

Some Experiences of Specialists in Maritime Transport Education at SUAI (Russia) and the University of Dubrovnik (Croatia)

Neka iskustva u obrazovanju specijalista za pomorski prijevoz na SUAI, (Rusija) i Sveučilištu u Dubrovniku (Hrvatska)

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Summary

Transport sector is traditionally globally oriented, so education is necessarily connected with standardization. The importance of experience exchange between education centers and schools is obvious. More and more skills that are necessary for specialist in transport sector are connected with logistics and ICT. The most effective approach is that one in which the education is governed by simulators and especially educated instructors with great experience from real sector. In this paper, we have presented some experiences from Saint-Petersburg State University of Aerospace Instrumentation (SUAI) in Russia and Maritime Department from The University of Dubrovnik in Croatia.

KEY WORDS

education in transport sector
maritime education and courses
STCW Convention
IMO Model Courses

Sažetak

Sektor transporta tradicionalno je globalan, zbog toga su u procesu obrazovanja kadrova nužno potrebni standardi. Također je važna izmjena iskustava iz pojedinih edukacijskih središta/ustanova/škola. U školovanju prometnih specijalista sve više dolaze do izražaja vještine u logistici i ICT-u. Najučinkovitiji način školovanja je pomoću suvremenih simulatora, a uz nadzor posebno školovanih instruktora koji posjeduju veliko iskustvo u realnom gospodarstvu. U ovom članku prezentiraju se neka iskustva s Državnog sveučilišta za svemirsku instrumentaciju (SUAI) iz Rusije i Pomorskog odjela sa Sveučilišta u Dubrovniku iz Hrvatske.

KLJUČNE RIJEČI

obrazovanje u prometnom sektoru
obrazovanje i izobrazba za pomorstvo
STCW konvencija
IMO model tečaja

INTRODUCTION / Uvod

Today in education we have to introduce international standards, especially if we want to distribute our students to different places around the world. In transport sector, an international approach in education is the must. Some fields of transportation are traditionally globally oriented, especially in airline industry, maritime trading, truck freight forwarding, transcontinental railways and bus cruising, etc. But personal transport aid as vehicles (cars, motorbike, bicycles etc.) are more and more popular in mobility on long distances, crossing

the state borders. So, education at management level for the specialist in transport sector has to be tailored in that way. In this article we want to show that some standards for education are here, so we have to improve teaching aids and skills of teaching personnel (stuff) only. In that sense, we have to exchange teaching aids and our experiences using them, to stimulate mobility of our teaching personnel, participate in consortia for teaching aids (simulator) building etc.

EXAMPLES IN EDUCATION OF SPECIALIST OF TRANSPORT SECTOR AT SAINT-PETERSBURG STATE UNIVERSITY OF AEROSPACE INSTRUMENTATION (SUAI) / *Primjeri iz obrazovanja specijalista u sektoru prijevoza na državnom aeronautičkom Sveučilištu u Sankt Petersburgu*

To improve the organization and content of learning process in terms of the standard of the third generation in the direction of training, "Technology of transport processes" (190700.62) [1] at the Department of Systems Analysis and Logistics Saint-Petersburg State University of Aerospace Instrumentation, it was implemented a system approach to the training than the training of engineers in special field "Organization and Management in Transport". More important is the professional preparation of the future graduate training at his laboratory, workshops and lessons learned on field trips and internships. The system training graduate is impossible without interaction with the transport industry (airport, port, railway, city infrastructure), as they help to us to identify the most important topics. In addition, students should have the skills to work with a wide range of professional information used in logistics. The system approach allows the provision of information divided into subsystems, which will be presented from the bottom up in the learning process, so the student will study initially small logistics subsystem that can solve some logistical problems at the level of Bachelor's degree, after that at Master's degree, the student began working with the global logistics information systems.

Separately, it must be said about the complex implementation of an information program as teaching knowledge (interactive content), special skills training simulators and simulations of transport processes (depending on the type of transport) that could control and analysis different logistics situation (software calculation of tariffs, documents and so on.). Particular attention is paid to the preparation of the expert simulation of transport processes. To solve these problems in the department delivered courses such as "simulation of transport processes" "the technology of virtual simulators transport processes" and several others. In the process of learning during summer practices and student internships the students could be

acquainted with each transport separately and gain experience solving transport problems. Upon the completion of training, the student chooses the location of the transportation system on which it will be the most effective way to work. Data information management implementation approach shows good results in training students of the Department of Systems Analysis and Logistics SUAI.

EXAMPLES IN EDUCATION OF SPECIALIST OF TRANSPORT SECTOR AT UNIVERSITY OF DUBROVNIK / *Primjeri vještina specijalista u prijevoznom sektoru na Sveučilištu u Dubrovniku*

In the education of specialists in maritime transport sector at management level we differentiate education for "master" and "chief mate" and for "chief engineer and "second engineer". Recently, from 2010., we have education for "Electro-Technical Officer (ETO)"; see fig 3. Such education for all degrees has been realized on Bachelor Degree at the University of Dubrovnik. All study programs has to be in compliance with Model Courses 7.01, 7.02 and 7.08 written by IMO (International Maritime Organization). These model courses aim to meet the mandatory minimum requirements for knowledge, understanding and proficiency of STCW 2010 (Standards of Training, Certification and Watch keeping) Also, IMO has produced a booklet entitled "Guidance on the implementation of IMO model courses", which deals with this aspect in greater detail. In certain cases, the requirements for some or all of the training in a subject are covered by another IMO model course. In these cases, the specific part of the STCW Code which applies is given and the user is referred to the other model course.

For the courses to run smoothly and to be effective, considerable attention must be paid to the availability and use of:

- Properly qualified instructors
- Support staff
- Rooms and other spaces
- Equipment
- Suggested references, textbooks, technical papers, bibliography
- Other reference material.

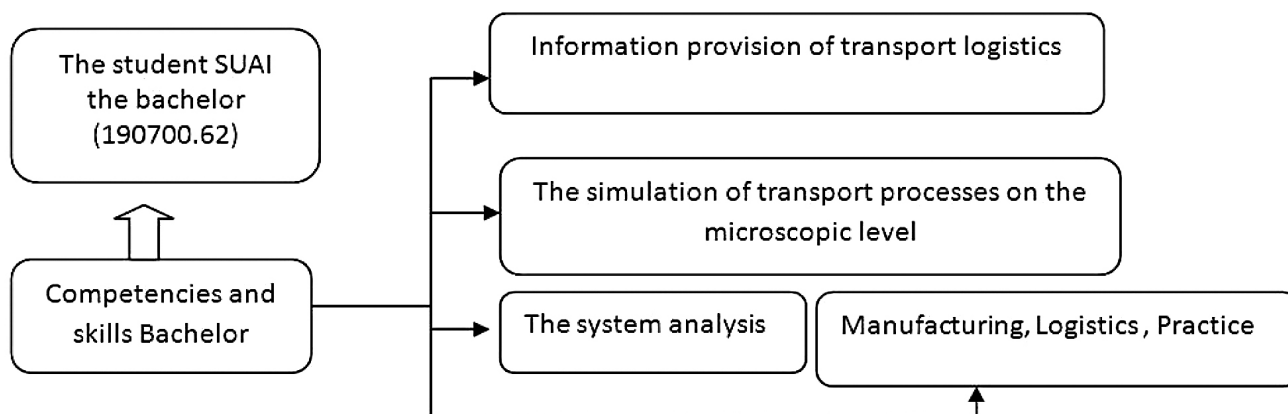


Figure 1 The Skills of the Bachelor
Slika 1. Vještine prvostupnika

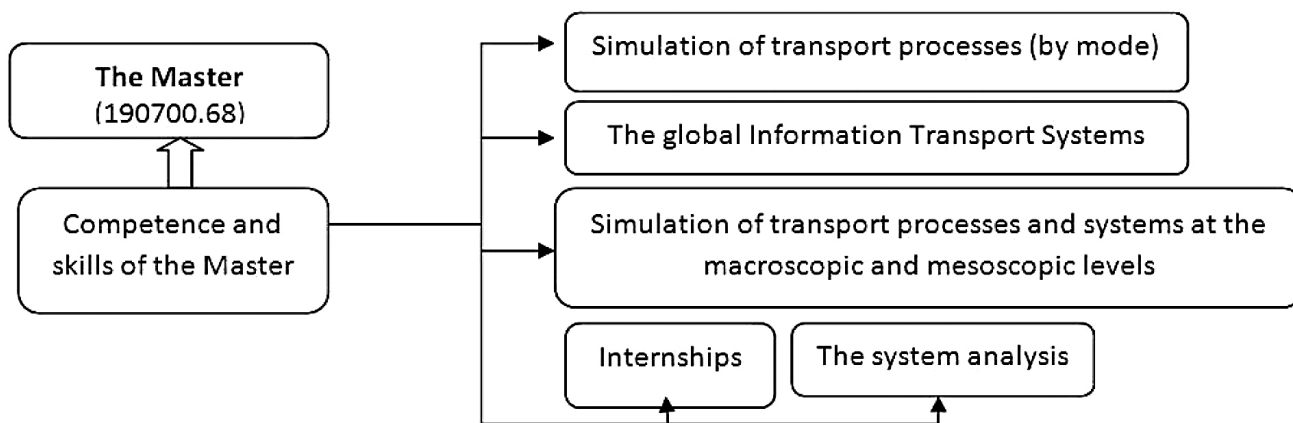


Figure 2 The Skills of the Master
Slika 2. Vještine magistra struke

The purpose of the IMO model courses is to assist maritime training institutes and their teaching staff in organizing and introducing new training courses, or in enhancing, updating or supplementing existing training material where the quality and effectiveness of the training courses may thereby be improved. The educational systems and the cultural backgrounds of trainees in maritime subjects vary significantly from country to country. For this reason the model course material has been designed to identify the basic entry requirements and trainee target group for each course in universally applicable terms, and to specify clearly the technical content and levels of knowledge and skill necessary to meet the technical intent of IMO conventions and related recommendations. The information contained in this document has been validated by the Sub-Committee on Standards of Training and Watch keeping for use by technical advisers, consultants and experts for the training and certification of seafarers so that the minimum standards implemented may be as uniform as possible.

Here we show an example of model course 7.01 for Master Mariner and Chief Mate. This model course aims to meet the mandatory minimum requirements for knowledge, understanding and proficiency in Table A-II/2 of STCW 2010 for the function Navigation at the Management Level (Function 1), for the function Cargo Handling and Stowage at the Management Level (Function 2) and the background knowledge to support Controlling the Operation of the Ship and Care for Persons on Board at the Management Level (Function 3).

The syllabus for Function 1, covers the requirements of the 2010 STCW Convention Chapter II, Section A-II/2. This functional element provides the detailed knowledge to support the training outcomes related to the Navigation at the Management Level. This section provides the background knowledge to support the tasks, duties and responsibilities in:

- planning a voyage and conducting navigation
- determining position and the accuracy of resultant position fix by any means
- determining and allowing for compass errors
- coordinating search and rescue operations
- establishing watch keeping arrangements and procedures

- maintaining safe navigation through information from navigation equipment and systems to assist command decision-making
- maintaining the safety of navigation through the use of ECDIS and associated navigation systems to assist command decision making
- forecasting weather and oceanographic
- response to navigational emergencies
- manoeuvring and handling a ship in all conditions
- operation of remote controls of propulsion plant and engineering systems and services. At the Maritime Department of The University of Dubrovnik, Polaris Ship Bridge Simulator produced by Norwegian company Kongsberg was installed in 2011. Polaris has a modern design similar to current onboard equipment with implemented mathematical models of own ships and targets allowing simulation of manoeuvring and sailing of different types of vessels in many ports and different hydro-meteorological conditions.

By a full mission simulator we understand a simulator capable of simulating a total shipboard bridge operation situation, including the capability for advanced manoeuvring in restricted waterways, e.g. advanced tugging with ship-to-ship interaction, ice, effects of tug/winch etc. This type of simulator is interfaced to a full mission Engine Room Simulator (ERS). This enables a total training capability.

The syllabus of Function 2 covers the requirements of the 2010 STCW Convention Chapter II, Section AII/2. This functional element provides the detailed knowledge to support the training outcomes related to Cargo Handling and Stowage at the Management Level. This section provides the background knowledge to support the tasks, duties and responsibilities in:

- planning, safe loading, stowage, securing and care during the voyage and unloading of cargoes
- the carriage of dangerous goods.

This includes topics such as ship trim, stability, ballasting, cargo securing, tankers and tanker operations and carriage of dangerous, hazardous and harmful cargoes.

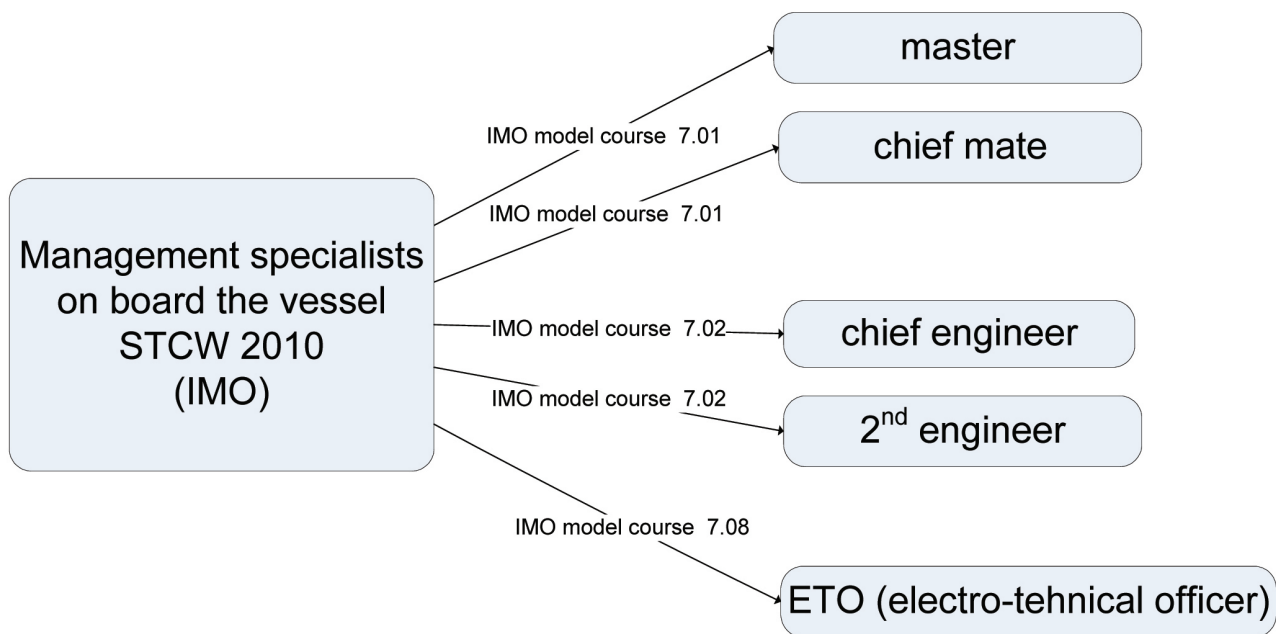


Figure 3 An example of education of specialists in maritime transport sector at University of Dubrovnik
 Slika 3. Primjer specijalista u sektoru pomorskog obrazovanju na Sveučilištu u Dubrovniku

The syllabus of Function 3 covers the requirements of the 2010 STCW Convention Chapter II, Section A-II/2. This functional element provides the detailed knowledge to support the training outcomes related to Controlling the Operation of the Ship and Care for Persons on Board at the Management Level.

This section provides the background knowledge to support the tasks, duties and responsibilities in:

- controlling trim, stability and stress
- monitoring and controlling compliance with legislation to ensure
- safety of life at sea
- protection of the marine environment
- maintaining safety and security of crew and passengers
- developing emergency and damage control plans
- organizing and managing the crew
- organizing and providing medical care on board

This includes topics such as ship construction and stability, dry-docking, search and rescue, personnel management and contingency planning.

At the Maritime Department of University of Dubrovnik ship's loading computer programs of different types of vessels have been used to fulfill these requirements.

There are PCs with programs provided by shipping company Atlantska Plovidba d.d. Dubrovnik approved by Register. This real equipment helps students to learn many tasks regarding ship's intact stability, damaged stability, strength of ship's construction, influence of change of sea density on ship's draft, draft survey, loading etc.

Also, for safety purpose education we have Poseidon Communication Simulator produced by Norwegian company from Lofoten. Posedon is PC based simulator with elements similar to current onboard equipment with implemented mathematical models of behavior of communications equipment. Students can practice with typical equipment of own ship and communicate with another ships or with Coast Stations and Land Earth Stations distributed on different

position in the world. It enables simulation of specific safety problems in emergence situations related to different scenarios and different hydro meteorological conditions.

STAFF REQUIREMENTS / *Zahtjevi osoblja*

Instructors shall be qualified in the task for which training is being conducted and have appropriate training in instructional techniques and training methods (STCW Code Section A1/6). Depending on the complexity of the exercises set, an assistant instructor with similar experience is desirable for certain practical exercises.

TEACHING FACILITIES AND EQUIPMENT / *Oprema za obuku i pomagala*

Below is a comprehensive list of Teaching Aids that may be used for the purpose of teaching in the course. It is not advocated that all the Aids mentioned here must be used nor does it mean that other Teaching Aids not mentioned here are excluded from being used. The Instructor is free to use additional teaching material that may be best suited for the transference of knowledge and skills to the trainees. The following items are necessary for use in group work:

FOR FUNCTION 1: / *Za funkciju 1:*

COLREGS '72 — a set of table-top models displaying proper signals or lights, a magnetic board or a navigation light simulator
 Manoeuvring — a set of models to represent ships, jetties, piers and other dock configurations, which can be used on a table top to illustrate ship handling techniques

FOR FUNCTION 2 AND FUNCTION 3: / *Za funkciju 2 i funkciju 3:*

- a collection of photographs, drawings and plans, illustrating various types of ship and constructional details, should be provided. Cutaway models should be used to re-enforce this knowledge
- a floating ship stability demonstration model and a flotation

tank are recommended. The model should be capable of demonstrating the effects of adding or removing masses, of shifting masses, of suspending masses and of free surface liquid - a ship's loading instrument or manufacturers' descriptions of examples of them
 - capacity plans and hydrostatic data for one or more ships
 - electronic calculators.

TEACHING AIDS / *Obrazovna pomagala*

- A1 Instructor's Manual (Part D of this course)
- A2 Catalogue of British Admiralty charts and other hydrographic publications
- A3 British Admiralty Notices to Mariners
- A4 Nautical Almanac
- A5 Nautical tables (Norie's, Burton's or others)
- A6 Pre-computed altitude and azimuth tables (e.g. H0229)
- A7 Pocket calculator
- A8 Working chart
- A9 Ocean plotting sheet
- A10 Passage planning charts
- A11 Routing charts
- A12 Ocean Passages for the World (NP 136), (Taunton, Hydrograph of the Navy, 1987)
- A13 Distance tables
- A14 British Admiralty list of lights
- A15 National list of lights and buoyage system
- A16 British Admiralty tide table of the area concerned
- A17 Local tide table
- A18 Tidal stream atlas
- A19 British Admiralty 'Pilot' book for the area concerned
- A20 National sailing directions
- A21 Port information books
- A22 IALA Maritime Buoyage System, Admiralty NP 735
- A23 British Admiralty List of Radio Signals, Vol. 2:
- A24 Global Maritime Distress and Safety System (GMDSS)
- A25 British Admiralty List of Radio Signals, Vol. 6: Pilot Services, Vessel Traffic Services and Port Operations. 7 volumes
- A26 British Admiralty List of Radio Signals, Vol. 3: Maritime Safety Information Services
- A27 Ship's log-book
- A28 Loran-C Receiver
- A29 Magnetic compass in a binnacle with necessary correcting devices for identification of various parts only
- A30 Pelorus and azimuth mirror

- A31 Gyro-compass
- A32 GPS Receivers
- A33 Differential GPS (DGPS) Receiver
- A34 Enhanced Loran (eLoran) Receiver
- A35 Global Navigation Satellite System (GLONASS) Receiver
- A36 Galileo Receiver
- A37 Automatic Identification System (AIS) Receiver
- A38 Long Range Identification and Tracking (LRIT) Receiver
- A39 Voyage Data Recorder (VDR) and Simplified Voyage Data Recorder (S-VDR)
- A40 Bridge Navigational watch alarm system (BNWAS)
- A41 Ship's Drawings / Plan (GA, Mid section)
- A42 Simulators (wherever applicable to enhance understanding of topics, especially, COLREGS and Ship handling)

Note: - Other equivalent teaching aids, simulators, videos, CD-ROMs, CBT's may be used as deemed fit by the instructor.

CONCLUSION / *Zaključak*

Transport sector is traditionally globally oriented, so education has to be necessarily connected with standardization. The system training of graduate and post-graduate students is impossible without interaction with the transport industry (airport, port, railway, city infrastructure). In this article, we want to show some standards for education. In that sense, we have to exchange teaching aids and our experiences using them, to stimulate mobility of our teaching personnel, participate in consortia for teaching aids (simulators), building etc. Here we have presented some experiences from Saint-Petersburg State University of Aerospace Instrumentation (SUAI) in Russia and Maritime Department of The University of Dubrovnik in Croatia.

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