

The Importance of the Educational Factor to Assure the Safe and Security on the Sea

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ABSTRACT: Our paper deals with the methods and techniques used in the educational process in the Maritime University of Constanta to develop the practical abilities and principles in applying the operational procedures and the utilization of the specific safe and rescue equipments at sea, by the students and maritime officers. The educational process has an outstanding role in the career of a maritime officer and the problem of the safety and security is essential in order to avoid catastrophes and for saving human lives. The paper presents the implementation, the role and function of the new simulators as part of the teaching process. Quality cannot be obtained without new teaching methods and training procedures, where IT and simulators occupy an outstanding place. These new methods and techniques have been introduced in the Maritime University of Constanta (MUC) step by step, from the multimedia tools to computers with dedicated complex software.

1 INTRODUCTION

Maritime University of Constanta -MUC- has a unique profile in the Romanian higher education, offering its graduates licenses for maritime officer and for engineer too. There are two faculties in the MUC: the Navigation Faculty and the Naval Electromechanical Engineering Faculty.

The University provides additional training for seafarer and ashore personal, many of which are our (MUC) graduates. The MUC provides training and education for students and officer in accordance to the State educational standards, with Maritime Authority requirements and in compliance with the STCW standards.

With the introduction of the International Safety Management (ISM) Code the responsibility of seafarers' competency now also lies with the ship owner. Section 6.5 of the ISM Code states that the ship owner should establish and maintain procedures for assessing competence and identifying any training which may be required in support of the Safety Management System (SMS) and ensure that such training is provided for all personnel concerned.

Over the last decade the world vessel fleets have become highly sophisticated and technically advanced. However, due to human error, disasters still occur. Operational failures a miss-communication can easily cause major accidents or expensive breakdowns with severe economical consequences for a company.

The new challenge for shipping companies, maritime college and training centers will be to find tools for such training and evaluation.

Once the educational system registered a reform, due to the major impact of the technical revolution during the last twenty years, the teaching methods had to undergo major changes.

The faculties provides by the latest achievements of the information technology, not only as regards computing speed and storing capacity, but also, and especially through the unprecedented development of software packages, which offer the possibility of commissioning such resources, imposed themselves in the last years as an essential and outstanding support in the educational process. The new approaches of the training methods include the following: improved links between on-the-job and off-the-jobs activities; self-learning and distance learning training packages (computer, video and audio teaching aids); trainer training; modular training; simulator training.

The main objectives of the new approach for educational methods and techniques are as follows: to make a knowledge transfer from the traditional support; to organize the inter-active data bases for storing, updating and transfer of knowledge to the trainees; to develop some protection, supervising and administration systems for the access to such data bases; to implement the intranet and internet access information systems.

One of principal goal of our maritime educational process is to allow, key problems of fleet such as safe navigation and safety of life at sea. MUC developed a number of educational and training programs for maritime specialists and other personal engaged in use and maintenance of the equipment for safety of navigation.

In this paper, we present some of the main methods and techniques applied in MUC for the continuous training and improvement of officers.

2 TRAINING PROCESS IN MARITIME UNIVERSITY OF CONSTANTA

In the last decade, the educational system in MUC has suffered major transformation, which caused an essential progress in learning and training process. The training process was developed by different periods:

- 1990-1994 – practice training in the university's technical labs (Radiolocation, Electrical navigation equipment, Electrical engines, Internal combustion engines, Naval mechanical, Hydraulically, cooling system, Fluid Mechanics and hydraulic Machines, Naval steams generators and student training on the Neptun school ship;
- 1994-2000 – theoretical training and evaluation control using a network computers and multimedia tools. E-learning is used both in the theoretical and practical process for different purposes: testing, evaluation, self-evaluation, creating virtual laboratories, simulations. Specialized software are used by students according to the different specialties (electro technical, mechanical, navigation). Soft wares for controlling and auto controlling students; knowledge have been done for different moments: initial tests, daily tests, final evaluation tests. Using different tests in different moments of the educational process, this can afford the continuous improvement of students' training level. Audio-video methods, simulation, computer animation proved to be extremely attractive for our students, with good results as both their technical and practical knowledge.

These methods determined the students to be more active using the Internet, for growing their scientific and professional information and in finishing their license.

E-learning is used in MUC for on-line courses, masters' courses and for obtaining the officers' maritime license.

From 2001, it has been applied computer knowledge testing for obtaining the officers' III license.

2004 – future – using the simulator for training and evaluation control. This new choice is the perfect solution for achieving the perfect simulation on board: regarding operating ships, maritime equipments, practicing procedures established by ISM, the main plants and malfunctions by plants and machines.

This paper will be presented the types of controlling tests, also the procedure of testing and evaluation of the graduates.

3 THE SIMULATORS, MEANS OF IMPROVEMENT THE EDUCATIONAL EFFICIENCY FOR SAFE NAVIGATION SAFETY ON THE SEA

Simulator training has over the last years proved to be an effective training method when training engineers, especially where an error of judgment can endanger life, environments and property. A dynamic real-time computerized simulator can, when it comes to certain situations, compress years of experience, into a few weeks and give competence to handle these situations and know ledge of the dynamic and interactive processes typical for a real engine room.

Proper simulator training will reduce accidents; will prevent the maritime disaster and marine pollution too, besides its educational training seamanship in navigation and maneuvering. The simulators improve efficiency, and give the engineers the necessary experience and confidence in their job-situation.

Starting with 2002 year, MUC installed and put in operation three Kongsberg Norcontrol simulators: GMDSS and SAR simulator, Engine room simulator and Navigation simulator. The MUC installed these simulators to organize practical training for its students and graduates, for ship and shore users, as well as for system service engineering training. Simulators, used for the practical training, proved to be the perfect solution to create appropriate conditions similar to the real situation on board ship- regarding operating ships, maritime equipments, practicing procedures established by the International Safety and Rescue Rules.

The use on ship the GMDSS equipment widened its possibilities for safety purposes. The GMDSS simulator includes one GMDSS console equipped with different GMDSS replica instruments.

The equipment of a console consists of the following components:

Radiotelephone VHF simplex/duplex/semi duplex channel

Radiotelephone SSB MF and HF

DSC Controller and receiver MF and HF

Navtex

Inmarsat C complete

Radio telex (NBDP)

EPIRB and Sart

All the ship's GMDSS/SAR radio equipment, SART (Search and Rescue Transponder), EPIRB (Emergency Position Indicating Radio Beacon), Radar display, Navtex, Communication systems (VHF, DSC, NBDP) are graphically simulated on the student PC station.

The GMDSS and SAR simulator is used both, by the students of Navigation Faculty and those of Naval Electromechanically, but with different targets in accordance with their competences on the ship board.

The GMDSS and SAR simulator consists now of a main instructor station and four student stations and it is to be fitted with two more students stations this year. The simulator includes all radio communication equipments for sea area A1 to A4 in accordance with international regulations IMO/SOLAS/GMDSS. The instructor station is connected to the student stations by a computer network. The simulator provides a training interactive package combining computer-based training with PC simulation. The instructor has the possibility of creating a lot of exercises and modifying different parameters, such as: sea area, types of equipment, ship's geographical position, heading and speed, identification number and name, etc. By means of computer the instructor can configure all the instruments which are available to the student for each SAR-mission exercise.

All the ship's GMDSS/SAR radio equipment, SART (Search and Rescue Transponder), EPIRB (Emergency Position Indicating Radio Beacon), Radar display, NAVTEX communication systems (VHF, DSC, NBDP) are graphically simulated on the student PC station.

In Maritime University of Constanta exists a KONGSBERG NORCONTROL ERS-MC 90-III engine room simulator which has:

- 1 instructor station;
- 2 control room equipment;
- 3 engine room equipment;
- 4 internal telephone;
- 5 synthesized sound system;
- 6 documentation;
- 7 installation start-up;
- 8 training.

The concept of training and evaluation control (TEC) is an instructor system which gives the instructor/student a tool for an efficient handling of the training and evaluation of the predefined task and

the student an easy operated system. This system is build up of scenarios and all scenarios can be edited and changed on-line, while the simulator is running, or created off-line. The on-line facility is normally used during a session, when the training progress has to be justified. The students run their training from TEC in the operator mode.

In the following pictures, Figures 1-3, are presented the solution of our engine room simulator:



Figure 1. Engine Control Room

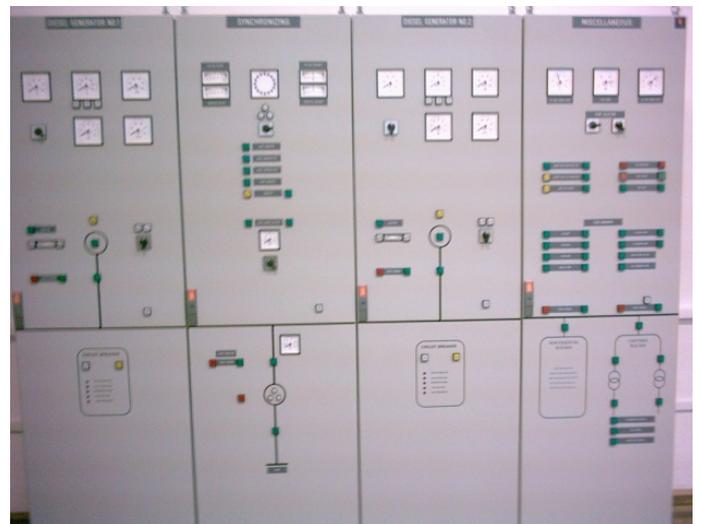


Figure 2. Main Switchboard



Figure 3. Local Control Room with 4 Local Operating Stations (LOS)

For the training of students of Navigation Faculty was installed a Transas simulator. The Transas full mission bridge configuration consists of the entire spectrum of navigational controls to be expected on a bridge, including radar displays, ECDIS, vessel controls and navigational sensors, all of which are build into consoles. All related visual and sound effects are also incorporated into the simulator to create a realistic, professional simulated environment. Main components of the Full Mission bridge simulator include Conning station, ECDIS display, NavAids and Instrumentation display, Bearing/CCTV/2nd Conning station, Visual channel(s), Real ship controls, Mathematical model, Databases. It will be exemplified the exercises created by the instructors and the mood of evaluation for each type of simulator

4 CONCLUSIONS

Various simulators and simulations software together with other hands-on training including labs training ship have played an important role in providing and assessing the skills that the students need to acquire. MUC developed a number of educational and

training programs for maritime specialists and other personnel engaged in use and maintenance of the equipment for safety of navigation.

Simulators are powerful means in the maritime educational systems as they developed multipurpose skills. They render students the possibility to know the processes in their dynamics and interaction, facilitate an easy and fast understanding of the basic theoretical notions, which can be demonstrated by using programs that initiate different drills that simulate real on-board situations.

As a result of introducing these modern technologies in maritime education, the results are positive and stimulative for pursuing this activity. The students are guided towards independent study and to self evaluation. These methods make learning and training more effective and attractive, and have increased the student's interest in attending the courses, laboratories and simulators. The use of simulators has proved to be not only a modern and fast method of learning and developing practical skills for the future maritime officers, but also very profitable from the economic point of view.

Maritime University of Constanta, and implicitly the Engine Room Simulator, drew and got accredited from the Naval Authority Romania for the courses Engine Team and Resource Management and Bridge Team and Resource Management, courses directed to all the students and maritime officers.

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