

A Study on the Development of Training Model by Enforcement of the IP Code(SOLAS Chapter XV)

MoonGyo Cho*, JeongMin Kim*

*Lead Instructor, Ocean Technology Training Team, Korea Institute of Maritime and Fisheries Technology, Busan, Korea

*Professor, Ocean Technology Training Team, Korea Institute of Maritime and Fisheries Technology, Busan, Korea

[Abstract]

Through the 106th session of the International Maritime Organization(IMO)'s Maritime Safety Committee(MSC), a mandatory safety training requirement for all personnel transferred or accommodated for offshore industrial activities was established and adopted under the name of SOLAS Chapter XV, IP(Industrial Personnel) Code. This regulation mandates pre-boarding safety training to enable individuals to anticipate and mitigate hazardous risks in navigation and operational environments. Consequently, the IP Code includes provisions regarding the training content for industrial personnel and regulations for the refusal of master who has a full responsibility for individuals who have not completed the required training(non-qualified industrial personnel).

Referred to as the IP Code, this agreement is set to enter into force in July 2024, necessitating the establishment and operation of safety education for industrial personnel boarding ships before that date. Accordingly, this paper reviews the legal requirements related to training within IP code and analyzes the details of models including training objectives, target audience, duration, and course structure of safety trainings such as STCW, OPITO, GWO training, and other delegated training related to current ships. Additionally, it aims to propose a curriculum model for IP training courses which consists of a total of 16 hours over 2 days, offered by the Korea Institute of Maritime and Fisheries Technology, including teaching objectives, duration, and course structure.

▶ **Key words:** Industrial Personnel, Safety Training, Maritime Safety Committee(MSC), International Maritime Organization(IMO), SOLAS

-
- First Author: MoonGyo Cho, Corresponding Author: JeongMin Kim
 - *MoonGyo Cho (chosogood@seaman.or.kr), Ocean Technology Training Team, Korea Institute of Maritime and Fisheries Technology
 - *JeongMin Kim (jmkim@seaman.or.kr), Ocean Technology Training Team, Korea Institute of Maritime and Fisheries Technology
 - Received: 2024. 03. 28, Revised: 2024. 04. 15, Accepted: 2024. 04. 17.

[요 약]

국제해사기구(IMO) 해사안전위원회(MSC)의 제106차 회의를 통해, 해상 산업활동을 위해 이송되거나 수용되는 모든 인원에 대한 의무적인 안전 교육 요구사항이 SOLAS 제15장 IP(산업인력) 코드로 제정되고 채택되었다. 이 규정은 항해 및 작업 환경에서의 유해한 위험을 예측하고 완화할 수 있도록 승선 전 안전 교육을 의무화한다. 또한, IP 코드에는 산업인력을 위한 교육 내용 및 필수 교육을 이수하지 않은 산업인력에 대한 승선 거부 규정이 포함되어 있다. IP 코드는 2024년 7월에 발효될 예정이며, 그에 앞서 이러한 선박에 승선하는 산업인력을 위한 안전 교육이 개설되어 운영이 필요하다. 이에 따라, 본 논문에서는 IP코드 내 교육과 관련된 법적 요건에 대해 검토하고 현행 선박과 관련하여 진행되는 안전교육인 STCW 교육, OPITO 교육, GWO 교육 및 기타 수탁 교육의 교수요목, 교육대상, 기간 및 강의구성을 포함한 모델의 세부 내용을 분석하였다. 아울러 이를 통하여 총 2일간의 16시간으로 구성된 한국해양수산연수원에서 개설한 IP 교육과정 에 대해 교수요목, 기간 및 강의구성 등 커리큘럼의 모델에 대하여 제안하고자 한다.

▶ **주제어:** 산업인력, 안전교육, 해사안전위원회, 국제해사기구, 국제해상인명안전협약

I. Introduction

In February 2017, during the 4th Sub-Committee on Ship Design and Construction (SDC 4) convened by the International Maritime Organization (IMO), a proposal was jointly submitted by Germany and the United States. This proposal addresses the need to establish safety standards for the transfer of maritime industrial personnel and vessels involved in offshore wind power generation facilities among adjacent countries, including Europe[1]. The document recommends the incorporation of these standards into Chapter XV of the Safety of Life at Sea (SOLAS) convention[2].

Recognizing the increasing importance of offshore wind power generation facilities and the growing transfer of maritime industrial personnel and vessels among adjacent countries, Germany and the United States collaborated to present a comment document during the SDC 4 session in 2017[1]. The document emphasizes the necessity of developing comprehensive safety standards to govern the transfer of personnel and vessels engaged in offshore wind energy projects.

The primary objectives of the proposal are to

enhance the safety and security of maritime activities associated with offshore wind power generation facilities and to establish a standardized framework for the transfer of personnel and vessels across adjacent countries, with a particular focus on Europe[3].

The comment document submitted by Germany and the United States during SDC 4 in 2017 underscores the importance of establishing safety standards for the transfer of maritime industrial personnel and vessels in the context of offshore wind power generation facilities. The proposal advocates for a collaborative international approach and seeks to integrate these safety standards into SOLAS Chapter XV, reflecting a commitment to ensuring the safety and security of maritime activities in this evolving sector[3].

During the 106th session of the Maritime Safety Committee (MSC) in April 2022, a new addition to the existing SOLAS convention and the High-Speed Craft (HSC) Code¹⁾ was introduced. In an effort to establish safety requirements for the transportation of industrial personnel exceeding 12 individuals on

1) HSC Code : it refers to the international code on the safety of high-speed craft, adopted by the Maritime Safety Committee (MSC) through MSC.97(73). This code, established in the year 2000, focuses on the safety standards for high-speed vessels. The adoption, entry into force, and effectiveness of amendments proposed by the committee are subject to the provisions outlined in Article 8 of the agreement, specifically concerning the amendment procedures applicable to documents other than Chapter I.

cargo ships and high-speed vessels with a total tonnage of 500 tons or more, a new Chapter XV, referred to as the "Safety Measures for Ships Carrying Industrial Personnel²⁾" (IP Code), was adopted[4].

The code is scheduled to be enforced from July 1st, 2024, and will be applicable domestically including vessels involved in the construction of offshore wind farms. Within the code, there are provisions covering not only the structure and equipment of the vessels but also mandatory safety training that industrial personnel must undergo before boarding. Compliance with these regulations is required until the code comes into effect[4].

The safety training is a key requirement that mandates all individuals being transported or accommodated for the purpose of maritime industrial activities to undergo mandatory safety training before boarding. The primary objective is to ensure that passengers are prepared to anticipate and address hazardous and risky factors in the navigation and operational environment[5].

Therefore, there are two main purpose of this study. Firstly, it aims to review the training requirements that Industrial Personnel boarding ships subject to the IP Code should receive. Secondly, it seeks to analyze in detail the teaching objectives, duration, target and objectives of safety training courses for crew and other personnel boarding ships already in operation. The ultimate goal is to propose a standardized education model that Industrial Personnel should receive. Additionally, considering that this legislation is expected to be revised as implementing regulations of international conventions on ship safety, proactive steps are being taken to establish and operate training programs preemptively, providing essential training to be implemented in the industry.

II. Review and Analysis of the IP Code

2.1 Establishment Procedure and Objectives

As designated during the SDC 4, a draft IP code specified and discussed as a separate chapter which was addressed as agenda Item 7 during the SDC 5 held in January 2018. In this session, the principles for the development of the IP Code were determined. Subsequently with the re-established communication working group, the discussions held during the session and comment documents submitted were taken into account to commence the development of the IP Code[1].

Based on the decisions and discussions during the MSC 102, the SDC 8 meeting instructed the establishment of a working group specifically for industrial personnel and directed the completion of a new draft for the IP Code. Approval for these drafts was sought at the MSC 105[2][3].

The IP Code will not be subject to the four-year cycle of entry into force, as outlined in the Guidelines for the Entry into Force of the 1974 SOLAS Convention amendments (MSC.1/Circ.1481) Section 4 (Exceptional Circumstances). This means that the traditional adoption and entry-into-force procedures of the convention will be applied[5].

In the working group, the issues such as the validity of the IP certificate for ships including certificates for industrial personnel, equipment records, the quantity of life jackets for infants and children, and concerns related to transporting toxic substances, low flashpoint materials, or acids on ships carrying more than 60 individuals, were addressed. During the MSC 105 held from April 20 to 29, 2022, the "International Code of Safety for Ships carrying Industrial Personnel (IP Code)" was approved as Agenda Item 20.

As a result of this approval during the MSC 106, the IP Code was adopted to establish safety requirements for the transportation of industrial personnel exceeding 12 individuals on cargo ships

2) Industrial Personnel : it refers to all individuals transported or accommodated on ships for the purpose of engaging in industrial activities performed on other vessels and/or offshore facilities.

and high-speed cargo ships with a total tonnage of 500 tons or more, in addition to the existing SOLAS convention and HSC Code[5].

The purpose of this Code is to address risks that persist without being adequately mitigated by the applicable safety standards of the 1974 SOLAS, thereby ensuring the safe operation of ships carrying industrial personnel and providing for their safety during personnel transfer operations[5].

2.2 Contents of IP Code

As the structure of the IP Code, it is divided into “Part I - General”, “Part II - Goal and Functional Requirement”, and “Part III - Regulation”. Among these, Part II/1 outlines the functional requirements related to Industrial Personnel. Upon examining this provision, it is presented in the table 1[5].

Table 1. SOLAS XV II/1. Industrial Personnel

Part II/1. Industrial Personnel
<p>1.2 Functional requirements Means shall be provided to ensure that industrial personnel:</p> <p>.1 are medically fit; .2 are able to communicate with the ship's crew; .3 have received appropriate safety training; .4 have received onboard ship-specific safety familiarization; and .5 have received onboard familiarization with the ship's transfer arrangements and equipment.</p>

To meet the functional requirements in Part II/1.2.1, the industrial personnel boarding the ship must provide the master with certified documentation about their medical fitness. Additionally, they are required to successfully complete the training, including the content specified in Part III/1 as listed in Table 2, certified by an accredited institution.

Table 2. SOLAS XV III/1. Industrial Personnel

Part III/1. Industrial Personnel
<p>1.3 All industrial personnel shall, prior to boarding the ship, receive training or instruction in Personnel meeting the training requirements in paragraph 5.5 of the Recommendations for the training and certification of personnel on mobile offshore units (Resolution A.1079(28)) or industrial training standards, such as those of the Global Wind Organization (GWO), Offshore Petroleum Industry Training Organization (OPITO) or Basic Offshore Safety Induction and Emergency Training (OPITO accredited), may be considered as meeting the requirements of this section.</p> <p>.1 personal survival that includes: .1 knowledge of emergency situations that may occur on board a ship; .2 the use of personal life-saving equipment; .3 safely entering the water from a height, and survival in the water; and .4 boarding a survival craft from the ship and water while wearing a lifejacket; .2 fire safety that includes knowledge of the types of fire hazards on board ships and precautionary measures to be taken to prevent a fire; and .3 personal safety and social responsibilities that include: .1 understanding the authority of the master or their representative on board; .2 complying with instructions provided by the shipboard personnel; and .3 understanding safety information symbols, signs and alarm signals found on board ships.</p>

Furthermore, the regulation explicitly states the captain's right to refuse embarkation for industrial personnel who have not completed the required training as outlined in Part III/1.4.

In accordance with Part III/1.5, ships are also obligated to provide safety induction for industrial personnel before transfer, ensuring that they are well-versed in the vessel's equipment, transfer procedures, arrangement, and other safety measures.

In this study, the proposed IP training model aims to analyze the required training elements specified in the regulations, considering the time for each training course and other factors, to formulate an effective educational framework.

III. Analyze of Other Training Program

The KIMFT(Korea Institute of Maritime and Fisheries Technology) provides training aimed at safety for shipping industries where target vessel operate, and it intends to examine training programs with purposes similar to the establishment background of the IP Code[6].

3.1 STCW Safety Training for seafarers

It is stipulated to regularly provide basic safety training for marine crew, which is designed to maintain and develop individual safety competence by the STCW Code. Among them, training that aligns with the purpose of the IP Code can be summarized as shown in Table 3[7].

Table 3. Syllabus of STCW Safety Training Courses

Course	Contents of training
Basic Safety Training (BST)	1) Duration : 29 Hours 2) Capacity : 20 persons 3) Learning Objectives : Survival of ships in distress and prevention of safety accidents 4) Target : Any crew on an international voyage
Advanced Safety Training (AST)	1) Duration : 37 Hours 2) Capacity : 20 persons 3) Learning Objectives : As an advanced course in BST, it aims to enhance survival skills during emergencies and prevention of safety accidents 4) Target : Any crew on an international voyage

3.2 OPITO’s International Safety Training

The OPITO(Offshore Petroleum Industry Training Organization) is an international organization that establishes international standards for safety and job training in the petroleum and gas industries. The accredited training centers are conducted to ensure the uniformity of training programs and facilities for the safety of trainees by OPITO inspector annually. By providing approved training courses, it ensures the quality of training. It is a summary of OPITO-certified safety training courses in Table 4[8].

Table 4. Syllabus of OPITO Safety Training Courses

Course	Contents of training
BOSIET	1) Duration : 24 Hours 2) Capacity : 16 persons 3) Learning Objectives : To assist in meeting the initial offshore safety, emergency response training. 4) Target : A new person to the offshore, oil and gas and renewable energy industries.
FOET	1) Duration : 8 Hours 2) Capacity : 16 persons 3) Learning Objectives : To refresh their knowledge and revalidate their safety certificate. 4) Target : A person who already have a BOSIET certification.

3.3 GWO’s International Safety training

The GWO(Global Wind Organization) is a non-profit organization established by manufacturers, owners, and operators of wind turbines to provide standards necessary for general safety and technical training in the wind farm industries. It offers standardized GWO certification audits to provide high-quality training, similar to the training purposes of the IP Code. It is a summary of GWO-certified training in table 5[9].

Table 5. Syllabus of GWO approved training course

Course	Contents of training
Basic Safety Training (BST) .1 Working at Height .2 Manual Handling .3 First Aid .4 Fire Awareness .5 Sea Survival	1) Duration : 39 Hours 2) Capacity : 12 persons 3) Learning Objectives : Improve understanding of work at wind farm industry and prevent accident 4) Target : A person who works in the wind farm or related fields
Wind Limited Access	1) Duration : 8 Hours 2) Capacity : 12 persons 3) Learning Objectives : Improve understanding of work at wind farm industry and prevent accident 4) Target : Worker in the wind farm or related fields who perform short-term duties (no more than 6 times per a year)

3.4 Commissioned Training Course

The KIMFT offers commissioned training courses to meet the needs of clients in addition to STCW, OPITO, and GWO courses. These courses are designed based on the safety and technical training contents by each industry site and working condition of clients. The quality standards for training are based on the standards of the industry to which the client belongs. It is a summary of the currently operational commissioned safety training courses, as outlined in Table 6[10].

Table 6. Syllabus of Commissioned Training Courses

Course	Contents of training
Basic Sea Survival for Offshore Worker	1) Duration : 8 Hours 2) Capacity : 16 persons 3) Learning Objectives : Improve understanding of Offshore fields. 4) Target A person who visits or works in offshore structures.
Basic Fire Fighting for Offshore Worker	1) Duration : 8 Hours 2) Capacity : 16 persons 3) Learning Objectives : Improve ability to prevent fire accident 4) Target A person who visits or works in offshore structures.
Marine Safety Training for Customs	1) Duration : 4 Hours 2) Capacity : 20 persons 3) Learning Objectives : Acquisition of skills related to fire fighting and survival skill 4) Target A person who works at Custom
Basic Polar Region Safety Training	1) Duration : : 8 Hours 2) Capacity : 20 persons 3) Learning Objectives : Improvement of accident prevention in polar environment 4) Target A researcher who visits at polar

IV. Proposal of the IP Training Model

4.1 Overview of IP Training Model

Among the types of vessels operated for offshore activities in South Korea, those subject to IP code include Cable Layer, ROV Vessel, WTIV(Wind Turbine Installation Vessel), Research vessel, etc. The purpose of the IP Code is to aim for safe operation during transportation by industrial

personnel, and further to establish regulations so that they can be familiar with risks associated with navigation environments.

In Part III, there is a provision for adequate familiarization with safety training tailored to they type of vessel among the listed functional requirements aimed at achieving these objectives. Furthermore, to meet the functional requirements specified in Part II/1.2.1, industrial personnel must provide the master with documentation stating their medical fitness. Part III/1.4 specifies the master's right to refuse boarding for industrial personnel who have not fulfilled the required training. Therefore, an analysis of the time for other training courses according to the mandatory training requirement specified in the regulations is conducted to propose the new IP Training Model course as follows based on Table 7[6].

Table 7. Training Contents of IP Code

Training Contents of IP Code
1) personal survival that includes: .1 knowledge of emergency situations that may occur on board a ship; .2 the use of personal life-saving equipment; .3 safely entering the water from a height, and survival in the water; and .4 boarding a survival craft from the ship and water while wearing a lifejacket. 2) fire safety that includes knowledge of the types of fire hazards on board ships and precautionary measures to be taken to prevent a fire. 3) personal safety and social responsibilities that include: .1 understanding the authority of the master or their representative on board; .2 complying with instructions provided by the shipboard personnel; and .3 understanding safety information symbols, signs and alarm signals found on board ships.

4.2 Personal Survival Training Model

Based on the contents of Table 7, it is evident that personal survival training should consist of both theoretical and practical training. The theoretical training should encompass knowledge of emergency situations, as well as the usage of personal safety equipment on board the vessel. Additionally,

practical training should include methods of entering the water swimming techniques, which are performed during the training.

Regarding the duration of training, theoretical part typically last between 3 to 5 hours according to the other training and, practical part last for about 4 hours. Therefore, a proposed training model for personal survival should adhere to there guidelines as outlined in Table 8[6].

Table 8. Model of Personal Survival Training

Name	Details
Theory of Personal Survival	1) Duration : 3 Hours 2) Contents : - Types and Characteristics of emergency Situation - Emergency Procedure - Step off method - Liferafts and Lifeboat
Practice of Personal Survival	1) Duration : 4 Hours 2) Contents : - Step off Simulation - Survival swimming technique - Boarding Liferafts and Lifeboat
Intro	1) Duration : 1 Hour 2) Contents : Debrief and Course Evaluation

4.3 Personal Safety and Responsibility Model

It should be structured with content on the characteristics of working on a ship and theoretical aspects to ensure personal safety. When comparing to other training programs, subjects resemble a similar model's one such as onboard safety and emergency response in STCW training and safety induction in OPITO training. Therefore, a proposed model of personal safety and responsibility is present as follows in Table 9[6].

Table 9. Model of Personal Safety and Responsibility Training

Course	Contents of training
Personal Safety and Responsibility	1) Duration : 4 Hours 2) Contents : - Onboard safety and emergency response Onboard culture and organization Introduction of vessels

4.4 Fire Awareness Training Model

Fire awareness training should also combine theoretical and practical part. The theoretical part should contain an overview of fire types and response methods, including the use of portable extinguishers, fixed fire-fighting system, and fire blanket. Practical part should include basic fire response techniques which inevitably include the proper use of fire extinguishers. Additionally, evacuation in confined space program is included same as other training courses, it should also be incorporated into fire response training.

Considering the duration of training, other courses combine theoretical and practical part for a total of 4 hours. Therefore, a proposed model for fire awareness should follow the same format as shown in Table 10[6].

Table 10. Model of Fire Awareness Training

Course	Contents of training
Fire (Theory)	1) Duration : 2 Hours 2) Contents : - The 3 elements of fire - Types and Characteristics of fires - Portable Fire Extinguisher - Fixed Fire-fighting System
Fire (Practice)	1) Duration : 2 Hours 2) Contents : - Drills based on type of fires - Escape confined space

V. Conclusions

The International Code of Safety for Ships carrying Industrial Personnel, to be amended under SOLAS Chapter XV, is scheduled to be enforced from July 1, 2024. Additionally, domestic legislation is being proposed through amendments to the Ship Safety Act Enforcement Regulations to reflect definitions and training courses for such industrial personnel carrying ships. With the offshore wind farm industry gaining momentum domestically, inquiries for ship orders applicable to this sector are also increasing.

This paper reviews the training models that industrial personnel must undergo before boarding carrying ships in light of these new regulations. It examines the safety training under STCW, represented by the IMO model courses, as well as industry-proposed training models from OPITO and GWO, proposing a model course that includes mandatory training content specified in the code.

In the case of this training model, all the elements of IP Code to be applied through the revision of the Enforcement Rule of the Domestic Ship Safety Act are currently reflected and proposed.

The training provided is designed to ensure safety during the period when Industrial Personnel board ships for offshore industrial activities. Therefore, the training model primarily focuses on providing knowledge about ships that is essential for safety, along with content aimed at enhancing safety measures. Unlike safety training for crew members who must actively respond to ship accidents, the training model for Industrial Personnel has been structured with different training hours. Furthermore, unlike OPITO and GWO training conducted based on industry demands, IP training is mandatory under domestic and international regulations, emphasizing its necessity.

Given the current lack of domestic and international training related to the code, it is expected that planning and implementing advanced training aligned with international regulations prior to the enforcement of the regulations will exert international influence. However, only the minimum requirements from the proposed Code were included to propose an training model, after analyzing the requirements for existing education programs in this study. Therefore, the evaluation of the effectiveness of training in real-world scenarios has been left as a future research task. Furthermore, the allocation of training duration is expected to be closely examined and modified through rigorous validation of the effectiveness of

the training model in the future, with active model revisions expected if necessary. And, continuously surveying trainees for improvement areas identified during the operation of this training course will be necessary to suggest and present a standardized training model as an international standard model.

REFERENCES

- [1] International Maritime Organization, Interim Recommendation on the Safe Carriage of More Than 12 Industrial Personnel on board Vessels engaged on International Voyage, Resolution MSC.418(97), 2016.
- [2] International Maritime Organization, Mandatory Instrument and/or Provisions Addressing Safety Standards for the Carriage of More Than 12 Industrial Personnel on board Vessels engaged on International Voyage, SDC 8/18 Agenda 4, 2022.
- [3] International Maritime Organization, Report of the Maritime Safety Committee on its 105th Session, MSC 105/20 Agenda 15, 2022.
- [4] International Maritime Organization, Report of the Maritime Safety Committee on its 106th Session, MSC 106/19 Agenda 3, 2022.
- [5] International Maritime Organization, Amendments to the International Convention for the Safety of Life at Sea, 1974(Chapter VX), MSC 106/19 Annex 3, 2022.
- [6] Korea Institute of Maritime and Fisheries Technology, Development of Training Curriculum in response to the Implementation of SOLAS Chapter XV(IP Code), Internal Research Report, 2023.
- [7] CHO J.W. and LEE C.H. "A Study on the Improvement for Basic-Advanced Safety Training Course", *Journal of Fisheries and Marine Sciences Education*, 28(2), pp. 418-427, 2016. DOI: <http://dx.doi.org/10.13000/JFMSE.2016.28.2.417>
- [8] Sherif A., Hossam E.G. and Ahmed E., "Towards Enhancing Major Emergency Initial Response Training: A Comparative Study of the STCW and OPITO Standards", *Maritime Research and Technology*, Vol. 2, pp. 2-15, 2023. DOI : <http://dx.doi.org/10.21622/MRT.2023.02.1.001>
- [9] Joghee S.C. and El-Thalji I., "Workflow and concept study to design mixed reality assisted safety training in the wind energy sector", *IOP Conference Series: Materials Science and Engineering*, pp. 1-9, 2024, DOI: 10.1088/1757-899X/1201/1/012087
- [10] Korea Institute of Maritime and Fisheries Technology, Curriculum Objectives and Lesson Plan, <http://www.seaman.or.kr/main.do/>, 2024.

Authors



MoonGyo Cho received the B.S degree in Marine system engineering., M.S. degree in Offshore Management Administration from Korea Maritime and Ocean University, Korea, in 2009 and 2021 respectively.

Cho joined the faculty of the Ocean Technology Training Team at Korea Institute of Maritime and Fisheries Technology (KIMFT), Busan, Korea, in 2018. He is interested in development of safety training and job skill training, OPITO and GWO specially. He is in charge of TM in KIMFT GWO Training Center.



JeongMin Kim is master mariner and received the B.S degree in Coast guard., Master degree in Business Administration and Ph. D. in Offshore Management from Korea Maritime and Ocean University, Korea, in

2009, 2017 and 2024 respectively. Dr. Prof. Kim joined the faculty of the Ocean Technology Training Team at Korea Institute of Maritime and Fisheries Technology (KIMFT), Busan, Korea, in 2021. He is interested in development of Maritime Autonomous Surface Ship(MASS), Dynamic Positioning (DP) system in vessel specially, He is in charge of TM in KIMFT DP Training Center.