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SIMULATOR INSTRUCTOR - STCW REQUIREMENTS AND REALITY

It is now more than a decade that the Convention on the Standards of Training, Certification and Watch keeping (STCW) was adopted to improve the competency of the seafarers worldwide. One of the major new developments in the new convention was the concept of competency based training whereby the trainee was to prove the desired competency through the most appropriate means available. Simulators were mentioned multiple times, the competency tables to be used as tools for the training of seafarers by the instructors as well as for proving the competency by the trainees. This put heavy responsibilities on the simulator instructors in the METICs world wide for the quality training and assessment when using the simulators. The purpose of this paper is to examine in details what are the requirements set in by the Convention to be a simulator instructor and what in reality is the situation, with some recommendations to improve the situation in the interest of the maritime community.

Key words: simulator, instructor, qualification, training, STCW Convention.

1. INTRODUCTION

Why are simulators getting more and more importance for the training of seafarers? Simulator training is steadily replacing the in service training of seafarers and the STCW Convention also gives weightage to the training conducted at a simulator with the experience of an in-service training. Over the time, simulator training has started having more face value and weightage. Training needs to have both validity and reliability parallelly. Now simulators can simulate a diverse range of ship's types, scenarios and situations which in actual life may be rare to happen. This increases the validity of the simulator training vis a vis in-service experiences. And with regard to reliability, simulation can be very effective due to a positive control and training environment in

METICs whereas an in-service experience may have difficulties in controlling conditions and administrative procedures.

2. STCW REQUIREMENTS ON A SIMULATOR BASED TRAINING

STCW discusses the simulators under the three important headings;

- a) Training and assessment.
- b) Use of simulator.
- c) Minimum standards of competencies.

STCW95 mentions the possibility of using simulators as a tool during the discussion on *Training And Assessment* of seafarers as under;

Regulation-I/6-Training and Assessment.

Section A-I/6-Training and Assessment (Mandatory).

Section B-I/6-Guidance regarding Training and Assessment.

2.1 Regulation-I/6-Training and Assessment.

This regulation demands all parties to ensure that training and assessment of seafarers is in accordance with the STCW Code A and all instructors and assessors are appropriately qualified and competent to carry out their task.

2.2 Section A-I/6-Training and Assessment (Mandatory).

This section desires that if the training is being conducted using simulator;

- the instructor employed should have received appropriate guidance in instructional techniques involving the use of simulators, and
- have gained practical operational experience on the particular type of simulator being used for the training.

Moreover, when assessment is being done by using simulators, the assessor should have gained practical assessment experience on a particular type of simulator under the supervision and to the satisfaction of an experienced assessor.

2.3 Section B-I/6-Guidance Regarding Training and Assessment.

This section is meant for providing the guidance on how to comply with the corresponding section of Code A, and mentions the IMO Model Courses for Instructors and for Examination and Certification of Seafarers

Then there is a dedicated part of STCW, which highlights the *Use Of Simulators*, as under;

Regulation-I/12-Use of simulators.

Section A-I/12-Standards governing the Use of Simulators (Mandatory).

Section B-I/12-Guidance regarding Use of Simulators.

2.4 Regulation-I/12-Use of simulators.

This regulation gives a legal cover to the performance standards of marine simulators being used for the training and assessment of seafarers and their certification in compliance with STCW.

2.5 Section A-I/12-Standards governing the Use of Simulators (Mandatory).

This section has two parts:

- **Part 1** provides the performance standards of the simulators that can be used for the training and assessment of seafarers separately. STCW desires physical and behavioural realism of the simulators appropriate to the training and assessment objectives. Capabilities and limitations of the original equipment along with the possible errors should form part of the simulation. Simulators should be able to produce emergency, hazardous and unusual conditions for an effective training value. The most important aspect of the performance standards in STCW is the requirement of simulators to provide the simulator instructor with the control and monitoring facilities along with the recording equipment for an effective debriefing to the trainees.
- **Part 2** provides other provisions whereby training and assessment procedures have been discussed for the simulator trainers and assessors to have a standard conduct of the simulator training. STCW foresees briefing, planning, familiarisation, monitoring, and debriefing to be part of any simulator based exercise. It also highlights the importance of guidance and exercise stimuli by the instructor during the monitoring and use of the peer assessment technique in the de-briefing stage. Simulator exercises are required to be designed and tested by the simulator instructor to ensure their suitability for the specified training objectives.

2.6 Section B-I/12-Guidance regarding Use of Simulators.

STCW has made only the RADAR / ARPA simulator training mandatory for the seafarers and in this section, it gives a detailed guidance how to use the RADAR / ARPA simulator for training and assessment purposes.

RADAR Simulator. STCW highlights the following areas of the radar simulator when being used for the training and assessment of seafarers;

- Factors affecting performance and accuracy.
- Detection of misrepresentation of information, including false echoes and sea returns.
- Setting up and maintaining displays.
- Range and bearing.
- Plotting techniques and relative motion concepts.
- Identification of critical echoes.
- Course and speed of other ships.
- Time and distance of the closest approach to crossing, meeting or overtaking ships.
- Detecting course and speed changes of other ships.
- Effects on the changes of the own ship's course or speed or both.
- Application of the International Regulations for Preventing Collisions at Sea.

ARPA Simulator. STCW highlights the following areas of the ARPA simulator when being used for the training and assessment of seafarers;

- Possible risks of over-reliance on ARPA.
- Principle types of the ARPA systems and their display characteristics.
- IMO performance standards for ARPA.
- Factors affecting the system performance and accuracy.
- Tracking capabilities and limitations.
- Processing delays.
- Operational warnings, their benefits and limitations.
- System operational tests.
- Manual and automatic acquisition of targets and their respective limitations.
- True and relative vectors and typical graphic representation of target information and danger areas.
- Information on past positions of targets being tracked.
- Setting up and maintaining displays.
- Obtaining information from the ARPA display.
- Application of the International Regulations for Preventing Collisions at Sea.

Non-mandatory Simulators. STCW mentions the following non-mandatory simulation system, with the possibility of more systems used for the training and/or assessment of seafarers;

- Navigation and watch keeping simulator,
- Ship handling and manoeuvring simulator,

- Cargo handling and stowage simulator,
- Radio communications simulator, and
- Main and auxiliary machinery operation simulator.

STCW then briefly mentions the performance standards for these non-mandatory simulation systems. Here it is important to note that while STCW has discussed the RADAR / ARPA simulators in details, with a separate heading for training and assessment, all other simulators have been discussed with respect to the general provisions only. The RADAR / ARPA simulators are a very basic form of simulation when compared to the, for example, Ship Handling Simulator (SHS) in respect of the equipment fitted, complexity of operations and responsibilities of the instructor. While the discussion on the two RADAR / ARPA simulators is spread over a dozen pages, five non-mandatory simulators have been discussed in about four pages. This clearly implies that as far as a simulator instructor is concerned, he has to put in a lot to design and conduct the training and assessment exercises on these simulators with only a few details available in the Convention.

Finally, STCW mentions the simulators as one of the means to prove the competencies by seafarers. Chapter II, III and IV of Code A list down the competencies in the forms of tables required out of deck, engine room and radio personnel at management and operational levels. These competency tables enumerate multiple means to prove the competency and an approved simulator training is mentioned at numerous occasions together with the in-service experience and trained ship experience. This parallel between real ship and simulator itself puts heavy responsibilities on the simulator instructor to ensure that the simulator based training is designed and conducted in such a manner that it gives real time experiences to the trainees. A simulator training is required to put the trainee in almost the same working environment, mental scenarios and physical stress as onboard a real ship.

It may also be of relevance here to mention that the STCW convention lists down seven functions of seafarers at three different levels of responsibility. Competency tables are divided on the same lines and simulator based training has also to be structured on the same division.

The above parts also enumerate Performance Standards (physical realism, behavioural realism, minimum errors, instructor control, suitability for training objectives and man-machine interface), Training Procedure (briefing, familiarization, exercise stimuli, monitoring, debriefing, peer assessment) and Assessment Procedure (performance criteria, assessment criteria, briefing, grading methodology) to be adopted on simulators.

STCW also desires instructors and assessors on marine simulators to be appropriately qualified and experienced. As STCW has made only the RADAR/ARPA simulator training mandatory, more detailed instructions are available on this simulator to be used by the training centres. Then, STCW has

competency tables along with KUP for both the Deck and Engine Room, in Chapter II, III and IV (Code A) for Management and Operational levels. These tables also contain a column for the method of demonstrating competencies where simulators are listed as one of the means that can be used for the demonstration of competencies.

3. EFFORTS TO IMPROVE THE SIMULATOR INSTRUCTOR

Taking into account the importance of the simulator instructor in conducting a quality training on simulators and achieving the desired results of the competency based training of the STCW, there have been multiple efforts in the industry for improving the qualification of simulator instructors. Major efforts were as listed below;

3.1 World Maritime University

The World Maritime University designed a Professional Development Course (PDC) in 2004 with the aim to impart instructional skills to maritime simulator operators. This one week course was meant to assist both experienced and new simulator instructors as well as maritime lecturers to better understand the application of the STCW95 Convention in relation to the training and assessment of seafarers on marine simulators. The programme was supported by the simulation facilities and instructor staff of the MIWB, Ter-schelling. A certificate of attendance was issued by to the participants by the University.

Course objectives were as stated below:

1. to fully appreciate the application of the STCW95 to simulator training and assessment.
2. to enable the instructor to understand the functions, role and use of marine simulators as learning, training and assessment tools.
3. to provide the instructor with practical skills and experience in the planning, operation and evaluation of simulation based training and assessment of seafarers.
4. to be aware of the limitations of marine simulators when used to assess practical skills and competence of seafarers.

Several practical workshops formed an important element in the programme. Working in small groups, the participants developed and designed short training and assessment scenarios and exercises and conducted the same on supporting simulator facilities. The groups participated in, monitored and debriefed the exercises in order to evaluate the different approaches and meth-

ods used for training and assessment purposes. The range and extent of the coverage of simulation in the programme was adjusted depending upon the background of the participants and the availability of the simulation facilities.

The syllabus for Simulator Instructor Courses, as given by Prof. Muirhead, was as follows:

- STCW95 and the use of simulators.
- Competency based training.
- Training process.
- The role of instructor.
- Course design.
- Exercise development.
- Pre-briefing techniques.
- Simulator Familiarization.
- Monitoring and recording activity.
- De-briefing techniques and feedback.
- Assessment process.
- The role of assessor.
- Feedback and performance evaluation.
- Validation.

3.2 Train the Trainer Course

With the active involvement of the IMO and regional industry players, Train the Trainer Course has been conducted at the Integrated Simulation Centre (ISC), Singapore. This course was meant for improving the expertise of the simulator instructors in conducting the simulator based training. Participants were Nautical and Engineering officers both from the administration and METICs from South Asia, South East Asia and the Far East.

Such a Train the Trainer course was also conducted at the Regional Maritime Academy, Ghana, with the assistance of the IMO. Participants were from the African continent and aimed at promoting the simulator based training in the less developed countries and improve the quality of the simulator instructor.

3.3 IMO Model Course 6.09

Objectives

The objectives of the course include the planning and preparation of an effective teaching and instruction; the selection of appropriate methods of instruction and teaching materials; and the evaluation of the teaching and learning process.

Discussion

This model course is of 10 days duration with 6 hours of working time per day. The total time of 30 hours has been divided into 24 hours of class-room lecture time with 36 hours of activity. The main subject areas of the course are;

- STCW training requirements,
- Effective teaching environment,
- Appropriate training aids,
- Relevant lesson plans,
- Evaluation of learning, and
- Design of a course.

Under these main subject areas, multiple topics have been covered in details. Some of these topics are;

- Question / answer techniques,
- Use of Overhead Projector (OHP),
- Use of Board and Charts,
- Making handouts,
- Practical lectures,
- Various teaching methods,
- Use of slides and models,
- Use of video films.

A period of a 1.5 hour duration on day 6 has been kept for 'Role Play and Simulation'. This session envisages availability of the Radar / ARPA simulator and if that is not available, then only role play by the trainee instructors for their education on how to use the simulators for the training of seafarers is used.

A model course gives examples of different seating arrangements for example, u-shape, traditional school and lecture theatre depending upon no of trainees and space available. It requires trainee instructors to act as trainee and instructor at different times for learning various techniques to be used in a class room environment. Verbal and non-verbal communications are important for the instructor. His facial expression, dress and outlook, speaking style and use of vocabulary affect the learning process. A model course gives practical examples of how to make a lesson plan, handouts and OHP transparencies.

4. CONCLUSION AND RECOMMENDATIONS

STCW lays strong emphasis on the competency based training at all levels of the career of a seafarer. Simulators have been accepted as a major source of proving the competency and simulator instructors are desired to be appropriately qualified and experienced. When we look at the job description of a mar-

itime instructor employed on class room instruction and simulator based training, we find a major difference of the competencies required out of the instructor. While we find an IMO Model Course for the instructor to improve their instructional techniques, training of the simulator instructor have not attracted any effort to have a universal model course to act as the guideline for the training of simulator instructors. There is a strong need to have a IMO Model Course for the simulator instructors to draw the attention of the MET-ICs towards the specialities of the simulator based training. This will surely improve the competency of the simulator instructors and the effectiveness of the simulator training to achieve the objectives of the STCW.

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Sažetak

INSTRUKTOR NA SIMULATORU – ZAHTJEVI PREMA SCTW KONVENCIJI I REALNOST

Prošlo je već deset godina od usvajanja Međunarodne konvencije o standardima za izobrazbu, izdavanje svjedodžbi i držanju straže pomoraca (STCW), s ciljem da se poboljša stručna osposobljenost pomoraca širom svijeta. Jedna od glavnih novouvedenih postavki u novousvojenoj Konvenciji jest koncept obučavanja temeljen na stručnoj osposobljenosti, pri čemu pomorac na stručnoj izobrazbi treba dokazati svoju osposobljenost koristeći odgovarajuća raspoloživa sredstva. Pri tome se vrlo često spominju simulatori, kao i tablice osposobljenosti koje bi, kao sredstvo pri osposobljavanju pomoraca, trebao koristiti instruktor, ali i sami pomorci na stručnoj izobrazbi kao dokaz svoje osposobljenosti. Time se velika odgovornost stavlja pred instruktore na simulatoru širom METIC svijeta za kvalitetno obučavanje i procjenu osposobljenosti pri korištenju simulatora. Ovaj rad ima za cilj detaljno istražiti zahtjeve navedene u Konvenciji koje instruktor na simulatoru mora ispuniti, te kakva je u stvarnosti situacija u tom pogledu, uz preporuke kako poboljšati tu situaciju, a što je u interesu cjelokupne pomorske zajednice.

Ključne riječi: simulator, instruktor, kvalifikacija, obučavanje, STCW konvencija

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