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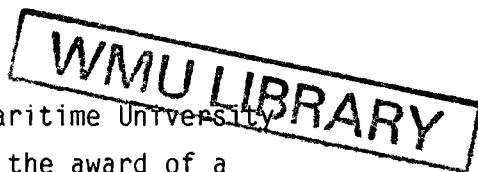
WORLD MARITIME UNIVERSITY
MALMÖ, SWEDEN

AN EXTENDED MARITIME EDUCATION AND TRAINING CONCEPT
AS A NECESSARY RESPONSE TO CHANGES IN THE SHIPPING
INDUSTRY AND SOCIAL ENVIRONMENT

by

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Portugal



A paper submitted to the Faculty of the World Maritime University
in partial satisfaction of the requirements for the award of a

MASTER OF SCIENCE DEGREE
in
MARITIME EDUCATION AND TRAINING (NAUTICAL).

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

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**AN EXTENDED MARITIME EDUCATION AND TRAINING CONCEPT
AS A NECESSARY RESPONSE TO CHANGES IN THE SHIPPING
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TABLE OF CONTENTS

	<u>Page No.</u>
ACKNOWLEDGEMENTS	ii
ABSTRACT.....	01
CHAPTER ONE THE EXISTING SCENARIO ON MARITIME EDUCATION AND TRAINING (MET).....	02
CHAPTER TWO CHANGES IN THE MARITIME INDUSTRY (WITH IMPACT ON MARITIME EDUCATION AND TRAINING SYSTEMS).....	11
CHAPTER THREE CHANGES IN SOCIAL AND SOCIETAL FACTORS AND DEMANDS ON MARITIME EDUCATION AND TRAINING (MET) SYSTEMS.....	31
CHAPTER FOUR CONCLUSIONS - PART ONE THE EXTENDED MARITIME AND TRAINING SYSTEM (CONCEPTUAL GUIDELINES).....	45
CHAPTER FIVE CONCLUSIONS - PART TWO THE NEED FOR HARMONIZATION OF MARITIME EDUCATION AND TRAINING (MET) SYSTEMS IN THE EUROPEAN ECONOMIC COMMUNITY (EEC)..	85
BIBLIOGRAPHY	109

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A B S T R A C T

Most existing Maritime Education and Training (MET) Systems have difficulties to cope with the new demands (**Chapter One**), stemming from the changes in the industry (**Chapter Two**) and from new social and societal factors (**Chapter Three**).

This results in the near crisis situation that MET Systems and Institutions are facing throughout the world, in general and with particular relevance in Western Europe where schools are closing down and the number of candidates to MET drops sharply. Up till now, the different counter strategies developed have not been efficient. The author sustains that the main reason for the failure lies in the fact that, although these new counter strategies are different in their outer shape, they are embodied and built over the same, externally induced, basic and outdated philosophy.

But will it be possible to design and build a system, flexible enough to answer the integrated social and industrial demands, stemming from the changing environment (**Chapter Three**)?

A possible answer is given in the conclusions, where:

- An "Extended Maritime Education and Training (EMET) System" concept is introduced (**Chapter Four**),
- A specific new problem - Training of Dual Purpose Officers (DPO) - is discussed and dealt with, under the EMET concept (**Chapter Four**), and
- The need for Harmonization of MET Systems and their output careers in the European Economic Community (EEC) is discussed and some measures are proposed (**Chapter Five**).

CHAPTER ONE

THE EXISTING SCENARIO ON MARITIME EDUCATION AND TRAINING (MET)

The aim of this chapter is to provide an overall view of the present situation in the MET area. Particular stress will be given to the situation in the Western European Countries that are part of the European Economic Community (EEC).

The main reasons for this approach stem from the following factors:

- the EEC countries are traditional maritime nations with a long historical past and background on MET,
- the majority of the worldwide existing systems are based on and can be traced back to the systems existing in this set of countries (1), and
- at the moment, the MET Systems in the EEC countries are facing both a threat and a challenge. The strategies used to fight against the threat and answer the challenge may contain relevant lessons for other systems.

It was referred that MET systems in the EEC are facing both a threat and a challenge and it seems important to identify those. Whereas the challenge stems from the foreseen common and single labour market that will take place, in those countries, in 1993, the threat results from overcapacity of the existing MET institutions which is partly due to the crisis in the EEC shipping industry (2), and partly due to the sharp drop in the number of candidates for MET in

(1) Waters D.M., Principal - Australian Maritime College, Visiting Professor World Maritime University (WMU). WMU textbook on "Maritime Education and Training Policy Objectives and Practical Considerations", 1989, pp 31 and 32.

(2) Technology and Manning for Safe Ship Operations in the 1990's, Liverpool Polytechnic, Plymouth Polytechnic and other U.K. Colleges, November 1986, Vol. 1, p. 15 (lines 1-9).

EEC (1).

From the aforementioned situation it is concluded that MET systems in the EEC are not coping with the new demands resulting from changes in the shipping industry and changes in the social environment. Yet, for centuries, those countries have produced one of the best trained and educated group of seafarers in the world and, at present, have one of the best MET infrastructure available e.g. knowledge, equipment and research facilities.

A striking fact is that this "near crisis" situation seems to affect, from a qualitative point of view, almost identically, every country concerned, in spite of the major and wide external differences among their shipping industry and MET Systems and policies.

The differences in the shipping industry are mainly quantitative. It can be stated that the present crisis results, on a larger or smaller scale, from the same causes, e.g. flagging-out, increased competition from flags of convenience, Eastern Block countries and Developing countries' fleets (this issue will be expanded in Chapter Two). The external shapes and concepts that characterize the different EEC countries MET Systems vary so widely that one may be led to think that there is no further solution left, unless one common crisis inducing factor exists.

Nevertheless, it seems very difficult to find such a common factor or concept among systems in which, namely the following fundamental parameters, differ so widely:

- type of entrance requirements: from "front entrance", e.g. Belgium, France, Portugal, to "hawse-pipe", e.g. Denmark and FRG, systems,

(1) Zade, G., Vice Rector and Academic Dean, World Maritime University, paper on "The Training of Merchant Marine Officers - what challenges have been and have to be met", presented at conference "1993: Une Chance Pour l'Officier de la Marine Marchande Francais" at Ecole Nationale de la Marine Marchande, Le Havre, France 16-17 February 1989, p. 9 (2.3).

- level of entrance requirements: ranging from the highest secondary education level (the same as for university), e.g. France and Portugal, to medium secondary education level, e.g. Italy,
- type of MET, ranging from "sandwich" systems, e.g. France, to "front-ended" types, e.g. Portugal.
- duration of theoretical studies, ranging from three to four years, in general,
- type of MET Institutions: from central government type, e.g. France, to federation state type, e.g. Federal Republic of Germany and private type, depending from sponsorship of shipping companies, e.g. United Kingdom,

BSc.

- type of academic achievement and integration in the national system of education, e.g. FRG schools are integrated in the national system of education and grant BSc degrees, whereas others are not integrated and do not offer any academic degree, e.g. Greece, and
- type of career: monovalent, e.g. Belgium, Portugal, Spain, semi-bivalent or fully bivalent, e.g. the Netherlands, France.

The set of differences among the systems could be expanded but it is out of the scope of this chapter (for further readings see Zade, G., "The Training of Merchant Marine Officers - what challenges have been and have to be met" (1)). Nevertheless, from the aforementioned it is clear that the existing MET systems in the EEC are different in quite a considerable number of fundamental parameters and yet all failed, up till now, to provide an effective answer to the continuous reduction of attraction of suitable candidates to MET and

(1) Zade G., Paper on "The Training of Merchant Marine Officers - what challenges have been and have to be met" presented at Conference "1993: Une Chance Pour l'Officier de la Marine Marchande Francais" at Ecole Nationale de la Marine Marchande, Le Havre, France 16-17 February 1989.

towards the creation of a "know-how" advantage that EC shipping industry requires, to be competitive.

In addition, the decrease in demand of officers due to the direct influence of the "crisis" in the EEC shipping industry, has been overtaken by a decrease in the number of candidates to MET (1).

That is to say that schools cannot provide the industry with the number of officers that the latter demands, because there are not enough applicants for the MET Institutions. Therefore, the reason for the crisis in MET does not depend exclusively and directly from the crisis in the industry but from other reasons as well.

Although the global MET System in EEC contains positive approaches, no single system is composed by positive sides only. At the present stage, every system is composed of "bits and pieces" some reflecting new philosophies, others maintaining outdated concepts. It is at this stage, that we may identify one single outdated but leading concept that is common to all systems. We refer to the old concept whereby MET must be sea oriented only and depend exclusively from the shipping industry. In some extreme cases, one of the roles of the entire MET is to lure candidates into a type of closed system that is virtually impossible to abandon without suffering important social damages. This concept is probably as old as MET itself and albeit it never prevented drop out from sea (2), it is still in use. Outdated and totally apart from the new social reality, it still embodies the overall philosophy of the existing MET Systems in the EEC. The author further considers that, the maintenance of this concept is, at present, the major contributing factor that leads suitable candidates to refrain from engaging in the MET. Additionally, it prevents major reforms in the MET systems that could

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- (1) Zade, G., Paper on "The Need for Harmonization of Training Schemes and Standards in Western Europe", presented at Conference "Maritime Training Forum Europe's 89", Amsterdam, the Netherlands, 20-22 June 1989, p. 9
 - (2) Hill, J.M.M., "The Seafaring Career", Centre for Applied Social Research, the Tavistock Institute of Human Relations, 1972, pp 26-27.

decrease the effects of the existing crisis if not to solve it.

The maintenance of this concept prevents development and therefore prevents the shipping industry from getting the well trained manpower that could contribute to a "know how" solution in the search for comparative advantages in shipping. Fortunately most EC ship-owners still prefer the use of qualified manpower (1) to the use of low quality, but cheaper, labour.

It seems also important to stress that although some EC MET systems and many national reports and proceedings of international conferences point towards a different concept of MET that allow for:

- the preparation for a future shore career in the infrastructure of the maritime transport system, e.g. France and Federal Republic of Germany,
- the integration of MET in the national educational system at the level of higher education, e.g. the Netherlands and Federal Republic of Germany,
- the awarding of academic degrees together with the certificate of competency, e.g. Belgium and Federal Republic of Germany, and
- the official recognition that the seagoing career is, in average, for medium term stayers.

The fact is that, whereas in some countries the measures are already adopted or intended, fail to produce the desired effect and face difficulties to be fully implemented. In other countries, those newly intended characteristics completely fail to come into practice. In all cases the only common factor, seems to be, that if these new characteristics were taken to their full extent, they

(1) Technology and Manning for Safe Ship Operations in the 1990's, Liverpool Polytechnic, Plymouth Polytechnic and other U.K. Colleges, November 1986, Vol. 1, p. 15 (lines 10-12).

would go against the above referred concept of "training for sea careers only".

The odd thing about this entire situation is that in many EEC countries, there is no such a thing as higher educational courses preparing for the infrastructure of the maritime transport system, neither for top nor for middle levels of management, administration or technical areas. Other countries cover only limited levels and/or areas, but seldom, if ever, using the MET Institutions.

In fact, many companies, either directly involved in sea transport operations, e.g. shipping companies, or directly related, e.g. marine insurance brokers or port operators, are managed by staff that although required to possess an academic degree, as entrance requirement may have an education background, that has no bearing whatsoever with transport in general or maritime transport in particular. This staff, although prepared for general tasks through education on methodological and/or technical subjects, at the beginning has no knowledge of either environmental or applied technical subjects related to the sector.

In addition, even technical staff coming from a seagoing career to work ashore has, in general, no specific education for this new career, mainly lacking of knowledge on methodological and environmental subjects.

MET institutions that provide comprehensive educational facilities at this higher level of education are rare in the EEC.

Therefore, one may conclude that in many EEC countries, leading management, administration and technical staff is not educated and trained for the specific job demands in the maritime transport system. The tradition has been to learn from experience only, which may be a costly and sometimes dangerous method of learning.

Nevertheless, it seems clear that better educated management, administration and technical staff, would have a major qualitative impact in the efficiency and safety of operation of the overall infrastructure of the maritime transport system. Educating in shipping human resources for shipping at all levels, is, as Professor Frankel points out (1) to developing countries, a corner stone for the development of shipping. Unfortunately, this sound principle, is not applied either in some EEC countries.

While MET Institutions are facing overcapacity problems, no adequate training is being provided for shore based jobs in the maritime transport industry. Although, somewhat odd, this situation - whereby schools with vocational capability to provide training, not only do not provide it but face overcapacity problems as well - exists and cannot be explained, unless we recall the old rule whereby MET is supposed to educate and train for sea careers only and MET institutions are supposed to be too specific to engage in other levels or types of education.

Nevertheless, the referred concept is in reality rather an inherited historical concept than a demand stemming from the present situation in the shipping industry (as it will be seen in the following chapters). Exception is made to those systems where shipowners sponsor directly the MET institutions. They represent only a minority among EEC countries.

The awareness of the "blind alley" consequences of a MET concept based on "training for sea careers only", has led specialists in the MET field, in general, to point the direction of the necessary changes towards a more "academic approach", rather than to the carrying on or deepening of the aforementioned concept and the

(1) Frankel, E.G., Professor, Massachusetts Institute of Technology - USA, Visiting Professor World Maritime University, Malmö, Sweden, paper "Changes in the Shipping Environments in Developing Countries Toward the year 2000" - Seoul, 1988, conference proceedings, p. 192 (n .6.).

restricted vocational view it represents.

Implementation steps of this different approach are urgently required. In fact, and although not dramatic, the situation of EEC's MET is far from promising.

The closing down of maritime academies has already produced negative consequences, namely in the teaching staff and in the available equipment. Recruitment of teaching staff has either been reduced or completely stopped and as a consequence the average age of the faculty members increases and no school or opportunities exist for new teachers (1).

Furthermore, one academy with a reduced number of students can hardly cope with the high costs "per capita" that the purchase of sophisticated new equipment, necessary to train officers for the new technologies, implies. Therefore, such investment will, in general, either be postponed or not made.

The result of the aforementioned decaying process will be a reduction in the quality of the standards of education and training and unless this trend is stopped, EEC may soon attain a lower level of MET than some of the developing countries, namely those belonging to the newly industrialized economies.

Accordingly, the lower quality or non-existence of appropriate staff and the impossibility of training with sophisticated equipments for high technology ships, will cause negative impacts on the:

- competitiveness of the EEC shipping industry,

(1) Zade, G., Vice Rector and Academic Dean, World Maritime University, paper on "The Training of Merchant Marine Officers - what challenges have been and have to be met", presented at conference "1993: Une Chance Pour l'Officier de la Marine Marchande Francais" at Ecole Nationale de la Marine Marchande, Le Havre, France 16-17 February 1989, p. 9 (2.3).

- competitiveness and standards of operation of the infrastructure of the maritime transport system, and
- the global safety of operation and the protection of the environment.

A concluding remark to this chapter is that MET in the EEC must be upgraded. The required upgrading process will not result, if it applies only to the partial improvement of existing contents. Instead, a new philosophy of MET, able to meet the new demands of the environment, is required.

CHAPTER TWO

CHANGES IN THE MARITIME INDUSTRY (WITH IMPACT ON MARITIME EDUCATION AND TRAINING SYSTEMS)

Introduction: In this chapter, the changes that took place (during the last two decades) in the shipping industry with a relevant impact on the Maritime Education and Training Systems, are discussed. Particular emphasis is given to the European Community Shipping Industry.

The method of approach used can be represented through the following diagram.

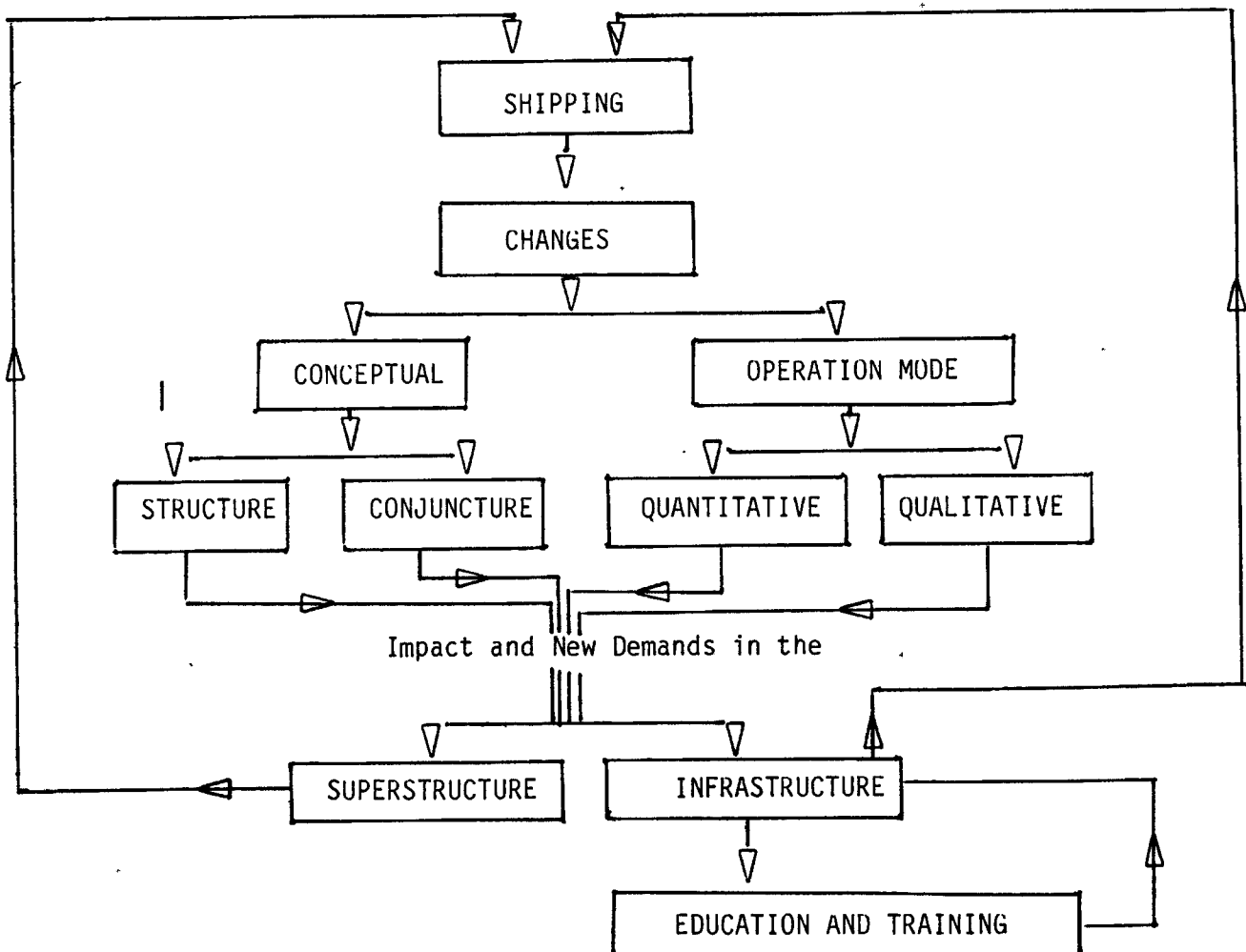


FIGURE 2.1

1. "Shipping is no more an independent and isolated industry..... Intermodal transport has reduced the weight and importance of particularities in shipping which made this part of the transport industry so special"
Professor Günther Zade, Vice Rector and Academic Dean, World Maritime University - Paper "The Training of Merchant Marine Officers - what challenges have been and have to be met?" Le Havre, 1989.
2. "It has often been stated that the structure of the shipping industry and the role of shipping companies are expected to change dramatically:
 - shipping companies will merge with other transportation companies to establish highly integrated transport systems from the source to the customer..."
Dr. Rolf Stuchey, Professor, Director, Institute of Shipping Economics and Logistics, Bremen, Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" Seoul, 1988.
3. "Shipping policies may helpfully be discussed within the standard framework of economics than as something special"
Dr. Richard Goss, Professor, Department of Maritime Studies University of Wales, U.K. - Paper "World Shipping to the Year 2000" Seoul, 1988.
4. "The old (outdated) ideas of shipping being a cyclical industry with supply and demand sooner or later coming into balance are gone. The old corrective mechanisms no longer work..."
Professor David Moreby, Ex.C., Ph.D., Institute of Maritime Studies, Plymouth Polytechnic - Paper "Emerging Trends in Manning and Training in the UK" 1988.

While it is commonly and widely accepted that the maritime industry changed in the last decades. How and how much its main parameters changed, remains one of the most important factor of analysis for the study of the new demands of the shipping industry with relevant impact on the Maritime Education/Training/Certification policies.

As far as the characteristics of the industry are concerned two main parameters emerge:

- .1 - the concept (or philosophy) of shipping
- .2 - the operation mode (how the industry operates)

2.1 Regarding the change in the concept of the industry it may be approached by distinguishing between:

- the conjunctural changes
- the structural changes

- .1 Conjunctural Changes - referring to the short/medium term effects caused by a limited life time change in the surrounding environment (e.g. short period oil crisis/boom or in a specific market like dry bulk). Those changes are not likely to affect permanently the very nature of the industry, unless their life span is very long. They normally demand only limited counter-strategies.
- .2 Structural Changes - referring to the very notion of shipping and the way it influences and is determined by its working environment.

Shipping is a service. An international service that in order to survive must meet the demands of its working environment - world trade.

The concept, extent and terms of international trade changed drastically after the Second World War, determined by considerable political changes and consequent reorganization of the pattern of international trade (geographical trading areas plus type of commodities traded).

While it is far beyond the scope of this thesis to try to define extensively these changes, it is nevertheless important to point-out some of these that produced modifications in the structure and concept of the shipping industry.

Whereas the shipping industry used to be the most important "basis for conquest and economic dominance" (1), and the corner stone for world trade, dictating the terms and pattern of trade, because world trade consisted almost exclusively of the world seaborne trade (both in quantity and value of the type of goods carried). The actual situation is entirely different, mainly due to the end of the oligopolistic or monopolistic type of transport market situations, caused by:

- changes in the political and economical relations between the countries of the world (decline of flag protection, reserved trading areas, colonialism, etc.),
- competition within the shipping industry itself (over-capacity, new flags and fleets, lower freight rates),
- competition with other modes of transport (rail, road, etc.)

All these events led to an increased power of the users of the services industry that shipping is. Other types of events, like the rationalization of the transport chain (e.g. containerization, door-to-door services, land-bridges, pipe-lines, etc.) cumulated with local and conjunctural crises and affected considerably the transport of goods by sea. The same happened with the competition of other modes of transport (mainly air and fast train services) concerning the trade and transport of high value manufactured goods (fast train services may also threaten the transport of containers within

(1) Frankel, E.G., Professor, Massachusetts Institute of Technology - USA, Visiting Professor WMU, Malmö, Sweden - Paper "Changes in the Shipping Environments in Developing Countries Toward the Year 2000" - Seoul, 1988, proceedings of conference, page 170.

larger geographical regions, e.g. European mainland).

In short, all the aforementioned factors led to the establishment of a different role and concept of the shipping industry which was not defining anymore the global transport chain (the global logistics system) but being determined by it instead or, at least, seen under that perspective. This new view defines the structural change in the shipping industry, from the conceptual point of view.

Conclusions:

- While retaining a fundamental role in the world's economic and social development due to its participation in the world's trade (roughly 85% is seaborne), the shipping industry is not setting the scenario anymore, but becoming a part of it, instead, which means that shipping must be regarded as a part of the global transport system.
- As a result of this new reality and of the consequent need to adapt and meet the new demands, a variety of changes occurred on the mode of operation of the shipping industry.

2.2 MODE OF OPERATION

Changes of two different types (with different consequences) occurred:

- .1 - quantitative
- .2 - qualitative

.1 Quantitative Changes - if we concentrate on the last decades, we may observe that:

- The World Fleet increased in size from approximately 300 million DWT (1970) to 600 million DWT (forecasted 1989), with large fluctuations and a peak in 1983 (1).

(1) Fearnleys Review 1988, January 1989, p. 3, Graph 2.

- The World Seaborne Trade increased from around 2500 million tons (1970) to roughly 4000 million tons (estimated 1990) (1).
- The Tonnage Balance shows a trend to an even balance by 1990. Overcapacity of transport will probably disappear by then (2).

Some conclusions that may be drawn from the aforementioned data are the following:

1. There is a very close relationship between World Trade, World Seaborne Trade and World Fleet as far as quantity is concerned.
2. There was an overall growth of the three aforementioned indicators.
3. The quantity/type of commodities carried and therefore the type/number of ships required, varies largely; e.g. whilst there is a maximum quantity increase in "coal" and "non-specific commodities" there is a maximum fluctuation in "crude oil" (3).

- .2 Qualitative Changes - changes of this type that took place are so comprehensive and complex that in order to analyse its consequences a more systematic approach is required.

According to its relevance, for the scope of this thesis, the main changes are classified in the following areas:

(1) Fearnleys Review 1988, January 1989, p. 4, Graph 4.

(2) Ibidem (1), p. 6, Graph 5.

(3) Ibidem (1), pp 4, 5 and 28.

- .1 - New Concepts of Operational Practices in Shipping
- .2 - Technological Advances
- .3 - New Concepts of Management Practices in Shipping

.1 New Concepts of Operational Practices in Shipping:

- Ships became more specialized allowing for more efficient operations and the number of specialized ships increases constantly, e.g. all dedicated ships like container and car carriers, Ro/Ro vessels, etc. (1)
- Ship operations became more mechanized and the same type of developments occurred in port cargo handling operations, both resulting in overall transport operation increased efficiency.
- A considerable share of the shipping industry became involved in the door-to-door concept of transport, a step towards an integrated global system of transport, while the remaining share was also largely affected by the increased rationalization of the global logistic system.

.2 Technological Innovation:

A vast array of new technology was available, ranging from handy size computers to satellites, allowing for a host of on board uses, covering, virtually, every sector of the ship/shipping company/shipping infrastructure.

The full range of utilisation of those technological products extended, from communications and data processing systems (e.g. GMDSS, INMARSAT,

(1) Shipping Statistics Yearbook 1988, Institute of Shipping Economics and Logistics (ISL), Bremen, p. 20.

NAVTEX), to automation and control of the ship, ship's stability and strength, loading operations, navigation and collision avoidance, propulsion and engine efficiency and, in general, shipboard management. Therefore, ships were fitted with, either the full range (not very many) or only part of the "high-tech" equipments available.

Applied research projects on "high-tech" ships for the future, were developed by several industrialized maritime interested countries (such as: FRG, Japan and Norway), some of them looking forward to a simultaneously specialized and flexible ship, as far as the type of cargoes were concerned (e.g. Norwegian owned "PROBOS" already in operation), but all, in general, looking forward to the increased efficiency/reduced cost or higher revenues of the ship operation.

A 1986 research project, sponsored by the Department of Transport - UK (1), discloses major technological impacts as taking place in the following main ship's areas:

Navigation/Cargo Operations/Engineering/Hotel and Catering Services/Communication and Information Technology/Management/Seamanship and Emergency Equipment. Dr. Goss referring to this subject stresses specifically the major impact of "information technology and electronic data interchange" (2).

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- (1) "Technology and Manning for Safe Ship Operations in the 1990's", Liverpool Polytechnic, Plymouth Polytechnic and other U.K. Colleges, November 1986, pp 25-28, Volume I and pp 100-110, Volume II.
 - (2) Goss, R.O., Professor, Department of Maritime Studies, University of Wales, U.K. - Paper "World Shipping to the Year 2000" - Seoul, 1988, pp 11, 13, proceedings of the conference.

.3 New Concepts of Management Practices in Shipping:

Shipowners faced with a changing universe and a ferocious competition, adopted drastic survival strategies that were embodied in new ship management practices.

Flagging-out to Flags of Convenience (FOC), new manning policies, ship-board management, open and off-shore registries and the replacement of the traditional shipowner by a trinity: shipowner - ship operator - ship manager; were some of the adopted counter strategies that changed the face of the shipping world dramatically.

Whether those practices were the best or socially acceptable or even safe, is not relevant now, the fact is that they actually took place and shaped a new shipping reality. This drastic change, in the infrastructure, took place during so much time that generated long term effects which induced changes in the superstructure as a feed-back effect. Therefore it is not possible, nowadays, to look into the industry and ignore them, unless at one's risk and peril.

Long past are gone the "good old days" of the well known and established in the trade huge ship-owner of the liner trades and of the all-powerful shipping conferences.

The last shipping giants face the choice of either growing up to a more flexible but also demanding role of "chain-of-transport operator" or crumble down to mere chartered parts of that chain-of-transport. Furthermore, today, either transport companies or other enterprises without any previous relationship with the maritime industry,

are owners of shipping companies. Tomorrow will, probably, be the day of the all powerful "chain of transport" conferences.

In conclusion it could be said that some of the more relevant worldwide trends and characteristics of the shipping industry are as follows:

- Shipping is still the principal transport mode used for international trade with well over 92% of the volume and 81% of the value of transported goods in international trade (1).
- Quantitative changes in the shipping industry followed, in general, the trend of world seaborne trade which followed world trade and economic production results as the overall growth of world trade, world seaborne trade and world fleet, in the last two decades.
- Qualitative changes resulted mainly from shipping becoming part of an overall chain of transport.
- The required increased efficiency in the maritime transport operations resulted in the need for more mechanized ship and port cargo handling operations.
- Ships become more specialized and new technologies were introduced, from these the major impact resulted in the use of information technology and electronic data processing and interchange (2), that is to say "knowledge engineering" (3).

(1) Frankel, E.G., Professor, Massachusetts Institute of Technology - USA, Visiting Professor WMU, Malmö, Sweden - Paper "Changes in the Shipping Environments in Developing Countries Toward the Year 2000" - Seoul, 1988, conference proceedings, p. 174 (lines 15-19).

(2) "Technology and Manning for Safe Ship Operations in 1990's", Liverpool Polytechnic, Plymouth Polytechnic and other UK Colleges, November 1986, Volume I, p. 37.

(3) McPherson, P./Knight, A./Liasides, C. - Paper "The Impact of Technology on Fleet Management Systems", Transimare (C), Volume 99, Conference 2, p. 19 (lines 23-30).

- Flagging-out to open registries or flags of convenience produced a considerable impact on the shipping scenario of both developed and developing countries.
- The need to cope with the changing environment force ship-owners to an increased use of counter strategies that include both flexibility and wider resilience of management (1). Those counter strategies have considerable impact both on shore based and on board organization.

2.3 ECONOMIC EUROPEAN COMMUNITY (EEC):

"The shipping policy of the EC reflects the structural changes in World Trade, World Shipping and the structural decline of European Shipping as a high labour cost industry", Dr. Rolf W. Stuchtey (2).

After looking, briefly, at the worldwide situation with special necessary emphasis on "developing countries", it is necessary to look into the "developed countries" situation. A thorough analysis should go deep and consider the entire set of OECD member states, however for the purpose and scope of this thesis, a general view into a specific group of OECD's member states is particularly relevant - the Western European countries members of the EEC.

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- (1) Goss, R.O., Professor, Department of Maritime Studies, University of Wales, U.K. - Paper "World Shipping to the Year 2000" - Seoul, 1988, proceedings of the conference, p. 2 (lines 20-27) and p. 21 (lines 6-12).
 - (2) Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, conference proceedings, p. 97 (IV).

.1 Importance and General Objective of the EEC:

As Dr. R. Stuchtey stresses "today there are three main economic blocs in the world: North America, Western Europe and the Pacific area..." (1)

This vast integrated market that has an enormous influence on world's trade has, as long term objective and guiding principle the formation of a modern Europe aiming at the creation of favourable conditions for the industry and the welfare of European people.

.2 Composition:

The European Community is composed by 12 member states - Belgium, Denmark, France, Germany (Federal Republic of), Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain and the United Kingdom; all of them Western European States and geographically distributed over the north, center and south of Europe, covering a wide maritime strategic zone from the Baltic, North Sea and Atlantic Ocean to the Mediterranean basin. Three of these countries have no direct land access to the other countries of the Community: Greece, Ireland and the United Kingdom; from which the mainland of two is an Island (Ireland and United Kingdom). Smaller islands and archipelagos, both far apart or close by the mainland, are also part of the territory of member states as e.g. France, Greece and Portugal.

(1) Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, conference proceedings, p.91.

.3 Trade

The following EEC's characteristics are particularly relevant:

- produces nearly 33% of total world exports, whereas USA 15%, Japan 9%, all developing countries 23% and Eastern Bloc countries 11%,
- nearly 75% of its exports are manufactured goods and to a larger share high technology products as e.g., machinery, engineering products, telecommunication equipments, motor vehicles and airplanes. European "high-tech" exports represent 34% of all electronic products, 42% of automatic data processing equipments, 31% of telecommunications equipment and 40% of business electronics,
- is the world's biggest import region. It represents up till 31% of world imports, 20% of the community imports consist of fuels and 60% on manufactured goods,
- from 1963 to 1985 its international trade increased more than 1,000%,
- and in the same period its intra-regional trade within the community grew more than 1,200%.

The aforementioned data (1) leads to the conclusion that today EEC is:

- the world's largest integrated market,
- the world's largest international market, and
- by becoming, more and more, a unified economic area, is forming a basis for long-term international trade strategy (2).

(1) EEC - Commission and Council - various documents.

(2) Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, p. 105.

.3.1 Characteristics of EEC's Seaborne Trade

A large trade market of this type must generate a large seaborne trade both international and inter-communitary. In fact seaborne trade represents:

- 85-90% of the EEC international trade,
- 25-30% of intra-EEC trade,
- a, nearly, 9 billion USD contribution to the community balance of payments.

.4 EEC Fleet

A demand for seaborne trade of this magnitude would usually generate a correspondent high magnitude own fleet. Nevertheless, not only EEC own fleet does not meet that expected magnitude as well as it is declining in opposition to the growth trend of EEC trade and its seaborne trade.

.4.1 Quantitative Characteristics on EEC's Fleet

As it may be seen from the following statistical data, in 1975 the EEC fleet represented 30.2% of world fleet (with 103.2 million tons gross) (1) against 16.4% (with 62.2 million tons gross) in 1988 (2) and (3). This means that not only the world's fleet is increasing faster than EEC's, but that the absolute values of the EEC fleet (in GRT) are decreasing steeply.

(1) Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, p. 93, Table 2.

(2) Lloyd's Register of Shipping Statistical Table, 1988, p. 3.

(3) For the statistical data referred to Portugal: Boletim, Direccao Geral da Marinha do Comercio, Vol. 13 (1988), p. 3 (Tables 1.1 - 1.2)

.4.2 Quantitative Characteristics of EEC's Fleet

As far as the type of ships composing EEC's fleet is concerned, the trend followed, in general, the world trend but for two important exceptions: (1)

- container fleet, with a lower decline trend
- general cargo vessels, with a higher decline trend.

As far as the age of ships is concerned, the average age of the EEC's fleet (although unequal among state members) is better than the world average (2), with state members leading the more modern fleets (FRG and the Netherlands) and in spite of other state members being classified among the oldest fleets (Greece). In addition, the modern EEC's vessels use higher technology equipment than the world average.

.5 Comparing Trade with Fleet Indicators

As we have seen, in general, whereas trade increased, fleet declined. Nevertheless, the amount of EEC's own trade handled by its own fleet, has only slightly decreased for the last decades, remaining approximately at the actual value of 40%.

Analysis of this data suggests that, the main losses in shipping are related to carriage of goods between foreign

(1) Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, p. 94. and Lloyd's Register of Shipping Statistical Tables 1988, for 1988 data.

(2) Lloyd's Register of Shipping, 1988, p. 4.

countries, which reflects that other countries have increased their own fleet and their competition capabilities (1).

.6 Analysis of Changes

As pointed out by Dr. Rolf Stuchtey (2) the community's fleet relative decline is generated by short- and long-term factors. Following the method used before, we may indentify the following change inducing factors:

.6.1 Conjunctural (short/medium term) factors as:

- recent recession in internatinal trade (quantitative),
- over supply of tonnage (quantitative),
- different ship's financing policies e.g. easier access to capital (qualitative) and
- different price policies both for newbuildings and second-hand vessels, e.g. very low prices (qualitative).

.6.2 Structural (long-term, main change inducing group) factors as:

- qualitative changes in the relationship between shippers (consumers of shipping services) and shipping companies, as a result of increase awareness of overall costs (where transport costs are included) and their consequences in competition,

(1) OECD Maritime Transport, OECD-1987 (pages 121/128).

(2) Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, pp 95-97.

- qualitative and quantitative changes in liner trades and conferences,
- qualitative and quantitative effects of national protectionism in developing and eastern bloc countries,
- easy access to European cargo (qualitative), and
- flagging out of community's shipowners (qualitative).

From the aforementioned, two qualitative factors, due to the magnitude of their impact, must be stressed:

1. Flagging-out
2. Relationship between shipper and shipping companies

1. **FLAGGING-OUT.** The seriousness and quantitative impact of this factor, may be clearly illustrated by the increase of DWT tonnage flagged-out from EEC countries from 1973 (23.8 million DWT) to 1987 (63.5 million DWT). Detailed data is extracted from different sources (1). As "OECD Maritime Transport" analysis points out, the fleet under the flags of OECD member countries fell dramatically and in some countries, like Norway and West Germany, less shipping is operated under the

(1) "Flagging-out" per country: Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, p. 96, Table 4.

"Flagging-out" per flag of convenience: Direccao Geral da Marinha do Comercio - Relatorio da Comissao Nomeado por Despacho SETC 15/87 de 10 de Marco. Lisbon - September 1988, p. 164 (Table XIV).

Tonnage Trend: Lloyd's Register of Shipping - Statistical Tables 1988, p. 3.

national flag than under other flags.

Whereas social consequences will be dealt with in Chapter Three, it is important to point out some of the counter strategies adopted by individual countries ranging from state subsidies to the establishment of "open" or "off-shore" registers.

Some of the registers are already in operation and others are expected soon to open. In EEC alone the following member states have advanced stage plans or operate "open registers": Denmark, France, Germany, the Netherlands, Spain, Portugal and United Kingdom. Whether continues or not, the fact is that this new reality must be taken into account as a major change inducing factor that will affect the whole shipping industry infrastructure.

2. RELATIONSHIP BETWEEN SHIPPER AND SHIPPING

COMPANIES: Qualitative changes in the relations between shippers and shipping companies are the other qualitative factor that are inducing changes in the shipping industry.

The major concern for the consumer of transport services is certainly its cost. Furthermore, consumers are not concerned with the structure of the cost but with the cost itself, because that will be the amount to be added to their costs of production defining the final cost and therefore the competitive position of their products in the market.

The need to answer to consumer's demands led to changes in the operation mode aiming at rationalized operation and optimized total cost. Systems

like containerization (1) and unitized cargo, allowed for further steps as "door to door", that in their turn allowed for multimodalism and in general, to the, more or less competition generated, establishment of an overall chain of transport, logistic network whereby all the segments of transport are linked and interdependent.

As a result, the traditional view that the focal point of international trade was the shipping company and the Conference, is nowadays unrealistic. The focal point of transport today is the chain of transport operator not only from an economic point of view but from a safety one as well. Furthermore, in Central Europe due to geographical proximity and morphology other means of transport than shipping were utilized for international transport among those countries, e.g. railway road, and inland waterways (2).

.7 Concluding Remarks

Mainly due to competition, the composition of the EEC fleet moves, increasingly, towards technologically sophisticated ships and equipment, which in order to be efficiently and safely operated required higher qualifications from seagoing staff.

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- (1) Kim, C.K. (1987) An Innovation in Liner Shipping: The Round the World Service as a Global Strategy, Institute of Shipping Economics and Logistics, Bremen - 1987, p. 133.
 - (2) Stuchtey, R.W., Professor, Director, Institute of Shipping Economics and Logistics, Bremen, FRG - Paper "Changes in the Shipping Environments and Counter-Strategy of the EC Countries Toward the Year 2000" - Seoul, 1988, conference proceedings p. 106 (paragraphs 10-11).

In addition, the trade pattern, political aims, geographical location and morphology and the available logistic network, place the EEC as the first region in the world where an entire logistic network is defining the segments of transport. Therefore, in EEC the concept of logistic system defines both the infrastructure and the demands of the overall shipping industry. In addition, it places direct demands in the infrastructure of the shipping industry that must be answered.

In conclusion, it must be stressed that, in order to survive within the EEC, a Maritime Education and Training System must not only meet the demands of the shipping industry, but those of the overall chain of transport as well.

CHAPTER THREE

CHANGES IN SOCIAL AND SOCIETAL FACTORS AND DEMANDS ON MARITIME EDUCATION AND TRAINING (MET) SYSTEMS

3.1 INTRODUCTION

The aim of this chapter is to identify some of the leading social changes that occurred in the infrastructure of the maritime transport system and that resulted in new demands to the MET systems.

The relevant social changes that took place over the last twenty years, can be traced back to, two main sources:

- the shipping industry, and
- the seafarers

Albeit, theoretically, each one of these factors generates separate effects, they are so interwoven that, in practice, one is faced with a complex combined effect.

Nevertheless and to understand the result of the interaction process, one must try to identify and assess, firstly, the components of each one of the aforementioned factors and their consequences. Only by doing so, one may find adequate single counter strategies and later, after cross checking them, try to define a global set of measures that may represent a suitable compromise solution for the problem.

The most striking social factor that affects MET systems all over the world and with special relevance the "developed countries", is the reduction of attraction of the seagoing careers. As indicated before (Chapter One), the final result of this phenomena is that MET Institutions are facing an over-capacity problem while the shipping companies are facing an

increasingly higher drop out rate, of seafarers, from active seagoing service.

The consequences of the aforementioned, if discussed under a governmental view, represent, in general, the following convergent but separated problems. Firstly the educational investment in MET is not paying-back as it should. Secondly, from a welfare view, a group of the working population is dissatisfied. Thirdly, if the present trend continues, it will deplete the strategic stock of human resources and know-how, required to man such an important and strategic sector as the maritime transport system, which is a corner stone of the global transport logistics system.

From the industrialized countries and specially from the EEC countries point of view, the global situation and particularly the third problem, causes major concern. As it was seen before (Chapter Two - 2.3.3.1), seaborne trade represents 85-90% of the EEC's international trade and 25-30% of intra-EEC trade. Moreover, still referring to the EEC, six years ago, the estimated number of European seafarers employed on community vessels was roughly 260,000 whereas in 1988 this figure had dropped to 130,000 (1). Additionally, in the same period thousands of shipping industry related jobs were lost ashore.

3.2 ANALYSIS OF SOCIAL CHANGES IN THE EEC SHIPPING INDUSTRY, RESULTING FROM NEW ENVIRONMENTAL DEMANDS

Focussing on EEC countries and as shown before (Chapter Two - 2.3), the causes for the aforementioned situation, stream directly from the near-crisis scenario in the shipping industry which results, mainly, from structural factors e.g.

(1) Eliades, M., Cyprus Bureau of Shipping, paper presented at Conference "Which Register, Which Flag...Now?", promoted by Lloyd's Ship Manager, Shipping News International and Lloyd's of London Press, Essex House, New York, October 1988, conference proceedings, p. 2.

shipping is no longer an isolated industry but a part of the global chain of transport, increased competition and "flagging-out". All these factors are inextricably linked and the output of their sum had major impacts in the EEC shipping industry which eventually lead to changes with serious social consequences.

We will now analyse the above referred factors in more details.

"Flagging-out", the use of this strategy lead directly to the loss of jobs at sea as well as in the shore based infrastructure. Furthermore it created an increased job uncertainty - threat of unemployment; that for the first time was not confined to the country's supply and demand internal factors. This new reality was contradictory with the traditional stability that supported the view of a sea career as a "way of life" and not only as a job (1).

Additionally, this strategy introduced new terms of comparison for seagoing jobs, that were alien to the European society. Cheaper labour, streaming from developing countries, with lower qualifications, invaded EEC flagged-out but owned ships and replaced "well trained" seafarers.

This occurrence damaged the "social status" image of the traditional European seafarer. Furthermore the European seafarer felt powerless to fight against these new concepts whereby all traditional scales of value were inverted or erased. Labour competition was not anymore based on a positive approach e.g. higher qualification means better chances of getting a better job and wages, but on a negative approach instead e.g. lower qualified labour demanding less wages have

(1) Hill, J.M.M., The Seafaring Career, Center for Applied Social Research, The Tavistock Institute of Human Relations, London, 1972, p. 45 (119.).

a better chance to get a (better) job. In addition, the professional and social pride, resulting from sailing in a well known shipping company under a traditional and respected national flag, was lost.

In short, the adoption of the use of "Flags of Convenience" (FOC) lead to a decrease of attraction for seagoing careers in general and specially for those people that were mainly attracted or felt particularly rewarded by the prospect of living in a "total institution" (1). Officers were particularly affected, in fact, whereas the traditional work relations were based on the "Officer and Gentleman" approach (2), the new situation pointed towards a rating-like approach e.g. wages and coercive work relations (3).

Increased competition led to a faster turnaround with less time spent in ports and manning reductions which resulted in increased work load. Namely those who were attracted by a romantic concept of sea life and by the chance of travelling round the world were particularly affected.

The shipping industry became just a part of the overall chain of transport and this led to drastic changes resulting from survival counter-strategies. Firstly, the traditional ship-owner disappeared to be replaced by a shipowner, ship operator and ship manager trinity. Secondly, to the reduction in size of many shipping companies. The outcome of this new situation was that the traditional upward mobility in the seagoing career was stopped, e.g. one starts as a mate, goes up to master of smaller and older ships and finally attains command

(1) Moreby, D.H., Head of School of Maritime Studies, Plymouth Polytechnic, "The Human Element in Shipping", Seatrade, Colchester, 1975, pp 41-45.

(2) Ibidem 1, p. 46.

(3) Ibidem 1, p. 46.

of the pride-of-the-company vessels and may eventually step ashore for a marine superintendent post, all of this within the same company or at least within shipping companies. Those traditional career prospects are gone, even the wide range of shore based ship-husbandry services that was traditionally ensured by the shipping companies, is now performed by independent, shore based, companies many of which have no sea roots and do not employ a single seafarer, moreover those companies are not even aware of what a seafarer is, what he does or what he is prepared for.

Moreover, the increased availability of high technology communication and data processing equipments as e.g. satellite communication links and computers providing "real time" access to ship's technical data, allowed head offices to a permanent contact with ships, as a result direct control over the ship increased (1). Mainly economical decisions but also some technical decisions were taken away from the master and the ship officers, leading to an increased work pressure and reduced job satisfaction.

In short, this leads to a reduction of attraction for the traditional seafarers profile of long and medium term stayers (2).

In general, all the aforementioned changes ended with the special bonds that used to link a seafarer to the shipping industry and that reflected the MET traditional view of

(1) Zade, G., Vice Rector and Academic Dean, World Maritime University - Paper on "The Training of Merchant Marine Officers - What challenges have been and have to be met?", presented at Conference "1993: Une Chance Pour l'Officier de la Marine Marchande Francais", Le Havre, France, 16-17 February 1989, p. 5.

(2) Hill, J.M.M., "The Seafaring Career", Center for Applied Social Research, The Tavistock Institute of Human Relations, London, 1972, pp 100-102.

training for sea careers only. Being educated for sea, used to mean access to very wide career prospects, not anymore. Today the seafarer faces a wider and ferocious competition not only at sea but also when he tries to step ashore and he is not prepared for it, because MET systems, in general, do not prepare him for it. Therefore the choice of a seagoing career appears to be more and more stepping in a "blind alley".

Additionally the seafarer is pushed by the new system to look for seafaring as a job, e.g. frequent changes of ships, companies and flags. Probably seafaring is still attractive as a good job, but in the majority of the cases only as a medium term one. The problem lies on what can a MET educated person do next in the society. Prospective candidates are aware of this and the result may be seen in the overcapacity situation that MET institutions in the EEC are facing.

3.3 SOCIAL CHANGES AFFECTING THE CHOICE OF A SEAFARING CAREER

As Haralambides pointed out (1), the reasons for the choice of sea career fall into the spheres of economics, sociology and psychology.

The subject has been comprehensively dealt with, namely by Moreby (2), Hill (3) and the Rochdale Report (4), among other

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- (1) Haralambides, H.E., Lecturer, World Maritime University, Malmö - Paper "An Econometric Analysis of the Seagoing Labour Market", presented at the Fifth World Conference on Transport Research, Yokohama, July 1989, p. 6.
 - (2) Moreby, D.H., Head of School of Maritime Studies, Plymouth Polytechnic, "The Human Element in Shipping", Seatrade, Colchester, 1975, pp 41-45.
 - (3) Hill, J.M.M., "The Seafaring Career", Center for Applied Social Research, The Tavistock Institute of Human Relations, London, 1972, pp 100-102.
 - (4) Rochdale Report, Committee of Enquiry into Shipping, HMSO, London, 1970.

authors and studies. Therefore only a few striking facts will be pointed out.

Particularly in Western Europe, the global social welfare environment, lead to reduction of attraction of seagoing careers, because:

- the qualification requirements for a shore job are more and more based on a national awarded education degree,
- it is easier to get access to higher education, a better education, e.g. post-graduation, is more and more related to with better career and social life prospects. Demands for post graduation, have constantly increased in OECD countries (1),
- nobody goes to sea anymore to have access to contacts with foreign countries and different cultures,
- there is more awareness and less acceptance of "social marginality" (2) consequences,
- the affluent society provides better economic conditions and the wages differential between shore based and equivalent seagoing jobs (3) was either considerably reduced or suppressed,
- family or regional influence in the choice of a sea career became a negative factor due to the consequences of the

(1) Post-Graduation in the 1980's, OECD, Paris, 1987, pp 74-75.

(2) Forsyth, C., and Bankston, W., Department of Sociology, Louisiana State University, "The Social Psychological Consequence of A Lift at Sea: A Causal Model". Maritime Policy and Management, 1984, Vol. II, No. 2, p. 123.

(3) Haralambides, H.E., Lecturer, World Maritime University, Malmö - Paper "An Econometric Analysis of the Seagoing Labour Market", presented at the Fifth World Conference on Transport Research, Yokohama, July 1989, p. 6.

crisis in the shipping industry, e.g. prospective candidates were faced with the negative values of unemployment, fewer career perspectives, etc.,

- due to changes in the industry and in the working environment, as we have seen before (3.1) the type of psychologic profile that may potentially be attracted by seafaring changed. New profile layers may be added whereas some old disappeared, and
- no significant qualitative change occurred in the MET systems to counteract the negative aspects of life at sea and the change in the potential candidates psychologic profile.

3.4 RESEARCH RESULTS

Additionally, the author conducted a small scale research in this area.

A standardized format interview (see annex 1 to the chapter) was carried out. Seventy-two persons were interviewed. All of them ex-officers of the merchant marine (Deck and Engine) who abandoned active seagoing life for industry related shore jobs. The population is composed by people from 25 different countries (developing and developed) mostly teachers in MET Institutions but also experts in the shipping industry and post graduate students at the World Maritime University (WMU). The interviews were conducted at the WMU and during field trips to the following countries: Denmark, Canada, France, Germany (Federal Republic of), German Democratic Republic, the Netherlands, United States of America, USSR and United Kingdom.

The relevant conclusions were as follows:

- The majority was married before leaving active seagoing service.

- Main reasons for leaving sea are: no career prospects, better job opportunities ashore and family.
- The duration of the active seagoing service was mostly comprised between five and twelve years.
- The majority had attained the highest certificates of competency available.
- The majority did not have an academic degree by the time they left sea.
- In the majority of the cases, the MET system was not integrated in the national educational system.
- In the majority of the cases, the first job ashore had been directly related to the shipping industry.
- The majority of the interviewed, considered that if they had had an academic degree they might have experienced increased opportunities of finding a job ashore.
- All agreed that professional experience and MET had been of paramount importance for the first job ashore and that it was still a positive factor for their actual careers.
- No interviewed person stressed any particular aspect of their previous MET and professional experience as specially relevant to their shore based jobs.
- No interviewed did go back to active seagoing service, the reasons given were the same as for leaving sea.
- The majority did not feel any particularly relevant difficulties to carry on in their with their career ashore.

- The majority felt the need of either upgrading knowledge or increasing the academic level of education.

The following needs were discussed during the interview and can be said to constitute a generalized view:

- To improve existing MET system.
- To integrate MET in the national education system as a way to put an end to isolation and allow for wider social recognition of MET qualifications, that should be equivalent, at least, to a Bachelor of Science (BSc) degree. Opportunities for post graduate studies should be available within MET institutions.
- An expanded career where by the possibility of a shore career should follow the active seagoing service phase. Furthermore, this career should take place in the chain of transport, nevertheless this would require an extended education in the field of transport logistics, that should be provided by MET.

3.5 AN ASSESSMENT OF RELATIVE MARITIME EDUCATION AND TRAINING AND WASTAGE COSTS (FROM A GOVERNMENTAL POINT OF VIEW)

When a given investment is made by the state in education, its final output is expected to be, the production of a certain social value that will last for a given time. The higher the investment, the more important and/or spread in time, the social value is expected to be. There is also, a close relationship between the level of education one receives (duration and quality) and the social value of the output (wages, career, social position) and its life span, e.g. higher education output is, in general, used throughout active professional life.

Let us assume then, the following hypothetical values for

higher education at BSc degree level. The duration of the education process equals four years. The expected life span of active use of acquired knowledge and skills equals thirty years. In this case, the investment made by the state (or the individual) - costs of four years of higher education; will produce a certain social value that is expected to last for thirty years.

Let us see now what is happening to MET costs due to wastage. We will assume that the cost of a four years MET education is equal to that of an average BSc (in fact it tends to be higher, due to equipment costs and at present also due to overcapacity).

This means, from a governmental point of view, that a MET student is therefore expected to produce the social value that he was trained for over the same length of time - thirty years.

Nevertheless, what really happens is that the majority of MET graduates are either short or medium term stayers, as pointed out by Hill (1) - the figures for the UK, in 1972, were: 33% of all entrants leave before completing one year of service, only about 25% complete five years and only 12% complete ten years (2).

Let us assume first that, in general, 60% of the entrants will have a maximum survival pattern of ten years. In this case the relative cost of MET, if compared with other equivalent education, would increase three-fold, taking in consideration only the length of use of the social value and provided that

(1) Hill, J.M.M., "The Seafaring Career", Center for Applied Social Research, The Tavistock Institute of Human Relations, London, 1972, pp 97 (258.) and 103 (280.).

(2) Ibidem 1.

the MET education is not primarily used in future jobs.

This means that wastage has a direct impact on MET costs from a governmental view.

Furthermore, most of the leavers will need academic upgrading, to find a compatible shore job (social standing and wages) with the one they are leaving.

This situation, that is spreading, will mean a further added cost for the government, because the length of use of this new social value will also be shortened, falling below the average.

An exact quantification of the aforementioned requires extensive research and must be done for each country, due to considerable differences in costs and social values.

3.6 CONCLUDING REMARKS

The author believes that the demands on MET Systems, resulting from the changes in social and societal factors that affect the shipping industry and seafarers, must be answered if MET institutions are to survive.

Furthermore, the only way to reduce costs, added costs and optimize the duration of use of MET knowledge, seems to imply both the need to attract other population layers than the traditional seafarers psychologic profiles and generate conditions for the extended (ashore) use of MET academic degrees.

In the actual social context in the EEC, the best way to answer to all the new demands, seems to be:

(1) Hill, J.M.M., "The Seafaring Career", Center for Applied Social Research, The Tavistock Institute of Human Relations, London, 1972, pp 97 (258.) and 103 (280.).

- the upgrading of the level of MET education
- the extension of MET philosophy and aims
- the linkage to the national educational system
- the access to upgrading and post-graduation within the science field and in MET institutions.

All of this in such a way that a shore based career may become a natural step after a "realistic" average seagoing service, also allowing for sea-shore interchange not as an obligation but as a free choice decision.

ANNEX TO CHAPTER THREE - INTERVIEW WMU AND FIELD TRIPS

Tentative Identification of Attrition Among Seafarers

Country:

Region:

Present Age:

Present Job:

01. What was your age (when leaving sea)?
02. What was your marital status (when leaving sea)?
03. What was your reason for leaving sea?
04. What was the length of your sea career in years?
05. What was the length of your sea career in certificates?
06. Did you have a degree?
If yes, which?
07. Was Your MET integrated in the national educational system?
08. What was your first job ashore?
09. Would it have been different if you had had a degree?
If yes, why?
10. What is your professional experience (rank/job) relevant to your employers?
11. Which points from your education/training/professional experience and attitude were relevant to your new job?
12. Did you go back to sea?
If yes, why?
13. Do you feel any difficulties to carry on with your career ashore?
If yes, what?
14. Did you ever feel the need of academic upgrading?

CHAPTER FOUR

CONCLUSIONS - PART ONE

THE EXTENDED MARITIME AND TRAINING SYSTEM (CONCEPTUAL GUIDELINES)

4.1 INTRODUCTION

Will it be possible for a MET system to meet the new type of demands stemming from changes in the shipping industry, society and social attitude of seafarers?

The answer to this question requires the evaluation of the global set of demands, identified in the previous chapters and that may be summarized as follows:

1. the pathway towards a global system of transport implies the existence of highly educated and skilled labour able to cope with the:
 - diversity of means of transport to be used in the global transport chain,
 - heterogeneity and hazardousness of the type of commodities to be carried,
 - organization, safety, security and smooth interfacing of different physical means of transport and operators,
 - protection of the environment, and
 - need for a considerably efficient and resilient management of the complex systems involved.
2. the need to provide highly qualified technical staff to:
 - operate increasingly sophisticated ships and equipment within the established safety and (desired) efficiency parameters,

- operate, manage and administer the infrastructure of the maritime transportation system (e.g. Port, Vessel Traffic Services, Port State Control and Commercial Managers, Maritime Lecturers, Surveyors, Consultants, Maritime Administrators, etc.).

3. the need to minimize wastage in the educational investments related to maritime education and training,
4. the necessity to respond to the social, job-satisfaction and career demands of seafarers, and
5. the social obligation to minimize the social alienating effects of actual sea careers on those concerned.

One may ask if it is possible to harmonize this various set of demands, where, at first sight, each need seems alien to the other. Nevertheless a more comprehensive approach will show the existence of a high proportion of complementary factors among the different requirements, therefore allowing for the design of systems that, although not perfect, will generate a good global compromise solution that will cover the essential of the identified needs.

As the aim is to devise an educational system able to answer to the aforementioned requirements, it is believed that such a system must be based on the analysis of the complementary factors and therefore should be built in accordance with the following aims:

- primary response: fulfill the direct labour and expertise requirements of the industry and its infrastructure (see Chapter 2),
- secondary response: form a positive basis to respond to the needs of the chain-of-transport and wastage of qualified personnel under the light of job satisfaction and wider

career prospects thereby minimizing the negative social alienating effects and consequences,

One of the possible answers requires an extended maritime education and training system whose main conceptual lines will be described in the following paragraphs.

4.2 THE EXTENDED MARITIME EDUCATION AND TRAINING SYSTEM (CONCEPTUAL GUIDELINES)

1. Philosophy - the system must be designed in such a way that:

- its ultimate aim is to provide education and training both for sea and shore careers,
- its final output must be such as to guarantee a full coverage of an average professional life-time career, using the national average for all sectors of activity as reference, therefrom a full profit on the educational investment will be guaranteed to the state, in similar conditions to what is achieved in other educational activities of equivalent level,
- the system must be fully integrated in the national educational system, higher education level, demanding and granting the same type of conditions and degrees that result from other equivalent levels of education,
- the system must maintain a close structural link to the relevant maritime administration and observe all applicable international and national maritime rules and regulations,
- the system must allow for a close relationship with the maritime transportation system and with the overall chain of transport, e.g. applied research, and
- the system must be designed to stimulate and allow for the "continuous education" concept. Therefore,

access to post-graduate and research degrees (MSc and Ph.D.) must be ensured.

2. Structure

The educational structure required to meet these demands implies three key levels of knowledge (education and training):

- .1 specialist level (equivalent to BSc academic degree) - academic education
- .2 professional level - in the industry - sea career as a specialist - practical experience
- .3 graduate level (equivalent to MSc academic degree) - academic education (having access to Ph.D.)

The third level should not be obligatory but required as the basis for: manager, administrator, researcher, educator and technical expert, levels. The third level cannot be attained without fulfilling levels 1 and 2. The whole validity of level three is based not only on its own academic quality but also on the quality of the background knowledge acquired on previous levels. The graduate level is thus acquired through a sandwich type of education.

- .1 **SPECIALIST LEVEL:** This level which in academic terms must grant a Bachelor of Science (BSc) degree, should provide the student with the Academic Supporting and Technical Disciplines which will be required, in general, throughout his entire career.

In practical terms, the main goal of this level will be to provide the student with the scientific

knowledge required to perform the technical jobs of a deck officer, from third officer to master foreign going certificates, complying with relevant international and national standards.

The duration of this level will depend on the characteristics of the national educational system and the entrance requirements. Assuming that the entrance requirements will necessarily be the same as for university or polytechnic, granting the BSc degree, then the duration may vary between three to four years of academic education and one year of sea training.

The educational system must follow "higher education" sound standards and concepts, such as "critical thinking" (1) and "continuous education" (2). The aforementioned guidelines should embody the educational system thus allowing for both critical analysis, understanding and operation of the principles and systems used or operated (3); and for the academic attitude of self-upgrading, leading professionals to keep abreast of technological advances and new job demands (4).

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- (1) Grant, G.E., (1988) Teaching Critical Thinking, Praeger, New York, 1988, pp 2 (lines 30-32), 3 (lines 15-17) and 35-37.
 - (2) Hatzius, A., and Myers, W.R.C., in World Conference on Cooperative Education, Edinburg, UK, 1985.
 - (3) Myers, W.R.C. Towards lifelong learning for engineers. In World Conference on Cooperative Education, Edinburgh, UK, 1985, conference proceedings, pp 465-468.
 - (4) Hatzius, A., (1985) Cooperation in regional continuing education systems: models, experiences and perspectives in the Federal Republic of Germany. In World Conference on Cooperative Education, Edinburgh, UK, 1985, conference proceedings, pp 465-468.

The aforementioned state of mind is of paramount importance in a sector where more sophisticated systems are continuously being introduced, namely those related with the use of data processing and advanced information technologies. At the same time "old technology" still exists and must be safely and efficiently operated. In addition, flexibility will be increased, e.g. the ability to deal with and safely adapt to different displays and types of equipment to perform the same or extended tasks. The need for long, frequent and expensive upgrading and refreshing courses will be reduced and replaced by optimized "cost and science contents" refreshing or upgrading courses which means more intensive, shorter and not so frequent courses. Basic academic support and technical generalities that nowadays may attain more than 60% of the contents will be phased out. Similar systems are for a long time, part of the concept of higher education and have been in existence in other fields of education and industry and in the shipping industry itself (1).

2. **PROFESSIONAL LEVEL:** This level is extremely relevant because it is the experience acquired in the industry that develops the professional attitude and the wide range of desirable professional qualities that merchant marine officers proved to possess in the past and will allow for a deep practical knowledge of the marine transportation sector and of the chain of transport itself, in addition to the technical knowledge.

(1) Education and the World of Work Positive Partnership (1987) edited by Peter Linklater (Linklater/Coaker/Everard/Barron/Butler/Bates/Culshaw and Gerver), Society for Research into Higher Education, pp 39-41.

The sea-career requirements and the certificates of competency must be changed and adapted according to the international standards and the national practices, bearing in mind the need for harmonization. As, in general, the duration of the sea-career from the lowest to the highest officer's certificate should not be less than 36 months of approved seagoing service; this duration should be taken into account when establishing the minimum seagoing service that will fulfill the "professional level" requirements and will allow for entry to the third level. Three years of approved seagoing service seems to be the best compromise solution, not only because it is based on the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 (STCW/78) and on the sound expertise and common-sense it reveals (giving the guarantee that the officer will have a satisfactory level of experience) but also because these three years of seagoing service will require, because of the inclusion of leave period, at least, four calendar years. A wider spacing, as minimum, would be counter-productive and not interesting, both from an academic and social point of view. There will be situations, e.g. seafarers of countries without merchant fleet or undergoing intensive flagging-out, where equivalent service solutions might be required. In any case less than 24 months of approved seagoing service or equivalent three years of service in the industry seems to be of no relevance as experience under the concept of the whole system. This second level must be considered a "conditio sine qua non" to gain access to the third level. As it seems only too obvious a specialist requires experience in the industry

before he eventually takes the following level of management/administration or higher specialization/research (1)

Summarizing: the result of the interface of the two previous levels will be the reunion of both theory and practice of the working principles of the marine transportation system and its technical needs, thus allowing for a considerable educated and trained human resource with a valuable and wide range of use in this entire economic sector.

3. **THIRD LEVEL: MANAGEMENT/ADMINISTRATION/HIGHER SPECIALIZATION/RESEARCH/EDUCATION:** The aim of this educational level is to upgrade, deepen and provide knowledge to specialists with professional experience in order to obtain highly specialized staff for the top levels of management, administration, operation, expertise, research and education, in the infrastructure of the maritime transportation system as well as for the overall logistic system.

The duration of this academic level may vary but should comply with international and national agreed standards to obtain a Master of Science/Arts degree. The minimum duration for the accomplishment of studies/exams programs should be one full academic year, plus a thesis as a necessary step to fulfill the requirements for a master's degree. Nevertheless, the main objective is that this third level will be accepted by the national educational system (and therefore by the employment market) as a master's degree. Therefore,

(1) Post-Graduate Education in the 1980s, OECD, Paris 1987, pages: 9 (lines 1-4) and 26 (lines 6-10).

although the compliance with internationally agreed, academic degree standards would be desirable, the compliance with national standards must come first, at least in the first stage. The following two main areas of activity should be covered by this extended education:

1. Management and Administration
2. Technical specialization.

Research and specific training for educationalists should be considered as a by-product of the two main areas and although requiring specialized courses or optional or additional specialized disciplines in the curriculae of the main areas, should not constitute a whole specialization area in itself. Nevertheless, research and specific training for lecturers, constitute corner stones of the educational building without which it will crumble and fall apart. When designing the structure of the system it must be borne in mind that arrangements are made to allow for the access of the graduates up to Doctor of Philosophy or Doctor of Science degrees. The importance of this latter concept becomes self-evident when the integration and cooperation with the national educational system and therefore with institutions at the same level like universities and polytechnics, which are a corner stone of the philosophy of this system, aims to be achieved. It should also be noted that not only the scientific achievements of the aforementioned degrees, by themselves, are of paramount importance; in addition the isolation of the maritime education and training system will be prevented. This will be one of the main advantages. Nevertheless, a careless approach to a long established system may, however, lead to inconvenient situations. Extinction or loss of personality and

vocation may be an undesired result, when struggling for ever scarce allocation of funds from the national educational budget or when cooperating with other universities or employing "academic" lecturers for the academic supporting disciplines. Good and sound policies that used to make sense among those initiated in the "small shipping world" may be dismissed by "academics" with high academic status and considerable knowledge in their fields but without a single hint on what the maritime transport industry, or its extended environment, is and requires. Maritime educationalists need to explain and justify, using a scientific approach, to see their policies be accepted. Examples of failures are present in some countries in the world, ranging from the "a priori" or "a posteriori" non recognition of degrees, to the absorption and extinction of maritime departments. Nevertheless, there are also positive cases of integration revealing large capacity of diversification and growth, such as the system adopted by the Australian Maritime College in Launceston, Tasmania (1).

In general, we could say that this level will prepare experts for a wide range of jobs such as: maritime administrators, shipping managers, technical managers, master mariners, surveyors, port managers, cargo superintendents, cargo forwarding superintendents, port state control administrators and inspectors, vessel traffic systems managers, maritime lecturers, etc.

The whole chain of transport may be supplied with

(1) Waters, D.M., Principal - Australian Maritime College, Visiting Professor World Maritime University (WMU). WMU Textbook on "Maritime Education and Training Policy Objectives and Practical Considerations" (1989), pp 29, 30, 37-39 and 61-67.

experts and managers for the safe and efficient operations e.g. concerning dangerous goods and lashing arrangements for multimodal transport to experts in logistics.

3. The Academic Management of a Governmental Maritime Education and Training Institution

What type of academic management would better reflect the philosophy, fit the structure and optimize the final product using at the initial stage the existing resources and expanding them?

Adequate management techniques are required to put conceptual guidelines into practice, define strategies and ensure the practical feasibility of the system. In other words, how does one interface with the complex environment and optimize and expand both human and resources and equipment/facilities when it is known that resources are always scarce.

How to achieve a higher social value for the institution and therefore not only preserve it but expand its prestige and scope. Many approaches may be used to expand in this issue, the author selected the financial resources approach, in other words the budget, because:

- every institution has a budget within which everything must be accomplished;
- resources cost money which will be confined to the budget; and finally
- budget is, in general, the marking characteristic of the social value of the institution.

In short, to develop, the institution will need to increase its budget and the management policies used to

achieve it will reflect positively or negatively on the daily life, internal components and future of the institution.

As it was pointed out budget money is always scarce and an average Maritime Education and Training Institution (METI) that is funded by the state, usually finds out that all available money in the budget does not meet the demands resulting from the need to acquire and maintain new equipment, enhance the faculty and staff and improve the library, all of these, different and converging ways of improving or updating the quality of education provided. To achieve the increase of its financial resources, the following three different management policies may be experimented:

1. Increase of the allocation of state funds.
 2. Additional direct funding from the shipping industry in general or affluent shipping companies.
 3. Wider resilience of academic management leading to development of applied research projects and joint-ventures and diversification of activities.
-
1. It seems a widely spread practice and it is commonly accepted that the state will only increase the allocation of funds to any institution if and when the latter increases its importance for society. In other words, funds will only be increased if the social importance of what is produced, either in quality or in quantity, will increase at least as much. Additionally, increasing the social value of the product of an METI depends very much on external factors, e.g. the situation of the shipping industry, its strategic relevance and therefore its own social value for the country; such factors are clearly out of the control or do not depend on the will of the METI. Nevertheless, the social value

of the output also depends on internal factors that directly affect the quality of the final product, may even influence its quantity, and therefore will determine the amount of budget allocated.

Straightforward examples of quality and quantity increases of the output are better trained professionals and the training of more professionals, respectively.

As referred to, earlier, the increase of the social value of the final product (or output) of a METI depends both on external and internal factors. Whereas external factors are not controllable by the institution and are therefore out of the scope of the present discussion, the same does not apply to internal factors. Those will be discussed in more details below.

One may discuss, briefly, two types of internal factors that are of paramount importance for the quality of the output: faculty and equipment; and how a managerial policy directed to the increase of the allocation of the state funds may use faculty and equipment to improve the overall condition of the institution by using the existing resources to optimize the output. To allow management to change the final product it follows that an additional use must be given to the existing faculty and/ or to the existing equipment or that an additional faculty and/or equipment are used. In both cases it will mean the need for additional or different use of financial resources and that, because either one will need to make a better use of equipment implying e.g. more maintenance and/or higher operating costs, or the costs of a refreshing course for an instructor, or extra hours of work for the existing

instructors, or a new instructor or new equipment, or both. In any of the cases one comes into a chicken and egg problem, the institution has no more money but needs more money to invest in improved quality or quantity to justify the allocation of more financial resources. Some METIs struggle to survive in this endless circular motion cycle, usually with specially negative results on faculty members, interdepartmental relations, students and equipment. New priorities in the allocation of existing funds e.g. diverting funds from one department to another, often results in unbearable relations and stimulates "guild fights" between departments and/or professors, with severe repercussions in study programs and students and may end with the extinction or severe hampering of viable sectors. Unfortunately the final result seldom differs from the aforementioned and decline or immobility and contraction are the results instead of the intended growth. One additional reason for this scenario is that it seems to be very difficult, if not impossible altogether, that an institution, if based only on internal discussion, analysis and assessment may define social values and priorities other than the existing ones. Each department or equipment has its own reasons of existence and according to each one of them, those would be very good reasons. If the institution only self-assesses itself, the scale of value will not change and therefore the relative degree of importance of each department will not change too. External scales of value are required for a thorough assessment and often the state will not provide them.

2. A management policy that concentrates in the attraction of external sources, like the direct

subsidies either from the shipping industry or from affluent shipping companies, may also be tried.

Although the negative effects of this solution have already been identified in Chapter Three, it seems appropriate to stress the following.

Direct subsidies will lead to direct dependency and to the contradiction between general interests and planning terms of the state/institution and, usually, the more immediate interests of the industry or, what is even worse, of individual companies with very narrow and specific interests (1). As the first policy reveals an unbalanced tendency to bureaucracy and isolation of the theory from the "real world", the latter is too liberal and short-term oriented, hampering the institution in such a way that it will even become unable to adapt to any new demands from the direct sponsors. If this solution is adopted as the only possible one, then it will be much sounder to make the institution fully dependent from the shipping industry or shipping companies. Accordingly, accepting that the social value will only be the one those sponsors momentarily have, incurs in the risk that if capital is transferred from the shipping industry or if the trend is flagging-out, the institution may die. In this case the state will have no reason to fund the school.

It must be stressed though that the aforesaid refers only to direct, uncontrolled and excessive dependence from shipping companies and not to

(1) Technology and Manning for Safe Ship Operations in the 1990's. Liverpool Polytechnic, Plymouth Polytechnic, other UK Colleges, November 1986, Vol. I, p. 15 (lines 21-22).

sounder policies whereby cooperation and communication with the shipping industry are stimulated. In fact the need for improved and closer relations with the maritime industry and the maritime administration as a developmental factor for a Governmental Maritime Education and Training Institution has been comprehensively dealt with by Prof. Günther Zade (1) under a "salaries and the quality of teaching staff" approach.

3. If an institution is to survive and expand only resilient academic management practices such as those stressing the development of applied research projects, joint-ventures, and diversification of activities, will allow it.

As we have seen before the solution for budgetary problems, that constrain the entire life of an institution e.g. with a larger budget you may increase the quality and quantity of both human resources and equipment, depends directly on the social value of the Governmental Institution; and therefore on the social value of its final product (either in quality or quantity or both). We have further seen that the social value is given either by external factors, entirely beyond the control of the institution and by internal factors, which depend mainly on the institution itself. The aim now is to demonstrate not only that controllable internal factors will make the difference between social values of outputs e.g. better teaching staff will produce better quality graduates and therefore

(1) Zade, G., Vice Rector and Academic Dean, World Maritime University - Paper on "Attraction and Selection, Training and Updating of Maritime Lecturers" presented at Fourth Conference of the International Maritime Lecturer's Association (IMLA) on "Maritime Education and Training" in Kotka, Finland, 17-19 September 1987, pp 14-16.

will increase the social value of the output; but also that one specific internal factor - management; if applied differently to two similar institutions, in terms of available human resources and equipment, given the same initial stage, may make the difference between a successful and a dying institution, at a later stage.

Some of the most important negative points that stem from the discussion regarding management policies, must be stressed and counter-strategies found to incorporate the desired policy. The following points are a summary of the situations that must be avoided:

- isolation,
- that internal scales of value are the only assessment references for the quality of work of the institution,
- direct dependency from the industry,
- that the social value of the institution depends exclusively from one industry (if possible) and mainly from one specific component of one industry (do not put all eggs in the same basket) and
- to depend exclusively from the state funds.

Taking the aforementioned into consideration, the main guidelines of the desired tailor-made management policy must pursue an increased openness, expanding relations with the graduates future job-market environment yet bearing in mind that any form of direct dependency should be avoided. One of the most feasible ways to achieve it seems to be through the implementation of applied research projects, undertaken in association with the industrial environment, under well defined joint-ventures. Additionally, through the development of short intensive vocational courses (referred to earlier) requested by the industry, the system will experience one of the best ways to keep in touch with

the demands and reality of the sector. That is to say that while no direct funding will be expected from the industry to allow for the normal running of the core work of the institution, extra financial resources will be available to the institution, to be used on specific projects in specific areas. In addition, this will mean that controllable external scales of value will exist for assessment of performances. This new situation will lead to positive impacts on: "maritime" and "academic" lecturers, students, equipment, the quality of education and image and prestige of the institution. (1)

We will look now, in more details, at some of those positive impacts:

- Attraction and selection of "maritime" lecturers will become easier. Therefore, aiming at best quality will be possible not only because higher salaries may be offered but out of prestige and social status as well.
- Research will constitute a self-upgrading method for existing maritime lecturers. These will need to keep abreast of technological and scientific advances. In addition to career and salary improvements it will be a rewarding method because a "real life" scale of value will be available to measure the direct impact of their work and knowledge in the industry. It tends to be quite rewarding to be able to see objective and concrete achievements instead of living and working constantly under a somewhat abstract notion of

(1) Zade, G., Vice Rector and Academic Dean, World Maritime University - Paper on "Salaries and the Quality of Teaching Staff in Governmental Maritime Education and Training Institutions", pp 4, 5.

"quality of education" as the only means of assessment of one's work. Existing lecturers should be encouraged to engage in Master of Science or Ph.D. degrees, either in the maritime sciences field or in other areas. When recruiting new "lecturers, special attention should be paid to candidates with another academic degree, e.g. economics or law. Past experience in various countries has proven their potential value.

- As far as "academic" lecturers are concerned, this method will allow for the application of their specific scientific and professional skills to real problems in the industrial environment of the institution, homing them in the right direction. It is often noted that an "academic" lecturer feels completely apart from the overall aims of the institution because he has neither an overall picture of the environment nor an available path to get it. Therefore what usually happens is that in addition to weaker links to the institution and lack of motivation, bad professional relations with "maritime" lecturers are developed (both "guilds" do not understand each other and do not communicate as a result from the lack of a common language). If consultancy or expert work or even research is undertaken by an "academic" lecturer, usually, it has no relation with the institution's industrial environment, but with either his previous school or professional sector. Undertaking applied research in the institution will have a feed-back effect in terms of motivation and ability to understand and solve concrete problems of the environment of the institution, thus making communication possible with "maritime" lecturers. Additionally, the impact of their increased applied knowledge on the quality of teaching and on their role in the institution will be enormous.

- Students will benefit directly from the increased quality of teaching stemming from the added, upgraded and refreshed knowledge of lecturers. Furthermore, their future professional attitude will also be positively influenced by the optimized professional behavioral pattern of the lecturers. Additionally students will have the fortunate chance to work on or have access to results from industry projects.
- The image and prestige of the institution will be improved and that will lead to a positive impact in the social value of its product both in quality and in quantity. Therefore, the institution will have an easier access to an enlarged budget. A less restricted budget, will allow for the maintenance of "non-fashionable" but fundamental lines of activity and theoretical research lines aiming at the future.
- Finally, a respected and dynamic institution will have both the resources and the prestige to enlarge and diversify its own field of work, as a counter-strategy to total dependence from one specific sector of the industry. As we have seen before, if the institution depends entirely on e.g. shipping companies, every seasonal fluctuation of their social importance or requirements (1) or their decision to phase out activity will have a direct, disastrous impact in the institution. The aim of a resilient academic management policy must be to expand and diversify to all the sub-sectors of the shipping industry and to the overall transport chain. Furthermore, cooperation with other universities through the

(1) Technology and Manning for Safe Ship Operations in the 1990's. Liverpool Polytechnic, Plymouth Polytechnic, other UK Colleges, November 1986, Vol. I, p. 15 (lines 15-17).

establishment of joint-venture projects of education and training must be achieved, e.g. cooperation with a well-known university dealing with graduate courses on management or logistics, to establish its own graduated courses on those areas or to develop specific disciplines.

New fields or complementary fields of studies, education and training can be enforced in a response to market and local or national social needs. Not only the costs will be spread, but the institution might survive the seasonal fluctuations of the shipping industry without fading away or suffer overwhelming political pressures with extreme negative impacts in the quality of education. The delay in recovery will be much longer than the generation of the crisis.

4. The Initial Stage

Specific policy lines must be developed for the initial stage.

Usually, at this stage no graduate courses exist and only limited upgrading facilities are offered to the faculty. Nevertheless, "know-how" and therefore faculty is the key for all development.

If one looks for an upgraded, awarded academic degree e.g. Master of Science/Arts, an equally upgraded faculty is required for the institution. This is the first and foremost step.

Upgrading facilities available in the country must be thoroughly explored through cooperation with existing national institutions. Still some areas of knowledge, mainly on technical maritime subjects, will be either non-existent or insufficiently covered. Regional or

international cooperation will then be required. Albeit a limited number of different solutions might be available, it seems to the author that the most comprehensive institution existing in the maritime field for the maritime field cannot be ignored, that is to say the World Maritime University. This university should be used to play the upgrading role in the initial stage. This issue will not be expanded out of redundancy. A large and comprehensive number of papers has been regularly submitted on almost every international conference on matters pertaining to the maritime education and training field (1) with special relevance to those presented on the International Maritime Lecturers Association (IMLA) Conferences.

Nevertheless it seems important to stress that even at later stages of development, fruitful cooperation can and should be pursued additionally to the MSc degree courses, either in the form of regular contacts and consults or in order to achieve the next academic degree (Ph.D.).

5. Academic and Professional Achievements

Further precision is required on the academic and professional aims of the extended maritime and training institution.

- type of academic and professional certificates
- standards of achievement and governmental control

The specialist level must lead to a Bachelor of Science

(1) Zade, G., Vice Rector and Academic Dean, World Maritime University, Seafarer's Training as a Lecturer Subject at World Maritime University (WMU) and WMU-supported Educational Programmes in the ESCAP-Region - Paper presented at ESCAP Seminar on Seafarer's Training and Certification, Manila, Republic of the Philippines, 16-20 November 1987, pp 2-7.

Degree in academic terms and in professional terms to the full education and training contents required for the full range of Certificates of Competency from Deck Officer to Master Foreign-going. Approved seagoing service, although obviously required, is excluded here because it is a matter pertaining to the Maritime Administration exclusively.

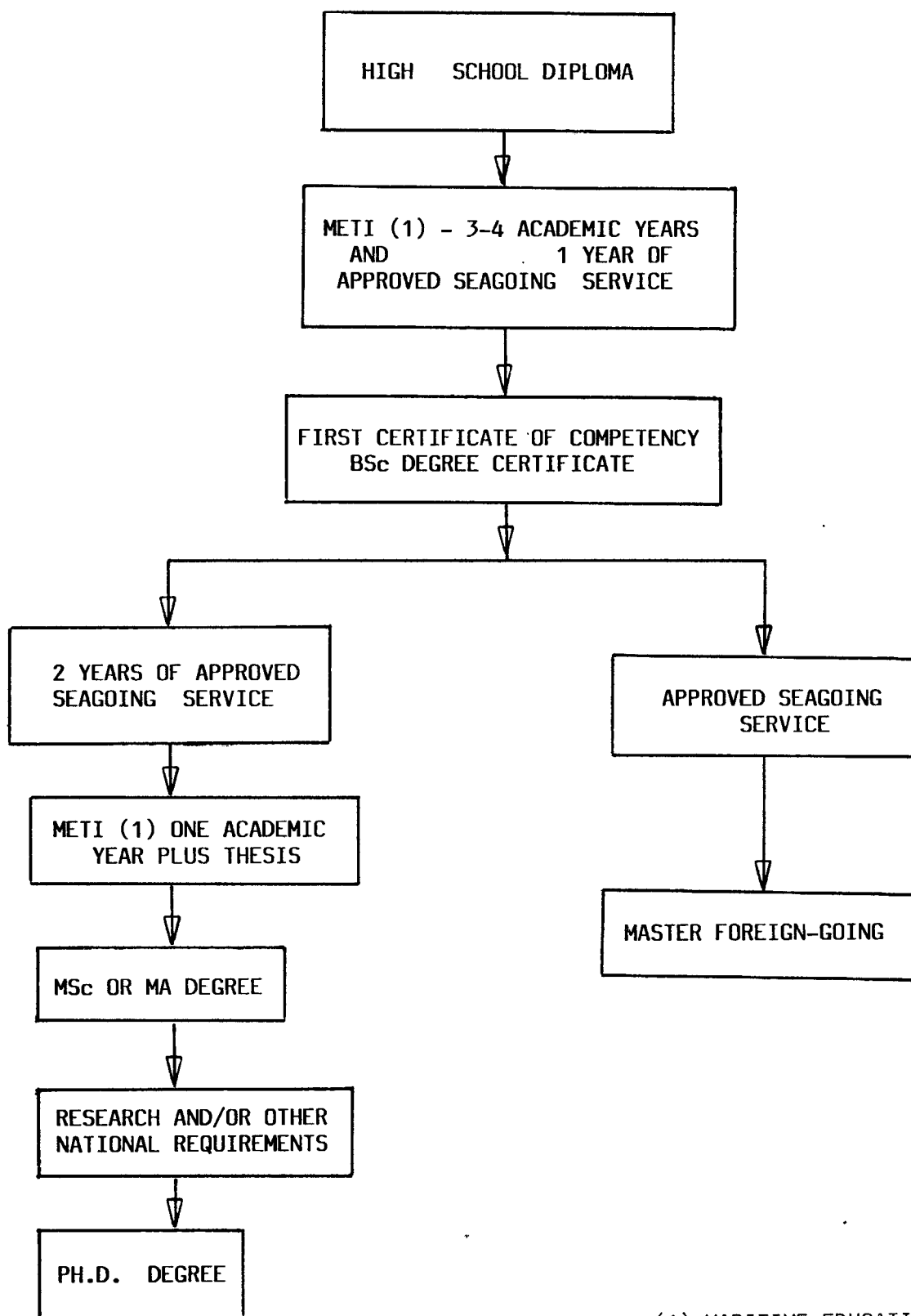
It seems adequate, at this stage, to have a look into the academic and seagoing career overview provided in Figure 4.1 (next page). Important remarks are that:

1. entrance requirements will be the same as per university,
2. main science subjects will be Mathematics and Physics and one humanities subject, English Language.

As far as the academic degrees are concerned, it must be noted that the national education authorities will set the standards that must be complied with to ensure their validity. Therefore, the Ministry of Education must not have only control, but a direct hierarchic relation with the institution. In fact the institution should depend and be integrated (as stated before) in the National Educational System.

Additionally if the education and training contents for Certificates of Competency, either general or specific, are to be achieved then the competent authority, in the country, to set those standards must have an adequate hierarchical link with the institution.

Although a specific solution that appears to be more advantageous is pointed out here, the main hierarchical link may either be the Ministry of Education or the Maritime Administration, this will depend on the real conditions of each country, provided that ultimate aims are met.



(1) MARITIME EDUCATION AND
TRAINING INSTITUTION

FIGURE 4.1 - OVERVIEW OF ACADEMIC AND SEA-GOING CAREER

This hierarchical interdependence will also allow that all the education, training and examination process leading to the relevant output academic degree/certificate of competency, is conducted by and depends on the institution.

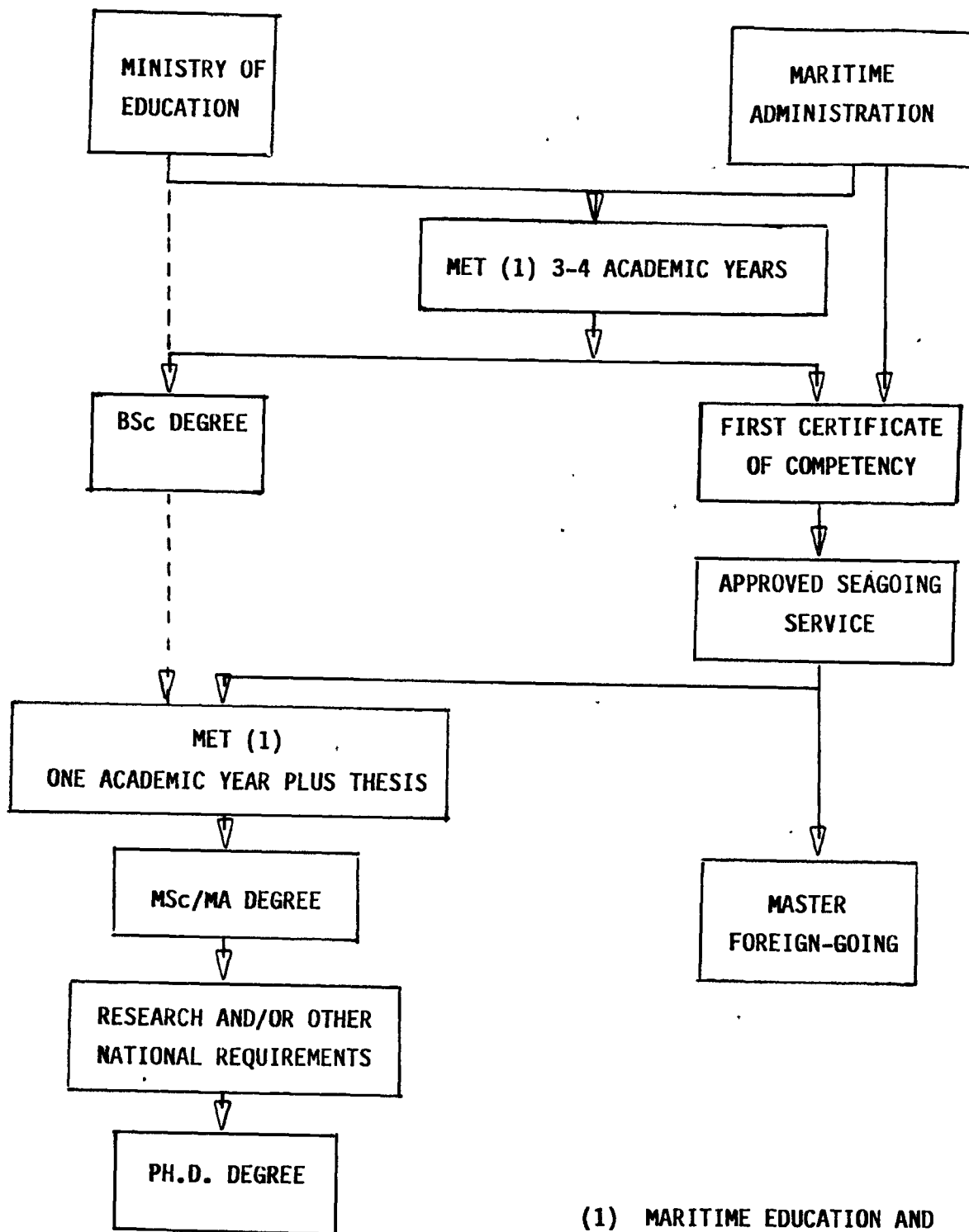
Emphasizing this interdependence, the entrance requirements for the next level of academic career (that will have no bearing whatsoever with the seagoing career) demands a given degree of professional experience (that may be translated into a specific certificate of competency) that will be certified by the Maritime Administration.

In addition there will be courses/degrees/certificates that require only approval from the Ministry of Education, e.g. M.Sc. and Ph.D., or from the Maritime Administration, e.g. refreshment or specialization, or from none of them, e.g. tailor-made upgrading courses for a shipping company.

In general it must be noted that this "dual" (academic and sea career) certification and requirements and therefore the hierarchical interdependence, will place heavy, but not unsurmountable demands on the institution and will imply a clear hierarchic structure whereby aims, standards and areas of responsibility are clearly defined. An overview is provided on Figure 4.2 (next page).

6. Graduated Studies and Research Degrees

Taking into consideration the characteristics of the professional groups that will be potentially involved, both in graduate education and research degrees, we may define three groups of seagoing staff:



(1) MARITIME EDUCATION AND
TRAINING INSTITUTION

FIGURE 4.2 - HIERARCHICAL INTERDEPENDENCE OVERVIEW

- professionals, who for some reason, can afford total daily commitment to the courses,
- professionals who are working ashore in the geographical area of the school and can afford, at least, a daily commitment after "working hours", and
- professionals engaged on active seagoing service, or working ashore in geographical areas not close to the school.

It seems, from practical experience, that the majority of potential students/researchers will be included in the third group.

As the main aim of the extended maritime education and training system is to offer graduate studies and/or research to all interested professionals, it seems necessary to design a type of education that will take the practical and professional induced problems in due consideration. Therefore, some degree of flexibility is required when defining fundamentals such as, course structure, support materials, types of assessment, examinations policy, research work and teaching methods.

At least two general methods of education should be developed and offered to answer to students' needs.

- **Traditional education with flexible timetables**, concentration of classes and assessment in the period of "after working hours", whereas the practical undertaking of research should be allocated, if possible, to the "working hours" period. Such a policy will be a compromise solution, covering the needs of the first group of students and the majority of those in the second group (these could/should use their own job or their specific industry for applied research). This solution will also represent a good

compromise solution with the requirements of the undergraduates courses, as far as the use and allocation of equipment, facilities and staff are concerned.

- **Distance Education** (1), must be used as, it appears to be, the better educational system to meet the non usual requirements of the majority third group. Putting such a system into practice, requires further comprehensive investigation as the overall situation is complex and does not allow for a straightforward solution. However, a carefully designed tailor-made system will overcome the difficulties of both implementation and maintenance.

Although not specially costly, such a system requires good organization and special ability, mainly from lecturers and staff, to adapt to this mode of teaching and academic administration.

Computer assisted educational techniques should be used, as well as more traditional aids, such as handouts and special, intensive, tutorials in some specific periods. Examinations and assessment in general, must be conceived on "different than usual" forms, stressing the role of written assignments and allowing for several examination epochs. Practical research may and should be undertaken, as much as possible, within the industrial unit or field the student is in.

4.3 DOES THE DESCRIBED EXTENDED MARITIME EDUCATION AND TRAINING SYSTEM MEET THE DESIRED DEMANDS?

As we have seen in the previous chapter, three types of demands should be met by the Maritime Education and Training Systems:

(1) Keegan, D., (1986), The foundations of Distance Education, Croom Helm, pp 31 and 42-52.

1. seafarers/social demands
2. industry demands
3. state demands

1. The following answers will be provided by the system to seafarers/social demands:

- when facing the choice of a lifetime career, through higher education, a candidate will not see a sea career as a blind alley any more,
- the knowledge that not only upgrading will be possible within their own professional and scientific area but that at every step of their career a nation-wide higher education degree is available,
- the reassuring awareness that if a shore career is intended, fair competition is possible with other similar academic degrees (professional experience becoming then an advantage), will diminish the pressure for early leaving from the seagoing career,
- higher education and the associated thinking skills will have a positive impact on job satisfaction and on the decrease of social alienating effects of seagoing careers,
- the specialist will not be competing in the shore labour market, with an "alien" professional experience and an unknown or lesser academic degree, against known academic degrees and usual professional experience. Instead, the seafarer will possess a recognizable academic degree that in addition will make his valuable professional experience also recognizable, allowing for unbiased analysis of qualifications by prospective employers,

- the new system will allow the seafarer self-determination and free choice regarding the duration of his sea career. The reason for this being that he will not be pressed to leave the sea well before the critical age of thirty-five because he must undergo new academic education so that he is ready for the labour market before that critical age. In fact, through the new system he will not be so much constrained by age factors, because he will not be a fresh graduate without adequate professional experience, but a graduate with experience on the professional use of his scientific achievements, this makes the difference in the type and level of job achievable and on its associated age requirements,
- the labour market flexibility that a professional acquires will allow him to survive the seasonal crises of the shipping industry,
- human relations in the industry, both among "professionals" and between "professionals" and "shorelings" will be drastically improved as a result of improved self confidence and lesser career limitations, and
- the type of career offered will not only expand the advantages of the previous system, but also eliminate its main disadvantages that prevented people from choosing a sea career.

2. The intended system has the following answers for the industry demands:

- it will provide the shipping industry with upgraded specialists, as far as safety and operation are concerned,
- the upgraded specialist will be more flexible to

adapt to different types of ships and equipment, being able to cope with sophisticated ships and equipment, as well as with standard or older ships and equipment,

- upgraded specialists will allow for a wider resilience of management and flexibility with reduced costs on additional operational and safety training costs for shipowners,
- whatever repairs and maintenance policies shipowners wish to follow, in their ships, the upgraded specialists will be able to cope with them,
- it will not imply any extra cost for the shipowners,
- it will result, in the medium term, on financial savings for the shipowners,
- it will provide an enlarged and wide industrial field with highly specialized staff for top technical and managerial positions as well as research facilities, both allowing for optimized operations,
- it will reduce the know-how losses due to drop out from the sea going service (mainly during the first ten years of career), and
- it will attract and ensure available seagoing staff in larger numbers (mainly during the first ten years of career), therefore allowing shipowners to avoid dependency from foreign labour.

3. The proposed system will meet the state demands in the following way:

- negative social costs and effects of the present situation will disappear,

- there will be a safer and better operated shipping industry, therefore a better economic tool for the country,
- the overall operation of the infrastructure of the entire maritime transportation system will be improved,
- expanded know-how and better qualified staff will be available for the Maritime Administration, ensuring safer and smoother performances in the maritime sector,
- the quality and quantity of required staff for strategic purposes will be increased,
- a better institution with increased social value will exist,
- the enlarged prospective labour market and the new academic career, will allow other candidate profiles into the institution, in addition to the traditional ones and therefore the number and quality of students is expected to increase
- the flexibility and expanded social use acquired by the professionals in the labour market will reduce the moral, social and financial burden to the state that results from seasonal crisis in the shipping industry,
- the cost/benefit analysis of the system will show positive to the state. In fact, as shown in Chapter Three (3.5), the additional costs to the state, resulting from the setting-up and running of the new system, will be smaller than the financial and social

costs of wastage, misuse or non-optimized use of maritime education or even non-optimized professional use of further academic education.

4.4 A SPECIFIC DEMAND TO THE EXTENDED MARITIME EDUCATION AND TRAINING SYSTEM (EMET) - THE "RESTRICTED DUAL PURPOSE WATCHKEEPING OFFICER" (RDPO) CONCEPT

.1 **Introduction:**

In this section, one specific demand to the EMET stemming from limited areas in the shipping industry, will be discussed.

We refer to the concept of the "Dual Purpose Officer" (DPO). Albeit of paramount importance, the aim of the following discussion is not to undertake the required comprehensive study on the advantages or disadvantages of the concept. That requires extensive research and some safety aspects may have to be dealt with in the appropriate International Forum, that is to say the International Maritime Organization (IMO).

Nevertheless, some systems using DPOs concepts, are already in existence and tacitly accepted as complying with the international mandatory safety standards and others are under study.

All of the aforementioned systems differ in the ultimate aims and in the ways to achieve them. They reveal that there is not a clear and widely accepted view, on what a dual purpose officer is or what it should be. The same applies to the limits of the career and to the scientific contents of the courses. This is the main reason for the present discussion, how, if required, the EMET may deal with the DPO concept at the initial stage of implementation, without impairing its ultimate aims.

Furthermore, it is necessary to stress at this stage that the dual purpose general tasks we are referring to, concern the dual ability to perform Deck and Engineer jobs, exclusively.

.2 Conceptual Guidelines for the Design of the DPO System

The author considered that the design of the proposed DPO system should take the following factors into account:

- the "science contents" quality of monovalent certificates of coompetency must be met,
- the "professional experience" quality of monovalent certificates of competency must be met,
- the "knowledge" and "professional experience" quality levels, required by the infrastructure of the shipping industry must be met,
- the industry and social environment needs and reality must be taken into consideration,
- the required technological base of ships and equipment that can be operated by the DPO must be clearly defined,
- the range of activities and job performances that a DPO is expected to perform and achieve must be clearly defined,
- the international mandatory minimum standards, and
- the range of strategic planning in the industry (that is usually much shorter than state or governmental MET ones).

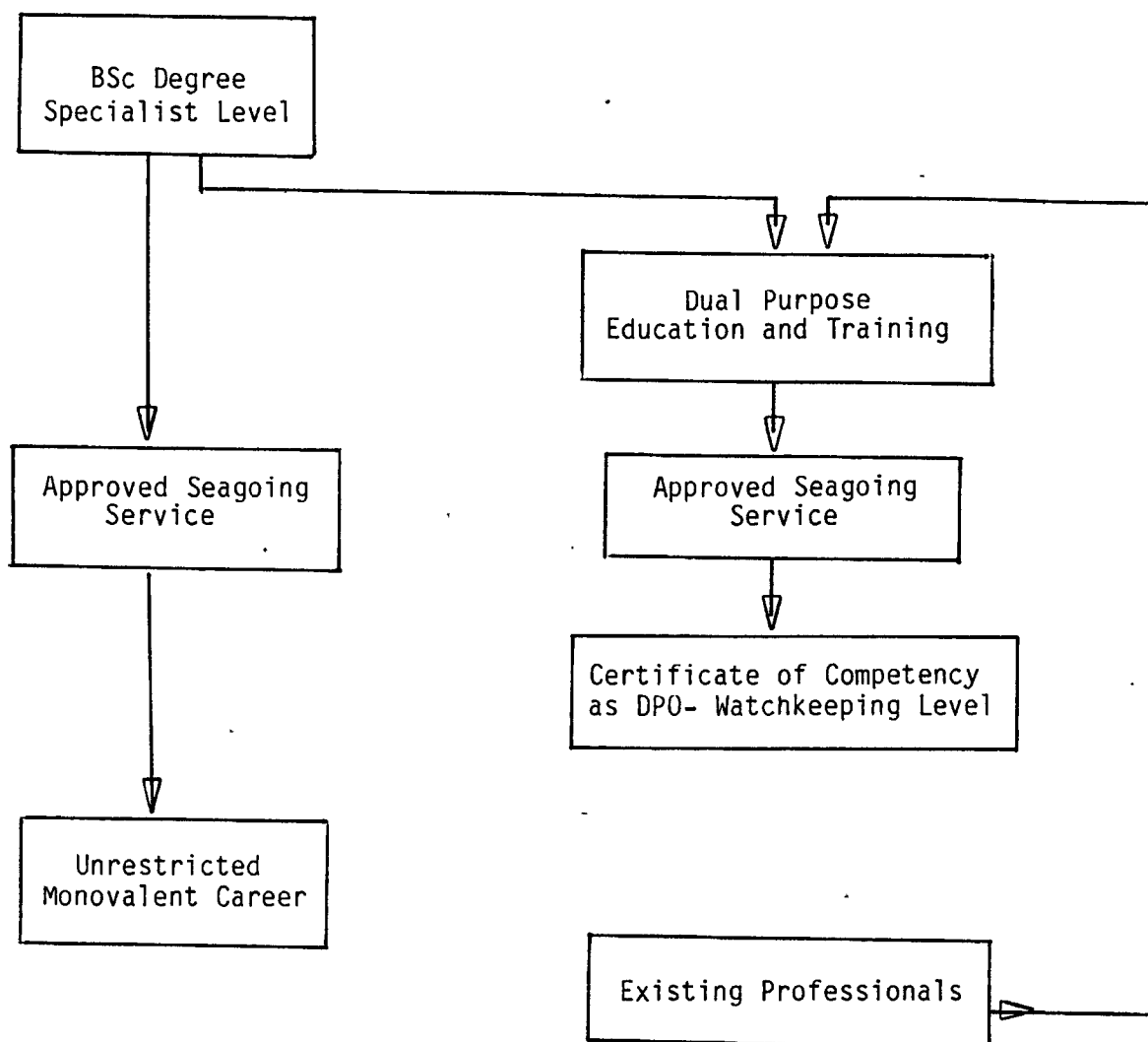
From the aforementioned, we may conclude that if a DPO system is desired to comply with the international mandatory minimum standards and industry needs, then: additional education and training must be provided, ensuring that shipowners will have extended job performances at watchkeeping level provided enough technology is available.

Furthermore, this additional education and training scheme should not impair either the quality of the specialist monovalent courses or the access to further academic and professional careers and will be Restricted to Dual Purpose Watchkeeping.

Moreover, only the education and training scheme to convert monovalent deck into bivalent watchkeepers will be discussed.

.3 How the Extended Maritime Education and Training System (EMET) May Deal with "Restricted Dual Purpose" Courses? (A Proposal)

Stemming from the previous discussion and the parameters set in the previous paragraph (4.4.2), a scheme of education and training, intended to allow monovalent Deck Officers and trainees into the "Restricted Dual Purpose" (RDPO) Certificate, may be designed as follows:



.1 Special Training Requirements and Parameters

1. **SCOPE:** The training system will depend on the required job performances, assessed through a job task analysis. It will only be considered the level of "bridge operation and control of the engine command console". Additionally, the possibility of undertaking minor maintenance tasks directly related to the aforementioned equipment will be also considered.
2. **DURATION:** It is believed that the duration of six months of education and six months of approved seagoing service would reasonably fit safety requirements.

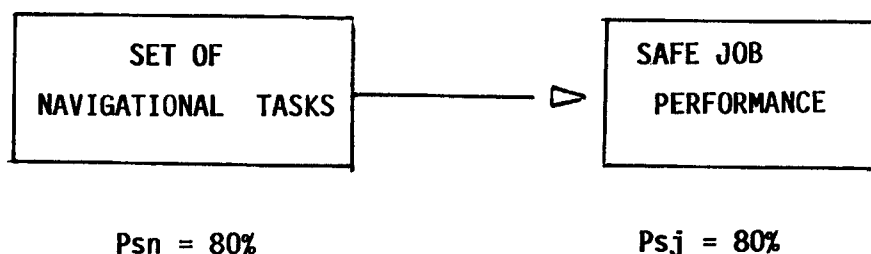
3. **STRUCTURE:** The course should be organized in modules, with one month of duration and exams immediately afterwards. Namely the following areas should be considered in the modules:

- Propulsion
- Mechanical Systems
- Electrical Systems
- Electronic Systems
- Automation and Control
- Hydraulic Systems
- Monitoring Systems
- Engine Simulator Training
- Integrated Bridge and Engine Simulator Training

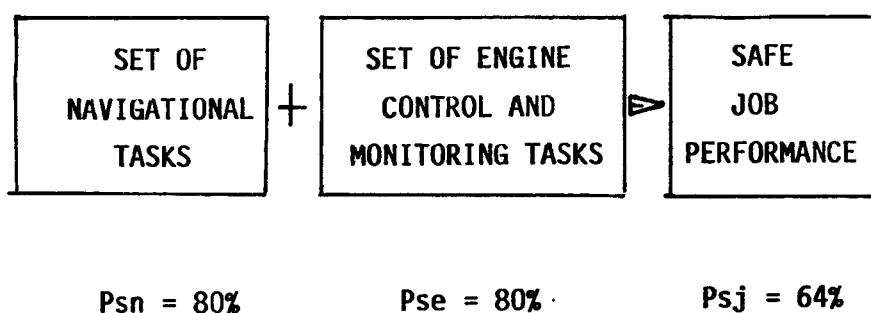
.2 The Need and Requirements for Simulator Training

Whatever the situation might be, if a task is added to the job performance, the probability of successful completion of the job will be smaller, as illustrated in the following discussion:

1. Let us assume that the Monovalent Deck Officer of the watch in the bridge has a probability of successfully accomplishing his set of navigational tasks (P_{sn}) of 80%, then the probability of successfully accomplishing the required safe job performance (P_{sj}) is also 80% because the safe job performance depends only on the navigational tasks.



2. Let us consider now the "Restricted Dual Purpose" Watchkeeping Officer. In order to accomplish the safe job performance, the Officer must accomplish the set of navigational tasks and the set of engine control and monitoring tasks simultaneously. It is a compound system situation and the reliability will drop because only when the two independent sets are accomplished successfully, the final product will be successful.



This simple example was given to stress that reliability of safe job performance drops with added tasks and therefore added care has to be taken, namely at the training stage.

3. Simulation Training: At least one month of the course should be dedicated to the use of simulation techniques that may reproduce the engine working environment. At least the last two weeks should be dedicated to simulation techniques that may reproduce, as accurately as possible, the future working environment, that is to say Navigation and Engine tasks at the same time. Therefore, the traditional navigation ship simulator (either blind or with picture display) must be upgraded to include simultaneously the operation and monitoring of the engine command console. A typical

stress situation will then be the need to take action when, at the same time typical emergency actions are required, e.g. malfunction in the engine that must be corrected and need to perform and assess anti-collision manoeuvres. The student must be re-trained to assess the most immediate or significant danger and perform accordingly.

In addition, simulation will become an extremely important tool for improvements in both ergonomics and human behaviour, in the new bridge scenario.

Finally, any mandatory requirements for certification should always include and specify the integrated navigation and engine bridge simulator as a training requirement.

4.5 SUMMARY OF THE ADVANTAGES OF THE PROPOSED SYSTEM

The system will allow:

- flexible and immediate answers to the overall needs of the shipping industry,
- the training of students, newly graduated officers or existing professionals (all ranks),
- valuable research in the fusion and optimization of disciplines and therefore, controlled feed-back into the specialist level courses, and
- to test the real desire and need of the shipping industry for this new job performance. This means that if shipowners really need it, then they will send their professionals for upgrading, assuming the financial burden of the courses.

The training of professionals will be particularly valuable for the assessment and improvement of the system.

The system will not interfere with:

- specialist training,
- academic level and recognition by the national educational system of academic degree, and
- extended academic studies and higher specialization careers.

Therefore, this system will not interfere with the overall philosophy of the Extended Maritime Education and Training System (EMET). In addition, the latter will not be over-dependent on a new system that has not been properly tested and widely accepted by the shipping industry and professionals and whose future parameters are unknown.

Briefly, the proposed system will have all the functional advantages of the previous and in addition will be able to respond with the shortest possible delay (one year) to eventual requirements of the shipping industry.

CHAPTER FIVE

CONCLUSIONS - PART TWO

THE NEED FOR HARMONIZATION OF MARITIME EDUCATION AND TRAINING (MET) SYSTEMS IN THE EUROPEAN ECONOMIC COMMUNITY (EEC)

5.1 INTRODUCTION

1. Overview

Although an entirely new subject stemming from the foreseen single and common labour market in 1993, whereby total freedom of employment throughout EEC countries will exist for workers coming from any EEC country, the need for "harmonization of training schemes and standards" has already been pointed out by G. Zade (1) from a conceptual point of view and by European Shipowners (2) as the logical result of 1993's new reality.

Furthermore, the analysis of the contents of, at least two Conferences Seminars that have taken place in Europe during 1983 (3), reveals that this subject is under

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- (1) Zade, G., Vice-Rector and Academic Dean, World Maritime University, Paper on "The Need for Harmonization of Training Schemes and Standards in Western Europe", presented at conference "Marine Training Forum Europe '89", Amsterdam, the Netherlands, 20 - 22 June 1989.
 - (2) Boquin, C., Director Dreyfus SA, paper "La Formation Professionnelle Maritime Le Point De Vue De L'Armement" - presented at conference "1993: Une Chance Pour L'Officier De La Marine Marchande Française", Le Havre, France, 16 - 17 February 1989, p. 6.
 - (3) Conferences: "Marine Training Forum Europe '89", Amsterdam, the Netherlands, 20 - 22 June 1989 and "1993: Une Chance Pour L'Officier De La Marine Marchande Française", Le Havre, France, 16 - 17 February 1989.

carefull study and will embody the national policies that sooner or later will be presented by each member country to the relevant structure of the EEC. The aforementioned applies also to relevant bodies of the community that have analysed the issue in the last five years (1) and (2).

Therefore, the aim of the present discussion is not to establish the need or to justify it from a conceptual point of view, because that has already been done (for further readings see notes (1), (2), and (3) on the previous page and (1) and (2) on this page) but to expand on a possible way to achieve the required harmonization, under the concept communitary development and cooperation. Furthermore, this discussion will be restricted to the MET for the highest certificates of competency (unrestricted), for Deck Officers, both on seagoing and shore-based careers.

2. What Requires to be Harmonized?

Free circulation and equal access to the labour market will require imply equal or equivalent certification (3) and (4).

In the specific area we are dealing with, this will require the harmonization of:

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- (1) "EEC Maritime Transport Policy", Economic and Social Consultative Assembly, European Communities, Economic and Social Committee, Brussels, June 1986, pp 14, 15, 38 and 39.
 - (2) "Progress Towards a Common Transport Policy - Maritime Transport", Commission of the European Communities, Brussels, 14 March 1985, pp 25 (42.) and 48 (98.).
 - (3) Ibidem (1).
 - (4) Resolution of the Council of Ministers of the EEC on 21/12/88 on the equivalence of academic certificates.

- .1 seagoing career/certificates of competency, and
- .2 shore based career in the infrastructure of the shipping industry and in the global chain of transport.

In fact, certification that clearly meets the job demands will be required by any EEC employer whether it concerns seagoing or shore-based jobs.

- .1 As far as the seagoing career is concerned, each national Maritime Administration (MARAD), must have the means to analyse and assess with objectivity the absolute and relative value of any certificate of competency, issued by any other EEC country (analysis of the value of the certificate for itself and in relation with others).

Only after performing this assessment (verifying harmonization), the relevant MARAD will be able to guarantee to the shipowners flying their flag, that the "foreign" certificate of competency ensures a given standard of safe job performance (higher/equivalent/lower) in relation to the national standard.

Nevertheless, through this type of assessment only, the shipowner will not be able to know, "a priori", what is the real value of the certificate and of the related professional experience, from a quality of operation point of view. That must be left to a problematic "trial and error" method.

- .2 The problems that a prospective shore employer will face, are roughly the same. The only added difficulty is that no MARAD will be available to assess and certify the safe job performance level and associated skills presented by the prospective employee.

Other governmental authority must be found to certify not only those, but in addition the "knowledge contents" of the qualifications presented. Most likely this task will be performed by the ministry of education at an earlier stage.

In fact, the institutions under the Ministry of Education seem to be far more advanced than those sea-related e.g. the higher education sector has already developed a number of actions towards the harmonization of schemes and standards related to academic qualifications and degrees. As the Ministry of Education is responsible for the education requirements for almost all of the scope of social activity, much has to be learnt from their experience in the process and in fact they should be responsible for the "science contents" and academic profile of the MET systems.

3. Why Is the Harmonization of Contents of MET Required?

From the previous discussions it results that an objective analysis of the Certificate of Competency is required. Nevertheless this analysis of the external frame of the education process will not be enough for other purposes than safety. Operational capabilities that are of paramount importance for the economic output of the shipping industry are not defined internationally through a traditional certificate of competency. This applies both to the shore-based and seagoing careers. Furthermore, it is well known that in some countries MET is reduced to the bare bones of the international mandatory minimum safety standards. Therefore, the pathway towards the global assessment of absolute and relative qualifications will always point out to the analysis of contents and that also implies the analysis of the processes that generated those qualifications.

In the case concerned, the aforesaid implies the comparative analysis of MET systems and institutions. Looking for similarities and differences is not an easy task unless the systems are close. Unfortunately MET systems in EEC are not close.

In fact and as G. Zade has pointed out (1), both the aims for ways to achieve a maritime education differ substantially amongst EEC MET systems, e.g. monovalent/bivalent certification, academic entrance requirements, front/hawse-pipe entrance systems and academic degrees. In some cases differences stem directly from industry and/or social demands, whereas in others tradition or MET policies are the main reasons. Whatever the case may be, each existing system represents each country's official view on MET.

However, the situation has changed and for 1993 what will be required is a system that represents the view on maritime education of the EEC as a whole. Therefore, existing differences must be smoothed and either the final output or the contents of education must be harmonized.

It is the opinion of the author that harmonization of the output alone will not bring any additional advantages and will have large built-in disadvantages because it will reflect and maintain the concept of the national view, instead of allowing for the adoption of an EEC view that will be required for any future developments. In fact the adoption of the harmonized output concept by itself, would not reflect the aims, policy and stage of development of the community as such and therefore it would not

(1) Zade, G., Vice-Rector and Academic Dean, World Maritime University, Paper on "The Need for Harmonization of Training Schemes and Standards in Western Europe", presented at conference "Marine Training Forum Europe '89", Amsterdam, the Netherlands, 20 - 22 June 1989, pp 3 to 5 (ad 1, 2, 3, 4).

be a contributing factor to the desired development of the community. Likewise, this approach should only be used in the transition stage, as the first step towards the implementation of a global system and under that concept.

On the contrary, the adoption of "harmonization of contents" as the leading concept would bring forth the following advantages:-

- it would reflect the spirit of the community,
- it would be coherent with the global strategy of the community towards development,
- it would ensure harmonization not only during the transition phase but in the future as well,
- the entire MET system would become interactive and would benefit from all the experiences and needs of each national system, and
- increased quality and flexibility might be expected from a system that would have to accommodate different practical applications under a common leading concept.

4. How to Harmonize

To harmonize different systems, under the same leading concept, a factor of harmonization is required. It must represent a common denominator to each and all national MET policies, that is to say, a common starting point bridging the different systems. At the same time it must provide an objective comparison criteria, so that different systems are neither penalized nor unduly rewarded and finally it must be coherent with the final aims of the desired global MET.

Therefore the criteria to find the factor of harmonization must comply with the following parameters:

- the intended access of students to the labour market where they will fulfill their social role,
- that students future social value will depend on the width and depth of the labour market layers, they were trained for,
- the width and depth of the prospective labour market depends directly on the "knowledge contents" of the education and training process,
- international mandatory minimum standards of safe job performance,
- EEC's global policy and aims on education,
- EEC's global policy and aims on the prevention of pollution and the protection of the environment,
- a harmonized system and aims will produce harmonized social values, and
- the need to prevent unfair competition among member countries.

5.2 TOWARDS HARMONIZATION: A Proposal - the Harmonized EEC Certificate of Competency/Seagoing Career and the Harmonization of Entrance Requirements and Academic Degrees for the MET System in the EEC.

The following proposal is intended to answer the demands for harmonization from:

- .1 the seagoing career/certificates of competency
 - .2 shore-based career in the infrastructure of the shipping industry and in the chain of transport.
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- .1 **The Harmonization of Seagoing Careers and Certificates of Competency**, will certainly be the first and foremost problem to solve, as far as the EEC's shipping industry is concerned. The way this problem is tackled will determine the way MARADs and the social partners will accept in practice the spirit of 1993 and therefore it will deeply affect the overall scenario of the EEC's shipping industry in the nineties.

Although a straightforward solution might be to take the "International Convention of Standards of Training, Certification and Watchkeeping for Seafarers, 1978" (STCW/78) as the harmonizing factor, because:

- it represents the international mandatory minimum safety standards, and
- it is one of the safety requirements adopted by the 1982 Memorandum of Paris, that is to say the relevant rules and requirements of Port State Control applicable in EEC and the Community recommended policy in safety of navigation (1).

The fact is that adopting the STCW/78 as the only harmonizing factor should be carefully taken into consideration because:

- the convention is eleven years old, and
- it represents only the best compromise solution if taken on a worldwide basis (as it was intended to).

Therefore and albeit of paramount importance the STCW/78 did not reflect entirely the possibilities and needs of the EEC shipping industry and MET of eleven years ago, but instead the acceptable minimum safety standards for the worldwide shipping community of eleven years ago. In addition, it must be stressed that during the last decade new technologies were introduced and new training systems came into existence. Presently STCW/78 needs to be updated even from a worldwide point of view.

Therefore, the adoption of the STCW/78 as the single harmonizing factor would represent a contradiction with the concept of relative performance and safety standards that the other industries must meet in Europe if compared

(1) "Progress Towards a Common Transport Policy - Maritime Transport", Commission of the European Communities, Brussels, 14 March 1985, p. 48 (98.).

with the rest of the world, namely as far as the prevention of pollution and safe standards of operation are concerned.

As a result of the aforesaid the following is proposed that:

- an EEC Certificate of Competency, and
 - an EEC seagoing career
- should be created and should be based both on:
- the STCW/78 requirements, and
 - extra (EEC) safety and operational requirements (1).

The final result should represent for the EEC the same that the STCW/78 represents for the worldwide situation, that is to say the minimum mandatory safety standards acceptable by and for the EEC as a whole.

The proposal can be summarized through the following diagram:

Diagram 1:

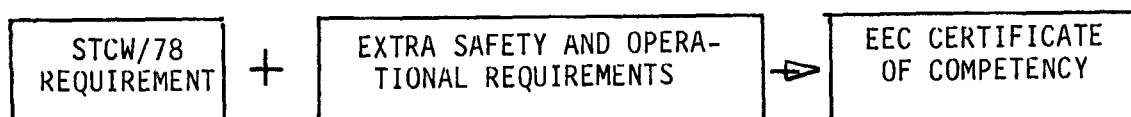
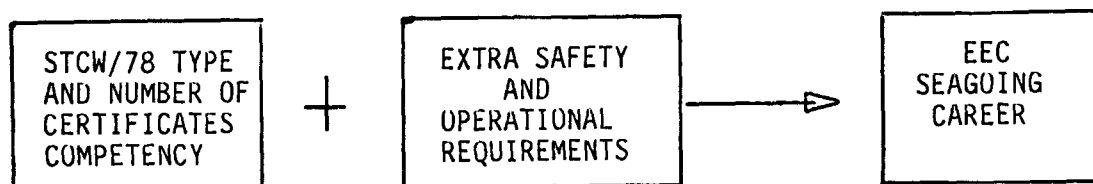


Diagram 2:



(1) Bernet, C., Directeur de Gens de mer e de l'Administration Generale au Ministere Delege Charge de la mer - Paper "L'Acte Unique Europeen et les Directives Du Livre Blanc Annexe", presented at Conference "1993: une Chance pour l'Officier de la Marine Marchande Francais", Le Havre, France, 16-17 February 1989, p. 20.

This implies that the community must create an organized technical structure to discuss and adopt the "extra" requirements and the final decisions, that should later on be presented as a proposal to the relevant organs of the community for approval.

It is felt by the author that the contents of the "EEC Certificate of Competency" and the "EEC seagoing career", after coming into force within the community, should be presented both by the community and by each individual member country to the International Maritime Organization (IMO) as a proposal to update the STCW/78.

In addition it must be stressed that some special certificates such as the bivalent or restricted bivalent, must be clearly defined in relation to the monovalent certificates and careers.

- .2 **The Solution to be Found for the Harmonization of a Shore-Based Career in the Shipping Industry Infrastructure and in the Chain of Transport**, is not as straightforward as the previous one. In fact, shore-based labour qualifications and requirements, vary widely from country to country and the same applies to the relevant contents of education and training as well as to professional careers and experience. The only common factor to be found is that there is always an academic qualification backing the labour performances and requirements. In most cases there is a close relationship between the level and type of academic achievements and level and type of job.

It is believed that trying to set up a framework of detailed aims and harmonizing factors that may cover the entire range of demands of the EEC shipping industry infrastructure and chain of transport may be achieved not in the first stage of harmonization but as a result of the harmonization process at a later stage.

Therefore, it is believed that, as G. Zade pointed out (1), a course of action based on the EEC "Harmonization of Schemes and Standards in Higher Education" and on the necessary translation of MET science contents into academic degrees, will be the right way towards harmonization, allowing it to be achieved until 1993.

Nevertheless two basic parameters must be met if this course of action is to be followed:

- the acceptance of the EEC certificate of competency and seagoing career, and
- the harmonization of entrance requirements for the MET.

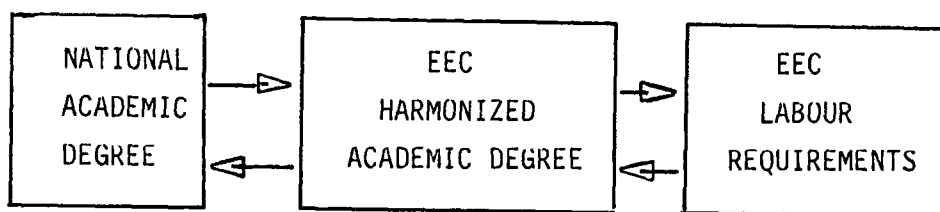
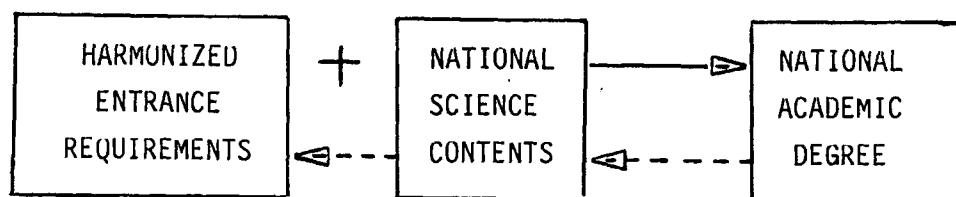
As the first parameter was already dealt with in 5.2.1 only the second will be discussed. It seems only necessary to point that, in general, if the entrance requirements are substantially different then the final output will be different in terms of quality and consequently in terms of academic degrees. The general trend in Europe is to have entrance requirements for the MET equivalent to those for higher education, still some countries lag behind.

Therefore the first step must be to harmonize the national entrance requirements for the MET with the national entrance requirements for higher education. Then it will be possible to use the rules and procedures

(1) Zade, G., Vice-Rector and Academic Dean, World Maritime University, Paper on "The Need for Harmonization of Training Schemes and Standards in Western Europe", presented at conference "Marine Training Forum Europe '89", Amsterdam, the Netherlands, 20 - 22 June 1989, pp 2 and 12.

resulting from the EEC's "Harmonization of Schemes and Standards for Higher Education" to fully harmonize the MET in the EEC.

The proposal may be defined through the following diagram:

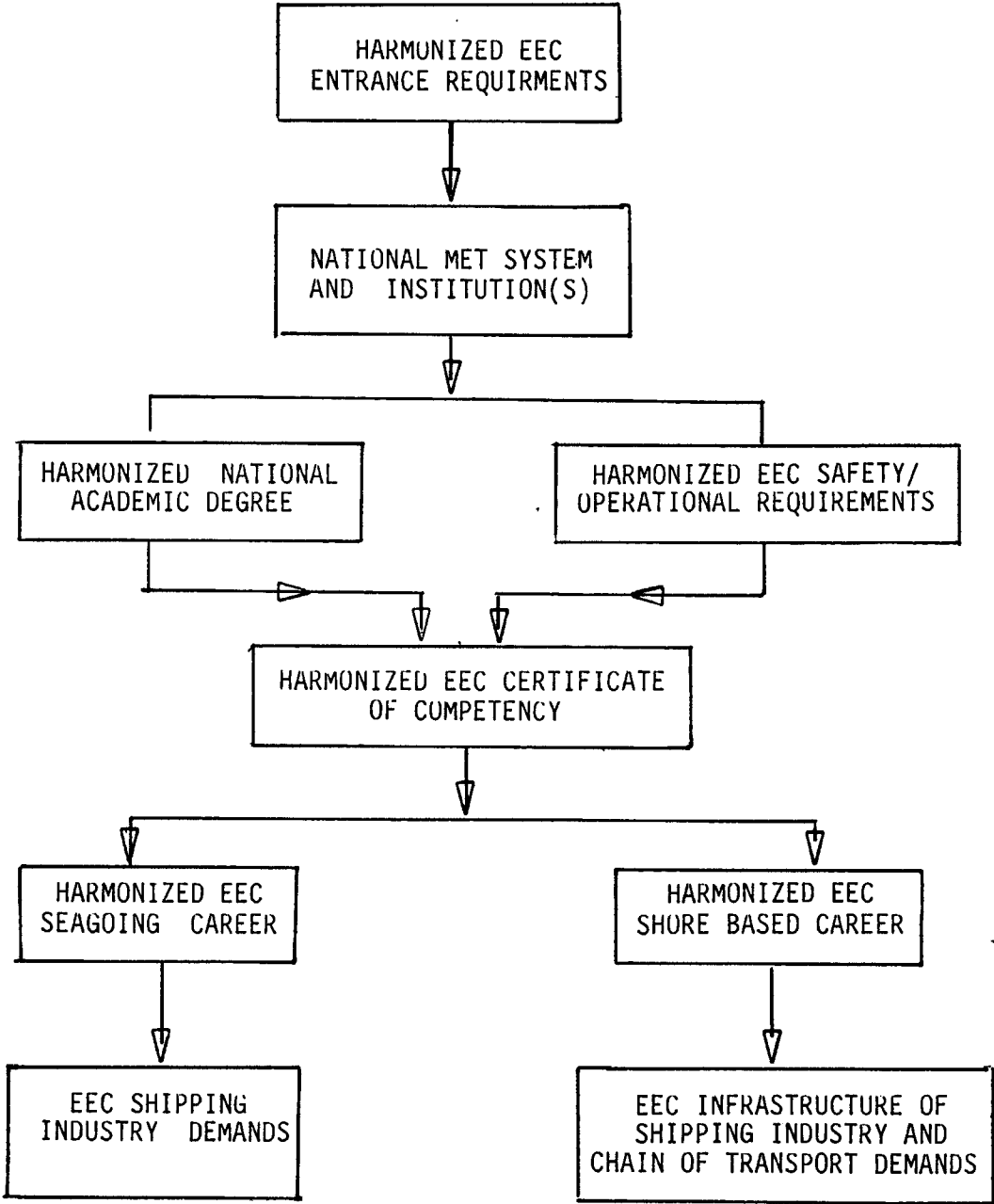


We would like to stress that this way seems to fulfill two basic aims:

- answer to the new EEC requirements under the spirit of 1993, and
- prevent unfair competition and wrongful use of the 1993's open pathways.

A diagram showing an overview of the proposed global harmonization of MET in the EEC is presented next.

3. Overview of the Proposed Harmonization of MET in the EEC:



5.3 THE CREATION OF AN EEC ACADEMY OF MARITIME STUDIES - A Proposal with the Objective of: Harmonize Science Contents, Upgrade Maritime Lecturers and Experts, Develop Applied Research and Science Parks, Optimize the Use of Existing Facilities and the Overall Output of MET Institutions and Systems

In the previous paragraphs we have dealt with the harmonization of: entrance requirements, academic contents, certificates of competency and seagoing career. Nevertheless there is still one fundamental parameter in the MET systems for which no concrete proposal for harmonization was made, it refers to the science contents of maritime technical subjects.

1. The Harmonization of Science Contents of the Maritime Technical Subjects

Although the headings for these subjects are in general standardized, their contents are not.

IMO is taking steps in that direction, namely as a result of the creation and the work developed at the World Maritime University (WMU) - Malmö. A good example of the aforementioned is the development, with Norwegian funding, of syllabi and contents of IMO short training courses in specific technical subjects related to the STCW/78 requirements, to be applied worldwide.

It seems relevant to stress that although of paramount importance for the real application of the requirements contained in the STCW/78, only in the last two years a comprehensive and extensive work on short training courses came into existence. This fact reflects both the difficulty of the task and the need for a widely accepted and centralized structure to trigger, organize, perform and monitor the project. Without WMU or with WMU at a lower development stage this would not have been possible.

Within the EEC the situation is similar to that existing in the International Maritime Community before the creation of the WMU, that is to say:

- few international contacts between institutions and/or specialists (1),
- the existing contacts are mainly made on a personal basis (2), and
- in several countries only one institution exists without any communication links to others

and this has led to:

- none or limited communication,
- an increased trend for isolation of institutions and/or specialists, and
- survival strategies adopted by the institutions lead to added inaccurate and scarce exchange of information.

As the superstructure has changed (EEC 1993's leading policy) the institutions and specialists will be forced sooner or later, either to establish contacts and define common strategies or to have to accept policies defined by someone else whose good intentions will not be enough to compensate for the lack of knowledge of the MET and may produce regrettable results. Similar developments have happened in many EEC countries in the context of the definition to National MET policies.

It seems to the author that the logical step towards

(1) Zade, G., Vice-Rector and Academic Dean, World Maritime University, Paper on "The Need for Harmonization of Training Schemes and Standards in Western Europe", presented at conference "Marine Training Forum Europe '89", Amsterdam, the Netherlands, 20 - 22 June 1989, p. 6.

(2) Ibidem (1)

harmonization of the science contents of the maritime technical subjects as well as towards the entire harmonization process of the MET in the EEC, requires an active leading role of the MET institutions and specialists in the EEC.

Geographical dispersion and the large number of existing institutions imply the creation of a centralized structure within the EEC framework that will deal, manage and administer the global MET policies for and in the EEC.

Therefore the creation of an **"EEC Academy of Maritime Studies"** is necessary and it is believed that it will have the same positive impact on MET in the EEC, as the one WMU achieved in the worldwide MET scenario.

The creation of such an institution will not be contradictory with the existence of WMU, quite on the contrary, because the main conceptual guidelines and final aims are the same, mainly complementarities will exist. While WMU must cater for the worldwide situation, the EEC Academy may design a tailor-made system that fits the EEC scenario and needs. Furthermore, the interaction and cooperation that will necessarily exist among the two institutions will produce positive impacts in both of them. A proof of what was said before lies both in the cooperation that many EEC countries already have with WMU either through individual institutions or specialists.

Last but not least if harmonization is achieved in the EEC, this will mean an easier way to achieve it in a worldwide scale, because of well known reasons, EEC MET systems have been the main generating seeds of those worldwide MET systems.

2. Organizational Structure

Concentration of resources does not necessarily imply the

geographical concentration of all the available resources in a given place. It may also mean a centralized management and administration of all the available resources. This latter view seems to fit better the EEC scenario and philosophy. Accordingly, a centralized administrative structure with a given geographical location, that would manage a decentralized network of focal points of specialized activity (where specific resources are concentrated) should be created.

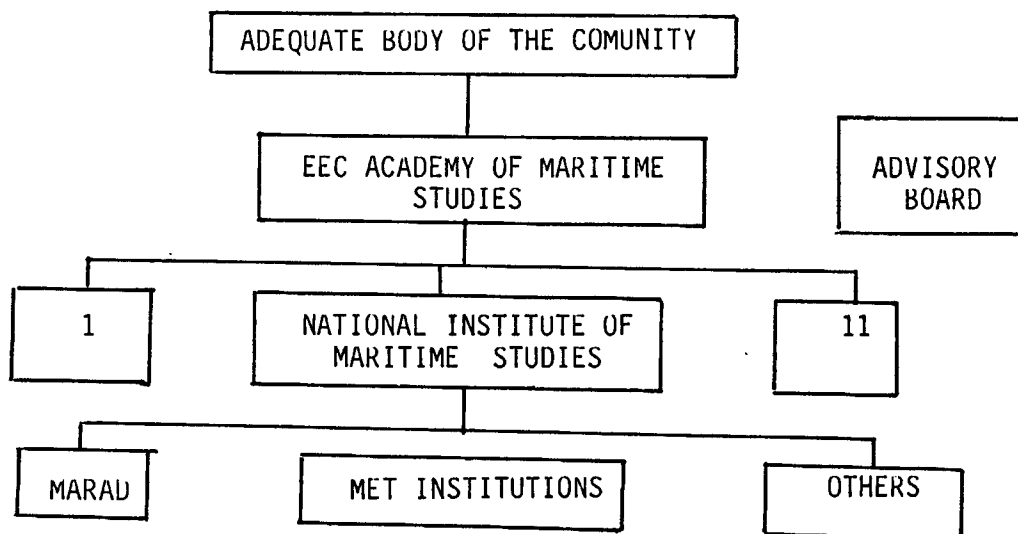
It is the firm belief of the author that any attempt to concentrate all resources in the same place not only would not be possible but would generate such antagonism that the whole concept would perish. Some of the reasons for this are as follows:

- eleven of the twelve state members of the community are traditional maritime countries,
- in general, all of these countries experience overcapacity of MET institutions and infrastructure, e.g. closing down of MET schools already done or intended to,
- all these countries have "know-how" in the maritime field as well as a "tradition" of MET,
- all of them have specific comparative advantages stemming from different sources, e.g. existing equipment, "know-how", political power, strategic geographical location, and
- each one of the countries would warmly welcome the chance of hosting the **EEC Academy of Maritime Studies** (therefore acquiring a comparative advantage in all matters related to MET and stemming from it).

Its practical aspects of the chosen approach are as follows:

- the EEC Academy of Maritime Studies should be related to and dependent on an adequate directing organ and/or structure of the communities,
- the administration of the EEC Academy of Maritime Studies should be located in Brussels,
- the management body of the Academy should be composed by eleven **National Institutes of Maritime Studies**,
- each National Institute should represent the administration of MET in each country and also relevant national organizations or institutions, e.g. MARAD and MET Institutions and Shipowners Associations,
- An **Advisory Board** to the Academy should be created and its constituting elements should represent International and EEC Organizations and Institutions of relevance e.g. teaching institutions, professional organizations, industry organizations, labour organizations and specialized maritime agencies.

An overview of the organizational structure is demonstrated in the following diagram:



As an example the following institutions or organizations should be part of the Advisory Board: WMU, EEC Shipowners Association, EEC Shipping Related Industry and Services

Associations, EEC Nautical and Navigation Institutes, EEC Research Institutes or Bodies, Chain of Transport Operators Associations, etc. If and when required any other relevant institution or organization should be consulted.

3. Generalities on the Work of the Academy

The general aims of the Academy should consist, namely of the following:

- development of the maritime sciences in the EEC,
- organization and expansion of research in and to the maritime field (1),
- optimization of the existing resources,
- definition of definite fields of specialization for each member country
- (propose) the allocation of EEC funds for research,
- development of communication among MET institutions,
- definition and organization of upgrading, specialization and post-graduate courses for EEC maritime lecturers and experts (2),
- creation of a network of leading institution that will conduct research and promote upgrading specialization and post-graduate courses.
- creation of new or development of existing mini science parks geographically located near the relevant specialized institution/country,
- harmonization and advancement of the contents of maritime sciences in the community, and
- definition of the general strategies and proposition of global policies for the EEC in this field.

(1) "Post-Graduate Education in the 1980s", OECD, Paris 1987, p 74 (lines 1-4).

(2) Ibidem (1), p. 7 (line 7).

To support the existence and work of the Academy a harmonized communication language is required. As pointed out by G. Zade (1), referring to the development of contacts that have been taking place among different countries MET institutions - increased contacts were possible due to an increasingly spread ability to communicate in English. Communication in technical matters requires a harmonized language and whatever the practices may be in other fields of the community, this one requires English as the first and foremost communication language. Without a harmonized working language no seminars, joint researches, post-graduation courses will be possible as well as basic communication between specialists. The importance of the ability to communicate in English, in the maritime community, is so overwhelming that it is mentioned as one area where higher efforts should be concentrated for improvement by a major study on the French MET System (2).

The criteria used to define the specialized area of activity assigned to each country should consist mainly of:

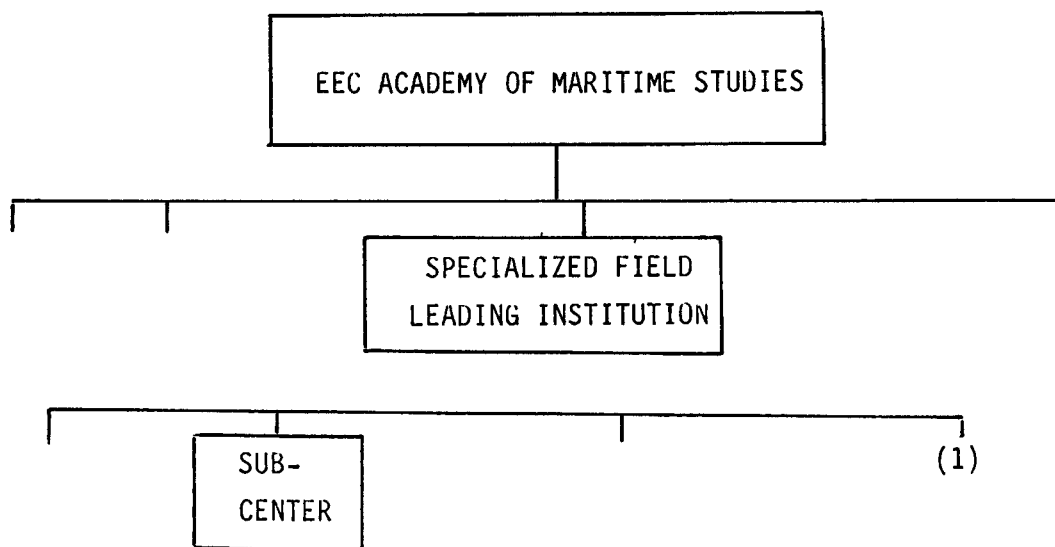
- existing resources (equipment and know-how)
- strategic location
- cooperation possibilities with foreign countries
- shipping industry environment
- political interest

(1) Zade, G., Vice-Rector and Academic Dean, World Maritime University, Paper on "The Need for Harmonization of Training Schemes and Standards in Western Europe", presented at conference "Marine Training Forum Europe '89", Amsterdam, the Netherlands, 20 - 22 June 1989, p. 6.

(2) Dubois, J., Ingenieur General des Ponts et Chaussees and Fouche, G., Director ENMM du Havre - "Ecoles Nationales De La Marine Marchande - Rapport De Mission" - March 1988, pp 10, 17 and 34.

Nationality of staff appointed for leading institutions for research and training: one key element to the overall concept is the requirement that any local centre of research or activity must not only be open to researchers from other countries of the community but that a maximum ratio of nationals/other EEC nationalities needs to be established when defining the permanent staff of the centre. The general principle is that every country must have access and participate in every and each type of research or activity developed. One of the best ways to ensure it, is through the appointment of staff for the local centres.

Overview of Leading Institutions Network



- (1) Network of EEC member countries Sub-Centers (one or more sub-center per each country) working in the specialized area under the supervision of the leading EEC institution.

5.4 IMPLEMENTATION STEPS

It must be recognized that the complete organizational structure of the EEC Academy of maritime studies will require time to be built. At the same time several matters require more immediate consideration, such as the upgrading of maritime lectures and the specialization of maritime experts in some areas.

Answering in the short terms to these needs, would be possible, if leading institutions for research, education and training, were appointed by the adequate body of the community even before the entire structure of the academy is completed. Such a development would be a consistent intermediary step, with the process of creation of the academy.

Accordingly, some EEC Maritime Education and Training Institutions, that are outstanding in areas where training is urgently required, should be appointed as the leading institutions for research, education and training in those areas. Furthermore, the appointed institutions should be able to initiate their new work without delay.

Some of the areas where harmonized upgrading and specialization is particularly required, are the following:

.1 For the harmonized upgrading of maritime lecturers

- shiphandling simulation
- liquid cargo (tanker) operations (requires simulator)
- radar and navigation simulation (extended use of ARPA)
- electronic data processing

.2 For the harmonized specialization

- port state control (for administrators and inspectors)
- vessel traffic systems (for administrators and senior officials)

A direct consequence of this implementation step would be the harmonization of MET science contents in those areas, additionally this would result in the facilitation of the harmonization process of maritime education and training systems that should take place until 1993. Furthermore, the experience gathered would be invaluable for the subsequent implementation steps of the EEC Academy of Maritime Studies.

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