc., whereas "service technologies" are the methods and technological assets required to produce economic services *inter alia* banking, trade, insurance, public and welfare services, etc.
 42. ASEAN is the acronym for Association of South East Asian countries, viz., Malaysia, Singapore, Thailand, Indonesia, Philippines and Brunei Darussalam created by the signing of the ASEAN Agreement in 1967 [prior to this date it was known as ASA consisting of Thailand, Malaysia and Indonesia]. ASEAN is devoted to the promotion of regional cooperation in economic, social, cultural and technical fields. Shipping matters are dealt with exclusively by the (i) Sub-Committee on Ports and Shipping and (ii) the Joint Working Group on Shipping; these two bodies report to the the ASEAN Committee on Transportation and Communications[COTAC]. For more information regarding the objec-

tives and activities of COTAC please refer to UNCTAD, "Activities of International Regional Organizations in the field of Maritime Transport" in Report by the UNCTAD Secretariat "Review of Maritime Transport 1990", UNCTAD TD/B/C.4/340, UNITED NATIONS, New York, 1991. pp.70-71. The Ministry of Transport, Malaysia being the current chairman of COTAC.

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44. *Ibid.*, Chapter III "Strengthening domestic technological investments and capacities" *inter alia* "New arrangements for financing technology" pp. 40-41 and "R & D: Linking innovation policy to the enterprise" pp.42-43; for more examples of technology financing please refer to para. 105(20) of the Final Act of UNCTAD VII re technical assistance in shipping to developing countries; see Resolution 64(XIV) on economic co-operation among developing countries (ECDC) in the fields of shipping, ports and multimodal transport, also see Resolution 615(XIV) re work programme in shipping, policy, international maritime legislation, technical co-operation and training.
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46. Sohmen, H. "The Human Element in shipping", Fourth Chua Teck Memorial Lecture, delivered on 19 January 1990, Chua Teck Memorial Fund Trustee Committee, Singapore.
47. see *supra* note 35. An *ad hoc* committee was established comprising of the Economic Planning Unit in the Prime Minister Department and other agencies viz. Ministry of Transport, Customs, Immigration departments and the port authorities.
48. See "Machine Management of Marine Operations" by C.G. Biancardi and D.R. Dellwo as published in Marine Technology, vol.1, Jan. 1988, pp. 30-35 on the potential maritime industrial applications of ES technology [a branch of artificial intelligence] and some of the systems currently available in the United States and in the European countries.

CHAPTER 3

ESTABLISHMENT OF R & D DEPARTMENT AT ALAM

3.1 Organisational Structure and Terms of Reference

ALAM does not possess any corporate status. Any functions that are to be undertaken in relation to the objectives and purposes of the academy, are executed in the name of the MATES Foundation ⁽¹⁾. This is a body corporate whose members are the Board of Governors of ALAM. In this context, ALAM's status is unique when compared with the many educational institutions in the country. This is due to the fact that whilst the Mates Foundation [this is synonymous with ALAM] was incorporated under the Companies Act, it is also an organisation with vested government interest, thereby benefiting from corporate tax exemption ⁽²⁾ in accordance with the latter status. Most of the tertiary level educational institutions in the country were established under the Universities and Colleges Act ⁽³⁾; this offers them full autonomy [with minor exceptions] in their management of their programmes. Simultaneously, they are also fully funded by the government. Privately owned and funded institutions are managed like any other enterprises incorporated under the Companies Act.

Due to the special status enjoyed by ALAM as described before, it is therefore not the intention to propose any particular organisational structure, for the establishment of an R & D department at ALAM [hereinafter known as "the department"]. Since such an exercise tends to involve delicate and sensitive issues thereby making it highly complex; this will have to be decided [for this purpose] by a special body/committee to be established or already in existence.

In this dissertation, four options re organisational structures will be described including a sample of the *pros and cons* of each option. These will later be submitted to the aforementioned body to enable them to deliberate and finally approve the proposal. These options are:

3.1.1 A department within ALAM's current organisational structure

Under this option, the Head of Department will be reporting directly to the Principal [Chief Executive Officer] of ALAM in all matters of management viz. policy, budget, income and expenditure, staff appointment, etc. All administrative and operational matters will be the prerogative of the head of department in line with the general policies of ALAM. The Head will be assisted by an Administrative Services Officer and a Research Assistant [this is the initial staff strength]; the latter personnel is required to co-ordinate and facilitate all technical research work. All department staff will be full-time employees of ALAM.

Income if any, generated through research activities will be apportioned between ALAM and the R & D department; the apportionment to be based on an equitable formula decided by ALAM's management. The net income credited to the department's accounts will be utilised to reimburse ALAM for all support services rendered e.g. the use of staff, equipment, material, infrastructure, etc.; the balance of such earnings will be for the departments' own account i.e. administrative, operational, marketing, etc. At a later stage when sufficient funds are accrued, these funds should also be used to supplement the development budget acquired via ALAM.

Advantages

- i) as an inherent part of ALAM, there is therefore no obstacle to be foreseen in acquiring government recognition and funding, particularly in the initial years;
- ii) there is no necessity to acquire own assets, e.g. buildings, simulator, library, towing tank and other infrastructure;
- iii) the current staff at ALAM can be identified and utilised for R & D at this initial stage. Whenever the need arises, additional staff can be recruited on a temporary basis ;
- iv) no foreseeable problems in the overall co-ordination and cooperation with other departments within ALAM;
- v) ALAM's status as an MET institution will be enhanced through the involvement of own staff in research.

Disadvantages

- i) the current management and the management style of ALAM is in many respects extensively dictated by government civil service rules and procedures unlike other government tertiary level educational institutions [e.g. government rules prohibit ALAM from engaging in commercial enterprise; research staff unable to share the direct pecuniary gain];
- ii) the absence of full autonomy for the department inhibits dynamism in the conduct of R & D activities and will act as a constraint for future development [viz. in financial matters, employment of staff, acquisition of independent assets] particularly when embarking into consultancy projects for the private sector.

3.1.2 Within the purview of the Universities and Colleges Act

This is a very radical option to be considered. As described earlier, ALAM's organisational structure and management style is unlike any other tertiary level educational institution. It is therefore proposed here that ALAM's current status is altered and thereby established as a university within the context of the Universities and Colleges Act.

As in any other university, the department will be established independently of any faculty or discipline, but will be reporting directly to the Academic Dean. In a university, R & D activities must be present. It is required and expedient for faculty members to be involved not only for the pursuit of academic excellence

and the upgrading of status of the university; this is also important for staff upgrading and hence a monetary advantage for them.

Advantages

- i) it will be fully staffed and equipped; all other faculty members and graduate students will be able to conduct their research programmes as per schedules agreed upon by the university's management;
- ii) research activities are normally funded through specific budget allocation. Additionally, research activities are also funded by the industry through the awarding of grants, joint ventures for profit sharing, or direct payment for the performance of a specific project;
- iii) there exists autonomy in the management and conduct of R & D activities within the ambit of the Act;
- iv) the quality of research performed, reflects the academic excellence of any university. It is therefore expected that in an academic environment, bureaucratic obstacles to R & D will be very much minimised, if not totally absent, as achieving the aforementioned goal is one of the prime objectives of such an institution.

Disadvantages

- i) courses conducted at ALAM which currently do not possess the required academic content and for which the pre-requisite entry level qualifications of students are deemed not to satisfy a university's academic criteria e.g. ratings and lower grade

- certificate of competency courses, will have to be dropped from the academic programme. Another institution then is needed to cater for these courses;
- ii) it is highly improbable that this alternative will be chosen, as this will involve a major rethinking of national education priorities [particularly vocational policies]. The country has already a technological university, the Universiti Teknologi Malaysia [UTM]. A conspectus of the placement of maritime affairs especially ports and shipping in national development [e.g. the quantum of revenue that can be generated by this industry, social development, etc.] is necessary prior to arriving at a particular decision.

3.1.3 The Akademi Laut Malaysia Act⁽⁴⁾

Under this option, an enabling Act of Parliament is drafted and promulgated, the tabling and passage of such legislation being the responsibility of the ministry empowered to oversee MET affairs. This proposal is as radical as the option in 3.1.2 above.

The abovestated legal instrument to alter ALAM's current status will have far reaching implications not only for the academy *per se*, but also for MET in general. Under this statutory provision, ALAM should be empowered with special functions that relate to MET and MET related activities but not be limited to :

- provision of education and training at all levels for the entire maritime industry;
- the conduct of various forms of evaluation and assessment connected with the courses conducted by

the college as it may deem fit and the subsequent award of degrees, diplomas and certificates in relation to this;

- the advancement and development of knowledge and skills through and utilising multifarious means available and feasible to the academy [R & D and the conduct of its activities is in congruence with this];
- all other powers and functions that are deemed to be indispensable and concomitant to the efficient management and operation of the academy;

and many others that can be deliberated by the body appointed to study and approve the establishment of the R & D department at ALAM.

Advantages

All the advantages that were previously described for the establishment of a R & D department within a university [see item 3.1.2], are applicable *mutatis mutandis* for this option. In addition, the incorporation of ALAM under its own enabling legislation which has been specifically drafted for the MET environment, augurs very well for the academy.

The clearly defined powers included under this statute will enable the academy to perform the relevant functions necessary not only for the academy's own development but also to contribute to the development of the industry. The ability to conduct and sustain R & D activities very much hinges on the academy's overall performance as a successful MET institution.

Disadvantages

Currently, there are various impediments present to the choice of this option, even though the advantages as described above look very promising. The disadvantages mentioned under item 3.1.2 are also applicable here. Major changes to the curricula of certain courses that do not meet the standards prescribed under the act will have to be made. However, as stated previously in the same item, a detailed and exhaustive study is needed to determine the feasibility of this option within the context of national development policies.

3.1.4 A limited company within ALAM

This is a complete *volte-face* to the three options mentioned earlier with respect to the department's relationship with the parent body, ALAM. Previously, the department exists as an inherent part of the organisation. Under this option, it is envisaged that a limited company, subservient to the parent company [ALAM will then be the holding company owning 100% shares of the research company], is established to undertake research activities. ALAM as explained earlier was established as a company with vested government interest.

The company management team, at the initial stage consisting of an Administrative Staff Officer and a Research Assistant, will be under the leadership of its chief executive officer [Manager]. The Manager will have the full authority and powers entrusted by the Board of Directors, to manage and operate the company as he may deem fit; subject to the policy of the Board and the relevant legal requirements [i.e. as any other commer-

cial enterprise].

Possessing its own corporate status, this company is totally divorced from the normal management policy and its conduct in the academy [see exceptions below]. However, the interests of ALAM are taken care of in the incorporation of the company via the following legal mechanism :

- the current Principal of ALAM is to be the Chairman of the Board of Directors; the remaining directors to be chosen from among the senior staff of ALAM and personalities from the education sector as well as industry who are *au fait* with the management and/or conduct of research activities. Two-thirds of the current Board must be at all times serving faculty members of the academy;
- the manager will be appointed from among the academy's staff sitting on the Board.

Advantages

- i) this option offers the highest level of independence to the research body to manage its own affairs in comparison to the other three, whilst simultaneously guaranteeing the interests of the academy;
- ii) the terms and conditions of employment of the staff are compatible as in the normal industry. Academy staff are engaged as consultants in any R & D programmes undertaken by the company;
- iii) the company is not subjected to the bureaucracy normally attached to civil service rules and procedures;

- iv) The main objective of the company is to generate profits through the undertaking of research activities. The company will be utilising the staff and facilities of ALAM in most of its projects which will have to be financially re-imbursed. Not only will the academy benefit financially, its academic standards will also be raised through the R & D activities.

Disadvantages

- i) a re-definition of the objectives of ALAM as stated in its Charter is required. There is now a need to broaden this to include all activities conducive to the conduct of and pertaining to the advancement of education and training for the overall maritime industry [i.e. not only in professional shipping]. Such an exercise requires a comprehensive and detailed study of the priority of MET by the government agency responsible within the context of national development;
- ii) as a company without previous experience in the field of research, it will be faced with a daunting task to convince not only the industry [particularly in the field of consultancy] but also the government, being the initial paymaster, of the company's capability to embark in research activities. The academy in pursuing this, must be dynamic and courageous enough to provide full and undying support to promote the company until it is capable of standing on its own.

3.2 Manpower Requirements

Notwithstanding the above four options re the establishment of the R & D department, it is imperative and expedient that ALAM's faculty members are capable of conducting research. Earlier, in this chapter, this point has been continuously stressed upon and repeated when highlighting the advantages of each of the four options. In the following sub-headings, the issue of the manpower requirements of the academy and their rationale, will be discussed in detail.

3.2.1 Current Staff Strength and Qualifications

The faculty at ALAM has been over the past few years besetted with the problems caused by reduced staff strength. The national shipping industry experienced a boom at the turn of the last decade; one of its results was the migration of staff from the faculty to shipping as well as to the petroleum industries. The cyclical nature of shipping is also reflected in the everchanging ratio of local *vis-a-vis* expatriate staff complement.

The services of the latter were urgently needed in the early years of the academy's growth, due to the insufficient number of local, former sea-going professionals available to fulfil the staffing requirements. The few that were available then, did not have the interest to pursue the vocation of MET due to many underlying reasons; some of these reasons were pure economics, others were not exposed to the various facets of academic life and the benefits that it can offer to one's ownself.

The commitment of local staff to the conduct and advancement of R & D activities is very pertinent. This statement is not to be construed as demeaning or negating the capability, professionalism and conscientiousness of the expatriates that had been serving, in current service or those that the academy intends to employ in the future. Their primary duty has been to educate and train ALAM's students, until such time that sufficient Malaysian educators and trainers are available to fulfil the central role needed in the advancement of MET in the country. This must be accepted as a reality of life. The employment status of the locals is permanent; in the case of the expatriates, they are employed on contractual terms [normal duration of three years].

It is highly probable that in this situation, any contribution from these expatriate staff in the field of R & D, may then be interrupted due to their employment contract having expired and not renewed for whatever reason. In addition, the utilisation of expatriates, other than being retained as a consultant, is also not germane to national aspiration and the aspiration of the academy as a national MET institution.

.1 Staff Distribution

i) current staff strength:	---->	180 persons	
ii) training department:	---->	59	"
a) local lecturers	---->	22	"
b) local instructors	---->	11	"
c) expatriate lecturers	---->	12	"
d) clerical and ancillary staff	-->	14	"

iii) administration department: ----> 121 persons

It is very clear from the above staff distribution figures that the ratio of training staff *vis-a-vis* administrative staff in the academy is askew towards the latter. This is not the status quo that should be present in any organisation dedicated to the provision of education and/or training, especially in the MET setting [being vocational and professional].

It must also be impressed here that to maintain a conducive environment to foster R & D in ALAM, the above imbalance must be remedied soonest. If the faculty members represent the majority, then the *esprit de corps* among this group can prevail. The academic programmes will benefit not only because the full complement of faculty members are available, hence innovation in education can be strived upon by them; only through this and the presence of promising terms and conditions of employment, will the full commitment of the staff be drawn.

Effective training and upgrading of the faculty members can be easily planned and put into effect without any fear of disruptions to any regular training programmes. At the same time contingency plans can be evolved to accomodate special requests from the maritime industry for the conduct of both new and additional courses. Of prime importance to this dissertation, will be the available pool of staff that can be deployed for R & D activities. It must be reiterated here, that the exigency of correcting this imbalance, is paramount among the many steps to be undertaken prior to the establishment of the R & D department.

.2 Staff Qualifications

The faculty members are in the main, former seafarers; some have industrial experiences ashore e.g. harbour pilots or shipping company superintendents, whilst others have previous teaching experience in MET. A handful of the staff also possess commercial qualification and experience in management or business [CIT, ICS], relevant to the maritime industry. The level of their sea-going qualifications are as follows:-

Lecturers

- i) Nautical -----> Master Mariner Class 1
[Master Foreign-Going]
- ii) Marine Engineering ---> Marine Engineer Class 1
[Chief Engineer]
- iii) Maritime -----> Radio Telegraphy/Tele-
Communications phony [Unrestricted]
- iv) In addition, the academic subjects' lecturers possess the relevant academic degrees in their specialisation.
- v) At the lower end of the scale, Instructors for the Pre-Sea and other short courses, possess vocational certificates and working experience either in the Navy or Merchant Navy.

On a regular basis, all faculty members attend various short courses/training programmes essential for the upgrading of knowledge and skills pertaining to MET; these courses are held locally or abroad. Currently, two of them are graduates of the World Maritime University, Malmo, Sweden.

The academy is currently pursuing rapid development in MET activities through the upgrading/revision of present courses to satisfy current and new IMO and national requirements [e.g. preparatory courses for personnel serving on board coastal and near coastal ships, "steam" certification for marine engineers, GMDSS, advanced fire-fighting, tanker familiarisation, etc.]. In addition, new courses [e.g. shipboard management, pre-sea marine engineering cadets course at the Diploma in Marine Technology level, and tailor-made courses for the industry, etc.] have also been introduced.

The teaching workload for all faculty members have been increased in line with the above development. There is an on-going recruitment programme for new staff implemented by the academy to satisfy the aforementioned needs.

3.2.2 R & D Staff Recruitment and Training Structure

One of the many prerequisites for the establishment of the department, will be the implementation of a permanent scheme in ALAM's Human Resources and Development [HRD] programme, to ensure the continuous availability and capability of local faculty members to engage in R & D programmes. The implementation of such a scheme, once properly studied and approved by the academy's management, should be structured according to the following stages, viz.;

.1 Training in research

The importance of a MET institution having its own

staff trained in research have been underlined earlier in this chapter. It is now opportune, particularly for the senior faculty members to be involved in research work. A training in research scheme for the intended personnel can now be instituted subject to the following provisions :

- i) the staff chosen should be a Malaysian citizen;
- ii) he/she has served ALAM for at least five (5) years in the capacity of a lecturer;
- iii) he/she is currently on ALAM's permanent staff.

The training scheme is to be fully financed through ALAM's own staff training fund which must be established [currently, this is non-existent] for this purpose. The sources and means of acquiring these funds for the academy will be discussed under item 3.5 of this chapter. The above training scheme will consist of one or a combination of the following programmes, viz.,

- i) acquirement of any qualification equivalent to or superior than the level of a Master's degree from a recognised university. The assessment for the award of the degree, must be based on or to include, the submission of a dissertation or a thesis;
- ii) attachment for a minimum total period of at least six months or longer, at the R & D unit of any tertiary level educational institution. The staff attachment programme can be either on a continuous or part-time basis subject to the mutual acquiescence between ALAM and the institution where the programme is to be effected;
- iii) as in (ii) above, but the organisation where such

training is to be provided, will be the R & D unit of any or a combination of the following:-

- the government;
- a government enterprise;
- a non-governmental organisation [NGO];
- the industry.

It is desirable but not necessarily a must, that the particular research activity, of any of the aforementioned units that ALAM's staff is attached to in items (ii) and (iii), should be maritime-based or maritime related, for the purpose of this training scheme.

.2 Recruitment

In parallel to the implementation of the training in research, the academy will now be required to proceed on a recruitment drive to satisfy the two objectives stated below :

- i) in the first instance, ALAM has to recruit more staff to join the faculty. Towards this end, it is suggested here, that amongst others, there is a need [*for the academy*] , to undertake a major revision of its present terms and conditions of service to attract experienced personnel from the industry, both ashore and afloat to join as lecturers. The presence of both, i.e. professionals of high calibre and those possessing the potential to contribute new ideas to the MET system, will readily assist ALAM in her endeavours towards an excellent institution for the maritime industry.

The above approach will also assist ALAM in her efforts to minimise the brain-drain that has been a source of the frequent hiatuses in the implementation of the academic programmes. If the shortage of staff situation is not overcome, then it will also affect the overall future development of the academic programmes, such as curriculum updating or revision, introduction of new courses, etc.

A point more relevant for this dissertation however, will be the inability of ALAM to undertake any R & D project as the newly appointed staff is required to replace or supplement the staff in the faculty that has been identified or already engaged in research;

- ii) simultaneously, the recruitment drive must also address the issue of the non-availability of faculty members capable of undertaking research work. To satisfy this shortcoming, it is desirable for ALAM to recruit new personnel who have had the experience of research work either at a university or any other R & D organisations [see previous item 3.2.2.1]. This does not necessarily have to be research experience in the maritime field of study or application.

These new intake can then be deployed immediately into research work, either as the main researcher or to complement the available team. The choice between the former and the latter is dependent on whether the particular staff possess the relevant experience in the maritime field.

3.2.3 Deployment of Personnel in R & D activities

.1 Utilisation of ALAM's personnel

Within ALAM, the Head of the R & D department will be responsible for the overall management, that includes the prioritisation [time-scheduling] and deployment of personnel, of any research project undertaken by the department. He or she is to co-ordinate and identify the staff from the respective departments that will be involved; this will be effected through consultation with the respective heads of department.

These procedures must be adhered to as it is not practicable nor financially sound, for the department to require the presence of a permanent team of researchers, notwithstanding the choice of option the approval body will take re the organisational structure of the department [see item 3.1.1]. The research team will be seconded to or employed as consultants by the department from the other departments in ALAM, either on a full or part-time basis. The exact terms of reference of these personnel will be decided as described above.

.2 Utilisation of non-ALAM personnel

In a certain project, the utilisation of non-ALAM personnel may be required or it may be the only way that the particular project can be implemented; the decision will then be taken to do so. The manner in which this decision will be arrived at, is dependent on the organisational status of the department [see item 3.1.1]. This will be the procedure to be adhered to whenever the need for the external research staff has been identified.

Such a need may arise in any joint research activity whether with the industry or other universities; it may also arise in the case of undertaking consultancy projects for the industry, government, or for any other organisations.

.3 Administrative staff

At the inception of the department, it will suffice to have a small but efficient team consisting of only one administrative officer and one technical research assistant. The number of administrative staff can be increased on an *ad hoc* basis. In the future, once the department is able to generate sufficient research work that necessitates the additional complement, then new personnel will be recruited for this. This approach will only be resorted to, if the frequency of increased workload has been identified as being regular and such demands are not anticipated for the immediate future.

3.3 Resource Centre

Any effective R & D unit must include or be supported by a well-managed resource centre. Consequently, the centre has to be properly staffed and equipped. This is one of the prerequisites in the organisation of R & D.

The "centre" does not have to exist in the physical sense at all; what is important is the availability of an efficient infrastructure within the organisation, capable of providing the required services.

This approach is advocated for this dissertation,

as it is not envisaged nor will it be realistic, to imagine that the department will immediately upon its establishment, embark upon or be invited to conduct an extensive research project for any party. It is imperative for the academy to ensure that the level of efficiency required for the above infrastructure is tenable at all times.

3.3.1 Current facilities and infrastructure

The following facilities and infrastructure are currently available at the academy :

- .1 a Radar Simulator with four own ships; each ship is fully equipped to conduct courses such as Radar Observer and Simulator, Electronic Navigational Aids and upgrading courses for Harbour Pilots;
- .2 a medium-sized library stocked with textbooks, IMO documents, conference and seminar papers, journals and periodicals pertaining to the maritime industry, with emphasis on ports and shipping matters;
- .3 a computer laboratory, currently being utilised for the training of the pre-sea cadets and the conduct of in-house computer courses for ALAM's staff [faculty members, administrative officers and clerical staff];
- .4 arrangements have been made to procure a vessel belonging to the Light Dues Authority of Malaysia, to be used and maintained by ALAM for an

unspecified period, in the seamanship training of pre-sea students and shiphandling practicals for the Master Foreign-Going candidates. At this moment, the negotiation and the finalisation of details are still in progress;

.5 a complete inventory of teaching equipment/aids and course materials are available; ALAM also possesses the capability of designing and presenting tailor-made training programmes;

.6 a printing unit which is currently being upgraded to a full repographic section; and

.7 an administration department capable of providing the necessary support services, e.g. secretarial, internal / external communications [telephone, telex and telefax], transport, accommodation and catering].

3.3.2 Upgrading of facilities and infrastructure

The status quo of the facilities and infrastructure described in the preceding topic, is deemed to be inadequate for the department to embark into full-scale research activities. A large scale development project for the upgrading of facilities i.e. modification work on existing ones, construction of new buildings, purchase of equipment and machinery, introduction of new technology, etc. will be needed. A complete overhaul of the mechanism and quality of rendering services will require a major rethinking and a subsequent restructuring exercise on service priorities by the management. "Altruism" should become the key word in the service

sector of the academy.

However, pragmatism and common sense should always prevail in all aspects of planning and implementation. Having said this, ALAM is not required to implement all the above recommendations at one stroke. An on-going market survey must be instituted to determine not only the needs, but also the feasibility of any project in research, prior to the undertaking of the same. The department must establish a long-term plan [e.g. a five-year plan] that will include an annual calender of research projects to be implemented; innate to this calender is the project prioritisation level [please see item 3.4 below re The Implementation and Scheduling of R & D Projects].

ALAM will be utilising the project implementation schedule, as one of the determinant factors, for the conduct [implementation date or period, budget allocation, etc.], of the facilities and infrastructure upgrading programme described below. The following facilities and infrastructure *inter alia*, must be acquired not necessarily via purchasing means only; other options recommended are through leasing, hire, loan, supplied by the client as part of the research contract agreement, joint-purchase with other R & D organisations, etc. All these must be made available in or to the department [including the optimum utilisation and maintenance] in ALAM's endeavour to achieve the status of a National Maritime Resource Centre.

As part of the facility upgrading project, additional training programmes for faculty members will have to be planned and implemented to enable them to be

familiar with the use of the new equipment and the associated softwares. This can be incorporated in the purchase contract as part of the factory acceptance test. Alternatively, special training arrangements for the staff can be established with other MET institutions/research organisations that are utilising the same hardware/software.

Other specialists and support staff viz. a Naval Architect, a fishery expert, a computer programmer, a maritime lawyer, technicians, etc. may need to be employed either on a full or part-time basis, to assist in the R & D projects.

The facilities and infrastructure required are :

- .1 the current Radar Simulator is to be upgraded to a Visual Shiphandling Simulator [VSS] for both day and night visuals. Through this new acquisition, the simulator will be incorporated with the necessary hardwares and softwares, including a comprehensive mathematical model, capable of simulating the dynamic behaviour of any marine craft and the associated operating hydrodynamic environment;
- .2 as a complement to the above, the acquisition of a Towing Tank to assess and evaluate the hydrodynamic effectiveness and stability of a marine craft design;
- .3 a Flume Tank for net modelling [fishing];
- .4 a complete Diesel Engine Simulator;

.5 the library will be equipped with the latest and extensive list of publications [professional journals, research/conference/seminar papers, periodical, books, etc.] encompassing the whole maritime field of study, classified into the three broad disciplines of Pure and Natural Sciences, Applied Science and Engineering/Technology and Social Sciences, Professional/Technical.

A total integrated library system⁽⁵⁾ utilising new technology is needed if the library is also to be recognised as the information collation, management and distribution centre of the Maritime Resource Centre.

Such a system will include amongst others :-

- a computerised library database management and access system for internal as well as on-line inter-library format. The inter-library loan system, especially among research libraries⁽⁶⁾, and other organisations involved or participating in maritime statistical collation and analyses, for access to printed copies, computer disks etc., should be established.

Prior to all these, the department's library should operate an efficient cataloguing system based upon the Dewey Decimal Classification [DDC], the Library of Congress, USA [LC] or any other system that is more commonly used by major libraries, in particular those that serve research organisations;

- serial literature to be made available in any or all the following formats i.e. microfilm, microfiche and CD-ROM⁽⁷⁾. In this respect, the relevant hardware including those already available in the academy to be appropriately utilised. As a supplementary system, ALAM should endeavour to introduce an internal computer network, linking all PC terminals and work stations to the library database storage;
- a proper management system of Non-Book Materials [NMB], i.e. sound and video recordings, graphics and micro-computer software;

.6 a Liquid Cargo Handling Simulator;

.7 upgrading of other training equipment and facilities, particularly the introduction of computerised training packages.

3.4 The Implementation and Scheduling of R & D Projects

It is neither envisaged nor expected that the department will undertake full-fledged research activities immediately upon its establishment, notwithstanding its organisational structure or the availability of funds. The capability, experience and availability of staff, the status of present facilities and infrastructure in the academy, the experience of similar research organisations worldwide; all these strengthened the aforementioned view. Nevertheless, a systematic approach in the conduct and prioritization of research activities

must be pursued.

All matters being considered, the department will commence its initial R & D operations in the promotion and undertaking of projects related to education and training for the maritime sector. The department will approach this task, by advising and assisting the maritime sector, in the identification of training needs for the appropriate staff level. These courses will be "tailor-made" and presented as a total package for the intended clientele, i.e. it includes the design of curriculum and syllabus, training/learning materials, the trainer and last but not least, the training itself.

These programmes are intended to be a remedial measure for the non-availability or insufficiency of commercial sector and/or non-mandatory courses only. Mandatory courses for the industry have been taken care of through the enforcement of relevant legislations by the regulatory bodies, e.g. the Marine Department.

With this initial venture by the department into R & D, the department and the staff, will hopefully gain the required experience and expertise, to encroach further afield into the other sectors of research activities in the maritime arena, i.e. consultancy, contract research, resource centre and think-tank, *et al*, at the national and international scenarios. At this later stage, it is hoped that the department will avail itself of the necessary funding, already established, to finance the intended project.

3.5 Budget

3.5.1 The initial years

Prior to the establishment of the department, it is imperative that a budget allocation is made available to the department, during its initial setting-up period; this includes all the topics that have been previously described in this chapter i.e. staff recruitment and training programme, upgrading of facilities and infrastructure, etc.

The word "initial" being used here is to be construed as the "first five years after the inception of the department".

In addition to the above, the expenditure necessary for the initial promotion exercise and the marketing of research activities of the department, must also be considered by the special committee [see item 3.1] as part of their deliberations, in deciding the form and feature of the intended research department.

3.5.2 Operational and Developmental Budget

After the initial period, it is expected that the department will be able to finance itself [operational budget], from the profits accrued through the conduct of its R & D activities. However, it must be realised that, in order to remain competitive and innovative, the department must constantly keep abreast of new developments, not only in the maritime industry *per se*; it is also imperative and expedient for it to maintain a high standard in the field of research.

To enable the department to achieve and maintain this target, all of its staff are required to improve the quality of research and simultaneously, embark into and generate new research activities. Continuous training programme [incorporated into ALAM's HRD Programme], must be instituted. Naturally, to complement this, the utilisation of equipment, materials and infrastructure must also be optimised; it is also important that these must be constantly upgraded in line with the introduction and application of the latest technology.

3.5.3 Source of Funds

There are various sources and means of funding for the department that can be explored, from within Malaysia as well as from abroad. Certainly, the legal status of the department will be an important factor in determining the appropriate source of funds or even the benefactor as the case may be. Among the sources that can be considered are:-

.1 from ALAM's own accumulated funds and budget allocation i.e.

- the annual operating and developmental budgets which are derived from the Federal Government [50%] and the other members of the MATES Foundation [50%];
- operating budget allocation provided for by the government under the Five-year Malaysia Plan;
- funds accrued from savings made in previous years' expenditure, if any;

- .2 from the government, private sector and private individuals, in the form of grants, donations, bequests, for the conduct of research;
- .3 payments or part payments by clients for the conduct of research. The latter is applicable in the case of a joint-research programme with a company or an organisation;
- .4 profits from R & D activities;
- .5 special budget allocation from the federal government. For this purpose, a memorandum has to be submitted by ALAM to the Implementation and Co-ordination Unit [ICU] or the Economic Planning Unit [EPU], both under the Prime Minister's Department. This approach will be taken for the initial budget allocation;
- .6 through the budget allocation of the Federation of ASEAN Shipowners Association's [FASA] HRD programme⁽⁸⁾;
- .7 financial assistance provided through the various international technical aid and co-operation programme e.g. the European Community [EC], the Japan International Co-operation Agency [JICA]⁽⁹⁾;
- .8 the raising of funds through the performance of any act or acts authorised by the government or any relevant legislation pertaining to the management and operation of ALAM as an MET institution;

and through any other means as deemed fit by the management of ALAM.

NOTES & REFERENCES

1. MATES Foundation is the acronym for Maritime Training and Education for Seamen Foundation, a company limited by guarantee and not having a share capital.
2. See "Report of the Auditors to the Members of the MATES Foundation" in "ALAM's Annual Report 1989". Quote ".....granted exemption....on the grounds...that it is a charitable organisation...objective...advancement of education for the benefit of the public". p.13
3. The Universities and Colleges Act, is a legislation promulgated by the Parliament of Malaysia, empowering the establishment of the universities in the country and detailing *inter alia*, the scope and limitations of the authority, powers, functions, rights and duties of the universities re the role of these higher institutions of learning in providing the right education to the public.
4. For a comparative study, see the "Maritime College Act 1978" of the Commonwealth of Australia. This is the enabling legislation [very comprehensive] to establish the Australian Maritime College, Launceston, Tasmania, Australia.
5. Lovecy, I. (1991), "The impact on collection management of automated systems and services" in Jenkins, C. and Morley, M (ed.) (1991), *Collection Management in Academic Libraries*, Aldershot[England] and Brookfield [Vermont, USA], Gower Publishing Limited. pp.94-112.
6. *ibid.* Brill, P.B. (1991), "Co-operative collection development: progress from apotheosis to reality". See the examples of the Research Libraries Group [RLG] and the Centre for Research Libraries [CRL] which currently has a membership of more than one hundred member libraries, and the academic library programmes and network in the USA; in the United Kingdom, see also the activities of the British Library Document Supply Centre. pp.240-255. There are three well known library cataloguing system in use in the world today viz., (a) Dewey Decimal Classification [DDC]. This British oriented system uses three numerals and three letters of the author's surname; (b) The Library of Congress [LC]. This American based system is composed of letters A to Z to denote the subject area followed by numerals for the subject, and further numerals for subject extension. In addition the author's mark is also indicated. This system is more detail than (a) above and is primarily used by large university libraries or education research centres that anticipate tremendous growth in data collection; and (c) Universal Decimal Classification [UDC]. This is mainly used for research documents that require a high [more detailed] specification.
7. *ibid.* Woodward, H. (1991), "The management of serials collection". pp.164-183.
8. The ASEAN Association of Maritime Education and Training Institutions [AAMETI], of which ALAM is a member, is also an Associate Member of the Federation of ASEAN Shipowners Association [FASA]. At FASA's annual general meeting held at Kuala Lumpur on 4th December 1990, AAMETI was appointed as the FASA's project manager for the HRD in Shipping project. Starting as early as 1975, IMO, ASEAN, COTAC, FASA, ESCAP, and the UNDP have been involved with regional programmes for MET; some of the aforementioned parties were also involved in the formulation of special programmes on HRD in Shipping for the ASEAN region. See Wan Shukry, W.K., (1992) "Harmonisation of Maritime Education and Training [MET] in the ASEAN region", 7th International Conference on Maritime Education and Training, *Harmonization of Standards*, USMMA, New York, USA, 6-9 July 1992.

CHAPTER 4

CONCLUSION AND RECOMMENDATION

4.1 Summary

The world of MET is currently undergoing rapid changes in line with new demands for cost optimisation in maritime activities, particularly shipping. Some countries e.g. France, The Netherlands, USA and Japan, have realised the need for ship's personnel to be versatile not only for the purpose of operating merchant ships in a safe manner but also to appreciate that a safe and efficient operation will result in the optimisation of investment capital and operating costs for the benefit of their respective countries.

In these countries, the administration and the shipping community had also realised the urgent need for sea-going officers and shore management personnel [technical and commercial management teams] to have empathy for the roles of floating staff versus that of the shore-side team and *vice versa*, in the quest for a shipping business that will be safe, efficient and profitable. A national shipping industry that is able to achieve and maintain this *status quo*, will bring tremen-

dous economic benefits to the country. The manifestations of such benefits will take the form of *inter alia*, a positive balance of trade figures, a reduction in trade invisibles [i.e. improvement in the service sector industry related to shipping or transport related infrastructure, viz. financing, shipbuilding and repairs, marine insurance, chartering, bunkering, etc.], lower purchase prices for imported items, stable rate of employment for the ships, crew and other marine services' enterprises/organisations, etc. These benefits can then be injected into the nation's coffers to develop other sectors of industry to maintain the country's economic standing.

For a non-national shipping industry, the flag state can still reap the socio-economic benefits, if the shipping [administrative, financial and legal] environment of the country enables/able to ensure that the aforementioned objectives of the industry, i.e. safe, efficient and profitable can be achieved.

Safe shipping, will also ascertain the protection of the marine environment, not only for economic reasons, but also aesthetically warranted, so as to preserve the common heritage of mankind.

The MET institutions in Europe, and in other areas of the world, that have embarked into the multifarious activities of maritime R & D [applied research], have made contributions to technical developments, shipping safety, efficient operation and other sectors of the maritime field. Added to this, is the new knowledge gained by the MET research personnel [faculty members]; this in turn will improve the quality of the MET pro-

grammes of the institution, and the overall MET system in the country. In some cases e.g. in Contract Research, income may also be generated to the institution.

However there is one area of R & D which has not been tackled by the MET institutions, i.e. research in maritime education and training [education research]. The lack of research undertaken for this last item was mainly due to insufficient academic/research expertise available in the MET systems. This then lead to the slow pace of development in achieving quality MET. In the future, it is hoped that MET institutions will be able to address this very pertinent issue.

It is not just the port and shipping sector that stands to gain from the conduct of maritime R & D activities. This dissertation had expounded the many advantages that can be derived through R & D, in transport and other transport-related industries [service sector], tertiary education, government administration, defence and security, maritime law and public safety, amongst others.

4.2 Conclusion and Recommendations

Having said all this, it is therefore expedient and timely that ALAM, as the national MET institution of Malaysia, should be in the forefront of maritime R & D. The establishment of a R & D department at ALAM is one of the many approaches that should be adopted to develop and sustain the maritime industry in the country.

However, in the absence of legislative, financial, the appropriate infrastructure from within and outside

the academy, government, industry and the public support [not necessarily in that order]; ALAM in its present stage, will not be capable of pursuing this programme effectively.

ALAM must take the initiative to impress all relevant parties and invite the latter, especially the government to give their full and unabated support, in the academy's endeavour to materialise the establishment of a R & D department at ALAM. This can be effected primordially, by the government in particular, through the necessary legislative and administrative framework and sufficient financial contribution. Upon accomplishing this, the other parties should at a later stage, give due recognition by utilising and inviting the department to participate in any relevant research programme. It is also appropriate that the industry and any other party relevant to a particular R & D project, continue to provide full support to the department, whenever required or requested in the conduct of its activities. However, the department itself must demonstrate to the maritime industry that it is capable of conducting R & D projects. It should undertake some small projects such as course development etc. before any of the above support/recognition can be acquired.

Since a study for the establishment of an R & D department has never been made and subsequently no proposal formulated till now, this subject therefore had missed the opportunity of being included in the budget submission by ALAM for the government's consideration under the Sixth Malaysia Plan [1991-1995], it is hoped that the academy will be able to undertake a feasibility study of this project within the next two years. At the

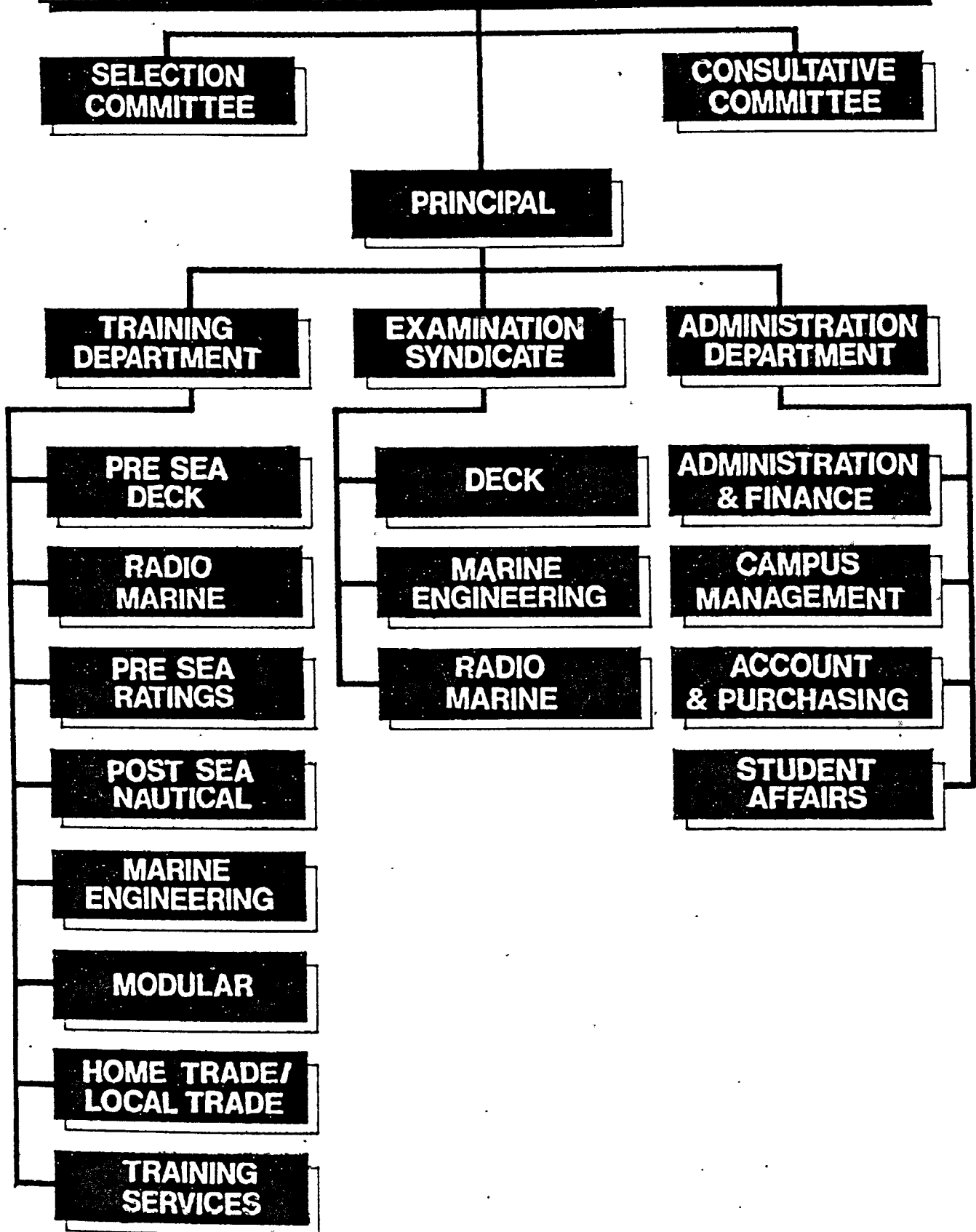
earliest opportunity, the complete proposal should then be submitted to the government, through its inclusion in the Mid-term Review of the Sixth Malaysia Plan, or for submission and consideration under the Seventh Malaysia Plan [1996-2000], at the latest.

An immediate matter that needs to be addressed in the feasibility study, is the re-organisation of ALAM's current structure. Once this has been decided, the first step that ALAM is required to take is the implementation of the HRD programme for R & D staff training and recruitment. The first research activity that the department shall undertake however, is the course design and implementation.

Later, subject to the capability of the department, it is recommended that consultancy projects should only be undertaken, two years after the department's establishment. This hopefully will enable the department to acquire the appropriate staff, qualified and properly trained, to engage in research. At this juncture, it is hoped that the necessary facilities and infrastructure will then be made available.

Once the establishment of a R & D department at ALAM is realised, an important part of the the government's crusade for "Vision 2020", and "Malaysia as a Maritime Nation", will be accomplished.

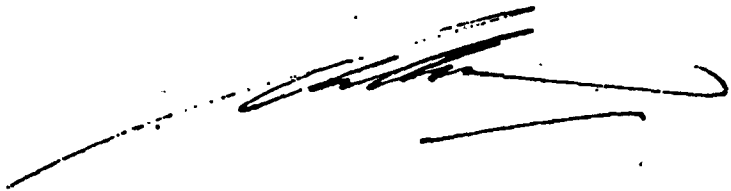
Board Of Governors MATES FOUNDATION



*The Charter
of the Maritime
Academy of Malaysia*

1. *The Maritime Academy of Malaysia is established as a component part of MATES Foundation, functioning under the control and supervision of MATES Foundation. Designed as an academy for the teaching of various aspects of professional shipping, it is primarily meant to provide employed sea-farers with additional skill in and a more advanced knowledge of their occupation.*
2. *The purpose of the establishment of the Academy is the development and the enhancement of the education and training Merchant Navy Officers and Ratings and for that purpose the Academy may —*
 - (a) *conduct professional shipping courses and examinations in connection with these courses as it may deem fit;*
 - (b) *print or publish or assist in the printing or publication of reading materials on shipping and related subjects;*
 - (c) *formulate such guidelines as may be necessary to regulate the responsibility and control of the academic and teaching staff of the Academy and the policy on the selection and admission of students and fees payable in respect of the courses of study offered by the Academy; and*
 - (d) *carry out research on shipping matters.*
3. *As the Academy does not have corporate status, any functions that are to be undertaken in relation to the objectives and purposes of the Academy, being functions that can only be undertaken by a body corporate, shall be undertaken by MATES Foundation.*
4. *There shall be two committees to assist the work of the Academy. There are —*
 - (a) *the Consultative Committee and*
 - (b) *the Selection Committee.*

5. *The Consultative Committee shall comprise persons described in Part 'A' of the Schedule to this Charter. It shall, when required by the Academy, make recommendations to the Academy on the appropriate syllabus required in respect of any course of study, the manner in which examinations in respect of any course of study, may be conducted and any other matters relating thereto.*
6. *The Selection Committee shall comprise persons described in Part 'B' of the Schedule to this Charter. It shall, when required by the Academy, make recommendations to the Academy on the manner in which students are to be selected and admitted to the Academy and the appointment of staff members of the Academy.*
7. *At the end of each course, the Academy shall issue a certificate of attendance to a student who has completed the course of study to the satisfaction of the Academy and the Academy shall recommend to the Ministry of Transport for the issuing of certificate of competency.*



**(YAB DATUK SERI DR. MAHATHIR BIN MOHAMAD,
SSDK, SPMJ, SPMS, SSAP, DP, DUPN)
Perdana Menteri Malaysia**

15hb Ogos, 1981

SCHEDULE

Part 'A'

CONSULTATIVE COMMITTEE

Policy, curriculum, training policy, research etc.

Members:-

1. Director of Marine	—	Chairman
2. Ministry of Transport	—	Member
3. MISC	—	Member
4. Ministry of Education	—	Member
5. Maritime Academy	—	Secretary

Part 'B'

SELECTION COMMITTEE

For selection of students and recruitment of professional staff.

Members:-

1. Deputy Director of Marine	—	Chairman
2. MISC	—	Member
3. Ministry of Education	—	Member
4. Public Services Department	—	Member
5. Maritime Academy	—	Secretary

**MARITIME ACADEMY MALAYSIA
TRAINING DEPARTMENT
DETAILED SCHEDULE OF COURSES - JANUARY TO DECEMBER 1992**

(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)		
SR. NO.	NAME OF COURSE	COURSE CODE	COURSE NO	COURSE DATES		TOTAL DURATION (CONTACT) IN WEEKS/DAYS	MIN/MAX CAPACITY PER SESSION	GENERAL REMARKS (IF ANY)	CLOSING DATE FOR BOOKINGS		
				(A) FROM	(B) TO						
1.0	PRE-SEA DECK CADETS	DC	25	20.5.91	18.4.92	42 WEEKS	20 - 35		AS PER ADVERTISEMENT IN NEWSPAPERS		
			26	9.9.91	15.8.92						
			27	11.5.92							
			28	7.9.92							
2.0	MARINE RADIO	RC	14	20.5.91	18.4.92	42 WEEKS	10 - 24				
			15	11.5.92							
3.0	RATINGS	DR	43	6.1.92	18.4.92	14 WEEKS	18 - 24				
	3.1 DECK RATING		44	11.5.92	15.8.92						
			45	7.9.92	12.12.92						
			3.2 ENGINE RATING	43	6.1.92					18.4.92	14 WEEKS
	44	11.5.92		15.8.92							
	45	7.9.92		12.12.92							
	3.3 CATERING RATING	CR	42	9.9.91	18.4.92	28 WEEKS	10 - 15				
			43	6.1.92	15.8.92						
			44	11.5.92	12.12.92						
			45	7.9.92							

(1) SR NO	(2) NAME OF COURSE	(3) COURSE CODE	(4) COURSE NO	(5) COURSE DATES		(6) TOTAL DURATION (CONTACT) IN WEEKS/DAYS	(7) MIN/MAX CAPACITY PER SESSION	(8) GENERAL REMARKS (IF ANY)	(9) CLOSING DATE FOR BOOKINGS
				(A) FROM	(B) TO				
4.0	PREPARATORY (NAUTICAL)	D3M	27	6.1.92	18.4.92	14 WEEKS	15 - 25	CANDIDATES ARE ADVISED TO COMPLETE ALL RELEVANT MODULAR COURSES BEFORE JOINING THE COURSE	ONE MONTH BEFORE DATE OF COMMENCEMENT OF EACH COURSE
	4.1 3RD MATE (FG)		28	11.5.92	15.8.92				
			29	7.9.92	12.12.92				
	4.2 2ND MATE (FG)	D2M	26	6.1.92	18.4.92	14 WEEKS	15 - 30		
			27	11.5.91	15.8.92				
			28	7.9.92	12.12.92				
	4.3 1ST MATE (FG)	D1M	12	6.1.92	15.8.92	28 WEEKS	10 - 30		
			13	7.9.92					
	4.4 MASTER (FG)	DMC	11	6.1.92	15.8.92	28 WEEKS	10 - 25		
			12	7.9.92	12.12.92				
	4.5 MATE (LT)	D1L	19	6.1.92	18.4.92	14 WEEKS	10 - 30		
			20	11.5.92	15.8.92				
			21	7.9.92	12.12.92				
			45	7.9.92					

(1) SR NO.	(2) NAME OF COURSE	(3) COURSE CODE	(4) COURSE NO.	(5) COURSE DATES		(6) TOTAL DURATION (CONTACT) IN WEEKS/DAYS	(7) MIN/MAX CAPACITY PER SESSION	(8) GENERAL REMARKS (IF ANY)	(9) CLOSING DATE FOR BOOKINGS
				(A) FROM	(B) TO				
	4.7 MATE (HT)	D1H	18 19 20	6.1.92 11.5.92 7.9.92	18.4.92 15.8.92 12.12.92	14 WEEKS	10 - 30	CANDIDATES ARE ADVISED TO COMPLETE ALL RELEVANT MODULAR COURSES BEFORE JOINING THE COURSE	ONE MONTH BEFORE DATE OF COMMENCEMENT OF EACH COURSE
	4.8 MASTER (HT)	DMH	20 21 22	6.1.92 11.5.92 7.9.92	18.4.92 15.8.92 12.12.92	14 WEEKS	4 - 10		
5.0	PREPARATORY (MARINE ENGG.) 5.1 2ND CLASS PART B (MOTOR)	E2B(M)	22	11.5.92	15.8.92	14 WEEKS	6 - 20		
	5.2 2ND CLASS PART B (STEAM)	E2B(S)	3	11.5.92	15.8.92	14 WEEKS	6 - 20		
	5.3 1ST CLASS PART B (MOTOR)	E1B(M)	19 20	6.1.92 7.9.92	18.4.92 12.12.92	14 WEEKS	6 - 20		
	5.4 1ST CLASS PART B (STEAM)	E1B(S)	4 5	6.1.92 7.9.92	18.4.92 12.12.92	14 WEEKS	6 - 20		
	5.5 ENGINE DRIVER CLASS III	ED III	20 21 22	6.1.92 11.5.92 7.9.92	15.2.92 20.6.92 17.10.92	6 WEEKS	15 - 30		
	5.6 ENGINE DRIVER CLASS II	ED II	20 21 22	3.2.92 8.6.92 5.10.92	4.4.92 1.8.92 28.11.92	8 WEEKS	8 - 15		
	5.7 ENGINE DRIVER CLASS I	ED I	20 21 22	3.2.92 8.6.92 5.10.92	18.4.92 15.8.92 12.12.92	10 WEEKS	8 - 15		

(1) SR. NO.	(2) NAME OF COURSE	(3) COURSE CODE	(4) COURSE NO.	(5) COURSE DATES		(6) TOTAL DURATION (CONTACT) IN WEEKS/DAYS	(7) MIN/MAX CAPACITY PER SESSION	(8) GENERAL REMARKS (IF ANY)	(9) CLOSING DATE FOR BOOKINGS		
				(A) FROM	(B) TO						
6.0	MODULAR 6.1 BASIC PERSONAL SURVIVAL AT SEA	MPS	80	27.1.92	30.1.92	4 DAYS	10 - 15	CANDIDATES SHOULD BE PHYSICALLY & MEDICALLY FIT & SHOULD BRING THEIR OVERALLS & SWIMMING TRUNKS	15 DAYS BEFORE DATE OF COMMENCEMENT OF EACH COURSE		
			81	2.3.92	5.3.92						
			82	1.6.92	4.6.92						
			83	3.8.92	6.8.92						
			84	5.10.92	8.10.92						
			85	7.12.92	10.12.92						
	6.2 BASIC FIRE- FIGHTING AT SEA	MFF	105	20.1.92	24.1.92	5 DAYS	8 - 20	CANDIDATES SHOULD BE PHYSICALLY & MEDICALLY FIT & SHOULD BRING TWO PAIRS OF OVERALLS			
			106	24.2.92	28.2.92						
			107	13.4.92	17.4.92						
			108	11.5.92	15.5.92						
			109	15.6.92	19.6.92						
			110	27.7.92	31.7.92						
			111	10.8.92	14.8.92						
			112	28.9.92	2.10.92						
	6.3 BASIC FIRST AID AT SEA	MFA	113	26.10.92	30.10.92	5 DAYS	8 - 20	CANDIDATES SHOULD BE PHYSICALLY FIT			
			114	23.11.92	27.11.92						
			111	17.2.92	21.2.92						
			112	23.3.92	27.3.92						
			113	4.5.92	8.5.92						
			114	22.6.92	26.6.92						
			115	20.7.92	24.7.92						
			116	17.8.92	21.8.92						
			117	21.9.92	25.9.92						
			118	12.10.92	16.10.92						
			119	30.11.92	4.12.92						
			120	28.12.92	1.1.93						

(1) SR. NO.	(2) NAME OF COURSE	(3) COURSE CODE	(4) COURSE NO.	(5) COURSE DATES		(6) TOTAL DURATION (CONTACT) IN WEEKS/DAYS	(7) MIN/MAX CAPACITY PER SESSION	(8) GENERAL REMARKS (IF ANY)	(9) CLOSING DATE FOR BOOKINGS		
				(A) FROM	(B) TO						
	6.4 PROFICIENCY IN SURVIVAL CRAFT	MSC	86	13.1.92	18.1.92	6 DAYS	10 - 15	MUST PRODUCE EVIDENCE OF AT LEAST 12 MONTHS SHIPBOARD SERVICE; BE PHYSICALLY & MEDICALLY FIT; SHOULD BRING SWIMMING TRUNKS & OVERALLS	15 DAYS BEFORE DATE OF COMMENCEMENT OF EACH COURSE		
			87	10.2.92	15.2.92						
			88	20.4.92	25.4.92						
			89	18.5.92	23.5.92						
			90	22.6.92	27.6.92						
			91	20.7.92	25.7.92						
			92	17.8.92	22.8.92						
			93	21.9.92	26.9.92						
			94	19.10.92	24.10.92						
			95	16.11.92	21.11.92						
	96	14.12.92	19.12.92								
	6.5 RADIO TELEPHONY RESTRICTED	MRT	95	6.1.92	10.1.92	5 DAYS	5 - 15	CANDIDATES SHOULD BE PHYSICALLY FIT WITH NO DEAFNESS OR IMPEDIMENT OF SPEECH & HAVE NORMAL COLOUR VISION. '3 PASSPORT SIZE PHOTOS TO BE SUBMITTED TOGETHER WITH REG.FORM			
			96	17.2.92	21.2.92						
			97	9.3.92	13.3.92						
			98	13.4.92	17.4.92						
			99	25.5.92	29.5.92						
			100	13.7.92	17.7.92						
			101	3.8.92	7.8.92						
			102	14.9.92	18.9.92						
			103	5.10.92	9.10.92						
			104	2.11.92	6.11.92						
	105	7.12.92	11.12.92								
	6.6 RADAR OBSERVERS	MRB	47	17.2.92	7.3.92	3 WEEKS	10 - 15	MUST PRODUCE EVIDENCE OF AT LEAST 12 MONTHS SHIPBOARD SERVICE IN THE DECK DEPT.			
			48	8.6.92	27.6.92						
49			20.7.92	8.8.92							
50			2.11.92	21.11.92							

(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)
SR. NO.	NAME OF COURSE	COURSE CODE	COURSE NO.	COURSE	DATES	TOTAL DURATION (CONTACT) IN WEEKS/DAYS	MIN/MAX CAPACITY PER SESSION	GENERAL REMARKS (IF ANY)	CLOSING DATE FOR BOOKINGS
				(A) FROM	(B) TO				
	6.7 ELECTRONIC NAV. AIDS (OPERATION)	MNA	50	13.1.92	2.2.92	3 WEEKS	8 - 12	MUST PRODUCE EVIDENCE OF AT LEAST 12 MONTHS SHIPBOARD SERVICE IN THE DECK DEPT.	15 DAYS BEFORE DATE OF COMMENCEMENT OF EACH COURSE
			51	9.3.92	28.3.92				
			52	29.6.92	18.7.92				
			53	12.10.92	31.10.92				
			54	23.11.92	12.12.92				
	6.8 RADAR OPERATOR	MRP	25	11.5.92	23.5.92	2 WEEKS	10 - 15		
			26	7.9.92	19.9.92				
	6.9 SHIP CAPTAIN'S MEDICAL TRAINING	MSM	41	20.4.92	2.5.92	2 WEEKS	6 - 10	MUST POSSESS A VALID BASIC FIRST AID AT SEA CERT. (OR EQUIVALENT)	
			42	24.8.92	5.9.92				
			43	12.12.92	26.12.92				
	6.10 RADAR SIMULATOR	MRS	23	27.4.92	1.5.92	5 DAYS	6 - 12	MUST POSSESS A VALID RADAR OBS.CERT. & PRODUCE EVIDENCE OF AT LEAST 12 MTHS SERVICE AS A DECK WATCHKEEPING OFFICER	
			24	1.9.92	5.9.92				
			25	28.12.92	1.1.93				
	6.11 SHIPBOARD MANAGEMENT	MMG	3	4.5.92	8.5.92	5 DAYS	10 - 20	HAVE HAD SERVICE AS A SHIP WATCHKEEPING OFFICER	
			4	17.8.92	21.8.92				
			5	14.12.92	18.12.92				
	6.12 OIL TANKER FAMILIARISATION	MOF	5	20.4.92	25.4.92	5 DAYS	10 - 20	MUST POSSESS A VALID BASIC FIRE-FIGHTING AT SEA CERT.	
			6	24.8.92	29.8.92				
			7	21.12.92	26.12.92				

(1) SR. NO.	(2) NAME OF COURSE	(3) COURSE CODE	(4) COURSE NO.	(5) COURSE DATES		(6) TOTAL DURATION (CONTACT) IN WEEKS/DAYS	(7) MIN/MAX CAPACITY PER SESSION	(8) GENERAL REMARKS (IF ANY)	(9) CLOSING DATE FOR BOOKINGS
				(A) FROM	(B) TO				
	6.13 ELECTRIC ARC MAINTENANCE WELDING	MMW	7	6.1.92	10.1.92	5 DAYS	6 - 8	HAVE PREVIOUS EXPERIENCE IN ELECTRIC ARC WELDING & MAINTENANCE WORK	15 DAYS BEFORE DATE OF COMMENCEMENT OF EACH COURSE
			8	13.4.92	17.4.92				
			9	11.5.92	15.5.92				
			10	10.8.92	14.8.92				
			11	7.9.92	11.9.92				
			12	7.12.92	11.12.92				
	6.14 WATCHKEEPERS (CLASS 4)	MEW	4	17.2.92	21.2.92	5 DAYS	6 - 30	POSSESS A DIP.IN MAR.ENGG. FROM PUO OR OTHER APPROVED INSTITUTIONS & COMPLETED THE QUALIFYING SEA SERVICE OF 6 MONTHS	
			5	25.5.92	29.5.92				
			6	19.10.92	23.10.92				

NOTE :

- (I) The 'General Remarks' given in column (8) are intended as a very general guideline. Full details of the courses, entry requirements, accommodation, application forms etc. are available from the Academy's Students Affair Section.
- (II) The Academy reserves the right to amend the above schedule if deemed necessary.
- (III) Additional course(s) can be considered if circumstances permit, and the Sponsor is able to book maximum number of persons required for the relevant course(s).
- (IV) All bookings should be made using the prescribed Application forms.

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