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WORLD MARITIME UNIVERSITY
Malmö, Sweden

**EDUCATION AND TRAINING DEVELOPMENT
SYSTEM OF NAVAL INSTITUTE IN THE
SAUDI ARABIA COAST GUARD**

BY

HAZMI .M. AL-GARNI
Kingdom of Saudi Arabia

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
(Engineering)

1996

DECLARATION

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

The contents of this dissertation reflect my own personal views and necessarily endorsed by the University.

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ABSTRACT

The improvements in automation on vessels has made it necessary for Maritime Education and Training systems to adjust the training of their crews. It is therefore necessary for national Maritime Education and Training Institute to take these advancements into consideration and to train ratings and officers who can cope with these advancements.

The present training system at the Saudi Coast Guard Maritime Training Institute (SCG) is presented and the shortcomings in this system are pointed out. In this context, the ways to improve the situation are suggested.

The practical training problems are discussed and the plans to increase the efficiency of the training process at the Institute are suggested on the basic idea of Hannemann.

A comparison of three countries, Austria, Germany and Japan, with developed rating systems and Saudi Arabia are made.

The three developed countries train ratings for multi-purpose service. They combine nautical subjects and engineering subjects and by this they strengthen the position of ratings.

Since there are a great number of similarities between the candidates admitted to the developed countries, the cadets of Saudi Coast Guard Maritime Training Institute can follow the same programs and be trained them as Dual-Purpose Crew.

The advantages of the Dual-Purpose Crew member is that he does not feel strange in the two environments (engine room and bridge) and can adapt to changing circumstances easily. He can perform both on conventional ships and on high-tech ships.

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INTRODUCTION

Historical Background

The Border Guard in the Kingdom of Saudi Arabia, initiated in 1925, was called "Frontier Force, Harbor and Coast Guard". Its mission was to guard the coasts and borders via patrols by riding animals or by using sailing boats manned by irregular troops. The efforts were scattered and not concentrated.

In 1928 the first main center for land and naval patrols was formed in Jeddah and in 1934 coast Guard Headquarters were established. This change resulted in a major development in the work of the system which required increase of land and sea patrols and consequently increase in the number of employees.

Frontier Forces is considered the oldest governmental body in the Kingdom and has been developed gradually and steadily according to the developments in the nature of the work and requirements to do the work. In this respect the development of manpower has become of great interest and therefore the training centers for the training and recruitment of manpower have been given great importance.

A few years ago it was the policy of the Border Guard to send students to get naval qualifications abroad. The first group was sent to Pakistan Naval College in order to become petty officers in different specializations. Other groups were sent to the UK and China in the hope of diversifying the information sources and the qualifications of the naval officers.

Graduates who returned from these academies were not the main source of trained personnel but they were the core. With the help of these graduates the Border Guard started local training and a Naval Institute was established. Students were admitted for the following specializations: Navigation, Deck, Supply, Rescue, Motors Mechanic, Power Electricity, Electronics, Welding, Infantry, Typing, Workshop Tools and Maintenance of outer motors.

The Institute holds refresher courses for the graduates in order to provide them with the new information on the developments made in their line of specialization. The Institute emphasizes courses on security and naval watchkeeping since these courses help to carry out the mission of the Border Guard. The aim is to train the nationals sufficiently so that there will be enough qualified nationals to carry out this mission.

Need for Improvement

This dissertation aims at pointing out the shortcomings of the training of the ratings in the Saudi Coast Guard Maritime Training and finding solutions how to overcome these shortcomings.

Due to the advancements in shipping technology, emphasis has been given to the need for training of the ratings that can share duties and responsibilities in more than one area.

In the modern ships the number of crew has been reduced and instead the area of duties and responsibilities for each crew member has been broadened to cover a wider area. Instead of having about 50 crew members (each with one single conventional specialty) on board an ocean going vessel sixty years ago, today we have only 16 crew members (each with several specialties) on board the ship.

Human error has been indicated as the contributing cause to a great number of marine casualties. One of the ways to overcome this case is to improve the human element and by doing so the human element (crew) needs to have sufficient training with the sophisticated equipment on board ships.

The crew needs to have a complete understanding of the equipment with which they need to work during voyages. In order to achieve this it is necessary to train crew members for more than just one task and to make sure that the equipment is available in the maritime institutes where seafarers receive their training.

It is obvious that is equipment involves some financial strains on the institutes, but it is necessary for the seafarers to have them available at their disposal during their training period. If there are institutes which cannot afford to purchase is equipment, they should send their trainees to the institutes which have is equipment for training.

The use of modern technology and automatic operations on board ships has become an obvious factor today. Not only on board ships but also in ports and shipping companies and the maritime industry has the advanced technology been introduced which plays a very important role in both the safety and economy of shipping.

As a result of improvements in vessel automation most of developed countries have reorganized their operational spectra and adjusted their shipboard organization in order to be able to train crew who could work in a broader scope than just the conventional form of service and be able to carry out more variety of duties and responsibilities.

In this dissertation the present ratings training system at Saudi Coast Guard Maritime Institute is described followed by a comparison between three developed countries with advanced shipping and Saudi Arabia.

The comparison shows the adjustments made in these three developed countries to meet

the requirements of crew members to run the operations on board modern ships with sophisticated equipment. They have felt the crucial importance for safety at sea and protection of the marine environment and based on these two factors and also on the innovations in technology in both engine room and bridge these three countries have adjusted the training of their crew to be adaptable to the equipment they are to work with.

The comparison also shows the similarity in students admitted to the institutes of these three developed countries and Saudi Arabia.

This shows that the students admitted to the maritime institutes in these three countries and Saudi Arabia are so similar that the program and training should be the same.

Therefore, there is a need in Saudi Arabia to improve the training system in order to meet the requirements of an advanced vessel.

There is a need for Saudi Arabia to train ratings which can cover more than one conventional responsibility. The conventional crew members who are trained at the Saudi Coast Guard Maritime Training was ideal for the ships of yesterday Today we need to train crews for the ships of today and also prepare them for the ships of tomorrow.

Consideration should be given to modern ships and crew which can be adapted to these ships as well as the importance for safety at sea and protection of the marine environment.

CHAPTER ONE

PRESENT TRAINING SYSTEM

SAUDI COAST GUARD MARITIME TRAINING INSTITUTE

(SCGMTI)

The Dimension of Training and Development

Generally, training and development should include all the subjects of education and experience needed for cadets. There are different philosophies on how to achieve the desired result in changing the behavior to what is required in order to fulfill the aims and objectives of the Institute.

The means and methods of training which have developed in the past few decades along with the developments in educational, psychological and social philosophy, have varied vastly. Each of these methods has its supporters and enthusiasts.

Among these methods the following are the main ones:

- The method based on the type of units and lectures, where each type is dealt with separately.
- The method based on the mental operations needed for each subject.
- The method based on the division of the characteristics of each individual method.
- The method which is a combination of all these methods.

Each of these methods have their own way to classify types of lessons and subjects of training.

All these methods should be studied thoroughly and used as a tool that helps us to take the shortest way of doing what is required to be done, using the easiest and most effective method of teaching and learning, and aiming to guide the trainee to the required objective of training. In order to reach this goal there are three main elements which should be given prior consideration:

- a. Human element: Instructor and Trainee
- b. Material element: Books, handouts, training aids, equipment, etc.
- c. Strategic element: Methods, techniques, media, etc.

A thorough research of all activities and programs carried out, developed and supported by the Saudi Coast Guard Maritime Training Institute (SCGMTI) makes it obvious that these activities and programs are designed to:

- prepare and train officers, sub-lieutenants and the soldiers of the Royal Coast Guard in the different technical, professional and marine fields of specialization at the Institute, and
- prepare, train and graduate sub-lieutenants at different military technical ranks in the various technical fields of specialization that fulfill the needs of the Coast Guard.

Shortcomings of the SCGMTI

The major outcome of the research was that the Institute takes care of developing trainees. However, there was no mention on how to develop and prepare instructors who will be training the trainees. In other words the "human factor" was ignored in the sense that without appropriate instructors it is doubtful that we can achieve the desirable result in training our trainees.

Based on the observations of the training programs at the SCGMTI, the following shortcomings could be listed:

1. These programs were laid without consultation with scientific or academic personnel, without considering the syllabus as a whole and without any pre-review of what is needed and how it should be implemented.
2. The lack of a fixed academic group who can organize and influence these programs.
3. Instability in administration and management line has made the development process very slow.
4. There is a lack of professional staff who can determine what is needed for the improvement of the Institute, since the management body does not have enough experience and knowledge in the area to recruit qualified staff.
5. There is a lack of research and study of the work of the Institute. As a result of this there is no strategic plan for the development of the Institute to be followed.
6. The poor method of recruiting graduates directly after graduation as lecturers and instructors. These graduates who are completely without experience lack teaching ability and do not have the practical experience required to be able to teach cadets effectively.
7. The educational materials used are usually out of date. Regular changes in the

material could be made if the academic group of the Institute was the right academic group.

8. There is too much external involvement in the affairs of the Institute which has a negative affect on the development process. This external involvement is normally a result of insufficient competent national staff members at the Institute.

The above short comings point only in one direction: the quality of the staff in charge of the Institute needs to be improved. The management body of the Institute should have the right background for the job and they should see to it that the staff members have the required qualifications. It is necessary to establish an academic group who will review a short-term and long-term plan of the Institute. In order to achieve this the following is necessary:

- To have short courses for the lecturers and instructors in order to familiarize them with the latest developments in the area of their work and to help them improve the quality of their work.
- To have special training for the instructors who work with different high-tech equipment and familiarize them with any development in the technology of is equipment and the new hardware and software changes.
- To improve the employment regulations in order to raise the standard of the new lectures and instructors who are recruited by the Institute.
- To encourage the participation of the teaching personnel in the international seminars and conferences where the opportunity for discussing the new developments and methods with colleagues from different parts of the world exists.

Development of Personnel

The majority of the programs at the SCGMTI has not been well organized. The programs were laid out by the personnel in the Programs Department of the Institute. These programs have never followed a basic outline determined in the syllabus.

Another aspect of the Institute which needs improvement is the organization structure. In many cases there are staff members in charge who are not in favor of changes. They have a routine which they have followed every year and they do not want to see these routines disturbed by new methods. They feel comfortable doing what they have been doing for years and therefore they neglect the need for necessary changes and improvements. On the other hand there are those at the top level of management who make structural changes in the organization on the basis of completely personal opinion, without considering the advantages or disadvantages for the Institute.

Since 1993, the Higher Management Council has started showing more concern about improving the routines of training at the Institute where more power is given to the Institute's staff who are able to determine the objectives and to set out internal and external policies at the Institute and to take necessary decisions. Given the authority by the Higher Management Council the wheels of the management body at the Institute were put in motion in all aspects such as leadership, long-term and short-term planning, making decisions for the development of the training process.

The basic and logical concept of the Organization Development at the Institute is to make all staff members feel the need for change and to make them ready for it.

It is now decided that all steps of the organizational development should be under the direct supervision of the Institute Manager. this is an important condition for the

organization development to be effective.

The programs should be fully supported by the Higher Management Council. This will help us avoid external and internal influences in the Institute.

There is considerable development in training programs for the Coast Guard units and for the staff in charge of training programs and the Institute in general.

Development is also remarkable at other aspects like leadership, planning, objectives, internal and external policy making decisions. This development will soon lead to an increase in the training efficiency and raise it to the required level.

There is continuous development in all management and supervision aspects such as leadership, planning, objective, internal and external policy making decisions.

All the programs should be supported by the Higher Management on a long-term basis, and provide the chance to practice on site with continuous progress evaluation and revision.

Some other considerations of management development are: working under direct supervision, forming groups to study and discuss the developments.

Development of the Core Training Programs

The majority of the programs at the Coast Guard Maritime Training Institute were laid down without consultation with academic personnel and without considering the syllabus as a whole. In order to improve and develop these programs to respond to the needs of the trainees the following four main training categories should be observed. Each category represents a specific objective.

- i. Training of New Cadets, which includes preparatory programs and training on different duty-related skills.

- ii. **Refreshment Training**, which aims at improving the duty-skills of the new trainees and correcting any short-comings which may exist there.
- iii. **Advanced Training**, which aims at improving duty-related skills and capabilities.
- iv. **Rehabilitation Training**, which aims at providing new skills and updating the technical information for the Coast Guard members to correspond with the new equipment used by the respective Coast Guard units.

1.4.1 **General Requirements**

The elements in the training programs carried out consist of: objectives, contents, training organization methods, educational material, auxiliary dissertations, equipment, strategies, methods and rules, improvement studies, etc. All of these elements are related to each other.

These programs are of vital importance. In order to assure that the training program efficiently fulfills the needs of the training unit and the personnel working in that unit, the development and training team needs to take into consideration, above anything else, the continuous development of training programs.

1.4.2 **Training and Development Systems**

Training and development systems are major importance. The three main stages are as follows:

Stage one - analyzing the system

- Determining the training and development needs very accurately.
- Determining the future requirements of training.
- Collecting and analyzing the data of duties and missions.

Stage two - preparing the system

- Listing the objectives and goals.
- Choosing the training strategy and aiding means.
- Preparing the educating material and validating it.
- Determining the equipment required.
- Choosing and training the training instructors.
- Producing the training documents.

Stage three - validating the system

- Testing the trainees.
- Revising and applying the training systems.
- Following the progress of the graduates.

1.4.3 Determination of the Training and Development Needs

In order to execute the programs designed to improve the skills of the trainees various types of equipment are required. This equipment is normally quite expensive and therefore the cost of its transport and installation is also quite high. In order to have the training carried out efficiently it is necessary that long-term and short-term plans be submitted so that the exact quantity of the equipment and dates of operation be determined as early as possible.

1.4.4 The Nature of Training Equipment

The types of equipment used in training could be categorized as follows:

- furniture and the fixed fittings
- typical aiding equipment like diving equipment
- other specialization equipment related directly to training like mechanic, electrical, electronic, typing machines, calculators etc.

The following questions should be asked before making a final decision about the type and the quantity of the equipment.

- What are the objectives of training?
- Who is going to be trained?
- How many are to be trained using this particular equipment per year?
- Where is training going to take place?
- What training strategy will be used?

And also the following data should be carefully examined:

- The present equipment that is currently used at the Institute, the function and objective of each and the type of task it was designed to do.
- Future equipment, to support long-term programs.
- The possibilities and terms of providing the equipment, since it is of great importance for planning purposes to be able to know all the terms of delivery and the possibilities of supplying the equipment needed currently or in the future.
- The costs related to each piece of equipment, including the price and the operating and maintenance costs for the equipment.

The SCGMTI has taken into consideration the training needs and given them priority.

To provide the required personnel the Institute has improved the standard of recruitment and started choosing qualified officers who are willing and capable to participate in the process of developing the training. Some of these officers are sent to other institutes of higher education both in the Kingdom and abroad for higher studies and improvement of their knowledge and experience in the maritime training field.

Other personnel were sent to other institutes to gain experience to raise their ability to do their duties at the Institute. Civil local and foreign instructors and lecturers were also assigned to the Institute.

1.4.5 Writing Training Objectives

Determining the objectives of training is a reckoning operation by qualified people. The other more significant problems which arise afterwards are usually related to formulating the objectives.

The remaining steps of the process of preparing the program are basically related to the uses of these objectives. These uses represent the heart of the training program. Moreover, the objectives of training serve particular aims, such as:

Consistency in the design of training system:

When the training system consists of elements that react and integrate with each other, these elements have to work in harmony.

The main elements in a training system are: human factor (the instructors and the trainees), the material factor (training equipment, aiding tools, training books, handouts) and organizational and the strategic factors (methods, rules and regulations etc.) To make sure that all these factors react positively with each other and actually help each other, they should be selected through a team work policy.

Clear objectives and effective communication:

Communication is the main task of the objectives. The training objectives that were successfully sent and received are more likely to be successfully performed than any unclearly transmitted instructions. With the presence of the clearly

determined objectives, the instructor can communicate more efficiently and the trainee can learn better. The instructors know precisely what they should try to do, and the trainees know what they are expected to accomplish.

The objectives are considered vital for the instructors to design methods and to revise their own and others progress. The instructors can also use the objectives to inform other instructors, training supervisors and the heads of departments through the contents of the program and what the trainees will be capable of doing at the end of the training program.

Selecting appropriate course content:

The objective represents the main skeleton or the main frame of the training program, while the content represents the flesh and muscles. The wise selection of objectives enables the selection of suitable contents from the points of view of quality and quantity.

Selecting the most suitable instructional strategy:

That is used to simplify the process of selecting the method and the aiding tool and the best organizational system.

Subjective evaluation:

The pre-determined objectives provide that lost link in the chain of the process of evaluating the instructors, that is the agreement between the instructor (who transfers the information to the students) and the evaluator (who gathers information and assesses its value in making decisions) about what the instructional operation is to accomplish. The presence of the pre-determined objectives makes both the instructor and the evaluator able to determine what the result of the instructional operation should be. The result enables the subjective evaluation of the training program and in due course makes the instructions of the

evaluator more acceptable to the instructor.

1.4.6 Selecting and training instructors

The instructors are considered to be the second most important element of the training process after the trainees. The instructors lay down the average speed of the training operation, give the necessary instructions and training aid required by the trainees, supply the experience required in the training subject and play an important role in the process of evaluation and revision of a training system in validating its design. The efficiency of the instructor is a vital factor in the training operation.

Based upon the above mentioned factors, it is essential to have a list of the terms and conditions in every training system.

The following are a selected number of terms and conditions:

- Practical Experience: It is important to choose instructors who have enough practical experience in the area and who have shown highly professional skills during their professional lives.
- Knowledge of the Training Unit: A successful instructor needs to have knowledge about the organizational chart, the lines of communication and about relations between the different training departments.
- Professional Skills: The instructor should be highly skilled in the methods and techniques of training.
- Training Methods Skills: It is important that the instructor combines the knowledge of the subject of training and the professional skills together with the experience in the subject of training and special skills in teaching techniques or training method skills.

- **Communications Skills**: Most of the basic methods used in training require a skilled verbal communication ability, i.e. lectures, questions and answers, giving examples, explanations, etc. Training can be considered a matter of communication that implies that good instructors should be good communicators, both verbally and in writing.
- **Personality**: Almost all successful instructors have the following in common: above average smartness, physical ability, emotional ability, self confidence, patience and understanding, team work spirit, good manners, self satisfaction and an enjoyment doing their work.

1.4.7 **Selecting Trainees**

There are many factors in selecting trainees. Trainees should do their duties and follow the instructions of the instructors as specified in the training plan to be able to achieve the training objectives.

The following are the factors that should be considered when selecting trainees:

- Smartness
- Care
- Learning ability
- Special skills or special abilities
- Character and personality
- Previous training
- Practical experience
- Military experience or background

Evaluation of Training Systems

The main objectives of evaluating a training system is to collect the data necessary to improve the training and developing system. This data is not collected to evaluate the instructors as a separate factor but it will be used to evaluate the training process as one unit.

There are three secondary objectives as follows:

1. To make sure that the training is going on as planned.
2. To have a basis to determine the needs of the instructors, where the collected data can be used to determine what type of refreshment courses the instructors need to update their information.
3. To provide the data needed to revise and change the refreshment courses or the program of training of the instructors. The evaluation might reveal common drawbacks that can be avoided by revising the instructors, training program.

To evaluate a training and development program various integrated points of view are needed. Practically, one or two different points of view are taken into consideration when revising the program. The points of view include notes and evaluations of the instructors and executive supervisors on site.

CHAPTER TWO

CURRICULUM DESIGN

Introduction

Curriculum design can make a number of valuable contributions to any educational institution. David Prat (1980) explains that a systematic approach to curriculum aims at improved design of learning situations. According to him the benefits gained from a curriculum design are as follows:

1. Design focuses attention on goals.
2. Design increases the probability of success.
3. Economy of time and effort is improved by design.
4. Design facilitates communication and coordination of projects.
5. Design reduces stress.

The curriculum design in general has a few basic elements, These elements if studied thoroughly, worked on and implemented correctly, will give the desirable result.

In this chapter it is intended to address the shortcomings of the curriculum design presented at the Saudi Coast Guard Maritime Training Institute (SCGMTI). Basically the main problem with the curriculum designed for students at the SCGMTI is lack of expert input.

The influence of those who teach the course and those who go through the course, the results of the course which a student is supposed to achieve after going through the course in order to pursue a career after graduating from the course, the identification of weaknesses and strengths of the curriculum which could only be achieved by involving

those who directly teach the subjects of the course and those who go through the course are ignored.

The lack of expert input in the design of the course has resulted in the following:

- In some cases the period considered to cover a subject is too short. The area is too vast to be covered under the period indicated.
- In some cases the period considered to cover a subject is too long. The area is too narrow for the time devoted to it and it could be sufficiently covered in a much shorter time. In return the time could be allocated to attend to those subject matters for which time is too short.
- In some cases the knowledge given to the students is too basic and does not fully justify the course they are going through.
- In some cases the knowledge given to the students is too complicated for which you need to have an introductory course in order to comprehend it.

The curriculum designed for the SCGMTI, has not been thoroughly studied and in some cases the basic elements which are to be considered for working out a suitable curriculum have been ignored.

Four Phases of Curriculum Design

Curriculum should be looked at as a system which in an organized way connects the ingredients of education. According to Derek Rowntree (1985) and S. Downey and Kelly (1982) in order to design curriculum four basic phases have to be considered and thoroughly studied. These phases are reflected in Figure 2.1;

1. Purposes
2. Design of Learning
3. Evaluation
4. Improvement

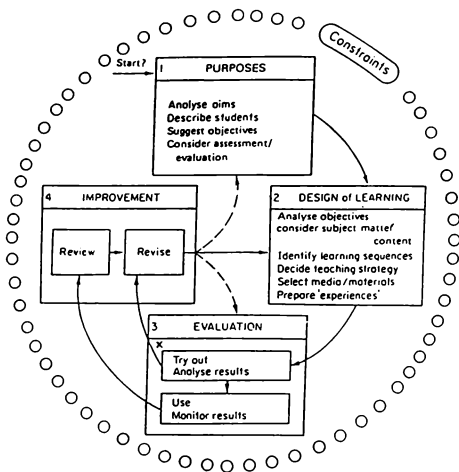


Figure 2.1: Educational Technology in Curriculum Development

Source: D. Rowntree (1985)

2.2.1 Purposes of Improving

The identification of purpose in a curriculum is a must. The academic staff should pay attention to what it is they hope their students achieve as a result of their studies.

The purpose of improving the curriculum is to try to upgrade the standards of education, in this case at the SCGMTI. To bring into balance the content of the curriculum with the purpose that the curriculum is designed for and to upgrade the standards, it is necessary to put emphasis upon what are the primary needs of education in the academy, how are the teaching measures, what is the aim of the curriculum, how are the tests and examinations developed and graded, etc. In order to achieve this it is necessary to have an understanding of the goals. In the process of doing this the materials which are selected and different levels of the curriculum are measured by the educational objectives.

1. Analyses of Aims

The most important concept of curriculum design is to identify the aims to be achieved. To identify these aims it should be clear who this curriculum is intended for, what these learners need to know and have acquired before entering the course for which the curriculum is being designed, what they are supposed to develop by going through this course, how they are going to be evaluated and assessed to see whether they have learned what they are supposed to have learned, what requirements should apply to those who teach this course, what books should be used, etc.

2. Description of Student

The group of students which this course is designed for has to be identified. It should also be considered whether these students (who are high-school graduates) have to have pre-entry qualifications. In the SCGMTI the pre-entry qualifications are almost the same for all the courses. The reason for this is that those who planned the curriculum have not been experts in this field and have not had practical experience of such a course. Students applying for different courses should have different levels of pre-entry qualification. In order to get the right students with the right qualifications for the courses at the SCGMTI, the enrollment procedure of our Academy needs to be improved. In order to achieve this it is advisable to form an Admissions Board which will study each application carefully and based on the information in the application decide whether a student is eligible to enter the course or not. In this manner the educational background of the student is studied carefully and to improve this even more we can arrange for an individual interview with the student. Interviews can provide us with some valuable information such as the student's understanding of the course and what he expects to achieve, where is he going to move in his career after finishing the course and whether what we have to offer in the course is going to give him the necessary tool to move forward towards his aim.

This exercise and measures, if taken correctly, will provide a two- fold benefit: On the one hand this information will lead to identification of the students who will eventually enroll on the course and give an idea of who are the students who would like to enroll on the course, what backgrounds they normally have, at what level in their career they are now and where they expect to move after finishing their studies, what are their understandings and expectations of the course offered. Furthermore, it will help with the selection of the material for the course and structuring the content of teaching it.

3. Suggested Objectives

In order to design the curriculum the needs and limitations have to be thoroughly examined and the outcome of this examination should be carefully analyzed. This is a very time and resource-consuming practice. Throughout this practice the purpose of education for which this curriculum is being designed should be the main objective.

The objectives of a curriculum should clearly state what a student should be able to do as a result of working through the course. After identification of the objectives a system of teaching and learning will be developed which will serve as the tools which will enable the students to aim correctly and move towards these objectives.

4. Assessment/Evaluation

Although there has been some criticism against evaluation, it is a necessary practice and without it teaching is pointless. It is necessary to measure a student's achievement and therefore grades and marks are the best way of measuring it. There is no other means which is as efficient and dependable as evaluating what learners have learned and compare to what was expected of them to learn. It is also one of the best beneficial feedbacks to the process of education which would help to evaluate the course as well as the student's performance.

Development of tests and exams are required in order to assess a student's performance and achievement. These tests must be reliable and valid to serve their purposes. An educational institute should have a consistent and unified basis for assigning grades which will be used by all the different sections and teachers. When developing tests consideration should be given to what is the

reason for the test, what is aimed at to be measured, in what way is this measurement going to be interpreted. It should also be made sure that these tests are valid, reliable and practical.

In order to evaluate the validity of the test it could be compared with the objectives of the course and with the content and the method of teaching. The reliability of the test could be improved by making sure that the questions are clear and match the level of students and also that the instructions to the students are clear and understandable and the time for answering the questions is sufficient. For practical purposes teachers should find an assessment scheme that is feasible and therefore they must have the skill to administer and grade the assessment.

Today the following assessment methods are available to the teachers. Each of these methods serve a specific objective.

Essay: measures the writing ability of the student

Short answer: gives straight forward answers, is used for formative evaluation.

This method should not be used for complex examinations where one has to select and argue a case.

Multiple-choice: This method is useful in science and technology areas and is of high reliability. The scoring is also done rather quickly with the help of a key and therefore is not as time-consuming as, for example the essay method.

Oral: This is a good method of testing when assessing the learning of some special courses such as foreign languages.

There are other methods as structured practical and self-assessment.

2.2.2 Design of Learning

Knowing what the student should be able to do after having finished the course and as a result of going through the course will be a starting step to help the teacher decide what experiences they should have during the course. This will also help select the material for the course and structure the content of teaching it.

While looking into possible objectives, some important topic areas may be identified and based upon this a possible path through the course could be suggested. Identification of objectives will also help decide on appropriate learning activities and teaching media.

1. Analysis of Objectives

The necessary conditions for achieving each objective is to identify the kind of objective. There are different levels of objectives which involve different processes of a learner. There are those objectives which involve a student's thinking process, attitude, and physical activity. In each of these categories, based on the complexity, there are different levels of objectives distinguishable. There are some skills which are more difficult for a student to achieve than others.

A good way to help analyzing objectives would be to discuss them with the students and the teachers who are involved in similar subjects. This introduces opportunities for argument and cooperation. This is one of the steps which needs to be taken at the SCGMTI, especially since the subjects of curriculum is designed by people who are not experts in this line and therefore it is necessary that they discuss it with those who know more about this matter. A better way to handle this is to form a curriculum committee of experts. This committee would discuss the different aspects of the curriculum and have the possibility to call into meetings other students and teachers and find out their point of view as well. The curriculum must be influenced by those who are directly involved, namely

the teachers and students.

2. Subject Matter

The course content and subject matter should related directly to the objectives. In order to achieve the proper subject matter which is to be covered in the course, the curriculum committee should call in others who are involved in the same area and seek their advice or input. Cooperation and communication between experts should be highly encouraged. An open discussion with other colleagues on the subject will usually lead to a useful outcome and could even lead to the achievement of good results. Besides the teachers and experts in the field the students who have gone through a similar course will be a good category of people to include in discussions. This will result in finding out their views about the course and what subject matters they found more useful and what they thought were weaknesses.

3. Learning Sequences

Analysis of the objectives and the necessary subject matter coverage should give enough information to help identify the elements to be learned and find effective ways in which order they should be learned. Depending on the subject of the course there are different types of learning sequences. These sequences are as follows:

- chronological order of events
- chain of actions
- structural element of the subject

On the other hand there are subject matters where the elements are not chained to each other and are independent from each other and for which no sequence is necessary to be observed. These subjects could be handled in any sequence.

4. Teaching Strategy

Consider a strategy which helps students learn. There are different strategies to be considered. One strategy is to simply show the students how to reach the objectives (help them climb the ladder). The other one is to advise them of the resources they can use to reach the objectives (show them the ladder and tell them to climb it). The choice of the teaching strategy is dependent on the nature of the subject matter, whether it is a practical matter or research matter, and design of learning.

5. Select Media (Materials)

The media used for teaching consists of the following:

- Classroom media: giving lectures, referring to text books, involving students in discussions, using audio- and visual-tapes, using computers, etc.
- Outside classroom media: taking students on field-studies and having practical work done at the place where the real practical work is done. This could be a complementary part of the classroom media. This will give students a touch of real involvement in what they should be doing after finishing the course.

When choosing material which is already prepared by someone else to run a course, it should be carefully examined and thoroughly studied that the material is directly in line with the objectives of the course.

6. Prepare "Experience"

As earlier advised in section 2.2.2 it is important to receive feedback from both the teachers and the learners of the course. The feedback from the learners helps to find out whether the media used for teaching was successful or if there are any suggestions for improving it. There are a few different approaches to achieve this.

Ask for a written report on each learning experience, such as field-studies. The advantage of this is that students have plenty of time and can explain in detail their experience. The other advantage is that most of the students may not like to say what they think in front of the other students and writing it down will take away this limitation. The disadvantage is that they might be a bit reserved to put down in writing and document what they think is wrong with the course.

The second approach is to have a round-class discussion and listen to the ideas and experiences. The advantage of this system is that the body language and the facial expressions can be observed which could be of great help when assessing a course. The disadvantage is that there is always the risk that there is a number of students who do not feel very free to express their criticism in front of the others, no matter how friendly the classroom atmosphere is. Sometimes there are students who feel they would have failed their instructor if they criticize the course he has organized for them.

The third approach is to prepare a set of questions and have the students answer these questions. Most of the students feel very comfortable with this system. The disadvantage is that the information will be limited to the questions.

2.2.3 Evaluation

To evaluate the course the results should be analyzed. For this purpose the students who have attended the program should be assessed.

The result of this assessment shows how the course was received and what was the outcome of the course. It also shows which objectives which were aimed at have been reached by most of the students and which objectives have not been reached. Sometimes the results have not been planned for.

If the result is satisfactory and the objectives of the course are reached by most of the students then there is little to be done except to continue with the course and regularly evaluate it to make sure it remains satisfactory.

2.2.4 Improvement

If the result is not satisfactory then efforts should be made to improve the course and bring it up to the satisfactory level. To achieve this the results should be analyzed and the strong points and weak points of the course identified. It should also be identified which objectives have been reached and which ones have not been reached and then analyze the reasons for this. The materials used for the course should also be analyzed and it should be made sure that they are appropriate. After all these are considered all the elements of the course should be thoroughly studied and the elements which are not feasible and functioning should be updated. Afterwards a revised version of the course should be offered and a new evaluation should be made to make sure whether the weaknesses have disappeared and complications solved.

2.2.5 Alternative Ways of Curriculum Planning

As discussed earlier in section 2.2.1 it is of utmost importance for design to identify the objectives the course is supposed to achieve and aim in reaching these objectives. In addition to this system there are other ways to help improve curriculum planning. It is always of great help to see what others who have gone through the same course have done and therefore reading the examination syllabus, the question papers, and reports of the examiners from the previous years will give a valuable insight to the matter. It is also of great help to analyze similar courses which are offered in other places and read the textbooks related to these courses which are aimed at students who more or less at the same level as the students are expected for the course. Individual interviews with the students who will be taking the course and finding out what they expect the course to include and listening to their reasons and arguments, is also of benefit. In addition, discussions with other teachers and experts in the subject and learning about their ideas and views about text books and materials which should be covered during the course of the course, reviewing journal and newspaper articles relating to the proposed subject and discussing them with those who are experts in the field are also valuable.

CHAPTER THREE

PLANNING AND TRAINING DEVELOPMENT

In this chapter, practical training problems are discussed and plans to increase the efficiency of the training process at the Institute are suggested.

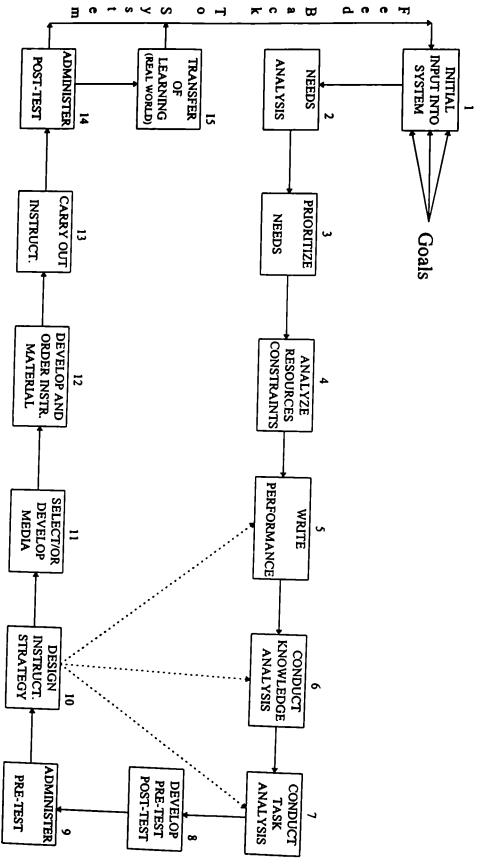
Al-Beshi (1992) explained in the Instructors Guide” factors that should be taken into consideration in order to develop the training process at the Institute.

Remann, C.E. (1992) introduced planning and training development, Fig. 3.1, a method which is adaptable for increasing the efficiency of the training process at the Institute.

Determining the Objectives

The following four steps can determine the objectives:

- a. Writing the method of performance, or giving the instructor the road that if followed, the objective will be achieved.
- b. Revising the objectives and performance deleting what is repeated and combining the homogeneous items.
- c. Writing the objective in its final form in such a way as to measure progress and performance and in due course revising and making the necessary modifications.
- d. Testing the final form.



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(Dr. C.E. Hannemann)

Needs Analysis

At this stage, the following steps should be followed:

- a. Noting down all the needs, not taking into consideration the priorities nor the possibility of providing them.
- b. Sorting the needs by priority.
- c. Evaluating the current situation.
- d. Determining the required situation.
- e. Measuring the distance between the current and the required situations by one of the following methods:
 - personal interviews
 - observation
 - all types of tests
 - questionnaire
 - performance evaluations (efficiency reports)
 - reports and publications
 - records
 - conferences and committees
 - scientific research
 - job analysis
- f. Determining the actual needs and the achievable ones by:
 - sorting as per step "b"
 - the determining the distance between the current and the required situations as in "e"
 - determining the time

- evaluating the costs and results
- determining what to be achieved by training.

Prioritizing Needs

The cadets of the different stages have different academic backgrounds, i.e. a college student can not be taught what a school pupil is taught, and so on. At each stage of study, a periodic objective is achieved that together would finally lead to the required objective.

Analyzing Resources Constraints

The Institute might have great objectives that are practically impossible to achieve due to a lack of resources. It is therefore advisable to stick to the objectives that are possible to achieve. The following factors should be taken into consideration by an external body or mixed group of internal and external bodies.

- economic factors
- time factor
- availability of qualified human resources
- availability of scientific material.

Writing the Performance Objectives

The objective differs from the subject. The objective is general and comprehensive while the subject is confined and specific. It is possible to measure the subject but difficult to do so with the objective, for instance, when a person says: "My objective is Knowledge", to achieve this objective, a number of subjects should be fulfilled like saying "After two years of study at the World Maritime University, I'll earn the Master degree in training with the grade of Excellent". In the previous example, the subject includes:

- a. A standard verb "Earn",
- b. Performance Scales "Excellent", and
- c. Performance environment "World Maritime University, specialization of Training".

The subjects should be linked with the objectives by asking the following questions:

- a. Is it possible to measure what is achieved and is it possible to make sure I am on the right way?
- b. Are the Scales determined, realistic, clear and possible?
- c. Are the circumstances of performance clear?

The performance would go on if the answer to all the above is "yes", if not, subject connections and revisions are to be applied.

Conducting Knowledge Analysis

By using the Performance Objectives determined in the previous paragraph, more specifically the Standard Verb, it will explain if these skills are:

1. Brain abilities like "distinguish, determine, analyze", and if so are they on the top of the pyramid or from the base that starts with:
 - a. Knowledge like saying: There is a science called Training.
 - b. The aspect of sense like visiting WMU.
 - c. Illusion like imagining the WMU without needing to go through the previous steps, using previous experience.
 - d. The law of Science that states: Any science that consists of the elements of Planning, Organization, Supervision and Control, is called Management.

- e. Application, which is an advanced state that implies moving on from studies and theory to practical work.
 - f. Solving problems, which is the top of the pyramid, and is the ability to apply the previous experiences in solving problems.
2. Motion Abilities, in which the nerve system has a big role in the learning process, like typewriting, sports and using computers. Here the practical training is a great factor.
3. Emotional Information, which implies forming liking and disliking feelings towards a particular thing, This comes through the heart and is preferably taught through telling stories and recalling situations, examples are politics, religion, culture and values.

Conducting Task Analysis

This can be achieved by answering the following question:

What units are essential to teach the trainee in order to accomplish the objective - Taking into consideration that free subjects can be excluded since the cadets are expected to have already learned them.

Some examples are:

Material: Training Operation

Units: Planning, Organizing, Supervision, Monitoring

Subjects: Every unit should have the appropriate subjects related to it. One of the subjects of Planning, for instance, is the Objectives.

Developing Pre-Tests and Post-Tests

In order to develop pre-tests and post-tests the following aspects should be looked into:

- a. Determine the current academic background of the cadet.
- b. Determine the wishes and expectations of the cadet from the course.
- c. Measure the abilities of the cadet; is he more suitable for the Brain, Motional or Emotional Information.
- d. Treat the weak cadet by supplying him with an extra dose of books.
- e. Make use of the presence of the clever cadets to enrich the discussions in the classroom.
- f. Supply the data required later to evaluate the progress by determining what each cadet knew before he started the course.
- g. Give the cadet some idea about the objective of the course.
- h. Prepare the cadet emotionally for the course by convincing him that he does not know everything about the subject.

Administering Pre-Tests

To make sure the cadet understands what the instructor means, it is necessary to make it clear that the objective is not to give marks, the objective is:

To determine the levels of the cadets, giving marks that will help the instructor to determine the starting point. If Ali gets 50 points and Sam gets 70 points at the beginning of the course, then they get 70 and 90 points respectively, this means they will get the same mark since both have improved by 20 points throughout the course.

1 Designing Instructional Strategies

Although the staff in charge of training generally consider that the training and development should include all the subjects of education and experiences needed for cadets, there are different philosophies on how to achieve the desired result in changing the behavior to what is required in order to fulfill the aims and objectives of the Institute. For this purpose Instructional Strategy should be designed and a strategy should be considered which helps students learn this particular subject. This can be done by taking the previous items into consideration.

Selecting or Developing Media

Identification of objectives will help to decide on appropriate learning activities and teaching media. The media used for teaching are of two kinds: classroom media and outside classroom media.

Classroom media: giving lectures, referring to text books, involving students in discussions, using audio- and visual-tapes, using computers, etc.

Outside classroom media: taking students on field-studies and having practical work done at the place where the real practical work is done. This could be a complementary part of the classroom media. This will give students a touch of real involvement in what they should be doing after finishing the course.

In order to develop media the following should be taken into consideration.

- a. The number of cadets.
- b. Size or area of the classroom.
- c. Distance between the cadets and the instructor and the blackboard, effects (sight and hearing).
- d. Vitality of the subject and the importance of commenting and exclamation.

- e. The values, manners and habits that the cadets believe in; the proper method should be used so that it does not offend any of the cadets, like racism, etc.
- f. The relationship between the training means and the subject; if the motion is important, for instance, like reflections in behavior situations, television is preferred, if it is numbers and graphs, fixed posters and charts are preferred, cassette tapes can be preferred if voice is more important.
- g. Costs, availability and what one gets in return.
- h. Time, relatively long or short.
- i. Movement, faults, operation; machines that can easily go out of order should be avoided.

Developing and Ordering Instructional Material

Stages 3.5 and 3.7 should be taken into consideration for this purpose. Already available books can also be of great help even if modifications should be applied. In this case the already prepared material should be carefully examined and made sure that it is in line with the objectives of the training. This is an important stage. Flexibility is also vital so that the material takes into consideration future additions and modifications.

Carrying out Instructions

This stage will help to anticipate the potential problems and prevent costly delays. This is an important stage where design faults can be discovered and the probability of success can be increased.

4 Administer Post-Test

Can be done using final exam where the accomplished can be measured and compared with the planned, with the performance objective as the axis. The degree of success depends on accomplishing the performance objective of the course. There is no other means which is as efficient and dependable as evaluating what learners have learned and compare it to what was expected of them to learn. Tests and exams are required in order to assess a student' s performance and achievement.

Transfer Learning (Real World)

This is the stage when learning has reached a point where it could be transferred for fulfilling the current and future needs. In this respect skillful ability in communication and good personal qualities (smartness, physical and emotional ability, self-confidence, patience and understanding, team-work spirit, enjoying doing the work) are of importance.

CHAPTER FOUR

THE OBJECTIVES AND MISSIONS OF THE COAST GUARD INSTITUTE

Introduction

The Maritime Training Institute was established for the training of the main cadre required to work as crew teams on boats, vessels and other marine Coast Guard units. This requirement made it necessary for the authorities in charge of the Institute to lay a technical teaching strategy plan to train those teams and make them ready for the job, and to form a basis for the work at the Institute.

This led to the preparation of the intern regulations, tests rules, permanent instructions, training plans and the various training programs and material that have been successively revised year after year until they have reached the current level that satisfies the superiors and can be considered as a good basis that will help to fulfill the mission of the Institute.

In this chapter, the objectives and missions of the Institute are discussed. The various courses held at the Institute and their specifications are also explained.

Background of the Coast Guard Institute

Founded in 1973, the Institute was to help create the main cadre required to operate and maintain vessels and equipment.

The main objective was to train the officers on operational procedures and law enforcement as well as the crew and other personnel from different Coast Guard units, so

they could join the patrolling units. In 1981, the objectives of the Institute were broadened and to a certain degree modified to offer education for Preparatory School and High School graduates.

Today the Institute has the following objectives:

Preparation and training of officers and soldiers of the Coast Guard in the various technical and marine fields of specialization available at the Institute.

- Preparation, training and graduating officers of different ranks in the various marine field of specialization required by the marine Coast Guard units.

Following and revising the different training programs at the Institute, as well as submitting marine and technical advice when required.

The education staff consists of officers of the Saudi Coast Guard assigned to the Institute. They have diverse educational and training backgrounds since most of them are graduates of foreign academies.

The Institute is responsible for providing the appropriate training to cadets, required for the operation and maintenance of its marine units and naval bases. Since its foundation the SCGNI has graduated over 3000 ratings in more than 30 technical subjects. From the beginning, the Institute chose a traditional method of training cadets in navigation, ship handling and engineering subjects by combining classroom teaching, workshop practice and sea time onboard small boats and whenever possible in a dedicated training ship, the T/S Tabuk. The SCGNI has trained cadets using some of the teaching facilities shown in Table 4.1, and complemented, with increasing difficulties, with training at sea.

3LE 4.1 - Teaching Facilities and Aids at the Institute

Kind of Training	Facilities	Teaching aids
theoretical	Classroom	- Blackboard, overhead projector, etc. - Laboratories
practical	Workshop	Teaching equipment
Sea Training	- Small boats - Training Ship	Magnetic compass, chart/plotting equipment, echo sounder, radio telephone. Navigation equipment, Communication equipment

From the table above, it is easy to note that since the beginning the Institute has had no difficulty in choosing the teaching methods and the teaching aids to be employed in the training of its cadets. With time though, technological advances in almost all areas of shipping and navigation around the world have updated most of the equipment, teaching aids, vessels, etc. and to a greater extent even the teaching methods. It is important for the Institute to follow these trends in order to keep training competent personnel.

Of special interest is the actual conditions of the training vessel. It has naturally deteriorated, running coast have escalated, and provision of spare parts for vessels with an age of 20 years are not easy to secure. It makes more practical sea-training for cadets and navigation and technical refresher courses for the officers and ratings less frequent and increasingly difficult.

On board the ship is the only time when students have the opportunity to practice with the instruments and equipment. If the opportunity of sea training ceases to exist, due to the

problems mentioned above, the training will be reduced to only theory, which obviously will be inadequate.

Management Council

The Management Council of the Institute, which meets once a year, is the authority in charge of laying down the outline of the main education and training policy at the Institute and of taking any decisions related to its cadets, including the following:

- Establishing the internal regulations of the Institute.
- Determining the main education policy and academic material needs.
- Determining the various subjects of study and their hours etc.
- Deciding and announcing all dates; starting, exams, leave, graduation, etc. related to courses at the Institute.
- Suggesting the distribution plan of new graduates and relocating each at the different marine units.
- The acceptance procedures for new cadets.
- The suggestion of marine training trips to the high seas and to neighboring countries.
- To add, revise or delete any one or more of the rules of the internal regulations of the Institute.

The Objectives of Training

The best training methods are to be used in order to catch up on the increasingly developing high technology worldwide in the marine aspects where the vessels used are designed to overcome any difficulties and work in any weather conditions.

Today's marine vessels are equipped with advanced electronic devices and engines of all kinds and with sophisticated control devices that impose the fact that the Institute can not accept any cadets with less of a background than the Junior High School Certificate. This has made it necessary for the Institute to provide them with the necessary training over 1 to 2 years, which is the minimum time required to enable the cadet to take the first step in his respective marine profession.

The Institute provides training courses for the graduate and earning the various military ranks due in each individual case. These training courses include both theoretical and practical courses and include long marine study trips at sea for various periods depending upon the field of specialization for the participants to provide them with the practical experience necessary for them to be able to form new crews for their own vessels and to be able to perform any maintenance jobs required in the marine workshops.

As a matter of fact, the Coast Guard Force has now a number of marine vessels that are used for training, such as the training ship Tabuk.

Good and hard training, added to propel developed educational means will enable the Institute to fulfill the training requirements of the Coast Guard of the Kingdom for the next five years.

The Institute has now the capacity to accept a total of twenty classes at the same time which results in 140 graduates per year.

The Courses at the Institute

4.5.1 Summary of Fields of Specialization

When choosing the field of specialization, it was taken into consideration that these fields of specialization should fulfill the requirements of the Marine Force Units. Also taken into consideration was the necessity to provide the trained individual with the highest possible efficiency to work onboard ships and in the different marine workshops in maintenance and repairing the faults and performing the necessary maintenance to marine vessels and engines etc.

There are 11 different technical courses at the Institute as shown in Table 4.2. This shows the time of study required for each technical course in relation to the academic background of the cadets. The time of study is generally one or two years, during which the cadets go through many stages of theoretical study and then practical training as shown in Figure 4.1 (one-year courses) and Figure 4.2 (two-year courses).

Generally, the courses include:

1. Basic marine skills for all cadets.
2. Technical studies for different periods depending on the field of specialization.
3. Professional studies.
4. Specialization studies.
5. Training field trips between the various harbors depending upon the fields of specialization using the training ship Tabuk.
6. Mathematics, Physics, English Language at different levels.
7. Studies in the maintenance of the marine vessels.

These courses include the following:

e 4.2 - The Technical Courses at the Institute

Course Title	Higher or Vocational School Graduates	Intermediate or Prep. School Graduates
Navigation Tech.	1 year	2 year
Electronics Tech.	1 year	2 year
Electrical Tech.	1 year	2 year
Mechanics Tech.	1 year	2 year
Machine Tech.	-	1 year
Workshop Tech.	-	1 year
Welding Tech.	-	1 year
Deck Tech.	-	1 year
Radio Tech.	-	1 year
Supply Tech.	1 year	-
Diving Tech.	-	1 year

Source: Book of Interior Regulations of the Institute (1989)

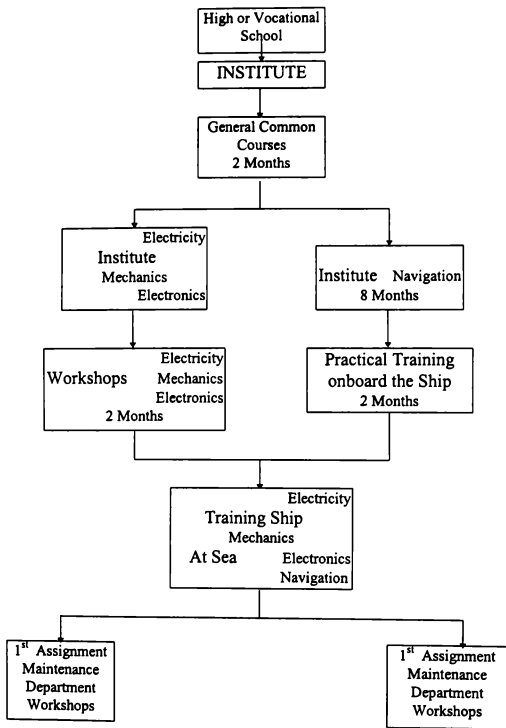


Figure 4.1: Program of one year study for Coast Guard cadets at the Institute

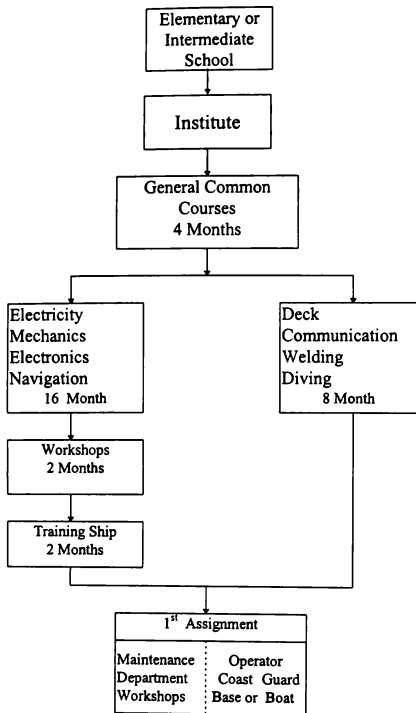


Figure 2: Program of two year study for Coast Guard cadets at the Institute

4.5.2 Advanced Specialization Courses

After graduation from the Institute and working on site for at least two more years, the distinguished officers with practical recommendations are usually invited to new advanced courses in their respective fields of specialization. The details of these courses are determined in due course as per the needs of the Force.

The Importance of the Courses

The technical courses (1-4) in Table 4.2 are essential for any recent marine vessels that can technically be divided mainly into the following four departments:

1. Deck Department (sailing of boats and hovercraft after proper training and deck and nautical work on ships and yachts).
2. Mechanical Department (operating the various engines of vessels, both benzene and diesel, including secondary engines, and performing the required maintenance).
3. Electrical Department (operating and maintaining of electrical generators and engines, electrical distribution boards, batteries and other electrical devices).
4. Nautical and Wireless Department (including operating and maintaining wireless and radar equipment, sonar and other electronic location devices, and any other nautical equipment).

On the other hand, we can say that the courses (5-7) in Table 4.2 are generally technical courses necessary to repair the body and metal of the vessels in the workshop since the nature and circumstances in which these vessels operate increases the risk of accidents taking place (wind factors that cannot be avoided sometimes) in addition to the regular annual maintenance required for these vessels in normal cases.

A Diving Course is for provides the necessary techniques to pick up any drawn items or to search for floating any other sinkable items in the harbor in addition to welding and cutting jobs under water and search and rescue work.

On the other hand, the Deck Technical Course is essential for pilots on all marine ships and boats as well as service boats and other vessels. It is also essential for controllers in the control room. Deck equipment maintenance personnel also make use of this course.

The Radio operator course is necessary for any marine vessels and for any marine center on land to be able to operate radio equipment and use signals onboard ships and marine boats. Participants of the course would also be able to do preliminary maintenance on radio equipment.

The Supply Technical Course, gives the graduates the ability to do all store keeping and delivery of goods at the marine stores as well as doing other office and clerk jobs in the various marine units and ports.

Technical and Professional Courses

Table 4.3 below shows the distribution of hours of study in the different education categories. The education categories include General, Technical and Professional Education, and start only after the Basic Courses are finished.

Table 4.3 - The hours of the Technical and Professional Courses at the Institute

Course Title	General Education Hours	Technical Education Hours	Professional Education Hours	Total Hours of Education
Navigation Tech.	1210	1240	-	2450
Electronics Tech.	1100	1350	-	2450
Mechanics Tech.	1230	1220	-	2450
Electricity Tech.	1100	1350	-	2450
Machine Tech.	440	100	810	1350
Workshop Tech.	440	100	810	1350
Deck Tech.	440	820	-	1260
Radio Tech.	440	820	-	1260
Welding Tech.	440	100	810	1350
Diving Tech.	440	100	810	1350

Source: Book of Interior Regulations of the Institute (1989)

Basic Courses

The teaching hours for Basic Courses are four hundred (400) hours for participants in all courses for 10 weeks, 40 hours/week. They include:

- Marine Skills: 240 hours.
- Military Ceremonial: 60 hours.
- Parade Training: 60 hours.
- Physical Training and Swimming: 40 hours.

The Study Profiles of Technical and Professional Courses

Study at the Institute is divided into 4 subjects: Basic, General and Technical Subjects as well as Sea Training. Table 4.4 below shows the number of hours assigned for each subject, both for one-year and two-year courses.

The total two-year period of study includes:

- Actual study and training trips for 80 weeks.
- Annual vacations or leave for 12 weeks.
- Public holidays for 8 weeks (4 weeks each year).

e 4.4 - Hours of Main Subjects of Study

Main Subject	one-year (hours)	two-year (hours)
Basic Subjects	200	400
General Subjects	440	1210
Technical and Marine Subjects	820	1240
Sea Training	80	160
TOTAL	1540	3010

Source: Book of Interior Regulations of the Institute (1989)

CHAPTER FIVE

ANALYSIS OF RATING'S TRAINING SYSTEMS

Introduction

In Chapter One the shortcomings of the Saudi Coast Guard Maritime Training Institute were mentioned. One of the ways to suggest improvements in overcoming these shortcomings is to compare the SCGMTI rating training system with other training systems where the level of standards is higher. From this comparison we could more clearly see what is done in these countries and what is being done in our country and how we could make changes to achieve what the developed countries have achieved in this field.

One of the main factors to observe in this respect is that ship technology and ship operations have witnessed many changes in the past thirty years. These changes are in connection with developments of high technology in ship control, communications, information technique (IT), etc. These developments demand efficiency of the human-element and therefore it is important for the seafarers to receive efficient training to be able to adjust to the developments of high technology. In other words, the equipment is of a higher standard and more complex nature, therefore the people who are running it should receive training of higher standard.

It many of the maritime accidents the reason contributing to the accident has been singled out as "human error". In order to reduce the "human error", the human factor has to receive proper training in order to efficiently handle the equipment.

The introduction of new technology on board ships, which has resulted in the reduction of manning, has made it necessary for the crew to have much better training than before. The development of reduced manning has introduced dual purpose crews who will be able to work both on deck and in the engine room. This requires a higher standard of training for ratings and for ratings having the same basic training as officers. In many developed countries the training programs have been restructured in order to meet the demands required by introducing new technology.

Below is a brief description of the ratings, training in three developed countries: Australia, Germany and Japan. The following information is acquired through the lectures by Muirhead (1996) and Ishida (1996) at World Maritime University on different MET Systems and also through descriptions and clarifications received during various field trips.

Australian Rating Training

According to Muirhead (1996), the present system of the training of ratings was introduced in the early 1980s by a committee who studied the work of the Australian Maritime College. This system gives high importance to the matter of safety and gives similar training to both ratings and officers in these matters. As a result of this, ratings and officers enter interactions at the beginning of their training.

All Australians who want to start their seafaring careers must successfully complete the Integrated Ratings Course at the Australian Maritime College.

Pre-requisites for entering the Integrated Ratings Course:

1. The minimum level of education is the 10th grade of the high school with acceptable results in Mathematics and the English language.
For cadet officers the minimum level of education is the 12th grade with good marks in science subjects.
2. In the second semester of their studies (20 weeks sea training), the applicants should be able to show their ability to achieve sea-going experience.
3. They must have a sponsor, usually from industry (shipping companies).
4. Certified physical fitness.

The duration of this course is 39 weeks divided into two semesters as follows:

First Semester

- 3 weeks basic training in: Shipboard Safety, Survival at Sea, Fire Fighting and First Aid.
- 16 weeks lecture period for learning Deck or Engine Room skills.

The following is a breakdown of subjects and hours in the first semester:

- Survival at Sea and Personal Safety (43 hours)
- Shipboard Safety and Shipping Industry (56 hours)
- Marine Operations (132 hours)
- Fitting and Machining (132 hours)
- Marine Machinery Systems (120 hours)
- Welding and Thermal Cutting (67 hours)
- Maintenance (30 hours)
- Rigging Technology (38 hours)
- Communications (20 hours)
- Total (638 hours)

Second Semester

- Task and Guided Study (160 hours)
- Total number of lecture hours (798)

After successful completion of the course, total 798 lecture hours, the student will be awarded the following certificates:

1. Certificate of Marine Operations from Australian Maritime College
2. Integrated Rating Certificate from Australian Maritime Safety Authority

Those trainees who finish the course successfully, but do not have necessary basic educational background to qualify as officer trainees, can reach this level after twelve months at sea and obtain a full Integrated Rating Certificate from the Australian Maritime Safety Authority. After receiving this certificate the trainee has two options for further improvement and upgrading of his qualifications:

1. Senior Integrated Rating

To achieve this the candidate is required to have two years service at sea after obtaining the full Integrating Rating Certificate from the Australian Maritime Safety Authority. After this he is eligible to apply to the National Maritime Industry Training Committee for entering the course on Senior Integrated Rating.

This course is a three-week course, one week of which is concentrated on advanced fire fighting.

2. Watch Officer (Navigation or Engine Room)

In order to achieve this the candidate must first enroll for Correspondence Education or Distance Learning. The length of this course is three months at the end of which the candidate will have to sit for a test. If the candidate passes the

test he will go to the next step which is a preparatory course in Deck (for Navigators) and Engine (for Engineers). The duration of this course is six months and the candidate has to sit for an examination at the end of the course. Those who pass the course will be sponsored by the National Maritime Industry Training Committee to take up their studies as Watchkeeping Officer (Deck or Engine Room) at the Australian Maritime College.

German Rating Training

According to Captain Rahn of Hochschule in Bremen (1996), in the early 1980s multi-purpose training was introduced in the German MET system. The result of this program, if successfully completed, was a multi-purpose rating called Ship Mechanic.

The pre-requisite for applying for the "Ship Mechanic" course is to hold one of the following three certificates:

1. Elementary School Certificate, Secondary School Certificate, or Gymnasium School Certificate
2. Connection to a shipping company who will shoulder the cost of the studies during the three years
3. Medical Fitness
4. Minimum age: 15 years

The training period for "Ship Mechanic" is three years during which the student will have a contract with a shipping company. The shipping company pays for all the expenses of the student and also a monthly allowance. For this the student will serve the shipping company during the sea training during. These three years are divided into the following periods:

First Year

1. 10 weeks basic training in:
workshop technology, personal safety and survival at sea, fire fighting, metal work, techniques of watchkeeping (engine room and deck), etc.
2. 43 weeks practical training at sea.

Second Year

1. 10 weeks advanced training in:
workshop technology, personal safety and survival at sea, fire fighting, metal work, techniques of watchkeeping (engine room and deck), etc. with consideration to the knowledge acquired during the time spent at sea. At the end of these ten weeks the student shall have to sit for an examination in personal safety and survival at sea and also in fire fighting. If the result is successful the student will receive a certificate.
2. 43 weeks sea training on board ship.

Third Year

1. 43 weeks sea training on board ship.
2. 10 weeks lecture period for preparation for final examinations. After these ten weeks and after the examination successful students will receive a Ship Mechanic Certificate at the end of the course.

The lecture periods during these three years are divided as follows:

- Personal safety, survival at sea, fire fighting (132 hours)
- Marine Engineering (250 hours)
- Ship Handling (40 hours)
- Machinery (Deck) and Equipment (Cargo Handling) (40 hours)
- **Total number of lecture hours (462)**

After completion of the course the Ship Mechanic has the possibility to achieve the following positions.

1. **Master Ship Mechanic**

(For those who entered Ship Mechanic Course with a Secondary School Certificate)

The Ship Mechanics in this category, after five years of service as Ship Mechanic, can enter the school of Master Ship Mechanic for a twenty-nine week course. Upon the completion of this course they will have to pass the Master Ship Mechanic Certificate exam to become Master Ship Mechanics.

2. **Chief Engineer or Master Certificate**

(For those who entered Ship Mechanic Course with an Elementary School Certificate)

The Ship Mechanics in this category have the possibility to continue their studies at the regular Technical or Nautical College for three years. After successful completion of the three-year study at these colleges they will hold a Chief Engineer (for ships with limited propulsion power) or Master Certificate (for limited tonnage).

3. **Chief Engineer or Master (Foreign Going)**

(For those who entered Ship Mechanic Course with a Gymnasium School Certificate)

The Ship Mechanics in this category can enter the Nautical or Technical colleges for a three-year course to qualify as Master or Chief Engineer (Foreign Going).

4. **Ship Operating Officer (multi-purpose)**

(For those who entered Ship Mechanic Course with a Gymnasium School Certificate)

The Ship Mechanics in this category can enter colleges such as Hamburg Nautical and Technical College, which offers an integrated officer's course. The duration of the course is four years, upon the successful completion of which the student will achieve "Ship Operating Officer" certificate which is multi-purpose ship's officer.

Japanese Rating Training

According to Ishida, K. (1996) the cost saving policy was the main issue when the Japanese Research Committee on Modernization of the Seafarer's System decided to create a training system where the Deck and Engine crew could be trained for the dual purpose job. The objectives of this new training system were:

For the Deck and Engine officers to be able to perform each others duties.

For the ratings to be able to perform part of the officers' duties who work in the same department as they do, which will in the long run result in closer cooperation between these two classes in the same profession.

The research committee decided to run the program for an experimental test and they formulated a guideline called "Hypothetical Image of the Seafarer". This image was divided into two parts:

1. Hypothetical Image of the Seafarer during the transitional process.
2. Hypothetical Image of the Seafarer as the ideal target for the future.

Dual Purpose Crew

The first part, which dealt with the transitional process, required a very careful and complete study of a major change which was about to happen. This change was in the division of work which existed between Deck and Engine Room operators. They had to go through new training and learn the other part's job and after successfully passing the tests they were called Dual Purpose Crew.

This was not only for the ratings but officers too. They were to be trained sufficiently in both capacities and be capable of serving as watch officer interchangeable. During the transition, the dual service experiment was to be tested on lower rank officers and thereafter continued to the higher rank officers.

In the beginning of the 1980s and the beginning of the transitional period the target was to reduce crew to only 18 and to achieve this some equipment was installed on board ships which could replace some crew members. The ships which were equipped with these facilities were called M-ZERO ships. On board M-ZERO ships traditional ratings were replaced by Dual-Purpose Crew and the third officers (navigation and engine room) were replaced by a Watch Officer (WO).

The M-ZERO ship experiment turned out to be quite a success. With the new improvements in the area of marine technology the M-ZERO ships were equipped with more equipment which saved manpower. This was seen as a revolution in the maritime world and therefore the laws were revised to specify standards for installation of modern hi-tech equipment and clarify the assignment of W/O and Dual-Purpose Crew who had new responsibilities in their jobs compared with the traditional crew before them.

With the appearance of the Automatic Radar Plotting Aid (ARPA) the manning of ships was reduced even further. At this point the complete crew for a ship was agreed to be

only 16. At this time a new position was introduced called kW/O. The kW/O was a Dual-Purpose Crew member who had received advanced training in handling the equipment on board ship and could do both his own job and the job of those who were junior to him. The kW/O was equal to a third officer either on the Bridge or in the Engine Room.

For a Dual-Purpose Crew member to become kW/O it was necessary to enter a five-month course at the Marine Technical College. At the end of the course the candidate had to pass an examination for Third Officer (Navigation or Engine Room) and, if successful, he could be granted a certificate as kW/O. This certificate is in accordance with the STCW regulations II/4 and III/4.

Rating Program

The ratings program in Japan aimed at having Dual-Purpose Crew. This was done during the transitional period by re-training the monovalent ratings who became Dual-Purpose Crew and after that Watch Officer and kW/O. After the transitional period was successfully completed and the experiments which were carried out during this period gave good results, the Japanese Administration abolished the monovalent entry into the seafaring career and replaced it with dual-purpose training.

Pre-requisites for entering the ratings course in Japan:

1. Educational Requirements:
Junior High School (9th Grade) for the Regular Course
Senior High School (12th Grade) for the Special Course
2. Pass the entrance test.
3. Physical fitness.
4. Minimum Age: 15-19 years for Regular Course and 18-20 years for Special Course.

As mentioned above the candidates for this new program could be from the two different educational backgrounds as follows:

1. Junior High School (9th Grade) - Regular Course

Those with junior high school certificate who could join any of the six national schools for seamen's training. They have to complete a three-year course.

2. Senior High School (12th Grade) - Special Course

Those with senior high school certificates who could join any of the three or two schools for seamen's training. They have to complete a one-year special course.

Both categories have to serve a month at sea to undergo a series of training which is organized by Institute for Sea Training.

The graduates of both categories after successful completion of their course are awarded the Dual-Purpose Crew Certificate. This certificate is equal to 4th Grade Maritime Officer.

The following is a break-down of the lecture hours and subjects for each of the two courses (regular and special):

No. of Hours	No. of Hours	
<u>Regular Course</u>	<u>Special Course</u>	<u>Subject</u>
1260	----	General Subjects
1575	1044	Technical Subjects
660	216	Practical Training
210	72	Safety
735	285	Sea Training
<u>4440</u>	<u>1545</u>	<u>Total no. Of lecture hours</u>

The person who will qualify at the end of the course as Dual-Purpose Crew will have the possibility to apply for studies at the Marine Technical College. These studies will give him the opportunity to take examinations to obtain the Certificate of Competency for Third Grade Maritime Officer.

Saudi Arabian Rating Training

As mentioned before at the Saudi Coast Guard Maritime Training Institute the majority of the programs have never followed a basic outline determined in the syllabus. These programs are sometimes of a totally different nature to what the Institute is aiming at and therefore of no use to our students.

The situation has now been detected by the Higher Management Council of the Institute and therefore they feel that it is necessary to make changes.

Since 1993, the Higher Management Council has started showing more concern about improving the routines of training at the Institute where more power is given to the

Institute's staff who are able to determine the objectives and to establish internal and external policies at the Institute and to take the necessary decisions. Given the authority by the Higher Management Council the wheels of the management of the Institute were put into motion in all aspects such as leadership, long-term and short-term planning and making decisions for the development of the training process.

The basic and logical concept of the Organization Development at the Institute is to make everyone of the staff of the Institute feel the need for change and to make them ready for it and look forward to see it happen. Thus, only permanent and meaningful changes can take place at the Institute and to achieve this it is important that we improve the quality of the teachers, instructors and staff of the Institute.

It is now decided that all steps of the organizational development should be under the direct supervision of the Institute Manager. This is an important condition for the organization development to be effective. The programs should also be fully supported by the Higher Management Council. This will help us avoid external influences in the Institute and also help us to prevent the changes which are made by staff members in the Institute their personal judgment and opinion without being based on sufficient grounds. In the Saudi Coast Guard Maritime Training Institute the training for each category (navigation and engine room) is handled separately. Following is the situation for each category at present (Source: Book of Interior Regulations of the Institute, 1995):

Admission Requirements

1. Educational Pre-requisites
 - a. High School Certificate (for one-year course trainees)
 - b. Elementary School Certificate (for two year course trainees)

2. Requisites of Acceptance

In order to join the Institute the candidate has to fulfill the following requirements:

Age: between 16 and 24 years old.

Written approval from the parents if the candidate is under 18 years old.

Single

No records of conviction in any crime.

Passing the entrance examination.

Medically fit.

Course structure for the one-year course for those who hold a high-school certificate at the time of entering the Institute:

<u>No. of Hours</u>	<u>Subject</u>
---------------------	----------------

200	Basic Marine Subjects (Deck, Communication, Welding, Diving Engineering, Electricity, Electronic)
400	General Subjects
860	Professional and Technical Subjects
80	Sea Training

1540 **Total number of lecture hours**

Course structure for the two-year course for those who hold an elementary school certificate at the time of entering the Institute:

<u>No. of Hours</u>	<u>Subject</u>
400	Basic Marine Subjects
1100	General Subjects
1350	Professional and Technical Subjects
160	Sea Training
3010	<u>Total number of lecture hours</u>

Comparison of Rating Education in Four Countries

Total teaching hours and subject hours in four countries are shown in Figure 6.1 and Figures 6.2 (a) to 6.2 (f), respectively. The details are discussed as follows:

Brief Comparison of Admission Requirements

	<u>AUS</u>	<u>GER</u>	<u>JAP</u>	<u>SAUDI</u>
Educational Pre-requisite				
- Senior High School Certificate	x	x	x	x
- Junior High School Certificate	x	x	x	x
- Elementary School Certificate	-	x	-	x
	<u>AUS</u>	<u>GER</u>	<u>JAP</u>	<u>SAUDI</u>
Physical Fitness	x	x	x	x
Passing the entrance examination	-	-	x	x
Sea-going ability at the end of 2nd semester	x	-	-	-
<u>Provision of Sponsor</u>	x	x	-	-
Minimum Age	-	x	x	x
Marital status: single	-	-	-	x

Brief Comparison of Teaching Hours/Subject

The comparison is made between the training of Dual-Purpose Crew for Australia, Germany and Japan and Monovalent Crew for Saudi Arabia.

In order to make the comparison brief the subjects covered during training are divided into three main groups as follows:

Maritime Safety Subjects (MSS):

Survival at sea, life support, fire fighting, ship-board safety, etc.

Technical/Professional Subjects (PROF):

Engineering, navigation, seamanship, instruments, meteorology, electricity, electronics, fuel and lubrications, machinery fittings, etc.

Task and Guided Study:

Training on board a training vessel guided by a trainee.

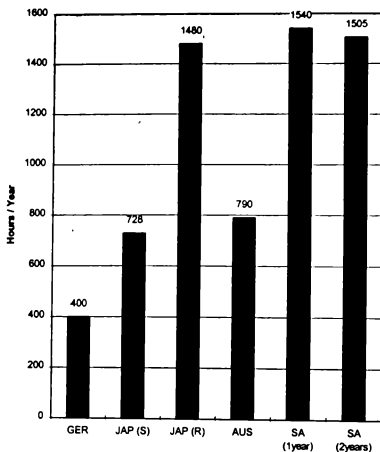
	<u>AUS</u>	<u>GER</u>	<u>JAPR</u>	<u>JAPS</u>	<u>SAU1</u>	<u>SAU2</u>
Safety Subjects	115	132	210	72	400	200
Technical/Professional Subjects	523	290	2230	1260	1450	1060
Task and Guided Study	160	40	735	285	160	80

(These hours indicate the total hours covered in each subject for the completion of the course)

- JAPR =** The candidates who hold a Junior High-School Certificate at the time of entry (9th grade).
- JAPS =** The candidates who hold a Senior High-School Certificate at the time of entry (12th grade).
- SAU1 =** The candidates who hold an Elementary School Certificate at the time of entry.
- SAU2 =** The candidates who hold a High School Certificate at the time of entry.

Figure 6.1 shows the comparison of total teaching hours, JAPR and SAU 1 have more than 2000 hours.

Fig. 6.1 Comparison of Total Teaching Hours utilised by each country



Result of the Comparison

The entry requirements for the four countries are more or less the same. The same age group of candidates are accepted at the ratings schools with similar educational

backgrounds. Even the duration of studies are almost the same.

The main difference between the three developed countries and Saudi Arabia is that these candidates will be trained for a much broader knowledge which can be ideal for the vessels of today. The three developed countries train ratings for multi-purpose service. They combine the nautical subjects and engineering subjects and by this they strengthen the position of the rating.

Since there are a great deal of similarities between the candidates admitted to the three developed countries, and the cadets of Saudi Coast Guard Maritime Training Institute they can have the same programs and train them as Dual-Purpose Crew.

The advantage of the Dual-Purpose Crew member is that he is not a stranger to either of the two environments (engine room and bridge) and can adapt to changing circumstances easily. He can perform both on conventional ships and on high-tech ships.

Without doubt the advancement of shipping technology will make it necessary for the fleet owners to have Dual-Purpose Crew. In the near future there will not be much room left for a monovalent rating.

From the middle of the 1970s the operation of vessels has gone through a substantial reorganization. This reorganization was for the adjustments which were needed to be made as a result of improvements in vessel automation. These improvements started already in the late 1950s and have advanced ever since. The ships are equipped now with all kinds of modern engine room, navigation, cargo handling and telecommunication equipment which does not make it necessary to have a great number of crew members but a few crew members with a great number of skills. An ocean-going vessel in the 1950s would have about 50 crew members on board. Today 16 crew members, working

in a team, is sufficient for such a vessel. They share duties and responsibilities and therefore Dual-Purpose or Multi-Purpose crew members are needed to be able to share each others duties.

The conventional ships are changed by better equipment and advanced technology, therefore the conventional crew needs to adapt to these ship. The way to do this is by dual-purpose or multi-purpose training starting from the ratings level.

Fig. 6.2(a) SUBJECT HOURS - AUSTRALIA

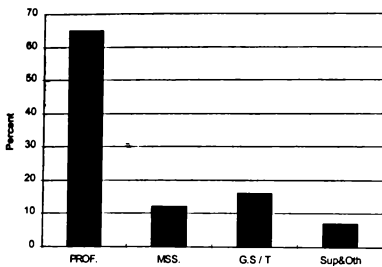


Fig. 6.2(b) SUBJECT HOURS - GERMANY

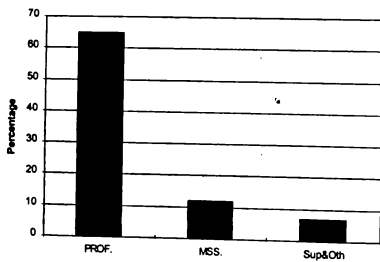


Fig. 6.2(c) SUBJECT HOURS - JAPAN (R)

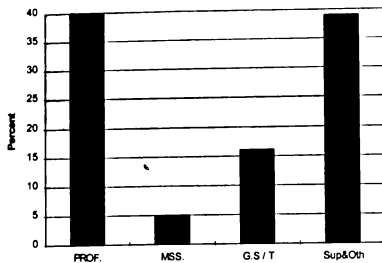


Fig. 6.2(d) SUBJECT HOURS - JAPAN (S)

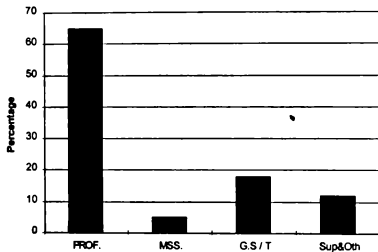


Fig. 6.2(e) SUBJECT HOURS - SAUDI ARABIA (2 years)

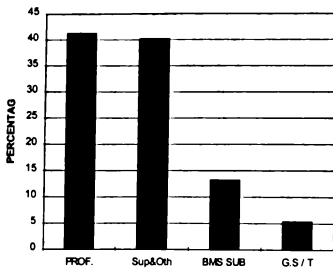
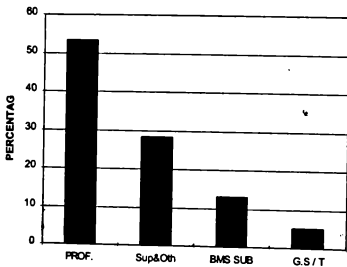


Fig. 6.2(f) SUBJECT HOURS - SAUDI ARABIA (1 year)



CONCLUSIONS

It is obvious that a great deal of progress has been made in the use of modern technology on modern ships. The modern ships with sophisticated equipment have brought conventional navigation and engineering crews closer together because with the new requirements for the job of seafaring they need to share each others duties and responsibilities.

In order to train seafarers who can sail on the ships of today and tomorrow, first the training program at SCGMTI needs to be modified. The basic shortcomings which have to be faced today

Uninvolvement of scientific or academic personnel in the set up of the programs.

Unstable academic programs.

Unstable administration and management.

Insufficient professional staff in the academic core.

Lack of a proper short-term and long-term strategic plans for running the programs.

Insufficient practical experience of the trainers.

Lack of up-dated and appropriate teaching material.

Insufficient national experts.

In order to be able to modify the training program of SCGMTI to solve the above mentioned problems, the following needs to be:

Improve the Personnel: train the trainers better in a way so that they can be up-to-date in what

are teaching. There needs to be refresher courses for them; make them familiar with the hi-tech equipment with which they will be involved when teaching students; encourage them to participate in international seminars and conferences so that they get the opportunity to meet their colleagues and exchange ideas. The employment regulations need to be sharpened up and the standard of the trainers needs to be raised. It is very important to make the selection of trainers with a great deal of care.

Improve the Training Programs: Analysing the training system, objectives and goals. The equipment used by the students also needs to be improved. In this respect the use of advanced technology needs to be introduced.

A new rating training system will also make it necessary for each member of the crew to work as a team. This will result in better coordination and cooperation between ratings and officers. Many countries have already started changing their methodology and adopting new systems to meet the requirements of the industry. For Saudi Arabia it is necessary to introduce a fully integrated dual purpose scheme. In order to achieve this the existing system and modification should be used.

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