Nautical education and training in Mexico

Genaro H. Narvaez

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WORLD MARITIME UNIVERSITY
MALMO, Sweden

NAUTICAL EDUCATION AND TRAINING IN MEXICO

by

Genaro Narvaez H.

Mexico

November 1985

A paper submitted to the Faculty of the World Maritime University in partial satisfaction of the requirements of the MARITIME EDUCATION AND TRAINING (NAUTICAL) COURSE.

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

Signature:

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Abstract:

This paper deals with maritime education and training in Mexico in a general sense and more particularly with the education and training of deck officers. Chapter one gives a brief introduction stating the reasons for the existence of the maritime education and training system. Chapter two deals with the framework of the maritime education and training system in an international context and the national policy as regards the development of the national merchant marine in which maritime education is a most important part. Chapter three gives an historical overview of the evolution of the national maritime education and training system in order to demonstrate and describe the long experience in this field, the lively interest for maritime education and training, the efforts to maintain such a system and the successful results obtained recently from this evolution. Chapter four describes the national maritime education and training system for the master mariner certificate in Mexico. (See note in the following page). Chapter five gives conclusions and some recommendations which in my opinion and after my W.M.U. experience can be applied in order to contribute to the improvement of the Mexican system of nautical education and training for officers. At the end of this paper there is a list of the reference material and text books from which information has been collected for the elaboration of this paper. Some tables, drawings and pictures have been included in this paper with the purpose to give a more detailed explanation.
The two courses in maritime education and training offered at the World Maritime University deal with the nautical and engineering side. I attended the course that deals with the nautical side. This is why the description of the education and training for engineer officers has not been made part of this paper. In Mexico the sequence of education and training of engineer officers runs parallel with the education and training of deck officers from the very beginning stages of the system but differs in contents and objectives.
Acknowledgment

I wish to express my appreciation to the several persons whose efforts helped me in the elaboration of this paper. In particular I am grateful to:

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Nautical Education and Training in Mexico.
# Table of contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>II</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>IV</td>
</tr>
<tr>
<td>Table of contents</td>
<td>VI</td>
</tr>
<tr>
<td>List of figures and illustrations</td>
<td>IX</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2. Policy and programs for the development of the national merchant marine</td>
<td>4</td>
</tr>
<tr>
<td>2.1. Recommendations for maritime safety administrations in developing countries as regards maritime personnel</td>
<td>4</td>
</tr>
<tr>
<td>2.2. Outlines of policy and program for the development of the national merchant marine in Mexico</td>
<td>7</td>
</tr>
<tr>
<td>3. Maritime education and training in Mexico</td>
<td>11</td>
</tr>
<tr>
<td>3.1 Introduction</td>
<td>11</td>
</tr>
<tr>
<td>3.2 The Trust, i.e. Fideicomiso</td>
<td>12</td>
</tr>
<tr>
<td>3.2 The Maritime Academy of Mazatlan &quot;Capitan de Altura Antonio Gomez Maqueo&quot;</td>
<td>17</td>
</tr>
</tbody>
</table>
3.3 The Maritime Academy of Veracruz "Capitan de Altura Fernando Siliceo y Torres" .......................... 21
3.4 The Maritime Academy of Tampico ........................................... 24
3.5 The training ship "Nauticas Mexico" ........................................ 28
3.6 The training center for ratings and port operators "Emilio Barragan" in Lazaro Cardenas .......................... 32
3.7 The training center for ratings in Tuxpan .............................. 32

4. Description of the national maritime educational and training system for master mariner certificates........ 33
4.1 Entrance prerequisites for maritime (nautical) education and training institutes................................. 33
4.1.1 General education prerequisites for maritime (nautical) education and training institute .......................... 33
4.1.2 Physical and psychological prerequisites for maritime (nautical) education and training institute.............. 36
4.1.3 Practical prerequisites for maritime (nautical) education and training institute................................. 36
4.1.4 Entrance examination.......................................................... 41
4.2 Education, training and experience from entrance into maritime (nautical) education and training institute to master mariner certificate........................................ 46
4.2.1 Shorebased education............................................................. 47
4.2.1.1 Syllabus............................................................................. 51
4.2.2 Education and training on-board.......................................... 58
4.2.3 Sea service periods........................... 62
4.3 Assessment and certification....................... 64
  4.3.1 Assessment for officer in training certificate.... 65
  4.3.2 Assessment for chief mate certificate............ 66
  4.3.3 Assessment for master mariner certificate..... 67
4.4 Additional courses................................... 70

5. Conclusions and recommendations......................... 73
  5.1 Conclusions........................................... 74
  5.2 Recommendations...................................... 75

Bibliography................................................. 85

Figures and Illustrations................................... 88

Contact addresses of the maritime education and training system in Mexico................................. 116
Figures and Illustrations.

Figures

- Map and facts about Mexico.......................... 69
- Geographical location of maritime training facilities in Mexico....................................... 90
- Organizational chart of the Trust for the education and training of personnel of the national merchant marine................................................ 91
- Geographical location of the Maritime Academy of Mazatlan............................................. 92
- Organizational chart of the Maritime Academy of -- Mazatlan............................................. 93
- Geographical location of the Maritime Academy of -- Veracruz............................................. 94
- Organizational chart of the M.A. of Veracruz...... 95
- Photo. Main offices of the Maritime Academy of -- Veracruz............................................. 96
- Photo. Classrooms and offices of the Maritime Academy of Veracruz.................................. 96
- Photo. Students dormitories in the M.A. of Veracruz 97
- Photo. View of the main offices, classrooms and -- Planetarium in the maritime Academy of Veracruz.... 97
- Port of Tampico..................................... 98
- Geographical location of the Maritime Academy of -- Tampico............................................. 99
- Organizational chart of the Maritime Academy of -- Tampico............................................. 100
15. Photo. Main offices of the Maritime Academy of Tampico................................................. 101
16. Photo. Classrooms and Planetarium in the Maritime Academy of Tampico............................................ 101
17. Photo. Area of Simulators, laboratories and workshops in the Maritime Academy of Tampico........ 102
18. Photo. Students dormitories in the Maritime Academy of Tampico............................................. 102
19. Organizational chart of the floating Academy or the Training Ship "Nauticas Mexico"...................... 103
20. The Training Ship "Nauticas Mexico", decks A and B.  104
21. The T.S. "Nauticas Mexico", decks C, D and E........ 105
22. Photo. The T.S. "Nauticas Mexico", departing from Veracruz, Mexico (June 1983)................................. 106
23. Photo. The T.S. "Nauticas Mexico", docked in the port of Salina Cruz, Mexico, after arrival from Shanghai, China. (January 1985)........................................ 107
24. Photo. Partial view of the T.S. "Nauticas Mexico".. 107
25. Photo. One of the classrooms on board the training Ship "Nauticas Mexico"................................. 108
26. Photo. Partial view of the T.S. "Nauticas Mexico", from the area of hold number 4......................... 108
27. Organizational chart of the Training center for ratings and port operators in Lazaro Cardenas...... 109
28. Organizational chart of the Training center for ratings in Tuxpan............................................. 110
29. Table for determining weight parameters for candidates to enter the maritime academies........ 111
30. - Diagram of general basic education prior to entrance in the maritime academies in Mexico........ 112

31. - Diagram of maritime education and training leading to master mariner certificate in Mexico............ 113

32. - Sample certificate issued by the Mexican Maritime Administration in special course............... 114

33. - Reverse side of the sample certificate ............ 115
Chapter 1.

1. Introduction.

Participating in world trade is an important factor determining the pace of economic and social development in developing countries.

At present, nearly 90% of world trade is transported by sea. The oceans cover 3/4 of the world and the sea represents open routes for international trade. Carriage of goods by sea is by far the cheapest mode of transportation available today.

In Mexico, more than 70% of the country's international trade is transported by sea and due to the increasing diversification of this trade, such participation will also increase in the near future. But participation in the world's maritime trade depends on a developing country's infrastructure, human capabilities and administrative structure.

Shipping is the business of transporting trade from a port of origin to a port of destination at a required time, thus all activities involved in the business of carrying goods by sea are considered the shipping industry. The shipping industry in any country has the following basic factors:
- Cargo,
- Ships,
- Port installations,
- Maritime administrative structure.
Marine personnel.

Since the shipping industry is an international industry and it utilizes capital intensive equipment, the acquisition of new or second-hand ships for the formation of a national fleet and/or the construction of ships and port installations is not difficult once the appropriate policy decisions are taken by an administration in order to achieve the goal to handle, store and carry cargoes. But while cargoes, port installations and ships are readily executed, the appropriate marine personnel required to man and administer them is always difficult to obtain, or at least it will take a long period and considerable investment to have highly qualified and experienced personnel.

The essential reasons in support of the need for training of seamen can be summarized as follows:

- The training of seamen improves safety standards and efficiency, both of which are vital. An untrained seaman would be a liability to others and himself, especially in emergencies.

- Trained seamen of a country would increase the employment potential of seamen of that country in the long run.

- Shipowners at large are becoming keen on employing trained seamen.

- Maritime governments are becoming particular about having trained seamen being employed on their ships.

- There is a strong and increasing demand in international fora, such as I.M.O. and I.L.O., for the highest standards of safety and manning of ships, including trained and compe-
tent seamen.

- The necessity and the need for adequate training and for attainment of professional standards had been recognized by the diplomatic conference attended by representatives of 72 countries when it adopted the International Convention on Standards of Training, Certification and Watchkeeping in 1978. It is, therefore, in the vital interest of all maritime countries to prepare their seafaring personnel to meet its provisions so that they do not remain professionally handicapped since the convention already came into force in April, 1984.
2.- Policy and programs for the development of the national merchant marine.

2.1.- Recommendations for maritime safety administrations in developing countries as regards marine personnel.

The most abundant resource available in most developing countries are human resources. The lead role and primary responsibility in making good use of human resources and utilizing them to maximum national advantage in the maritime field, has to be assumed by the government. The government of a country is better equipped than shipping companies, national seafarers' unions or any other organization to deal with international pressures in various forms in the context of national interest.

The government of a country has to meet national and international obligations, including standards to assure competency of its seafarers. The national government is in the best position to monitor and evaluate international developments affecting its maritime personnel and to seek the influence of such developments through international support. And at last, the government has to adopt policies compatible with its national interests.

The policies to adopt as regards maritime personnel have to stress the importance of maritime training, certification and
manning of ships. These three aspects will determine the standards of safety and efficiency in the operation of a ship.

In assuming the lead role, responsibilities and functions as regards maritime personnel in the shipping industry, the government through the maritime administration has to act in concert with:

- Shipping industry,
- Maritime education system,
- Ministry of transport,
- Trade unions,
- Professional institutions and societies,
- Research institutions,
- Maritime equipment manufacturers.

It is the government that decides which suitable procedure will serve to establish a board, either trustee or advisory, to organize the concerted actions taken by the interested parties.

The types of maritime training facilities will consist of courses for:

- ratings in the deck department,
- ratings in the engine room department,
- ratings in the catering department,
- officers in the deck department,
- officers in the engine room department and additional special courses.
In order to meet its present and future requirements as regards maritime personnel, as well to meet mandatory international standards, the government has to take the following steps:

i - Conduct a manpower study of the maritime personnel needs of the shipping industry (present and future) for a period of 10 years.

ii - Reduce the manpower plan to an annual basis.

iii - Formulate a recruitment policy in terms of the number and quality of persons to be recruited. The quality will be in accordance with the planned requirements and it has to be ensured by prescribing the minimum educational standards.

iv - Formulate suitable training programs and identify and provide training courses and facilities for the various categories of personnel.
2.2. - Outlines of policy and program for the development of the National Merchant Marine in Mexico.

In 1979, the Mexican Directorate of Merchant Marine, i.e. Dirección General de Marina Mercante (D.G.M.M.), issued its outlines of policy and program for the development of the national merchant marine.

This document comprises the following:

- An analysis made in 1979, which deals with the evolution of the national merchant marine with data and figures from 1970 to 1978.
- The programs and policies to be implemented in the next eleven years (1979-1990).

The study pointed out the main problems confronted by the Mexican shipping industry and the areas in which the governmental efforts have to be stressed in order to cope with the necessities of the future.

The following are the long term objectives:

1. To increase and expedite the education and training of seafarers.
2. To increase the merchant marine fleet.
3. To promote cargo agreements according to the resolutions of the code of conduct of the liner conference.
4. To support and encourage national owners by means of financial aids through legal instruments.
It is not the purpose of this paper to deal with the above mentioned objectives, but a brief explanation is given for a better understanding of the maritime education system in Mexico, since the 1979 outlines of policy and program for the development of the National Merchant Marine have established some important changes in maritime education.

The national policy to achieve the development of the merchant marine in Mexico comprises the following fundamental aspects:

1. The owners encountered a lack of seafarers. The measures taken to solve this problem were:

- increasing the number of recruited personnel in existing training centers and
- expediting the education and training of such personnel.

In order to achieve this, the study programs (Syllabus) in the three maritime academies were modified according to the requirements of the STCW convention of IMO. The period of study in the academies was comprised from four to three years. The new three-year period consists of: two years of shore-based education and one year of training on-board. The aim was to increase the number of qualified seafarers and to promote a more active and practical safety oriented training.

To make this plan possible, a new, general cargo/training ship with a cargo capacity of 12,000 tons and facilities to accommodate 200 cadets, christened "Nauticas Mexico", was acquired in the Netherlands at a cost of $40 million. Training for
teachers and instructors for the training ship took place in Sweden through "Marine planning". Radar simulators for special courses for graduated officers were also acquired from Norway. The old training ship "Primero de Junio" was docked in the Pacific port of Lazaro Cardenas and it is intended to be used as a floating training facility for the purpose of training ratings.

The new plan of study has produced nearly 200 deck and engineer officers every year since 1982 and the plan will continue till 1990 when a new program will come into force.

2.- The second main objective of the national policy for the development of the national merchant marine was to increase the units of the merchant marine through:

- The availability of human resources
- The creation and consolidation of new shipping companies
- The increasing use of ships flying the Mexican flag.

The government will promote and encourage new shipping companies (private, mixed or state controlled) which satisfy governmental requirements as regards transport necessities and trade conditions.

3.- The third main objective is to support the growth of the national merchant marine, establishing trade agreements with other countries according to the Code of Conduct of Liner Conferences (40,40,20%).
.4.- The plan is promoting the establishment of financial aids in the long term for the acquisition of ships. The enormous amount of economic resources implied in the establishment and expansion of shipping companies, amid the policy of subsidies seen in many other countries, make governmental support for the development of the merchant marine essential.
Chapter 3.

Maritime education and training facilities in Mexico.

3.1.- Introduction.

In almost all countries, maritime education is part of a system and it operates closely with other parts. The main parts of such a system can be identified as:
- maritime administration,
- shipping companies,
- maritime education system.

Maritime education in Mexico has in fact been influenced by this pattern for many years. However, it was not until 1972, that the interested parties, i.e. the Mexican Maritime Administration, Mexican shipping companies and the Mexican Maritime Education System agreed to establish a Trust (Fideicomiso) in order to organize and administer the concerted action taken by the interested parties as regards maritime education. The Trust is in charge of providing maritime education and training for:
- officers in the deck department,
- officers in the engine room department,
- ratings in the deck department,
- ratings in the engine room department,
- ratings in the catering department,
- refresher and updating courses for deck, engineer and radio officers,
- port operators.
The Trust has the following installations and training facilities to provide maritime education in the various categories of marine personnel:

- for the education and training of officers in deck and engine departments:
  - The Maritime Academy in Mazatlan,
  - The Maritime Academy in Veracruz,
  - The Maritime Academy in Tampico,
  - The Training Ship "Nauticas Mexico",

- for the education and training of ratings and port operators:
  - The Training Center for ratings and port operators in Lazaro Cardenas,
  - The Training Center for ratings in Tuxpan.

In order to have a better understanding of the activities in the above mentioned institutions a brief explanation is given below.

3.2.-The Trust, i.e. Fideicomiso.
The Trust is named "Fideicomiso para la formacion y capacitacion del personal de la Marina Mercante Nacional", which means Trust for the education and training for the personnel of the National Merchant Marine. The Trust is presently under the jurisdiction of the General Directorate of Merchant Marine (Direccion General de Marina Mercante or D.G.M.M.), the D.G.M.M. is one department of the Ministry of Communications and Transport (Secretaria de Comunicaciones y Transportes).
Establishment of the Trust.

The Trust was founded on August 17, 1972, under Presidential Agreement. Its original name, "Trust for the restructuring and administration of the maritime academies" (Fideicomiso para la restructuracion y el funcionamiento de las Escuelas Nauticas Mercantes) stated the original objectives.

The Board of Trustees were:

- from the federal administration:
  - Ministry of Public Education,
  - Ministry of Presidential Affairs,
  - Ministry of the Navy.

- from the shipping industry:
  - the state-owned oil tanker company "Petroleos Mexicanos",
  - the state-owned ferry company "Servicio de Transbordadores",
  - the shipping company, "Transportacion Maritima Mexicana",
  - the shipping company, "Navimex".

- from other parties:
  - The National Union of Masters and Deck Officers,
  - The National Union of Harbour Masters,
  - The National Union of Engine Officers.

At this stage the Board of Trustees was dealing exclusively with the education and training of deck and engineer Officers in the maritime academies.
Relocation.

The Trust was under the jurisdiction of the Ministry of the Navy, but in 1976 under a national administrative reorganization, all Merchant Marine Affairs were placed under the jurisdiction of the Ministry of Communications and Transport due to the very civilian nature of its activities. The Trust was included in this reorganization and it has remained under the same Ministry since then. This relocation gave to the National merchant marine the opportunity to have autonomy; this autonomy has lead to a great improvement in all aspects of the national merchant marine affairs.

Modification.

On May 11 of 1983, the Ministry of Communications and Transport agreed with the parties interested to modify and update the original Presidential Agreement. Main modifications were:
- the name for the Trust since then was changed to "Fideicomiso para la formacion y capacitacion del personal de la Marina Mercante Nacional", i.e. Trust for the education and training of personnel for the National Merchant Marine.
- more responsibilities were assigned to the trust, since the education and training of various categories of personnel and the task of provide updating courses for graduate officers was included in its activities.

The parties involved in the Board of Trustees are:
- from the Federal Administration:
  - Ministry of Programming and Budgeting,
  - Ministry of Communications and Transport,
- from the Shipping Industry:
  - the state-owned oil tanker company "Petroleos Mexicanos",
  - the state-owned ferry company "Servicio de Transbordadores",
  - the shipping company "Transportacion Maritima Mexicana",
  - the shipping company "Compania Naviera Tecomar".
- from other parties:
  - National Union of Masters and Deck officers,
  - National Union of Engineer Officers,
  - National Union of Harbour Masters,
  - all those persons or institutions who wish to cooperate with the Trust by previous acceptance of the committee.

Under this modification the Trust took over the responsibility of the education and training of all categories of seafarers, including officers and ratings. The training facilities under its administration comprise two training centers for ratings and the training ship "Nauticas Mexico" in addition to the maritime academies.

The Board of Trustees has elaborated Organizational Manuals for each institution to provide:
- guidance and orientation to the public servants as regard the institution activities,
- guidance and orientation to the public servants as regard their own duties,
- definition of responsibilities,
- limitations of jurisdiction.
The organizational Chart of the Trust is shown in Figure 3. The Head of the Trust is named "Secretario del Fideicomiso" or Secretary of the Trust. Most of the administrative posts in the Trust are held by marine personnel with long sea experience in the National Merchant Marine and the maritime education system. The headquarters of the Trust are located in Mexico City.
3.2.- The Maritime Academy of Mazatlan "Capitan de Altura Antonio Gomez Maqueo".

Historical facts.

March 8, 1880.- Interested parties in maritime education succeeded in their efforts to obtain Federal support for the establishment of maritime educational facilities. A Presidential Decree issued on that date established the creation of both the Maritime Academy of Mazatlan and the Maritime Academy of Campeche. The latter with the passage of time was relocated and became the Maritime Academy of Veracruz.

1881.- The Maritime Academy of Mazatlan opened its doors for the first time and started regular activities. The objective was to prepare officers for the National Merchant Marine.

1884.- Economic problems resulted in closure of the academy, although efforts continued and maritime instruction was given irregularly in other institutions.

April 13, 1913.- Still without physical installations, internal regulations for the maritime academy were established.

1921.- According to the requirements of the Mexican Political Constitution, Article 32, which clearly specified that only Mexicans are allowed to man ships flying Mexican flag, the Maritime Academy of Mazatlan resumed a second stage of operations.

1932.- The Capitan de Altura Antonio Gomez Maqueo initiated his activities in the maritime academy and his influence definitely benefited the academy.

1934.- Residential facilities were integrated in the academy.

1936.- A regimental life system for students was established.
1937.- The Capitan de Altura Antonio Gomez Maqueo took over the Administration of the Academy; his efforts helped in the improvement of academic and disciplinary levels.

1939.- The Maritime Academy of Mazatlan occupied a new building.

1940.- New regulations regarding admissions were established.

1941.- Due to the Second World War the Maritime Academy of Mazatlan was incorporated into the National Navy and renamed Naval Academy of the Pacific. The second stage of operation of the Maritime Academy of Mazatlan thus came to an end.

1948.- By Presidential decree The Naval Academy of the Pacific was discontinued and all its personnel and equipment were incorporated into the Naval Academy of Veracruz in the Gulf of Mexico. The buildings of the Maritime Academy of Mazatlan were then occupied by the Naval training center for crew.

The interest for reopening the Maritime Academy of Mazatlan has risen again. The increasing concern has created a Council which takes care of the reopening efforts.

Dec. 14, 1957.- The Council obtained assistance from the Federal Administration. The Maritime Academy of Mazatlan was then named in honor of its most illustrious Director whose deeds brought fame to the Academy; "Capitan de Altura Antonio Gomez Maqueo".

Jan. 15, 1958.- A Board for the Maritime Academy was established.

Feb. 1 1958.- Buildings were redelivered to the Academy and it was formerly reopened. The third stage of operational activities commenced.

1971.- The Trust (Fideicomiso) for the administration of the National Maritime Education was established.
Sept. 26 1972.- The Trust commenced activities. Under the administration of the Trust the Maritime academy of Mazatlan got engaged in the international maritime regulations (OCMI).

1976.- The Directorate of Merchant Marine Affairs including the Trust, was relocated from the Ministry of the Navy (Secretaría de Marina) to the Ministry of Communications and Transport (Secretaría de Comunicaciones y Transportes, S.C.T.) This change produced autonomy which led to a great improvement in the merchant marine affairs.

1978.- The STCW Convention is signed by the Mexican Administration and the effects of the Convention caused some changes in the National Maritime Education System.

1979.- The syllabus was modified to comply with STCW Convention. Syllabus is comprised of three to four years and a new activity was added to the academy, the updating courses for graduated officers.

1984.- A new branch was added to its Organizational Chart; the Department of updating courses.

Nowadays the Maritime Academy of Mazatlan is engaged in the education, training, assessment and certification of deck and engineer Officers; its activities can be summarized as follows:

- teaching the four first semesters of the syllabus for students before the training on board the training ship,
- teaching of updating courses for graduated officers,
- assessment and certification of deck and engineer officers in the upper levels.
Location of the Academy.

The academy campus is located in the city of Mazatlan, 200 meters from the seaside of the Pacific ocean.

The city of Mazatlan is a fine and a very well known large international resort. Its main economical activities comprise the tourism and the fishing industry. The port installations in Mazatlan and the services offered make this port one of the most important in Mexico and it is also the largest fishing port in the Mexican coast of the Pacific ocean. The city is under the jurisdiction of the Mexican federal state of Sinaloa. Mazatlan has a population of more than 600,000 inhabitants. Domestic and international flights connect Mazatlan with Mexico city, northern cities of Mexico and southern cities of the U.S.A.

The Maritime Academy of Mazatlan is the oldest one in the country and it has a very long tradition in maritime activities. The academy’s influence extends to the neighbouring states (Sonora, Chihuahua, Coahuila, Durango, Lower California South, Lower California North, Colima, Jalisco, Guerrero and Nayarit among others) from where most of the candidates are recruited.

The Organizational Chart of the Academy is shown in Figure 5.
3.3 The Maritime Academy of Veracruz "Capitan de Altura Fernando Siliceo y Torres".

Historical facts.

1917. - The Mexican Political Constitution requires vide Article 32 that ships flying Mexican flag must be manned by Mexican citizens.

1918. - The Capitan de Altura Fernando Siliceo y Torres, a graduate from the Maritime Academy of Campeche, commenced his personal efforts with the objective to establish a Maritime Academy in Veracruz for the education and training of officers for the National Merchant Marine. Local support is also raised and finally the concerted actions are successful.

Feb.5 1919. - The Maritime academy was founded with the name of Escuela de Nautica y Comercio, i.e. Nautical and Commerce Academy.

1924. - The administration was changed from the Chamber of commerce to a Council approved by the Federal Administration. The name of the academy was also changed to Escuela Nautica Mercante, i.e. Merchant Marine Academy. Federal economic support was reduced and finally it ceased. Personal efforts by the Academy's Director Capitan de Altura Fernando Siliceo y Torres maintained the academy.

1937. - Economic difficulties results in closure. Students undertaking studies in the Maritime Academy of Veracruz were transferred to the Maritime Academy of Mazatian.

1939. - Local and State support were successful in their efforts to reopen the maritime academy.

1949. - New building installation was inaugurated. The Maritime
Academy was incorporated to the State University.

April 1968.- An Administrative Council was established. The University administration was phased out.

1971.- The Trust or Fideicomiso for the administration of the maritime education system was established.

Sept. 26 1972.- The trust commenced activities.

1973.- New building installations were started. 20,000 square metres were re-claimed from the sea and residential facilities were built.

1976.- The Directorate of Merchant Marine including the Trust was relocated from the Ministry of the Navy to the Ministry of Communications and Transport. (S.C.T.). This change produced autonomy which led to a great improvement in the merchant marine affairs.

1976.- The new buildings were inaugurated.

1978.- The STCW Convention was signed by the Mexican Maritime Administration.

1979.- The Syllabus was modified to comply with STCW Convention. The Syllabus was comprised from four to three years and a new activity was added; the updating courses for graduated officers.

1984.- A new branch was added to the Organizational Chart of the Academy the Department of updating courses.

At present the Maritime Academy of Veracruz "Capitan de Altura Fernandeo Siliceo y Torres" is engaged in the following activities:

- teaching of the syllabus in its first four semesters for the education and training of deck and engineer officers, before the sea training period.
- training for updating courses for graduated officers.
- assessment and certification for deck and engineer officers.

Location of the Academy.
The academy campus is located in the city of Veracruz in front of "Hornos Reef" with a magnificent view of the sea near the port entrance, in the Gulf of Mexico.

Veracruz, a city with a long history, has its roots from the Spanish Conquest. It was the first municipal city founded in the whole American continent. Many other historical events in the national context have generated a strong sense of local pride from its natives. The city is nowadays an important tourist and industrial center and the port is of international importance. Shipbuilding facilities and shiprepair drydocks are two of the most important activities. The population in Veracruz is more than 800,000 inhabitants. There are regular commercial flights connecting the port with Mexico City and other cities in the south of Mexico. The city is under the jurisdiction of the Mexican federal state of Veracruz.

The Maritime Academy of Veracruz possesses a big influence on the central and southern states of the country (Puebla, Mexico, Tlaxcala, Oaxaca, Campeche, Chiapas, Yucatan and Tabasco among others) and the Federal District where the country's capital is located. Most of the recruited students come from this area.

The Organizational Chart of The Maritime Academy of Veracruz "Capitan de Altura Fernando Siliceo y Torres" is shown in Figure 7.
3.3. - The Maritime Academy of Tampico.

Historical facts :

1945. - A group of interested seamen in maritime education commenced efforts in order to establish a maritime academy. Their efforts were successful and with local and state support a Civil Association named Instituto de Ciencias y Tecnologias de Tampico, i.e. Institute of Sciences and Technology of Tampico, was founded. The Maritime Academy of Tampico was established as a part of this Institute.

Sept. 2 1945. - The Maritime Academy of Tampico commenced courses for the education and training of officers of the National Merchant Marine. The Syllabus was similar to that in the Maritime Academy in Veracruz.

March 25, 1950. - The Maritime Academy of Tampico was separated from the administration of the Institute of Sciences and Technology.

Sept. 1950. - Economic federal support was requested. In October, a regimental system for students was established in the Academy.

1952. - Economic federal support was granted through the Ministry of the Navy.

1955. - The Maritime Academy ceased its activities from September to November due to the hurricanes "Hilda" and "Janet" which caused severe damage to the city. The Academy's buildings were used for distressed people.

1956. - The Ministry of the Navy implemented the same syllabus in all Maritime Academies in the country as those in the Naval Academy excluding military subjects.
August 20, 1960.—A meeting was held with the Director of each academy in order to standardize the Syllabus.

September 1962.—The Institute of Sciences and Technology ceased its economical support to the Academy. Economic difficulties make it necessary to establish an association to promote the Maritime Academy of Tampico.

1967.—The Maritime Academy hired its own building; before it was occupying shared installations with the other Institute.

1971. The Trust or Fideicomiso for the administration of the National Maritime Education was established.

1972.—The Trust commenced activities.

1973.—An agreement to build the Maritime Academy installations was reached.

1974.—Building of installations commenced. They were located in the southern part of the Carpintero Lagoon on re-claimed terrain.

1975.—New Buildings were inaugurated. Residential facilities were offered for 156 students.

1976.—The Directorate of Merchant Marine, including the Trust is relocated from the Ministry of the Navy to the Ministry of Communication and Transport, S.C.T.. This change produces autonomy, which led to a great improvement in merchant marine affairs.

1978.—The STCW Convention was signed by the Mexican Administration.

1979.—The syllabus was modified to comply with the STCW Convention. Syllabus was comprised of three to four years and a new activity was added to the academy; namely updating courses for graduated officers. With this purpose a radar simulator
was installed in the Academy.

1984.- The Maritime Academy of Tampico accepted female candidates for the first time in the country. A new branch was added to the academy’s organizational chart, the Department of updating courses.

Nowadays the Maritime Academy of Tampico is engaged in the education, training, assessment and certification of deck and engineer officers. Its activities can be summarized as follows:

- teaching of the first four semesters of the syllabus for the education and training of deck and engineer officers before commencing the training on board the training ship.
- teaching of updating courses for graduated officers.
- assessment and certification for graduate officers.

Location of the academy.
The academy campus is located in the city of Tampico in the southern part of the "Carpintero" lagoon and built over reclaimed terrain.

The city of Tampico is located about 10 kilometers up-stream of the river "Panuco", in the Gulf of Mexico. Tampico and the surrounding area has nearly 1 million inhabitants. The main activities comprise industrial factories, fishing industry, oil refineries and port operations. The nearby completion of a new industrial port (Altamira) located 22 km up to the north with artificial harbour will increase the economical activities, making Tampico one of the fastest growing developed areas in the country. Tampico is under the jurisdiction of the Mexican federal state of Tamaulipas. Regular commercial
flights connect the port with Mexico City and others in the northern part of Mexico and along the U.S. border.

The academy of Tampico is the youngest one of the maritime academies in Mexico but it has kept a very dynamic position in the evolution of the maritime education system. Now for example, in the Maritime Academy of Tampico the first batch of students including female candidates is under way. The academy influence extends to the northeastern and central states of the country (Nuevo Leon, Coahuila, Chihuahua, San Luis, Hidalgo, Queretaro and Guanajuato among others) from where most of the candidates are recruited.

The organizational chart of the Maritime Academy of Tampico is shown in Figure 14.
3.4.- The Training Ship "Nauticas Mexico".

The idea of utilizing a training ship included in the syllabus for the education and training of deck and engineer officers was put into practice in 1973 when a second hand passenger/general cargo vessel was acquired from Spain with the purpose of using it as a training ship, this first Mexican training ship was re-named "Primero de Junio". It served as a training ship from 1974 to 1979. At presently this old venerable vessel is docked in the port of Lazaro Cardenas in the Pacific coast of Mexico and it is intended to be used as auxiliary equipment for the training of ratings.

The training ship "Nauticas Mexico" was the result of an elaborated study in which most of the experiences registered with the old training ship were included in the design of the new training ship in order to make it more functional. International advise was also considered.

The new training ship was acquired in order to comply with the modified requirements of maritime education established in the document issued in 1979, the Outlines of policy and program for the development of the National Merchant Marine. This document produced some important changes in the syllabus for the education of officers for the merchant marine in order to provide a expeditious and practical training. The syllabus was comprised of three to four years. The new three-year syllabus includes: four semesters of shore based education in one of the three maritime academies and two semesters of training on-board the training ship.
According to this plan a new, specially designed combined general cargo/training ship with a cargo capacity of 12,000 tons and facilities to accommodate 200 students, christened "Nauticas Mexico" was acquired in the Netherlands. The "Nauticas Mexico" was ordered in 1980 and delivered on July 31, 1981. It started commercial operations almost immediately after delivery, carrying steel pipes and other cargoes from Rotterdam to Veracruz on its maiden voyage. The training operations started at the end of August 1981 when the first batch of students came on board for their sea-training period.

The following are the main characteristics of the training ship:

- able to carry general cargo, cargo in bulk and/or containers.
- dead weight 12,000 tons,
- length between perpendiculars 150.5 m,
- beam 21 m,
- draught 9.2 m,
- holds capacity 15,000 cubic m,
- main engine Sulzer 6 RND 68 M,
- power 10,200 BHP at 137 RPM,
- speed 18.0 knots,
- facilities to accommodate 200 students.

The new plan of study has trained nearly 200 deck and engineer officers every year since 1982 and the plan will continue till 1990 when a new program will come into force. The number of students that have graduated are shown below:
1982 course with 194 graduates.
1983 course with 192 graduates.
1984 course with 187 graduates.
1985 course with 185 graduates.
Total...758 graduates.

During this training period (August 1981-June 1985), working under commercial basis as a tramp the ship sailed more than 200,000 nautical miles, carried more than 150,000 tons of cargo and has visited the following ports:

In The Netherlands : Rotterdam.
In Mexico : Veracruz, Coatzacoalcos (port of register), Tampico, Manzanillo and Salina Cruz.
In Spain : Algeciras, Tarragona, Santa Cruz de Tenerife, Palmas.
In Italy : Livorno, Piombino.
In Yugoslavia : Rijeka.
In Canada : Montreal.
In U.S.S.R. : Ventspils.
In Venezuela : Maracaibo.
In Haiti : Port au Prince.
In Santa Lucia : Port Castres.
In Trinidad & Tobago : Port of Spain.
In Turkey : Mersim, Gemlik.
In Egypt : Alexandria, Port Said, Suez Canal.
In Libya : Bengazi.
In Jordan : Aquabah.
In Panama: The Panama Canal.
And, lately, in addition, some other ports in China, Malaysia, Japan, Korea and Taiwan.
At present the ship is operating in the Pacific area and the 1986 batch of students is on board.
The organizational chart of the training ship is shown in Figure 19.
3.5.- The Training Center for ratings and port operators in Lazaro Cardenas.

In March 1984 the Trust took over the building facilities and installations of the training center for ratings and port operators. Most of the courses are under implementation. The organizational chart of the training center for ratings in Lazaro Cardenas is shown in figure 27.

3.6.- The Training Center for ratings in Tuxpan.

The training center in Tuxpan was initially a training center for operators of dredgers. The Trust took over the administration of this center which will come into operation soon. The organizational chart of the training center for ratings in Tuxpan is shown in figure 28.
Chapter 4.

4.- Description of the national maritime education and training system for master mariner certificate.

4.1.- Entrance prerequisites for maritime (nautical) education and training institute.

The following are the basic prerequisites for the entrance into any of the three maritime academies located in Mexico:

- To be Mexican by birth,
- To be in good condition, both physical and mental,
- To be single,
- To be no more than 22 years of age,
- To have a high school degree in physics-mathematical sciences,
- To pass the selective examinations.

4.1.1.- General education prerequisites for maritime (nautical) education and training institute.

The general education prerequisites for maritime (nautical) education in Mexico can be divided into:

- Primary or elementary school,
- Secondary school and
- Preparatory or high school.

1.- The Primary school education starts when the children are at an average age of 6 years. The government through the Ministry of Public Education (S.E.P.) is in charge of providing this elementary education. The main characteristics of
this education are:
- mandatory,
- totally free,
- programmed nation-wide,
- secular,
- 6 years duration.

This education is provided mainly by public institutions which come under the jurisdiction of the federal, state or municipal government. Private institutions, very often under religious administration (mostly Catholics), but under governmental control and supervision are also available.

At the completion of these studies a certificate is issued by the institution and the Ministry of Public Education. This certificate entitles the holder to follow the upper levels of education. Elementary education is considered the minimum requirement for the labor force and in the case of marine personnel for ratings.

.2.- Secondary school follows primary school. It is of three-years duration and the student's average age is 12 years at the time of entrance or matriculation. The Ministry of Public Education is also in charge of the control and supervision of such education, but is not mandatory.

Secondary school is provided free of cost, mainly by public institutions but a few private institutions are also available. Some attempts are being made to make secondary education the minimum education requirement for the labor force, i.e. ratings.
3.- Preparatory or high school is a three-year pre-vocational study period. Students start at an average age of 15 years. Here the students can choose the area in which they aspire to specialize, having in mind their future professional career. The main streams of specialization are:

- Physics/mathematics.
- Chemistry/biology.
- Economics/administration.
- Sociology.
- Humanities.
- Fine arts.

Students can attend high school in public institutions but a few private institutions are also available. Again, the Ministry of Public Education is in charge of providing this education as well as being in charge of the control and supervision. Very often public and private professional institutions have their own preparatory schools with the objective of preparing the students in the specific area they are covering.

As a result of the governmental policy as regards public education, any student who wishes to follow a professional career has the opportunity to do it since education is free, even at the university level. Private institutions are allowed to run primary, secondary and preparatory school and even universities, but the greatest majority of students are prepared in public institutions which are sponsored and supported by the government. This has been a source of pride for the Mexican government because since several decades more than one fifth of the national budget has been allocated to education rather than to non-productive and expensive weapons.
Maritime education in Mexico comes under the jurisdiction of the Ministry of Communication and Transport (S.C.T.) due to the very specific nature of the activities involved. The candidates are recruited from the students who have just finished preparatory or high school and who have obtained the certificate specializing in the area of physics/mathematics. Neither sea experience nor special training is needed.

4.1.2.- Physical and psychological prerequisites for maritime (nautical) education and training.

The Ministry of Communications and Transport (SCT), the governmental body in charge of maritime education, has established through its medical department (D.G.M.P.T) the following physical and psychological requirements for those candidates wishing to enter the maritime academies in Mexico:

a.-The age limit for admission is between 16 and 22 years.

b.-Minimum height is 1.65 meters.

c.-Weight must be within the established parameters shown in Figure 29 with a minimum or a maximum variation of 15%.

d.-Candidates for the nautical sciences must fulfill the following specific medical requirements:

- must have a visual acuteness of 0.6 (minimum) in each eye, without glasses,
- correct color detection,
- visual field without alterations,
- normal ocular tension,
- normal extraocular mobility,
- dental examination must be attached.
e. - The physical examination required for admission will consist of:
- clinical references.
- ophtalmological study.
- otorrinolaringological study.
- neurological study.
- cardiological study.
- odonthological study.
- psychological study.
- laboratory and clinical studies.
- any other medical examinations to be considered by the medical department.

The following diseases would preclude admission:

1. - Chronic diseases which affect or could affect any activity
2. - Neurological:
   2.1. - Convulsions.
   2.2. - Encephalopathy.
   2.3. - Brain lesions.
3. - Psychological:
   3.1. - Personality alterations, conduct problems which may affect the student’s activities.
   3.2. - Psychopathies.
   3.3. - Evidence of cerebral lesions.
   3.4. - I.Q. lower than average.
4. - Otorrinolaringological:
   4.1. - Chronic infections.
   4.2. - Auditive sense out of normal limits (otitis).
4.3. - Abnormal vestibular test.

4.4. - Congenital malformation which may affect respiration.

5. - Cardiovascular.

5.1. - Cardio-insufficiency.

5.2. - Arrhythmia:

5.2.1. - Inferior sinusal bradichardia (50 per min.).

5.2.2. - Superior sinusal tachicardia (99 per min.).

5.3. - Rhythm alterations.

5.3.1. - Supraventricular extrasistolisis.

5.3.2. - Ventricular fibrilation.

5.3.3. - Heart disease (tachicardia and brachicardia syndrome).

5.3.4. - Auricular-ventricular dissociation.

5.4. - Circulatory system alterations.

5.4.1. - Nodal rhythm if rheumatic activity is shown.

5.4.2. - Migratory by-pass.

5.4.3. - Any degree of ventricular-auricular blocking

5.4.4. - Hys bundle, right branch blocked.

5.4.5. - Any type of hys bundle, left branch blocking.

5.4.6. - Pre-exititation Wolf Parkinson White, Lown Ganon Levine Syndrome.

5.4.7. - Sub-divisional blockage.

5.5. - Acquired cardiopathies.

5.6. - Ischemic cardiopathies.

5.7. - Congenital cardiopathies.

5.8. - Peripheral vascular problems.

5.8.1. - Arterial insufficiency of upper and lower limbs, due to occlusive or degenerative phe-
5.8.2.- Venous alterations.
   5.8.2.1.- Venous insufficiency (varicose veins).
   5.8.2.2.- Arteriovenous fistulae.
   5.8.2.3.- Post-phlebitic continuations.

5.9.- Arterial hypertension.
   5.9.1.- It is established that figures above 140-190 should be considered as representative of hypertension.

5.10.- Invalidating continuations of vascular accidents.

6.- Pneumological.
   6.1.- Any chronic or acute illness which affects or compromises lung physiology.

7.- Gastroenterological.
   7.1.- Chronic gastroenterological illness which affects or may affect fitness for the development of activities.

8.- Chronic genito-urinary illness which affects or may affect fitness for development of activities.

9.- Endocrinological.
   9.1.- Diabetes mellitus.
   9.2.- Obesity surpassing 15% of the established weight in the corresponding table, (Table, figure 29).
   9.3.- Any other endocrinopathies which affect or may affect fitness for the development of activities.

10.- Skeleto-muscular.
   10.1.- Osteoarticular and muscular illness of any origin which may affect fitness for the development of activities.
11.- Hernia(s) in the abdominal wall.
12.- Any kind of cancer.
Cases not foreseen shall be assessed individually by the medical department.
4.1.3. - Practical prerequisites for maritime (nautical) education.

As was stated earlier, neither sea experience nor special training is required from the candidates prior to entrance. The candidates are recruited from the national education system after 12 years of general basic education. The average age of candidates is 18 years at the time of entrance. Most come from the middle and lower classes. Maritime education is not completely free since students have to pay monthly fees while in the academies, although the fees are reduced so that students from the lower class can afford it. Some fellowships are also available for those with high achievement in both disciplinary and academic activities.

4.1.4. - Entrance examinations.

According to the present plan, each academy has a capacity of 60 places, of which 40 places are for candidates in the nautical sciences and 40 places for candidates in the marine-engineering sciences. The selective examinations will determine which candidate fulfills the academic and physical requirements to occupy one of the places for students that will integrate the annual batch in the maritime academy. The selective entrance examinations are carried out in each of the three maritime academies (Mazatlan, Veracruz and Tampico). Each academy designs and provides special staff to carry out the selection procedure. The entrance examination takes place
every year during the last week of July or the first week of August. Students from outside the city are permitted to use the academy's accommodation facilities during the week of examinations (capacity for 150 candidates in each academy).

Each year the number of candidates has increased substantially and each academy has confronted the difficult task of selecting only 80 places among more than 500 candidates. This, however, has led to the improved quality of selected candidates.

The total number of selected candidates in the whole system is about 240 students, having in mind an attrition level of 20% during the two-year period of shorebased education. The training ship receives approximately 200 cadets in the third year. The selective examinations are free of charge and candidates are requested to pay their own travel expenses.

Foreign students.

Two extra places in each academy are permitted annually for foreign students coming from Central or South America. It has become customary that every year two foreign students are included in the annual batch of selected candidates in each academy. There are some limitations in the number of the admitted foreign students.

Candidates from Guatemala, Costa Rica, Panama, Nicaragua, Colombia and Venezuela, among others countries, have graduated from the different maritime academies and the training ship. Arrangements for the admission are made through the Mexican Diplomatic Embassy and I.M.O.
The selective entrance examination is divided into two parts namely:

- The physical and medical examination, and
- The academic examination.

The physical and medical examination will determine who is and who is not qualified to be accepted as a candidate. The medical examination will be held at no cost in one of the medical centers established throughout the country by the Ministry of Communications and Transport. This examination will be carried out by a professional staff of doctors, psychologists and specialists who after an exhaustive analysis will issue a medical certificate that will be requested prior to the academic examinations. No one will be admitted for candidate registration without the appropriate medical clearance. Registration by mail in advance is also requested.

The academic examination consists of four main subjects:
- mathematics,
- physics,
- chemistry,
- English language.

The academies provide study guides to orient candidates in the themes each subject includes. The guides also give book references.

The following are the study guides.
Study guide for the entrance examination in mathematics:

Algebra:
- algebraic addition, subtraction, multiplication and division.
- notable products, factorization
- first grade equations, one unknown
- first grade equations, two unknown
- second grade and quadratic equations.

Trigonometry:
- cyclic units in degrees and radians
- triangle elements ratios (sin, cos, tan, etc.)
- trigonometric identities and equations
- logarithms and antilogarithms.

Analytic geometry:
- distance between two points
- point dividing a segment in a given reference
- straight line equation in a general and symmetric way
- straight line gradient
- circumference equation
- parabola
- spherical trigonometry.

Study guide for the entrance examination in physics:
- units and measurements in physics
- study of forces
- work power and simple machines
- movement and energy conservation
- pressure and fluid properties
- heat, thermometry and body dilatation
- calorimetry, physical changes of state
- heat transmission
- ondulatory movement and sound
- light transmission and illumination
- light reflection and refraction
- light diffusion and optical instruments
- static electricity, Coulomb and Ohm's Laws
- series and parallel circuits
- magnetism and electromagnetism.

Study guide for the entrance examination in chemistry:
- matter and energy
- quantum theory
- classification of elements
- solutions and dissolutions
- chemical reactions
- organic chemistry.

Study guide for the entrance examination in the English language:
- verb to be, present and past tenses, affirmative, interrogative and negative forms
- verbs used daily, present and past tenses, affirmative, interrogative and negative forms
- question words
- vocabulary.
4.2 Education, training and experience from entrance into maritime academy to unrestricted master marine certificate.

The education and training of a master mariner in Mexico goes through the following steps:

.1.- A three-year period of professional studies, which are divided into:
   - A two-year period of shorebased education in one of the three maritime academies in Mazatlan, Veracruz or Tampico.
   - A one-year period of education and training on board the training ship, "Nauticas Mexico". After assessment on-board students graduate as "Officers in Training".

Students in the nautical department undertake both studies ashore and on-board together with the students of the engine room department. In both periods the candidate is designated as "Estudiante", i.e. "Student".

.2.- A six-month period of bridge watchkeeping duties under the supervision of a qualified officer on board a sea-going vessels. During this period the candidate is designated as "Official en Entrenamiento", i.e. "Officer in Training". After this period as "Officers in Training", officers are qualified to perform duties as bridge watchkeeping officers on board sea-going vessels and previous certificate of sea experience they are awarded with the title as "Piloto Naval" i.e. Deck Officer.

.3.- A three-year period of sea service, as watchkeeping officer on duty on board sea-going vessels or equivalent sea
period, which will entitle the candidate to an assessment for
the chief mate certificate. Additional courses are included
during this period before the examination.

During this period the candidate is designated as "Piloto
Naval", i.e. "Deck Officer".

.4.- A three-year period of sea service as chief mate on duty
on board sea-going vessels or equivalent sea period, which
will entitle the candidate to an assessment for a master marine
certificate. Additional courses are included during this
period.

During this sea service period the candidate is designated as
"Capitan de Marina", i.e. "Chief Mate".

After this period when he has complied with the maritime admi-
nistration regulations in order to obtain a master mariner
certificate the candidate will be named as "Capitan de Altura"
i.e. "Master".

4.2.1.- Shorebased education.

Shorebased education is carried out during a two-year period
of study in one of the three maritime academies located in
Mazatlan, Veracruz and Tampico.

The academic activities start every year in September as do
those in other institutions of the National Education System.
The two years of shorebased education are divided into four
semesters:

- the first semester runs from September to January,
- the second semester from February to June,
- the third one starts again in September and ends in January,
- and the last one ashore is held from February to June.

During the two-month period between the first and second year (July and August), selection of incoming candidates takes place in the academies.

The calendar of activities(*), in the three academies is as follows:

Week of Activities of the year.

Program for semesters I and III

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>36-51</td>
<td>16 weeks of academic activities</td>
</tr>
<tr>
<td>52</td>
<td>1 week of winter holidays</td>
</tr>
<tr>
<td>1</td>
<td>1 week of academic activities</td>
</tr>
<tr>
<td>2-3</td>
<td>2 weeks of assessment</td>
</tr>
<tr>
<td>4</td>
<td>1 week of review and evaluation of syllabi</td>
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</table>

Program for semesters II and IV

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
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</thead>
<tbody>
<tr>
<td>5-13</td>
<td>9 weeks of academic activities</td>
</tr>
<tr>
<td>14</td>
<td>1 week of Easter holidays</td>
</tr>
<tr>
<td>15-22</td>
<td>8 weeks of academic activities</td>
</tr>
<tr>
<td>23-24</td>
<td>2 weeks of end of semester examinations</td>
</tr>
<tr>
<td>25</td>
<td>1 week of review and evaluation of syllabi</td>
</tr>
</tbody>
</table>

Program for the selective entrance procedure

<table>
<thead>
<tr>
<th>Week</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>26-30</td>
<td>Acceptance of applications</td>
</tr>
<tr>
<td>31</td>
<td>1 week of entrance examinations</td>
</tr>
<tr>
<td>32-35</td>
<td>Registration of accepted candidates and a four-week preparation course for selected candidates.</td>
</tr>
<tr>
<td>36</td>
<td>Start of academic activities</td>
</tr>
</tbody>
</table>

(*) Some small changes can be expected from one academy to another and from year to year.
Syllabi are common to the three academies and they are prepared by professors of each academy. At the end of each semester syllabi are reviewed and when it is necessary, they are suitably modified. Besides this local review of syllabi, it has become customary to hold a national meeting every year in one of the three academies with the purpose of evaluating and discussing possible adjustments to the syllabi. This practice keeps the Mexican Maritime Education System dynamic.

The three academies provide residential facilities; each academy can accommodate 150 students. Students undertake their studies in a regimental system of living as a part of their education. They must comply with the academy’s internal regulations and they are required to meet high standards of conduct and discipline.

The daily routine (*) in a typical day of activities in the maritime academies consist of:

0545 General call, start of the day.
0550-0600 Room cleaning, early morning form up.
0600-0630 Physical exercises and showers.
0630-0650 Breakfast.
0700-0750 Lecture.
0750-0800 Morning form up, honours to the national flag.
0800-1150 Lecturers.
1200-1230 Personal cleanliness.
1230-1300 Noon form up and Lunch.
1300-1400 Free time at personal disposal.
1400-1700 Practical lecturers and/or sports activities.
1700-1750 Showers.
1750-1800 Evening form up, honours to the national flag.
1800-1830 Dinner time.
1900-2100 Time of study in the classrooms.
2100 End of the day.

(*) Some small changes can be found among the academies.

This routine applies from Monday to Friday. Students are permitted to go out on Saturday afternoons and the whole day on Sundays. Students with high standards in discipline and academic activities are permitted to have free evenings on Thursdays and Fridays.

Discipline is maintained bearing in mind the future activities in which students will be involved.
The following table shows the syllabus divided into the six semesters. The figures indicate the number of lesson-hours(*) utilized to cover each subject in the whole semester.

<table>
<thead>
<tr>
<th>Semesters</th>
<th>Ashore</th>
<th>On-board</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
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<tr>
<td>Subjects</td>
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<tr>
<td>Mathemat</td>
<td>102</td>
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<td>Physics</td>
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<td>Chemistry</td>
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<td>Technical</td>
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<tr>
<td>Drawing</td>
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<td>English</td>
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<tr>
<td>Language</td>
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<td>68</td>
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<td>Ship's theory</td>
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</table>
Meteorology and
Oceanography.................................................85  102
Maritime Law.................................................51

Maritime

Medicine.........................................................34

Principles of
Management...................................................34

Principles of
Economy.........................................................51

Elements of
Marine Engines................................................51

Human Relations................................................34

Radar Navigation...............................................102  102

Cargo Stowage
and Ship

Stability.........................................................85  102

Seamanship....................................................34  34  34  34  34  34

Physical

Education.......................................................34  34  34  34

Signaling and
Communications..............................................34

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Total hours..... 680  714  714  714  680  680

* Duration of a lecture :
- ashore.- 50 minutes.
- on-board.- 45 minutes.
Dosification of the syllabus and assignment of credits.

In order to identify the assignment of credit-hours and credits-subject a system of codes has been established. The following table specifies the subjects which comprise the syllabus, their identification code and their assigned lesson-hours (theoretical and practical) and credits. The time unit utilized is the week.

<table>
<thead>
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<th>Code</th>
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</table>

Abbreviations used:
- H.L./Week., means - Hours/lessons per week.
- T., means - Theoretical lesson.
- P., means - Practical lesson.

Code Interpretation:
Take for example this code; MAT-310612
- MAT refers to the subject, in this case Mathematics.
- 3 means that there are three semesters of that subject in the syllabus.
- 1 means that the following information corresponds to the first semester of that subject; this should not to be interpreted as the semester position in the syllabus.
- 06 means the total amount of lessons per week, both theore-
tical and practical, of that subject
- 12 means the total amount of credits per week assigned to
that subject according to the number of lessons.
Theoretical lessons have a value of two credits and practi-
cal lessons have a value of one credit.

The syllabus according to the above mentioned criteria can be
summarized as follows:

Shorebased Education.

<table>
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<tr>
<th>Semester I</th>
<th>Semester II</th>
<th>Semester III</th>
<th>Semester IV</th>
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Total:

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Education and Training on board

Semester V | Semester VI
---|---
CYE-210580 | CYE-220609
SEG-320406 | SEG-330406
NAV-540609 | NAV-550610
TBU-330609 | MAG-110306
ING-650508 | ING-660508
MET-220609 | MAN-330608
NAR-210609 | NAR-220609
PMR-650202 | CYS-330202
PMR-660202

40 H.L./W. | 40
60 Credits. | 60

Semesters
1 2 3 4 5 6

Grand Total = 40 + 42 + 42 + 40 + 40 + 40 = 246 L/W/S.
Grand Total = 70 + 72 + 72 + 70 + 60 + 60 = 404 C/W/S.

The Ministry of Public Education (Secretaria de Educacion Publica or S.E.P.) is in charge of reviewing and updating on an annual basis the assignment of lectures and credits per subject in order to comply with the national regulations as regards the education and training for deck and engineer officers.
4.2.2.- Education and training on-board.

At the end of the two-year shorebased education period in each academy, students from the three academies and from both nautical and engineering departments go on board the training ship to undertake the last two semesters (the fifth and sixth) of their professional studies.

The training ship is a combined general cargo/training ship with facilities to accommodate 200 students and at the same time to carry 12,000 tons of cargo. The training ship has been specially designed to provide both theoretical and practical studies and it sails on a commercial basis as a tramp vessel.

Due to the nature of its activities, the personnel on board are divided into:

- directive,
- operative,
- academic and
- the students.

The Director of this floating academy is a highly qualified sea-going master with maximum authority on board and the highest responsibility since he is in charge of both staffs; the academic and the operative. The Master is at the same time the Director of the training ship.

The Deputy Director of the ship is a highly qualified seagoing Chief Engineer performing both duties, i.e. Deputy Director of the Academic department and Chief Engineer in the Operational department.

The academic staff consists of:

1 Headmaster of nautical studies.
1 Headmaster of engineering studies.
14 Teachers and Instructors.

The academic staff is in charge of providing training for 200 Students, (100 from the Nautical side and 100 from the Engineering side).

The training ship is equipped with the following teaching facilities: (since this paper deals with the education and training of officers on the nautical side; only these facilities are mentioned, although extensive teaching facilities in the engineering department can be found in the training ship):

- radar simulator with four own ships,
- navigational electronic aids simulators: omega, radio direction finder, satellite and echo sounder,
- cargo load calculator,
- 6 classrooms with a capacity for 20 students each,
- language laboratory,
- one simulated bridge,
- library (shared with the engine students),
- 30 sextants for practices,
- the ship itself, which constitutes the closest approach to the pedagogical method of teaching by doing. Among the cargo operational equipment available for the training of students can be mentioned: different kind of winches, hydraulic cranes, stulken cranes, cargo gear union purchase, cargo gear parallel, cargo gear swinging boom, loadicator, McGregor hatches, etc., in addition the loading and unloading operations provide practical training in cargo stowage, handling of dangerous goods, etc. This equipment is available for the students' practice under supervision of qualified officers.
At the very beginning of their period on board students are familiarized with ship's installations and its organization by means of a one-week induction course.

The students remain on board for two semesters while the teaching staff rotates every semester. The academic calendar of activities on board is as follows:

Week of the year. Activities(*).

36-04 Academic activities of the 5th semester.
05-25 Academic activities of the 6th semester.
26-35 Teaching staff on board, preparing and reviewing syllabi.

(*) - Small changes can be expected from year to year.

The Syllabus is prepared to allow the more practical subjects to be carried out on board.

Daily routine on-board.

Student activities consist of:
- theoretical studies,
- application of theoretical studies by means of simulator exercises,
- watchkeeping duties on the real bridge under supervision of the watchkeeping officer,
- watchkeeping duties in the simulated bridge under supervision of a qualified instructor,
- practical duties on deck under the supervision of a qualified instructor,
- regular exercises and drills in; abandoning ship, man overboard, firefighting and emergency.

In order to comply with the above mentioned, a special sche-
dule is arranged so that all students can participate in these activities periodically.

The daily routine on board is apparently similar to those in the academies, but it involves an active and complex schedule in which students are engaged. A typical day consists of the following basic activities:

**Daily basic activities on-board.**

0600  General call, start of the day.
0600-0700 Cleaning of cabins, showers.
0700-0745 Breakfast.
0800-1145 Lectures and/or practical duties.
1145-1230 Personal cleanliness.
1230-1300 Lunch.
1300-1345 Free time at personal disposal.
1400-1730 Lectures and/or practical duties.
1730-1800 Personal cleanliness.
1800-1900 Dinner.
1900-2100 Study time.
2100  End of the day.

In addition, some other schedules covering other activities, such as watchkeeping duties and practical work on deck supplement this main schedule. The lectures indicated in this main schedule comprise mainly practical lessons as was stated earlier.

Students undertake their studies under a regimental system. They must comply with regulations on board as a part of their training. They are required to meet high standards of conduct and discipline. Special personnel on board are in charge of the students' discipline.
4.2.3. Sea service periods.

The Maritime administration has established several periods of sea service as a prerequisite for each assessment and certification.

These sea training periods are controlled by means of a certificate of sea service issued by the master of the ship in which the officer has made his practices. This certificate of sea service is collected by the officer at the moment of disembarkation. The certificate is then endorsed after disembarkation by the Harbour Master in National Ports or the Mexican Consulate or Embassy when in foreign ports.

This certificate or these certificates of sea service will be requested by the Administration from the officer in order to give evidence of his sea experience. This procedure of collecting certificates when disembarking will also be used in all future sea experience.

The certificate of sea service includes the following:

- Name of the Master,
- Name of the holder of the certificate,
- Name of the ship and flag,
- Name of the company,
- Main characteristics of the ship, such as:
  - type of vessel,
  - port of register,
  - identification signal,
  - gross and net tonnage,
  - year and place of construction,
  - power capacity.
- Kind of sea experience performed and duration,
- Ports of operations during this period,
- Date and port of disembarkation,
- Signature of the Master.

4.2.3.- Sequence of sea service periods.

The Directorate of the Merchant Marine has established the following sequence of sea service periods:

1.- A six-month period of bridge watchkeeping duties on board sea-going vessels for those that left the training ship as "officer in training" after the completion of the sixth semester. This is done to comply with the STCW Convention as regards the regulation for certification of officers in charge of a navigational watch on ships of over 200 GRT, (Regulation II/4, paragraph 2, (c)).

After this six-month period the "officer in training" is awarded the Title of deck officer or "Piloto Naval" of the Merchant Marine.

2.- A three-year period as watchkeeping officer on board sea-going vessels or equivalent sea service.

Equivalent sea service means:

- one-year sea service period as watchkeeping officer on board vessels over 1600 GRT plus one-year sea service period as chief mate on sea going vessels over 7000 GRT.

After this sea service period as watchkeeping officer the candidate is entitled to an assessment for the chief mate certificate.
3.- A three-year period as watchkeeping officer on board sea going vessels or equivalent sea service.

Equivalent sea service means:
- one-year sea service period as watchkeeping officer on board sea going vessels plus one-year period of sea service as chief mate on board vessels over 1 600 GRT.

After this sea service period the candidate is entitled to an assessment for a master certificate.

4.3 Assessment and certification.

According to the present plan there are three main assessments or examinations for certification:

1.- at the end of the sixth semester on-board the training ship in order to obtain a certificate as officer in training.

2.- after three years of sea service or equivalent sea period which entitles the officer to an assessment for the chief mate certificate.

3.- after three years of sea service or equivalent sea period which entitle the chief mate to an assessment for master certificate.

Each certificate is valid for 5 years in compliance with the STCW Convention (Regulation 11/5, paragraph 1).

Certificates are issued and endorsed by the Ministry of Communications and Transport.
4.3.1. - Assessment for officer in training certificate.

The examination in order to obtain a certificate for officer in training consists of the assessments included in the syllabus for the formation of deck officers. Students must leave the training ship after the completion of the sixth semester with all subjects passed with at least the minimum aprobatory mark. The scale of marks for qualifications of subjects goes from zero to ten, the minimum aprobatory mark for all subjects is six.

4.3.2. - Assessment for chief mate certificate.

The National regulations as regards the assessment to obtain the certificate as a chief mate includes the following requirements:

- application for assessment, indicating in which center of studies the assessment will be held,
- certificate/s of sea experience duly endorsed by the harbour master when disembarkation occurs in national ports or by the Mexican embassy or consulate when in foreign ports,
- medical clearance issued by one of the medical center established by the medical department of the Ministry of Communications and Transport throughout the country,
- provide information as regard his name, address, phone,
- photocopy of the latter certificate,
- six photos as established in the requirements,
- fee of 15,000 pesos (about $50).

Before the assessment, the candidate must have attended and passed the following updating courses:

- radar course,
- survival craft crewman.
- others which the administration requires.

Development of assessment for chief mate certificate.

The assessment for the chief mate certificate is held in one of the three maritime academies or on board the training ship. A Jury will be established. The Jury members consist of:
- a president of the Jury who can be the Director or the Deputy Director in the academy or on the training ship,
- three assessors selected from the academic staff of the academy or the training ship. Assessors must possess higher certificates than the candidate,
- one assessor selected by the candidate and who is engaged in active sea service.

The Jury will determine the division of the assessment program among the assessors. The candidate is permitted to utilize the teaching material he wishes for his explanations since the assessment is oral. Duration of assessment will be a minimum of four hours. Part of the examination can take place onboard docked ships and other installations used as support equipment for explanations by the candidate. The result of the assessment is always by unanimity of the Jury. The president of the Jury will hold the vote and the result can be pass or fail. In the case of a negative result the Jury will establish an extra period of sea training or other practical requirements for the candidate prior to any other attempt for assessment.
The reference guide for the assessment for a chief mate certificate consist of:
- navigation,
- meteorology and oceanography,
- ship’s theory,
- manoeuvring,
- cargo load operations and ship stability,
- maritime law,
- management,
- maritime English language,
- maritime communications,
- hygiene and safety on board,
- first aids, survival at sea,
- maintenance of equipment.

The assessment will consist mainly questions related to the type of ships on which the candidate has sailed. The Jury has to include assessors with experience in specific areas according with the candidate experience, for example, gas carriers, petrochemical tankers, container vessels, etc.

4.3.3.- Assessment for master mariner certificate. The National regulations as regard the assessment to obtain the master marine certificate consist of the following requirements:
- application for assessment, indicating in which center of maritime studies the assessment will be held,
- certificate/s of sea experience duly endorsed by the harbour master when disembarkation occurs in national ports or by the Mexican embassy or consulate when in foreign ports,
- list of ships in which the candidate has sailed.
- medical clearance issued by one of the medical centers established by the medical department of the Ministry of Communications and Transport throughout the country,
- photo-copy of the latter certificate,
- six photos as established in the requirements,
- provide information as regards his name, address, phone,
- fee of 25,000 pesos (about $75).

Before the assessment the candidate must have attended and passed the following courses:
- radar course,
- any other course which the administration requires.

Development of assessment for master certificate.

The assessment for the master certificate is held in one of the three maritime academies or on board the training ship. A Jury will be established. The Jury members consist of:
- a president of the Jury who can be the Director or the Deputy Director in the academies or on the training ship,
- three assessors selected from the academic staff and which possess higher certificates than the candidate,
- one assessor selected by the candidate and who is engaged in active sea service.

The Jury will determine the division of the assessment program among the assessors. The candidate is permitted to utilize teaching material he wishes for his explanations since the assessment is oral. The duration of assessment will be a minimum of four hours. Part of the assessment can take place on board docked ships and other installations used as support.
equipment for explanations by the candidate. The result of the assessment is always by unanimity of votes. The president of the Jury will hold the vote and the result can be pass or fail. In the case of a negative result, the Jury will establish an extra period of sea training or other practical requirements for the candidate prior to any other attempt for assessment. The reference guide for the assessment for a master certificate includes the following subjects:

- electronic navigation aids,
- meteorology and oceanography,
- ships' theory,
- manoeuvring,
- cargo load and stowage operations,
- maritime law,
- maritime management,
- maritime English language,
- classifications societies and insurance,
- safety on board.

The assessment will include mainly questions related to the type of ships the candidate has sailed. The Jury has to include assessors with experience in the specific areas according with the candidate experience, for example; gas carriers, general cargo vessels, tankers, etc.

A restructuring as regards courses and special requirements before examinations for Chief Mate and Master are under way.
4.4. Additional courses.

The STCW Convention in Regulation 11/5, Paragraph 2, establishes that: "The Administration shall, in consultation with those concerned, formulate or promote the formulation of a structure of refresher and updating courses, either mandatory or voluntary, as appropriate, for masters and deck officers who are serving at sea, especially for re-entrants to seagoing service. The Administration shall ensure that arrangements are made to enable all persons concerned to attend such courses as appropriate to their experience and duties. Such courses shall be approved by the administration and include changes in marine technology and relevant international regulations and recommendations concerning the safety of life at sea and the protection to the marine environment".

According to the above mentioned, the Maritime Administration in Mexico started procedures to implement these courses. Having this in mind the Mexican Maritime Education System acquired a radar simulator for each maritime academy with the purpose of providing graduate deck officers with the radar observer course. The first radar simulator was fitted in the Maritime Academy in Tampico and a two-week course started in July, 1979; the other two maritime academies followed suit in 1980. Nowadays the course has been extended to three weeks and it includes the following:

- radar observer course,
- radar simulator course and
- ARPA or automatic radar plotting aids course.

Another area to cover was safety on-board, so in that way the
"Survival craft crewman" course was established for the first time in the Maritime Academy in Veracruz; the other maritime academies implemented this course later. This is a one-week course which includes:
- lifesaving appliances course,
- firefighting course,
- first aid course.

The increasing demand for personnel and activities involved in those courses and the diversification of courses in the academies made it necessary to create an extra department in each academy. The head of this department, named "Department of updating courses" is located at the level of a Deputy Director in the organizational chart of each academy.

With the creation of this extra department in each academy, the refresher and updating courses for deck officers came together with the refresher and updating courses for the engineer officers under one administration in each maritime academy.

The courses offered nowadays are as follows:
- Tanker course, which includes:
  - 3-week course on Oil Tankers,
  - 3-week course on Chemical Carriers,
  - 3-week course on Gas Carriers.
- Surveyor course, which includes:
  - 3-week course on Safety,
  - 3-week course on Insurance,
  - 3-week course on Shipping.
- Radar course, which includes:
- one-week course on radar observer,
- one-week course on radar simulator,
- one-week course on ARPA systems.
- Survival Craft Crewman course, one week duration.
- Radio operator course, one week duration.
- Maritime English course.
- Teaching Staff course, six week duration.
- Diesel Plant Simulator course, four weeks duration.
- Chief Mate engineering department course, 13 weeks.
- Chief Mate deck department course, under implementation.
- Chief Engineer course, 13 weeks duration.
- Port Operation course, under implementation.

Most of the courses are under implementation and they constitute the main task in the months to come for the Mexican maritime education system.
Chapter 5.

5.- Conclusions and recommendations.

Conclusions.

Evolution of the Mexican maritime education and training system.

The Maritime education and training in Mexico has been in evolution since the end of the last century. This evolution has been given in the past time mostly in an isolated way. Such an evolution has produced a unique system according to the national necessities and interests. The system has been also strongly influenced by the events registered in the national political life as it has happened in many other countries. One of the most important characteristics of this system is its deep sense of nationalism.

Centralization of the administration in 1972 produced high achievements as regards academic levels due to the standardization of syllabi.

The seventies were remarkable since international regulations started to produce some important changes in the Mexican maritime education and training system.

In 1976 the Mexican merchant marine and its maritime education system acquired autonomy in the national administrative reorganization in which all merchant marine affairs were relocated from the Ministry of the Navy to the Ministry of Communications and Transport. This relocation permitted autonomy which led toward great improvement in all aspects in the
national merchant marine.

During the years from 1976 to 1984, efforts were stressed in the education and training of deck and engineer officers in order to make a maritime education system more expeditious and to increase in numbers the formation of such personnel.

The idea of utilizing a training ship included in the syllabus is not new. The old training ship "Primero de Junio" left many experiences that were applied in the new training vessel "Nauticas Mexico" now under operation.

Present situation.

Most of the problems confronted by the Mexican maritime education system have been solved or are in the process of being solved within the international standards. Mission consultants and further contacts with I.M.O. have provided guidance. Most of the policies as regards the development of the maritime education and training system have been already taken and established by the administration in order to cope with the necessities in the future.

Nowadays the results of the interaction between the requirements of the National merchant marine and the International regulations can be seen in the operation of the different institutions for the formation of the various categories of personnel. It is noticeable that the maritime education and training in Mexico is among the highest in the international context as regards the education and training of deck officers but some necessities exist for the formation of personnel in the higher levels. The maritime administration was aware of this situation and it commenced the procedures for the imple-
mentation of specialized courses. At present the Mexican maritime education and training system is stressing efforts in order to implement a national system of refresher and updating courses. With this purpose in mind a new department has been created in each maritime academy; this new department is named "Departamento de cursos de actualizacion", i.e. department of updating courses. Most of the courses included in this department are by now under implementation, however, the teaching staff to provide such a kind of courses are not easily available.

Recommendations.

After the two-year course in maritime education and training in the World Maritime University some knowledge and points of comparison have been acquired. One of the main conclusions after the W.M.U. experience is that no one maritime education system in the world can be considered the best. Every country has produced its own maritime education system according to the circumstances, necessities and conditions given. Nevertheless, the W.M.U. experience provided point of references to compare different systems and hence the opportunity to take other experiences in order to improve others systems. Under this premise the following recommendations are given with the only purpose to help in the improvement of the maritime education and training system in Mexico. These recommendations do not include great and drastic changes (as for example, concentration of academies, modification of syllabus or the establishment of maritime universities or
acquisition of expensive equipment etc.). This has been avoided taking into consideration the large amount of investments required for such modifications and having in mind also that the decisions involving great and drastic changes in the Mexican maritime education and training system are made after long and careful studies by the appropriate personnel which take into account the concerted interest of the parties involved. The recommendations here emphasize present necessities of the existing system. The recommendations are listed below.

1.- In the selection process of candidates for entrance in the maritime academies, a personal interview is recommended; after candidates are declared successful in both the medical and academic examination, they must appear for an interview in viva-voce. A Board consisting of members of the academic staff and other maritime professional groups will carry out the personal interviews with each candidate. The board will assess/judge the suitability of a candidate from the following points listed below:

- personality, this includes bearing, smartness, general appearance and overall confidence of a candidate.
- speech and expression, this includes whether a candidate can express himself effectively, clearly and logically and also whether he/she has clear pronunciation and accent, (of course in Spanish language).
- intelligence, this includes a candidate’s presence of mind, quickness in uptake and honour and common sense.
- knowledge, this includes a candidate general knowledge.
knowledge of current national and international affairs which may include maritime subjects.

- extra-curricular activities, this includes a candidate's participation in games, sports, hobbies, debating, scouting, etc.

The personal interview should carry X marks. This mark will be part of the general results.

2. One area which could benefit from improvement are the library facilities in the academies and on board the training ship. Funds should be allocated in this area periodically in order to increase the number of books in the library. Subscriptions to national and international magazines and publications in the maritime field should be initiated and maintained. The increase of activities in the libraries in each academy is to be expected and the personnel there has to be trained in this area.

3. The establishing of special courses should be according to the international recommendations. Guidance in establishing every special course can be found in the syllabus recommended by IMO. But very often the experience to provide such courses is always difficult to acquire. It is then recommended to designate a special staff of instructors (two or three) to be in charge of the task of preparation of such courses. It is also recommended that the instructors in charge of the preparation of the special course attend a similar course already established in another country. The English language must be required of the instructors to be trained. Cooperation with
other institutions can be obtained through the World Maritime University, the International Maritime Lecturers Association, the IMO or even direct personal contacts with directors of the institutions in an interchange of experiences. The investment for the preparation of courses is always high in time, money and personal efforts if successful results are wanted.

.4.- The acquisition of advanced maritime teaching equipment for advanced training course due to the considerable amount of economic resources involved should be carefully planned. Training for instructors and maintenance operators and continuity in the maintenance programs have to be assured.

.5.- Recommendations in this paper are stressed in the area of the teaching staff and its administration, by now the most important element in a maritime education and training system. The following are some consideration collected as regards the teaching staff:

The maritime administration is in a position to define high standards for maritime lecturers. A system of selection of candidates for the teaching staff should be established. This system would allow only the best trained and most experienced candidates to enter a teaching staff in the academy. Attractive salaries would also be offered and lecturers with the necessary qualifications could be attracted. The result would be a teaching staff that the maritime administration will use as advisors and/or for carrying special tasks in which the administration may neither have the time nor the staff.
For the solution of training problems the teaching staff cannot be substituted by facilities and equipment. Equipment only gives the possibility to advance the quality of training. The system to be implemented in order to select and keep an efficient teaching staff would vary from country to country, but a good example can be adopted from others educational systems.

In the U.S.A. for example the faculty qualifications standards for appointment and promotion are classified or categorised as follows:

- instructor,
- assistant professor,
- associate professor,
- professor.

.a.- The instructor must have the following academic requirements; Third mate licence plus bachelor's degree or Master's degree. In addition the candidate must have evidence of high standards of scholarship and/or professional achievements.

.b.- The assistant professor must possess:

- second mate licence plus bachelor's degree for a two-year appointment and acceptable graduate study of at least 12 hours required for continuance after 2 years.
- or chief mate licence plus bachelor's degree,
- or master's degree.

In addition the candidate must have high standards of scholarship and professional achievements and promise of professional growth and development.
c. - Associate professor must have the following requirements:
- second mate licence plus master's degree plus 12 hours
  acceptable graduate study beyond their master's degree
toward doctorate or,
- chief mate licence plus bachelor's degree or,
- master's licence plus bachelor's degree or,
- doctorate.
In addition the candidate must shown a definite record of
scholarship and promise of achieving some distinction in his
field and/or for licenced personnel, a record of continuing
progress of professional development in those areas of compe-
tence required of a modern merchant marine officer; demostra-
ted teaching ability; superior personal attributes and at
least five academic years of successful college teaching. Up
to five years practical experience as a licenced officer may
be substituted for teaching experience on a one for one basis.
Promotion of a faculty member from assistant professor to
associate professor will be made only to those who contribute
significantly to the mission of the national merchant marine.
Such a promotion represents a change in status from that of a
junior to that of a senior member of the faculty.

e. - Professor, must fulfill the following requirements:
- Chief mate's licence plus master's degree plus 18 hours
  acceptable graduate study beyond the master's degree toward
  a doctorate or,
- master's licence plus master's degree, or
- doctorate.
A candidate should be a person of mature professional stature, well regarded by colleagues and distinguished by the quality of scholarly efforts and/or by a recognized high level of professional expertise in maritime operation and techniques and by a teaching ability. Candidates must have at least six years of academic experience in the rank of associate professor.

The recommendation then is not to establish the system above mentioned but a similar one adopted especially for the Mexican maritime education and training system. The adopted classification of the teaching staff should take in consideration the steps already established in this area by the Mexican maritime education and training system. Salaries and incentives should be included in order to attract and maintain the most qualified and motivated personnel.

6. - The above mentioned system can be adopted but it will not run with an appropriate management. An appropriate management required people of good character, personalities more interested in the common good than in the advantage for himself, persons who have a clear insight as regards the function of shipping and the conditions needed to ensure a safe and effective functioning of shipping. Such personalities would give maritime training the attention it deserves. The way of management should not differ from those observed in successful companies nowadays. Many books deal with this topic and they give guidance and recommendations. During lecturers in the WMU the "Teamwork on board" was recommended as of prime importance in the management function of shipping companies.
The situation on board and in any academy does not differ greatly as regards administration problems and the same principles utilized by the "Teamwork on board" can be applied when dealing with administrative problems in academies or a teaching staff. In addition to the principles of the "Teamwork on board", the guides to a good management practice are also recommended to be followed in order to obtain better results from personnel and equipment. The guides divided into three parts constitute the commandments for the professional manager as regards the individual manager, the organization and others who work in the organization.

Guides to good management practice.

Part 1.- As regard the individual manager.

The professional manager should:

a. - Make proper use of the resources available to him.
b. - Appraise his own competence, acknowledge potential weaknesses and seek relevant qualified advice.
c. - Take every reasonable opportunity to improve his professional capability.
d. - Be objective and constructive when giving advice or guidance in his professional capacity.
e. - Accept accountability for the actions of his subordinates as well as for his own.
f. - In pursuing his personal ambitions, take account of the interest of others.
g. - Never maliciously injure the professional reputation or career prospects of others nor the business of others.
h. - Be aware and sensitive to the cultural environment within he is working.
Part 2. As regards the organization.

The professional manager should:

a. By leadership, coordination, personal example and commitment direct all available efforts towards the success of enterprise.

b. Apply the lawful policies of the organization and carry out its instructions with integrity.

c. Define and maintain an organization structure, allocate responsibilities and encourage the achievements of objectives.

d. Demonstrate his loyalty to the organization by promoting its interest and objectives.

e. Promote effective communications within the organization and outside it.

f. Make immediate and full declaration of any personal interest which may conflict with the interests of the organization.

g. Refrain from engaging in any activity which impairs his effectiveness as a manager.

h. Act in accordance with his own judgement in any instance of conflict of interest arising from his membership in a trade union, trade association or other body.

i. Ensure that plant, processes and materials committed to his charge are maintained and operated as efficiently and safely as reasonably practicable.

Part 3. As regards others who work in the organization.

The professional manager should:

a. Strive to minimise misunderstanding and promote good rela-
tions between all who work in the organization.

b. - Consult and communicate clearly.

c. - Take full account of the needs and problems, ideas and suggestions of others.

d. - Ensure that all his subordinates are aware of their duties and responsibilities especially in relation to those of others.

e. - Encourage the improved performance of his subordinates and the development of their potential by means of training and other suitable ways.

f. - Be concerned about the working environment for the health, safety and well being of all, especially those for whom he is responsible.

g. - Promote self-discipline as the best form of discipline both for himself and for his subordinates.

h. - Ensure that disciplinary or other corrective action is constructive and respects the dignity of all concerned.

i. - Using his judgement, advise senior colleagues in advance of situations in which they are likely to become involved.

7. - Once the appropriate system for the selection of the teaching staff has been established, the specialization of instructors and professors has to be promoted and encouraged in order to produce expertise in maritime fields. Such kinds of specialized personnel must maintain contact with the international fora through participation in seminars, workshops, conferences and exhibitions in order to keep themselves updated with the changeable maritime technological environment.
Most of the material utilized in the elaboration of this paper came from handouts and reference books provided during the WMU lecturers. The WMU library was also a source of information. Other material was collected during the field trips organized by the WMU to different institutions. Most of the information as regards the Mexican maritime education system came from material collected in Mexico during the past winter (1984-1985) and from personal experiences acquired during the period performed as radar instructor on board the training ship "Nauticas Mexico".

The following are some of the references from which most of the information has been taken for the elaboration of this paper:

Lecturers on the establishment of a national shipping industry in a developing maritime country. By Professor Dr. A.A. Monsief, Master mariner, lecturer of the WMU. 1984.

Establishment/administration of maritime affairs in developing countries. Volume I, by Professor P.S. Vanchiswar, resident professor of the WMU. 1984.

Lineamientos de politica y programa para el desarrollo de la marina mercante nacional. Mexico, 1979. Secretaria de Comunicaciones y Transportes. (Outlines of policy and program for the development of the national merchant marine). Ministry of Com-
66

International conference on training and certification of sea-


Global cooperation for the training of marine personnel, I.M.O., World maritime day, 1984.


Figures and Illustrations.
Figure 1 Map and facts about Mexico.

FACTS ABOUT MEXICO:

NAME: ESTADOS UNIDOS MEXICANOS, UNITED MEXICAN STATES.
AREA: 1,958,201 SQUARE K.M.
CAPITAL: MEXICO CITY.
CLIMATE: VARIES ACCORDING TO ALTITUDE AND LATITUDE FROM TROPICAL TO TEMPERATE.
POPULATION: 71,330,000 (1982).
GOVERNMENT: FEDERAL REPUBLIC WITH 31 STATES AND ONE FEDERAL DISTRICT.

LOCATION: 14°32' to 32°43'N, 86°42' to 118°22'W BOUNDARY LENGTHS: U.S. 3,418 km (2,123 mi); Gulf of Mexico and Caribbean coastline, 2,070 km (1,286 mi); Belize, 251 km (156 mi); Guatemala, 871 km (541 mi); Pacific coastline (including Baja California), 7,329 km (4,550 mi).
1. TRUST OFFICES IN MEXICO CITY,
2. MARITIME ACADEMY OF MAZATLAN,
3. MARITIME ACADEMY OF VERACRUZ,
4. MARITIME ACADEMY OF TAMPICO,
5. COATZACOALCOS, PORT OF REGISTER OF THE TRAINING SHIP "NAUTICAS MEXICO".
6. TRAINING CENTER FOR RATINGS IN LAZARO CARDENAS.
7. TRAINING CENTER FOR RATINGS IN TUXPAN.

Figure 2 Geographical location of maritime training facilities in Mexico.
Figure 3 Organizational chart of the Trust for the education and training of personnel the national merchant marine.
Figure 4 Geographical location of the Maritime Academy of Mazatlan.
Figure 5 Organizational chart of the Maritime Academy of Mazatlan.
Figure 6 Geographical location of the Maritime Academy of Veracruz.
Figure 7 Organizational chart of the M.A. of Veracruz.
Figure 8 Photo. Main offices of the Maritime Academy of Veracruz.

Figure 9 Photo. Classrooms and offices of the Maritime Academy of Veracruz.
Figure 10 Photo. Students dormitories in the M.A. of Veracruz.

Figure 11 Photo. View of the main offices, classrooms and -- Planetarium in the maritime Academy of Veracruz.
Figure 12 Port of Tampico.
Organizational chart of the Maritime Academy of Tampico.
Figure 15 Photo. Main offices of the Maritime Academy of Tampico.

Figure 16 Photo. Classrooms and Planetarium in the Maritime Academy of Tampico.
Figure 17 Photo. Area of Simulators, laboratories and workshops in the Maritime Academy of Tampico.

Figure 18 Photo. Students dormitories in the Maritime Academy of Tampico.
Figure 19 Organizational chart of the Training Ship "Nauticas Mexico".
Figure 20 The Training Ship "Nauticas Mexico", decks A and B.
Figure 21 The T. S. "Nauticas Mexico". decks C, D and E.
Figure 22 Photo. The T.S. "Nauticas Mexico", departing from Veracruz, Mexico (June 1983).
Figure 23 Photo. The T.S. "Nauticas Mexico", docked in the port of Salina Cruz, Mexico, after arrival from Shanghai, China. (January 1985).

Figure 24 Photo. Partial view of the T.S. "Nauticas Mexico".
Figure 25 Photo. One of the classrooms on board of the T.S. "Nauticas Mexico".

Figure 26 Photo. Partial view of the T.S. "Nauticas Mexico", from the area of hold number 4.
Figure 27

Organizational chart of the Training center for ratings and port operators in Lazaro Cardenas.
Organizational chart of the Training center for ratings in Tuxpan.
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HEIGHT IN METERS WEIGHT IN KILOGRAMS.

Figure 29 Table for determining weight parameters for candidates to enter the maritime academies.
Figure 30 Diagram of general basic education prior to entrance in the maritime academies in Mexico.
A.- SIX-MONTH SUPERVISED WATCHKEEPING DUTIES UNDER SUPERVISION.

B.- THREE TO FOUR MONTHS COURSE UNDER IMPLEMENTATION, INTENDED TO BE 7TH SEMESTER OR SENIOR MARINE STUDIES, BY NOW REQUIRED COURSES PLUS ASSESSMENT FOR CHIEF MATE CERTIFICATE.

C.- THREE TO FOUR MONTHS COURSE UNDER IMPLEMENTATION, INTENDED TO BE 8TH SEMESTER OR SENIOR MARINE STUDIES, BY NOW REQUIRED COURSES PLUS ASSESSMENT FOR MASTER CERTIFICATE.

Figure 31.- Diagram of maritime education and training leading to master mariner certificate in Mexico.
LA SECRETARIA DE COMUNICACIONES Y TRANSPORTES

CERTIFICADO DE COMPETENCIA ESPECIAL
Certificate of Special Competence

DE ACUERDO CON LAS LEYES Y REGLAMENTOS MEXICANOS Y
In accordance with the Mexican Rules and Laws, and
RESOLUCIONES: DEL CONVENIO INTERNACIONAL
resolutions: the International Pact
SOBRE NORMAS DE FORMACION, TITULACION Y GUARDIA PARA LA
on Standards of Training, Certification and Watchkeeping for
GENTE DE MAR (1978): DE LA ORGANIZACION MARITIMA INTERNACIONAL, O M I
Seafarers (1978): of the International Maritime Organization, I M O

Tomese Razon:

El Subsecretario de Operación

El Director General de Marina Mercante
Figure 33 Reverse side of the sample certificate.

CONTENIDO DEL CURSO
Course Content

ZAFARRANCHO DE HOMBRE AL AGUA
Man Overboard Drill
a) Voces de Alarma
   Alarm Voices
b) Usos de Aros Salvavidas
   Use of Lifejets
   c) Técnicas de Flotación
   Floating Techniques

ZAFARRANCHO DE ABANDONO DE BUCHE
Abandoning Ship Drill:
a) Operación de Boles Salvavidas Usos de Chalecos Salvavidas
   Lifeboat Operations Use of Lifejackets
b) Practicas de Remo
   Boatwork under Oars
c) Navegación a Vela
   Sailing
   d) Operación de Bajías Salvavidas
   Inflatable Litters Operations
   e) Conocimiento del Equipo de Boles y Bajías Salvavidas
   Equipment and Rations for Lifeboats and Litters

HELICÓPTERO COMO MEDIO DE SALVAMENTO
Assistance by helicopters
a) Dispositivos Especiales desde el Helicóptero
   Special Devices for Hovering persons
b) Precauciones de Seguridad para recibir Helicópteros Codigo de señales
   Safety procedures before the assistance Code of Signals

ZAFARRANCHO CONTRA INCENDIO.
Fire-Fighting Drill
a) Manejo y Uso de Extinguidores
   Handling and use of fire fighting appliances
   b) Sistemas Fene
   Fire Fighting Systems

PRIMEROS AUXILIOS
First Aid:
a) Hipotermia, Respiración Artificial
   Hypothermia Artificial Respiration
   Choque Nervioso
   Comotion
b) Signos Vitales
   Vital Signs

CLAVE: ES

SE TOMO RAZON EN FOJA
CON EL NUMERO DE REGISTRO
Fecha de nacimiento
ACT NAC CERT
México. D.F a de de 19

DIRECTOR DE NAVEGACION

DIRECTOR ESCUELA NAUTICA MERCANTE DE

INSTRUCTOR
Maritime education and training system in Mexico.

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