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**DEVELOPMENT OF TRAINING PROVISIONS FOR SEAFARERS RELATED TO THE  
BWM CONVENTION**

**Proposed amendments to the Seafarers' Training, Certification and Watchkeeping  
(STCW) Code to address the training of seafarers  
related to ballast water management**

**Submitted by China and ICS**

**SUMMARY**

*Executive summary:* This document provides proposed amendments to the STCW Code to address the training of seafarers related to ballast water management. It also provides an initial draft list of elements for the contents of new and revised IMO model courses to support the implementation and compliance with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, and the implementation of the amendments to the STCW Code.

*Strategic direction, if applicable:* 1

*Output:* 1.33

*Action to be taken:* Paragraph 23

*Related documents:* MEPC 72/4/10, MEPC 72/17; MEPC 73/15/1, MEPC 73/15/6, MEPC 73/WP.10 and MEPC 73/19

1 The International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, (BWM Convention) was adopted to prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments.

2 Regulation B-1 (Ballast Water Management Plan) of the BWM Convention provides that each ship shall have on board and implement a Ballast Water Management Plan (BWMP), which shall be specific to each ship and shall, inter alia, designate an officer on board in charge of ensuring that the plan is properly implemented.

3 Regulation B-6 (Duties of officers and crew) of the BWM Convention provides that officers and crew shall be familiar with their duties in the implementation of ballast water management particular to the ship on which they serve and shall, appropriate to their duties, be familiar with the ship's BWMP.

4 The Guidelines for Ballast Water Management and Development of Ballast Water Management Plans (G4) (Resolution MEPC.127(53)), in section 3 of part A, state that the BWMP should include training and education on ballast water management practices and the systems and procedures used on board the ship.

5 At the seventy-second session of the Marine Environment Protection Committee (MEPC 72), the Committee considered document MEPC 72/4/10 (China), containing a proposal to develop a model course under the BWM Convention to standardize the training, certification and watchkeeping for seafarers related to ballast water management. During the discussion at MEPC 72, the majority of delegations that spoke expressed support for the proposal, but some delegations were of the view that more information should be compiled first regarding the specific needs for seafarer training on ballast water management. As a result, the Committee invited China to submit a proposal for a new output at a future session, taking into account the views expressed at MEPC 72 (MEPC 72/17, paragraphs 4.46 to 4.48).

6 At MEPC 73, the Committee considered document MEPC 73/15/1 (China), containing a proposal for a new output regarding the development of the seafarer model course under the BWM Convention, and document MEPC 73/15/6 (ICS), which proposed a modification of the description of the proposed new output. In considering the documents, the Committee noted the support for the modified proposal in document MEPC 73/15/6 (ICS), which would enable a comprehensive review of seafarer training related to ballast water management and did not preclude a model course (MEPC 73/19, paragraph 15.6).

7 The Committee approved a new output on "Development of training provisions for seafarers related to the BWM Convention" in the post-biennial agenda of the Committee, assigning the HTW Sub-Committee as the associated organ, with two sessions needed to complete the work (MEPC 73/19, paragraph 15.10), with the scope described as follows (MEPC 73/WP.10, annex 4):

"The scope of this output would encompass the development of generic training for seafarers to implement the requirements of the regulations under the BWM Convention and including themes listed in paragraph 20.4 of the manual entitled "Ballast Water Management – How to do it". It shall be based on seafarers' capacities, duties, and responsibilities on board ships, and could include, inter alia: exceptions and exemptions, ballast water management plans, ballast water record books, ballast water management requirements (regulation B-3), reception facilities, other methods (regulation B-3.7), sediment management, ballast water exchange, duties of officers and crew, survey and certification, additional measures (regulation C-1) and warnings concerning ballast water uptake."

8 The co-sponsors have prepared this document to assist the Sub-Committee with commencing its work on the "Development of training provisions for seafarers related to the BWM Convention".

## **Discussion**

9 The co-sponsors note that the provisions of the BWM Convention and associated guidance emphasize the importance of training and familiarization of masters, officers and ratings to enable them to fulfil their responsibilities under the BWM Convention and operate and maintain ballast water management systems on board ships.

10 The co-sponsors also note that the "ballast water management system" is among the newest pieces of a ship's equipment and systems established as a statutory requirement by an IMO instrument (i.e. regulation D-3 of the BWM Convention), with other examples being ECDIS by chapter V of SOLAS and oil filtering equipment by Annex I of MARPOL.

11 The co-sponsors further note that the existing tables of competence in chapters II and III of the STCW Code provide for generic training related to most ship's equipment and systems established as statutory requirements by an IMO instrument, with existing examples being ECDIS in STCW table A-II/1, oily-water separators in STCW table A-III/1, etc.

12 Therefore, the co-sponsors concluded that generic training related to the operation and maintenance of ballast water management systems is required and should be treated the same as generic training related to any other piece of ship's systems and equipment, and as such, it should be included in the STCW Convention in the same manner as the existing generic training related to those other pieces of ship's systems and equipment. Such generic training should be seen as a formative precondition for the subsequent onboard familiarization required by regulation B-6 of the BWM Convention, as well as more generally by STCW regulation I/14 and the ISM Code.

### ***Amendments to chapters II and III of the STCW Code***

13 The co-sponsors have developed draft amendments to the STCW Code to provide for generic training related to ballast water management that addresses the responsibilities of shipboard personnel emanating from the BWM Convention and the ability to operate and maintain the ballast water management systems.

14 The co-sponsors identified the following when preparing the draft amendments:

- .1 since personnel from both the deck and engine departments on ships will have some duties or responsibilities in relation to the ship's ballast water, amendments are necessary to both chapters II and III of the STCW Code to ensure that generic training related to ballast water management recognizes each of the capacities concerned and accounts for their relevant duties or responsibilities;
- .2 since there are existing competences and KUPs addressing the operation and maintenance of various other pieces of ship's systems and equipment in the existing tables of competence in chapters II and III of the STCW Code, it is not necessary to introduce any new competence(s) addressing ballast water management into the STCW Code, which has the added benefit of facilitating the implementation of the amendments into the current curricula of maritime education and training institutions;
- .3 since there are existing provisions in the tables of competence in chapters II and III of the STCW Code concerning the knowledge of "responsibilities" under various IMO instruments, these can be amended to specifically reference the BWM Convention (as is practice related to SOLAS and MARPOL) and responsibilities related to ballast water management; and
- .4 since the overarching environment-related objective referenced on numerous occasions in the existing provisions in the tables of competence in chapters II and III of the STCW Code is "pollution prevention" (or the iteration "prevent pollution"), a consequence of introducing ballast water management to the existing competences and KUPs is that amendments are necessary to expand the objective expressed to "protection of marine environment" (or iteration thereof).

**Development of new and revised IMO model courses**

15 The co-sponsors recognize the significant role of IMO model courses in the implementation of IMO instruments, and in particular their special role in the implementation of the STCW Convention, where they provide a validated framework for course providers.

16 Therefore, the co-sponsors consider that:

- .1 a new IMO model course related to the BWM Convention should be developed to support implementation and compliance; and
- .2 some existing IMO model courses covering the competences and KUPs addressed by the proposed amendments would potentially need to be revised should the amendments be finalized and adopted.

17 Regarding a new IMO model course on the BWM Convention, it would assist with the implementation and compliance with the requirements of the Convention, especially if the framework provided by the course was such that it would be relevant and appropriate for all personnel concerned with ballast water management and the BWM Convention.

18 Regarding the existing IMO model courses, early consideration of the possible need to revise some of them would avoid similar difficulties to those faced in the past when IMO model courses to support new amendments were not validated and available to course providers and Administrations in advance of the entry into force of amendments.

19 The development of new and revised IMO model courses should follow the process set out in the *Revised guidelines for the development, review and validation of model courses* (MSC-MEPC.2/Circ.15/Rev.1), and need not be undertaken as part of the output on the "Development of training provisions for seafarers related to the BWM Convention". However, the co-sponsors note that MEPC 73 made it clear the output did not preclude the development of a model course(s), which indicates that such work can begin under the output.

20 Therefore, the co-sponsors have developed an initial list of elements for possible inclusion in new and revised IMO model courses for further consideration.

**Proposal**

21 The co-sponsors propose that the development of training provisions for seafarers related to the BWM Convention should comprise:

- .1 the development of draft amendments to chapters II and III of the STCW Code to address the training of seafarers related to ballast water management; and
- .2 the preparation of a list of elements for inclusion in new and revised IMO model courses to support the implementation and compliance with the BWM Convention and implementation of the proposed amendments to the STCW Code.

22 To provide a starting point for the work on the output, the co-sponsors provide proposed amendments to chapters II and III of the STCW Code in annex 1, and a draft initial list of elements for possible inclusion in new and revised IMO model courses in annex 2.

**Action request of the Sub-Committee**

23 The Sub-Committee is invited to consider the comments and proposals in paragraphs 21 and 22, and take action as appropriate.

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**ANNEX 1**

**PROPOSED AMENDMENTS TO THE SEAFARERS' TRAINING, CERTIFICATION AND WATCHKEEPING (STCW) CODE, AS AMENDED, TO ADDRESS TRAINING OF SEAFARERS RELATED TO BALLAST WATER MANAGEMENT**

**CHAPTER II**

Standards regarding the master and deck department

**Section A-II/1**

*Mandatory minimum requirements for certification of officers in charge of a navigational watch on ships of 500 gross tonnage or more*

1 In table A-II/1 (Specification of minimum standard of competence for officers in charge of a navigational watch on ships of 500 gross tonnage or more), the function of "Controlling the operation of the ship and care for persons on board at the operational level", is amended as follows:

<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Ensure compliance with environmental protection pollution-prevention requirements	<p><del>Prevention of pollution</del> Protection of the marine environment and anti-pollution procedures</p> <p>Knowledge of the precautions to be taken to prevent pollution of protect the marine environment</p> <p>Anti-pollution Environmental protection procedures and all associated equipment</p> <p>Importance of proactive measures to protect the marine environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved training</p>	<p>Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed</p> <p>Procedures for monitoring shipboard operations and ensuring compliance with the requirements of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, as amended, are fully observed</p> <p>Actions to ensure that a positive environmental reputation is maintained</p>
...	...	...	...

**Section A-II/2**

*Mandatory minimum requirements for certification of masters and chief mates on ships of 500 gross tonnage or more*

2 In table A-II/2 (Specification of minimum standard of competence for masters and chief mates on ships of 500 gross tonnage or more), the function on "Controlling the operation of the ship and care for persons on board at the management level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and the protection of the marine environment	<p>Knowledge of international maritime law embodied in international agreements and conventions</p> <p>Regard shall be paid especially to the following subjects:</p> <p>...</p> <p>.4bis responsibilities under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, as amended</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Procedures for monitoring operations and maintenance comply with legislative requirements</p> <p>Potential non-compliance is promptly and fully identified</p> <p>Planned renewal and extension of certificates ensures continued validity of surveyed items and equipment</p>
...	...	...	...

**Section A-II/3**

*Mandatory minimum requirements for certification of officers in charge of a navigational watch and of masters on ships of less than 500 gross tonnage, engaged on near-coastal voyages*

3 In table A-II/3 (Specification of minimum standard of competence for officers in charge of a navigational watch and for masters on ships of less than 500 gross tonnage engaged on near-coastal voyages), the function on "Controlling the operation of the ship and care for persons on board at the operational level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
Ensure compliance with environmental protection <del>pollution-</del>	<del>Prevention of pollution</del> Protection of the marine environment and anti-pollution procedures	Examination and assessment of evidence obtained from one or more of the following:	Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed

prevention requirements	Knowledge of the precautions to be taken to prevent pollution of protect the marine environment  Anti-pollution Environmental protection procedures and all associated equipment	.1 approved in-service experience  .2 approved training ship experience	Procedures for monitoring shipboard operations and ensuring compliance with requirements of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, are fully observed
...	...	...	...

### Section A-II/5

*Mandatory minimum requirements for certification of ratings as able seafarer deck*

4 In table A-II/5 (Specification of minimum standards of competence of ratings as able seafarer deck), the function on "Controlling the operation of the ship and care for persons on board at the support level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Apply precautions and contribute to protect the prevention of pollution of the marine environment	Knowledge of the precautions to be taken to prevent pollution of protect the marine environment  Knowledge of the use and operation of environmental protection anti-pollution equipment  Knowledge of the approved methods for disposal of marine pollutants and harmful aquatic organisms and pathogens	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience	Procedures designed to safeguard the marine environment are observed at all times
...	...	...	...

**CHAPTER III**  
Standards regarding engine department

**Section A-III/1**

*Mandatory minimum requirements for certification of officers in charge of an engineering watch in a manned engine-room or as designated duty engineers in a periodically unmanned engine-room*

5 In table A-III/1 (Specification of minimum standard of competence for officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room), the Function on "Marine engineering at the operational level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Operate main and auxiliary machinery and associated control systems	<p>Basic construction and operation principles of machinery systems:</p> <p>...</p> <p>.6 other auxiliaries, including various pumps, air compressor, purifier, fresh water generator, heat exchanger, refrigeration, ballast water management, air-conditioning, and ventilation systems</p> <p>...</p> <p>Preparation, operation, fault detection and necessary measures to prevent damage for the following machinery items and control systems:</p> <p>...</p> <p>.4 other auxiliaries, including refrigeration, ballast water management, air-conditioning and ventilation systems</p>	<p>...</p> <p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>...</p> <p>Operations are planned and carried out in accordance with operating manuals, established rules and procedures to ensure safety of operations and avoid pollution protection of the marine environment</p> <p>...</p>
Operate fuel, lubrication, ballast and other pumping systems and	Operational characteristics of pumps, and piping and treatment systems, including control systems	Examination and assessment of evidence obtained from one or more	Operations are planned and carried out in accordance with

associated control systems	<p>Operation of pumping systems:</p> <p>.1 routine pumping operations</p> <p>.2 operation of bilge, ballast and cargo pumping systems</p> <p>Oily-water separators (or similar equipment) requirements and operation</p> <p>Ballast water management system requirements and operation</p>	<p>of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>operating manuals, established rules and procedures to ensure safety of operations and <del>avoid pollution</del> protection of the marine environment</p> <p>Deviations from the norm are promptly identified and appropriate action is taken</p>
...	...	...	...

6 In table A-III/1 (Specification of minimum standard of competence for officers in charge of an engineering watch in a manned engine-room or designated duty engineers in a periodically unmanned engine-room), the function on "Controlling the operation of the ship and care for persons on board at the operational level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
<p>Ensure compliance with environmental protection <del>pollution prevention</del> requirements</p>	<p><del>Prevention of pollution</del> <i>Protection of the marine environment</i></p> <p>Knowledge of the precautions to be taken to <del>prevent pollution of</del> protect the marine environment</p> <p><del>Anti-pollution</del> Environmental protection procedures and all associated equipment</p> <p>Importance of proactive measures to protect the marine environment</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved training</p>	<p>Procedures for monitoring shipboard operations and ensuring compliance with MARPOL requirements are fully observed</p> <p>Procedures for monitoring shipboard operations and ensuring compliance with requirements of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, as amended, are fully observed</p>

			Actions to ensure that a positive environmental reputation is maintained
...	...	...	...

### Section A-III/2

*Mandatory minimum requirements for certification of chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000 kW propulsion power or more*

7 In table A-III/2 (Specification of minimum standard of competence for chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000 kW propulsion power or more), the function on "Marine engineering at the management level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Plan and schedule operations	<p><i>Theoretical knowledge</i></p> <p>...</p> <p>Naval architecture and ship construction, including damage control</p> <p>Ballast water treatment technologies</p>	...	...
Operation, surveillance, performance assessment and maintaining safety of propulsion plant and auxiliary machinery	<p><i>Practical knowledge</i></p> <p>...</p> <p>Functions and mechanism of automatic control for auxiliary machinery including but not limited to:</p> <p>...</p> <p>.7 cargo-handling equipment and deck machinery</p> <p>.8 ballast water management system</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p> <p>.4 approved laboratory equipment training</p>	<p>The methods of preparing for the start-up and of making available fuels, lubricants, cooling water and air are the most appropriate</p> <p>Checks of pressures, temperatures and revolutions during the start-up and warm-up period are in accordance with technical specifications and agreed work plans</p> <p>Surveillance of</p>

			<p>main propulsion plant and auxiliary systems is sufficient to maintain safe operating conditions</p> <p>The methods of preparing the shutdown, and of supervising the cooling down of the engine are the most appropriate</p> <p>The methods of measuring the load capacity of the engines are in accordance with technical specifications</p> <p>Performance is checked against bridge orders</p> <p>Performance levels are in accordance with technical specifications</p>
<p>Manage fuel, lubrication and ballast operations</p>	<p>Operation and maintenance of machinery, including pumps, and piping and treatment systems</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Fuel and ballast operations meet operational requirements and are carried out so as to prevent pollution of protect the marine environment</p>

8 In table A-III/2 (Specification of minimum standard of competence for chief engineer officers and second engineer officers on ships powered by main propulsion machinery of 3,000 kW propulsion power or more), the function on "Controlling the operation of the ship and care for persons on board at the management level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and protection of the marine environment	<p>Knowledge of relevant international maritime law embodied in international agreements and conventions</p> <p>Regard shall be paid especially to the following subjects</p> <p>...</p> <p>.4bis responsibilities under the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, as amended.</p> <p>...</p> <p>...</p>	<p>Examination and assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 approved training ship experience</p> <p>.3 approved simulator training, where appropriate</p>	<p>Procedures for monitoring operations and maintenance comply with legislative requirements</p> <p>Potential non-compliance is promptly and fully identified</p> <p>Requirements for renewal and extension of certificates ensure continued validity of survey items and equipment</p>
...	...	...	...

### Section A-III/5

*Mandatory minimum requirements; for certification of ratings as able seafarer engine in a manned engine-room or designated to perform duties in a periodically unmanned engine-room*

9 In table A-III/5 (Specification of minimum standard of competence for ratings as able seafarer engine in a manned engine-room or designated to perform duties in a periodically unmanned engine-room), the Function on "Marine engineering at the support level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Contribute to bilge and ballast operations	<p>Knowledge of the safe function, operation and maintenance of the bilge and ballast systems, and ballast water</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved</p>	<p>Operations and maintenance are carried out in accordance with established safety practices and</p>

...	<p>management system, including:</p> <p>.1 reporting incidents associated with transfer operations</p> <p>.2 ability to correctly measure and report tank levels</p> <p>.3 reporting changes of pressure and power in the ballast water management system</p>	<p>in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p> <p>Assessment of evidence obtained from practical demonstration</p>	<p>equipment operating instructions and pollution of the marine environment is avoided protected</p> <p>Communications within the operator's area of responsibility are consistently successful</p>
...	...	...	...

10 In table A-III/5 (Specification of minimum standard of competence for ratings as able seafarer engine in a manned engine-room or designated to perform duties in a periodically unmanned engine-room), the function on "Controlling the operation of the ship and care for persons on board at the support level" is amended as follows:

<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
...	...	...	...
Apply precautions and contribute to protection the prevention of pollution of the marine environment	<p>Knowledge of the precautions to be taken to prevent pollution of protect the marine environment</p> <p>Knowledge of the use and operation of environmental protection anti-pollution equipment</p> <p>Knowledge of the approved methods for disposal of marine pollutants and harmful aquatic organisms and pathogens</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	<p>Procedures designed to safeguard the marine environment are observed at all times</p>
...	...	...	...

**Section A-III/6**

*Mandatory minimum requirements for certification of electro-technical officers*

11 In table A-III/6 (Specification of minimum standard of competence for electro-technical officers), the function on "Electrical, electronic and control engineering at the operational level" is amended as follows:

<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Monitor the operation of electrical, electronic and control systems	Basic understanding of the operation of mechanical engineering systems, including:  ...  .4bis ballast water management systems  ...	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved simulator training, where appropriate  .4 approved laboratory equipment training	Operation of equipment and system is in accordance with operating manuals  Performance levels are in accordance with technical specifications
...	...	...	...

12 In table A-III/6 (Specification of minimum standard of competence for electro-technical officers), the Function on "Controlling the operation of the ship and care for persons on board at operational level" is amended as follows:

<b>Competence</b>	<b>Knowledge, understanding and proficiency</b>	<b>Methods for demonstrating competence</b>	<b>Criteria for evaluating competence</b>
Ensure compliance with environmental protection <del>pollution-prevention</del> requirements	<del>Prevention of pollution</del> <del>Protection of the marine environment</del>  Knowledge of the precautions to be taken to <del>prevent pollution of</del> protect the marine environment  <del>Anti-pollution</del> Environmental protection procedures and all associated equipment	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience  .3 approved training	Procedures for monitoring shipboard operations and ensuring compliance with environmental protection <del>pollution-prevention</del> requirements are fully observed  Actions to ensure that a positive environmental reputation is maintained

	Importance of proactive measures to protect the marine environment		
...	...	...	...

### Section A-III/7

#### Mandatory minimum requirements for certification of electro-technical rating

13 In table A-III/7 (Specification of minimum standard of competence for electro-technical ratings), the function on "Electrical, electronic and control engineering at the support level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Contribute to monitoring the operation of electrical systems and machinery	Basic knowledge of the operation of mechanical engineering systems, including: ... .4bis ballast water management systems ...	Assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 practical training  .3 examination  .4 approved training ship experience	Knowledge that ensures:  .1 operation of equipment and system is in accordance with operating manuals  .2 performance levels are in accordance with technical specifications
...	...	...	...

14 In table A-III/7 (Specification of minimum standard of competence for electro-technical ratings), the function on "Maintenance and repair at the support level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Contribute to the maintenance and repair of electrical systems and machinery on board	<i>Safety and emergency procedures</i> ... ...  Maintenance and repair of lighting fixtures and supply systems  Maintenance and repair of electric and electronic components of ballast	Examination and assessment of evidence obtained from one or more of the following:  .1 approved in-service experience  .2 approved training ship experience	The effect of malfunctions on associated plant and systems is accurately identified, ship's technical drawings are correctly interpreted, measuring and calibrating instruments are correctly used and actions taken are

	water management systems	.3 approved simulator training, where appropriate  .4 approved laboratory equipment training	justified  Isolation, dismantling and reassembly of plant and equipment is in accordance with manufacturer's safety guidelines and shipboard instructions
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15 In table A-III/7 (Specification of minimum standard of competence for electro-technical ratings), the function on "Controlling the operation of the ship and care for persons on board at the support level" is amended as follows:

Competence	Knowledge, understanding and proficiency	Methods for demonstrating competence	Criteria for evaluating competence
...	...	...	...
Apply precautions and contribute to protect the prevention of pollution of the marine environment	<p>Knowledge of the precautions to be taken to prevent pollution of protect the marine environment</p> <p>Knowledge of the use and operation of environmental protection anti-pollution equipment/agents</p> <p>Knowledge of the approved methods for disposal of marine pollutants and harmful aquatic organisms and pathogens</p>	<p>Assessment of evidence obtained from one or more of the following:</p> <p>.1 approved in-service experience</p> <p>.2 practical training</p> <p>.3 examination</p> <p>.4 approved training ship experience</p>	Procedures designed to safeguard the marine environment are observed at all times
...	...	...	...

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## ANNEX 2

### INITIAL LIST OF ELEMENTS FOR POSSIBLE INCLUSION IN IMO MODEL COURSES

#### IMO MODEL COURSES

Developing new and revised IMO model courses can support implementation and compliance with the BWM Convention and implementation of the proposed amendments to chapters II and III of the STCW Code.

The following existing IMO model courses may require some minor revisions to address the proposed amendments to chapters II and III of the STCW Code:

Model Course No. 7.01	Master and chief mate
Model Course No. 7.02	Chief engineer officer and second engineer officer
Model Course No. 7.03	Officer in charge of a navigational watch
Model Course No. 7.04	Officer in charge of an engineering watch
Model Course No. 7.08	Electro-technical officer
Model Course No. 7.15	Electro-technical rating
Model Course No. 7.10	Ratings as able seafarer deck
Model Course No. 7.16	Ratings as able seafarer engine

The following new IMO model course should be developed based on the requirements of the regulations of the BWM Convention, including the responsibilities of shipboard personnel:

Model Course (New)	BWM Convention
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#### PROPOSED ELEMENTS FOR INCLUSION IN NEW AND REVISED IMO MODEL COURSES

The following is a draft of an initial list of elements that could be included in new and revised IMO model courses to support implementation and compliance with the BWM Convention and implementation of the proposed amendments to chapters II and III of the STCW Code.

##### **BWM Convention**

Introduction to the BWM Convention

- Origins
- Purpose

Application of the BWM Convention

- Application
- Exceptions
- Exemptions

Survey and certification under the BWM Convention

- Types of surveys
- International Ballast Water Management Certificate

Inspection of ships under the BWM Convention

- Verification of certification
- Inspection of ballast water record book
- Sampling of ballast water

Requirements of the regulations under the BWM Convention

- Record-keeping
- Reporting
- Familiarization

Standards for ballast water management

- Ballast water exchange standard (D-1)
- Ballast water performance standard (D-2)
- Approval of ballast water management systems

### **Ballast Water Management**

Ballast water treatment technologies

- Mechanical treatment (e.g. filtration, separation, hydro-cyclone, carbonation)
- Physical treatment (e.g. thermal, UV radiation, ultrasound, electrolysis)
- Chemical treatment (e.g. oxidants, biocides, de-oxygenation)
- Combination of treatment technologies

Ballast water management systems

- Typical equipment and system composition
- Typical equipment and system operation and controls
- Typical equipment and system maintenance and service
- Typical equipment and system problems and repairs

Operation and control of ballast water management systems

- Typical equipment and system functions
- Typical operating and control requirements
- Typical operation and control requirements, including procedures
  - For treatment of ballast water
  - For discharge at sea and to shore
- Use of manuals and manufacturer's instructions

Maintenance and repair of ballast water management systems

- Typical equipment and system components requiring maintenance
- Typical equipment and system components that may require repair
- Typical approaches to troubleshooting and identification of problems
- Typical approaches to maintenance and repair, including procedures
- Use of manuals and manufacturer's instructions

### **Ballast water exchange**

Ballast water exchange methodologies

- Sequential
- Flow-through
- Dilution
- Other methodologies

Ballast water exchange standard (D-1)

- Conducting ballast water exchange
- Designated areas
- Safety considerations when conducting ballast water exchange

## **Sediment management**

Removal of sediment  
Storage of sediment  
Disposal of sediment  
Sediment reception facilities

## **Ballast Water Management Plans (BWMP)**

Elements of a BWMP  
Approval of a BWMP  
Following a BWMP

## **Duties and responsibilities of shipboard personnel**

Role of the designated officer in charge of ensuring implementation of the BWMP

Typical duties assigned to shipboard personnel related to ballast water management  
Responsibilities placed on shipboard personnel by the BWM Convention  
Operation and control of ballast water management systems  
Maintenance and repair of ballast water management systems

Typical shipboard procedures related ballast water management  
Procedures related to operation and control  
Procedures related to maintenance and repair  
Procedures to avoid unnecessary discharge of ballast water  
Procedures to minimize uptake of harmful aquatic organisms, pathogens, sediments

Emergency preparedness and response plans  
Operational accidents during ballast water management  
Procedures related to emergencies and accidents  
Exercises and drills related to ballast water management

## **Safety considerations associated with ballast water management**

Safety procedures related to ballast water management  
Precautions and procedures for ballast tank entry  
Precautions and procedures related to typical equipment and system components  
Precautions and procedures for handling, packaging and storage of sediment  
Precautions and procedures for handling, storage and preparation of chemicals and active substances

## **Environmental protection considerations associated with ballast water management**

Awareness of the harmful aquatic organisms and pathogens within ballast water of ships  
Risks to the marine environment posed by the harmful aquatic organisms and pathogens