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**WORLD MARITIME UNIVERSITY**  
Malmö, Sweden

**THE REVIEW AND EVALUATION OF THE BRAZILIAN  
MARITIME TRAINING AND EDUCATION SYSTEM AGAINST  
THE NEW REVISED 'STCW' INTERNATIONAL TRAINING AND  
COMPETENCY STANDARDS**

By

**SEBASTIÃO MAURO DE OLIVEIRA**  
Federative Republic of Brazil

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

**MASTER OF SCIENCE**

in

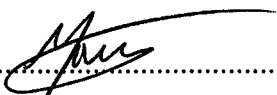
**MARITIME EDUCATION AND TRAINING**

1997

## Declaration

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

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

.......... (Signature)

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## ABSTRACT

This dissertation is research into the Examinations and Certifications of seafarers in Brazil as related to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, (as amended). The author has attempted to analyze the existing system and propose ways and means to improve the training, examination and certification system taking into account international developments including new technology, methodologies and quality assurance system.

An examination is made of management theories on quality and quality assurance. A discussion is made on all the steps necessary for successful implementation of a training, examination and certification system based on the revised STCW 78 Convention in Brazil. This includes analysis, initiating, preparing, documenting, training, examination, certification, monitoring and auditing.

The importance of appropriate qualifications for examiners or assessors in maritime administration and the vital role of same in the successful implementation of a quality assurance system in a new examination and certification system is examined. A brief review is made of the maritime education, training, examination and certification system in certain developed countries, noting their advantages and disadvantages with a view to improving the Brazilian maritime examination and certification system in the future.

There is a need not only for a supply of new seafarers onboard ships, but also a need for competent persons who meet the requirements of the revised STCW 78 Convention. In this regard, quality assurance is one of the most important factors for examination and certification for seafarers. A number of recommendations are made to improve and enhance the maritime examination and certification system for seafarers in Brazil

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## LIST OF ABBREVIATIONS

<b>Administ.</b>	Administration
<b>ARPA</b>	Automatic Radar Plotting Aids
<b>B.Sc</b>	Bachelor of Science
<b>CIABA</b>	Centro de Instrução Almirante Braz de Aguiar
<b>CIAGA</b>	Centro de Instrução Almirante Graca Aranha
<b>CoC</b>	Certificate of Competence
<b>Dep</b>	Department
<b>DN</b>	Naval District
<b>DOC</b>	Documents of Compliance
<b>DOCENAVE</b>	Companhia Vale do Rio Doce Navegação
<b>DPC</b>	Directorate of Ports and Coasts
<b>ECDIS</b>	Electronic Chart Display Information System
<b>FDEPM</b>	Fund for the Development of the Maritime Professional Education
<b>FRONAPE</b>	Frota Nacional de Petroleiros
<b>GMDSS</b>	Global Maritime Distress and Safety System
<b>GOC</b>	General Operator Certificate
<b>GRT</b>	Gross Tons
<b>IHO</b>	International Hydrographic Organization
<b>IMO</b>	International Maritime Organization
<b>INMARSAT</b>	International Maritime Satellite
<b>ISM Code</b>	International Safety Management Code
<b>ITU</b>	International Telecommunications Union
<b>km</b>	Kilometer (1,000 metre)

<b>kW</b>	Kilowatt
<b>MARPOL</b>	International Convention for the Prevention of Pollution from ships
<b>MC</b>	Model Course
<b>MET</b>	Maritime Education and Training
<b>MSc</b>	Master of Science
<b>OE</b>	Organ of Execution
<b>OGMO</b>	Management Organ of Labor
<b>OOW</b>	Officer On Watch
<b>PREPOM</b>	Professional Maritime Education Program
<b>QA</b>	Quality Assurance
<b>REB</b>	Special Brazilian Register
<b>RECO</b>	Course Report
<b>reg</b>	Regulation
<b>RO/RO</b>	Roll on Roll of
<b>SAR</b>	Search and Rescue
<b>Sec</b>	Section
<b>SMC</b>	Safety Management Certificates
<b>SOLAS</b>	International Convention for the Safety of Life at Sea
<b>STCW</b>	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
<b>STCW Code</b>	Seafarers Training, Certification and Watchkeeping Code
<b>TEU</b>	Twenty feet container unit
<b>WMO</b>	World Meteorological Organization
<b>WMU</b>	World Maritime University

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# CHAPTER 1

## INTRODUCTION

### A BACKGROUND STUDY OF THE HISTORY AND DEVELOPMENT OF BRAZILIAN MARITIME EDUCATION AND TRAINING

The starting point for Brazilian Maritime Education and Training MET was October 1892 when two maritime schools were built in the city of Belém, in the extreme north of Brazil. The aim of the Engineering School was to educate and train engineer officers for the merchant marine. The aim of the Deck Officers School was to educate and train deck officers for the merchant marine. In 1907 the two schools started to work together under the name Merchant Marine School of Pará, which is the name of the Brazilian state where the schools were built.

At that time the students from Rio de Janeiro, who had economic difficulties to move to Belém to start their maritime studies, had the opportunity to study through private teaching given by navy officers and to obtain their training on board merchant vessels.

During the Second World War Brazil did not have roads or rail-road linking its coastal states and cities. Therefore the Brazilian coastal trade was very intensive at that time. The world conflict showed the Navy the necessity to adopt the principle of "Forças Navais" (Marine Forces). On November 10 in 1939 the "Escola de Marinha Mercante do Lloyd Brasileiro" was brought into existence in the same building as the office of the "Companhia de Navegação Lloyd Brasileiro", which was a state-owned shipping company. The first director of this institution was admiral Graca Aranha.

In June 1956 the “Escola de Marinha Mercante do Lloyd Brasileiro” ceased to exist and a new “Escola de Marinha Mercante do Ministério da Marinha” was established under the direct responsibility and supervision of the Ministry of the Navy. The building was constructed in an area of 97,500 square meters in Avenida Brasil 9020 next to Guanabara Bay. In 1964 Brazilian shippowners had about 500,000 GRT and the education and training ministered at this school was quite adequate. However, the growth of Brazilian merchant marine trade and the need to build Brazilian shipyards became a fact. The 70s were golden years for the Brazilian merchant marine. New and modern vessels were built in Brazilian and foreign shipyards. The ports were restructured and new specialized terminals were built. To crew these new and modern vessels with properly educated and trained Brazilian seafarers the government decided to expand the “Escola de Marinha Mercante do Ministério da Marinha”. The school was rebuilt between 1971 and 1973 with support from IMO. In 1973 the new school was finished under the responsibility of the Directorate of Ports and Coasts (DPC) of the Navy. The school was named “Centro de Instrução Almirante Graca Aranha” (CIAGA). The original idea was that it should be a maritime university. The DPC started to be responsible for the education and training of the seafarers including the ratings who did not receive any education and training until that year.

During many years the Brazilian maritime education was classified as a non university level career. This has been a considerable obstacle for those having maritime certificates wishing to access work in land based institutions or private companies. Posts concerning activities directly linked to maritime transport, marine pollution and shipbuilding were normally occupied by “university level” people such as civil and naval engineers,

lawyers, economists or people who had graduated with a degree in other university studies.

The rules on the necessity of having university level certificates to take certain posts in the industry and particularly at government institutions were very rigid. Seamen with a good theoretical and practical training in the maritime field were not accepted for posts where they otherwise could be very useful.

Graduates from nautical schools were steadily complaining about this situation but the problem had a difficult solution because the Ministry of Education did not have competency over the Nautical Schools, which was under the responsibility of the Minister of the Navy. In 1977 the entrance level required for nautical studies was raised from primary to secondary or pre-university. A new updated curriculum was adopted and a diploma was authorized and recognized for the officers from the merchant marine school after inspection made by representatives from the Ministry of Education.

The most important development of nautical studies in Brazil has taken place with objectives focused not only to provide training for seafarers but also to offer the opportunity to the students who enter the nautical academies to have a university level certificate or degree this will allow them to work in other fields of maritime transport such as in maritime and port administrations, in shipping companies, in the oil industry, at shipyards or even in adjacent industries, such as power plants (marine engineers). Corresponding to the new objectives, the syllabus content was modified in order to reach the level of other university careers.

The introduction of an university degree in the Brazilian MET has led to the following major two reactions:

- Mainly due to the conditions of life at sea and family separation, an important percentage of the students are not interested in working at sea but they would like to have a post in a land based maritime transport activity. For those students the structure offers them the desired option. At present there are many professionals who have studied at the Brazilian Academy. Further, they either have a position in the administration or in a shipping company but they do not intend to continue a professional seaman career.
- On the contrary other people have vocational interest in working at sea but they need to follow a four-year course to become Second Mate or Third Engineer and after the mandatory sea service of three-year they have to return to study more an year to become Chief Mate or Second Engineer. There are some opinions that a five-year school period is not necessary to learn how to carry out positions at sea. Those not interested in studying at a university have no alternative.

Much censure has been leveled in recent years at the lack of standards and skills exhibited by many seafarers at sea. And this at the high rate of occurrence of human errors as an originating factor in many casualties. It has also been established at IMO and in other forums that many officers and ratings today lack the competence to perform duties efficiently in the work environment. There is certainly a strong indication that having obtained a formal education does not necessarily mean that the individual has the best liked ability. This view has been recognized in the revised International Convention on Standards of Training and Watchkeeping 1978 (STCW 95), where emphasis was arranged on the acquisition of skills by demonstration of an ability to perform (i.e. standards of competence).

As long as much of the learning and training process continues takes place ashore in the maritime educational institutions, where the monitoring of performance can be more readily observed, it is onboard in the ship's environment that the most operative learning and skills relating to the operations of the ship take place. However, some skills cannot be easily acquired in the work place, such as emergency response training in the handling of large vessels. These may be better acquired in a simulator.

Sea transport is the main form of transportation in Brazil for international trade. Maritime Education and Training plays an important role in Brazil. Training seafarers to operate Brazilian ships in Brazilian waters as well as in international waters is recognized as very important.

Major changes have been taken place in the maritime industry both locally and with international shipping. Brazil like any maritime country has to comply with regulations and standards to keep the maritime industry working safely and efficiently. Conventions have been introduced by the International Maritime Organization (IMO) to try to satisfy the maritime industry needs of every country and other matters related to maritime activities. These include among other things, safety of ships, safety of cargo and people at sea and keeping the sea clean. To achieve these objectives, those who are actually working on the ships must be trained. There are many MET systems in existence today all over the world. So Brazil is no exception having its own system. This system is the subject of this dissertation. The purpose/objective is to see if the standards and quality of the MET system in Brazil match international standards.



## **OBJECTIVES**

1. To investigate the present maritime education and training system in Brazil and compare it against national training needs and international standards.
2. To develop proposals for a revised maritime training and education system in Brazil to meet the future needs for the local shipping industry and the international market.
3. To make recommendations for the recognition of a Brazilian certificate of competence (CoC) for advanced standing into programs at higher certificate levels in other institutions in Brazil.

## **METHODOLOGY**

The materials concerning the reviewing process of the MET system in Brazil were collected during the short winter break, when the author was back in Brazil . Due to limited time, visits could only be made to senior staff in the maritime administration, the maritime academy of CIAGA and to a few shipping companies.

For the evaluation process, the author has relied upon international conventions and codes on standards of training, materials from WMU and other institutions.

Proposals and recommendations are made on the basis of the information on hand.

## CHAPTER 2

### THE MARITIME EDUCATION AND TRAINING SYSTEM IN BRAZIL

#### 2.1 The Maritime Administration

The Directorate of Ports and Coasts (DPC) of the Ministry of the Navy is the maritime administrative body in Brazil. Under national law this Directorate is the only representative to IMO regarding Brazilian territorial waters. The main functions of this directorate are administrating, regulating and handling safety and pollution prevention matters to ensure safety of life at sea and environment protection. These functions involve the following:

- (a) Surveys, inspections and certification of ships.
- (b) Installing and up-keeping navigational aids in coastal waters and inland rivers.
- (c) Training, examination and certification of seafarers.
- (d) Conducting inquiries and investigations into shipping casualties.
- (e) Dealing with matters pertaining to maritime search and rescue.
- (f) Attending international, regional and local conferences and seminars on maritime related matters.
- (g) Advising the government on maritime matters within the directorate's jurisdiction.
- (h) Responsibility for implementing port state control.
- (i) Dealing with matters pertaining to pollution prevention at sea.
- (j) Training, examination and certification of fishermen, port workers and pilots.

- (k) Determining the minimum number of crew for any national vessel.
- (l) Registering Brazilian ships.

The structure of the Maritime Administration in Brazil has the following set up:

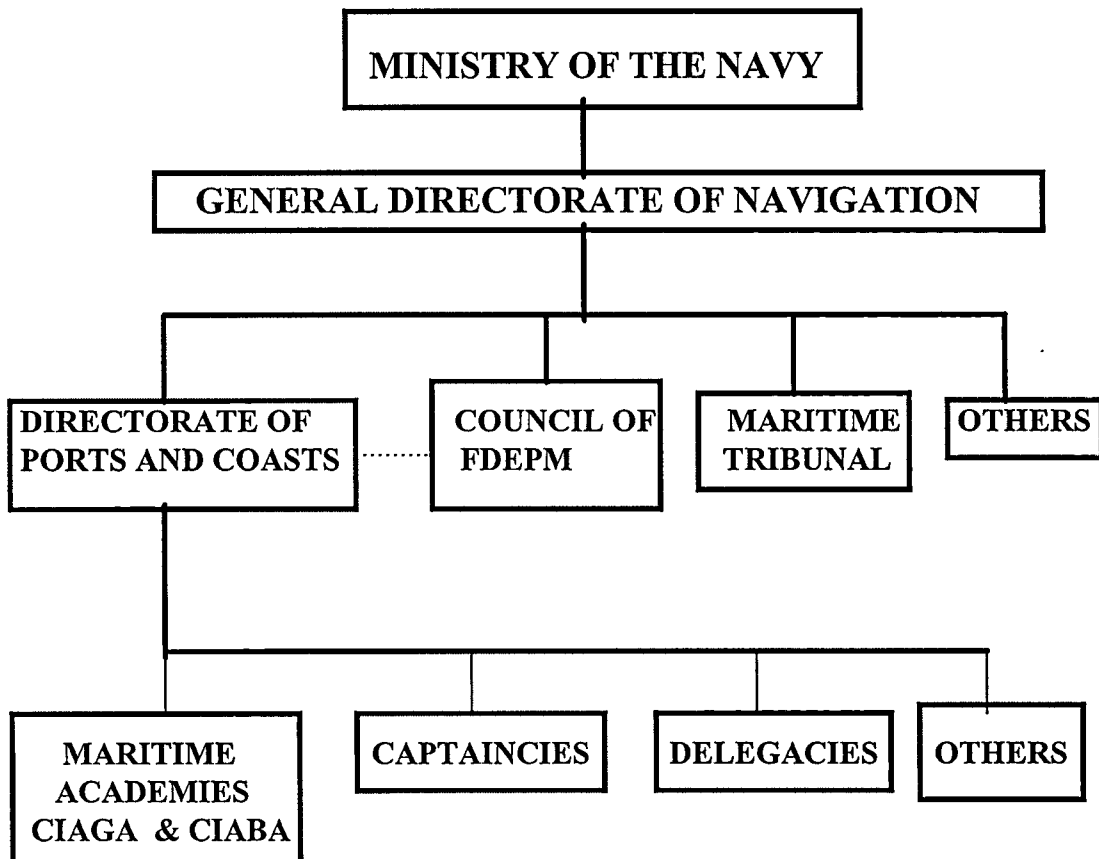


Fig 2.1. Brazilian Maritime Administration

The Directorate of Ports and Coasts is located in the city of Rio de Janeiro. To carry out its work it is represented by two maritime academies, captaincies, delegacies and agencies, located throughout the country, covering 7,400 km of coastline and around 50,000 km of navigable rivers and lakes. The captaincies, delegacies and agencies

receive technical guidance from the Directorate of Ports and Coasts (DPC) in matters related to safety of life at sea, navigational safety, prevention of pollution at sea and professional maritime education.

In the past all the jobs in the Directorate have been done locally. In some sections of the Directorate, ship surveys have been carried out without proper training of the officers responsible, specially in the licensing section. In recent years this has happened regarding accidents involving small ships in the Amazon River. In January 1992 the small ship "Bateau Mouch" had an accident in Rio de Janeiro, where more than one hundred people lost their lives. This accident raised regional concern about safety at sea. Therefore the Directorate started formal training for inspection officers and surveyors. Courses were done at "Centro de Instrução Almirante Graca Aranha", in Rio de Janeiro. They were based on the IMO Model Courses for surveys. The people who work as surveyors or licensing officers in the Captaincies and Delegacies are Navy officers whose duties and goals are different from those of maritime industry officers. When they arrive, for the first time, at a Captaincy or a Delegacy many difficulties arise because of their lack of experience in dealing with this type of job. Normally, they work for two years in a Captaincy or a Delegacy. When the officer has gained experience, it is time for him to go to an other military post maybe without any link to the maritime industry. A new officer comes. Also him with lack of experience.

Following the promulgation of the Maritime Education Law a Fund for the Development of Maritime Professional Education (FDEPM) was established to give economic support to education and training of maritime industry workers, for example port workers, fishermen, agents and seafarers. The maritime industry made a compulsory deposit of 0.02% over their monthly employer pay-roll to this Fund. The Directorate of

Ports and Coast is the executive branch authorized to use the money on maritime education. All expenses have to be authorized by the Council of the Fund for the Development of Maritime Professional Education, which is composed of the interested like the Navy and professionals in maritime industry. The president of the council is from the navy. The fund has about US\$70 million (1996) to implement maritime education and training in Brazil.

After the promulgation of the Port Law, the Directorate has continued to provide, through some of the Port Captaincies, courses for port workers. The Management Organ of Labor (OGMO) is legally responsible for the qualification and training of port workers. They work out a plan for the training of port workers to specialize them to use various types of cargo handling equipment (e.g. portainer, transtainer, pneumatic discharges, conveyor belts, cranes, tractors, etc...). They both train new workers and update already registered workers. The decisions are based on the necessities ascertained from the observation of the peculiarities of the operations in each port (terminals for grains, ores, containers, general cargo, ro-ro, etc...) and considering the assistance rendered by the Port Administration and the unions. Based on this planning the Management Organ of Labor prepares an Annual Program and presents the same in the form of a proposal to the Port Captaincy or Delegacy. This program is presented by mid-January of the year preceding the year considered for holding the courses (year D-1). By the end of January of year D-1 the Captaincies or Delegacies forward the proposals presented by the Management Organ of Labor, via Naval Districts (DN) to the Directorate of Ports and Coasts.

The Directorate of Ports and Coasts analyses the proposals and totals the financial resources necessary, in the light of the forecasts of financial availability to fund the

Basic Plan of the Directorate, in accordance with the System of the Master Plan of the Navy. By 30th September of year D-1 the courses will be approved and included in the Professional Maritime Education Program (PREPOM), which will be drawn up and distributed to the Naval Districts, Captaincies, Delegacies and other interested parties.

The Captaincies and Delegacies having received the Professional Maritime Education Program from the Directorate for holding the courses, contacts the Management Organ of Labor to make an Administrative Agreement (Covenant). This is done in order to make the application viable of the resources of the Fund for the Development of Maritime Professional Education (FDEPM) to the holding of the courses authorized. The covenants should have a list of the courses with costs, venue and number of students and a cost estimate.

The authorized course may be held by the Management Organ of Labor itself or by Organs of Execution (OE). The latter can be training centers, technical schools, universities, or the professional education section of captaincies or delegacies.

After the end of each course the Organs of Execution will draw up a report of courses (RECO), which will be sent to the Management Organ of Labor, in accordance with the covenant made. Up to 30 days after completion of each course, the Captaincies and Delegacies send a final report to the Directorate of Ports and Coasts who will analyze the same and re-supply the system in a manner to improve it.

In short, the Directorate of Port and Coasts (DPC) compiles norms and rules for the application of the Fund for the Development of Maritime Professional Education (FDEPM) capital in training programs for port workers. The proposals made by the Management Organ of Labor (OGMO) are analyzed and forwarded by the Captaincies and Delegacies. The Directorate of Ports and Coasts congregates the maritime education

programs and authorize the Captaincies to sign administrative agreements with OGMO's.

Two ministries are awarded with fishing. One is the Ministry of Agriculture, which controls fish exploitation. This Ministry determines where and when fishing is allowed. Another is the Ministry of Navy, which is responsible for the safety of life at sea. The Directorate of Ports and Coasts (DPC) supervises the centers of instruction, Captaincies and Delegacies which implement the training courses for fishermen and issues a seaman book. To have a fisherman seaman book is compulsory for all crew on board fishing vessels. The courses are conducted when fishing is prohibited (period of fishing reproduction) by the Ministry of Agriculture. The Fund for the Development of Maritime Professional Education (FDEPM) gives economic support for the development of the courses. The Directorate of Ports and Coasts (DPC) pays about US\$250 to each student as an allowance during the course period.

The Ministry of the Navy is responsible for the search and rescue operations in the area designed as Brazil-SAR. The effective implementation depends on the Ministry of Telecommunications which is in charge of the Coastal Radio Stations. In a casualty the Captaincy and/or the Delegacy is directly involved in a SAR operation.

In case of a casualty, the Directorate of Ports and Coast (DPC) is responsible for making inquiries. The Captaincy and/or the Delegacy must conduct the technical inquiry for the area where the casualty has happened. The conclusion of the technical inquiry is forwarded by the Captaincy and/or the Delegacy to the Directorate. The experts of DPC analyze the inquiry and depending on its implications they open a process which is sent to the Maritime Tribunal. This tribunal has been created by national law number 2181

promulgated in February 1954 and is under the responsibility of the Ministry of the Navy. There are six judges and one president in this tribunal. One judge must be a master marine with recognized experience aboard merchant vessels. The second judge must be a civil personal with specialization in ship management and international commerce. The third judge must be a lawyer specialized in international public rights. The fourth judge must be a lawyer with specialization in maritime law. The fifth must be a frigate from the "Corpo da Armada da Marinha". The sixth must be a frigate from the "Corpo de Engenheiros da Marinha". The president must be a General Officer of the Navy (Vice Admiral) who is nominated by the Ministry of the Navy. One of the judges is nominated by the president to study and present each case. After a presentation of the case, the judges vote. The president has the casting vote.

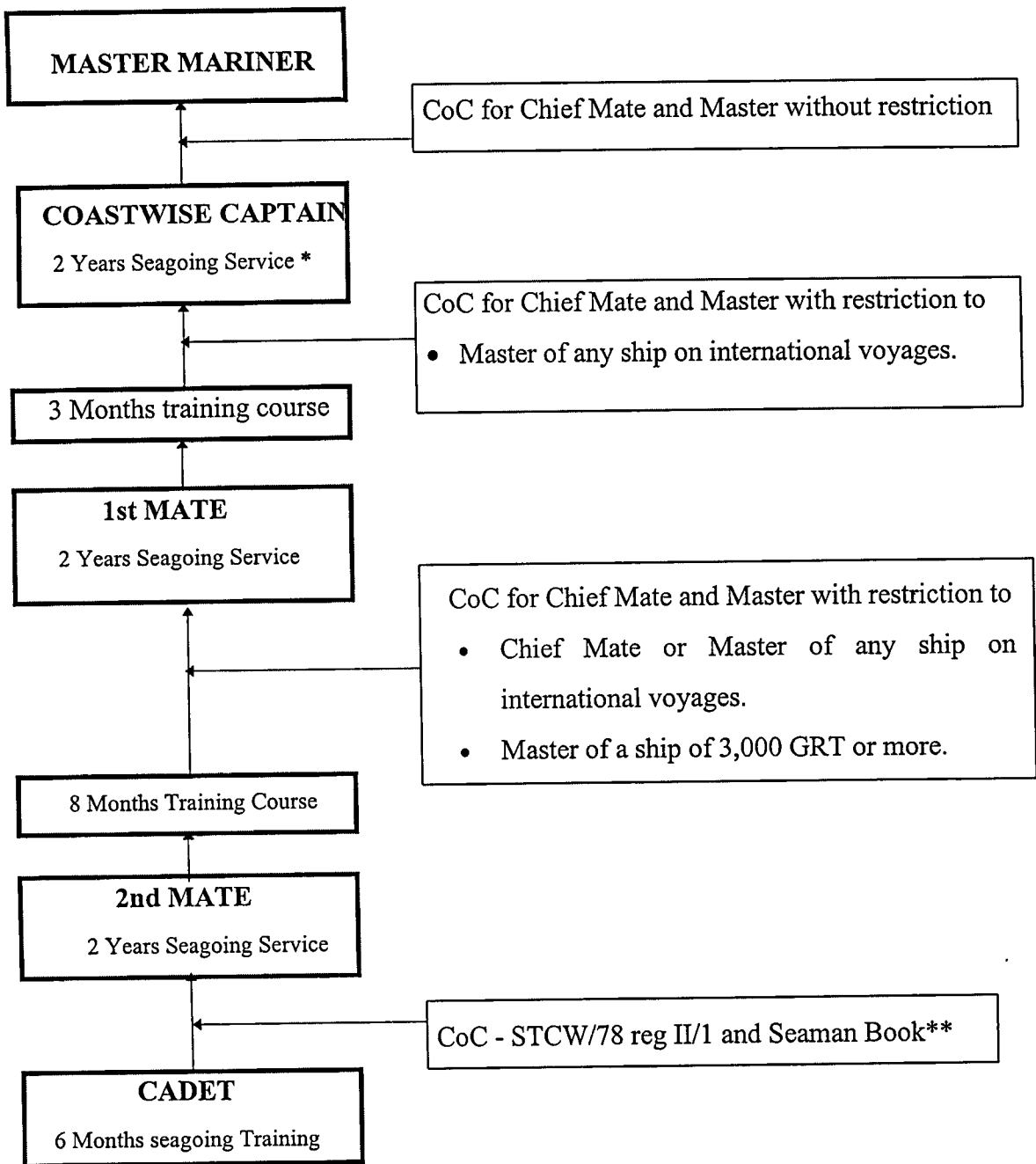
## **2.2 Present Certification System**

Brazil has ratified the International Convention on Standards of Training, Certification and Watchkeeping, STCW/78. In the early years of the 80s there was a change in the maritime certification system in order to fulfill the STCW/78. The Brazilian Maritime Education Law gave the power to the Directorate of Ports and Coasts to determine the policy in the maritime education field. This law made the Brazilian maritime education system very flexible and also fast in response. The head of the DPC, who is the high authority of the Maritime Education System, can authorize any necessary change in the curriculum of the seafarers.

For the time being, the present certification system is still based on the STCW/78 Convention. However some additional regulations are applied to national crew.

The present Nautical Certification of Competency (CoC) structure is Shown on the page overleaf:



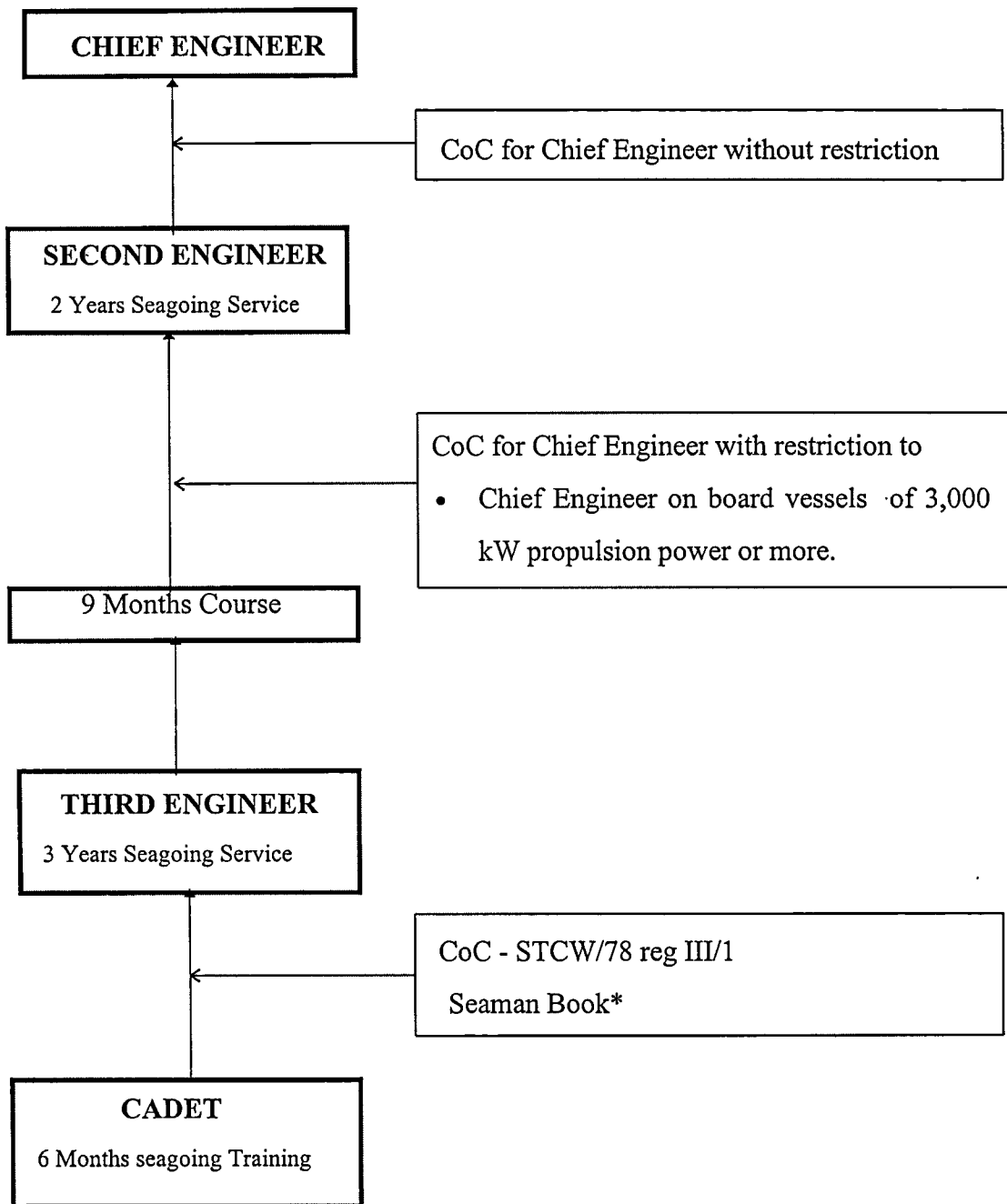


\* 1 year as Chief Mate in international voyage.

\*\* Document issued by the Navy to Brazilian seafarers which is compulsory.

Fig 2.2. Nautical Certificate of Competence Structure

The present Engineer Certification of Competency (CoC) structure is as follows:



\* Document issued by the Navy to Brazilian seafarers, which is compulsory.

Fig 2.3. Engineering Certificate of Competence Structure

Brazilian vessels are classified according to the areas they operate in as follows:

- (a) Regional (only sail on rivers, lakes and bays)
- (b) Coastal
- (c) Foreign going

Under the present regulations any person being an officer on a ship of 500 GRT or more needs to have a certificate of competency. The function on board the vessel determines the level of certification ( e.g. mate, chief mate or master). The Directorate of Ports and Coasts is the Authority who decides on the relation between certification and function. For example, on board a vessel in domestic traffic an officer with a CoC for officer on watch can function as master.

### **2.3 The curriculum structure**

The curriculum for duties on deck is structured to cover requirements for the manning of ships trading in coastal waters and overseas. The lowest standard of CoC is the Officer On Watch (OOW). The course syllabus covers the contents recommended in Regulation II/1 of the STCW/78. However, the seagoing training is three months less than recommended. After three years of seagoing service, the officer should return to the Nautical Academy for an 8 months course. This course covers all the subjects needed according to Regulation II/2. But the Brazilian Authority requires longer seagoing service than the one proposed. The deck officer is entitled as First Mate but his international certificate presents restrictions depending on ship size and the area in which the ship operates as described above.

In the engine room the lowest standard of CoC is the Officer in Charge of an Engineering Watch . The course syllabus covers the contents recommended in Regulation III/1 of the STCW/78. However, the seagoing training is three months less than the one recommended. After three years of seagoing service the officer should return to the Nautical Academy for a 9 month course. This course covers all the subjects needed according to Regulation III/2. The Brazilian Authority requires three years of seagoing service which is longer than that proposed in the above mentioned Regulation . He is entitled as Second Engineer Officer but his international certificate presents restrictions depending ships engine power.

## CHAPTER 3

### THE CURRENT ROLE OF MARITIME ACADEMIES

There are two maritime academies in Brazil. One is located in Rio de Janeiro named Instruction Centre Almirante Graca Aranha (CIAGA) and the other, which is located in Belém, is named Instruction Centre Almirante Bras de Aguiar (CIABA). The distance between the two academies is about 2,000 km. Their primary role is to train seafarers for the Brazilian mercantile fleet. The Directorate of Ports and Coasts, which represents Brazil in the International Maritime Organization (IMO), issues the certificate of competence to the students who have successfully completed their theoretical studies and the seagoing training. Any person, without distinction of sex, who wants to be officer of the Brazilian Merchant Marine must study in one of these two academies.

Apart from academic studies, the Brazilian students receive special military education and training during the two first years. After the seagoing training they receive the Diploma of Reserve Officer of the Navy.

About 20% of the vacancies in the courses for maritime officers are allocated to foreign students.

The CIAGA Academy is also in charge of written, oral and practical examinations applied to a person who wants to become a pilot in Brazilian waters. Only deck officers of the mercantile marine and officers of the navy, the latter with specialization in navigation, can be candidates to be a pilot. Oral and practical examinations are

conducted in a ship handling simulator in CIAGA. The actual area for pilotage will be subject for the simulation.

Retraining maritime officers is another important role of the two maritime academies. The CIAGA, which also is a branch of World Maritime University, is putting considerable efforts to implement the IMO model courses. Every year the Academy conducts about 12 model courses. The educational need of the Brazilian fleet regulates the number of model courses that have to be offered.

The administrative structure of CIAGA is as follows:

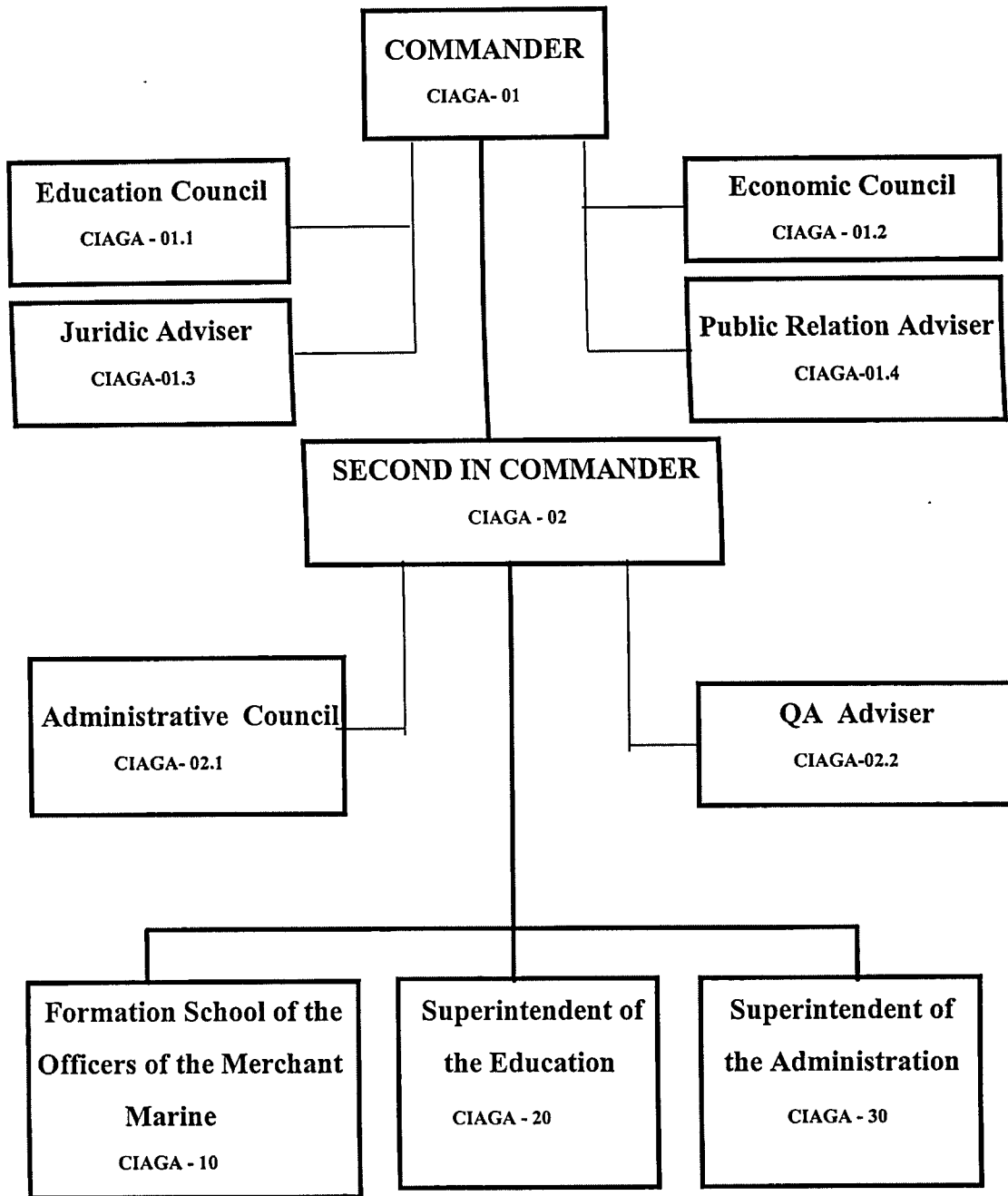


Fig 3.1. CIAGA Administrative Structure

The sectors of the above structure that are directly involved with the education and training are:

- Commander: the president of the Education Council, has a single vote. In writing a student should appeal to the commander for revision of his test result. The commander will decide if revision will take place or not. The Commander has the ultimate responsibility for the academy.
- Education Council: meets about three times between February and December. The main reason for the council meetings is to discuss and to take decisions about the education policy. The council has eleven permanent members.
- Formation School of the Officers of The Merchant Marine: is responsible for the military formation of the students. During the undergraduate period the Brazilian students are linked to the Navy. They receive military training and have their sea experience on board navy vessels.
- Superintendent of the Education: handles the maritime education and training contents of the academy. Since the beginning of the 80s the STCW/78 has been the guide for the minimum level of theoretical knowledge and competence necessary to be an officer on board mercantile vessels. He is responsible for the implementation of the education and training policy determined by the Education Council.



### 3.1 The structure of the Superintendent of the education

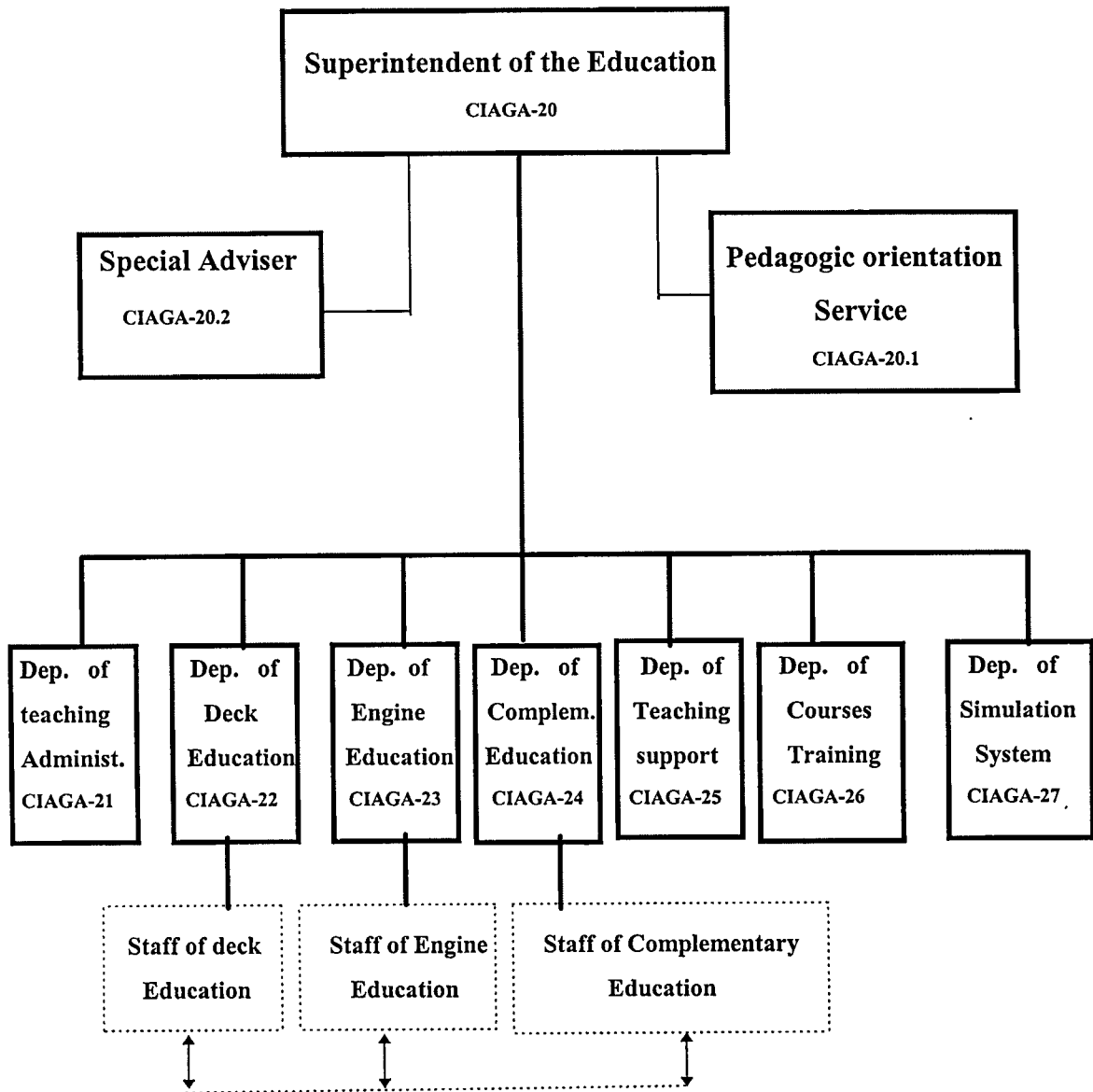


Fig 3.2. Structure of Superintendent of the Education

The head of Superintendent of the Education is a Captain of Frigate of the Navy. Every two years he is replaced because of military regulations. Lack of knowledge makes it difficult for the person in charge of the head of education to understand many educational problems related to the meetings both internal and international. He is the president of the Class Council, which meets at the end of each semester. The goal of the Class Council, which is composed by members of administration and members of academic staff, is to improve the education and training system.

The head of the Deck Department, who is nominated by the Commander, is a master mariner with many years of experience in teaching. The staff of this department are deck officers with vast experience aboard merchant vessels. Anyone who wants to become a teacher in nautical subjects needs to pass an open examination, which consists of:

- Written and oral examinations based on the subject he will teach in the academies
- Evaluation of the candidate's certificates and diplomas
- Teaching skills and examination techniques
- Interview

During an experience period of six months the new lecturer is observed and advised by a pedagogue. Opportunities are given to the new lecturer to observe experienced teachers.

The pedagogue may recommend:

- yes/no signature of a contract
- yes/no to a course in teaching skills and techniques.

The head of the Engine Department, who is nominated by the Commander, is a marine engineer with experience in teaching. The staff of this department are engineer officers with many years of seagoing service. Anyone who wishes to become teacher in engineering needs to pass the open examination as described above.

For the deck/engine officer courses each subject has its own lecturer.

The head of the Complementary Education Department, who is nominated by the Commander, is preferably a professor with specialization in pedagogic. This department deals with subjects other than those related to the maritime field. For example mathematics, physics, management, economics and law.

The CIAGA Academy has a covenant with the University of Rio de Janeiro and arrangements are made when CIAGA needs to train the staff in non maritime subjects like pedagogic, management and law. Post graduate courses (MSc and Ph.D.) are available, under this umbrella, to any staff at the University of Rio de Janeiro.

## **3.2 The Programs**

In the early years of the 1980s the academies in Brazil started to develop programs under the STCW/78. The academies entrance level are the same as for the universities. The maritime academy students graduate with a B.Sc. in Nautical Science issued by the Commander. The curriculum of the officers' courses are submitted to the Ministry of Education for recognition as a degree course.

The programs offered at the academies are divided into deck and engineering. These are described in the following sub sections:

### **3.2.1 Deck training**

The diploma of Coastwise Captain is the highest academic course offered and it incorporates subjects like ship management and maritime economics. This course is intended to provide nautical education for the students not only to acquire their CoC but also to prepare them for managerial jobs ashore in the Brazilian maritime

industry. The syllabus for CoC of Master and Chief Mate is incorporated in the course for First Mate, which incorporates other academic subjects.

### **3.2.2 Engineering**

The nine months course for CoC of Second Engineer is the highest academic course offered to engineers and it incorporates the syllabus for CoC of Chief Engineer and other subjects.

After a 40-week course a B.Sc. degree in Nautical Science is issued by the Academy and on the basis of this diploma the student can receive his/her CoC of Officer in Charge of an Engine Watch provided he/she fulfills statutory requirements such as seagoing training.

Courses run to prepare students for statutory qualifications are as follows:

Deck	Engine
Coastwise Captain	Second Engineer
First Mate	Third Engineer
Second Mate	Ship Mechanic
Boatswain	Engine Seaman
Seaman A/B	

### 3.2.3 IMO Model Courses implementation

The implementation of the IMO Model Courses began in the second half of the 80's. The CIAGA Academy was selected as a Branch of the World Maritime University in 1989 when a special division was set up to take care of the IMO model courses.

The courses offered at the academy which are appropriate statutory ones, include;

- Basic Fire Fighting (MC 1.20)
- Advanced Fire Fighting (MC 2.03)
- Personal Survival (MC 1.19)
- Proficiency in Survival Craft (MC 1.23)
- Restricted Radio Telephony Operator Course
- Radar Observation and Plotting (MC 1.07)
- ARPA (MC 1.08)
- Radar Simulator (MC 1.09)
- Medical Emergency - Basic Training (MC 1.13)
- Medical Emergency - First Aid (MC 1.14)

Other short courses are;

- Ship Simulator and Bridge Teamwork (MC 1.22)
- Oil/Chemical/Gas Tanker Familiarization
- Advanced Training Programme on Oil tanker Operations (MC 1.02)
- Advanced Training Programme on Chemical tanker Operations (MC 1.04)
- Advanced Training Programme on Liquefied Gas tanker Operations (MC 1.06)
- Engine Room Simulator (MC 2.07)
- Port State Control (MC 3.09).

#### **3.2.4 The GMDSS course implementation**

After many years of international discussion IMO and its Member Governments developed the Global Maritime Distress and Safety System (GMDSS) with the coordination and collaboration of many International Organizations i.e. International Telecommunications Union (ITU), World Meteorological Organization (WMO), International Hydrographic Organization (IHO), INMARSAT and COSPAS-SARSAT. In 1988 the SOLAS Convention incorporated the GMDSS by amendments. Cargo ships of 300 tons GRT and larger, and passenger ships making international voyages began the implementation of the GMDSS in 1992, and will complete it by 1 February 1999. The role of the Brazilian Academy in the GMDSS is to provide a General Operator Certification (GOC) for the deck officers. In 1996 the GMDSS simulator was added to the other teaching aids to achieve the desired skill and competency now stipulated by the 1995 Revised STCW/78.

## CHAPTER 4

### INTERNATIONAL STANDARDS AND CODES

Before any Maritime Education and Training system can be evaluated, it is important to mention the standards or codes against which the MET system will be measured. In this chapter, the author briefly describes three of existing standards and codes which will be used as a base for an appraisal of the MET System in Brazil.

Before establishing any standards or guidelines it must be realized that maritime education and training vary from country to country. Therefore the quality of the outcome, i.e. the seafarer, vary.

Some countries train their seamen according to standards determined by their respective governments or maritime administrations without comparing with standards in other countries. If did compare more uniform standards could be achieved. Some countries have made efforts of setting high standards of training while others produce seafarers whose competence and skills are dubious.

Many shipping casualty investigations indicate that human error, in one form or other, has contributed to most accidents besides those caused by natural disasters. It is worth mentioning here that although seafarers have many times been blamed for causing accidents at sea, at times, it was not totally their fault. Other factors have played a part in accidents including improper design, poor construction and workmanship, as well as incompetent shoreside management.

Due to the fact that shipping casualties often involve ships of different nations, the world shipping community with the involvement of international organizations such as the International Maritime Organization (IMO) has tried to take measures to improve the efficiency and reliability of the human element in shipping activities. The measures are

directed mainly for the prevention of accidents and sea environment protection. One such measure was to set mandatory standards for competency and skills of seafarers. In this case, we talk about the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 (STCW 78).

#### 4.1 The STCW 78 as revised in 1995 (STCW 95)

The aim of the present convention is to provide minimum standards of training, certification and watchkeeping for seafarers from countries which are parties to the convention to follow. Non signatory parties to the STCW Convention whose ships may visit ports in countries which have ratified the above named convention will also have to comply with the standards set. <sup>Annex A</sup> This is very significant specially when port state control procedures are enforced. When port state control inspectors go on board ships, one of the things they look for is the certificates of competency of those on board. If the inspectors are not satisfied or have suspicion that the certificates have been issued by a non competent or non recognized authority, the ship can be held up or black listed for not complying with the convention. Port States can enforce these requirements under their national laws if they think it is necessary.

The 1978 STCW Convention was criticized in many countries. Critics pointed to its many undetermined phrases, such as "to the satisfaction of the administration", which resulted in different interpretations. Others complained that it was never consistently applied and it did not impose any strict obligation on parties regarding implementation. Disinterested enforcement, together with discordant interpretations, have occasionally ended in a loss of confidence in some countries' national certification, in the distinct



country's maritime training and education process and in the necessary competence required in diversified aspects of qualified ship handling by that country's seafarers.

Over the last two decades the lack of earthly sameness has become more evident because of the shortage of seafarers from traditional maritime countries. This decline resulted in changes in the supply sources of seafarers. In addition, this has been intensified through fewer opportunities for competent on board training. This is due to reduced, and occasionally multinational manning and less on board time.

In essence, the whole purpose of the STCW Convention is to promote safety of life at sea, and to protect the marine environment. The Convention was revised in 1994/1995 by committees within the Maritime Safety Committee of the IMO. Many propositions were appreciated by the committees. From 26 June to 7 July 1995 the STCW Conference was convened by IMO and met at the Headquarters when the 1995 amendments to the annex to STCW 78 were adopted by Resolution 1. The proposed Codes were adopted by resolution 2. There were a total of 14 Resolutions from this Conference. The STCW Conference did not consider for amendment the articles of the 1978 STCW Convention because they could only be amended by a new convention. The tacit acceptance procedure was the mechanism utilized for the implementation of the amendments to the annex of STCW/78 proposed by the STCW 95 Conference. The dates defined to the implementation of the main changes was 1 February 1997, 1 August 1998 and 1 February 2002 respectively.

Added to Chapter I were twelve new regulations, which make provisions:

- driving Parties to the Convention to take steps against those violating the requirements in the Convention
- establishing procedures for Parties to follow when dealing with certificates, i.e. issuing and registering of certificates

- for the communication of information to IMO for the purpose of verifying that the requirements of the Convention are met by a Party
- establishing procedures for a Party to ensure quality standards are met in accordance with the provisions of the STCW Code and to communicate any results of any quality audits carried out to IMO
- describing the procedures which must be followed by an administration in order to recognize certificates issued by other Parties
- for the use of simulators
- which allows Administrations to conduct trials as long as they are carried out in a manner in accordance with the provisions set out in the STCW Code.

Chapter II, which deals with deck department, is subdivided into four regulations. Regulation II/1 deals with the mandatory minimum requirements for certification of those in charge of navigational watch on ships of 500 GRT or more. Regulation II/2 presents the minimum mandatory requirements for certification of master and chief mates on ships of 500 GRT or more. This regulation presents the requirements for certification of master and chief mates on ships of 3,000 GRT or more or on ships between 500 and 3,000 GRT. Regulation II/3 shows the requirements for certification of masters and of officers on ships of less than 500 GRT for near-coastal voyages or not. The requirements for certification of ratings forming part of a navigational watch, which is different from those requirements for certification of Able Seamen, are presented in Regulation II/4. The contents of the appendices in this chapter and the standards of competence are now included in sections A-II/1, A-II/2, A-II/3 and A-II/4 of the STCW Code, respectively.

Chapter III deals with the engine department and is also divided into four regulations. Regulation III/1 shows the mandatory minimum requirements for certification of those in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room on ships powered 750 kW propulsion power or more. Regulation III/2 presents the minimum mandatory requirements for certification of chief and second engineer officers on ships powered 3,000 kW propulsion power or more. Regulation III/3 shows the requirements for certification of chief and second engineer officers on ships powered of between 750 kW and 3,000 kW propulsion power. The requirements for certification of ratings forming part of a watch in a manned engine-room or designated to perform duties in a periodically unmanned engine-room on ships powered 750 kW or more propulsion power. The contents of the appendices in this chapter and the standards of competence are now included in sections A-III/1, A-III/2, A-III/3 and A-III/4 of the STCW Code, respectively.

Chapter IV deals with radio personnel and incorporates the regulations dealing with GMDSS. The contents of the appendices in this chapter are now included in section A-IV/2 of the STCW Code.

Chapter V now contains regulations V/1 and V/2 which stipulate the mandatory special training requirements for personnel on tankers and on ro-ro passenger ships, respectively. Various requirements in this regulation refers to sections A-V/1 and A-V/2 of the STCW Code.

Chapter VI was renamed emergency, occupational safety, medical care and survival functions. This chapter contains mandatory minimum requirements for

- the issue of certificates of proficiency in survival craft and rescue boats

- the training of seafarers in basic and advanced fire fighting
- the training of designed seafarers in medical care, including first aid.

The standards of competency required for these functions are specified in section A-VI of the STCW Code.

Chapter VII is a new chapter providing alternative methods of certifications. These are the functional certificates and the provisions of this chapter, section A-VII/1 and section A-VII/2 of the STCW Code prescribe the conditions and requirements which must be met before such certificates are issued.

### **STCW Code**

The STCW code contains the detailed requirements of the STCW 1978 Convention as revised. It is incorporated by reference in the revised annex of the Convention. With regards to the contents of the code it is separated in two parts. Part A details the mandatory minimum standards of competence necessary to ensure that all seafarers are properly trained, skilled and competent to perform their duties on board. The provisions in Part A also includes detailed minimum standards required to be maintained by Parties. This is to ensure that those involved in education, training and certification are actually providing the necessary training required. The specifications of minimum standards are related to functions. There are eight groups of functions, namely

include  
E.

1. Navigation
2. Cargo handling
3. Controlling the operations of the ship and care of persons on board
4. Marine and control engineering

5. Electrical and electronic engineering
6. Maintenance of ship and machinery
7. Controlling the technical operation of the ship and care for persons on board
8. Communications. → STCW art chapter ... (?)

Three levels of responsibility can be identified in each of the above groups, they are administrative or management, operation and support levels.

The scope of each function at the level of responsibility concerned is defined by abilities, which are listed in the standards of competence tables.

Part B contains the recommended guidance which provides assistance to Parties to the STCW Convention, including administrations and institutions, when implementing, applying or enforcing the provisions of the Convention. The provisions in this part are not mandatory but are to aid those concerned in maritime training to achieve the required standard of competence for their seafarers.

#### **4.2 SOLAS Chapter V as revised**

SOLAS stands for the International Convention for the Safety of Life at Sea. The first version of this convention was adopted in 1914 after the sinking of the White Star liner Titanic on her maiden voyage in April 1912. However it never entered into force. Since then, four versions of the Convention have been adopted. The present version was

adopted in 1974 and entered into force in 1980. Up to this time, amendments and protocols to the Convention have been carried out; the latest occurred in 1992 and it is included in the 1992 edition of the Convention.

Chapter V of the latest version is the part which is important to this paper in regard to training. This chapter consists of twenty one regulations dealing with various aspects of safety of navigation. The provisions of this chapter are more of an operational nature and are geared towards the safe operation of ships on international voyages only.

The topics which are covered in this chapter include danger messages and the information required in such messages, the maintenance of meteorological services for ships, the ice patrol service, routing of ships and provisions of search and rescue services. Also contained in this chapter is the obligation for governments who are signatories to the SOLAS Convention to ensure that all ships are sufficiently and efficiently manned from a safety point of view. It is also required for ships to be fitted with radar and other navigational aids, and to carry nautical publications.

#### **4.3 The International Safety Management (ISM) Code**

In November 1995, the guidelines on the implementation of the International Safety Management (ISM) Code were adopted by the 19th Assembly of the IMO. The governments were urged by the Assembly to adhere the guidelines, when implementing the Code. The validity of the Document of Compliance and the Safety Management Certificate, required under the ISM Code, calls for special attention by governments.

The purposes of the mandatory use of the ISM Code are to guarantee compliance with rules and regulations related to the safe operation of fleet and protection of the environment and the competent implementation and exacting compliance carried out by administrations.

Sufficient enforcement must embody verification that the Safety Management System (SMS) complies with the provisions stipulated in the ISM Code, as well as confirmation of compliance with mandatory rules and regulations.

The compulsory application of the ISM Code might ensure support and encourage that pertinent codes, guidelines and standards recommended by the IMO, administration, classification societies and maritime industry organization are taken into consideration.

The administration is accountable for verifying compliance with the requirements of the ISM Code and issuing Documents of Compliance (DOC) to companies, and Safety Management Certificates (SMC) to ships.

It is appropriate to note the connections between the competence of seafarers and the new responsibilities for shipping companies. There is accurate correlation between the pertinent requirements in the International Safety Management (ISM) Code and the provisions of the STCW 78 Convention, as revised in 1995. The control established as required by the ISM Code will be simplified and carried out more effectively by competent officers in accordance with the STCW 78 Convention, as revised in 1995.

The ISM Code is urging some companies to review their ownership structures. The ownership structures, basically designed for avoidance of taxes, could come under closer inspection from tax authorities because of the new transparency manifested in the ISM Code. The data owners furnish to both tax authorities and flag states over their ownership structure have to be conforming. If not, the paper path established by the ISM Code could be inspected by the tax authorities.

#### 4.4 The impact of the revision on Brazilian Maritime Education System

The Revised STCW/78 Convention greatly affects those who are involved in Maritime Education and Training in Brazil. The Convention is important because major changes are needed both in the maritime administration and in the centres involved in Maritime Education and Training. The impact will be great regarding quality assurance. The lack of a well defined career for both deck and engine staff is one of many problems with the Maritime Education System in Brazil.

The impact on the maritime administration, which means the Directorate of Ports and Coasts is as follows:

- Updating shipping regulations.  
This is to ensure that the shipping regulations are in line with international conventions, applicable to both local and overseas ships and is enforceable.
- Constituting the Brazilian Coast Guard. This is necessary to ensure the exacting compliance with rules and regulations related to maritime transport of cargo. The Directorate of Ports and Coast should be transformed into to the Brazilian Coast Guard and its goals must be to ensure safety at sea and the protection of the maritime environment and to help confront the contraband and the piracy in Brazilian ports. The Capitancies and Delegacies will help very much in the implementation of the coast guard which should be established under the responsibility of the Ministry of the Navy. The principal difference between the Navy and the Coast Guard will be the specific qualification and training needed by this personal and their specific role.
- Establishing means of controlling and monitoring standards of maritime education and training. A Quality Assurance System should be established and an external evaluation process must be carried out every year.



- Upgrading of staff qualifications. This is one of the most important components in MET. It is important that the academic staff is flexible and from time to time is willing to go back to sea to realize new technologies and procedures. World Maritime University in Sweden is one possibility for updating staff. In Brazil maritime academic staff is public servants. To change such a person is almost impossible. The national law do not allow temporary contracts for public servants.

## CHAPTER 5

### EVALUATION OF THE PRESENT TRAINING SYSTEM

To understand the Brazilian MET system it is essential to mention the philosophies of the various involved actors.

In the second half of the 1980's the ships in the Brazilian merchant fleet were gradually becoming highly automated in the engine room and where possible on deck as well. The equipment of these ships were progressively changed towards "high tech". Therefore it was obvious that the education of the officers also had to change.

It is important to stress that the four political main actors think along the same lines although their philosophies differ.

A. The philosophy of the ship owners is that MET should provide officers who can cooperate in realizing the objectives of the shipping company by efficiently carrying out the following on board tasks:

navigation  
transport and cargo-handling  
maintenance

B. The philosophy of the Directorate of Ports and Coasts is that MET should educate officers that can run ships safely according to internationally agreed standards and regulations. The officers should be able to maintain a proper watch in port as well as at sea and be able to establish communication links in cases of emergency, urgency and safety.

C. The philosophy of the labor unions is that MET should provide the officers with a proper education with job satisfaction, as well as safety and mobility in the labor market.

D. The philosophy of the MET institutions is to educate the students in such a way that they are able to perform all tasks necessary to operate ships safely and economically. Furthermore, they aim to supply sufficient "skills" to enable the officers to keep abreast of developments in the industry and secure a relatively smooth transition to non-seagoing careers.

### **5.1 The future needs of the Brazilian maritime industry**

During the 80's Brazil experienced a period of high inflation which rose to 50% per month. The political and the economic stability Brazil is experienced during the latest four years with an inflation of about 0.9% per month, and the bet in the global commerce have transformed the country to one of the most growing consumer markets.

The Brazilian fleet is very small if compared with the country's needs. Only 5% of the international trade is carried out by Brazilian flag ships. Therefore, there are many ships of flag of convenience daily visiting Brazilian ports.

The Brazilian maritime industry has to renew its fleet, which is about 20 years old, to handle future demands. In spite of new equipment, ship owners will need educated and competent seafarers to navigate. New ships need to be purchased.

The offshore Campos Basin is responsible for more than 70% of the Brazilian oil production and 39% of the Brazilian gas production, which is growing very fast due

government investments. The Campos Basin is located more than 50 miles from the Brazilian coast line off Rio de Janeiro. Therefore, there will be a need for competent seafarers to handle offshore support vessels.

The approval of the "Registro Especial Brasileiro (REB)" or Special Brazilian Register (REB) on July 1997 by the Brazilian Parliament and its implementation will bring back to the Brazilian flag many ships which today are under flags of convenience. The Special Brazilian Register (REB) is very important for Brazilian seafarers because under its rules the master, chief engineer and 2/3 of the crew must be Brazilian. REB enables owners to benefit from exemptions on import and export taxes for freight which will lead to substantial cost savings. These and other advantages make it more attractive than having a convenience flag register. The owners are allowed to negotiate directly with the unions.

The biggest ship owner in Brazil is "Frota Nacional de Petroleiros - FRONAPE" with about 66 operational vessels and 5 non-operational vessels. The company, which employs 2,828 Brazilian seafarers, was established in April 1950. The company is devoted to the transport of heavy oil and petroleum products. FRONAPE transported in 1996 a total of 435 million barrels of oil and oil products. The negotiations to transfer its ships to a flag of convenience started in 1996 but were not concluded because of administrative problems. The Brazilian second register will be another option for "FRONAPE" to register its vessel under more profitable conditions. Operating under the conventional Brazilian Flag is nearly 50% more expensive than under a flag of convenience. In 1996, according to the international shipping gazette, Trade Winds, FRONAPE transported 100 million cubic meters. Spillage was not more than 1.34 cubic meters. This figure shows how well trained and competent Brazilian seafarers are. The implementation of the IMO model courses 1.02 and 1.12 in 1992 has prepared the country with competent seafarers for tanker vessels.

“Companhia Vale do Rio Doce Navegação - DOCENAVE” is the second biggest shipping company in Brazil. However, more than 75% of its fleet is under flag of convenience. The main cargoes transported by DOCENAVE are bulk cargoes, such as ore, coal, wheat and corn.

“DOCENAVE” has its vessels flagged and named as in the table below:

VESSEL	TYPE	FLAG	CREW	MANAGER
Docealfa	Panamax	Liberian	Brazilian	Sea&Port
Docebeta	Panamax	Liberian	Brazilian	Vships
Docebrisa	Panamax	Liberian	Brazilian	Vships
Docebruma	Panamax	Liberian	Brazilian	Sea&Port
Docelotus	Panamax	Liberian	Brazilian	Vships
Docelirio	Panamax	Liberian	Brazilian	Vships
Docelake	Panamax	Liberian	Brazilian	Sea&Port
Doceisland	Panamax	Liberian	Brazilian	Sea&Port
Docebay	Capesize	Liberian	Brazilian	Sea&Port
Doceriver	Capesize	Liberian	Brazilian	Sea&Port
Docecape	Capesize	Liberian	Brazilian	Sea&Port
Docerio	Capesize	Brazilian	Brazilian	DOCENAVE
Doceserra	Capesize	Brazilian	Brazilian	DOCENAVE
Docegulf	Handysize	Liberian	International	Vships
Docemarte	Handysize	Brazilian	Brazilian	DOCENAVE
Doceorion	Handysize	Brazilian	Brazilian	DOCENAVE
Docetaurus	Handysize	Brazilian	Brazilian	DOCENAVE
Docecanyon	Ore&Oil	Liberian	International	Vships
Docefjord	Ore&Oil	Liberian	International	BARBER
Tijuca	Ore&Oil	Liberian	International	BARBER

Table 5.1 DOCENAVE Vessels and Flag.

An examination of the table of Docenave ships shows that the intention behind the use of flag of convenience was to be exempted from Brazilian tax. The managers still use Brazilian crew on the majority of the vessels, which means that they believe that Brazilian crews are competent and well trained and also not so expensive. The contract of labor is made under flag of convenience laws, which are more advantageous to the manager because under Brazilian flag there is a tax of 80% over the remuneration of the seafarers to the Brazilian social & health system.

There are other small companies operating in Brazilian trades as follows:

- 'Flumar' with 5 chemical tankers.
- 'Global' with 4 ships; 3 of them transporting chemical products and liquefied gas and 1 Ro-Ro passenger ship.
- 'Transrol' with 4 Ro-Ro passenger ships.
- 'Alianca Navegação' with 6 container and conventional ships.
- 'Grupo Libra Navegação' with the multipurpose vessel 'Libra Rio' and the Suezmax tanker 'Libra Albacora' (Libra has six vessels chartered in and two 2,300-TEU and four 1,700-TEU vessels on order in a Brazilian shipyard).
- 'Frota Oceanica Navegação' with 6 conventional ships.

## **5.2 The future recruitment for the international maritime industry**

After the "cold war", the stability of oil prices and the opening of the Chinese consumer market will lead the world to a new era of economic progress. International trade will increase and there will be a need for the construction of new ships and consequently more jobs for seafarers worldwide.

From the writer's point of view the Philippines and China will be the biggest suppliers of seafarers at the start of the next century.

Brazilian officers are educated and trained in their mother tongue Portuguese. The ability to speak and write English is a main problem for many Brazilian officers. Brazil would be one of the most important suppliers of well trained officers for the international maritime industry if Brazilian maritime academies educated and trained their future officers in English.

### **5.3 Shortcomings in the present MET system**

The following are main areas of weaknesses in the present Brazilian maritime education system:

#### **5.3.1 The Maritime Education System**

The maritime education and training system in Brazil is monovalent and it has now come to the stage that seafarers leave the sea at an early stage in their careers when they know that there is no future for them at sea. This happens in both the deck and engine departments. When the cadets have obtained their certificates of competency about 50% leave for shore jobs in the maritime industry, i.e. shipyards, maritime shipping agencies, shipping management companies. The deck officers are only trained to work at sea. However, the standard of education in the academies is adequate for some jobs ashore. A diploma and/or degree award was included in the programs in the 1980's when some Brazilian owners started to register their ships under flag of convenience. The flag of convenience attracted Brazilian owners because of their lower flag state taxes. The

reduction of job opportunities on board national vessels make seafarers look for jobs ashore.

### **5.3.2 Maritime Regulation**

The Law of the Maritime Professional Education settled that the Navy should be the government body with the authority and responsibility for the conduct of Brazilian professional maritime education. The Directorate of Ports and Coasts issues the Certificate of Competence based on the recommendations made by the academies. There is no final examination conducted by proper qualified examiners. The process practiced is the continuous examination carried out by the lectures at the academies. The results are registered and documented at the department of teaching administration (CIAGA-21) for future reference. The examination prepared by the lecturers of one specific subject is analyzed by the head of the deck or engine department and by other lecturer specialized in pedagogic before to be applied.

There is no internal and external evaluation of the Brazilian maritime education system. There are no staff career criteria, hence there is lack of motivation. The law that was instituted in the 90's allowed retired Navy officers to be lecturers in the academies for two years, under recommendation of the head of the academies and the approval of the Directorate of Ports and Coasts. These lecturers are very bureaucratic and lack experience from merchant vessels. Futher, They have their salary as retired navy officers and the money they receive as teachers represents only a complement to their budget.



### 5.3.3 National Education System

The Brazilian Education System is divided into pre, primary and secondary schools or colleges and tertiary schools or universities. Pre school is not compulsory. Pupils are 4 or 5 years old. About 50% of all children attend pre schools. Seventy % of the pre schools are private schools. Primary schools are compulsory in Brazil. The pupils are 6 years old.

The primary education is divided into series nominated 1st series, 2nd series..... until 8th series. Each series corresponds to 1 year of education in a predetermined standard of education. In the end of each year the pupils are examined. If a pupil fail in the examination, he/she will not be promoted. Consequently he/she will study in the same series he/she did again. If the student does not fail in any examination at the age of 14, he/she will finish primary school. About 75% of all pupils attend primary school. More than 80% of the primary schools are public schools.

Secondary schools or colleges are not compulsory; therefore, about 50% of the Brazilian students attend secondary schools. About 70% of the secondary schools are private schools and are very expensive. In order to study in a public secondary school the students have to pass a national open examination with a grade that supports him/her to be classified according to vacancies. Because of the high level of competition for the secondary public school vacancies, many students leave the school world after primary school. Secondary schools are divided into series. Each series has one year duration. At the end of the year the students are required to take an examination and if they fail the examination, they will repeat the series the next year. In public schools a student cannot repeat one series more than two times. If this happens, he/she has to leave public school.

If a student has economic support, he/she can enter a private school. The majority of the secondary schools are polytechnic schools which have the aim to educate and train specialized man power for the Brazilian crescent industry. However, there are some secondary language schools, which educate the students who want to take an open examination, "vestibular", at the end of their secondary studies in order to continue their studies at universities, military academies, military institutes and maritime academies. About 80% of the Brazilian universities are private universities. The courses at the Brazilian private universities are very expensive for most Brazilians. To pass the examination "vestibular" and be classified for studies at a public university is quite difficult. The ratio is 30 candidates for each student place offered. Only very well prepared students have access to the Brazilian public universities. Unfortunately, only the rich parcel of the society has access to Brazilian public universities because they also have access to the best colleges which are private and expensive too. About 20% of the Brazilian students reach university standards due to the difficulty to access public universities and the high prices of private universities. Students are aged 16 or 18 years at end of the secondary school.

The Brazilian maritime academies are a good opportunity for the students to forward their education after secondary school. The attractive conditions offered by academies such as free share, free food and allowance added to the expectation for a promissory career in the merchant marine make the number of candidates more than thousand for only seventy or eighty vacancies. The candidates are examined in Mathematics, Portuguese, Physics and English. The exam of Mathematics is eliminatory, which means that the candidates who get a grade less than 50% are not allowed to be submitted to the test of Portuguese, Physics and English. Normally more than half of the applicants do not pass in Mathematics.

The Brazilian education system is illustrated as follows:

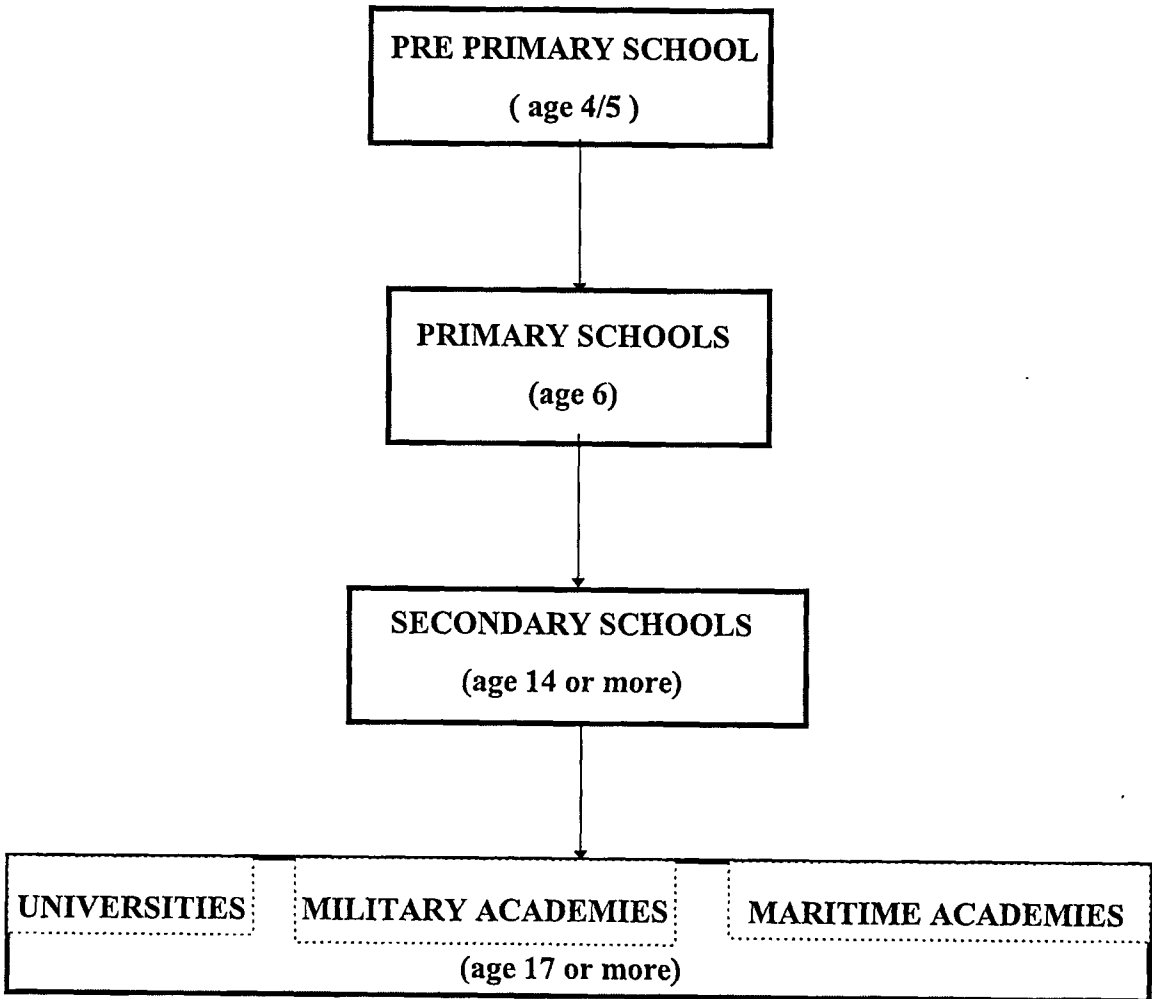


Fig 5.1. Brazilian Education System

#### 5.3.4 Quality of Training Programs

Currently there is no independent body making sure that the academies are fully teaching to the standards they claim. The staff are public servants which means that they have a job security. This makes the academies have difficulties to create a mechanism to motivate the staff to up date their knowledge. The policy for the staff career is not well defined and the salary is not satisfactory if compared to the staff of Brazilian public universities, who also are public servant. To change things in this field is a very difficult task because it depends on the authorization of the central government who is only concerned with cutting costs and preventing additional costs to the budget.

There are special rules concerning Brazilian public servants. One of the rules, which deal with the work load of public servants, obliges the staff to stay at the academies for 8 hours every day from Monday to Friday. The work regime is not satisfactory for those involved in education and in many cases demotivates the staff. The bureaucracy to get a license to do research outside the academies is another factor of demotivation.

The time of seagoing training is 9 months whereas the STCW 78 recommends 12 months.

The lack of updated information related to changes in the maritime industry is another serious problem. The IMO publications and other sources of information are written in English, which makes it difficult for some Brazilian academic staff to have access to the content because of their limitation in understanding English. The lack of text books written in Portuguese obliges the lectures to spend too much time translating and interpreting the new information. The heterogeneity of English knowledge of the students at the academies does not recommend the use of text books in English.

The rescue and survival stations used for training at the academies need improvement. The acquisition of modern equipment similar to that used on board new ships, such as a

freefall lifeboat-ramps, tanker lifeboats (closed and open), breathing apparatus and gas measuring equipment are essential to raise the quality of training.

### 5.3.5 Training Facilities and Equipment

The CIAGA academy has residential accommodation for about 700 students at any one time. The accommodation is made up of 70 times 10 male dormitories. There is a large sports centre with two swimming pools, many football fields, volleyball, basketball and judo facilities. There is an auditorium for 400 people, which is utilized for conferences, graduation ceremonies and movies for student entertainment. There is a mini-hospital inside the academies to take care of emergencies. There are two salons with TV sets and other types of amusement like games and magazines.

The teaching facilities within the academies consist of

- 25 classrooms
- 1 classroom/chartroom
- 1 library
- 1 computer lab
- 1 English lab
- 1 electric/electronic lab
- 1 simulator for GMDSS
- 1 bridge manoeuvring simulator
- 1 radar simulator
- 1 engine simulator
- 1 engine workshop
- 1 mechanic workshop
- 1 survival station
- various small boats
- 1 practical ship stability room
- liferafts

The classrooms are equipped with blackboards and overhead projectors. Furthermore, the centre for teaching aid can provide lecturers with a slide

projector, a movie projector and/or a video player. The mechanic workshop has two diesel generators for practical lessons, equal to those used aboard ships. The simulators are of full mission type simulators. A fire fighting centre near CIAGA is capable of covering the necessary training in all types of fire aboard ships and helicopters.

### **5.3.6 Instructors/supervisors and Examiners**

The instructors/supervisors are senior lecturers who have received special training by the equipment manufacturers. For example, the instructors of the ship handling simulator have been trained for three months by the simulator manufacturer where they learned how to operate and get the best result from the use of simulators. The working language in the simulators is English, which means that instructors have to have a good standard of English. Brazilian instructors have the capability of developing mathematical models of ships and ports. They have more knowledge than needed to operate the equipment. This is important in order to develop confidence in their work.

Brazilian academies use the system of continuous examinations. There are exams in each discipline (subject), which must cover the objectives established in the curriculum. The lecturers are trained to prepare clear and concise questions. The head of deck or engine department has the role to review the exam content to verify if it is in accordance with the objectives of the discipline. The Pedagogic Division makes the review on the exam to verify if the questions are clear and concise. In case of need they give advise to the lecturers and/or may recommend training courses in pedagogic for lecturers.

The exams are conducted by 2 lectures per group of 12 students, other than the lecture responsible for teaching a particular subject.

In the writer's point of view, a complementary abroad examination must be conducted at the end of each semester. The examination should be oral and in written form covering the objectives of each discipline taught in the semester. The use of a continuous examination system is good if there is one academy but in Brazil there are two, which lead the lectures to adopt different standards according to regional standards of education. The adoption of a board of examiners, under the responsibility of the Directorate of Ports and Coasts is needed. The board of examiners will control the application of the "end of semester examination" to ensure the same standards of education and competence in the two Brazilian academies.

The use of simulator for examinations has been done without proper training of the examiners, which have caused some concern about the use of such equipment for examination.

## CHAPTER 6

### PROPOSALS FOR A REVISED BRAZILIAN MET SYSTEM

#### 6.1 Adoption and implementation of the STCW 1978 Convention as revised in 1995

Brazil is one of the countries which has ratified the revised convention giving its support to the changes needed in the STCW 1978. The adoption of the STCW 95 Conference was the first step in the process to put in place and to reach the minimum standards of competence of seafarers. Today many countries are facing a second and very difficult step which is the implementation. Brazil started the STCW 95 implementation in 1996 by revising the curriculum content. The seagoing training program changed from 9 months to 12 months to be in compliance with the Revised STCW 78. However, it is known that there is much more work to be done in order to be on the IMO white list, beginning 1999. The STCW 95 Code A, which is mandatory, will be the main guidelines. The STCW 95 Code B, which is not mandatory, will be the guide to raise the standards of education and competence.

Brazilian maritime academies will be directly affected by some of the regulations in the Revised STCW 78 as follows:

Regulation I/3 - Principles governing near-coastal voyages: According to this regulation the education, training and certification of those involved in near coastal voyages must be improved to cover the minimum standards which ensure safe navigation. There is intensive off-shore traffic in certain areas of the Brazilian coast



because of the oil production platforms, e.g. on the coast of Campos in Rio de Janeiro, where there are many foreign small vessels trading between the platforms and the port of Campos.

- Regulation I/6 - Training and assessment: The Brazilian academies must be sure that the person responsible for training and assessment of competence of seafarers is appropriately qualified. The qualifications needed will depend on the level of training and/or assessment that the person carries out.

Regulation I/8 - Quality Standards: The Brazilian academies are governmental monovalent institutions; hence, item 1.2 of this regulation applies to them. A system of internal and external evaluation must be provided.

Regulation I/11 - Revalidation of certificates: The academies are directly involved in the revalidation of certificates because they are governmental institutions which have the commitment to give technical support to the Directorate of Ports and Coasts for the implementation of the policy of revalidation, which will be implemented in accordance with section A-I/11.

- Regulation I/12 - Use of simulators: The Brazilian academies must be equipped with simulators that can be operated by qualified instructors. Simulators are necessary for issuing certificates of competency.

## **6.2 Restructuring the present certification system**

Restructuring the present certification system for both deck and engine certificates will be based on the Revised STCW 78. The Brazilian certification system does not give the opportunity to ratings to become officers. In the past, the ratings had a similar education as primary school students, but today the majority have secondary school

education as primary school students, but today the majority have secondary school diplomas and therefore they have started to argue for a possibility to access the bridge or engine-room of ships as officers.

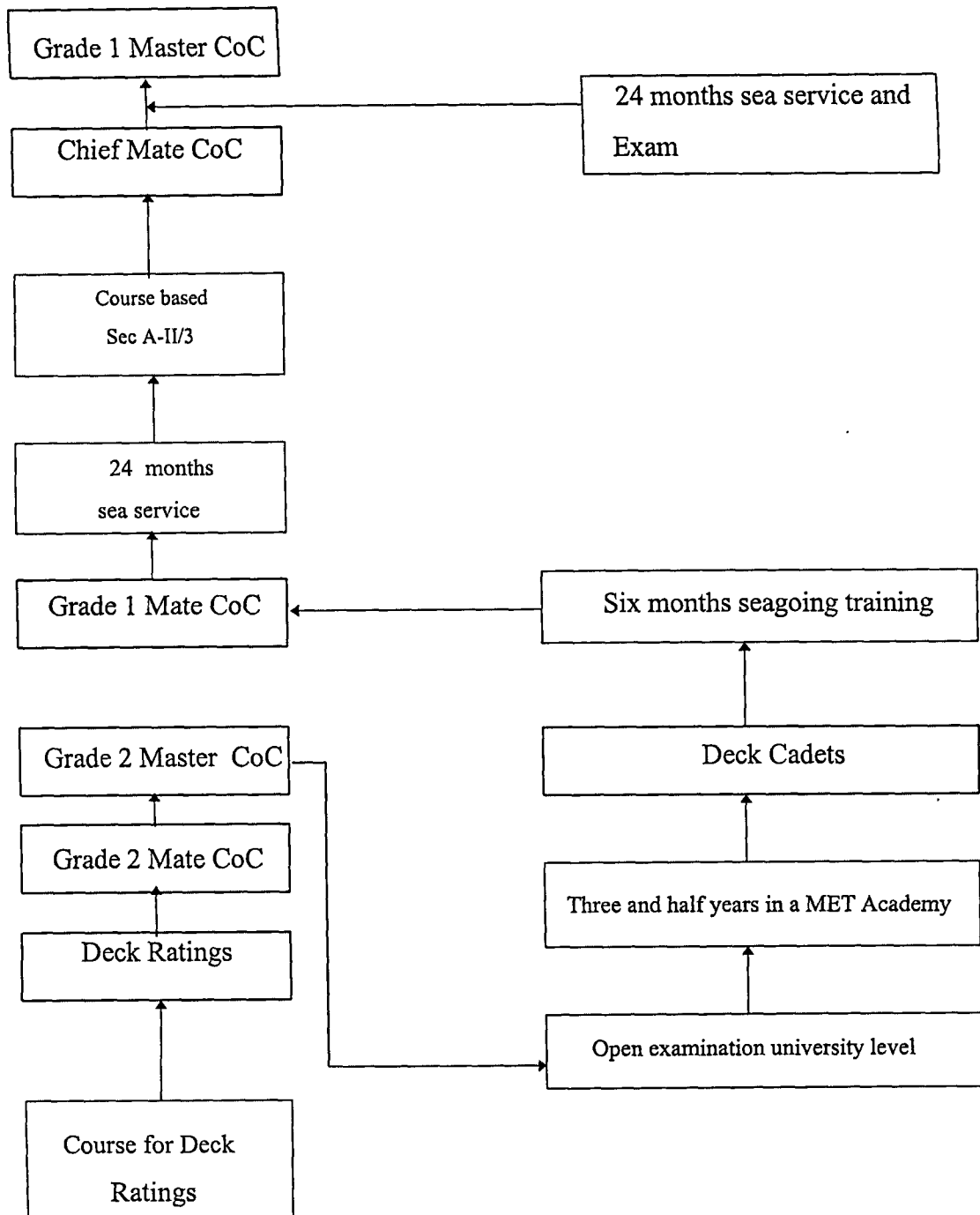
Table 6.1: DECK CERTIFICATES

<b>Present System</b>	<b>Restructured System</b>
Master Mariner	Grade 1 Master
Coastwise Captain	Chief Mate
First Mate	Grade 1 Mate
Second Mate	Grade 2 Master
Cabotage Coxswain	Grade 2 Mate
	Deck Ratings

Courses for deck ratings are still given at Brazilian MET academies. However, the restructured system will give them the opportunity to obtain certificates as Grade 2 Mates. Every candidate applying for certificate must:

- have completed 3 years seagoing service on deck
- present secondary diploma
- pass a special examination based on secondary education standards and be classified according the to number of vacancies
- have completed approved education and training and meet the standards of competence as specified in section A-II/3.

Fig 6.1. PROPOSED DECK COURSE STRUCTURE



The three and half years at the academies include six months of seagoing training. The Grade 2 Master will not have to undergo this seagoing training, which means that he/she will have one semester less during his/her academic studies. In this system the ratings can be a Grade 1 Master providing that they have the required knowledge and competence.

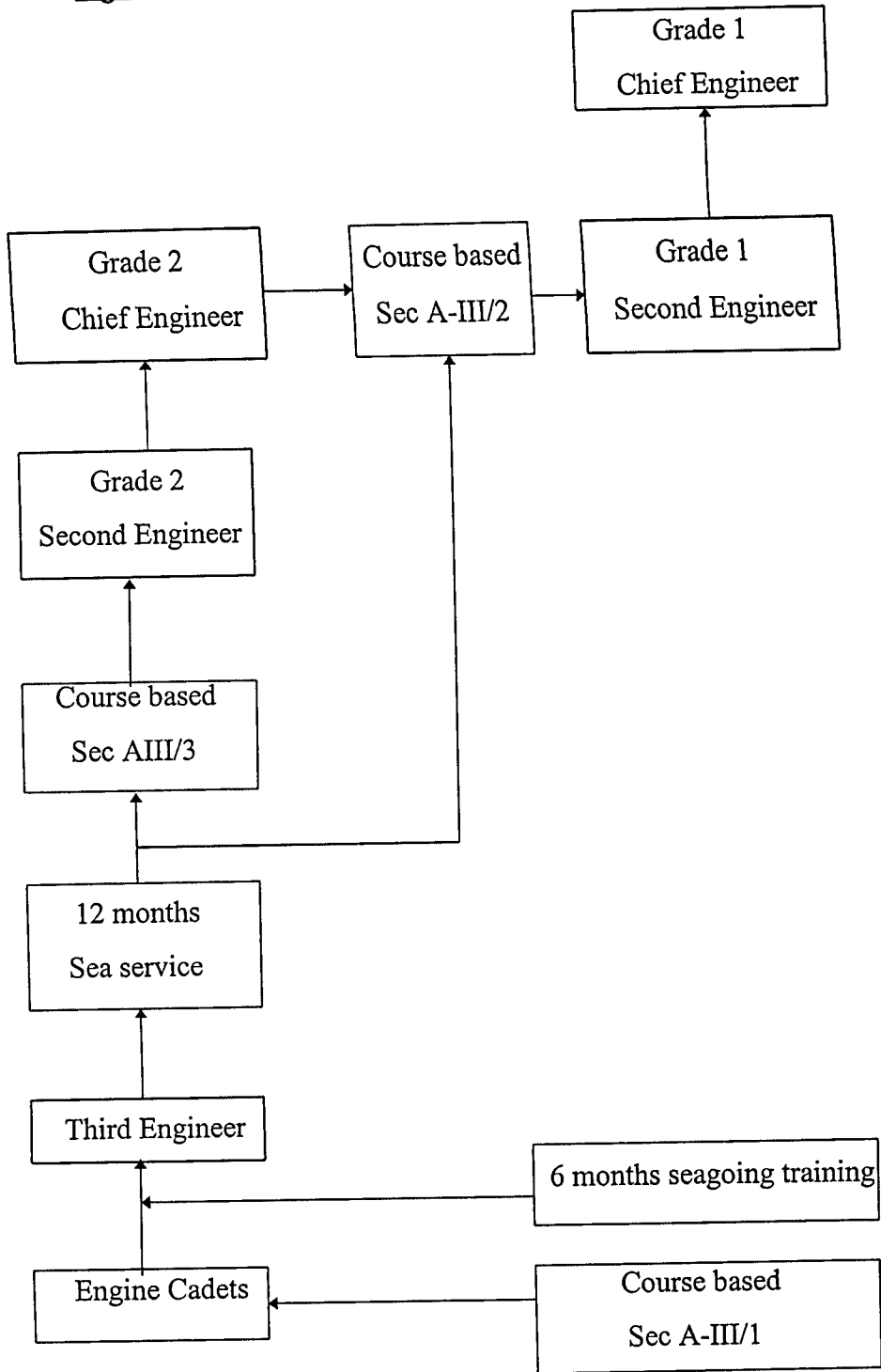
Table 6.2: ENGINEERING CERTIFICATES

<b>Present System</b>	<b>Restructured System</b>
Chief Engineer Second Engineer Third Engineer Mechanic Electrician	Grade 1 Chief Engineer Grade 1 Second Engineer Grade 2 Chief Engineer Grade 2 Second Engineer Third Engineer Engine-room Ratings

Courses for Engine-Room Ratings are still given at Brazilian MET academies. However, the curriculum must be modified because of the Revised STCW 78.

In the past the seagoing training for the third Engineer CoC was nine months. According to the Revised STCW 78 the seagoing training should be six months. In the writer's point of view the seagoing training should be reduced to six months. The extra three months should be used in workshops and simulators to raise the standards.

Fig 6.2 PROPOSED ENGINEERING COURSE STRUCTURE



The sea service and other requirements to become chief engineer should be determined by the administration. However they can not be less than the time made mandatory in the Revised STCW 78.

### **6.3 Upgrading Present Programs**

The Brazilian MET System needs some improvements to be ready for implementation of the STCW 95. There are not too many items to be introduced in respect of new knowledge, but a new view on training and measurement of competence need to be taken into consideration.

#### **6.3.1 Deck Programs**

The present programs are run according to the old shipping regulations although the academies have modified the teaching syllabus to try and bring the courses into line with the changes in the industry for the benefit of the students. The course for the Grade 1 Mate must be upgraded to include, but not limited to, the syllabus specified in the IMO model course 'Officer in Charge of a Navigational watch (M.C. 7.03)' and supervised seagoing service. The course for the Chief Mate and Master must be upgraded, but not limited to, the syllabus specified in the IMO model course 'Master and Chief Mate (M.C. 7.01)'. The implementation of the contents of table A-II/1 - Specification of the minimum standard of competence for officers in charge of a navigational watch on ships of 500 GRT or more - is necessary to ensure the minimum level of competence,

knowledge, understanding and proficiency for mates and to exercise the correct methods for demonstrating competence and to apply the correct criteria for evaluating competence.

Some of the conducted short courses must be upgraded.

Short Courses which require upgrading:

- Sea Survival - This courses are held in accordance with the IMO Model Course. However, they are more theoretic than practical because of the lack of a survival station fitted with proper equipment, such as freefall lifeboats, tanker lifeboats (closed and open) and breathing apparatus. In the writer's point of view, the improvements must be provided to fulfill the requirement of competence, strongly recommended by Regulation VI/2.
- Global Maritime Distress and Safety System (GMDSS) - Brazil has ratified the SOLAS 78 Convention and its protocols. The amendment concerning GMDSS, which was adopted in October 1988, states that all ships must carry GMDSS equipment by February 1999. The GMDSS course must be included in the deck officer curriculum as part of the course curriculum for Officer on Watch (Grade 1 Mate).
- Tanker Safety Course and Specialized Training for Liquefied Petroleum, Gas and Chemical Tankers - The tanker safety courses must be revised and from the three existing courses (Petroleum, Gas and Chemical basic training) one course covering the three types of ships must be conducted. Consequently a new curriculum must be drawn up.

- Revalidation Course - Academies must adopt and implement courses for the revalidation of certificates according to section A-I/11 for the purpose of updating the knowledge of masters, officers and radio operators.
- English Course - Brazilian academies are teaching in the Portuguese language, but the international trade language is English. Hence, more improvement is necessary to upgrade English language proficiency in Brazil. The adoption of the English IMO Model Course, as the minimum standard of knowledge and competence, is a necessary step for the two Brazilian academies to take.
- A course for training in crisis management and human behavior for personnel serving on board ro/ro passenger ships must be implemented.
- The subject Electronic Chart Display System (ECDIS) navigation must be included in the curriculum for Grade 1 Mate.

### **6.3.2 Engineering Programs**

The course for third engineers must be upgraded to include, but not limited to, the syllabus specified in the IMO model course 'Engineer Officer in Charge of a Watch (M.C. 7.04)' and supervised seagoing service. The course for second and chief engineers must be upgraded, but not limited to, the syllabus specified in the IMO model course 'Chief and Second Engineer Officer (M.C. 7.02)'. The implementation of the contents of table A-III/1 - Specification of the minimum standards of competence for



officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room - is necessary to ensure the minimum level of competence, knowledge, understanding and proficiency for engineers and to exercise the correct methods for demonstrating competence and to apply the correct criteria for evaluating competence.

#### **6.4 The IMO model courses implementation**

The implementation of the IMO model courses is an important step to upgrade the standards of education, training and competence of Brazilian seafarers. Since 1989, the Brazilian academy CIAGA was entitled Branch of World Maritime University. The CIAGA adopted and is implementing IMO model courses as follows:

- Basic Fire fighting (M.C. 1.20).
- Personal Survival (M.C. 1.19).
- Proficiency in Survival Craft (M.C. 1.23).
- Tanker Familiarization (M.C. 1.01, 1.03, 1.05).
- Advanced Training Programme on Oil Tanker Operations (M.C. 1.02).
- Advanced Training Programme on Chemical Tanker Operations (M.C. 1.04).
- Advanced Training Programme on Liquefied Gas Tanker Operations (M.C. 1.06).
- Radar Observation and Plotting (M.C. 1.07).
- The Operational Use of Automatic Radar Plotting Aids - ARPA (M.C. 1.08).
- Radar Simulator (M.C. 1.09).
- MARPOL 73/78 - Annex I (M.C. 1.11).
- Medical Emergency - First Aid (M.C. 1,14).
- Advanced Training in Fire Fighting (M.C. 2.03).
- Port State Control (M.C. 3.08).

To be in line with the Revised STCW 78 the following model courses should also be implemented:

- Medical care (M.C. 1,15).
- Ship Simulator and Bridge teamwork (M.C. 1.22).
- Maritime Search and Rescue Co-ordinator Surface Search (M.C. 2.02).
- Cargo and Ballast Handling Simulator (M.C. 2.06).
- Engine Room Simulator (M.C. 2.07).
- Fuel Combustion Efficiency (M.C. 2.08).

#### **6.5 The GMDSS course implementation**

Brazil has ratified the SOLAS 78 Convention and its protocols. The amendment concerning GMDSS, which was adopted in October 1988 states that all ships must carry GMDSS equipment by February 1999. The CIAGA, in Rio de Janeiro, was equipped with a GMDSS simulator and a lecturer was sent to England to receive proper training. The GMDSS courses at CIAGA started in 1994 when two courses were offered per year. The number of courses offered must be increased in order to have all Brazilian officers trained and certified until 1999. The GMDSS course should be included in the deck officer curriculum. The GMDSS course should be a part in the course curriculum for Officer on Watch (Grade 1 Mate).

## CHAPTER 7

### CONCLUSION AND RECOMMENDATIONS

#### 7.1 Conclusion

For the reorganization and improvement of the Brazilian Maritime Education and Training System, it is necessary to examine and assess the system currently in use to identify its strengths and weaknesses. Proposed changes can be implemented on the basis of this process.

The government who has the overall say in maritime affairs is resisting to establish the Brazilian Coast Guard, which should be the solution for harmonization. The minister of the Navy is fully incorporated in solving the problems related to maritime affairs and have been given the major contribution in this field. However, other important ministries, such as the Ministry of Transport and Telecommunications, have maritime affairs placed as one of the least on its list of priorities.

It has been identified that the present MET System does not fully satisfy the requirements of the Revised STCW 1978. The Brazilian academies have tried their best to upgrade their courses. However, they recognize that full implementation of the Revised STCW 78 is not an easy task.

There are deficiencies in the MET System which are summarized in the following points:

- The maritime administration legal framework, which provides the base for MET, has not adjusted its operation to accommodate the changes in the shipping industry, both locally and internationally;
- A shortage of qualified maritime administrators, lecturers, instructors and examiners;
- A lack of a board of examiners to conduct autonomous examinations at the end of each academic semester;
- A lack of adequate training facilities and equipment for survival and safety;
- Lack of an external evaluation system to ensure that academies say what they do and do what they say they do;
- The Brazilian academies must have the freedom to write a contract with lecturers, instructors and examiners outside of the Brazilian public employee system, which ensures them a job contract until the end of their lives. Almost 50% of the staff should be contracted for two-year terms, which should be renewed;
- Academies should encourage to use Brazilian shipping industry exports as part time lecturers.

The adoption of the Revised STCW 78 will put pressure on the Brazilian government to comply with the provisions. The academies also have to upgrade the curriculum to meet the required standards.

By implementing the provisions of the Revised STCW 78 and the support of the government, the Brazilian MET system should be able to produce seafarers who can be recognized outside Brazil.

## **7.2 Recommendations**

### **7.2.1 Adoption of International Standards**

For the Brazilian Maritime Education and Training system to be compatible with international standards the government, who adopted the Revised STCW78, must implement its provisions and also other relevant international conventions.

### **7.2.2 National Shipping Act**

The National Shipping Act should be upgraded to ensure that shipping regulations are abreast with international conventions, and are applicable to local and foreign going ships.

### **7.2.3 Restructuring of Maritime Administration**

The Brazilian Coast Guard should be adopted and implemented under the Ministry of the Navy. The structure must be such that it is workable to fulfill the needs of the industry. The function of each section must be clearly defined and personnel recruitment should be based on skills and qualifications.

#### **7.2.4 Administration**

Primary legislation containing provisions for prescription of manning certificate requirements, grades of certificates and related examinations, promulgation of relevant rules and regulations should be implemented. This should include production of appropriate documents, instructions to and appointments of examiners.

#### **7.2.5 Certification of Examination**

The process of certification and examination should be reviewed to ensure that examinations are conducted in a professional and harmonized way and that the qualification of those involved are thoroughly ensured of their capability. A board of examiners should be established.

#### **7.2.6 Training of maritime administrators, examiners and lecturers**

Priority should be given to the training and upgrading of the qualifications of personnel in the maritime administration and the staff of the maritime academies. IMO should be contacted, on a national level, and encouraged to offer more fellowships to teachers to attend programmes at WMU's MET Course.

### **7.2.7 Training facilities and equipment**

The heavy bureaucracy that exist to use the Fund for the Development of Maritime Education and Training (FDEPM) to acquire new training equipment and training of staff should be changed. The use of the fund to contract staff on private basis (not as public servants) should be a good solution also to raise staff motivation.

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