ECDIS Training in China: from International to National

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Abstract: Based on the instruction of the challenge of Electronic Chart Display and Information System training in China, this paper presents the actions taken or to be taken in the collaboration of China Maritime Safety Administration, the maritime education and training institutions and the shipping companies to transfer the international paper requirements into national adequate practice. This includes national legislation, performance standards of training classrooms and simulators, the competence of instructors and assessors. Future considerations to further improve the effectiveness of ECDIS training, such as the standardization and accreditation system of ECDIS simulators, the use of new ECDIS model course, the development of automatic assessment tools and the establishment of ECDIS training forum, are also proposed in the paper.

Keywords: STCW, ECDIS, training, examination, officer, student, simulator, instructor competence, China

1. Introduction

The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, as amended in 2010 (STCW 2010) mandates that any marine officer keeping a navigational watch on any International Convention on the Safety of Life at Sea (SOLAS Convention) vessel where an Electronic Chart Display and Information System (ECDIS) is fitted must be trained and certified as competent in the use of ECDIS to maintain safe navigation in the forthcoming years. ECDIS training has greatly challenged the institutions of maritime education and training (MET) in China, as more than 200,000 marine officers in addition to the 20,000 officer cadets graduated annually are required to receive this training during the transitional years as per the China Maritime Safety Administration (referred to as the Administration hereinafter) statistics[1]. Unlike any other new training program introduced into the MET industry, ECDIS training sees a more complicated process in terms of the training difference between officer and student, the consideration of acceptance of prior recommended training, and the performance standards of training classrooms and ad hoc ECDIS simulators. Some officers have already received and have been certified in ECDIS training from MET institutions based on the recommendation of the shipping industries before the STCW 2010 became effec-
tive. Will the Administration accredit this kind of training as effective, obsolete or compromising? How will the different training programs between officers who have working experience onboard and students who are totally fresh with the ship be implemented? How will we ensure that the instructor is competent to conduct the training? What are the performance standards of training classrooms and the ECDIS simulators?

2. National Legislation

In order to fully and effectively implement the STCW 2010, China’s Ministry of Transport developed and issued the latest Code of Competence Examination and Certification for Seafarers serving on Sea-going Ships (referred to as the Code hereinafter) at the end of 2011. The Code has relatively general specifications dealing mainly with the authorization for government, the contents, category, issuance and endorsement requirements of the Certificate of Competence (COC), the seafarer rank and function, and the category and application of the competence examination etc. [2] Therefore, the detailed requirements regarding training courses such as ECDIS cannot be detected in the Code, but actually covered in the Implementation Rule for the Code, issued at the beginning of this year by the Administration which is the competent authority dealing with the maritime affairs and administration under the control of China Ministry of Transport. The Implementation Rule for the Code contains the specific requirements pertaining to the training time, theoretical examination subjects, practical assessment subjects, professional training subjects, special training subjects etc. based on the different seafarer rank and function, ship’s tonnage/main engine power, and the trading area. The Administration also accordingly developed the syllabus for each training subject required[3]. However, the specifications of the Implementation Regulation for the Code are actually focusing on the new officer students after the STCW 2010 entered into force (referred to as new students hereinafter) rather than the current marine officers certificated by the STCW 95 (referred to as current officers hereinafter). Hence, the Administration further developed the Implementation Rule for the Transitional Regulations of the STCW 2010, which is the specific legislation dealing with the training and examination requirements for transferring the current officer’s COC mandated by the STCW 95 into the new COC compliance with the STCW 2010[4]. The Three aforementioned legislations were all effective on 1st March 2012. ECDIS training and examination requirements are mainly contained in the two Implementation Rules.

2.1 Requirements for New Students

ECDIS training and examination requirements for new students enrolled by the MET institutions after STCW 2010 became effective shall fully comply with the requirements of the new STCW Code A and Code B. In China, the new students applying for the COC of third mate shall complete the ECDIS training and pass the examination. The exam method consists of theoretical and practical assessments. The theoretical knowledge is examined in the Navigation subject, but the practical knowledge is just examined as an assessment subject that is different from the professional training subjects that result in professional certificates being issued to trainees after completing successful training and examination. The relevant training syllabus mainly adopts the specifications and guidance regarding ECDIS mentioned in new STCW Code A and Code B. The overall training time is suggested to be 40 hours but actually dependent upon the individual MET institution. For the stu-
dents who were enrolled before 1st March 2012 but graduated after this date, the Implementation Rule for Transitional Regulations of the STCW 2010 shall also be observed.

2.2 Requirements for Current Officers

Current officers holding the COC mandated by the STCW 95 which will become obsolete in 2017 shall complete the ECDIS training and examination during transitional period from 1st March 2012 to 31st December 2016 as one of compulsory conditions for applying the new COC. Current officers are classified into two categories. One is the officers who have never attended the ECDIS training and examination before, the other is the officers who have attended the ECDIS training that was recommended by the Administration and the shipping industry and who have obtained the relevant document of compliance before the STCW 2010 entered into force. For the first category, there is no doubt that these officers shall fully receive the ECDIS training and pass the exam required by the Administration. For the second category, the Administration adopts a compromising action. That is to say, whether the Administration accepts the previous ECDIS training outcome before the STCW 2010 entered into force conducted by certain MET institutions is mainly dependent upon whether the previous ECDIS training materials, such as syllabus, teaching plan, teaching handout etc. comply with the relevant requirements. The Administration will evaluate these kind of ECDIS training materials submitted by the MET institutions. If these training materials are considered to be fully in compliance with the new ECDIS training based on the Administration evaluation, the officers who have received this ECDIS training are approved to be exempt from the new ECDIS training progress, but new ECDIS exams are still required to be taken for these officers. Otherwise, the second category of officers shall fully re-attend the ECDIS training and exam. New ECDIS training time for current officers in the transitional period is only required to be 16 hours based on the considerations that current officers have the advantage of working experience as opposed to the new students.

3. Training Classroom

Unlike other training courses where the theoretical lectures are normally presented in the common classroom while the practical contents are exercised in the laboratory, the best and most effective ECDIS training method is well acknowledged to be demonstration, i.e. both theoretical and practical lectures are presented in the training classroom fitted with ECDIS simulators. Therefore, the performance of the ECDIS training classroom is of paramount importance for determining the training effectiveness.

3.1 General Requirements

The Administration requires that the ECDIS training shall be conducted in the specific-purpose training classroom.(Fig.1) The training classroom is required to fit not only the common devices of multimedia classroom, such as overhead projector, whiteboard, instructor station, microphones and speakers etc., but also sufficient training computers with installed ECDIS software referred to as the ECDIS simu-
lator. Additionally, a set of real ECDIS equipment is required to be fitted in each classroom to complement the training which cannot be presented by using ECDIS simulators. Each trainee shall sit on an ECDIS training simulator and the maximum trainees shall be 40 in one training classroom under the control of at least 2 competent instructors.

![Figure 1. Layout of ECDIS training classroom](image)

### 3.2 Simulator Requirements

There is no doubt that an ECDIS simulator based on the intranet structure plays an important role in training and examination. Hence the simulator used for ECDIS training and examination is required to be endorsed by the Administration in advance. Even though the Administration does not specify concrete regulations regarding the ECDIS training simulator performance, the simulator used is recommended to be accredited by the recognized organizations such as DNV. The performance standards of the ECDIS simulator consist of both hardware and software aspects. Some performances of ECDIS simulator are strongly recommended by the Administration. The simulator stations shall include an instructor workstation and student workstations. Each student workstation is comprised of two monitors, one main machine and one set of mouse and keyboard at least. One monitor is fixed to display the ECDIS picture, the other alternatively displays the 3-dimentional visual view and radar picture which is synchronized with the scenario displayed on the ECDIS screen as shown in Fig. 2.
Figure 2. One student workstation with two displays

The student workstation ECDIS software shall at least comply with the requirements of the ECDIS onboard performance standard developed by International Maritime Organizational (IMO). The instructor workstation including multi displays shall be able to control and monitor all student workstations via the intranet communication and the specialized software (see Fig. 3 and Fig. 4). The instructor workstation can design different scenarios and distribute them to all or certain student workstations. The student workstations can see each other on the ECDIS simulator screen under the control of the instructor workstation.

Figure 3. Layout of instructor workstation
4. Competence of Instructor and Assessor

As an ECDIS course is primarily a technical course designed to teach proper operation of an ECDIS, unlike other training courses the instructor competence is rather difficult to define so that it deserved lengthy discussions in the validation of revised ECDIS model course on the IMO’s Subcommittee on Standards of Training and Watchkeeping 43 Session (STW 43) held from 30th April to 4th May 2012[5]. The Administration requires that the instructor shall have adequate sea-going experience, certificate qualification and have successfully completed a type-approved ECDIS course. The instructor shall have at least one level of COC higher than the trainees on the course. The instructor shall successfully complete the ECDIS training course organized and endorsed by the Administration before conducting the ECDIS training for trainees. As far as assessor competence is concerned, the assessor shall be an instructor other than the instructor of the trainees to be assessed.

5. Future Considerations

It is widely recognized that ECDIS is an important system to maintain navigational safety of ships in future. Nevertheless, there is no mature, effective and successful ECDIS training and exam experience for reference since mandatory requirements came into effect. There are no doubts that many issues regarding ECDIS training still need to be researched and practiced both internationally and nationally. The following proposed considerations to further improve the effectiveness of ECDIS training in China shall be put on the top agenda by the Administration in future. The Administration shall further consider whether the standardization and accreditation system of ECDIS simulator are applicable based on the overall evaluation of effectiveness of the current ECDIS simulators. A new ECDIS model course has already been validated by IMO in the STW 43 Session [5]. As this new model course is so comprehensive compared to the previous version including the introductions of exercise and assessment cases, the Administration shall research and experiment with this model course so as to adopt it into ECDIS training in

Figure 4. Control software of instructor workstation
China as appropriately as possible. In order to make the assessment more efficient, effective and objective, the Administration shall work hard with other organizations to develop automatic assessment tools by using computer programs. Also, the Administration shall encourage and support the MET institutions and the shipping companies to jointly establish an ECDIS training forum in order to provide timely feedback and evaluate the ECDIS training as a whole.

6. Conclusion

China’s Administration and MET industry are currently facing a strong challenge regarding ECDIS training and examination due to a large number of trainees waiting to be trained since STCW 2010 came into force. In order to meet both the international requirements and national de facto situations, ECDIS training and examination in terms of the national legislation, performance standards of training classroom and simulator, competence of instructor and assessor etc. have already been developed or conducted. As well, the standardization and accreditation system of ECDIS simulator, the use of new ECDIS model course, the development of automatic assessment tool and the establishment of ECDIS training forum have been promoted in China.

References