

STCW 78 ,as amended in 2010: concepts and trends

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Abstract. This paper has been composed by materials of IMO STW meetings and Diplomatic Conference in Manila devoted to comprehensive review of STCW 78 Convention and Code , that have an impact on IAMU members activities ,their development and capacity building. The “Leximancer” software was used to make the conceptual and relational models and produce the selected analysis of STCW 78 Convention and Code of 1995 and 2010 versions, as appropriate.

Keyword: *STCW 78, Manila amendments, training, fatigue, safety.*

1. Introduction

The Diplomatic Conference of Parties to the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers,1978, was held in Manila from 21 to 25 June under the auspices of the IMO. The amendments, to be known as "The Manila amendments to the STCW Convention and Code".

In 2007 prior to beginning the comprehensive review of Convention and Code, the STW sub-committee agreed that the review should only embrace the following principles [1]:

- a) *retain the structure and goals of the 1995 revision;*
- b) *not to down scale existing standards;*
- c) *not to amend the articles of the Convention;*
- d) *address inconsistencies, interpretations, MSC instructions, clarifications already issued, outdated requirements and technological advances;*
- e) *address requirements for effective communication;*
- f) *provide for flexibility in terms of compliance and for required levels of training and certification and watchkeeping arrangements due to innovation in technology;*
- g) *address the special character and circumstances of short sea shipping and the and the offshore industry;*
- h) *address security-related issues.*

Perusing the text of STCW 78, as amended in Manila and taking into account all STW outcomes of hot discussions during these years one can conclude the following:

In new amendments the goals of Convention were retained and the structure has been not changed (a). No doubt, that a lot of standards were considerably raised and improved (b). The appeared general trend , if

to compare 2010 with 1995 amendments, is to make the requirements as more “goal -based” type. Articles were not amended (c). A lot of hard work to follow principle (d) was carried out across the Convention and Code. Now it is up-to-date version. It’s to recognize that all the requirements for communication have become more clear and run through the entire document (e).

Flexibility of wordings is really provided (f) together with the raised standards, for example the most vividly it can be traced through the texts of Chapters III and VIII and appropriate sections of the Code.

Regulation I/3 and appropriate sections of the Code have been updated (g). Principles governing near-coastal voyages were developed. *Guidance on application of the provisions of the STCW Convention to mobile offshore units (MOUs)* was composed instead of the Resolution 10 of previous (1995) text of amendments. *The Guidance regarding training and qualifications of masters and officers in charge of a navigational watch on board offshore supply vessels* has been developed and adopted also.

The security issues (h) are included in all the appropriate regulations of Convention and sections of the Code. Chapter VI now has a new name “Emergency, occupational safety, **security**, medical care and survival functions”

If to look critically through the new amendments it’s possible to conclude that all the principles stated by STW 38 were kept. The so called Manila Amendments reflects the mainstream trends in shipping and launches the innovative areas for MET activity ,which can improve safety and raise essentially the quality of seafarers. It becomes more significant especially in this Year of Seafarer, when the shipping industry as a whole is recognizing that education, training are central to so many issues which now faces the industry. Safety, security, shipping’s environmental credentials, and indeed the whole future sustainability of the industry are all dependent to a great extent on the cultivation of a capable and effective manpower resource.

2. Important changes

Amongst the amendments adopted, there are a number of important changes to each chapter of the Convention and Code, including [2]:

- i) Improved measures to prevent fraudulent practices associated with certificates of competency and strengthen the evaluation process (monitoring of Parties' compliance with the Convention);
- j) Revised requirements on hours of work and rest and new requirements for the prevention of drug and alcohol abuse, as well as updated standards relating to medical fitness standards for seafarers;
- k) New certification requirements for able seafarers;
- l) New requirements relating to training in modern technology such as electronic charts and information systems (ECDIS);
- m) New requirements for marine environment awareness training and training in leadership and teamwork; obtaining and maintaining situational awareness, situation and risk assessment.
- n) New training and certification requirements for electro-technical officers;
- o) Updating of competence requirements for personnel serving on board all types of tankers, including new requirements for personnel serving on liquefied gas tankers;

- p) New requirements for security training, as well as provisions to ensure that seafarers are properly trained to cope if their ship comes under attack by pirates;
- q) Introduction of modern training methodology including distance learning and web-based learning;
- r) Training in celestial navigation;
- s) New training guidance for personnel serving on board ships operating in polar waters; and
- t) New training guidance for personnel operating Dynamic Positioning Systems.

In addition to two resolutions adopting the aforesaid amendments, the Conference also adopted 17 resolutions in frames of Convention and Code.

3. Leximancer analysis of selected concepts and trends

In principle, the Leximancer research submitted here is the logical continuation of analysis made by author in previous IAMU papers, but here only STCW amendments of 1995 and 2010 were compared.

However, due to impossibility to embrace all changes of STCW Convention and Code on pages of a short paper, and therefore we have selected 24 key concepts from 100 automatically identified by Leximancer software to check their roles and relative importance as concepts in two texts separately.

We have compared the results executed by conceptual and semantic analysis applied to the 1995 and 2010 versions of amendments to understand the most probable general trends, concepts and their mutual relations, which have occurred for the last 15 years.

The certain basic areas have been addressed for research. Leximancer software was used for the data extraction from both texts of STCW 78. These concepts extracted were as follows: *certification, communication, Ecdis, education, English, fatigue, knowledge, leadership, learning, medical (standards), officers, offshore (industry), polar (navigation), protection (of environment), quality, ratings, risk, safety, security, situation (awareness), standards, training, voyages, watchkeeping.*

The resulted data submitted in the paper enable the readers to make their independent analysis and conclusions.

By Leximancer ideology, the approaches to content analysis fall into two major categories: conceptual analysis and relational analysis. In conceptual analysis, documents are measured for the presence and frequency of concepts. Such concepts can be words or phrases, or more complex definitions, such as collections of words representing each concept. Relational analysis, by contrast, measures how such identified concepts are related to each other within the documents.

In accordance with [12], the information is displayed by means of a conceptual map that provides a bird's eye view of the material, representing the main concepts contained within the text and how they are related. Apart from viewing the conceptual structure of the information, this map allows users to perform a directed search of the documents in order to explore instances of the concepts or their interrelations.

The Leximancer's conceptual maps for selected concepts are presented on Fig. 1, where these concepts are united (circled) in thematic groups.

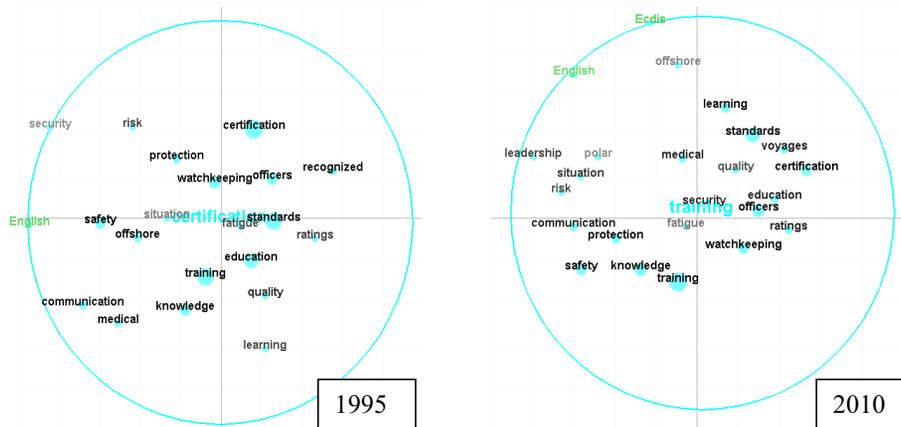


Fig.1 Selected conceptual maps of 1995 and 2010 STCW amendments

The maps provide three main sources of information about the content of documents:

- (1) The main concepts contained within the text and their relative importance;
- (2) The strengths of links between concepts (how often they co-occur);

In addition to maps, you can see Table 1 including the relative importance of selected concepts.

Concept	1995	2010	Concept	1995	2010
certification	100	31.9	Quality	6.1	2.7
communication	12.3	9	Raitings	3.8	8.8
education	47.8	9.3	Risk	3.5	3.3
English	2	1.7	Safety	37.8	34.4
Fatigue	2.6	1.2	Security	0.5	6.7
knowledge	26.6	41.8	Situation	0.8	5.2
Learning	3.2	22.4	Standards	70.6	51.6
Medical	17.3	8.1	Training	69.2	100
Officers	30.7	37.5	watchkeeping	33.7	24.9
Offshore	13.4	0.9	Ecdis	0	3.1
protection	12.3	17.2	leadership	0	4
Quality	6.1	2.7	Polar	0	0.7

Table 1. Relative frequency (relative importance) of the selected concepts (%)

If to look through the table , all the trends within the selected set of concepts can be clearly traced. For instance, the moving the “center of gravity” from the concept *certification* (1995) to *training* (2010) is to be recognized as a very much positive move.

(3) The similarities in the context in which they occur

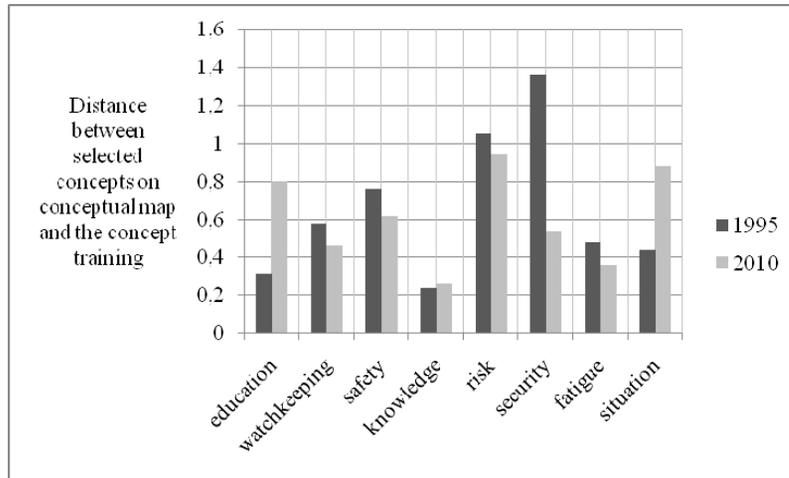


Fig. 2 Similarity trends of some selected concepts with the concept *training* (as per Fig.1)

The more closer together the concepts appear, (see Fig. 1) the more contextual similarity they have. So, *knowledge*, *watchkeeping* and *fatigue* are the most contextually similar to the concept *training*, (see Fig. 2). In Manila Amendments the following concepts have become more contextually similar to the concept *training*: *watchkeeping*, *safety*, *risk*, *security*, *fatigue*, though the types of *fatigue* (mental or physical) are not mentioned in both versions.

From this observation we can conclude, for instance, that the concepts *fatigue* and *training* are conceptually related. The epigraph to the paper may be rephrased: “The higher quality of your training, the less you feel fatigue on board” , (see Fig.3) .It means, that one of the real ways to reduce the level of fatigue of seafarers, is to raise the quality of training (and education), including **on-board-training**.

There is no doubt that the terms *training* and *competence* travel together in STCW 78. Some supporting findings extracted from [3] the following : ” As the degree of training increases, the quality of the bridge crew competence also increases. If the quality of the bridge crew competence is bad, then the individual is more likely to suffer loading, as his/her own workload may increase because he/she feels he/she has to double check the work of the other crew...” - so, this is the real way to be fatigued.

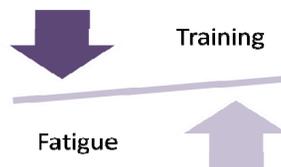


Fig. 3 The relations of two concepts: *fatigue* and *training*

The relationships between concepts are described by relative frequency (probability). Below, on Fig. 4 it is possible to see some results of data processing of both selected texts.

The latent information mined from set of texts is as follows:

- Concept *fatigue* has probabilistic relationships with almost all the concepts selected for research, except *polar*, *ECDIS*, *risk* and *communication*. Is this absence of links can be considered as gaps in Manila Amendments or not? Logically these concepts are to be linked in text.
- Concepts *training*, *watchkeeping*, *safety* and *officers* occur more frequent with *fatigue*, than *English*, *situation*, *education*.
- Very strict and increasing relations of the concepts *fatigue* and *training* confirm again the statement that both concepts are worth to be developed, treated, researched and used in regulations **only together as directly linked concepts**.

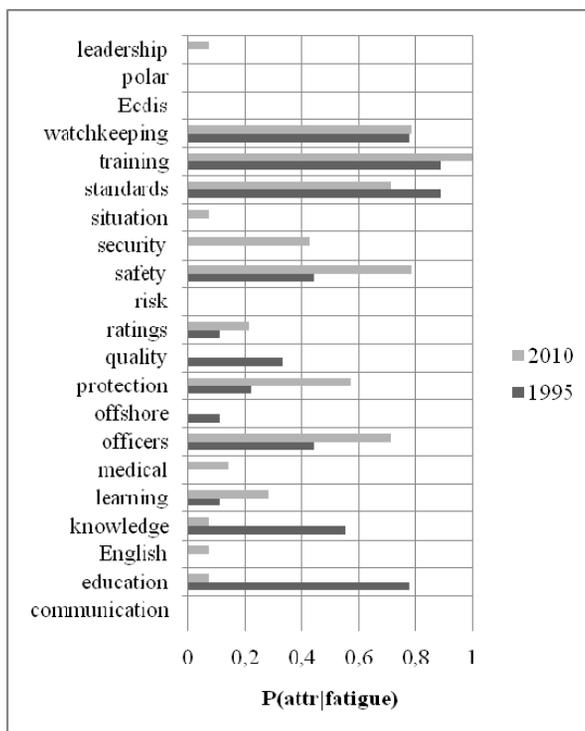


Fig. 4 Relationships between concept *fatigue* and some its attributes

It is known, that indirect links between concepts are accounted for, meaning that a significant semantic relationship can exist between concepts even when there are, in the main, only indirect relationship between them [9], as we can observe in *fatigue* and *training*.

Selected examples from Manila Amendments show that in the text there are no direct links between concepts *fatigue* and *training*, provided that the relative frequency is equal to 0.9 (1995) and 1 (2010). It's really can be seen on Fig. 4. These concepts are linked through *safety* and *watchkeeping*. (See Fig.5).

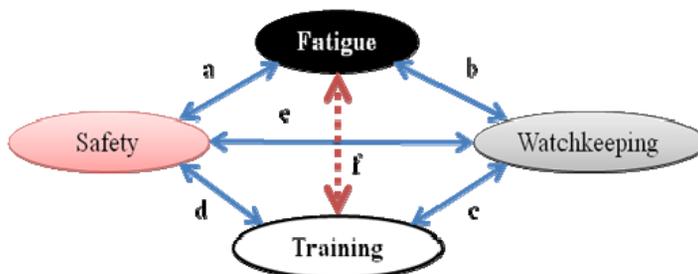


Fig. 5 Relations between selected concepts.

The textual examples of concepts, extracted by Leximancer from Manila Amendments, are the following (as per Leximancer format):

- (a) Concepts: safety and fatigue (direct link). STCW/CONF.2/DC/1, ANNEX, Page 36 CHAPTER VIII. Watchkeeping. Regulation VIII/1. Fitness for duty. 1 Each Administration shall, for the purpose of preventing **fatigue**: .1 establish and enforce rest periods for watchkeeping personnel and those whose duties involve designated **safety**, prevention of pollution and security duties in accordance with the provisions of section A-VIII/1 of the STCW Code; and .2 require that watch systems are so arranged that the efficiency of all watchkeeping personnel is not impaired by **fatigue** and that duties are so organized that the first watch at the commencement of a voyage and subsequent relieving watches are sufficiently rested and otherwise fit for duty, [4].
- (b) Concepts: fatigue and watchkeeping (direct link). STCW/CONF.2/DC/2 ANNEX 1 Page 220 CHAPTER VIII Standards regarding **watchkeeping** Section A-VIII/1 Fitness for duty 1 Administrations shall take account of the danger posed by **fatigue** of seafarers, especially those whose duties involve the safe and secure operation of a ship. 2 All persons who are assigned duty as officer in charge of a watch or as a rating forming part of a watch and those whose duties involve designated safety, prevention of pollution and security duties shall be provided with a rest period of not less than: .1 a minimum of 10 hours of rest in any 24-hour period; and .2 77 hours in any 7-day period [5].
- (c) Concepts: watchkeeping and training (direct link). 4 Every candidate for certification as officer in charge of a navigational **watch** on a seagoing ship of less than 500 gross tonnage engaged on near-coastal voyages shall: .1 be not less than 18 years of age; .2 have completed: 2.1 special **training**, including an adequate period of appropriate seagoing service as required by the Administration, or 2.2 approved seagoing service in the deck department of not less than 36 months, [4];
- (d) Concepts: training and safety (direct link). 6 For the purpose of updating the knowledge of masters, officers and radio operators, each Administration shall ensure that the texts of recent changes in national and international regulations concerning the **safety** of life at sea, security and the protection of the marine environment are made available to ships entitled to fly its flag. Regulation I/12 Use of simulators 1 The performance standards and other provisions set forth in section A-I/12 and such other requirements as are prescribed in part A of the STCW Code for any certificate concerned shall be complied with in respect of: .1 all mandatory simulator-based

training: .2 any assessment of competency required by part A of the STCW Code which is carried out by means of a simulator; and .3 any demonstration, by means of a simulator, of continued proficiency required by part A of the STCW Code, [4].

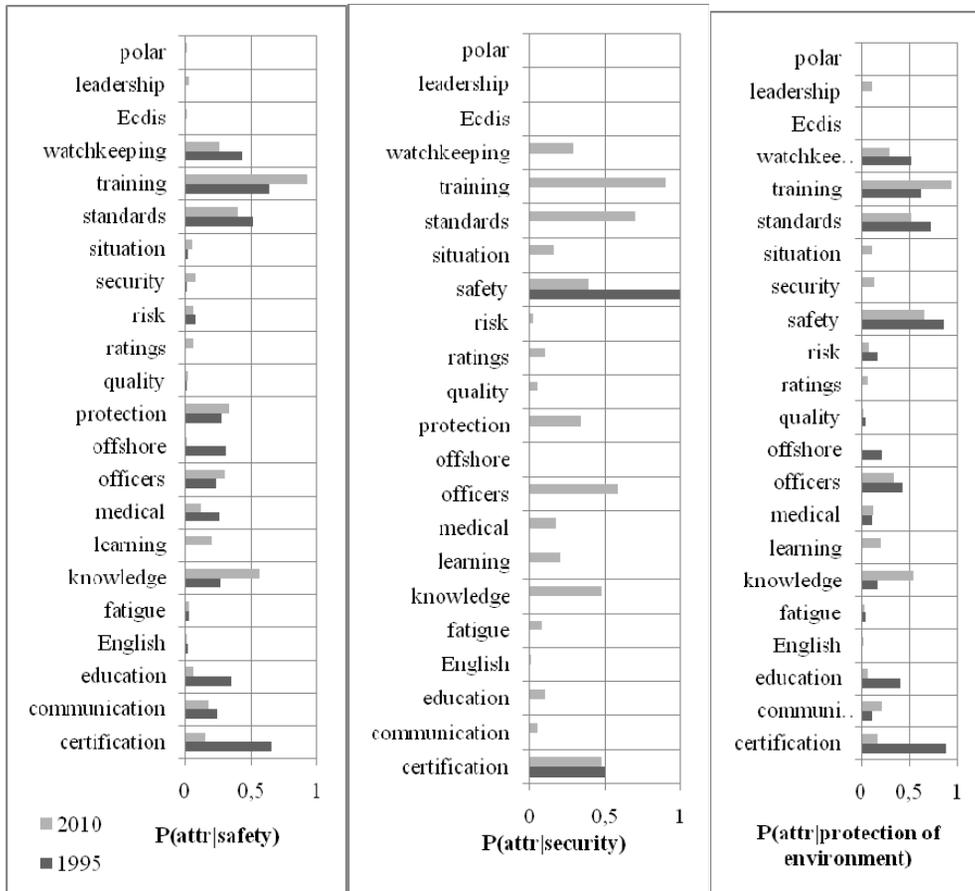


Fig. 6 Relationships between concepts *safety, security, protection* and some their attributes in 1995 and Manila Amendments to STCW 78

- (e) Concepts: safety and watchkeeping (direct link). **Watchkeeping** personnel shall notify the master/chief engineer officer/officer in charge of watch duties without any hesitation when in any doubt as to what action to take in the interest of **safety**,[5].
- (f) Concepts: fatigue and training (indirect link). In particular, the minimum rest periods specified in section A-VIII/1 should not be interpreted as implying that all other hours may be devoted to watchkeeping or other duties; the frequency and length of leave periods, and the granting of compensatory leave, are material factors in preventing **fatigue** from building up over a period of time; and the provisions may be varied for ships on short sea voyages, provided special safety arrangements are put in place ,[6].

So, the mining of direct and indirect links between two concepts as *fatigue* and *training* from both texts of amendments shows the relative importance of concepts for STCW versions and indicates the appropriate trend that can be applied for future research and improvements of STCW 78, as amended.

The observation confirms the statement, that it is possible to reduce fatigue by appropriate education and training of seamen, [10].

Every other concepts can be investigated by the same way and reader can use the data presented in the paper, (See Fig.6), to make his/her own initial conclusions on the 1995 and 2010 texts.

The other selected concepts and their trends can be seen also on Fig. 6, where it's possible to observe relationships between concepts *safety, security, protection* (of environment) and their selected attributes in 1995 and Manila Amendments to STCW 78.

4. Findings and results

The Leximancer formal research of selected concepts and their trends extracted from 1995 and 2010 STCW amendments revealed the following:

- As per Manila Amendments, the concept *fatigue*, which is extremely responsible for safety at sea in general, is very much influenced by the *training* and there is a trend of increasing this link. It also proves the substantially increasing role and significance of MET.
- The importance of such concepts as *training, knowledge, situation* (awareness), *protection* (of environment) and *leadership for safety* is increasing, as well; It is challenge for MET institutions to follow and reflect the trend in timely manner.
- As a *security* is a new concept in STCW Convention and Code, the significance of all security's attributes is formally raised, except *safety*. This result was not investigated in the paper.

At the end, it is to say that the issue of *manning* is not investigated in this paper. We have no reasons to do it. Resolution 6, *Standards of training and certification and ships' manning levels*, adopted by the Diplomatic Conference affirms that the STCW Convention and Code are instruments concerned with standards of training and certification and do not determine ships' manning levels; But however taking this into account and also, whereas the strict relationship between the concepts *training* and *fatigue*, and *manning* and *fatigue* exists as well [11], it should be concluded that the concept *manning* in principle has a link with the *training* and this relationship is not to be ignored in development of regulations.

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