

## Towards STCW 2012: an analysis and discussion of selected topics

**Fred Anstey**

*Coordinator of Programs, Fisheries & Marine Institute of Memorial University,*

[fanstey@mi.mun.ca](mailto:fanstey@mi.mun.ca)

**Catherine Dutton**

*Head School of Maritime Studies, Fisheries & Marine Institute of Memorial University,*

[cdutton@mi.mun.ca](mailto:cdutton@mi.mun.ca)

**Abstract** A diplomatic conference was convened in Manila in June of 2010 to adopt major revisions to the Standards of Training, Certification and Watchkeeping for Seafarers (STCW). The original 1978 Convention and Code were designed to establish basic requirements for training, certification and watchkeeping on an international level. In 1995 STCW was revised to give greater oversight, and to provide strict implementation obligations. The International Maritime Organization (IMO) has required the latest comprehensive review to reconcile inconsistencies and to address current global challenges. The call for submissions saw those with vested interests putting forward their views on needed changes. While all submissions had the interest of the global shipping community at heart, it is inherent, that with such diverse interests, the inevitable and resultant lobbying and negotiations would impact the final outcome. The revisions pertaining to marine security stipulate mandatory training for all levels of shipboard personnel as dictated by the International Ship and Port Facility Security (ISPS) Code. Mandatory training for the shore-based position of Company Security Officer (CSO) will continue to be ignored. Bridge and Engine-room Resource Management has been moved to the mandatory section of the Code but with an apparent reduction in requisite training elements. Advances in technology have created the need for and recognition by STCW of the electro-technical officer. With an overall increase in training as detailed by the revised STCW it will become increasingly difficult to monitor conformance, including adherence to the requirements for refresher and revalidation training. This paper will review these selected subject areas that have undergone changes in this latest iteration and due to enter into force in January 2012. A brief analysis of STCW training requirements for marine security, Bridge Resource Management (BRM), the electro-technical officer, and for refresher training and certificate revalidation has been undertaken and is presented as a catalyst for thought and discussion.

**Keyword:** *Electro-technical, resource management, MET, refresher training, security, STCW.*

### 1. Introduction

In 2006 the Maritime Safety Committee (MSC) of the IMO at its 81st session [1] initiated the process for a comprehensive review of the Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 as amended in 1995 (STCW) and the STCW Code to ensure that it continues to meet the new challenges facing the shipping industry. The initial work of defining the issues for review was delegated to the Sub-Committee on Standards of Training and Watchkeeping (STW), with a target completion of 2008. A subsequent draft text of amendments was prepared for consideration at the Diplomatic Conference held in Manila in the Philippines, June 2010. The adoption of these amendments will have impact on a number of areas for the training and certification of seafarers at all levels. Although each administration that is party to STCW is required to meet this Code, interpretation and application due to the individual regulatory structures will no doubt create variance in the actual standards applied. This paper will focus on a several areas where the changes to STCW (1995) will still need clarification. The additional requirements related to marine security - familiarization, awareness, and for those with designated security duties – needs clarification as to who will need what level and type of training and who will provide the training and certification. Moving Bridge Resource Management (BRM) and adding

Engine-Room Resource Management (ERM) to the operational level along with an emphasis on leadership and decision-making at the operational and management level will impact Maritime Education and Training (MET). With the advancement in technology for electrical and electronic equipment on board the modern vessel, and the introduction of the electro-technical officer and rating, we may see a reduction in the role of the marine engineer as it now exists. Administrations may or may not require this new certificate for manning purposes, so clarification will be needed as to who will maintain and repair this sophisticated equipment. Although STCW identifies requirements for refresher training and revalidation of certification the varying methods recognized and used for establishing continued professional competence may vary from country to country to the extent that the same standard is not always achieved.

## **2. Marine Security Training**

The events of 9/11 and the subsequent development and implementation of the ISPS Code by IMO called for security specific training. The focus of the STCW 1995 did not reflect the current threats to shipping from a security perspective. It was imperative that the newest iteration of STCW would be designed to help meet the IMO mission statement of ‘safe, secure and efficient shipping on clean oceans’.

Other papers by Anstey [2] [3] had previously identified problems with the STCW 95 in the context of security training. Unfortunately the STCW as adopted in Manila [4] does not recognize all of the training realities as created by IMO through the ISPS Code including the shore-based positions of Company Security Officer (CSO) and Port Facility Security Officer (PFSO). This paper will not otherwise revisit this matter but instead focus on how the revised STCW now proposes to address the other required security training.

### ***2.1 Ship Security Officer***

There are two significant changes noted in Chapter VI of the STCW as revised. Section A-VI/5 outlines mandatory requirements for the Ship Security Officer (SSO). This section had been previously modified by IMO through Resolution MSC.209 (81) [5]. The June 2010 modifications do reflect these changes listing the minimum mandatory requirements for the SSO and the standard of competence. Table A-VI/5 lists five competences relating to the implementation of the security plan; risk assessment; security inspections; operation and maintenance of security equipment; and vigilance and awareness. The listing of only five competencies may suggest an equal weighting for each which would not necessarily reflect the emphasis required by ISPS. The primary duty of the SSO is the implementation of the ship security plan (SSP) and thus this identified competency is an important one. However three of the other listed competencies relating to security equipment, security inspections, and security awareness are normally addressed in sections of the security plan and in practice would be subsets of this competency.

The competency relating to risk assessment is beneficial for the SSO as ongoing risk assessment is an important function for any security regime. However it must be noted that the CSO has the overall responsibility for conducting risk assessment used in the design or modification of the Ship Security Plan (SSP). The SSO would not normally be tasked with formal risk assessment or the use of risk assessment tools.

The associated ‘knowledge, understanding, and proficiency’ (KUPs) as listed in Table A-VI/5 do generally reflect requirements as listed in the ISPS Code. However there is one notable difference. In seven different KUPs there is now specific mention of piracy and armed robbery. None of the competencies and KUPs denotes any other specific security threats. The ISPS Code centers on risk assessment as it pertains to each vessel, when developing the ship security plan. For example some vessels may trade in areas with a high incidence of stowaways. Others of course would be in areas with high levels of piracy. Normally then risk assessment will determine what risks are likely and the security plan will detail the associated security measures to be in place. Piracy is not new. The rate of piracy was high at the time of 9/11 and the development of the ISPS Code. It may be argued that the inclusion of just one

specific threat may skew the emphasis of the security plan instead of basing it on individual risk assessment. To be frank, the ISPS Code was developed mainly in response to terrorism. Piracy now appears to be the current security ‘flavor of the month’. Some will argue that the inclusion of specific mention of ‘piracy and armed robbery’ in the STCW revision reflects certain current realities. However others may see it as reactionary to the high profile piracy attempt of the American flagged Maersk Alabama in April 2009, and this opinion may be supported through the timing of the position paper by the United States [6] in October 2009 and accepted by the sub-committee on STW [7] as evidenced in its report of January 2010.

## ***2.2 Security Familiarization and Awareness Training***

The most notable change in the newest version of the STCW is the inclusion of a new Section A-VI/6 which stipulates mandatory minimum requirements for security related training and instruction for seafarers. This issue had not previously been addressed by the STCW although the ISPS Code [8] does identify training requirements for both shipboard personnel who have specific security duties and for personnel who do not have such duties. The ISPS Code states that persons *should have* this training, while the latest version of STCW now specifies mandatory training. This current version also allows for transitional provision until January 1, 2014, however this aspect will not be further discussed in this paper but rather it will focus on the new mandatory requirements.

Section A-VI/6 identifies standards of competence for three areas, namely security-related familiarization training; security-awareness training; and training for seafarers with designated security duties. Only the latter two have associated tables specifying competence, KUPs, methods for demonstrating competence and criteria for evaluating. It is unclear exactly how the three are suppose to relate to each other with an apparent redundancy with the inclusion of ‘security-related familiarization training’. Are the three areas of training to be treated separately or are the latter two to be considered to be a subset of the ‘security-related familiarization training’?

The standard for security-related familiarization training applies to all seafarers on vessels covered by ISPS and identifies only three topics namely, reporting to, and responding to security threats and incidents, and training related to security emergency procedures. It appears that this training is to be part of the onboard orientation as it is stipulated that it is to be conducted by the SSO or similarly qualified officer. It is important to note that this training is to be approved but the entity conducting approval and how, is not specified.

The standard for security-awareness training stipulates training for seafarers in any capacity on ISPS applicable vessels other than those with security related responsibilities. There are three listed competencies but with ten broad-based KUPs, all of which are a subset of the standards for seafarers with designated duties. The standards require appropriate approved training and evidence of meeting the standard through a demonstration of competence and by examination or continuous assessment as part of an approved training program. How this standard is to be monitored is not quite clear.

The standard for seafarers with designated duties stipulates a demonstration of competencies as identified in Table A-VI/6-2, and by examination or continuous assessment. The Table identifies four main competencies with twenty-one broadly based KUPs. It is the only standard where certification is specifically identified in Part A of the STCW Code. Interestingly Table B-I/2 identifies a ‘Certificate of Proficiency’ for both this and the awareness training however neither endorsement or registration or revalidation is required for either.

From this educator’s experience in maritime security training the new requirements of STCW regarding training as covered in A-VI/6 and B-VI/6 is convoluted and to some degree nonsensical. For one, it requires training for seafarers on ISPS applicable vessels only. This may be more pertinent if the seafarer was to work on only one ship throughout their career. However for most this is unlikely and as they move through their seagoing career it is unclear who is to keep track of the level of training that was required; that was provided; and how it was recorded. Additionally is it only those persons on ISPS applicable vessels that should require the training? For example a Declaration of Security (DoS) is required when a port facility or vessel interfaces with vessels that do not have a security plan. Further, a vessel to which

ISPS does not apply and that is interfacing with an ISPS compliant facility, and with a crew not required to have the above noted training, at least theoretically, would not know the requirements of ISPS, including typical access control requirements, security levels, restricted areas and so forth.

The guidance in Part B of the STCW Code states that *for each* of the three above mentioned training scenarios as applicable, seafarers should complete the training at least one time in their career. The purpose of the training for the seafarer with designated security duties, as stated in Part A of the revised STCW, is to enable every candidate to perform the designated ship security duties. The ship specific security plan is based on the vessel risk assessment and will take into account the nature and area of the trade, and the unique vessel operational and physical characteristics. How will one set of training apply to each subsequent vessel? Further if a seafarer with designated security duties and receiving applicable training subsequently joins another vessel where she does not have those duties, is she now required to receive training in security awareness?

The mandatory requirements of A-VI/6 insist that seafarers receive approved security training or instruction for security-related familiarization training and for designated security duties. It further states that security-familiarization training is to be conducted by the SSO or an equally qualified person. The guidance of Part B-VI/6 of the STCW - referring to pertinent sections of the Code - states that security training does not have to meet the standards as normally required by STCW in the areas of structure, training, assessment, or instructional competence. How then will these standards be monitored and by what entity? An addition to Section A-I/4 of the STCW Code specifies that for seafarers with designated duties the assessment - normally by port state control officers - is only to be conducted in the case of clear grounds that security duties are not being carried out. For all other training, assessment appears to be proactive instead of in this reactive manner.

Equally important is that training now appears to be shifting more and more to the ship's officer. These officers are normally hired based on seagoing qualifications, competencies and abilities. Where are the similar quality training standards to those that are thrust upon MET institutions? Is the ship's officer qualified as an educator / trainer, and in fact does he want to be involved in the provision of training? Through the proliferation of codes, conventions, regulations and so on we have placed a tremendous burden on ships' officers. Why then do we wonder that it is so difficult to attract more people to this profession?

The newest version has some evidence of covering the topic of security in a more holistic manner with mention of security in other sections such as chapter VIII on watchkeeping. However when reviewing the STCW revisions *in toto* it appears that this topic is not interwoven throughout to the degree expected considering the current version of the IMO mission statement and the emphasis placed on security, rather it is addressed by interspersing the word 'security' in some of the broad statements.

A more simplistic and appropriate approach for security training, for *all* seagoing personnel, would be mandatory training similar to that done for safety training. For example a one-day course covering similar topics as covered in the SSO course but at a reduced level maybe the appropriate method. All mariners would then have a basic understanding of the security regulations. Specific security duties pertaining to each ship and voyage could be undertaken on board ship, facilitated due to the mariner having the previously mentioned basic but mandatory security training.

### **3. Bridge Resource and Engine-Room Resource Management Training**

Bridge Resource Management (BRM) was incorporated into Part B (guidance section) of STCW when amended in 1995. However it, along with Engine-Room Resource Management (ERM), will become mandatory with the new STCW revisions. The rationale for this change is simple – numerous marine casualties and incidents have been attributed to poor BRM practices [9]. Transportation Safety Board (TSB) reports have concluded that approximately 80% of these accidents are related to human error [10]. Although these authorities have not clearly defined human error, it is generally accepted to be related, in part to, management skills, operator status, the work environment, knowledge, or decision-making

practices. It was therefore proposed to include key elements of BRM in Part A of the Code. What then are these key elements?

Currently Section B V-III/2 of the STCW Code outlines BRM principles in order to ensure that duties are clearly assigned and understood and that qualified individuals are able to carry out these duties as assigned. It stipulates that the necessary equipment must be available and working; that distractions are removed; and that communication is clear. Members of the navigational watch must at all times be prepared to respond efficiently and effectively to changing circumstances [11].

Examples of accepted definitions for BRM include, “the effective management and utilization of all resources, human and technical, available to the Bridge Team to ensure the safe completion of the vessel’s voyage” [12] and “the study of human behavior in a specific circumstance: humans operating ships” [13]. The scope covered by these definitions is broad, and the interpretation for development and delivery of BRM training to date has not always been consistent. What then will be the standard under the STCW as amended? Using the principles as now outlined in STCW, current BRM courses have been developed ranging in time from three to five days and although common topics include situational awareness, master/pilot relationship, error-chain analysis, passage planning and the human factor, other courses also include crowd and crises management and cultural awareness.

Traditionally BRM has been taught at the management level and the initial proposal, for inclusion as mandatory training, was to insert BRM in Table A-II/2. However, as the officer-in-charge of the navigational watch (OOW) is responsible for assessing how bridge watch resources are being allocated and used during his/her watch it is now suggested that situational awareness along with communications, leadership, and the allocation and prioritization of resources be additionally included at the operational level. A new emphasis on leadership and decision-making at both the operational and management levels further expands the role of all shipboard personnel. We do need to be cautious on the scope of the training for the OOW - which typically includes cadets. BRM training taken by senior officers, as it has been conducted to date, may not be fully appreciated by or applicable to the OOW. Do they have the skill sets and experience as an officer-in-training to reach to the same level as we would expect of a master or experienced ship’s officer?

It is possible that we need two levels of training in order to cover both bridge teamwork, and the leadership and management aspects of the operation. At the operational level it is necessary to understand and effectively apply procedures for bridge teamwork as part of maintaining a safe navigation watch. Knowledge of leadership and team-working skills will have some part to play. At the management level additional emphasis will be required for leadership and management styles training.

What will become the standard for this training has yet to be determined. We have an IMO model course for Ship Simulator and Bridge Teamwork – will this satisfy the requirements for BRM under Table A-II/1 of STCW?

Although the emphasis has typically been in BRM, the whole area of Engine-Room Resource Management and the leadership and management skills as outlined in Tables A-III/1 and A-III/2 needs to be addressed in a similar manner. The scope of the actual training at the operational versus the management level will need to be addressed by national regulators and by MET.

#### **4. Electro-technical Officer Training**

The roles and responsibilities of the marine engineer have changed in the past decade due to the evolution of technology and advances in control systems and automation. We have seen the training for marine engineers change to meet these new requirements. The eventual addition of the electro-technical officer and rating to the STCW Code may in the long term also impact the role of the marine engineer.

Maintaining new electronic navigation and communications technologies for shipboard systems such as Automatic Identification Systems (AIS), Electronic Chart Display and Information Systems (ECDIS), Automatic Radar Plotting Aids (ARPA), and Global Marine Distress and Safety System (GMDSS), will become the responsibility of the electro-technical officer. Although, specifying the competence necessary will ensure that people employed as electro-technical officers are duly trained and certified, there is an

apparent overlap with the certification of the marine engineer. Does this mean that we will see a lessening of the training requirements for the marine engineer and with a resultant impact of their role on board ship?

If, with the introduction of more automation and control systems, there has been a reduction in the workload of the marine engineer, while at the same time they are required to have detailed understanding of electrical and electronic system we are left to wonder what will the marine engineer of the future look like. With the advances in technology, both electrical and electronic, and the need to have a person capable of maintaining and repairing these new systems we are seeing the job increasingly being undertaken by trained electrical or electronic technologists, who although have a knowledge of electrical and electronic systems, lack in the knowledge of marine (shipboard) systems [14]. In Canada we are currently seeing the education of the marine engineer being expanded to include marine computer science and networks [15]. There have also been attempts to “marinize” land-based electricians, with varying results.

It is possible that the electro-technical officer and the marine engineer would require the same competence in maintaining and repairing electrical and electronic equipment but the electro-technical officer would not be required or have the same level of knowledge in terms of the operation and repair of traditional marine equipment. Given that the training for the marine engineer also includes the electrical and electronic systems tied to the ship’s propulsion, could not their training be expanded to include the other systems, particularly the bridge navigation and communications? In the long term we would produce a stronger marine engineer who was capable of dealing with all the systems on board the vessel. Although there are new requirements outlined in the amended STCW for the electro-technical officer and rating, it may ultimately be a matter of what industry decides that it requires and potentially in conflict with how administrations decide to interpret and implement the revised STCW.

## 5. Refresher Training and Revalidation of Certificates

During the comprehensive STCW review process there was a call by a number of parties for refresher courses in a number of areas. For example the Philippines [16] in a submission noted approximately 27 areas related to chapter VI of STCW where, in their opinion, training could not be conducted on board the vessel and where short refresher courses might be preferable. Although the revised version of STCW does not stipulate this wide-spread usage of such courses there is some provision for refresher and revalidation training. While of benefit this does create some difficulty in implementation.

The revised STCW has some specific requirements for refresher training, notably in the area of ‘crowd and crisis’ training. Regulation V/2 specifies mandatory minimum requirements for the training of ship personnel on passenger ships. However it further stipulates, at intervals not exceeding five years, appropriate refresher training or provision of evidence that the mariner has achieved the required standard of competence within the previous five years.

The STCW as revised also requires, through section A-I/7 and Regulation I/7 that administrations review the full instrument in order to identify where refresher training will now be required in order to update the standard of competence that will keep mariners current with the Code. It requires those administrations to provide to IMO an outline of the refresher and upgrade training as mandated. Additionally it requires through Regulation I/14 that administrations hold ship operators responsible for ensuring that seafarers will receive requisite refresher training.

In the cited examples it may be questioned as to the standard measure for such training or the standard measure of competence previously gained. Will some administrations require refresher training while others rely on the mariner’s competence? If so what will be the length and composition of the training and will it be consistent with that of other administrations? If not how will the standard of competence previously gained by the seafarer be ascertained, by whom, and how will that test compare to other administrations?

The revised STCW has amended but maintained the process of revalidation of certificates. The primary purpose of this section A-I/11 is to maintain professional competence. The section stipulates that competence may be established by, *inter alia*, approved seagoing service of twelve months in the previous five years; passing an approved test; or successfully completed approved training course(s). Regulation A-I/11 (revalidation of certificates) requires that seafarers holding a certificate and wishing to continue to qualify for seagoing service must establish continued professional competence in accordance with section A-I/11. A number of methods therefore may be used by varying contracting states to measure this 'professional competence'.

In Canada the Marine Personnel Regulations [17] allows continued proficiency to be demonstrated through twelve months of sea-time within a five year timeframe; or, a refresher course in marine emergency duties along with a written and oral examination; or, successful completion of a ship management course and refresher training in marine emergency duties. Currently no MET institution within Canada offers a recognized refresher course in marine emergency duties.

In the United States, the Code of Federal Regulations [18] stipulates, among other things, that seafarers applying for continued proficiency must have twelve months sea-time in the previous five years; or, pass a comprehensive and open-book exercise covering general subject matter; or, complete an approved refresher training course; or, be employed in a position related to the operation, construction, or repair of vessels and demonstrate knowledge on an applicable Rules of the Road open-book exercise.

These examples show some consistency but also some variance in how member states are applying this section of the STCW. Similar questions may be asked with regards to revalidation as was asked regarding refresher courses. How will the varying measures used by a member state compare? How will the standards of one member state compare to others - recalling that the examples given are for only two such states? This challenge will be further complicated with the new changes to STCW and in how states now perceive the changes and then include these changes into their national regulations.

## 6. Conclusion

The revisions to the STCW continue to outline the basic requirements for training, certification and watch-keeping on an international level with mandatory requirements to ensure oversight and to ensure global consistency. Additionally they strive to reconcile past inconsistencies and to address current global challenges. This updated convention and code has been designed by the global maritime community and it is they that will be impacted. As with any significant and far-reaching legislation the implications and impact will be fully realized only in the passage of time.

Some revisions will achieve the desired objective of improving the STCW while other areas will have continued or new flaws and deficiencies. This paper has discussed only four selected areas in the revised STCW. The required training for marine security is now included but potential problems exist with application, oversight and certification. Mandatory standards of competence, outlining the knowledge, understanding and proficiencies for bridge and engine-room resource management may need to be applied differently to junior officers as compared to senior officers. The new requirements for the electro-technical officer may have impact on safe-manning but will certainly require MET, in consultation with national administrations to provide new and updated training, along with pertinent professional development for faculty. Administrations will undertake a mandatory and comprehensive review of their national regulations in comparison to the newly revised STCW in order to determine what refresher training is required and how it will be developed and provided. The process for certificate revalidation has the potential to vary significantly from signatory to signatory. Interpretation for implementation is the challenge that lies ahead not only for signatories to STCW but also MET. Undoubtedly the challenges created by these revisions will require a major overhaul of course content and hence a significant allocation of resources. The expected entry into force of the revised STCW in January of 2012 will herald significant and in some cases unexpected change. Are we ready?

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