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## How to improve maritime education in Mexico using existing structure and human resources

Angel Saucedo Escobar  
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**THE WORLD MARITIME UNIVERSITY ★**

How to improve maritime education in Mexico using existing structure and human resources and complying with requirements of the STCW-78 convention and the Public Education Ministry.

**by: Angel Saucedo Escobar**

**from: Mexico**



**15 May 1985**

**Thesis directed by:  
Charles E. Mathieu**

**Professor World Maritime University  
Malmoe, Sweden**

*Charles E. Mathieu*

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## The Author

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ANGEL SAUCEDO ESCOBAR is a Marine engineer, 33 years of age, who graduated from The Merchant Marine School of Tampico, Tamaulipas, Mexico in 1973.

During the development of his professional life, he has amalgamated experience aboard merchant ships, as a full time Professor in Maritime Academies and Instructor of engineering courses aboard the Mexican Training/Cargo Ships.

He has navigated general cargo ships, semi-container, tankers and LPG ships, and has served afloat in all existing responsible positions in his professional field.

He has imparted almost all technical subjects to the engineering cadets in Merchant Marine School of Tampico, also he has attended several pedagogy seminars and one technical course in The Merchant Marine Academy of Kalmar, Sweden.

He attended a technical course as an Instructor of Diesel Plant Simulator (NDR-CONTROL) and he finished a Post-Graduate course in Instrumentation and Topics of Heat Engineering at the Technical Institute of Madero, Tamaulipas, Mexico.

Now he is attending the fourth and last semester of Science Degree Course of Maritime Education (Engineering Field) at The World Maritime University of Malmoe, Sweden.

## Abstract

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This document is written primarily as a requirement of the World Maritime University in partial satisfaction of the Maritime Education (Engineering) Course. And secondly it is directed as a personal analysis of the Merchant Marine Education in Mexico.

If my project assists or coincides with the new training philosophies and practices, I shall be satisfied with my work.

Much of its content is based on my own experience about maritime education and Mexican shipping and the constructive ideas that I have received in the course that I am now attending.

My thesis describes the main characteristics of Mexico, and its Merchant Marine Division with its main elements.

I show the Maritime Education in Mexico and its present system and I recommend a few changes in our educational system such as the duration of the basic education, refresher courses before promotional exams, and the creation of post-graduate courses.

I comment about some facilities necessary in our schools and how I believe economical resources can be obtained meet the needs in our academic activities.

I mention the nature and importance of motivation for professors and students with a few examples.

At the end I list nine main recommendations that I believe are important to adopt in our academies.

## Preface

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Maritime education is governed in essence by the image that we have of seamen, and in our country it is based on freedom, dignity, democracy, efficiency, safety, and a nationalism supported by universal values.

Mexican maritime education complies with requirements of the STCW-78 convention and also with the national requirement of the Public Education Ministry for consent with the Certificate of Competence at the professional level.

Many radical changes have taken place in the field of maritime transportation such as the development of a variety of special purpose ships, some of which are of enormous size, complexity & cost; new machinery design and numerous electronic aids & automatic systems.

Consequently, periodically, the curriculums at merchant marine academies shall be reviewed to comply with international, national requirements and our ideals about the sea professions.

## Dedication

I wish to offer this work to those who have motivated me most to write it, and I believe it has been written executed in a realistic manner.

I will not dedicate this paper to my top bosses because they have from me my admiration and respect. Also it is not dedicated to the members of my family because they have from me something more subtle and undecipherable.

I dedicate my thesis to Mexico, because in my life it has given me political and social stability, freedom, the guarantee of individual privileges, and a deep feeling of nationalism.

It is dedicated also to the Merchant Marine of Mexico, because, in spite of my modest economic origin and I being the unique seaman in my family, through its classrooms I was able to become a professional of the sea, and I received a good education thanks to my luck, my ambition, and my retentive memory.

It has been a source of my job and given me a lot of personal satisfactions. I have traveled through several countries in all continents, and I hope and desire to continuing the rest of my life serving the maritime field to the best of my ability.

I thank my course professor, Charles E. Mathieu, for his detailed direction of my thesis and his valuable opinions throughout the course.

# CHAPTER 1

## Introduction.

The oceans cover about three fifths of the world, there is a strong interdependent relationship between international trade and sea transport. It is stated that in international trade, about 95 % of all goods are carried by ships.

At present, among the normal transport systems for example: ships, planes, trains, trailers, etc. vessels are the type of transport that is the cheapest per ton-mile and is capable of carrying large volumes at the same time, relatively fast and safely.

Shipping is the business of transporting trade, and it is also the source for much employment.

The economist defines production as the creation of utilities, and transportation is a phase of production, also they recommend specialization, that is, each country or determined area will be more economical and profitable if it produces few products in large quantities and trades the products based on the existing natural resources such as: land, climate, manpower, capital, social and political stability, technology, management, etc.

United Nations experts reported in the 1980s that there were 4,487 million inhabitants in the world and calculated an increase to 5,704 million in the 1990s; and in 2000s statistically they have calculated that there will be around 7,410 million people living on this planet.

The population is growing more quickly in some parts of the world than in others. The continent with the fastest growth rate is Latin America (2.9 per cent) followed by Africa (2.6 per cent) and Asia (2.1 per cent).

Consequently, the developing countries have and will have more demand for food, housing, education, medical care, energy, employment, old age pensions and social services. Therefore they depend greatly on foreign trade and the transport by ships; without trade each country would be obliged to depend on herself for producing all needs of life. Living standards would be very low.

These problems faced by developing countries guide their governments to increase their productivity and trade, based on the freedom of the seas, by increasing their merchant fleets.

I believe that Mexico should also nationalize their vessels and phase out the flag of convenience, thereby reducing their dependency on other countries. In addition Mexico must train their people for the operation and management of their fleets.

In 1984, Mexico had a population of approximately 74.9 million; its population rate of growth was about 3.5 per cent a year and this is one of the highest in the world.

Forty two percent of its population are youth of less than 21 years of age. This would mean that the country would have to create one million new jobs annually.

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## CHAPTER 2

### Merchant marine of Mexico.

The united Mexican States is a federal republic in North America, it covers a total area of 1,972,544 square Kilometres and has 8,978.49 Kiliometres of coast. It is bordered by the United States to the north, The Gulf of Mexico and the Caribbean Sea ti the east, Belize and Guatemala to the south and east, and the Pacific Ocean to the south and west.

Ships are used for the transportation of 77 % of Mexico's external trade, until October 1st, 1984 Mexico had registred 1,204,137 grt, 1,917,288 dwt, 759,161 rrt in 99 vessels of 300 grt & dwt and over. This places Mexico 43rd out of 144 countries.

By the year 1988 Mexico expects to have enough ships, with a capacity to carry 4,600,000 grt, to transport 100 % their coastal trade and 35 % of their international trade.

On january 1st, 1985 in the world orderbook development of ships of 2000 tonnes (dwt, gross or displacement) and above. Mexican Shipowners or directors of mexican parastatal companies approved building contracts for 6 ships above 2000 tonnes (dwt, gross or displacement) approximately 198,400 dwt, 86,400 H.P. in total of which 4 of them are tankers of 154,400 dwt, and 57,600 H.P.

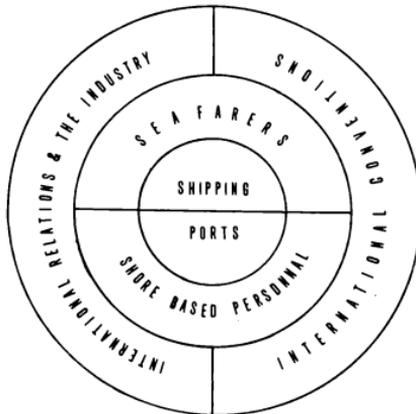
In 1917, article 32 of our National Constitution was approved whereby all mexican ships must be operated by mexicans born in Mexico; thus beginning the protectionist policy of our national fleet.

Recently we also have legislation, whereby 40 % of oil cargoes is reserved to the state oil company and in July '81 further legislation was made which reserves all government and parastatal cargoes to the national flag. In addition there is a 10 % rebate on freight costs to users of Mexican Ships.

Mexico was the world's 4th largest producer of oil/gas during 1983-84's with a production of 150,000,000 tons and Mexico's Petroleos Mexicanos (PEMEX) plans to drill at least 1,000 wells during 1985-89's to maintain Mexico's Production growth at 3 % per annum.

## 2.1 MAIN ELEMENTS THAT CONSTITUTE MEXICAN SHIPPING.

The below sketch represents elements that form the structure of our national shipping.



PORTS.- Mexico has 33 Harbour Master Offices, based in several coastal and internal states, 14 main ports on the Gulf of Mexico and 16 main ports on the Pacific Ocean.

SHIPPING.- The national fleet is the property of several organizations such as the government, the states, and private companies. All our vessels that sail on the sea, lakes and rivers, form our marine transport. This is controlled by the government through the ministry of transport and communication which consists of an operation division and a Merchant Marine division.

SEAFARERS.- Mexican seafarers have been trained well in technical, administration, social and cultural matters. They have conducted the national ships all over the world with great precision and security which has given us a modest international prestige.

At present, Mexico has approximately 4,660 seamen in active service aboard Coastal and Oceangoing Merchant Ships of 1,000 grt and over. At present there are three Merchant Marine Schools from which 200 new officers graduate annually. Two new training Centers for ship crew and port workers provide sufficient people to replace retired and promoted seamen.

SHORE BASED PERSONNAL.- There are about 0.5 million people working in our national marine field such as maritime enterprises and cooperatives, maritime and fishing institutes, operation of ports, etc.

INTERNATIONAL CONVENTIONS.- Mexico has traditionally respected compromises emanated from the IMO, or other similar organizations, signing, ratifying, accepting and approving all those conventions that are made for the welfare of humanity or its own interest. Mexico has retificated almost 45 % of international conventions.

INTERNATIONAL MARITIME CONVENTIONS

<u>CONVENTIONS FROM</u>	<u>RATIFIED</u>
IMO	12
TIO	17
UN (Maritimes)	8
UN (General Transport)	2
AMERICAN ORGANIZATIONS	4
GOVERNAMENTAL (Maritimes)	3
GOVERNAMENTAL (General Transport)	2
OTHER ORGANIZATIONS	<u>3</u>
	51

BILATERALS

MARITIME TRANSPORT	4
ECONOMIC COOPERATION	10
TRADE (Commercial)	8
RECIPROCAL COOPERATION	2
OTHER AGREEMENTS	<u>1</u>
	25

T O T A L 76

INTERNATIONAL RELATIONS AND THE INDUSTRY.- Mexico finds itself, confronting the same problems as other nations engaged in industrialization.

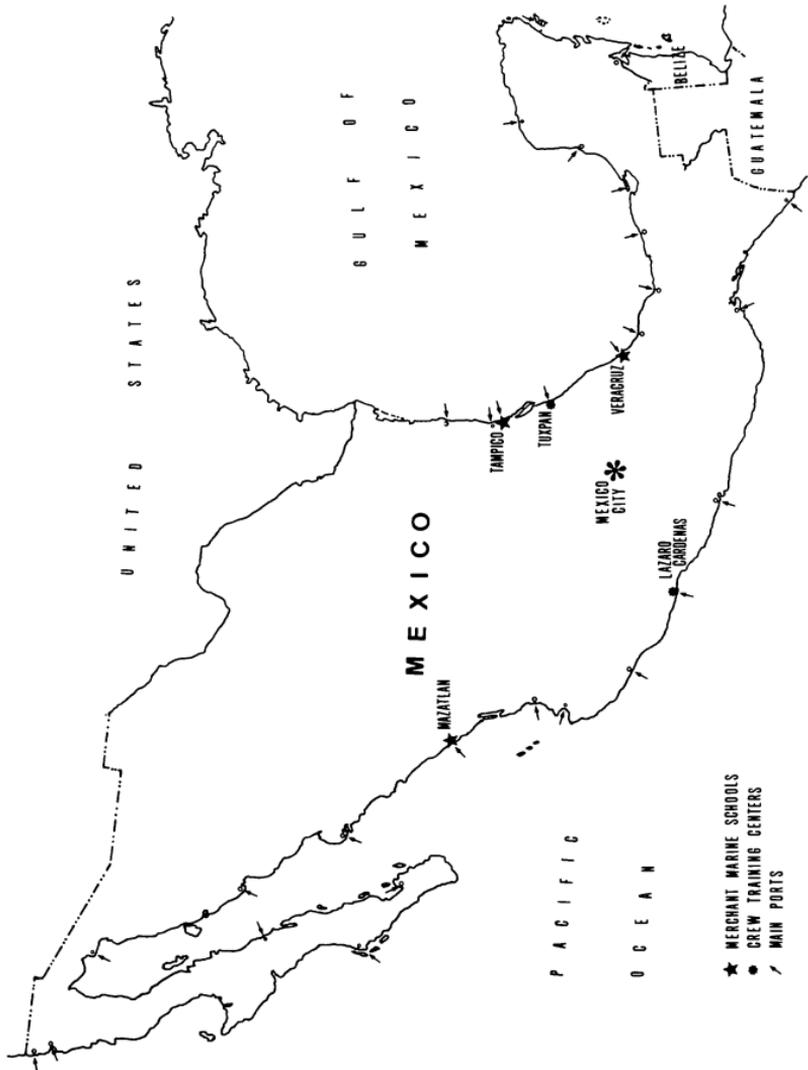
Economic problems include the necessities of establishing competitive prices, broadening domestic and foreign markets and lowering of interest rates on loans.

This year Mexico has coordinated the activities of the Group of 77's, and this is integrated for developing countries in the United Nations, to improve the Economical/Industrial Cooperation among them and try to solve their common problems.

Mexico exports: cotton sugar, coffee, shrimp, fresh meat, tomatoes, cattle, textiles, manufactured good, zinc, sulfur, fluorite, cement, silver, fuel oil, Chemicals, etc. Its major export destinations are to: United States, Japan, Switzerland, West Germany, Italy, Canada, Brazil, Colombia, Argentina, etc.

Mexico imports: boilers, machinery and mechanical appliance, electrical machinery and equipment, precision instruments, railway and tramway locomotives, rolling stock and parts, traffic signalling equipment, radioactive elements, etc. Its major import sources are: United States, West Germany, Japan, France, United Kingdom, Sweden, Canada, Italy, Spain, Switzerland, Netherlands, etc.

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## CHAPTER 3

### Maritime education in Mexico.

Mexico has three centers for the education of merchant marine officers operating in the ports of Veracruz, Tampico and Mazatlan. In these Institutions, the youths (boys and - girls), who have chosen the sea as their field of professional activities, are being prepared to integrate themselves into the Nation's goals.

These institutions contribute to the progress in the economic development of Mexico, specifically in the sectors of commerce and maritime communications.

Every merchant marine academy has a uniform annual medical and general knowledge exam for the selection of aspirants to become cadets.

Every candidate must have a good knowledge of theory especially in Mathematics, Physics, Chemistry and English and must possess a high school certificate.

Mexico's Merchant Marine Academies offer study opportunities in two areas, namely nautical and engineering. These two fields define the functioning and operating of a Merchant Ship, Deck Side and Engine Side.

Each academy is equipped with all the proper installations and facilities for training maritime cadets. The objective of both courses of study is to provide a technical and practical background at a professional level suitable for a Deck Officer or an Engineer Officer.

Our country since its beginning in maritime education has always used a "type B" training system that consists - of a trainee following a carefully planned scheme of training. This training covers all aspects of his expected - duties and is carried out under controlled conditions - mostly ashore in maritime academies and aboard our training ship.

The Study Programs approved by the Department of education, are constantly being supervised by the Department of Communications and Transports, which, through the General Direction of the Merchant Marine, extends the corresponding Degree and Certificates of Competence.

With the purpose of reaching a solid Academic and Technical background, as well as a physical and moral enforcement, which will begin modeling the conduct and necessary character for a Merchant Marine Officer's personality; Merchant Marine Academies in Mexico, have a militarized boarding system. This integrates the students to a disciplinary structure concerning the academic and behaviour factors, so organized as to offer a complete education, easing their integration to an active life inside the Merchant Marine.

Both careers are now completed in a period of three years divided into six semesters. The first four semester are studied in this Institutions, where the students obtain thr theoretical, technical and practical bases. Two more semesters are on board the training ship "NAUTICAS MEXICO", where students receive the basic capacity and instruction to start their professional life.

The training ship, built in 1981, is fitted with the most modern equipment for her operation and for the Instruction and Training program. These facilities are able to give good maritime training to the students because of the technologically advanced equipment on board.

A C T U A L   S Y S T E M

NAUTICAL SCIENCE CURRICULUM

M A R I N E   A C A D E M Y					T R A I N I N G   S H I P	
FIRST SEMESTER	SECOND SEMESTER	THIRD SEMESTER	FOURTH SEMESTER	FIFTH SEMESTER	SIXTH SEMESTER	
<ul style="list-style-type: none"> <li>-Mathematics.</li> <li>-Physics.</li> <li>-Chemistry.</li> <li>-Naval Culture.</li> <li>-English.</li> <li>-Human Relations.</li> <li>-Drawing.</li> <li>-Physical Education.</li> <li>-Mar. Practices.</li> </ul>	<ul style="list-style-type: none"> <li>-Mathematics.</li> <li>-Navigation.</li> <li>-Ship's Theory.</li> <li>-Electricity.</li> <li>-Naval Culture.</li> <li>-Communication &amp; Signals.</li> <li>-English.</li> <li>-Organization.</li> <li>-Naval Medicine.</li> <li>-Physical Education.</li> <li>-Mar. Practices.</li> </ul>	<ul style="list-style-type: none"> <li>-Mathematics.</li> <li>-Navigation.</li> <li>-Maneuvering.</li> <li>-Ship's Theory.</li> <li>-Electronics.</li> <li>-Economy.</li> <li>-English.</li> <li>-Physical Education.</li> <li>-Mar. Practices.</li> </ul>	<ul style="list-style-type: none"> <li>-Navigation.</li> <li>-Maneuvering.</li> <li>-Meteorology &amp; Oceanography.</li> <li>-Security &amp; Contamination.</li> <li>-Automatics.</li> <li>-Maritime Legislation.</li> <li>-English.</li> <li>-Communication &amp; Signals.</li> <li>-Physical Education.</li> <li>-Mar. Practices.</li> </ul>	<ul style="list-style-type: none"> <li>-Navigation.</li> <li>-Meteorology &amp; Oceanography.</li> <li>-Loading &amp; Stowing.</li> <li>-Security &amp; Contamination.</li> <li>-Navigation &amp; Radar Simulat.</li> <li>-English.</li> <li>-Ship's Theory.</li> <li>-Mar. Practices.</li> </ul>	<ul style="list-style-type: none"> <li>-Navigation.</li> <li>-Maneuvering.</li> <li>-Loading &amp; Stowing.</li> <li>-Security &amp; Contamination.</li> <li>-Navigation &amp; Radar Simulat.</li> <li>-English.</li> <li>-Steam Engines.</li> <li>-Communication &amp; Signals.</li> <li>-Mar. Practices.</li> </ul>	

CONTACT HOURS = 246  
CREDIT HOURS = 404

ACADEMIES REGISTRAR  
Nov. / 1983

A C T U A L   S Y S T E M

M A R I N E   E N G I N E E R I N G   C U R R I C U L U M

M A R I N E   A C A D E M Y					T R A I N I N G   S H I P	
FIRST SEMESTER	SECOND SEMESTER	THIRD SEMESTER	FOURTH SEMESTER	FIFTH SEMESTER	SIXTH SEMESTER	
-Mathematics. -Physics. -Chemistry. -Naval culture. -English. -Human Relations. -Drawing. -Physical Education. -Mar. Practices.	-Mathematics. -Electricity. -Naval Culture. -Materials. -Ship's Theory. -Mechanics. -Workshop. -Physical Education. -English. -Mar. Practices.	-Mathematics. -Thermodynamics. -Steam Engines. -Electronics. -Refrigeration. -Naval Medicine. -Workshop. -Physical Education. -English. -Mar. Practices.	-Automatics & Control. -Security & Contamination. -Steam Engines. -Int. Combustion Engines. -Refrigeration. -Electrotechnology. -Organization. -English. -Workshop. -Physical Education.	-Automatics & Control. -Security & Contamination. -Steam Engines. -Int. Combustion Engines. -Engine Room Simulator. -Maintenance. -English. -Mar. Practices.	-Security & Contamination. -Steam Engines. -Int. Combustion Engines. -Engine Room Simulator. -Maintenance. -English. -Mar.Practices.	

CONTACT HOURS = 246  
CREDIT HOURS = 402

ACADEMIES REGISTRAR  
Nov./ 1983

## WHY WE MUST INCREASE OUR ACADEMIC PERIOD TO FOUR YEARS.

The nautical student population in recent years has remained at less than one thousand total participants. And this has facilitated the General Division of the Merchant Marine using its wise capacity of analysis and foresight to adjust study programs and their duration. Such adjustments respond in function to the national maritime priorities, not causing negative effects.

But in this decade of the 20th Century there have been considerable developments in the field of maritime transportation. Great studies have been made in the design of ships for specific services giving birth to a variety of special purpose ships, some of which are of enormous size, complexity and cost.

New machinery design, numerous electronic aids and - automatic systems were introduced, etc.

Consequently, we must reflect and analyze the respective advantages and disadvantages of the three and four year courses of study for basic maritime education. For example.

- The present system of eight hours of class per day, the academic load is too heavy for the efficient assimilation of the study material by the participants.

- Laboratory manuals show a great variety of experiments that sometimes are not possible to do within the short time of the course.

- The present program is totally saturated and the - addition of any subject will cause a reduction in the quality of existing subjects.

I believe Mexico should follow the example of several countries with larger tonnage, more experience and longer maritime traditions, and follow the recommendations of IMO experts in their report of 6 to 8 September 1984.

I believe it is important and necessary to augment the basic period of training in our academies to four years as it was functioning between 1972 and 1981, and to compel our cadets to navigate six months aboard national merchant ships as assistants to officers.

With the above suggestions I believe that it will be possible to:

- Obtain an international standard level in maritime education as it is working in the majority of developed countries and several developing countries also.
- Give the participants stronger and deeper knowledge about their profession than the present system.
- Rise the average professional level of maritime education to the same standards as other professions in Mexico.
- Adopt the post-graduate courses and obtain specialized personal for our maritime industry with relative ease.
- Produce post-graduate officers for service in positions ashore within the marine industry, staff with professional qualifications and sea-going experience, and so.

In addition shipowners will be benefitted by better qualified personal and that means, improvements in: fuel consumption, maintenance, safety, operation and reduction of insurance premiums.

With the work report which the assistant officers will write during their six months of navigating, we will be encouraging our young officers in their first written report, book, etc. and in the future they could fill the need for maritime authors in Mexico.

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SUB-DIVISION OF CURRICULUMS IN DEPARTMENTS.

Maritime careers are some of the most specialized professions. But also these professions must have a broad background of other complementary matters for the safe and efficient operation of ships, cargo and crew.

Therefore the contents of the curriculums are a variety of other subjects from other professions.

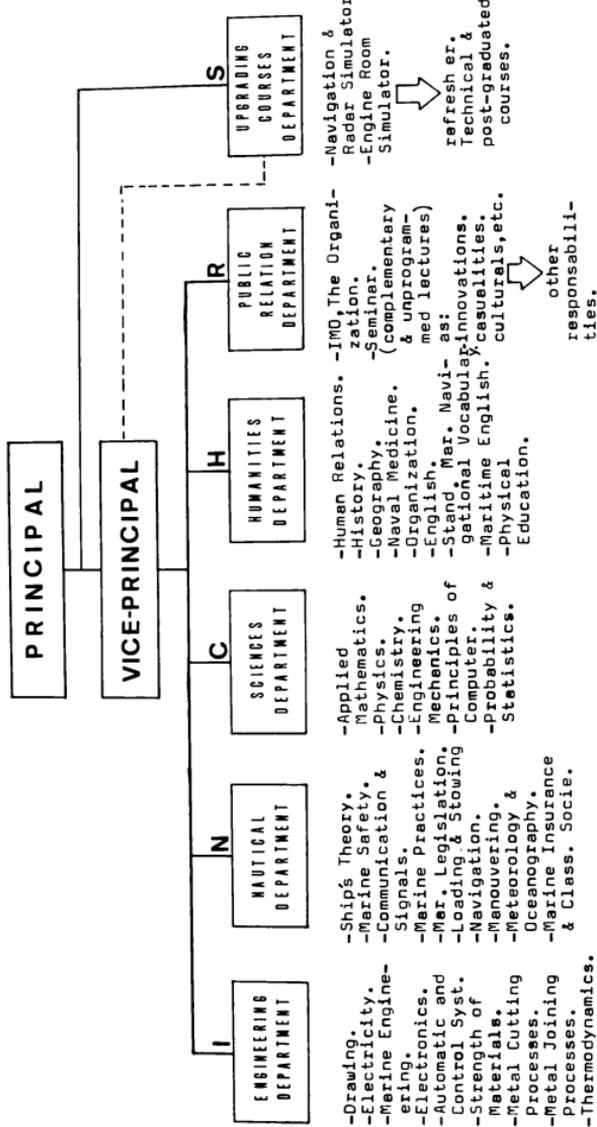
These subjects are grouped under departments, but frequently the content of a subject is different from another subject. It is therefore not possible for a single head of department to have good control.

Therefore prestigious institutions have grouped the subjects under common groups according to their contents (not by careers).

Consequently I suggest re-grouping of all subjects into six departments in our curriculums.

I believe that we will be able to:

- select the head of the department according to the needs of the specialized department.
- control and evaluate the teaching and the course more efficiently.
- create new careers relatively easily by only adding the indicated/related subjects in the relevant departments.



sub-division of curriculums in departments

PROPOSED PROGRAMS OF FOUR YEARS.

I have added one year extra to the original programs and I include new subjects that in my personal opinion - are important.

The first and second semesters of both fields have the same subjects and contents. All new cadets will attend a similar course for these semesters giving them a chance to better select their career in the following academic - year (third semester).

I include an unprogrammed class during the last academic year such as seminars on innovations, marine casualties, cultural matters, religion, etc. without examinations.

I suggest that the fifth and sixth semesters are the appropriate academic period for training aboard ships.

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# NAUTICAL SCIENCE CURRICULUM

M A R I N E A C A D E M Y			
FIRST SEMESTER	SECOND SEMESTER	THIRD SEMESTER	FOURTH SEMESTER
C21-Applied Mathematics. C11-Physics. C11-Chemistry. I21-Drawing. I21-Electricity H11-History. H41-English. H61-Physical Education.	C22-Applied Mathematics. I22-Drawing. I21-Marine Engineering. H11-Human Relations. C11-Engineering Mechanics H11-Geography. H42-English. H62-Physical Education.	N21-Communication & Signals. I11-Electronics. N31-Maneuvering. N31-Ships Theory. I11-Automatic and Control System. N21-Marine Practices. H43-English. H63-Physical Education.	N22-Communication & Signals. N11-Maritime Legislation. N32-Ships Theory. N31-Marine Safety. H11-Naval Medicine. H44-English. H64-Physical Educat.
T R A I N I N G S H I P			
FIFTH SEMESTER	SIXTH SEMESTER	SEVENTH SEMESTER	EIGHT SEMESTER
P21-Navigation & Radar Simulator. N31-Navigation. N31-Maneuvering. N21-Handling, Stowing. N32-Marine Safety. N21-Meteorology & Oceanography. H21-Standard Marine Navigational Vocabulary.	P22-Navigation & Radar Simulator. N32-Navigation. N32-Maneuvering. N22-Handling, Stowing. N22-Meteorology & Oceanography. N33-Ships Theory. H22-Standard Marine Navigational Vocabulary.	H11-Maritime Economy. H11-Organization. N22-Marine Practices. R21-Seminar. C21-Principles of Computer. C11-Probability & Statistics. H21-Maritime English. H65-Physical Education.	N33-Marine Safety. R22-Seminar. C22-Principles of Computer. N11-Mar. Insurance and Class. Societies. R11-IMO; the Organization. N11-SOLAS. H22-Maritime English. H66-Physical Educat.

KEY: C=Sciences Dep. N=Nautical Dep. I=Engineering Dep. H=Humanities Dep.

R=Public Relations Dep. S=Upgrading Courses Dep.

(C21) courses per career, order.

CONTACT HOURS = ADAPTABLE  
 CREDIT HOURS = ADAPTABLE

# MARINE ENGINEERING CURRICULUM

M A R I N E A C A D E M Y			
FIRST SEMESTER	SECOND SEMESTER	THIRD SEMESTER	FOURTH SEMESTER
C21-Applied Mathematics. C11-Physics. C11-Chemistry. I21-Drawing. I21-Electricity. H11-History. H41-English. H61-Physical Education.	C22-Applied Mathematics. I22-Drawing. I21-Marine Engineering. H11-Human Relations. C11-Engineering Mechanics. H11-Geography. H42-English. H62-Physical Education.	I11-Strength of Materials. I11-Electricity. I11-Metal Cutting Processes. I21-Thermodynamics. M11-Ships Theory. I11-Electronics. H43-English. H63-Physical Education.	I11-Metal Joining Processes. I22-Thermodynamics. N31-Marine Safety. I21-Steam Engines. I11-Refrigeration. I31-Int. Combustion Engines. H44-English. H64-Physical Education.
T R A I N I N G S H I P			
FIFTH SEMESTER	SIXTH SEMESTER	SEVENTH SEMESTER	EIGHT SEMESTER
S21-Engine Room Simulator. I32-Int. Combustion Engines. I11-Marine Refrigeration I21-Automatic and Control Systems. M32-Marine Safety. I22-Marine Engineering. H21-Standard Marine Navigational Vocabulary.	S22-Engine Room Simulator. I33-Int. Combustion Engines. I22-Steam Engines. I22-Automatic and Control Systems. I11-Marine Electricity. I11-Fluid Mechanics. H22-Standard Marine Navigational Vocabulary.	C21-Principles of Computer. R21-Seminar. H11-Organization. H11-Naval Medicine. C11-Probability & Statistics. I11-Marine Electronics. H21-Maritime English. H65-Physical Education.	C22-Principles of Computer. R22-Seminar. I11-Maintenance. R11-IMO; The Organization. N33-Marine Safety. M11-Mar. Insurance and Class. Societies. H22-Maritime English. H66-Physical Education

KEY: C=Sciences Dep. N=Nautical Dep. I=Engineering Dep. H=Humanities Dep.  
 R=Public Relations Dep. S=Upgrading Courses Dep.

(C21) courses per carrier, order.

CONTACT HOURS = ADAPTABLE  
 CREDIT HOURS = ADAPTABLE

PROPOSED PROGRAM

## CHAPTER 4

Obligatory courses to obtain the licenses of:  
chief mate/second engineer, master/chief engineer .

Continuing Education.- Basic schooling is only the beginning Every shipowning company of repute will insist on practical experience and continued training of its personnel as essential elements of a successful operation.

Onboard training may be the most useful, but is of course limited physically to the operational environment it needs to be periodically supplemented onshore by specialised courses for updating on the latest technical developments or new human skills. For crew members, these should in particular include firefighting, survival, and lifeboat training in the safety context. For officers they should extend additionally to instruction within their professional areas.

Here one would include courses in, for example, VLCC handling simulation, radar simulation, gyro compass, inert gas operation, or Bailey meter courses.

More detailed continuing education in the operation and/or capability of individual equipment on deck or in the engine room, and in automation and computer systems in all their varied applications aboard the modern vessels should also be included.

With the increasing public concern over tanker safety and pollution prevention and the new IMO Rules expected to be ratified in the foreseeable future, new skills will shortly be required for the large majority of both senior and junior marine staffs.

The industry must gear itself up to meet these challenges in good time. In this respect the efforts undertaken by industry associations and professional bodies, frequently in conjunction with the suppliers of marine equipment, the classification societies and academic research institutions are not only most welcome but should be exploited to the full by each shipowner and operator. Technical conferences can be another good source of learning if properly utilised.

Bigger companies may be able to run their own staff courses where the actual personal experience of more senior colleagues can be disseminated most effectively among their fellow-officers.

Although some administrations have provided that their sea professionals come back to the classrooms for one or more years, with the idea of covering all topics they didn't see in their initial instruction period, I think it is more realistic and practical for us to continue with our system (type B).

Previous to their promoted assessments (ranks) our academies could give them short or refresher courses for about eight weeks before their examination, putting emphasis on technical innovations, amendments, marine communication, marine safety, etc.

With these short courses, personnel concerned could attend this training period during their vacation. These people normally have some affiliation with marine enterprises and familiarity with particular types of ships so to interrupt their professional continuity isn't suitable. Also they are at an age full of personal and economic responsibilities and to pay for a large course is very expensive for them or their companies.



## REFRESHER COURSES FOR CHIEF MATE & SECOND ENGINEER

### Specification of course modules

#### RADAR OBSERVER (using navigation and radar simulator)

- The radar, radar functioning principles.
- Interpretation of targets on the screen.
- Factors affecting the radar interpretation and accuracy.
- Radar plotting, reflexion plotting.
- Anti-collision manoeuvring based on radar observations.
- Navigation by radar.
- Roules on route.
- Traffic separation schemes.
- Training in the navigation by radar, anti-collision manoeuvring.
- Training in the complete automatic anti-collision system.

#### AUTONOMOUS PROPULSION DIESEL PLANT

(using diesel plant simulator)

- Introduction to the UMS auto-systems.
- Description of the installation aboard.
- Description of the control panels by computer.
- Operation of the engine room in different conditions.
- Detection & failure control by computer.

#### AUTOMATIC CONTROLS (using "Bridge remote control" simulator.

- Practical systems manoeuvre.
- General description remote control.
- R.P.M. control, (Electronic or Woodward Governor).
- Main engine protection.
- Engine's adaptation.
- Operation practical with remote control.
- Digital technics to integrate circuits.
- Failure identification in printed and integrate circuits.
- Failure simulation.
- Adjustments technics to controls.
- Adjustments practical and controls.

#### SURVIVAL TECHNIQUES AT SEA.

- Man over board drill.
- Abandon ship drill.
- Assistance by helicopter.
- Inflatable liferafts operation.
- First aids.

#### MARINE COMMUNICATION.

- Shipboard maritime communication equipment requirements.
- Coastal radio stations.
- Radio communication system for ship-ship, ship-shore, and shore-ship communications.
- Creation of INMERSAT.
- Development of satellite communication systems.
- WARC, ITU regulations.

#### NATIONAL LEGISLATION:

- National maritime legislation and Merchant Shipping Acts.
- Codification of provisions of international maritime conventions and instruments into national maritime legislation.
- Process involved in the ratification of international maritime conventions.
- Penalty provisions, application of national law within territorial waters and ports, appeal provisions.
- Procedure for registration of ships.
- Duties and privileges of flag states.
- Treatment of foreign ships in accordance with control procedures specified in IMO Conventions.

#### STANDARD MARINE NAVIGATIONAL VOCABULARY (text of annex 1 to resolution A.380(X) adopted by the tenth IMO assem.)

- General.- procedure, standard verbs, responses, urgent messages, miscellaneous phrases, repetition, position, courses, bearings, distances, speed, numbers, time, and geographical names.
- Glossary.- (list and explanations of special marine vocab.).

- Phrase vocabulary: chapter A.- warnings, assistance.
- chapter B.- anchoring, arrival, berthing and departure, course, draught and height, fairway navigation, canal and lock operations, manoeuvring, pilotage, position, radar, navigational warnings, routing, speed, tide and depth, tropical storms, tugs, way points, weather.
- chapter C.- fishing, helicopters, ice-breakers.

#### ENGLISH FOR MARITIME STUDIES (book of T.N. Blakey).

- Unit VIII main engines.- different types of marine engines, two-stroke and four-stroke cycles, terms relating to main engines, measurement SI system, description of an engine governor, boilers.
- Unit IX auxiliary machinery.- functions of auxiliary machinery, fuel oil system, terms relating to ancillary service, description of types of pump.

#### SOLVING ENERGY PROBLEMS.

- Fuel price.
- Efficiency improvement.- hull efficiency improvement, propulsive improvements, engine efficiency improvement, and operations efficiency improvement.
- Costs of improvement/efficiency.
- Economics of saving of energy.

#### VESSEL STABILITY, LOADLINES, TONNAGE MEASUREMENTS.

- Theory and applications of vessel stability.
- Transverse and longitudinal stability.
- Hydrographic curves, stability curves, cross curves of stability.
- Damaged condition stability, floodable length.
- Free surface effects, loading problems.
- Stability booklets and loading manuals.
- Loadline criteria and regulations.
- Loadline surveys and marking.
- Tonnage measurement principles and regulations.
- Detailed study of applicable conventions and codes.

## REFRESHER

## COURSES

MASTER	WEEKS	CHIEF ENGINEER	WEEKS
- radar observer	2	- autonomous propulsion diesel plant.	2
- international maritime law	1	- international maritime law.	1
- principles of shipping economics	1	- principles of shipping economics	1
- marine insurance and classification societies	1	- marine insurance and classification societies.	1
- english for maritime studies.	1	- english for maritime studies.	1
- IMO: the organization and its work.	1	- IMO: the organization and its work.	1
- principles and aspects of: <ul style="list-style-type: none"> <li>• oil tankers.</li> <li>• chemical tankers.</li> <li>• liquefied gas tankers.</li> <li>• dangerous good cargo ships.</li> <li>• passenger ships.</li> <li>• fishing vessels.</li> </ul>	1	- operation, maintenance and innovations of: <ul style="list-style-type: none"> <li>• marine diesel engines.</li> <li>• marine steam propulsion plants.</li> <li>• marine gas turbines.</li> </ul>	1

total weeks : 8

total weeks : 8

• every participant may select one of these specialized topics according to his own interest.

## REFRESHER COURSES FOR MASTER & CHIEF ENGINEER

### Specification of course modules

#### RADAR OBSERVER (using navigation and radar simulator)

- The radar, radar functioning principles.
- Interpretation of targets on the screen.
- Factors affecting the radar interpretation and accuracy.
- Radar plotting, reflexion plotting.
- Anti-collision manouvering based on radar observations.
- Navigation by radar.
- Roules on route.
- Traffic separation schemes.
- Training in the navigation by radar, anti-collision manouvering.
- Training in the complete automatic anti-collision system.

#### AUTONOMOUS PROPULSION DIESEL PLANT.

(using diesel plant simulator)

- Introduction to the UMS auto-systems.
- Description of the installation aboard.
- Description of the control panels by computer.
- Operation of the engine room in different conditions.
- Detection & failure control by computer.
- Operation control and maintenance by computer.

#### INTERNATIONAL MARITIME LAW.

- Laws of the sea.
- International instruments and agreements affecting shipping as approved by other international organizations.

#### PRINCIPLES OF SHIPPING ECONOMICS.

- Volume of trade, percentage of international sea-borne trade in relation to total trade, country's share in the international sea-borne trade, share as third country

carriers, type of commodities, dry cargo, liquid, bulk, dangerous goods. Inter-relation between technical and commercial aspects of shipping, determination of type, size and characteristics and number of ships in relation to the type and volume of cargoes and lengths of voyages (unrestricted voyages, near coastal and short-sea trade).

- Acquisition of ships, study of ship as an economically viable unit, types of subsidies (construction, operational, etc.), financial arrangements, conference lines, membership, international agreement, pooling of cargoes, liner ship and tramp operations, freight rates, shippers council, freight bureaux.
- Bills of lading, charter parties.
- Relationship between shipowner, charterers and shipper, bare-boat, time and voyage charters.

#### MARINE INSURANCE AND CLASSIFICATION SOCIETIES.

- General introduction to marine insurance-hull, cargo P and I Clubs, classification societies and their functions, their role in the promotion of safety outside the scope of Conventions.
- Salvage and salvor's responsibilities, shipowners liabilities for damages to third parties, methods of payment of compensation. General and particular averages. Maritime fraud.

#### ENGLISH FOR MARITIME STUDIES (book of T. N. Blakey). MASTERS

- Unit I shipping.- how merchant ships operate, terms relating to shapes, description of bouyage.
- Unit IV manning.- the organization of a ship's crew, the deck department, terms relating to position in a ship, measurement, time at sea, description of the engine department.

ENGLISH FOR MARITIME STUDIES (book of T. N. Blakey)  
CHIEF ENGINEERS

- Unit X maintenance.- maintenance on board, fault chart, terms relating to maintenance, description of causes of cylinder liner wear.
- Unit XI safety aboard.- collision regulations, code of safe working practices, terms relating to life-saving appliances, terms relating to lifeboats, description of lowering a lifeboat.

IMO, THE ORGANIZATION AND ITS WORK.

- Brief history leading to the formation of IMO. The organization, its objectives, functions and responsibilities. The assembly, Council, Maritime Safety Committee and Marine environment Protection Committee and their technical sub-committees, Legal Committee, Technical Co-operation Committee and Facilitation Committee.
- Member States, contributions, delegations.
- Purpose and general provisions contained in all IMO Conventions, codes and recommended practices. IMO publications. Work programme of IMO.

PRINCIPLES AND ASPECTS OF: ●

- Oil tankers, or chemical tankers, or liquefied gas tankers, or dangerous good cargo ships, or passenger ships, or fishing vessels.

OPERATION, MAINTENANCE AND INNOVATIONS OF: ●

- Marine diesel engines.
- Marine steam propulsion plants.
- Marine gas turbines.

- Note: every participant may select one of these specialized topics according to his own interest.

We could use oriented studies, if the diversification of participants is too large and every student receives teaching material prepared in advance.

## CHAPTER 5

### Post-graduate courses.

What is a course ?

Courses come in all shapes and sizes. The term 'course' can apply to three or four related lessons or sessions, or to a whole degree programme lasting several years.

Essentially, we are talking about a sequence of structured learning with a time interval between each session and the next. It may occupy the student part time or full time, for a half term, a whole term, or two semesters, or two years (part time), and so on.

It has been found that sometimes there have been cases where people have obtained certificates without attending courses or without being sufficiently competent by purchasing these certificate.

This therefore results in some maritime authorities doubting the credibility of these certificates and the institutions from which they were obtained.

The prestige of the institutions are reflected by the qualification of professors and staff, field trips, didactic material used, laboratories, research facilities, duration of the courses, programme, etc. and ministries or organizations that vouch for these institutions.

After obtaining a certificate of competence to work in a position of responsibility, it is possible to attend a variety of courses, such as:

REFRESHER COURSES.- for one or several weeks of duration, emphasising innovations, without exams in the course and giving the participants a certificate of attendance.

This certificate should indicate the name of the institution, professor or instructor of the course, the program and its duration.

TECHNICAL COURSES.- for one or several days of duration, emphasising or describing, apparatus, engines, equipment, mechanical systems, instruments, etc. and their operation.

This is normally a more practical rather than a theoretical course.

There shall be no exams during the course and at the end a certificate of attendance is given.

This certificate shall indicate the name of the institution/factory, principal/director, responsible professor or instructor, program and duration of the course.

POST-GRADUATE  
COURSES

- a) specialization.
- b) masters degree.
- c) doctorate degree.

a) Specialization courses.- generally of six months in duration with monthly exams and each participant must write a report and have a report discussion at the end of the course.

In these courses the participants acquire basic and theoretical knowledge in specialised fields or topics, and are given certificates of completion in a particular field.

b) Master degree courses.- generally two years in duration with full time students.

The course should consist of continuous assessments, field trips, practical training concerning the course, a carefully planned scheme of the sessions and the writing of a thesis at the end of the course.

The thesis should be approved by the institution's board specially appointed for this purpose.

Each participant shall have, at the end of the course acquired deeper knowledge and experience in the particular field.

The successful participants will receive a Master Sc. degree in - - - . And it shall be endorsed by the education ministry of the country where the institution is situated or by the counsellor's office if the participant is from a foreign country. This certificate will also have to be endorsed by the participant's home Ministry of Education.

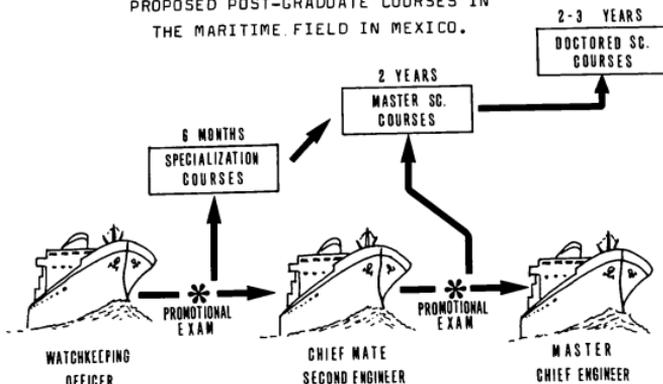
c) Doctorate degree courses.- the minimum time could be for two years or a more realistic duration would be three years.

This course is an extension of a Master Degree Course. A knowledge of a foreign language is essential so as to enable the participant to carry out a more comprehensive and complete research.

The participant will develop skills in investigating a narrow field.

Each participant must prepare a dissertation on his research, and defend in front of the investigation committee of the university.

PROPOSED POST-GRADUATE COURSES IN  
THE MARITIME FIELD IN MEXICO.



SPECIALIZED COURSES.

Problem: Mexico urgently requires specialized personnel in determined fields for an efficient development of its merchant marine.

Solution: Specialized courses of six months duration, four hours per day from monday to friday (17:00 - 21:00 hrs.) for part time participants.

These courses will therefore give basic and theoretical knowledge to those who shall be working in these fields.

Eligibility: Open to all officials with minimum rank of chief mate/second engineer, (electronic engineer, electrical engineer and other professionals) with minimum of five years experience.

Certificate awarded: Certificate of Completion.

## COURSES OF STUDY

- course on maritime education  
(engineering and nautical fields)
- " " management of ports
- " " marine electricity
- " " marine electronics
- " " fire fighting
- " " marine instrumentation

### MASTER IN Sc. DEGREE COURSES.

Problem.- Mexico urgently requires trained maritime personnel for matters related to the merchant marine such as: shipping company executives, ship surveyors, maritime educators at higher levels, in great number and quality and at the lowest possible cost.

Solution.- With courses of Master in Sc. degree of two years duration, four hours per day from monday to friday (17:00 - 21:00 hrs.)

Participants shall be part time during the first three semesters and full time for the last semester (for practicals and field trips).

This will give them deeper knowledge and experience in their specialized field that they shall be working in.

Eligibility.- Open to all officials of the merchant marine with minimum rank of master/chief engineer.

Chief mate/second engineer and civil professionals with a specialized course from our academies.

Electrical and electronic engineers, with 10 years of experience aboard merchant ships or other professionals with 10 years working experience in merchant marine companies or in maritime governmental administrations.

#### COURSES OF STUDY

- maritime education (nautical field)
- " " (engineering field)
- " safety administration (nautical field)
- " " " (engineering field)
- technical management of shipping companies
- general maritime administration

#### 5.1 THE SPECIALIZATION OF THE ACADEMIES.

The specialization of the academies is necessary so as to enable us to have sophisticated specialized courses, with expensive didactic equipment to complement each program.

Specialization is also necessary due to the limited number of local lecturers and the distances between the academies.

I therefore believe that it is important and profitable for us to specialize our maritime institutions in a few determined fields.

As a recommendation I am going to mention some possible fields of specialization.

- nautical field
- mechanical engineering field
- electrical engineering field

These fields of specialization could be started as post-graduate courses (specialization, master degree, and in the future doctorate degree courses).

With this plan we shall be able to:

- 1.- Concentrate larger numbers of specialized lecturers in each academy according to their speciality or to move them among our academies for short periods of time.
- 2.- Prevent rivalry among sister academies, which have the same rights, obligations and ambitions to develop.
- 3.- In the future these specialized fields could be called faculty of ----, when the Merchant Marine University of Mexico comes into being.
- 4.- We could acquire didactic materials which are sophisticated and the latest models without having to purchase a set of the same equipment for each of the three academies; for example:

HYDROMECHANICS LABORATORY, with:

- Water channel.- The circulating water channel is used for flow visualization, measurement of force and pressure distribution on submerged bodies, and propeller thrust and torque measurement. This allows demonstration of cavitation effects on propellers and hydrofoil sections.

- Ballast tank.- The ballast tank is used primarily by naval architecture students for the study of ship stability, inclining experiments, and experimentally determine righting arm curves.

Towing tank.- The determination of powering requirements for a new ship design requires testing of a model with propellers.

The tank is equipped with two carriages, the test hardware for maneuvering experiments, and has a high speed test capability.

- Coastal engineering tank.- Ocean engineering students use this facility to study the effect of littoral drift and wave action on ocean structures. The L-Shaped tank is equipped with a wavemaker.

Breakwaters, jetties, groins, and harbors can be designed, and their effectiveness evaluated. A moveable bridge structure serves as an observation platform, and as a mounting surface for instrumentation.

The laboratory also includes equipment for the study of the basic principles of soil mechanics as applied to marine sediments.

#### INTERACTIVE SHIP TRAFFIC SIMULATION.

- The ship traffic simulator.- It is used for safety and efficiency of ship traffic in high density areas.

The ship traffic simulation facility consists of a mathematical model programmed on a computer. This model continuously calculates the position of each ship sail to their destinations, according to the regulations, and to normal sailing practice, avoiding collisions and groundings according to the appropriate rules. Several hundred ships can be simulated simultaneously.

The simulation results can be made visible either through a plotting device or by a radar display. Traffic mix and harbour configuration can be specified in model-input, so any harbour area can be simulated. Real time as well as faster-than-real-time processing can be realized.

## SHIP BRIDGE SIMULATOR

The ship bridge simulator is based on a mock-up of a ship bridge, which has all the instrumentation needed to operate the subject ship properly. The ship behaviour is mathematically modelled and programmed on a computer. At the moment nine different ship types have been modelled and are available.

Propeller revolutions and steering wheel position, together with the influence of environmental conditions such as wind and current, are fed into the computer. This computer in turn provides signals for the instruments with which the ship bridge mock-up is equipped and for the projection system by which an outside view is generated. Relevant data can be recorded during the experiments and be used for analysis.

Applications of the bridge simulator in the field of port planning and vessel traffic management supplement those of the vessel traffic simulation facility and the navigator model:

- analysis of measures with regard to safety
- analysis of dimensions of (planned) harbour
- selection and evaluation of navigational aids as seen from the ship bridge
- training of pilots, masters and navigation officers
- training of shore-based personnel, who have to give advice and guidance to the ships in the harbour area.

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## CHAPTER 6

### General assessment.

What is an assessment ?

It is an attempt to get to know about the student and find out the nature and quality of his learning, his strengths and weaknesses, or his interests and aversions, or his style of learning.

Why assess ?

There are several reasons for formal assessments and I am going to concentrate on what I believe the main reasons are commonly advanced to be.

- a) To aid in selection
- b) To motivate students
- c) To maintain standards
- d) To give feedback to participants
- e) To give feedback to professors
- f) To prepare aspirants for "real life"
- g) To comply with international and national requests

a) To aid in selection.- Unfortunately our colleges have a limited capacity in student number, therefore, only 25 % of all interested candidates, are accepted on average, yearly.

These places are for aspirants that obtain the highest marks in medical and knowledge assessments.

b) To motivate students.- Monthly each student per group shall be examined and depending on their results, they receive awards of distinction, military ranks for within the school context, and often scholarships, etc.

c) To maintain standards.- The student that in monthly assessments obtains in average superior marks than the minimum established per subject is permitted to take the ordinary semi-annual exam. That means that he will be examined in several specific items related to the subject's program.

d) To give feedback to participants.- If the student doesn't obtain passing marks, he shall take an extraordinary semi-annual exam, and sometimes another assessment called, "title of sufficiency" for each subject, where he is himself forced to review the topic, and he is aided by his adviser. If the student doesn't pass all subjects in a semi-annual period, he is separated from the academy, but he could come back the next year. During his suspended time he shall sail on board national ships 50 % of that period.

If an officer doesn't pass a promotional assessment, he is permitted to present himself again six months after, and so on. He can review his doubts with aid from professors' staff and library consults.

e) To give feedback to professors.- At the end of a semester, professors must be evaluated by students on fixed forms in anonymity, (see form on page 47).

Also, each subject per student's group must be evaluated in accordance with the idea that 60 - 90 % in average mark is good result or efficient teaching technique and 75 % is the optimum (see form on page 48).

With these two data, the academic council will find the deficiencies in a teacher or a teaching technique.

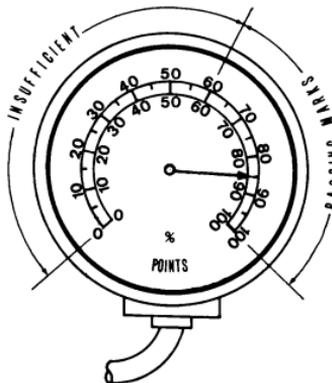
f) To prepare aspirants for "real life".- This period will give experience, confidence with other people, ships, company, etc. outside of his responsibilities as a member of the crew, he must prepare a work report about the marine company, characterizing the ships, the operation and maintenance of an engine-equipment, safety system, etc.

g) To fulfill international and national request.- - With this method of teaching-program-assessment, the Mexican Maritime Education fulfills national and international - requests.

#### HOW TO EXPRESS THE RESULT OF AN ASSESSMENT.

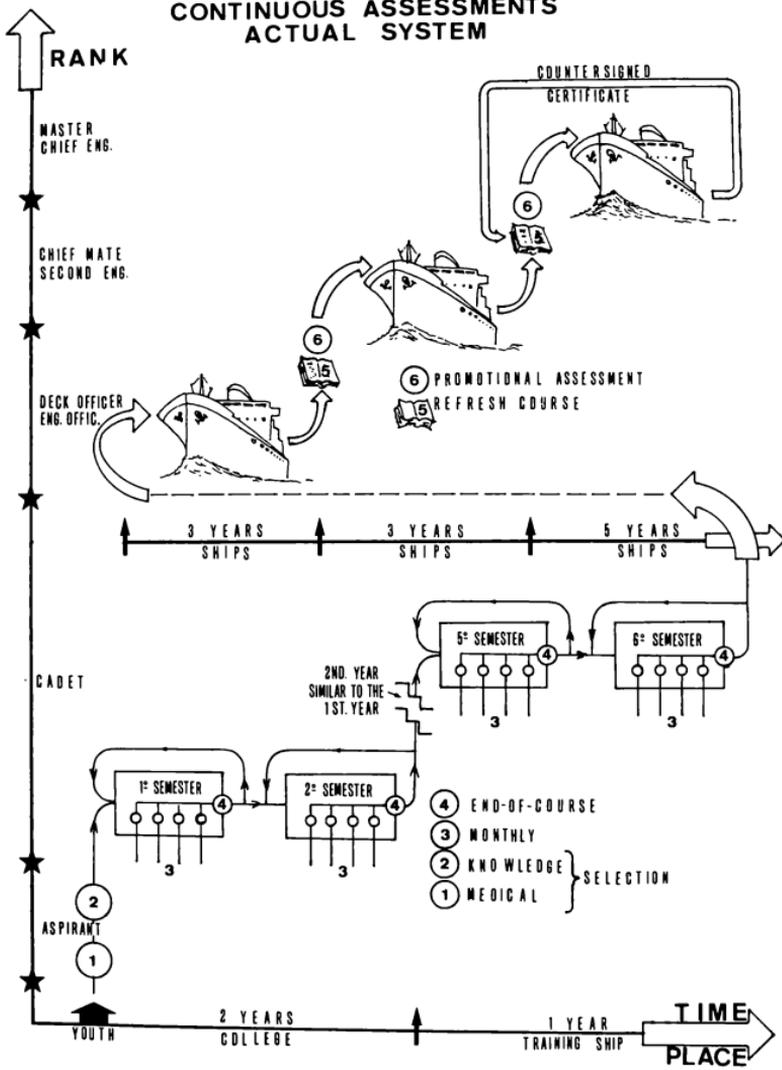
Educational institutions within a country frequently use different forms to express the result of an assessment. They use an alphabetic or a numerical system. They also can use different scales. But always the range is from 0 to 100 in percentage.

For that reason, I recomend uniform system that uses a range from 0 to 100 points.

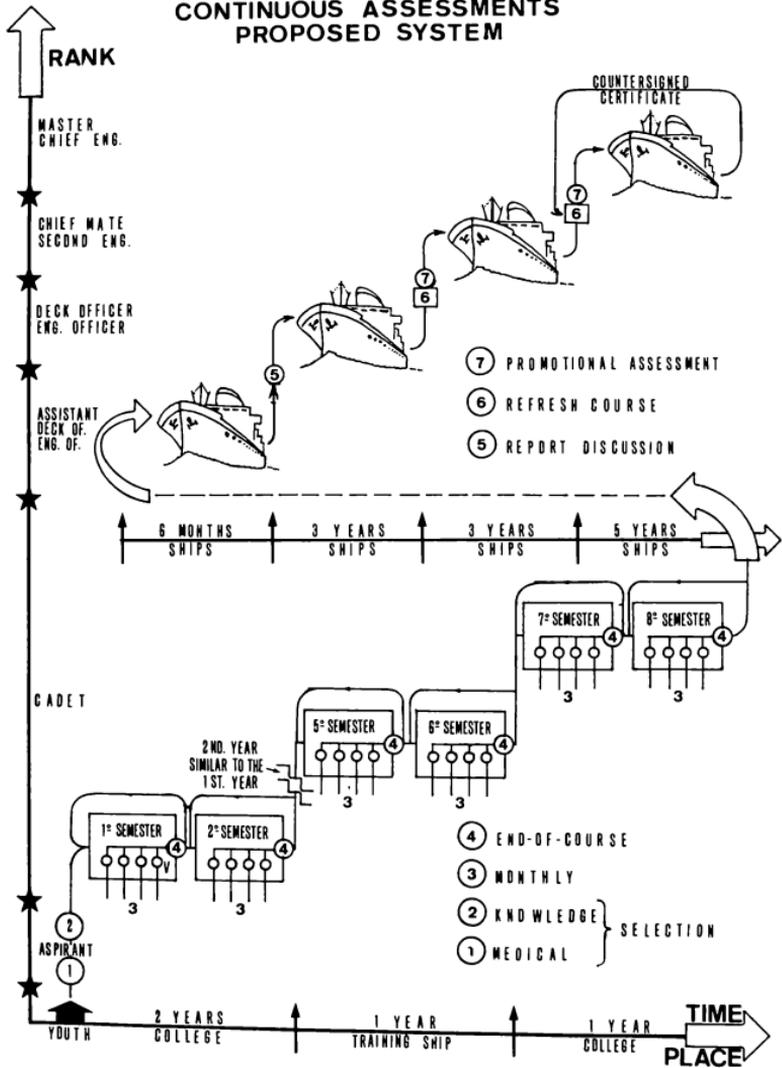


This value has enough points for a good accuracy and any one person would be able to understand the efficiency level of a participant. With a centesimal system the minimum passing mark shall be 60 points or 60 %, because this value represents 10 units more than medio value as a safety coefficient or guarantee.

# CONTINUOUS ASSESSMENTS ACTUAL SYSTEM



# CONTINUOUS ASSESSMENTS PROPOSED SYSTEM



## TYPES OF ASSESSMENT.

Some administrations use separate organizations independent of their academies, that are charged with evaluating students and officers.

In my country this activity is delegated to the general direction of the merchant marine and is accomplished by the Academic board. Normally, we use Three types of assessments; writing, oral and practical.

Writing assessments.- Writing assessment are given to numerous groups, generally to students in monthly, selections, and semester exams, with a duration of one to three hours, according to the program.

I am going to mention some of the exercises applied in that type of assessment.

- short answer question
- multiple-choice question
- problem solving
- simulation games
- drawing and describing
- false and true
- essay
- sketch/plot a graph, etc.
- practical test
- oral quizzes

I recommend mixing these exercises in an exam to give more opportunity for all participants to use their knowledge, skills and attitudes and to be more impartial.

Oral assessment.- Normally these are applied individually or in very small groups. Always that type is used in professional exams.

The jury is formed of five judges of high qualification and experience and are of higher rank than the examined. The exam duration is about four hours.

The examined is allowed access to slides, notes, instructives, planes, reports, etc. for consultation.

Practical assessment.- this also is applied individually or small groups and is frequently used with technical subjects, for example: workshop, computers, drawing, navigation, simulators, etc.

Frequently that kind of assessment is practiced in professional exams to complement an oral assessment and simulators or real equipment aboard the ships based in the port are used.

Its duration could be of few minutes or several hours. It could also be a cumulative assessment.

★ ★ ★ ★ ★

MERCHANT MARINE SCHOOL OF \_\_\_\_\_.  
STUDENT EVALUATION OF TEACHING.

\_\_\_\_\_ Semester      Subject \_\_\_\_\_  
Instructor's Name \_\_\_\_\_

We hope to improve teaching and help make personnel decisions in this school by asking you to describe your teacher's performance and to suggest improvements.

Please mark the appropriate number on the answer sheet.

DO NOT put your name on the answer sheet.

CHARACTERISTICS OF THE TEACHER AND TEACHING

Disagree	%					Agree
0.0	0.2	0.4	0.6	0.8	1.0	
1.- The teacher was well-prepared for each day's class.	(					
2.- The teacher respected the students.	(					
3.- The teacher's organization suited the purposes of the course.	(					
4.- The teacher stimulated thinking.	(					
5.- The test, projects, papers were valuable.	(					
6.- The teacher was fair and impartial in dealing with students.	(					
7.- The grades or other kinds of evaluations were assigned fairly.	(					
8.- The teacher (usually) presented to the students with good and clean appearance, soundness, and reliability.	(					
9.- The teacher was punctual in his arrival and departures.	(					
10.-The teacher has ability in translating his ideas, and knowledge to his students.	(					

Make any additional comments you wish to include.

\_\_\_\_\_

\_\_\_\_\_

NOTE: This evaluation shall be done for the head of Department indicated and also it shall be kept as confidential information.

Date: \_\_\_\_\_

MERCHANT MARINE SCHOOL OF \_\_\_\_\_.  
STUDENT EVALUATION OF THE COURSE.

\_\_\_\_\_ Semester      Subject \_\_\_\_\_

Instructor's Name \_\_\_\_\_

Your instructor/professor wants to make this course as - interesting and worthwhile as possible. Your thoughtful, objective, and honest responses to the survey questions will be appreciated.

Please mark the appropriate number on the answer sheet. DO NOT put your name on the answer sheet.

CHARACTERISTICS OF THE COURSE

Disagree	%				Agree
0.0	0.2	0.4	0.6	0.8	1.0

- 1.- The objectives of the course were clear. (
- 2.- The course has been beneficial to you. (
- 3.- The didactic materials used in the course were appropriate. (
- 4.- Each theme/chapter of the course was divided in the right time-proportion in the semester. (
- 5.- This course will be very important in your future activities. (
- 6.- The number of themes/chapters in the course fulfilled the real proportion of hours per semester. (
- 7.- This course has an appropriate proportion of theoretical/practical lessons. (
- 8.- The contents of the course were too difficult for you. (
- 9.- The text book, handout, etc. is appropriate for the course. (
- 10.-You (always) attend the classes. (

Make any additional comments you wish to include.

NOTE: This evaluation shall be done for the head of Department indicated and also it shall be kept as confidential information.

Date: \_\_\_\_\_

## CHAPTER 7

### Other facilities in our academies.

While other countries similar to ours had equipped - their academies with large auditoriums, pleasant swimming pools and recreation areas, Mexico has inverted its economic resources towards marine education so as to create, to modernize, and to amplify, five of its training centers of marine education for officers, ship crew and port workers.

Having equipped these institutions with modern and sophisticated didactic equipment such as: training/cargo ship, school ship, simulators, laboratories, planetariums, etc. Mexico has become one of the leaders in this matter among developing countries.

However, although we have all the basic demands, it is important to create cultural and recreational facilities and other comforts for our cadets, similar to the facilities aboard the modern merchant ships. (RESOLUTION 22 OF STCW/78).

1.- Library.- it will be designed as such with a great collection of books (text and general), microfilms, films, marin reports, marin publications, etc.

2.- Auditorium.- for seminars, conferences which are totally equipped.

3.- Gymnasium.- for in-door sports, and are totally equipped.

4.- Leisure room.- for students with T.V., music, - cafeteria, canteen and a shop selling souvenirs and personal articles, etc.

5.- Maritime museum.- with model ships, sporting - trophies, medals and souvenirs from old epoch and actuals, etc. donated for students, professors, officers, civilians, maritime companies and all people who love tradition and culture.

6.- Classrooms.- equipped with conditioned air, folding blackboards, visual-aids, dark curtains, T.V. for video-cassettes, telephone and clock.

7.- Music room.- equipped with musical instruments for cadets interested in musical activities.

8.- Painting room.- equipped with accessories for this activity for cadets interested in art and to orient them to sea motifs.

9.- Boats and sailboats.- for marine practices on lakes, lagoons, and nearby littorals.

10.- Club house officers.- with restaurant, pub, dancing area, to attract officers and to promote fraternity among us. The administration of the club house could be carried out by the Social Club of Nautic Ladies.

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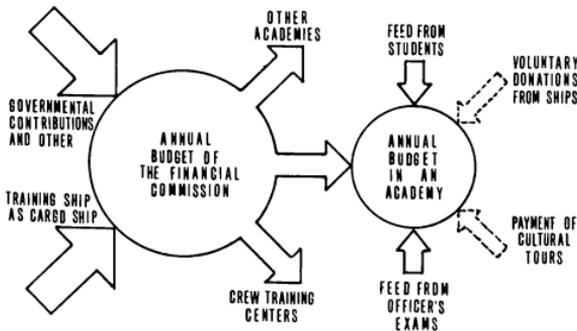
## CHAPTER 8

### How to obtain more economical resources in our academies.

In 1976, the Division of Merchant Marine was made part of the Ministry of Communication and Transport. Under this Division there was created a Financial Commission for the Merchant Marine Academies, which controlled and distributed the annual budget. The finance is given by the federal government as the majority contributor and also by union groups, shipping companies and other bodies interested in the creation of sea going professionals; and a small quantify from the training cum cargo ship.

This finance is equally distributed among the training institutions for their operation and maintenance.

Furthermore each academy has its own sources from monthly fees, short courses and promotional assessments for officers, etc.



The merchant marine academies benefit the country as a whole and the state and port included it's surrounding area where it is based by creating capable seamen.

The academies instill a feeling of pride for the states where it is based. For these reasons I believe it is acceptable to:

1.- Form a Port Commission consisting of Harbour Master Captain, Principal of the Merchant Marine Academy, Body of Port Pilots and Port Safety Inspectors, to plan for the use of voluntary coupons at an approximated value US \$ 10.00 for entrances of national and foreign ships of 1,000 grt and over, and it could be carried aboard by the Pilot or be obtained at the Harbour Master's Office.

This money could be kept in a bank and be administered by the Port Commission Director, who would also be Principal of the Academy, and this quantity could solve many of needs of the Academy.

2.- The merchant marine academies are a point of interest and culture for the people, because they have planetariums, simulators, and the traditional raising of the national flag, etc. These facilities are solely used by cadets and professors and sparingly for a few other people.

But I am sure that there are countless number of people (local and tourist) who would like to know about the instalations and operation of the merchant marine academies; for that reason, I believe it is acceptable to have an agreement between the state's tourist administration and the academy (Relation Public Department) and to plan short tours of our academies during the times free of academic activities.

These tours could be conducted by voluntary commissioned cadets. Its cost could be approximately US \$ 1.00 per adult in groups of ten persons and one hour duration.

The benefits of this activity are that we shall be:

- Giving a social service to the citizens
- Giving propaganda of our academy and in the future there will be more interested aspirants who will apply for admission
- Obtaining financial assistance for cadets which could also be distributed through:

- a) Scholarships
- b) Ceremony of Graduation
- c) Sporting material
- d) Monthly magazines, etc.

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## CHAPTER 9

### The nature and importance of motivation for professors and students.

Teaching activity is a big responsibility and all professionals of education must have a lot of qualities to be able to educate well and according to our ideals.

I am going to mention some of these qualities of knowledge, intellectual abilities and physical, social and cognitive skills.

a) KNOWLEDGE.- ability to remember facts, terms, definitions, methods, rules, principles, etc.

b) COMPREHENSION.- ability to translate ideas from one form into another, to interpret, and to extrapolate trends, consequences, etc.

c) APPLICATION.- ability to use general rules and principles in particular situations.

d) ANALYSIS.- ability to break down an artefact and make clear the nature of its component parts and the relationship between them.

e) SYNTHESIS.- ability to arrange and assemble various elements so as to make a new statement or plan or conclusion-a "unique communication".

f) EVALUATION.- ability to judge the value of materials or methods in terms of internal accuracy and consistency or by comparison with external criteria.

g) IMPARTIALITY.- any professor must be impartial among his group, forgetting familiarity and sympathy.

h) PRESENTABLE.- present himself to the public with good and clean appearance, soundness, and reliability.

i) VOICE.- ability to modulate the voice and to speak understandably and with strength.

j) LEADERSHIP.- qualities of a leader to conduct all participants to the objectives of the institution.

k) DRAWING.- ability to draw sketches quickly and clearly over a paper or blackboard to clarify a statement.

l) EXTROVERT.- person more interested in what goes on around him than in his own thoughts and feelings.

In our country and inside our merchant marine, it is very difficult to find personnel with those characteristics, or to be able to develop those qualities in a short time. Therefore when a professional of the sea is interested in that noble activity and shows good qualities, our National Board of Maritime Education must keep and motivate him.

There are many ways to motivate people and many theories also. It is important to study these statements and to apply each of them to specific situations, such as interest, need, value, attitude, aspiration and incentive.

I am going to mention a few motivations for the professor's staff.

10.- All employees are interested in obtaining a good salary (specially full time professors) to provide normal and honest life standards for their families. Their annual income shall be according to their knowledge, experience, responsibility, etc.

As a reference , I am going to mention some possible data, based on monthly salaries.

150 % professors with Doctorate Degree.  
130 % " " Masters Degree.  
120 % " " Master/Chief Engineer ranks.  
110 % " " Chief Mate/Second Engineer ranks  
or Civil professionals with specialized courses  
(six months minimum).  
100 % professors with Watchkeeping ranks or Civil professionals.

I wish to classify the teaching personnel in three categories:

- full time professors or instructors.
- middle time professors or instructors.
- visiting professors or instructors

There are differences between a professor and an instructor, i.e.

Professor: university or academy teacher at the highest level. Normally he/she imparts theoretical subjects and has a professional licence.

Instructor: person who teaches. Normally he/she imparts practical subjects and has a technical diploma.

20.- Almost all those working in a ship, company, academy, etc. have their own aspirations, i.e. They want to improve their position climbing steps, in accordance with their own resources. Therefore I suggest the application of rules and principles in this promotion, taking into account general knowledge, experience, maturity, energy, resources, rationality, creativity, etc.

Personally, I think that it is difficult to use only one criterion to select the ideal person. Consequently, election could be a better way. For instance, if the job is in an academy their own heads of department could be judges.

Opinions of principals and vice-principals of our merchant marine academies should be taken into account, if the job is for the position of principal of the academy or other higher positions within the maritime education.

With this policy, we will be practicing democracy and creating a friendly atmosphere in our daily activities.

3o.- Almost all staff, i.e. full time professors, receive only one salary and they expect to remain for the rest of their productive life in the school. At the time of retirement they have a fear of being unemployed without pensions.

Therefore I suggest, first, to include in the annual budget a quantity for that purpose and second, to give pensions to our old and dear professors equivalent to 100 % of monthly salary as full time professor.

4o.- We should officially allow professors to take leave to work on board merchant ships for the sake of improving themselves and to be able to return to their original posts of office.

5o.- When a professor does not have the necessary teaching qualities or is not current with the methods of an academy, or he is interested in an other job, our institutions shall release him according to the country's laws and help him to be reinstated in a merchant marine company.

## THE STUDENTS.

Humans, in the complexity of their reasoning and - action, are managed by positive and negative stimulus according to the criterion used by psychologists, and maritime education is not excluded from these theories.

Therefore I recommend to motivate our young cadets according to their academic marks and discipline.

There are many ways to motivate students and I shall mention some possible positive and negative stimuli applicable to our cadets.

1.- Our national flag, symbol of our motherland - shall always be guided by the cadet, who has the highest academic and disciplinary marks.

The cadets who form the escort should also have equally high grades and all these cadets should be from the last academic year.

2.- The academic scholarship that some organizations and social service clubs offer to the academy shall be distributed among the cadets who obtain the highest academic and disciplinary marks.

They should be distributed in equal numbers among the academic years and in both fields (nautical and engineering).

3.- Students with the highest academic and disciplinary marks, according to the decreasing order of the final academic year to the first academic year, shall be given student ranks, similar to the ranks used by the military.

4.- At the end of the academic period the student (who shall be assistant officers) with the highest academic and disciplinary marks have a choice of ship and company.

5.- The names of the students who have the highest marks shall be displayed monthly on an "honour board" which shall be placed in the visitors area.

6.- Students with distinctions or special commissions, those with their names on the honour board, band members, students with ranks, etc. shall be given weekly an extra afternoon free, after their academic activities.

7.- The names of the top three students from each of the nautical and engineering fields, who have obtained the highest marks shall be announced during the graduation and be given special prizes.

Negative stimulus.- This stimulus can clasified in - three types.

1.- Suspension from the school.- The school's regulations have defined this penalty, and my suggestion is to have the regulations reviewed annually.

2.- Temporary suspension from the school.- Regulations on this too already exist but I further suggest that the - suspended student shall navigate 50 % of their suspended - time aboard the national merchant ships and they shall be readmitted into their course only the following year.

3.- Apart from the above two negative stimulus we also have the suspension of free time of errant students, however the period of such suspension has to be analysed by the humanity department so as not to imprision the students in - their academy over a long period of time.

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## CHAPTER 10

### Conclusions and recommendations.

The Mexican maritime education is navigating with the wind by poop against the challenges of the new marine technology and international requirements.

Since more than one century ago, when the first two maritime academies were opened in Campeche and Mazatlan, Mexico, we have achieved transcendental changes in the maritime education offered to Mexico's seafarers with the addition of two new maritime academies and recently two new crew training centers.

Following our progressive ideals, we must augment the basic instructional period by one year and we must also start in the field of post-graduate courses for improved operation of our national fleet.

We must guide our maritime academies in specialization and in the near future create the MERCHANT MARINE UNIVERSITY OF MEXICO.

The approach to maritime education must not be a narrow one of producing officers only for the functioning and operation of merchant ships. We have the capacity to offer the youth of Mexico careers in shipbuilding.

Finally, the success in management of the maritime education in the last years has made it possible to await the arrival of the XXI century with confidence and safety.

## RECOMMENDATIONS

1.- The international System of Units, developed and maintained by the General Conference on Weights and Measures is intended as a basis for worldwide standardization of measurement units.

SI is a complete, coherent system that is being universally adopted. Although, in the civil life, the people resist moving out of their traditional unit system and will delay perhaps for a longer period of time before they adopt this international unit system.

In the maritime field and aboard the ships, it was applied several years ago. Therefore, I recommend the use of this system in our academies, especially in nautical and engineering fields, and to use text books with this system.

2.- It is very difficult to find a text book with all characteristics of any one specific subject or course. Furthermore, periodically, there are changes in our programs with new techniques and innovations.

Therefore I recommend to elaborate our own handouts per subject. It shall be supervised for the Heads of Departments among our academies.

These handouts will be available to all students and they will carry them throughout their professional life, for their own use. The contents of these handouts could be a selection of instructives, graphics, data, etc. of the better authors of text books. The text books could remain in the library for consultation by students. With the money budgeted for text books, we can now obtain a wider variety of books for the library. The copying-machine department can make these handouts and I believe it is cheaper to make copies than to buy several text books for student per subject.

3.- In the last years computers have become the most important tool of the modern professional; this is also true in the maritime field for: design, building, operation, communication, maintenance, etc. Therefore I recommend including in our programs the principles of operation and programming of these machines, and buying a minimum of 15 personalized units (5/school) of this model. (see hardware and accessories on next page).

4.- Some academies, in addition to full time professors and part-time professors, also have visiting lecturers. These educators are technicians or professionals of great experience and knowledge and they are invited through the Public Relations Department. Their service is gratuitous and we only pay their accommodation, food and transportation.

These people normally are retired professionals, shipyard staff, university professors, marine suppliers, etc. Therefore I recommend continuing with this practice.

5.- Our academies have expensive equipment and thus need constant vigilance. Therefore I recommend we purchase a closed-circuit T. V. with monitoring at various strategic points, such as corridors, entrances and exits, etc. this equipment could be centralized in the security office which operates 24 hours/day.

With this system we will have security and efficient vigilance, thereby not disturbing students in their daily academic activities.

6.- Since our daily activities are very tightly programmed and delays by cadets mean punishment, I recommend the purchase of a centrally operated/controlled clock system throughout the school. This would mean that every clock in the whole school will have the same time.

IBM PERSONAL COMPUTER

Hardware & Accessories.

ITEM	QUANTITY	DESCRIPTION	PART NUMBER
		<u>IBM PC/G</u>	
1	12	System Unit 64KB w/320KB one Diskette.	8130152
2	12	IBM 64KB Memory Expansion Option.	1501003
3	12	5 $\frac{1}{4}$ " 320KB Diskette Drive.	1503810
4	12	Keyboard.	8116080
5	12	IBM Monochrome Display (green).	8130050
6	12	IBM Monochrome Display & Printer Adapter.	1504900
7	12	Printer Cable.	1525612
8	12	IBM Matrix Printer 80 t/s .	8130053
9	12	IBM DOS 2.0 Operating System.	6936836

IBM PC/G with color Display.

10	3	System Unit 64KB w/320KB one Diskette.	8130152
11	3	IBM 64KB Memory Expansion Option.	1501003
12	3	5 $\frac{1}{4}$ " 320KB Diskette Drive.	1503810
13	3	Keyboard.	8116080
14	3	IBM Color Display.	8130003
15	3	IBM Color/Graphics Monitor Adapter.	1504910
16	3	Printer Adapter (PC).	1505200
17	3	Printer Cable.	1525612
18	3	IBM Matrix Printer 80 t/s .	8130053
19	3	Asynchronous Communication Adapter.	1502074
20	3	Asynchronous Communication Program.	6024032
21	3	IBM DOS 2.0 Operating System.	6936836

		<u>Software</u>	Minimum Memory	
22	3	IBM Writing Assistant	128K	6024144
23	3	IBM Graphing Assistant.	128K	6024147
24	3	IBM Filing Assistant.	128K	6024145
25	3	IBM Reporting Assistant.	128K	6024146

I thank my computer's professor Bertil Wagner for his detailed comments on this selection.

7.- Since all our merchant marine academies have been equipped with expensive equipment, the risk of fire is also increasing. Security is a basic subject in our program and is equally important aboard ships.

I recommend that we have a project to equip our academies with fire protection such as sprinkler systems and CO<sub>2</sub> systems.

8.- Shipping is an international business covering ships, ports, personnel, sea ways, cargo, etc. and also the academic institutions.

The IMO and IMLA are trying to achieve cultural and academic interchanges among maritime training centers, and on occasions it has been found that the name of our schools in our mother language has given a false impression at these international functions. The actual functions of the academies have been misinterpreted. Therefore I recommend analyzing the name of our schools and if is acceptable, to change them.

from:

Nautical Merchant School of - - - .

to:

Nautical and Engineering College of  
Merchant Marine of - - - .

When we are ready to offer post-graduate courses, I suggest that we must create the.

MERCHANT MARINE UNIVERSITY OF MEXICO.

Which shall be divided into three faculties, eachone of which shall be based at the three different existing academies

These faculties shall be:

Nautical Faculty in - - - .

Mecanical Engineering Faculty in - - - .

Electrical Engineering Faculty in - - - .

9.- The approach to education and training for the maritime field should not be a narrow one of producing officers only for service on ships or only for service in positions ashore within the maritime industry.

We also should have the capacity to produce naval architects, and in the near future also produce oceanographic professionals, etc.

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