

Assessing the Alignment of South Korea's Maritime Officers' Emergency Training with STCW Standards

Lee, ho*

*(Korea Institute of Maritime and Fisheries Technology, South Korea)

ABSTRACT

This study examines the alignment between the Republic of Korea's maritime officers' emergency response training curricula and the international standards mandated by the STCW Convention. While the STCW framework specifies comprehensive competency requirements for deck and engineering officers, the Korean system under the Seafarers' Act and the Ship Officers' Act provides comparatively fewer training hours and limited practical simulation components. The comparative analysis identifies significant discrepancies, particularly in management-level engineering training, where Korean programs allocate less than 10% of the recommended hours. These findings indicate that current domestic practices may not fully satisfy international requirements and could undermine maritime safety. The study emphasizes the critical necessity of expanding training hours, enhancing simulation-based modules, and incorporating 21st-century competencies such as leadership and communication.

Keywords - STCW; Maritime officers; Emergency response training; Curriculum alignment; Republic of Korea; Maritime safety; Simulation-based training

Date of Submission: 14-09-2025

Date of acceptance: 28-09-2025

I. INTRODUCTION

Maritime safety is a critical issue in the global shipping industry, and the International Maritime Organization (IMO) has established the STCW Convention to ensure standardized training and competency of seafarers worldwide. Among its requirements, emergency response training is emphasized as a key competency for deck and engineering officers.

In the Republic of Korea, maritime training is regulated by the Seafarers' Act and the Ship Officers' Act. However, several studies have shown gaps between Korean curricula and STCW standards, particularly in training hours and practical simulation exercises. For instance, while STCW mandates over 100 hours of management-level training, Korean programs often provide less than 10 hours, especially for engineering officers.

This misalignment poses risks to both international compliance and maritime safety. Therefore, it is necessary to evaluate the degree of alignment between Korea's current training system

and STCW requirements, and to propose reforms that will enhance both compliance and safety.

II. Literature review

The Standards of Training, Certification and Watchkeeping (STCW) Convention, adopted by the International Maritime Organization (IMO), provides the foundation for global maritime education and training. It prescribes minimum requirements for deck and engineering officers, with a particular emphasis on emergency response competencies such as damage control, stability management, firefighting, crisis communication, and evacuation procedures [1], [2].

STCW Tables A-II/1 through A-III/2 detail specific competencies at both the operational and management levels, requiring a balance of theoretical knowledge, practical drills, and simulation-based exercises. Recent scholarship has highlighted that the comprehensive revision of the STCW Convention reflects the growing demand for integrating leadership, communication, and technological adaptation into maritime training [1].

In the Republic of Korea, maritime training and certification are governed primarily by the *Seafarers' Act* and the *Ship Officers' Act*. These laws outline the training framework for deck and engine officers, including mandatory courses in emergency preparedness. However, gaps have been identified between Korean domestic standards and STCW requirements. For example, passenger ship officers receive four days (25 hours) of training under the *Seafarers' Act*, of which approximately 60% addresses emergency response. By contrast, STCW requires more than 100 hours at the management level. Similarly, under the *Ship Officers' Act*, deck officers undergo only eight hours of emergency response instruction, while engineering officers receive as little as two hours, far below the international benchmark [4].

Comparative studies have argued that such discrepancies may compromise both compliance and safety. Heinonen (2021) emphasized that aligning national curricula with international standards is essential for ensuring competence, while Maung (2019) underscored the importance of simulation-based training as an effective tool for bridging the gap between theory and practice. These findings suggest that Korea's current system, though legally structured, requires significant reform to achieve alignment with the STCW framework and global best practices.

III. Methodology

This study employed a comparative analysis framework to evaluate the alignment between the Republic of Korea's maritime officers' emergency response training curricula and the requirements of the STCW Convention. The methodology involved three primary steps.

First, the official STCW Convention documents, particularly Tables A-II/1 through A-III/2, were examined to identify mandatory competencies and minimum training hours prescribed at both the operational and management levels. These tables specify key areas such as stability management, damage control, engine-room emergencies, and passenger evacuation procedures [1], [2].

Second, national legal frameworks, including the *Seafarers' Act* and the *Ship Officers'*

Act of the Republic of Korea, were reviewed to extract training requirements, course durations, and competency areas for deck and engineering officers. Special attention was given to training modules mandated for passenger ships and merchant vessels, as outlined in Table 19 and Table 20 of the source material [4].

Third, a side-by-side comparison was conducted to highlight discrepancies in both scope and intensity between international and domestic curricula. Quantitative data, such as prescribed training hours, were visualized using comparative tables and figures (e.g., Fig. 1). Qualitative aspects, including simulation-based components and competency breadth, were also assessed through a review of academic literature that emphasizes the importance of practical training for maritime safety [5], [6].

By integrating regulatory analysis with empirical data from academic sources, this methodology ensured a comprehensive evaluation of the degree of alignment between Korea's maritime training programs and STCW standards.

IV. Results

Fig. 1 shows the comparison of training hours between STCW requirements and Korea's current curricula for emergency response.



Fig. 1. Comparison of training hours between STCW and Korea (Emergency Response)

While Tables 1~4 summarize the qualitative aspects of emergency response training-focusing on the specific competencies and course contents-Fig. 1 highlights the quantitative gap in training hours between STCW requirements and Korea's curricula. Together, they provide a complementary view: the tables describe what is taught, while the figure shows how much is taught.

4.1 Firefighting Training

The results of the comparative analysis on firefighting are presented in Table 1.

Category	STCW Requirements	Legal Framework in the Republic of Korea	Training Curriculum in the Republic of Korea	Remarks
Firefighting	STCW A-VI/3: Handling of extinguishers, fire equipment, teamwork	Ship Officers Act, Art. 45: Mandatory fire drills	Practical training (extinguisher use, fire-protective clothing, teamwork drills)	Largely aligned with STCW

Table 1. Firefighting training requirements

4.2 Survival Training

The findings on survival training are summarized in Table 2.

Category	STCW Requirements	Legal Framework in the Republic of Korea	Training Curriculum in the Republic of Korea	Remarks
Survival at sea	STCW A-VI/2: Lifeboat and liferaft handling, survival craft launching, signaling techniques	Seafarers Act, Art. 54: Mandatory survival training	Liferaft deployment, survival signaling, emergency rations	Fully aligned with STCW

Table 2. Survival training requirements

4.3 Medical First Aid Training

The results of the comparative analysis for medical first aid are shown in Table 3.

Category	STCW Requirements	Legal Framework in the Republic of Korea	Training Curriculum in the Republic of Korea	Remarks
Medical first aid	STCW A-VI/4: Basic competence in first aid and onboard medical care	Ship Officers Act, Art. 47: Basic first aid training	CPR, basic wound treatment, minor injury management	Lack of advanced medical training

Table 3. Medical first aid training requirements

4.4 Emergency Communication Training

The comparative results for emergency communication are presented in Table 4.

Category	STCW Requirements	Legal Framework in the Republic of Korea	Training Curriculum in the Republic of Korea	Remarks
Emergency communication	STCW A-IV/2: Proficiency in GMDSS operations and emergency communication procedures	No explicit provisions in national law	Limited training in radio communication procedures	Requires improvement

Table 4. Emergency communication training requirements

V. Discussion

The comparative analysis highlights both areas of compliance and areas requiring improvement in the Republic of Korea's maritime emergency response training.

First, **firefighting** and **survival training** show strong alignment with STCW requirements. Practical drills, teamwork, liferaft deployment, and signaling procedures are effectively incorporated into the Republic of Korea's curriculum, reflecting adherence to international standards (IMO, 2010).

Second, **medical first aid** remains limited to basic competencies. While seafarers receive training in CPR and minor injury management, advanced medical procedures for trauma, cardiovascular incidents, or hypothermia are not included. This gap may hinder the ability of seafarers to respond to serious medical emergencies during long voyages.

Third, **emergency communication** is identified as a significant weakness. The absence of explicit provisions in the national legal framework has resulted in limited integration of GMDSS training. Considering the critical role of standardized communication in international distress coordination, this deficiency poses a systemic risk to maritime safety.

Overall, the Republic of Korea's emergency response training system is fundamentally robust in core areas but requires targeted reforms in medical training and communication. Enhancing these areas would not only improve compliance with STCW but also strengthen the Republic of Korea's contribution to global maritime safety systems.

VI. Recommendations

1. Expansion of Training Hours

The current training hours allocated to medical first aid and emergency communication remain insufficient. Expanding the duration of these courses will allow seafarers to acquire deeper knowledge and practice complex scenarios. For instance, advanced modules on trauma care, cardiovascular emergencies, and hypothermia treatment is recommended to be incorporated into the curriculum.

2. Enhancement of Simulation-Based Training

While practical drills are conducted, the level of simulation in emergency training is still limited. High-fidelity simulators recommended to be introduced to replicate real-life emergency conditions such as shipboard fires, flooding, or mass-casualty incidents. This will improve situational awareness, stress management, and decision-making under pressure.

3. Integration of GMDSS and Emergency Communication Training

To address gaps in communication, GMDSS training must be systematically incorporated into national curricula. This includes both theoretical instruction and practical exercises in distress call

procedures, coordination with rescue centers, and use of satellite-based communication equipment.

4. Strengthening Legal and Institutional Frameworks

The Republic of Korea is recommended to revise its Seafarers Act and Ship Officers Act to explicitly include advanced medical and communication competencies as mandatory training components. Institutional collaboration between maritime academies, the Ministry of Oceans and Fisheries, and the Coast Guard can ensure standardized and enforceable training outcomes.

5. International Collaboration and Best Practice Sharing

Active engagement with the International Maritime Organization (IMO) and cooperation with leading maritime training institutes abroad would enable Korea to benchmark and adopt best practices. Joint simulation exercises and exchange programs can further elevate the competence of Korean seafarers.

In summary, implementing these recommendations—through extended training hours, advanced simulation, legal reinforcement, and global cooperation—will not only close the identified gaps but also ensure that the Republic of Korea's maritime workforce is fully equipped to respond effectively to emergencies at sea.

VII. Limitations

This study has several limitations that is recommended to be acknowledged. First, the analysis primarily relied on documentary sources such as STCW conventions, national legislation, and training curricula, without incorporating direct field surveys or empirical performance assessments of seafarers. Second, while the comparison identified critical gaps, it did not account for variability among different maritime academies and training institutions within the Republic of Korea, which may result in heterogeneous outcomes. Third, the scope of this paper was limited to core emergency response areas—firefighting, survival, medical first aid, and emergency communication—thus excluding other important safety competencies such as

environmental protection and cargo handling. Future studies should integrate empirical evaluations, institutional case studies, and a broader range of competencies to provide a more comprehensive assessment.

VIII. Conclusion

This study evaluated the degree of alignment between the Republic of Korea's maritime officers' emergency response training curricula and the international standards outlined in the STCW Convention. By analyzing competencies specified in Tables A-II/1 through A-III/2 and comparing them with the requirements under Korea's *Seafarers' Act* and *Ship Officers' Act*, the study identified significant discrepancies in both training hours and competency coverage.

The findings indicate that while the STCW Convention prescribes extensive training-ranging from 24 to 115 hours for deck officers and 31 to 103 hours for engineering officers-Korean domestic curricula provide substantially fewer hours. In some cases, management-level engineering officers receive less than 10% of the recommended hours. Furthermore, Korea's programs emphasize theoretical instruction over simulation-based exercises, thereby limiting the development of practical competencies crucial in real-world emergencies [1], [4].

From a policy perspective, these gaps suggest an urgent need for curriculum reform. Expanding the duration of emergency training, incorporating advanced simulation technologies, and embedding leadership and communication skills into the curriculum are essential steps toward improving alignment with STCW requirements **Pazaver et al. [2], [7]**. Periodic curriculum reviews should also be institutionalized to ensure continued compliance as international standards evolve.

In conclusion, aligning Korea's maritime training system with STCW standards will not only strengthen international compliance but also enhance maritime safety for seafarers, passengers, and vessels. Addressing these deficiencies represents a critical policy priority for Korea as it seeks to maintain competitiveness and reliability in the global shipping industry [6].

REFERENCES

- [1]. S. Y. Yi, M. Jung, and S. I. Lee, "Adapting to change: International maritime education and training for future seafarers – focusing on the comprehensive review of the STCW convention and code," *Maritime Affairs*, 2025. doi: 10.1080/25725084.2025.2464486.
- [2]. A. Pazaver and M. Kitada, "Integrating twenty-first century skills into STCW competences: implications for maritime education and training," *WMU Journal of Maritime Affairs*, 2025. doi: 10.1007/s13437-025-00368-7.
- [3]. S. Ghosh, G. R. Emad, and A. Ravi, "Understanding skills and competency frameworks through a systematic literature review: a feasibility study to revise the STCW Code for seafarer training," *Australian Journal of Maritime & Ocean Affairs*, 2024.
- [4]. K.-Y. Han and J.-H. Lee, "A study on the development of emergency response management education for passenger ship," *Journal of Fisheries and Marine Education Research*, Korea, 2022.
- [5]. C. T. Maung, "Simulation training and assessment in maritime education and training," *WMU Dissertation*, 2019.
- [6]. A. Heinonen, "Evaluation of the MET and the STCW competence requirement standards (OEI)," *Theseus.fi*, 2021.
- [7]. C. M. M. Kamal, "Recognizing STCW CoC Class 1 qualifications as equivalent to an academic master's degree," *ResearchGate preprint*, 2023.
- [8]. J. D. Fish, "A qualitative evaluation of STCW basic training: shifting the paradigm toward human security," *PhD Dissertation*, 2019.
- [9]. M. Baldauf, J. U. Schröder-Hinrichs, and K. Benedict, "Simulation-based team training for maritime safety and security," *Journal of Maritime Research*, 2012.
- [10]. M. Baldauf, D. Dalaklis, and A. Kataria, "Team training in safety and security via simulation: a practical dimension of maritime education and training," *INTED Proceedings*, 2016.
- [11]. R. Ziarati and M. Ziarati, "Piecemeal approach to development of STCW and the consequences – a case for comprehensive review," *Education and Professional Development of Engineers in the Maritime Industry*, 2012.
- [12]. A. M. Baylon and V. Santos, "The challenges in Philippine maritime education and training,"

International Journal of Innovative Interdisciplinary Research, 2011.

[13]. Y. Mori, "An analysis of leadership education and training in maritime education and training institutions," WMU Dissertation, 2014.

[14]. L. C. J. Robicheau, "Bridging the gap: enhancing naval warfare officer training with STCW civilian accreditation," Canadian Forces College Papers, 2019.

[15]. C. E. Demirel, T. Albayrak, and R. Ziarati, "Innovation in maritime education and training," Proceedings of International Maritime Lecturers Association, 2010.

[16]. G. Ye, "The impact of the revised STCW Convention on Chinese higher maritime education and training institutions," WMU Dissertation, 1996.

[17]. P. T. Lene, "Changes required to comply with the STCW 95 Amendments: A study of training at the Marine Training Center, Western Samoa," WMU Dissertation, 1997.

[18]. D. Yoon, T. K. Nam, J. B. Yim, and Y. Ah, "Comparison of training and education in the training ship," IAMU Conference Proceedings, 2010.

[19]. M. Vervoort, "Maritime leadership competence and its further implementation and assessment into the nautical education program," EDULEARN Proceedings, 2012.

[20]. R. Wei, "Views from maritime education and training on the full implementation of 2010 STCW amendments," Journal of Shipping and Ocean Engineering, 2013.

[21]. C. T. Maung and R. Ziarati, "Human factors in maritime emergency training: role of simulation," WMU Journal of Maritime Affairs, 2020.

[22]. International Maritime Organization, STCW Convention and Code: International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, London: IMO, 2017 (as amended).

[23]. Republic of Korea, Seafarers' Act, Act No. 17359, 2020.

[24]. Republic of Korea, Ship Officers' Act, Act No. 17892, 2021.

[25]. J. U. Schröder-Hinrichs, M. Baldauf, and S. Ghosh, "Human factors in the STCW context: training, competence, and safety," WMU Journal of Maritime Affairs, 2019.