

Novelties in the Development of the Qualification Standards for Electro-Technical Officers under STCW Convention Requirements

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ABSTRACT: Paper presents prepared by Bulgaria, France, Islamic Republic of Iran, IFSMA, ITF, Malaysia, Poland, Ukraine and the United Kingdom proposal of amendments [1] to the STCW Convention and its Code part A and B [2] establishing international qualification standard for electro-technical officers. It is proposed that the certificates of competency for electro-technical officer and senior electro-technical officers shall be placed in Chapter III "Engine Department" of the STCW Convention, under new Regulations III/6, III/7 and new sections A-III/6, A-III/7 and B-III/6, B-III/7 of the STCW Code. This amended concept it is a logical continuation and further development of the paper [3] which concerned the same issue and was presented at the MarCon 2008 proceedings.

1 INTRODUCTION

Due to the continuous technological development as well as new required qualifications and skills for maintenance of electrical/electronic systems, equipment and installations, there is a significant increase in application for properly qualified electric officers. At the moment, such people are being employed especially on cruise vessels, large ferries and all kinds of special purpose vessels, though their qualifications and competence have not been standardised on the international level [4]. It is worth to note the rapid progress in marine electrical and electronic technology, including among others, main electrical propulsion and high voltage systems. The latter solutions are generally accepted in cruise ships construction, it means in the shipbuilding branch which is developed very quickly. This trend may be illustrated by the data published in Cruise Industry News Quarterly [5], dealing with building of 49 new passenger ships for a bill of 25,8 billion US dollars in the years 2008-2012. Those contracts are not only a technological challenge, but first of all, a new impact to develop the electro-technical officers labour market. No doubt that they should be, a highly qualified staff, appropriately prepared to undertake the tasks, duties and responsibilities corresponding to up-to-date technological challenges. In this context it is worthy to mention an opinion expressed in the pa-

per titled "Are engineers getting the electrical training they need?" [4], where it was described frequently met in practice situation: "None of the senior engineers onboard had theoretical or practical education in 6,6 kV generation, distribution, and trouble shooting [4]. To avoid those situations and their dangerous and cost consequences, a new approach concerning the necessity to establish and put into force the qualification standards for electro-technical officers seems to be obvious [1]. Facts and statistics show that such qualified people are indispensable to work on large vessels. Over 2200 of them have been trained in Poland. It is significant that majority of them work under other than Polish flag. Hence, in the event of accident there is a question of a legal responsibility of such qualified people, whose professional qualifications were achieved in Poland and are recognised on Polish territory only. Therefore there is a need for an international qualification standard for electro-technical officers. It is proposed that the certificate of competency for electro-technical officers shall be placed in Chapter III "Engine Department" of the STCW Convention, under new Regulations III/6, III/7 and new sections A-III/6, A-III/7 and B-III/6, B-III/7 of the STCW Code. Paper presents qualification and competency standards for Electro-Technical Officers (ETO) and Senior Electro-Technical Officers (SETO) developed by Bulgaria, France, Islamic Republic of Iran,

IFSMA, ITF, Malaysia, Poland, Ukraine and the United Kingdom during *ad hoc* intersessional meeting of the STW working group relating to the comprehensive review of the STCW Convention and Code in order to present during nearest 40th session of the IMO Sub-Committee on Standards of Training and Watchkeeping – STW.

2 PROPOSED CHANGES TO THE STCW CONVENTION

Co-authors suggest to insert in the STCW Convention [1]:

1. In Regulation I/1 paragraph 31, the following new definition (STW 40/7/4): *Electro-technical officer* means an officer qualified in accordance with the provisions of chapter III of the convention;
2. In Regulation I/1 paragraph 32, the following new definition (STW 40/7/4): *Senior electro-technical officer* means an officer qualified for the operation, maintenance and repairs of electrical, electronic, computer systems and equipment, including electrical propulsion;
3. The following new Regulation III/6 – “*Mandatory minimum requirements for certification of electro-technical officer*” (STW 40/7/6):
 - 1 Every electro-technical officer serving on a sea-going ship powered by main propulsion machinery of 750 kW propulsion power or more, shall hold an appropriate certificate.
 - 2 Every candidate for certification shall:
 - .1 be not less than 18 years of age;
 - .2 have completed not less than 12 months combined workshop skills training and seagoing service of which not less than 6 months will be sea going service as part of an approved training which meets the requirements of section A-III/6 of the STCW Code and is documented in an approved training record book, or otherwise not less than 36 months combined workshop skills training and seagoing service of which not less than 30 months will be sea going service in engine department; and
 - .3 have completed approved education and training and meet the standards of competence specified in section A-III/6 of the STCW Code.
 - 3 Every Party shall compare the standards of competence which it required of electro-technical officers for certificates issued before

[date] with those specified for the certificate in section A-III/6 of the STCW Code, and shall determine the need for requiring those personnel to update their qualifications.

4 Seafarers may be considered by the Administration to have met the requirements of this regulation if they have served in relevant capacity on board seagoing ship powered by main propulsion machinery of 750 kW propulsion power or more for a period of not less than 12 months within the last 60 months and meet the competence specified in section A-III/6 of the STCW Code.

4. The following new Regulation III/6 – “*Mandatory minimum requirements for certification of senior electro-technical officer*” (STW 40/7/6):

1 Every senior electro-technical officer serving on a seagoing ship powered by main propulsion machinery of more than 750 kW propulsion power shall hold an appropriate certificate.

2 Every candidate for certification shall:

.1 meet the requirements for certification as electro-technical officer and shall have not less than 12 months approved seagoing service as electro-technical officer whilst holding electro-technical officer certificate;

.2 have completed approved education and training and meet the standard of competence specified in section A-III/7 of the STCW code.

3 Every Party shall compare the standards of competence which it required of senior electro-technical officers for certificates issued before [date] with those specified for the certificate in section A-III/7 of the STCW Code, and shall determine the need for requiring those personnel to update their qualifications.

Seafarers may be considered by the Administration to have met the requirements of this regulation if they have served in relevant capacity on board seagoing ship powered by main propulsion machinery of 750 kW propulsion power or more for a period of not less than 12 months within the last 60 months and meet the competence specified in section A-III/7 of the STCW Code.

3 SUGGESTED AMENDMENTS TO THE CODES

A new sections A-III/6 “*Mandatory minimum requirements for certification of electro-technical officer*” and B-III/6 “*Guidance regarding – the training and certification for electro-technical officers*” shall be inserted after sections A-III/5 and B-III/5.

The new section A-III/6 shall contain following requirements for on-board training and standard of competence for ETO [1]:

Training

1 The education and training required by paragraph 2.3 of regulation III/6 shall include training in electronic and electrical workshop skills relevant to the duties of electro-technical officer.

Onboard training

2 Every candidate for certification as electro-technical officer shall follow an approved program of onboard training which:

- .1 ensures that during required period of seagoing service the candidate receives systematic practical training and experience in the tasks, duties and responsibilities of an electro-technical officer;
- .2 is closely supervised and monitored by qualified and certificated officers aboard the ships in which the approved seagoing service is performed; and
- .3 is adequately documented in training record book.

Standard of competence

3 Every candidate for certification as electro-technical officer shall be required to demonstrate ability to undertake the tasks, duties and responsibilities listed in column 1 of table A-III/6.

4 The minimum knowledge, understanding and proficiency required for certification is listed in column 2 of table A-III/6 and it shall take into account the guidance given in part B of this Code.

5 Every candidate for certification shall be required to provide evidence of having achieved the required standard of competence tabulated in columns 3 and 4 of table A-III/6.

In new Section B-III/6 shall be inserted the following recommendations:

In addition to the requirements stated in table A-III/6 of this Code, Parties are encouraged to take into

account resolution A.702(17) concerning radio maintenance guidelines for the global maritime distress and safety system within their training programmes.

A new section A-III/7 “*Mandatory minimum requirements for certification of senior electro-technical officer*” shall be inserted after sections A-III/6. The new section A-III/7 shall contain following requirements for on-board training and standard of competence for SETO:

Standard of competence

1 Every candidate for certification as senior electro-technical officer of seagoing ships powered by main propulsion machinery of more than 750 kW shall be required to demonstrate ability to undertake the tasks, duties and responsibilities listed in column 1 of table A-III/7.

2 The minimum knowledge, understanding and proficiency required for certification is listed in column 2 of table A-III/7. This incorporates, expands and extends in depth the subjects listed in column 2 of the table A-III/6 for electro-technical officer.

3 Training and experience to achieve the necessary level of theoretical knowledge, understanding and proficiency shall take into account the relevant requirements of this part.

1 4 Every candidate for certification shall be required to provide evidence of having achieved the required standard of competence in accordance with the methods for demonstrating competence and the criteria for evaluating competence tabulated in columns 3 and 4 of table A-III/7.

4 MINIMUM STANDARD OF COMPETENCY FOR ETO AND SETO

Table A-III/6 presents the specification of minimum standards of competence for electro-technical officers.

Table A-III/7 presents the specification of minimum standards of competence for senior electro-technical officers.

Table A-III/6. Specification of minimum standards of competency for ETO [1]

| Function: electrical, electronic and control engineering at operational level | | | |
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| Column 1 | Column 2 | Column 3 | Column 4 |
| Competence | Knowledge, understanding and proficiency | Methods for demonstrating competence | Criteria for evaluating competence |
| Monitor the operation of electrical, electronic and control systems | <p>Basic understanding of the operation of mechanical engineering systems including :</p> <p>.1 Prime movers including main propulsion plant</p> <p>.2 Engine room auxiliary machineries</p> <p>.3 Steering systems</p> <p>.4 Cargo handling systems</p> <p>.5 Deck machineries</p> <p>.6 Hotel systems</p> <p>Basic knowledge of heat transmission, mechanics and hydromechanics</p> <p><i>Knowledge of:</i></p> <p>Electro-technology and electrical machines theory</p> <p>Fundamentals of electronics and power electronics</p> <p>Electrical power distribution boards and electrical equipment</p> <p>Fundamentals of automation, automatic control systems and technology</p> <p>Instrumentation, alarm and monitoring systems</p> <p>Electrical drives</p> <p>Technology of electrical materials</p> <p>Electro-hydraulic and electro-pneumatic control systems</p> <p>Appreciation of the hazards and precautions required for the operation of power systems above 1000 Volts</p> | <p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p> | <p>Operation of equipment and system is in accordance with operating manuals</p> <p>Performance levels are in accordance with technical specifications</p> |
| Monitor the operation of Automatic control systems of propulsion and auxiliary machinery | Preparation of control systems of propulsion and auxiliary machinery for operation | <p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p> | Surveillance of main propulsion plant and auxiliary systems is sufficient to maintain safe operation condition |
| Operate generators | Coupling, load sharing and changing over generators | <p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training,</p> | Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations |

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| | | where appropriate .4 approved laboratory equipment training | |
| Operate computers and computer networks on ships | Understanding of: .1 main features of data processing .2 construction and use of computer networks on ships .3 bridge based, engine room based and commercial computer use | Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training | Computer networks and computers are correctly checked and handled |
| Use hand tools, electrical and electronic measurement equipment for fault finding, maintenance and repair operations | Safety requirements for working on shipboard electrical systems. Knowledge of the causes of electric shock and precautions to be observed to prevent shock. Construction and operational characteristics of shipboard AC and DC systems and equipment Construction and operation of electrical test and measuring equipment Application of safe working practices | Assessment of evidence obtained from one or more of the following: .1 approved workshop skills training .2 approved practical experience and tests | Implementation of safety procedures is satisfactory Recognizes and reports electrical hazards and unsafe equipment Selection and use of test equipment is appropriate and interpretation of results is accurate Selection of procedures for the conduct of repair and maintenance is in accordance with manuals and good practice Commissioning and performance testing of equipment and systems brought back to service after repair is in accordance with manuals and good practice |
| Use English in written and oral form | Adequate knowledge of the English language to enable the officer to use engineering publications and to perform the officer's duties | Examination and assessment of evidence obtained from practical instructions | English language publications relevant to the officer's duties are correctly interpreted Communications are clear and understood |

Function: Maintenance and repair at operational level

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| Maintain and repair automation and control systems of main propulsion and auxiliary machinery | Appropriate electrical and mechanical knowledge and skills <i>Safety and emergency procedures</i> Safe isolation of equipment and associated systems required before personnel are permitted to work on such plant or equipment Practical knowledge for the test, maintenance, fault finding and repair Test, detect faults and maintain and restore electrical and electronic control equipment to operating condition Knowledge of the principles and maintenance procedures of navigation equipment, internal and external communication system. <i>Theoretical knowledge:</i> Electrical and electronic systems operating in flammable areas <i>Practical knowledge:</i> Carrying out safe maintenance | Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training | The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified Isolation, dismantling and reassembly of plant and equipment is in accordance with manufacturers safety guidelines and shipboard instructions and legislative and safety specifications. Action taken leads to the restoration of automation and control systems by the method most suitable and appropriate to the prevailing circumstances and conditions |
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| | and repair procedures Detection of machinery malfunction, location of faults and action to prevent damage | | |
| Maintain and repair bridge navigation equipment and ship communication systems | | | <p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p> <p>Isolation, dismantling and reassembly of plant and equipment is in accordance with manufacturers safety guidelines and shipboard instructions, legislative and safety specifications.</p> <p>Action taken leads to the restoration of bridge navigation equipment and ship communication systems by the method most suitable and appropriate to the prevailing circumstances and conditions</p> |
| Maintain and repair electrical, electronic and control systems of deck machinery and cargo handling equipment | | | <p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p> <p>Isolation, dismantling and reassembly of plant and equipment is in accordance with manufacturers safety guidelines and shipboard instructions, legislative and safety specifications.</p> <p>Action taken leads to the restoration of deck machinery and cargo handling equipment by the method most suitable and appropriate to the prevailing circumstances and conditions</p> |
| Maintain and repair control and safety systems of hotel equipment | | | <p>The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified</p> <p>Isolation, dismantling and reassembly of plant and equipment is in accordance with manufacturers safety guidelines and shipboard instructions, legislative and safety specifications.</p> <p>Action taken leads to the restoration of control and safety systems of hotel equipment by the method</p> |

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| | | | most suitable and appropriate to the prevailing circumstances and conditions |
| Function: Controlling the operation of the ship and care for persons on board at operational level | | | |
| Organize and manager subordinate crew | A knowledge of personnel management, organization and training on board ships A knowledge of international maritime conventions and recommendations, and related national legislation | Examination and assessment of evidence obtained from approved in service training and experience | The crew are allocated duties and informed of expected standards of work and behaviour in a manner appropriate to the individuals concerned Training objectives and activities are based on an assessment of current competence and capabilities and operational requirements |
| Ensure compliance with pollution prevention requirements | <i>Prevention of pollution of the marine environment</i> Knowledge of the precautions to be taken to prevent pollution of the marine environment Anti-pollution procedures and all associated equipment | Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience | Procedures for monitoring ship-board operations and ensuring compliance with MARPOL requirements are fully observed |
| Prevent, control and fight fire on board | <i>Fire prevention and fire-fighting appliances</i> Knowledge of fire prevention Ability to organize fire drills Knowledge of fire-fighting systems Action to be taken in the event of fire, including fires involving oil systems | Assessment of evidence obtained from approved fire-fighting training and experience as set out in section A-VI/3 | The type and scale of the problem is promptly identified and initial actions conform with the emergency procedure and contingency plans for the ship Evacuation, emergency shutdown and isolation procedures are appropriate to the nature of the emergency and are implemented promptly The order of priority, and the levels and time-scales of making reports and informing personnel on board, are relevant to the nature of the emergency and reflect the urgency of the problem |
| Operate life-saving appliance | Ability to organize abandon ship drills and knowledge of the operation of survival craft and rescue boats, their launching appliances and arrangements, and their equipment, including radio life-saving appliances, satellite EPIRBs, SARTs, immersion suits and thermal protective aids. Knowledge of survival at sea techniques | Assessment of evidence obtained from approved training and experience as set out in section A-VI/2, paragraphs 1 to 4 | Actions in responding to abandon ship and survival situations are appropriate to the prevailing circumstances and conditions and comply with accepted safety practices and standards |
| Apply medical first aid on board ship | Practical application of medical guides and advice by radio, including the ability to take effective action based on such knowledge in the case of accidents or illnesses that are likely to occur on board ship | Assessment of evidence obtained from approved training as set out in section A-VI/4, paragraphs 1 to 3 | Identification of probable cause, nature and extent of injuries or conditions is prompt and treatment minimizes immediate threat to life |

Table A-III/7. Specification of minimum standards of competency for SETO [1]

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| Function: electrical, electronic and control engineering at operational level |
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| Column 1 | Column 2 | Column 3 | Column 4 |
|---|---|---|--|
| Competence | Knowledge, understanding and proficiency | Methods for demonstrating competence | Criteria for evaluating competence |
| Monitor and evaluate electrical power generation and consumption | <i>Expanded theoretical knowledge</i> Electro-technology and electrical machines theory Electronics and power electronics Electrical power distribution boards and electrical equipment Automation, control systems and instrumentation | Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate | The methods of measuring the load capacity of the generators and motors are in accordance with technical specifications Performance levels are in accordance with technical specifications |
| Maintain safety of equipment, systems and services | <i>Practical knowledge</i> Operation and maintenance of: .1 Electrical generation and distribution systems .2 Electrical propulsion plant .3 Auxiliary machinery, including pumping, auxiliary boiler plant and steering-gear control systems .4 Integrated control systems .5 Electrically operated cargo-handling equipment and deck machinery | | Safety of equipment, systems and services is in accordance with manufacturers safety guidelines and shipboard instructions, legislative and safety specifications. |
| Diagnose faults, maintain and restore electrical power, electronic and control equipment to operating condition | Understand and diagnose the underlying cause of malfunctions in electrical power, electronic and control systems and equipment | Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training | Maintenance activities are correctly planned in accordance with technical, legislative, safety and procedural specifications The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are justified |
| Diagnose faults, maintain and restore navigation and communication equipment to operating condition | Understand and diagnose the underlying cause of malfunctions in navigation and communication systems and equipment | Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate | The methods of comparing actual operating conditions are in accordance with recommended practices and procedures Actions and decisions are in accordance with recommended operating specifications and limitations |
| Operate, maintain and manage power systems in excess of 1000 Volts | <i>Theoretical knowledge:</i> High voltage technology Safety precautions and procedures Electrical propulsion of the ships, electrical motors and control systems <i>Practical knowledge:</i> Safe operation and maintenance of high voltage systems including knowledge of the special technical type of high voltage systems and the danger resulting from operational voltage of more than 1000 V | Examination and assessment of evidence obtained from one or more of the following: .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate .4 approved laboratory equipment training | Operations are planned and carried out in accordance with established rules and procedures to ensure safety of operations |

| Function: controlling the operation of the ship and care for persons on board at the management level | | | |
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| Plan and schedule operations | <p><i>Knowledge of:</i></p> <ul style="list-style-type: none"> .1 computer-based management systems of periodical maintenance and repairs .2 preparations for dry docking and shipyard repairs and maintenance 3. class requirements | <p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate | <p>The planning and preparation of operations is suited to the design parameters of the power installation and to the requirements of the voyage</p> |
| Monitor and control compliance with legislative requirements and measures relating to electrical and electronic equipment and systems to ensure safety of life at sea and protection of the marine environment | <p>Knowledge of relevant international maritime law embodied in international agreements and conventions</p> <p>Regard shall be paid especially to the following subjects:</p> <ul style="list-style-type: none"> .1 certificates and other documents required to be carried on board ships by international conventions, how they may be obtained and the period of their legal validity .2 responsibilities under the relevant requirements of the International Convention for the Safety of Life at Sea .3 responsibilities under the International Convention for the Prevention of Pollution from Ships .4 maritime declarations of health and the requirements of the International Health Regulations .5 responsibilities under international instruments affecting the safety of the ships, passengers, crew or cargo .6 methods and aids to prevent pollution of the environment by ships .7 knowledge of national legislation for implementing international agreements and conventions | <p>Examination and assessment of evidence obtained from one or more of the following:</p> <ul style="list-style-type: none"> .1 approved in-service experience .2 approved training ship experience .3 approved simulator training, where appropriate | <p>Procedures for monitoring operations and maintenance comply with legislative requirements</p> <p>Potential non-compliance is promptly and fully identified</p> <p>Requirements for renewal and extension of certificates ensure continued validity of survey items and equipment</p> |

5 FINAL REMARKS

Proposal of amendments to the STCW Convention and its Code establishing international qualification standards for electro-technical officers described in this paper was a result of the Intersessional Working Group meeting in September 2008, next presented during the 40th session of the IMO STW Sub-Committee, regarding the comprehensive review of the STCW Convention and Code, scheduled from 02 to 06 February 2009.

In the meantime, between the Intersessional Working Group meeting on the STW issues some new documents related to the discussed matter appeared, like STW 40/7/54 submitted by Japan, STW 40/7/56 submitted by Denmark and STW 40/7/17 submitted by Germany.

Finally, three options for further considerations are at the table: the first one concerning two-level electro-technical officers standards, including ETO and SETO levels, the second option presented by the Germany, supported by USA, consisting of two-level electric / electronic staff understood as electro-technical officer and able seafarer electro-engineering, and the third option - all electric / electronic duties belong to and are realized by marine engineers (Denmark and Japan). The further steps of the procedure will be oriented for looking for the best solution and compromise proposal possible to accept by the majority of IMO member states.

REFERENCES

- [1] STW 40/7/3, STW 40/7/4, STW 40/7/6 - Working documents at the 40th session of the Sub-Committee on Standards and Watchkeeping, which support the ETO and SETO concept, IMO, London, 2009
- [2] STCW 95, STCW Convention, Resolution of the STCW Conference and STCW Code, IMO, London, 1996
- [3] Wyszowski J., Mindykowski J., Wawruch R., "Development of the qualification standards for electrotechnical officers (ETO)" Proc. of the XI Maritime Conference, Gdynia, 2008 (MarCon 2008), CD-ROM, pp.1-9
- [4] "Are engineers getting the electrical training they need?" Marine Engineering Review, March 2006, p.35-36
- [5] Orderbook: New Ships and Counting, Cruise Industry News Quarterly: Fall 2008
- [6] STW 40/7/17, STW 40/7/54, STW 40/7/56 - Working documents at the 40th session of the Sub-Committee on Standards and Watchkeeping, which do not support two-levels ETO concept, IMO, London, 2009