

40 Years of Experience in Educating Marine Engineers in Dubrovnik, Croatia

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Abstract: This paper reviews higher education of the seafarers in Dubrovnik during the period from 1959 till 1999. A short historic analysis of marine educational development is presented till the year 1959. Specifics of seafarer education in the Republic of Croatia are specially pointed out because of Croatian typical industrial, transport and academic orientation to the sea. All graduate programs are in compliance with standards proposed by the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) and additionally extended with other courses from the field of marine transportation. With such programs graduated students get knowledge and skills for sea oriented jobs and obtain their Associate in Science or Bachelor of Science degree. Actual departments for education of seafarers at the Polytechnic of Dubrovnik are: Department of Nautical, Department of Mechanical Engineering and Department of Electrical Engineering and Computing. All programs are constantly improving and adopting new technologies and relevant STCW proposals. Review of actual programs compared with STCW requirements is presented in the paper.

Keywords: Marine Engineer, Dubrovnik, STCW Convention

1. Introduction

The beginnings of academic education and scientific research in Dubrovnik go far in the past. This especially relates to the fields of marine, social and natural sciences. For example, as early as 1458, Beno Kotruljevic from Dubrovnik wrote four books entitled "On Trade and on Being Perfect Tradesman", published in Venice in 1573, which represents the first work ever written on this subject. Nikola Sorgojevic, also a citizen of the former the Republic of Dubrovnik (Republica Ragusii, 1358– 1816), was the first Croat to have written a book about navigation, published in 1574. The Jesuits founded "Collegium Rhagusinum" in 1624, and the Senate of the Republic of Dubrovnik proclaimed it to be the first public institution of academic education in 1654, in which philosophy and natural sciences were taught. The most famous of all Croatian scientists, and the founder of the dynamic theory of the atom, Rugjer Boskovic was also educated there. In the year 1793, the Senate of the Republic of Dubrovnik allowed young noblemen studies in navigation and trade, and practice of these skills in out-Adriatic sail.

Even since then higher education in Dubrovnik passed through different phases, up's and down's, but wanting and persistence in keeping the City's identity in that field remained. This claim is supported by a long tradition of the maritime scientific periodical "Nase more", founded in 1919, published by the Polytechnic of Dubrovnik.

The Polytechnic of Dubrovnik – Collegium Ragusinum was founded by a decree of the Government of the Republic of Croatia on the 12th of December 1996. It was founded on the tradition of higher education of seafarers in Dubrovnik, that started in 1959, when the College of Maritime Studies was founded. That institution grew into the Maritime Faculty of Dubrovnik in 1984, which was a part of the University of Split. When the Parliament of the Republic of Croatia proclaimed the new Higher Education Institutions Law in 1994, two separate directions in higher education were created. First was the scientific and applied to universities, and the second was specialized and applied to colleges. By then the Maritime Faculty of Dubrovnik recognized all the advantages of specialized studies, which brought completely new elements of west-European education into Croatian academic education system, and so the actions for the founding of the Polytechnic of Dubrovnik were made. Even though the process was not smooth, nor fast, in two years the Polytechnic was founded as the first public institution of such kind in the Republic of Croatia.

2. The Polytechnic of Dubrovnik – Collegium Ragusinum

The Polytechnic of Dubrovnik is located in a residential area of Dubrovnik overlooking the harbour, close to local sailing and rowing clubs. The Polytechnic of Dubrovnik shares its playground and gym with the Maritime High School situated next door. It is situated in a new building of approximately 3,500 sq.m., with an extension under construction, which will approximately double the available capacity. The current spaces include an auditorium with a capacity of 175 students, a large number of lecture rooms of 50 or 25 student capacity, several purpose-built laboratories, a library, a meeting room, office spaces for management, lecturers and operational staff, a student coffee bar and service rooms.

The teaching aids include a navigation simulator, a communication simulator and a real radio station, an engine room simulator, electrotechnical laboratory equipment, close to 200 personal computers in five large computer laboratories, multimedia projectors, overhead projectors, network equipment for access to Internet via the Croatian Academic and Research Network (CARNet), and complete sets of aids for approved STCW training programs. A research and training ship now under reconstruction is due to enter operation under the Polytechnic of Dubrovnik management in summer 2000.

The Polytechnic of Dubrovnik is partly financed from subsidies from the Croatian Ministry of Science and Technology and partly from its own income. 60 lecturers currently participate in educational activities in the four Departments: Nautical, Mechanical Engineering, Electrical Engineering and Computing, and Tourism. Two thirds of lecturers are directly employed by the Polytechnic. Around 20 lecturers have Doctor's and Master's degrees.

In the 1999/2000 academic year there is a total of 1530 students enrolled in all programs and all years of study. 120 students graduated in the last academic year. Currently an average of 120 candidates complete one of the 37 approved STCW training courses every month. All students are members of the Student Organisation, and elect their representatives into the governing bodies of the Polytechnic of Dubrovnik. They organise and actively participate in different sports and cultural events, and publish a student magazine.

The Polytechnic of Dubrovnik is organised on the department principle, with programs, as the lowest statutory elements, by the scheme given on the figure 1. Besides the maritime educational programs there are several non-maritime programs, but all somehow connected with the sea. Maritime educational programs are organised on modular principle (1st grade and 2nd grade). After completion of the 1st grade programs (two years), students can obtain their Associate in Science Diploma – A.Sc. Marine Engineer (or Higher National Diploma) in nautical, marine engineering or ship electrical engineering and electronics. Certifications are given by the maritime authorities of the Republic of Croatia, and are valid in the whole world. After completion of the 2nd grade programs (four years) students obtain their Bachelor of Science – B.Sc. Marine Engineer in nautical, marine engineering or ship management.

2.1 Nautical Program

Completion of this program enables the student to acquire the following knowledge and skills: navigation, ship maneuvering, handling and transport of cargo, ship crew management, ship systems management, ship systems maintenance, maritime law, meteorology, oceanology, economics and cost effective running of a ship. This program provides education for officers, and Masters on merchant ships.

It is a four-year program with an additional option that enables students to graduate after the first two years, which is, according to national and international regulations enough for complete professional maritime career. Completed four-year program allows the student, beside the ship's officer career, employment in head positions in shipping companies, port offices, naval agencies, coast guard and harbor management.

2.2 Ship Management Program

Students who have completed one of two-year maritime programs can continue their studies in Ship Management. This program enables the student to acquire knowledge and skills in the following areas: marketing in the shipping business and ports, financial and strategic management, economics, finance, shipping markets, ergonomics, maritime law, ethics in the market, and the history of the shipping industry.

2.3 Marine Engineering Program

Students in this program are taught the following knowledge and skills: operation and maintenance of a ship's propulsion system and auxiliary machinery systems, mechanics, material resistance, thermodynamics, marine diesel engines, turbines and steam generators, electrical systems, cooling systems, automation of the propulsion system, maintenance, resistance and propulsion. The program is aimed at the education of future engineering officers as well as future Chief Engineers.

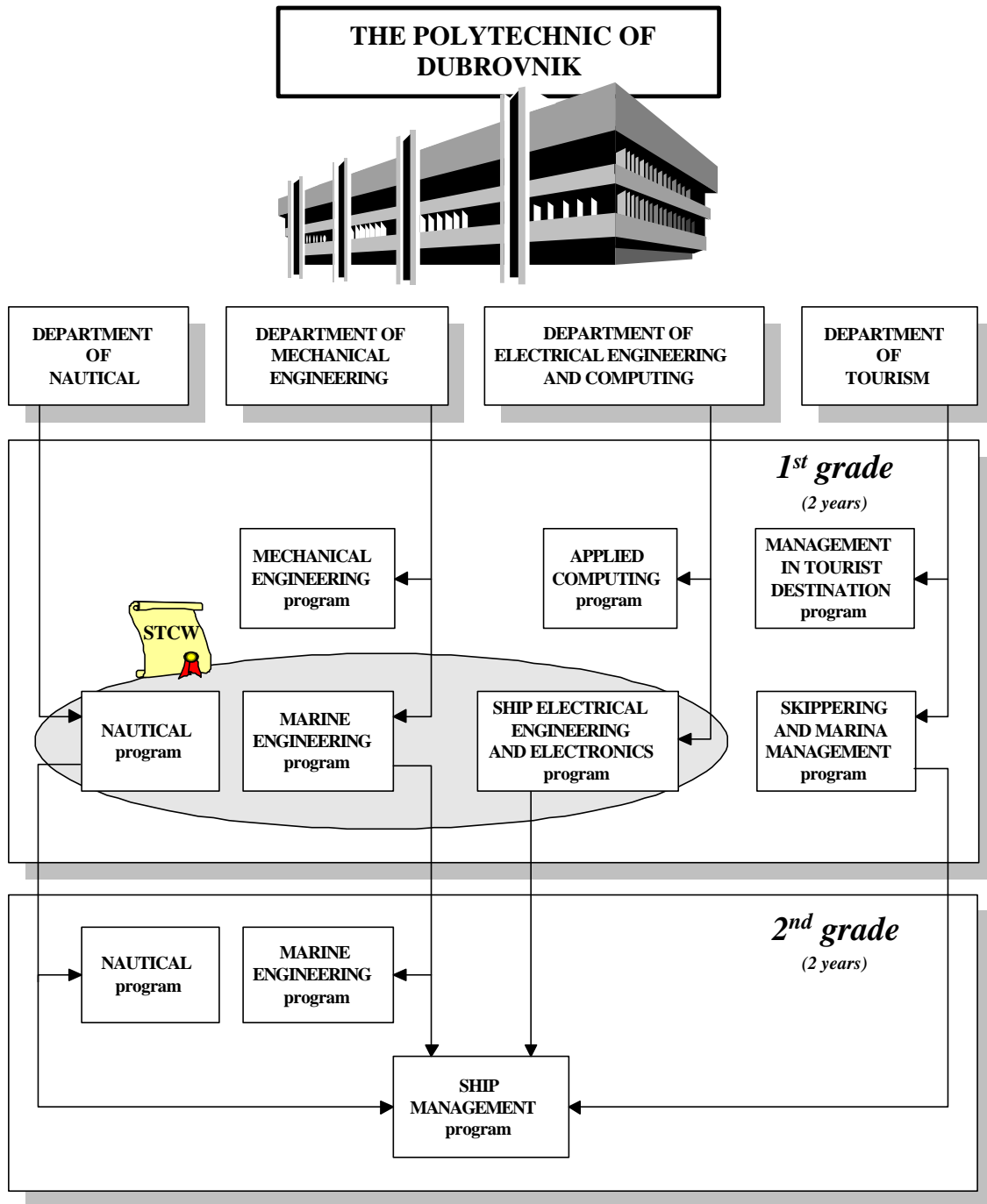


Fig. 1. Departments and Programs at the Polytechnic of Dubrovnik

This is a four-year program with an option of graduation after the first two years, which is, according to national and international regulations, enough for complete professional maritime career. Completed four-year program allows the student, beside the ship's officer career in merchant navy, employment in positions in shipping companies, port offices, naval agencies, coast guard and harbor management.

2.4 Mechanical Engineering Program

Completion of this program will provide the students with the following knowledge and skills: mechanical engineering combined with electrical engineering, computers, and modern management of small companies. Special focus is placed on the application of skills practiced in the environment of small production. This program lasts for three years. After its completion the title of A.Sc. Mechanical Engineer is given.

2.5 Ship Electrical Engineering and Electronics Program

Students in this program acquire the following knowledge and skills: operation and maintenance of the ship's electrical and electronic systems, marine radio communications, mechanics, electrical engineering, automation, radio and telecommunication systems, receiving and transmitting techniques and other. The program lasts for two years.

2.6 Applied Computing Program

The Applied Computing Program at the Polytechnic of Dubrovnik provides students with skills and knowledge in the everyday usage of computers in business. The students learn about the basics of network topology, computer systems, computer networking and databases. All skills learned are applied in the creation of computer programs. This program lasts for three years. After completion of the program the title of A.Sc. Computing Engineer is given.

2.7 Skippering and Marina Management Program

This program enables the students to acquire knowledge and skills in the following areas: commercial and technical management of marinas and small ships, including nautical tourism, construction of yachts, design and maintenance, sailing, communicating, accounting, finance, marina management, maritime regulations and insurance. This program is meant for those students who wish to pursue maritime careers not too far away from shore. Program is taught in two years. After completion of this program, the title of A.Sc Nautical Tourism Engineer is given.

2.8 Management in Tourist Destination Program

This two-year program enables the students to acquire the following knowledge and skills: business mathematics and statistics, accounting, the organization of reception in tourism, tourism economics, marketing, management, sociology etc. This program is meant for the education of students who will be performing jobs in tourism such as: head receptionist, organizer of various programs in tourism and managers of middle rank in travel agencies and hotels. After completion of this program the title of A.Sc. Tourism Economist is given.

2.9 International Programs

The Polytechnic of Dubrovnik and Rochester Institute of Technology, Rochester, NY, USA jointly founded the American College of Management and Technology (ACMT) in 1997. ACMT, which grants diplomas that are equally recognized in Croatia and in the USA, became the first private international institution of academic education in the Republic of Croatia. Currently, the Polytechnic is preparing a new professional program in the field of aquaculture, which is the result of cooperation between the Institute of Oceanography and Fisheries, Split – Dubrovnik, and Intechmer, Cherbourg, France.

3. Maritime Educational Programs

The Polytechnic of Dubrovnik follows a 40-year-long tradition in college level maritime education in Dubrovnik. The maritime educational programs are designed as continuation of 4-year maritime education at high school level, but also include differential programs for students coming from high schools other than maritime. The programs are continuously being adapted to meet national and international standards and customer requirements.

Today the roof organization that is creating international maritime rules and regulations is the International Maritime Organization (IMO) with the head office in London. One of the most important IMO Conventions is the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW) from 1978. World-wide standardization of such items contributed in more efficient training, uniform certification and safer seafaring. Modifications of the convention from 1995 and 1997 were other steps forward in globalization and easier implementation of the proposed requirements. The final goals of STCW proposals are increase of safety and prevention of the pollution from the ships. Modification from 1995 opened a completely new page in IMO history because for the first time they were allowed to control the implementation of STCW. As a result of such controls in the year 2000 *IMO White List* will be created (list of the countries which are fully in compliance with STCW

requirements). Further more, after 2002 seafarers without valid certificates will not be allowed to sail on the ships and such ships will be stopped in the ports. All of the maritime educational programs at the Polytechnic of Dubrovnik (table 1.) fully comply, and in the most cases greatly exceed, the requirements of the 1995 STCW Convention.

Table 1. Actual Maritime Educational Programs at the Polytechnic of Dubrovnik

Department	Program	Description	STCW 95 References	Duration (years)
Nautical	Nautical	Modular program for Master and deck department at the operational and management level	A-II/1, A-II/2	2 + 2
	Ship Management	Program for managers in shipping, as a 2-year continuation after completion of another maritime 2-year program	N/A	(2) + 2
Mechanical Engineering	Marine Engineering	Modular program for Chief Engineer and engine department at the operational and management level	A-III/1, A-III/2	2 + 2
Electrical Engineering and Computing	Ship Electrical Engineering and Electronics	Program for electrotechnical officer including requirements for radio personnel	A-IV/1	2

4. Quality Management System at the Polytechnic of Dubrovnik – ISO 9002

Polytechnic of Dubrovnik started the 1999/2000 academic year with valid certificates of compliance with ISO 9002 quality standards, approved by Bureau Veritas Quality International (BVQI) and Croatian Register of Shipping (CRS).

Quality system at the Polytechnic of Dubrovnik is the first of a that kind in higher education in Croatia, making us the **FIRST**. Quality system is a system that lives and ensures constant work enhancement, always allowing us to be **BETTER**. It is the only way in which the Polytechnic of Dubrovnik will be able to prove the correctness of the quality politics quote:

SEMPER PRIMUS, SEMPER MELIOR (ALWAYS FIRST, ALWAYS BETTER).

5. Conclusions

Dubrovnik's ancient orientation to the sea and seafaring had as a result early founding of public institutions of academic education. These traditions are the foundation of seafarers higher education in Dubrovnik that began with the founding of the College of Maritime Studies in 1959. Positive experiences, as well as the compliance with national and international regulations resulted modifications in the education system, which is now carried out on the Polytechnic of Dubrovnik – Collegium Ragusinum. Even though it has no "maritime" in its name, most of the programs are directed to seafarers education. All these programs fully comply, and in the most greatly exceed, the requirements of the STCW Convention. They allow acquisition of knowledge and skills needed for performing all jobs aboard ship at the operational and management level, as well as Master and Chief Engineer. Besides that, they allow ship officers the same possibilities for applying for jobs on land by gaining A.Sc. and B.Sc. titles.

6. References

- [1] International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended in 1995 (STCW Convention), International Maritime Organization, London, 1996.
- [2] Proceedings "40 Years of Seafarers Higher Educating in Dubrovnik", the Polytechnic of Dubrovnik, Dubrovnik, 2000, (in Croatian).
- [3] The Polytechnic of Dubrovnik Annual for 1998/1999 Academic Year, the Polytechnic of Dubrovnik, Dubrovnik, 1999, (in Croatian).