

## EDUCATION AND TRAINING OF ELECTRO-TECHNICAL OFFICERS AND STCW CONVENTION AND CODE NEW STANDARDS IMPLEMENTATION

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**Abstract** There are any requirements for electrician or electrical engineer officer in STCW Convention, 78 as amended. During review of the STCW Convention there were some points of view for this question.

“...As more of the traditional skills of the past were incorporated into the training of engineers the position of electricians was phased out and in theory the new technology was sufficiently advanced not to require continuous attention of a specialist. However, there has in the last decade, particularly on specialized ships, been major technological advances in the field of electronics and computers and due to minimum of manning, vessels are increasingly reliant on efficient operation of this technology. The skills required for this role are not only very new and highly sophisticated but are also constantly evolving...”

“...In consideration of this emphasis and the shortage of trained qualified personnel in the industry, the co-sponsors wish to stress that it is necessary to ensure that nothing in the STCW Convention or Code will prevent a suitably qualified and competent electrician from being employed on board any vessel and prevent that electrician from performing a related role on board without having gained the competences specified for certification as ETO...”

Ukraine defended necessity of three levels of Competence for Electro - technical personnel as new standards of the STCW. MET system for Electrical Engineer Officer in Ukraine has long history. ETO MET in ONMA.

**Keyword:** *STCW Convention and Code, new standards, Electro-technical Officers (ETO), ETO MET in Ukraine.*

At the end of June, 2010 a remarkable event took place – on the Diplomatic conference in Manila (the Philippines) amendments to the Annex to the International Convention on Standard of Training, Certification and Watchkeeping for Seafarers (STCW Convention) and to the Seafarers’ Training, Certification and Watchkeeping Code (STCW Code) [1], [2] were approved.

IMO continuous work on comprehensive review of the STCW Convention and Code has preceded this event. Adopted amendments cover practically all chapters of the STCW Convention and all sections of the STCW Code. Taking into account the comprehensive nature of the amendments, we can speak about practically new edition of the STCW Convention and Code.

Essential standards of seafarers' training became a result of a detailed reconsideration. However, standards regarding engine department were reformed most of all. Meanwhile, the most important amendments, in our opinion, are inclusion of standards regarding electro-technical officers into a new edition of the STCW Convention and Code.

From the very beginning of the STCW Convention and Code reconsideration IMO stated that technological advances tendencies address and required levels of training and certification and watchkeeping arrangements ensuring due to innovation in technology should be one of the leading principles. [3].

Maritime engineering is known to have had considerable progress in electric and electronic technologies for the last decade, to implement computer systems, especially on special purpose

vessels. Many shipping companies have already provided availability of electrical specialists in their crew for ensuring efficient operation of modern equipment. Meanwhile, there are different positions' names for such specialists in different companies (Electrician, Electrical Engineer, Electrical Officer, Electronic Officer, etc.) and different functions. At the same time, unified requirements for competence and levels of responsibility for such specialists have not been specified before as the corresponding standards were absent in the STCW Convention and Code. These factors were taken into account and appeared to be the key ones while making a decision about training and certification standards development for electro-technical specialists.

Development of electro-technical specialists training and certification standards turned out to be the most debatable question during STCW Convention and Code reconsideration. These questions were discussed at 38<sup>th</sup>, 39<sup>th</sup>, 40<sup>th</sup> and 41<sup>st</sup> sessions and at two Intersessional meetings of Subcommittee on standards of training and watchkeeping of the IMO. Different points of view were suggested and considered in the process of work. Two main stages of the discussion about standards relating to electro-technical specialists can be specified.

At the beginning of the discussion delegations of some countries doubted as to reasonability of the STCW Convention and Code's containing such standards at all. Existence of such standards caused concerns that they could lead to creation of a new department in the crew. However, most of them have agreed with the necessity of such standards existence, taking into consideration such factors as technological progress and actual electrical specialist's availability on different types of vessels. Meanwhile, a necessity of having deep special knowledge and understanding for performing operation, maintenance and repair duties of modern electro-technical and electronic equipment was mentioned.

Discussion of the electrical specialists' levels of responsibility issues became the next important stage. During the discussion, training and certification standards for all of the three levels were suggested [4]:

- Electro-technical rating (Support level);
- Electro-technical officer (Operational level);
- Senior Electro-technical officer (Management level).

Discussion as for Senior Electro-technical officer's standards' inclusion into the STCW Convention and Code was one of the most heated. Supporter and opposition of this issue went approximately fifty-fifty. However, as a result a decision about Electro-technical officer's standards' inclusion into the STCW Convention and Code only on two levels was approved: Electro-technical rating (Support level) and Electro-technical officer (Operational level).

The authors of the article offer their colleagues to pay special attention to training and certification standards for Electro-technical officers (ETO). To our mind, maritime educational establishments must organize specialists' training in compliance with these standards in the nearest future. The skills required for ETO are not only very new and highly sophisticated but are also constantly evolving.

Mandatory minimum requirements for certification and specification of minimum standards of competence for ETO are determined in new Regulation III/6 of the STCW Convention and Sections A-III/6 and B-III/6 of the STCW Code. These regulations provide ETO training in the following functions and corresponding competences:

**Function: Electrical, electronic and control engineering at the operational level**

**Competences:**

- Monitor the operation of electrical, electronic and control systems;
- Monitor the operation of automatic control systems of propulsion and auxiliary machinery;
- Operate generators and distribution systems;
- Operate and maintain power systems in excess of 1,000 volts;
- Operate computers and computer networks on ships;
- Use English in written and oral form;

- Use internal communication systems.

**Function: Maintenance and repair at the operational level**

**Competences:**

- Maintenance and repair of electrical and electronic equipment;
- Maintenance and repair of automation and control systems of main propulsion and auxiliary machinery;
- Maintenance and repair of bridge navigation equipment and ship communication systems;
- Maintenance and repair of electrical, electronic and control systems of deck machinery and cargo-handling equipment;
- Maintenance and repair of control and safety systems of hotel equipment.

**Function: Controlling the operation of the ship and care for persons on board at operational level**

**Competences:**

- Ensure compliance with pollution prevention requirements;
- Prevent, control and fight fire on board;
- Operate life-saving appliances;
- Apply medical first aid on board ship;
- Application of leadership and team-working skills;
- Contribute to the safety of personnel and ship.

As we can see, ETO functions and competences system assumes operation, maintenance and repair of a wide range of equipment. It should be noted that it concerns not only operation or replacement of broken equipment. In many cases, scanning of faults, maintenance of complex equipment falls within the responsibility of Electro-technical officers. It assumes deep process level, interior arrangement and operation mode knowledge.

In order to perform mentioned above functions and competencies, Electro-technical officer must have deep knowledge in different engineering and technological areas – starting from Mechanical engineering system and Electro-technology to Communication systems and Data processing.

Additionally, we'll draw your attention that new Section B-III/6 of the STCW Code recommends to take into account IMO resolution A.702(17) concerning radio maintenance guidelines for the global maritime distress and safety system when designing Electro-technical officers training programs in addition to the requirements stated in table A-III/6.

Thus, ETO knowledge, understanding and proficiency system assumes new programs' development and implementation at maritime educational establishments. Such programs can be classified as educational and training programmes in Combined Technology, as they should contain components concerning different traditional subject areas: Electrical and Electronic Engineering, Mechanical Engineering, Computer Science, Information and Communication Technology, etc.

As for “Controlling the operation of the ship and care for persons on board at operational level” functions, competence system, corresponding to it, is generally analogous to the competence system provided by the new edition of the Table A-III/1 of the STCW Code for officers in charge of an engineering watch. Competences dealing with seaworthiness of the ship and compliance with legislative requirements are an exception.

We should pay attention to “Application of leadership and team-working skills” competence that is provided in the new edition of the STCW Code in Tables A-II/1, A-III/1 and A-III/6 for deck and engine departments. This competence includes a vast range of knowledge, understanding and proficiency and is included into competence standards for ensuring effective resource management, cooperation between crew members and minimization of “human element” influence on accident occurrence.

Besides the above mentioned theoretical components, in compliance with Regulation III/6 of the STCW Convention ETO training programmes should contain not less than 12 months of

combined workshop skills training and approved seagoing service of which not less than 6 months will be seagoing service which is documented in an approved training record book. As you can see, requirements for ETO practical training are similar to the ones for officers in charge of an engineering watch.

Maritime educational establishments of a number of countries are known to be experienced in electro-technical specialists training. It should be noted that training and certification of such specialists have not been covered by international standards yet and are carried out in compliance with national requirements and regulations. But still, in the authors' opinion, maritime educational establishments of such kind can easily adjust their educational and training programmes to international standards established by the new edition of the STCW Convention and Code.

At the same time, some countries might have an ambiguous situation with ETO certification standards implementation. In a number of countries, where electro-technical specialists' training and certification are carried out, there exist a few ranks that are given to electro-technical officers (electrical engineers).

For example, Electro-technical ship's specialists' training and certification system has had a many years history in Ukraine. Thus, the Odesa National Maritime Academy (ONMA) has been training marine electrical engineers for more than 60 years. ONMA has considerable experience in developing and carrying out Electrical engineers' with the Bachelor of Sciences (first cycle of higher education), Specialist and Master of Sciences qualifications (second cycle of higher education) education and training programmes. ONMA is also very experienced in carrying out refreshing and updating courses for electrical engineers. Besides, Ukrainian maritime colleges carry out education and training programmes for electrical officers with qualification of Junior Specialist (short cycle in the first cycle of higher education framework).

Ukrainian national regulations provide 3-rank system of ship's electrical engineers certification. According to the level of education and practical experience a ship's electrical engineer can be given the third, the second and the first class.

To achieve a third class (the lowest one) electrical engineer's rank it is enough for a candidate to have Junior Specialist qualification and a workshop experience including not less than 6 months of seagoing service. In their turn, a candidate for the first class (the highest one) electrical engineer's position/rank must complete the second cycle of higher education (Specialist or Master Diploma) and have not less than 24 months of seagoing service as Second class electrical engineer.

Such multilevel training and certification system has proven to be good and enables to upgrade the qualification and progress step by step for electro-technical officers. Besides, such system allows a shipowner to select a crew with the qualification necessary for a certain vessel and to assure the most effective electro-technical and electronic equipment operation, maintenance and repair.

National certification regulations for electro-technical officers providing a quantity of ranks that is more than one exist in a number of other states. Such countries have a reasonable question – how to adjust an existing 2<sup>nd</sup>- and 3<sup>rd</sup>-rank national training and certification system for electro-technical officers to a 1-rank one, established for ETO by the new edition of the STCW Convention and Code?

From the authors' point of view, the problem of national regulations adjustment to the new STCW Convention requirements would be easily solved in case of adoption of Senior Electro-technical officer standards on the Management level. However, taking into consideration the fact that such standard has not been adopted; administrations and maritime educational establishments will have to make important decisions as for national training and certification regulations adjustments to the new edition of the STCW Convention. It might be reasonable to apply a combined approach – to certify all the electro-technical officers corresponding to Regulation III/6 as for ETO in compliance with the STCW Convention and to certify higher ranks electro-technical officers in compliance with national requirements.

Besides, the authors would like to draw attention to the discussion about electro-technical specialists' training and certification reasonability on the Management level. To our mind, this discussion has just begun. Delegations from a number of states have been successively supporting at IMO the idea of Senior Electro-technical officer standards implementation into the STCW Convention and Code. Such countries as Bulgaria, China, France, Poland, Ukraine, United Kingdom, etc. are among them.

Arguments in support of Senior Electro-technical officer's standards are the following: wide usage of modern electro- and electronic technologies and computer systems in marine engineering, existence of special purpose vessels with powerful and complex electric power plans maintained by electro-technical specialists' groups that might include a few electro-technical officers. In such situations there appears a necessity of management level tasks realization.

Besides, during the discussion at IMO delegates from many countries stated that electro-technical functions were often performed on the ship by University graduates. For the purpose of getting such qualified specialists involved in the crew work professional development should be provided, i.e. a possibility of obtaining a management position. Such an idea conforms to the IMO policy as for attracting new entrants to, and retaining qualified seafarers in the maritime profession and to the up-to-day IMO motto "Go to sea!".

The authors encourage their colleagues to start a discussion about electro-technical officers' training and certification on the Management level within IAMU's framework and to form a mutual position in this matter for its further discussion at IMO.

Shipowners should also get ready for new standards implementation when defining their manning policy [5]. Actually, electro-technical officers' standards inclusion into the STCW Convention and Code doesn't assume mandatory availability of such specialists in the crew of the vessels of all types. Resolution 6 of the Manila Conference states that the STCW Convention and Code are instruments concerned with standards of training and certification and do not determine ships' manning levels [6]. Meanwhile, it was emphasized that administrations and shipowners should take into consideration the principles of safe manning adopted by the IMO.

Guidelines for the application of principles of safe manning adopted by IMO Resolution A.890(21) recommends to consider size and type of ship; number, size and type of main propulsion units and auxiliaries; construction and equipment of the ship; method of maintenance used when determining the minimum safe manning level of a ship. [7]. Depending on these factors, shipowners will have a choice when arranging "Electrical, electronic and control engineering" functions provision. Responsibility for this function can be placed upon electro-technical staff or engineers. It should be marked, that engineers' competences have been considerably expanded within the framework of "Electrical, electronic and control engineering" functions in the new STCW Code edition. Particularly, "Maintenance and repair of electrical and electronic equipment" competence appears in Table A-III/1 of the STCW Code defining minimum competence standards for officers in charge of an engineering watch.

However, the set of competences, provided for ETO, covers a wider range of equipment, is more detailed and assumes deeper knowledge, understanding and proficiency in the area of electrical and electronic technologies. It is obvious that shipping companies will need more and more ETO because of electro- and electronic technologies use extension computer systems and networks use increase, and e-navigation role expansion in maintaining safe navigation.

Thus, the STCW Convention and Code new standards implementation supposes a range of new problems to be solved by administration, shipowners and maritime educational establishments. Authors emphasize that it is necessary to exert every effort for provision of the qualitative education and training for ETO, favorable conditions for being employed on board any vessel, and ensure that only persons having gained the competences specified for certification as ETO would/will be allowed to perform (have the right of performing) a related role on board.

New standards implementation on time in training programmes for electro-technical officers supposes priority task solving on corresponding model course and training record book elaboration in the nearest future. These documents are to become an important formation and

realization tool for education and training programmes for ETO in maritime educational establishments.

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