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**ΣΧΟΛΗ ΠΛΟΙΑΡΧΩΝ ΜΗΧΑΝΙΩΝΑΣ**

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ΑΛΕΞΑΝΔΡΟΥ – Α.Μ.Σ.: 3393

**ΘΕΜΑ: BALLAST WATER MANAGEMENT PLAN**



ΕΠΙΒΛΕΠΩΝ ΚΑΘΗΓΗΤΡΙΑ: ΞΕΝΙΤΙΔΟΥ ΕΛΛΗ

# 1. INTRODUCTION

Shipping is essential to the global economy, providing the most cost-effective means of transporting bulk goods over great distances. Over 90% of all global trade – including everything from food and fuel to construction materials, chemicals and household items – is carried by ships, with some 50,000 merchant ships sailing the world's oceans, with a combined tonnage of around 600 million gross tonnes.

Ships are specifically designed and built to move safely through the water while carrying this cargo. But, when the ship is travelling either without cargo, or only partially laden, it must take additional weight on board to enable it to operate effectively and safely by, for example, keeping the ship deep enough in the water to ensure efficient propeller and rudder operation. This additional material is called ballast. Ballast water is water carried in ships' ballast tanks to improve stability, balance and trim. It is taken up or discharged when cargo is unloaded or loaded, or when a ship needs extra stability in foul weather. While ballast water is essential for safe and efficient modern shipping operations, it may pose serious ecological, economic and health problems due to the multitude of marine species carried in ships' ballast water.

However, the Ballast Water Management Convention, adopted in 2004, aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments.

Under the Convention, all ships in international traffic are required to manage their ballast water and sediments to a certain standard, according to a ship-specific ballast water management plan. All ships will also have to carry a ballast water record book and an international ballast water management certificate. The ballast water management standards will be phased in over a period of time. As an intermediate solution, ships should exchange ballast water mid-ocean. However, eventually most ships will need to install an on-board ballast water treatment system.

## **2. ECOLOGICAL AND ECONOMIC IMPACTS OF BALLAST WATER TRANSPORTATION**

The ballast water inside a ship can be seen as an onboard aquarium full of microscopic life forms. That's because small organisms living in the sea water are pumped into ballast tanks along with the water. Moreover, coastal sediments and any associated organisms may be pumped into ballast tanks. The ballast water is taken from coastal port areas and transported inside the ship to the next port of call where the water may be discharged, along with all the surviving organisms. This way, ballast water may introduce organisms into the port of discharge that do not naturally belong there. These introduced species are also called exotic species. Populations of exotic species may grow very quickly in the absence of natural predators. In that case they are called 'invasive'.

**2.1 Ecological impacts:** At any one time ballast water can naturally contain an estimated 7000 different species of organisms comprising of plankton (microscopic plants and animals), bacteria and viruses. Over 80% of the world's commodities are being moved by shipping, calling for speedy and efficient vessel movement. It is estimated that approximately 7 billion tons of ballast water is transferred globally each year. The vast majority of marine species carried in ballast water do not survive the ships journey. However some species do survive and through the discharge of ballast water these are inadvertently introduced into new ecosystems. Once discharged some species can withstand a wide range of environmental conditions and may not have natural predators. In such cases these organisms can become invasive species causing a change in the ecosystem balance. Once such changes have occurred the effects are irreversible. These materials often include non-native, nuisance, exotic species that can cause extensive ecological and economic damage to aquatic ecosystems. It is believed that a marine species invades a new environment somewhere in the world every nine weeks. Apart from the threat that comes with the movement of marine life, there are also issues pertaining to overexploitation of living marine resources and physical alteration and destruction of marine habitats.

However, when all factors are favorable, an introduced species may survive to establish a reproductive population in the host environment. It may even become invasive, out-competing native species and multiplying into pest proportions. Ecological Impacts: Should an introduced species become a successful invader in its new environment, it can cause a range of ecological impacts. These include: competing with native species for space and food, preying upon native species, altering habitat, altering environmental conditions (e.g. increased water clarity due to mass filter-feeding), altering the food web and the overall ecosystem and displacing native species, reducing native biodiversity and even causing local extinctions. The United Nations Environment Program has identified invasive species in general as the second greatest threat to global bio-diversity after habitat loss and this was re-iterated at the World Summit on Sustainable Development in 2002. An important feature of the ecological impacts of harmful aquatic bio-invasions is that they are virtually always irreversible and generally increase in severity over time. In this regard it is worth comparing the impacts of aquatic bio-invasions with those of a better-known form of ship -sourced pollution; major oil spills. In a major oil spill, the ecological impacts are most likely to occur very quickly, be catastrophic and acute and highly visible. However, impacts will decrease over time as the oil degrades and clean up and rehabilitation activities are undertaken. With an aquatic bio-invasion, the initial impacts may be non-existent to minor and invisible. However, as the population increases, the impacts will increase over time, in an insidious, chronic and irreversible manner. Unlike oil spills, for which humans have developed a huge range of response and clean-up options, once an invading species has established a viable population in a new environment, it is almost always impossible to remove. There are no recorded cases of successful control and eradication of aquatic invasive species that have established in open waters. The extremely limited cases of successful control and eradication have been when the invading species was detected at a very early stage, inside enclosed waters such as a marina or small bay, which could be closed-off and treated with biocides.

## **2.2 Economic impacts:**

- Reductions in fisheries production (including collapse of the fishery) due to competition, predation and/or displacement of the fishery species by the invading species and/or through habitat/ environmental changes caused by the invading species.
- Impacts on aquaculture (including closure of fish-farms), especially from introduced harmful algae blooms.
- Physical impacts on coastal infrastructure, facilities and industry, especially by fouling species.
- Reduction in the economy and efficiency of shipping due to fouling species.
- Impacts and even closure of recreational and tourism beaches and other coastal amenity sites due to invasive species (e.g. physical fouling of beaches and severe odors from harmful algae blooms).
- Secondary economic impacts from human health impacts of introduced pathogens and toxic species, including increased monitoring, testing, diagnostic and treatment costs and loss of social productivity due to illness and even death in affected persons.
- Secondary economic impacts from ecological impacts and bio-diversity loss.
- The costs of responding to the problem, including research and development, monitoring, education, communication, regulation, compliance, management, mitigation and control costs.

**2.3 Global response:** Due to economic and ecological issues, this problem has received increasing attention in the last 20 years. Institutions such as the International Maritime Organization (IMO) and Asia Pacific Economic Co-operation frequently hold international forums on ballast water management.

In 1991, the Marine Environment Protection Committee of the IMO adopted the “Guidelines for Preventing the Introduction of Unwanted Organisms and Pathogens from Ships’ Ballast Waters and Sediment Discharges”. In 1992, the United Nations Conference on Environment and Development put in a request

to IMO for the adoption of appropriate legally binding rules on ballast water discharges with the aim of preventing the spread of non-indigenous organisms.

IMO member countries including Australia, Brazil, Singapore and the US have developed voluntary guidelines for the control and management of ships' ballast water to minimize the transfer of harmful aquatic organisms and pathogens. These guidelines were adopted by the IMO in 1997. Management and control measures recommended by the guidelines include:

- Minimizing the uptake of organisms during ballasting but avoiding areas in ports where outbreaks of populations of harmful organisms are known to occur.
- Cleaning ballast tanks and removing mud and sediments. These sediments may be small and can only be measured using methods such as laser diffraction, but left untouched, they form layers in ballast tanks and cargo holds, accumulating during the voyage.
- Exchanging ballast water at sea before arrival in port and replacing it with clean open ocean water.

**2.4 The need for urgent action:** The United Nations Millennium Declaration articulates in a single framework the major development challenges facing humanity and the measures necessary to realize them. The work of IMO has a major and direct impact on at least five of the Millennium Development Goals and ballast water management is part of this global effort. In order to become effective, the BWM Convention needs vision, foresight, purpose and, most importantly, urgent action by all involved. Unless IMO Members act together, proactively and with due sense of responsibility, the devastating impacts of aquatic bio-invasions will continue to remain one of the greatest threats to the ecological and economic wellbeing of the planet. Since the adoption of the BWM Convention, the Secretary-General of IMO has emphasized on many occasions the importance of its early entry into force and effective implementation. The concern remains that the pace of ratification is still very slow although studies show that the marine bio-invasions occur on a weekly to daily basis, resulting in lasting and sometimes disastrous impacts. The

Organization has already, through the Integrated Technical Co-operation Programme, co-ordinated and managed a number of activities, aiming at assisting in the implementation of the BWM Convention. During the GloBallast programme a number of ‘centres of excellence’ have been created, however the problem of invasive species is of global nature and further support is needed. Governments experiencing difficulties in the process of ratifying the Convention are urged to inform the Organization of the circumstances thereof, so that consideration can be given to taking appropriate action to provide the necessary technical assistance.

### **3. BALLAST WATER CONVENTION**

**3.1 General:** The Ballast Water Management Convention, adopted in 2004, aims to prevent the spread of harmful aquatic organisms from one region to another, by establishing standards and procedures for the management and control of ships' ballast water and sediments

Under the Convention, all ships in international traffic are required to manage their ballast water and sediments to a certain standard, according to a ship-specific ballast water management plan. All ships will also have to carry a ballast water record book and an international ballast water management certificate. The ballast water management standards will be phased in over a period of time. As an intermediate solution, ships should exchange ballast water mid-ocean. However, eventually most ships will need to install an on-board ballast water treatment system. A number of guidelines have been developed to facilitate the implementation of the Convention. The Convention will require all ships to implement a Ballast Water and Sediments Management Plan. All ships will have to carry a Ballast Water Record Book and will be required to carry out ballast water management procedures to a given standard. Existing ships will be required to do the same, but after a phase-in period.

Parties to the Convention are given the option to take additional measures which are subject to criteria set out in the Convention and to IMO guidelines

The Convention is divided into Articles and an Annex which includes technical standards and requirements in the Regulations for the control and management of ships' ballast water and sediments.

**3.2 Articles and regulations:** The total number of articles is 22. The first article hasn't something important, only the definitions. The remaining articles will be listed below one by one.

**Article 2: General Obligations**

- Parties undertake to give full and complete effect to the provisions of this Convention and the Annex thereto in order to prevent, minimize and ultimately eliminate the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships Ballast Water and Sediments.
- The Annex forms an integral part of this Convention. Unless expressly provided otherwise, a reference to this Convention constitutes at the same time a reference to the Annex.
- Nothing in this Convention shall be interpreted as preventing a Party from taking, individually or jointly with other Parties, more stringent measures with respect to the prevention, reduction or elimination of the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships Ballast Water and Sediments, consistent with international law.
- Parties shall endeavour to co-operate for the purpose of effective implementation, compliance and enforcement of this Convention.
- Parties undertake to encourage the continued development of Ballast Water Management and standards to prevent, minimize and ultimately eliminate

the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships Ballast Water and Sediments.

- Parties taking action pursuant to this Convention shall endeavour not to impair or damage their environment, human health, property or resources, or those of other States.
- Parties should ensure that Ballast Water Management practices used to comply with this Convention do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.
- Parties shall encourage ships entitled to fly their flag, and to which this Convention applies, to avoid, as far as practicable, the uptake of Ballast Water with potentially Harmful Aquatic Organisms and Pathogens, as well as Sediments that may contain such organisms, including promoting the adequate implementation of recommendations developed by the Organization.
- Parties shall endeavour to co-operate under the auspices of the Organization to address threats and risks to sensitive, vulnerable or threatened marine ecosystems and biodiversity in areas beyond the limits of national jurisdiction in relation to Ballast Water Management.

### **Article 3: Application**

- Except as expressly provided otherwise in this Convention, this Convention shall apply to: (a) ships entitled to fly the flag of a Party; and (b) ships not entitled to fly the flag of a Party but which operate under the authority of a Party.
- This Convention shall not apply to:
  1. ships not designed or constructed to carry Ballast Water
  2. ships of a Party which only operate in waters under the jurisdiction of that Party, unless the Party determines that the discharge of Ballast Water from such ships would impair or damage their environment, human health, property or resources, or those of adjacent or other State

3. ships of a Party which only operate in waters under the jurisdiction of another Party, subject to the authorization of the latter Party for such exclusion. No Party shall grant such authorization if doing so would impair or damage their environment, human health, property or resources, or those of adjacent or other States. Any Party not granting such authorization shall notify the Administration of the ship concerned that this Convention applies to such ship
4. ships which only operate in waters under the jurisdiction of one Party and on the high seas, except for ships not granted an authorization pursuant to sub-paragraph (c), unless such Party determines that the discharge of Ballast Water from such ships would impair or damage their environment, human health, property or resources, or those of adjacent of other States
5. any warship, naval auxiliary or other ship owned or operated by a State and used, for the time being, only on government non-commercial service. However, each Party shall ensure, by the adoption of appropriate measures not impairing operations or operational capabilities of such ships owned or operated by it, that such ships act in a manner consistent, so far as is reasonable and practicable, with this Convention
6. permanent Ballast Water in sealed tanks on ships, that is not subject to discharge.
  - With respect to ships of non-Parties to this Convention, Parties shall apply the requirements of this Convention as may be necessary to ensure that no more favourable treatment is given to such ships.

**Article 4: Control of the Transfer of Harmful Aquatic Organisms and Pathogens Through Ships Ballast Water and Sediments**

- Each Party shall require that ships to which this Convention applies and which are entitled to fly its flag or operating under its authority comply with the requirements set forth in this Convention, including the applicable standards and requirements in the Annex, and shall take effective measures to ensure that those ships comply with those requirements.

- Each Party shall, with due regard to its particular conditions and capabilities, develop national policies, strategies or programmes for Ballast Water Management in its ports and waters under its jurisdiction that accord with, and promote the attainment of the objectives of this Convention.

**Article 5: Sediment Reception Facilities**

- Each Party undertakes to ensure that, in ports and terminals designated by that Party where cleaning or repair of ballast tanks occurs, adequate facilities are provided for the reception of Sediments, taking into account the Guidelines developed by the Organization. Such reception facilities shall operate without causing undue delay to ships and shall provide for the safe disposal of such Sediments that does not impair or damage their environment, human health, property or resources or those of other States.
- Each Party shall notify the Organization for transmission to the other Parties concerned of all cases where the facilities provided under paragraph 1 are alleged to be inadequate.

**Article 6: Scientific and Technical Research and Monitoring**

1. Parties shall endeavour, individually or jointly, to:
  1. promote and facilitate scientific and technical research on Ballast Water Management and
  2. monitor the effects of Ballast Water Management in waters under their jurisdiction

Such research and monitoring should include observation, measurement, sampling, evaluation and analysis of the effectiveness and adverse impacts of any technology or methodology as well as any adverse impacts caused by such organisms and pathogens that have been identified to have been transferred through ships' Ballast Water.

- Each Party shall, to further the objectives of this Convention, promote the availability of relevant information to other Parties who request it on:

1. scientific and technology programmes and technical measures undertaken with respect to Ballast Water Management and
2. the effectiveness of Ballast Water Management deduced from any monitoring and assessment programmes

**Article 7: Survey and certification**

- Each Party shall ensure that ships flying its flag or operating under its authority and subject to survey and certification are so surveyed and certified in accordance with the regulations in the Annex.
- A Party implementing measures pursuant to Article 2.3 and Section C of the Annex shall not require additional survey and certification of a ship of another Party, nor shall the Administration of the ship be obligated to survey and certify additional measures imposed by another Party. Verification of such additional measures shall be the responsibility of the Party implementing such measures and shall not cause undue delay to the ship.

**Article 8: Violations**

- Any violation of the requirements of this Convention shall be prohibited and sanctions shall be established under the law of the Administration of the ship concerned, wherever the violation occurs. If the Administration is informed of such a violation, it shall investigate the matter and may request the reporting Party to furnish additional evidence of the alleged violation. If the Administration is satisfied that sufficient evidence is available to enable proceedings to be brought in respect of the alleged violation, it shall cause such proceedings to be taken as soon as possible, in accordance with its law. The Administration shall promptly inform the Party that reported the alleged violation, as well as the Organization, of any action taken. If the Administration has not taken any action within 1 year after receiving the information, it shall so inform the Party which reported the alleged violation.

- Any violation of the requirements of this Convention within the jurisdiction of any Party shall be prohibited and sanctions shall be established under the law of that Party. Whenever such a violation occurs, that Party shall either:
  1. cause proceedings to be taken in accordance with its law or
  2. furnish to the Administration of the ship such information and evidence as may be in its possession that a violation has occurred.
- The sanctions provided for by the laws of a Party pursuant to this Article shall be adequate in severity to discourage violations of this Convention wherever they occur.

**Article 9: Inspection of Ships**

- A ship to which this Convention applies may, in any port or offshore terminal of another Party, be subject to inspection by officers duly authorized by that Party for the purpose of determining whether the ship is in compliance with this Convention. Except as provided in paragraph 2 of this Article, any such inspection is limited to:
  1. verifying that there is onboard a valid Certificate, which, if valid shall be accepted and
  2. inspection of the Ballast Water record book, and/or
  3. a sampling of the ship's Ballast Water, carried out in accordance with the guidelines to be developed by the Organization. However, the time required to analyse the samples shall not be used as a basis for unduly delaying the operation, movement or departure of the ship.
- Where a ship does not carry a valid Certificate or there are clear grounds for believing that:
  1. the condition of the ship or its equipment does not correspond substantially with the particulars of the Certificate or
  2. the master or the crew are not familiar with essential shipboard procedures relating to Ballast Water Management, or have not implemented such procedures a detailed inspection may be carried out.
- In the circumstances given in paragraph 2 of this Article, the Party carrying out the inspection shall take such steps as will ensure that the ship shall not

discharge Ballast Water until it can do so without presenting a threat of harm to the environment, human health, property or resources.

**Article 10: Detection of Violations and Control of Ships**

- Parties shall co-operate in the detection of violations and the enforcement of the provisions of this Convention.
- If a ship is detected to have violated this Convention, the Party whose flag the ship is entitled to fly, and/or the Party in whose port or offshore terminal the ship is operating, may, in addition to any sanctions described in Article 8 or any action described in Article 9, take steps to warn, detain, or exclude the ship. The Party in whose port or offshore terminal the ship is operating, however, may grant such a ship permission to leave the port or offshore terminal for the purpose of discharging Ballast Water or proceeding to the nearest appropriate repair yard or reception facility available, provided doing so does not present a threat of harm to the environment, human health, property or resources.
- If the sampling described in Article 9.1(c) leads to a result, or supports information received from another port or offshore terminal, indicating that the ship poses a threat to the environment, human health, property or resources, the Party in whose waters the ship is operating shall prohibit such ship from discharging Ballast Water until the threat is removed.
- A Party may also inspect a ship when it enters the ports or offshore terminals under its jurisdiction, if a request for an investigation is received from any Party, together with sufficient evidence that a ship is operating or has operated in violation of a provision in this Convention. The report of such investigation shall be sent to the Party requesting it and to the competent authority of the Administration of the ship concerned so that appropriate action may be taken.

**Article 11: Notification of Control Actions**

- If an inspection conducted pursuant to Article 9 or 10 indicates a violation of this Convention, the ship shall be notified. A report shall be forwarded to the Administration, including any evidence of the violation.

- In the event that any action is taken pursuant to Article 9.3, 10.2 or 10.3, the officer carrying out such action shall forthwith inform, in writing, the Administration of the ship concerned, or if this is not possible, the consul or diplomatic representative of the ship concerned, of all the circumstances in which the action was deemed necessary. In addition, the recognized organization responsible for the issue of certificates shall be notified
- The port State authority concerned shall, in addition to parties mentioned in paragraph 2, notify the next port of call of all relevant information about the violation, if it is unable to take action as specified in Article 9.3, 10.2 or 10.3 or if the ship has been allowed to proceed to the next port of call.

**Article 12: Undue Delay to Ships**

- All possible efforts shall be made to avoid a ship being unduly detained or delayed under Article 7.2, 8, 9 or 10.
- When a ship is unduly detained or delayed under Article 7.2, 8, 9 or 10, it shall be entitled to compensation for any loss or damage suffered.

**Article 13: Technical Assistance, Co-operation and Regional Co-operation**

- Parties undertake, directly or through the Organization and other international bodies, as appropriate, in respect of the control and management of ships' Ballast Water and Sediments, to provide support for those Parties which request technical assistance:
  1. to train personnel
  2. to ensure the availability of relevant technology, equipment and facilities
  3. to initiate joint research and development programmes and
  4. to undertake other action aimed at the effective implementation of this Convention and of guidance developed by the Organization related thereto.
- Parties undertake to co-operate actively, subject to their national laws, regulations and policies, in the transfer of technology in respect of the control and management of ships' Ballast Water and Sediments.

- In order to further the objectives of this Convention, Parties with common interests to protect the environment, human health, property and resources in a given geographical area, in particular, those Parties bordering enclosed and semi-enclosed seas, shall endeavour, taking into account characteristic regional features, to enhance regional co-operation, including through the conclusion of regional agreements consistent with this Convention. Parties shall seek to co-operate with the Parties to regional agreements to develop harmonized procedures.

**Article 14: Communication of information**

- Each Party shall report to the Organization and, where appropriate, make available to other Parties the following information:
  1. any requirements and procedures relating to Ballast Water Management, including its laws, regulations, and guidelines for implementation of this Convention
  2. the availability and location of any reception facilities for the environmentally safe disposal of Ballast Water and Sediments
  3. any requirements for information from a ship which is unable to comply with the provisions of this Convention for reasons specified in regulations A-3 and B-4 of the Annex.
- The Organization shall notify Parties of the receipt of any communications under the present Article and circulate to all Parties any information communicated to it under subparagraphs 1(2) and (3) of this Article.

**Article 15: Dispute Settlement**

- Parties shall settle any dispute between them concerning the interpretation or application of this Convention by negotiation, enquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements or other peaceful means of their own choice.

**Article 16: Relationship to International Law and Other Agreements**

- Nothing in this Convention shall prejudice the rights and obligations of any State under customary international law as reflected in the United Nations Convention on the Law of the Sea.

**Article 17: Signature, Ratification, Acceptance, Approval and Accession**

- This Convention shall be open for signature by any State at the Headquarters of the Organization from 1 June 2004 to 31 May 2005 and shall thereafter remain open for accession by any State.
- States may become Parties to the Convention by:
  1. signature not subject to ratification, acceptance, or approval or
  2. signature subject to ratification, acceptance, or approval, followed by ratification, acceptance or approval or
  3. accession.
- Ratification, acceptance, approval or accession shall be effected by the deposit of an instrument to that effect with the Secretary-General.
- If a State comprises two or more territorial units in which different systems of law are applicable in relation to matters dealt with in this Convention, it may at the time of signature, ratification, acceptance, approval, or accession declare that this Convention shall extend to all its territorial units or only to one or more of them and may modify this declaration by submitting another declaration at any time.
- Any such declaration shall be notified to the Depositary in writing and shall state expressly the territorial unit or units to which this Convention applies.

**Article 18: Entry into Force**

- This Convention shall enter into force twelve months after the date on which not less than thirty States, the combined merchant fleets of which constitute not less than thirty-five percent of the gross tonnage of the world's merchant shipping, have either signed it without reservation as to ratification, acceptance or approval, or have deposited the requisite instrument of ratification, acceptance, approval or accession in accordance with Article 17.

- For States which have deposited an instrument of ratification, acceptance, approval or accession in respect of this Convention after the requirements for entry into force thereof have been met, but prior to the date of entry in force, the ratification, acceptance, approval or accession shall take effect on the date of entry into force of this Convention or three months after the date of deposit of instrument, whichever is the later date.
- Any instrument of ratification, acceptance, approval or accession deposited after the date on which this Convention enters into force shall take effect three months after the date of deposit.
- After the date on which an amendment to this Convention is deemed to have been accepted under Article 19, any instrument of ratification, acceptance, approval or accession deposited shall apply to this Convention as amended.

**Article 19: Amendments**

- This Convention may be amended by either of the procedures specified in the following paragraphs.
- Amendments after consideration within the Organization:
  1. Any Party may propose an amendment to this Convention. A proposed amendment shall be submitted to the Secretary-General, who shall then circulate it to the Parties and Members of the Organization at least six months prior to its consideration.
  2. An amendment proposed and circulated as above shall be referred to the Committee for consideration. Parties, whether or not Members of the Organization, shall be entitled to participate in the proceedings of the Committee for consideration and adoption of the amendment.
  3. Amendments shall be adopted by a two-thirds majority of the Parties present and voting in the Committee, on condition that at least one-third of the Parties shall be present at the time of voting.
  4. Amendments adopted in accordance with subparagraph (3) shall be communicated by the Secretary-General to the Parties for acceptance.
  5. An amendment shall be deemed to have been accepted in the following circumstances: I) An amendment to an article of this Convention shall be

deemed to have been accepted on the date on which two-thirds of the Parties have notified the Secretary-General of their acceptance of it. II) An amendment to the Annex shall be deemed to have been accepted at the end of twelve months after the date of adoption or such other date as determined by the Committee. However, if by that date more than one-third of the Parties notify the Secretary-General that they object to the amendment, it shall be deemed not to have been accepted.

6. An amendment shall enter into force under the following conditions: I) An amendment to an article of this Convention shall enter into force for those Parties that have declared that they have accepted it six months after the date on which it is deemed to have been accepted in accordance with subparagraph (5)(i). II) An amendment to the Annex shall enter into force with respect to all Parties six months after the date on which it is deemed to have been accepted, except for any Party that has:
  - notified its objection to the amendment in accordance with subparagraph (5)(ii) and that has not withdrawn such objection or
  - notified the Secretary-General, prior to the entry into force of such amendment, that the amendment shall enter into force for it only after a subsequent notification of its acceptance.
7. A Party that has notified an objection under subparagraph (f)(ii)(1) may subsequently notify the Secretary-General that it accepts the amendment. Such amendment shall enter into force for such Party six months after the date of its notification of acceptance, or the date on which the amendment enters into force, whichever is the later date.
8. If a Party that has made a notification referred to in subparagraph (6)(ii) notifies the Secretary-General of its acceptance with respect to an amendment, such amendment shall enter into force for such Party six months after the date of its notification of acceptance, or the date on which the amendment enters into force, whichever is the later date.
- Amendment by a Conference:

1. Upon the request of a Party concurred in by at least one-third of the Parties, the Organization shall convene a Conference of Parties to consider amendments to this Convention
  2. An amendment adopted by such a Conference by a two-thirds majority of the Parties present and voting shall be communicated by the Secretary-General to all Parties for acceptance.
  3. Unless the Conference decides otherwise, the amendment shall be deemed to have been accepted and shall enter into force in accordance with the procedures specified in paragraphs 2(e) and (f) respectively.
- Any Party that has declined to accept an amendment to the Annex shall be treated as a non-Party only for the purpose of application of that amendment.
  - Any notification under this Article shall be made in writing to the Secretary-General.
  - The Secretary-General shall inform the Parties and Members of the Organization of
    1. any amendment that enters into force and the date of its entry into force generally and for each Party and
    2. any notification made under this Article.

## **Article 20: Denunciation**

- This Convention may be denounced by any Party at any time after the expiry of two years from the date on which this Convention enters into force for that Party.
- Denunciation shall be effected by written notification to the Depositary, to take effect one year after receipt or such longer period as may be specified in that notification.

## **Article 21: Depositary**

- This Convention shall be deposited with the Secretary-General, who shall transmit certified copies of this Convention to all States which have signed this Convention or acceded thereto.
- In addition to the functions specified elsewhere in this Convention, the Secretary-General shall:
  1. inform all States that have signed this Convention, or acceded thereto of
    - a) each new signature or deposit of an instrument of ratification, acceptance, approval or accession, together with the date thereof
    - b) the date of entry into force of this Convention and
    - c) the deposit of any instrument of denunciation from the Convention, together with the date on which it was received and the date on which the denunciation takes effect and
  2. as soon as this Convention enters into force, transmit the text thereof to the Secretariat of the United Nations for registration and publication in accordance with Article 102 of the Charter of the United Nations.

## **Article 22: Languages**

This Convention is established in a single original in the Arabic, Chinese, English, French, Russian and Spanish languages, each text being equally authentic. DONE AT LONDON this thirteenth day of February, two thousand and four. IN WITNESS WHEREOF the undersigned, being duly authorised by their respective Governments for that purpose, have signed this Convention.

## **3.3 REGULATIONS FOR THE CONTROL AND MANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS**

### **3.3.1 SECTION A - GENERAL PROVISIONS**

#### **Regulation A-1: Definitions**

For the purposes of this Annex:

- “Anniversary date“ means the day and the month of each year corresponding to the date of expiry of the Certificate.
- “Ballast Water Capacity“ means the total volumetric capacity of any tanks, spaces or compartments on a ship used for carrying, loading or discharging Ballast Water, including any multi-use tank, space or compartment designed to allow carriage of Ballast Water.
- “Company“ means the owner of the ship or any other organization or person such as the manager, or the bareboat charterer, who has assumed the responsibility for operation of the ship from the owner of the ship and who on assuming such responsibility has agreed to take over all the duties and responsibilities imposed by the International Safety Management Code.
- “Constructed“ in respect of a ship means a stage of construction where:
  1. the keel is laid or
  2. construction identifiable with the specific ship begins
  3. assembly of the ship has commenced comprising at least 50 tonnes or 1 percent of the estimated mass of all structural material, whichever is less or
  4. the ship undergoes a major conversion.
- “Major conversion“ means a conversion of a ship:
  1. which changes its ballast water carrying capacity by 15 percent or greater, or
  2. which changes the ship type, or
  3. which, in the opinion of the Administration, is projected to prolong its life by ten years or more, or
  4. which results in modifications to its ballast water system other than component replacement-in-kind. Conversion of a ship to meet the provisions of regulation D-1 shall not be deemed to constitute a major conversion for the purpose of this Annex.
- “From the nearest land“ means from the baseline from which the territorial sea of the territory in question is established in accordance with international law except that, for the purposes of the Convention, —from the nearest land“ off the north-eastern coast of Australia shall mean from a line drawn from a point on the coast of Australia in:

latitude 11°00' S, longitude 142°08' E

to a point in latitude 10°35' S, longitude 141°55' E

thence to a point latitude 10°00' S, longitude 142°00' E

thence to a point latitude 9°10' S, longitude 143°52' E

thence to a point latitude 9°00' S, longitude 144°30' E

thence to a point latitude 10°41' S, longitude 145°00' E

thence to a point latitude 13°00' S, longitude 145°00' E

thence to a point latitude 15°00' S, longitude 146°00' E

thence to a point latitude 17°30' S, longitude 147°00' E

thence to a point latitude 21°00' S, longitude 152°55' E

thence to a point latitude 24°30' S, longitude 154°00' E

thence to a point on the coast of Australia in latitude 24°42' S, longitude 153°15' E.

- “Active Substance“ means a substance or organism, including a virus or a fungus, that has a general or specific action on or against Harmful Aquatic Organisms and Pathogens.

### **Regulation A-2: General Applicability**

- Except where expressly provided otherwise, the discharge of Ballast Water shall only be conducted through Ballast Water Management in accordance with the provisions of this Annex.

### **Regulation A-3: Exceptions**

The requirements of regulation B-3, or any measures adopted by a Party pursuant to Article 2.3 and Section C, shall not apply to:

- the uptake or discharge of Ballast Water and Sediments necessary for the purpose of ensuring the safety of a ship in emergency situations or saving life at sea or
- the accidental discharge or ingress of Ballast Water and Sediments resulting from damage to a ship or its equipment:
  1. provided that all reasonable precautions have been taken before and after the occurrence of the damage or discovery of the damage or discharge for the purpose of preventing or minimizing the discharge and
  2. unless the owner, Company or officer in charge wilfully or recklessly caused damage or
- the uptake and discharge of Ballast Water and Sediments when being used for the purpose of avoiding or minimizing pollution incidents from the ship or
- the uptake and subsequent discharge on the high seas of the same Ballast Water and Sediments or
- the discharge of Ballast Water and Sediments from a ship at the same location where the whole of that Ballast Water and those Sediments originated and provided that no mixing with unmanaged Ballast Water and Sediments from other areas has occurred. If mixing has occurred, the Ballast Water taken from other areas is subject to Ballast Water Management in accordance with this Annex.

**Regulation A-4: Exemptions**

- A Party or Parties, in waters under their jurisdiction, may grant exemptions to any requirements to apply regulations B-3 or C-1, in addition to those exemptions contained elsewhere in this Convention, but only when they are:
  1. granted to a ship or ships on a voyage or voyages between specified ports or locations; or to a ship which operates exclusively between specified ports or locations
  2. effective for a period of no more than five years subject to intermediate review
  3. granted to ships that do not mix Ballast Water or Sediments other than between the ports or locations specified in paragraph 1.1 and

4. granted based on the Guidelines on risk assessment developed by the Organization.
- Exemptions granted pursuant to paragraph 1 shall not be effective until after communication to the Organization and circulation of relevant information to the Parties
  - Any exemptions granted under this regulation shall not impair or damage the environment, human health, property or resources of adjacent or other States. Any State that the Party determines may be adversely affected shall be consulted, with a view to resolving any identified concerns.
  - Any exemptions granted under this regulation shall be recorded in the Ballast Water record book.

#### **Regulation A-5: Equivalent compliance**

Equivalent compliance with this Annex for pleasure craft used solely for recreation or competition or craft used primarily for search and rescue, less than 50 metres in length overall, and with a maximum Ballast Water capacity of 8 cubic metres, shall be determined by the Administration taking into account Guidelines developed by the Organization.

### **3.3.2 SECTION B - MANAGEMENT AND CONTROL REQUIREMENTS FOR SHIPS**

#### **Regulation B-1: Ballast Water Management Plan**

Each ship shall have on board and implement a Ballast Water Management plan. Such a plan shall be approved by the Administration taking into account Guidelines developed by the Organization. The Ballast Water Management plan shall be specific to each ship and shall at least:

- detail safety procedures for the ship and the crew associated with Ballast Water Management as required by this Convention
- provide a detailed description of the actions to be taken to implement the Ballast Water Management requirements and supplemental Ballast Water Management practices as set forth in this Convention

- detail the procedures for the disposal of Sediments:
  1. at sea and
  2. to shore
- include the procedures for coordinating shipboard Ballast Water Management that involves discharge to the sea with the authorities of the State into whose waters such discharge will take place
- designate the officer on board in charge of ensuring that the plan is properly implemented
- contain the reporting requirements for ships provided for under this Convention and
- be written in the working language of the ship. If the language used is not English, French or Spanish, a translation into one of these languages shall be included.

**Regulation B-2: Ballast Water Record Book**

- Each ship shall have on board a Ballast Water record book that may be an electronic record system, or that may be integrated into another record book or system and, which shall at least contain the information specified in Appendix II.
- Ballast Water record book entries shall be maintained on board the ship for a minimum period of two years after the last entry has been made and thereafter in the Company's control for a minimum period of three years.
- In the event of the discharge of Ballast Water pursuant to regulations A-3, A-4 or B-3.6 or in the event of other accidental or exceptional discharge of Ballast Water not otherwise exempted by this Convention, an entry shall be made in the Ballast Water record book describing the circumstances of, and the reason for, the discharge.
- The Ballast Water record book shall be kept readily available for inspection at all reasonable times and, in the case of an unmanned ship under tow, may be kept on the towing ship.
- Each operation concerning Ballast Water shall be fully recorded without delay in the Ballast Water record book. Each entry shall be signed by the officer in

charge of the operation concerned and each completed page shall be signed by the master. The entries in the Ballast Water record book shall be in a working language of the ship. If that language is not English, French or Spanish the entries shall contain a translation into one of those languages. When entries in an official national language of the State whose flag the ship is entitled to fly are also used, these shall prevail in case of a dispute or discrepancy.

- Officers duly authorized by a Party may inspect the Ballast Water record book on board any ship to which this regulation applies while the ship is in its port or offshore terminal, and may make a copy of any entry, and require the master to certify that the copy is a true copy. Any copy so certified shall be admissible in any judicial proceeding as evidence of the facts stated in the entry. The inspection of a Ballast Water record book and the taking of a certified copy shall be performed as expeditiously as possible without causing the ship to be unduly delayed.

### **Regulation B-3: Ballast Water Management for Ships**

- A ship constructed before 2009:
  1. with a Ballast Water Capacity of between 1,500 and 5,000 cubic metres, inclusive, shall conduct Ballast Water Management that at least meets the standard described in regulation D-1 or regulation D-2 until 2014, after which time it shall at least meet the standard described in regulation D-2;
  2. with a Ballast Water Capacity of less than 1,500 or greater than 5,000 cubic metres shall conduct Ballast Water Management that at least meets the standard described in regulation D-1 or regulation D-2 until 2016, after which time it shall at least meet the standard described in regulation D-2.
- A ship to which paragraph 1 applies shall comply with paragraph 1 not later than the first intermediate or renewal survey, whichever occurs first, after the anniversary date of delivery of the ship in the year of compliance with the standard applicable to the ship.
- A ship constructed in or after 2009 with a Ballast Water Capacity of less than 5,000 cubic metres shall conduct Ballast Water Management that at least meets the standard described in regulation D-2.

- A ship constructed in or after 2009, but before 2012, with a Ballast Water Capacity of 5,000 cubic metres or more shall conduct Ballast Water Management in accordance with paragraph 1.2.
- A ship constructed in or after 2012 with a Ballast Water Capacity of 5000 cubic metres or more shall conduct Ballast Water Management that at least meets the standard described in regulation D-2.
- The requirements of this regulation do not apply to ships that discharge Ballast Water to a reception facility designed taking into account the Guidelines developed by the Organization for such facilities.
- Other methods of Ballast Water Management may also be accepted as alternatives to the requirements described in paragraphs 1 to 5, provided that such methods ensure at least the same level of protection to the environment, human health, property or resources, and are approved in principle by the Committee.

**Regulation B-4: Ballast Water Exchange**

- A ship conducting Ballast Water exchange to meet the standard in regulation D-1 shall:
  1. whenever possible, conduct such Ballast Water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth, taking into account the Guidelines developed by the Organization
  2. in cases where the ship is unable to conduct Ballast Water exchange in accordance with paragraph 1.1, such Ballast Water exchange shall be conducted taking into account the Guidelines described in paragraph 1.1 and as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 metres in depth.
- In sea areas where the distance from the nearest land or the depth does not meet the parameters described in paragraph 1.1 or 1.2, the port State may designate areas, in consultation with adjacent or other States, as appropriate, where a ship may conduct Ballast Water exchange, taking into account the Guidelines described in paragraph 1.1.

- A ship shall not be required to deviate from its intended voyage, or delay the voyage, in order to comply with any particular requirement of paragraph 1.
- A ship conducting Ballast Water exchange shall not be required to comply with paragraphs 1 or 2, as appropriate, if the master reasonably decides that such exchange would threaten the safety or stability of the ship, its crew, or its passengers because of adverse weather, ship design or stress, equipment failure, or any other extraordinary condition.
- When a ship is required to conduct Ballast Water exchange and does not do so in accordance with this regulation, the reasons shall be entered in the Ballast Water record book.

**Regulation B-5: Sediment Management for Ships**

- All ships shall remove and dispose of Sediments from spaces designated to carry Ballast Water in accordance with the provisions of the ship’s Ballast Water Management plan.
- Ships described in regulation B-3.3 to B-3.5 should, without compromising safety or operational efficiency, be designed and constructed with a view to minimize the uptake and undesirable entrapment of Sediments, facilitate removal of Sediments, and provide safe access to allow for Sediment removal and sampling, taking into account guidelines developed by the Organization. Ships described in regulation B-3.1 should, to the extent practicable, comply with this paragraph.

**Regulation B-6: Duties of Officers and Crew**

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 Ballast Water Management plan.

**3.3.3 SECTION C - SPECIAL REQUIREMENTS IN CERTAIN AREAS**

## **Regulation C-1: Additional Measures**

- If a Party, individually or jointly with other Parties, determines that measures in addition to those in Section B are necessary to prevent, reduce, or eliminate the transfer of Harmful Aquatic Organisms and Pathogens through ships' Ballast Water and Sediments, such Party or Parties may, consistent with international law, require ships to meet a specified standard or requirement.
- Prior to establishing standards or requirements under paragraph 1, a Party or Parties should consult with adjacent or other States that may be affected by such standards or requirements.
- A Party or Parties intending to introduce additional measures in accordance with paragraph 1 shall:
  1. take into account the Guidelines developed by the Organization.
  2. communicate their intention to establish additional measure(s) to the Organization at least 6 months, except in emergency or epidemic situations, prior to the projected date of implementation of the measure(s). Such communication shall include: the precise co-ordinates where additional measure(s) is/are applicable, the need and reasoning for the application of the additional measure(s), including, whenever possible, benefits , a description of the additional measure(s) and any arrangements that may be provided to facilitate ships' compliance with the additional measure(s).
  3. to the extent required by customary international law as reflected in the United Nations Convention on the Law of the Sea, as appropriate, obtain the approval of the Organization.
- A Party or Parties, in introducing such additional measures, shall endeavour to make available all appropriate services, which may include but are not limited to notification to mariners of areas, available and alternative routes or ports, as far as practicable, in order to ease the burden on the ship.
- Any additional measures adopted by a Party or Parties shall not compromise the safety and security of the ship and in any circumstances not conflict with any other convention with which the ship must comply.
- A Party or Parties introducing additional measures may waive these measures for a period of time or in specific circumstances as they deem fit.

## **Regulation C-2: Warnings Concerning Ballast Water Uptake in Certain Areas and Related Flag State Measures**

- A Party shall endeavour to notify mariners of areas under their jurisdiction where ships should not uptake Ballast Water due to known conditions. The Party shall include in such notices the precise coordinates of the area or areas, and, where possible, the location of any alternative area or areas for the uptake of Ballast Water. Warnings may be issued for areas:
  1. known to contain outbreaks, infestations, or populations of Harmful Aquatic Organisms and Pathogens (e.g., toxic algal blooms) which are likely to be of relevance to Ballast Water uptake or discharge
  2. near sewage outfalls or
  3. where tidal flushing is poor or times during which a tidal stream is known to be more turbid.
- In addition to notifying mariners of areas in accordance with the provisions of paragraph 1, a Party shall notify the Organization and any potentially affected coastal States of any areas identified in paragraph 1 and the time period such warning is likely to be in effect. The notice to the Organization and any potentially affected coastal States shall include the precise coordinates of the area or areas, and, where possible, the location of any alternative area or areas for the uptake of Ballast Water. The notice shall include advice to ships needing to uptake Ballast Water in the area, describing arrangements made for alternative supplies. The Party shall also notify mariners, the Organization, and any potentially affected coastal States when a given warning is no longer applicable.

## **Regulation C-3: Communication of Information**

The Organization shall make available, through any appropriate means, information communicated to it under regulations C-1 and C-2.

### **3.3.4 SECTION D -STANDARDS FOR BALLAST WATER MANAGEMENT**

#### **Regulation D-1: Ballast Water Exchange Standard**

- Ships performing Ballast Water exchange in accordance with this regulation shall do so with an efficiency of at least 95 percent volumetric exchange of Ballast Water.
- For ships exchanging Ballast Water by the pumping-through method, pumping through three times the volume of each Ballast Water tank shall be considered to meet the standard described in paragraph 1. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95 percent volumetric exchange is met

#### **Regulation D-2: Ballast Water Performance Standard**

- Ships conducting Ballast Water Management in accordance with this regulation shall discharge less than 10 viable organisms per cubic metre greater than or equal to 50 micrometres in minimum dimension and less than 10 viable organisms per millilitre less than 50 micrometres in minimum dimension and greater than or equal to 10 micrometres in minimum dimension; and discharge of the indicator microbes shall not exceed the specified concentrations described in paragraph 2.
- Indicator microbes, as a human health standard, shall include:
  1. Toxicogenic *Vibrio cholerae* (O1 and O139) with less than 1 colony forming unit (cfu) per 100 millilitres or less than 1 cfu per 1 gram (wet weight) zooplankton samples
  2. *Escherichia coli* less than 250 cfu per 100 millilitres
  3. Intestinal *Enterococci* less than 100 cfu per 100 milliliters.

#### **Regulation D-3: Approval requirements for Ballast Water Management systems**

- Except as specified in paragraph 2, Ballast Water Management systems used to comply with this Convention must be approved by the Administration taking into account Guidelines developed by the Organization.

- Ballast Water Management systems which make use of Active Substances or preparations containing one or more Active Substances to comply with this Convention shall be approved by the Organization, based on a procedure developed by the Organization. This procedure shall describe the approval and withdrawal of approval of Active Substances and their proposed manner of application. At withdrawal of approval, the use of the relevant Active Substance or Substances shall be prohibited within 1 year after the date of such withdrawal.
- Ballast Water Management systems used to comply with this Convention must be safe in terms of the ship, its equipment and the crew.

**Regulation D-4: Prototype Ballast Water Treatment Technologies**

- For any ship that, prior to the date that the standard in regulation D-2 would otherwise become effective for it, participates in a programme approved by the Administration to test and evaluate promising Ballast Water treatment technologies, the standard in regulation D-2 shall not apply to that ship until five years from the date on which the ship would otherwise be required to comply with such standard.
- For any ship that, after the date on which the standard in regulation D-2 has become effective for it, participates in a programme approved by the Administration, taking into account Guidelines developed by the Organization, to test and evaluate promising Ballast Water technologies with the potential to result in treatment technologies achieving a standard higher than that in regulation D-2, the standard in regulation D-2 shall cease to apply to that ship for five years from the date of installation of such technology.
- In establishing and carrying out any programme to test and evaluate promising Ballast Water technologies, Parties shall:
  1. take into account Guidelines developed by the Organization, and
  2. allow participation only by the minimum number of ships necessary to effectively test such technologies.
- Throughout the test and evaluation period, the treatment system must be operated consistently and as designed.

### **Regulation D-5: Review of Standards by the Organization**

- At a meeting of the Committee held no later than three years before the earliest effective date of the standard set forth in regulation D-2, the Committee shall undertake a review which includes a determination of whether appropriate technologies are available to achieve the standard, an assessment of the criteria in paragraph 2, and an assessment of the socio-economic effect(s) specifically in relation to the developmental needs of developing countries, particularly small island developing States. The Committee shall also undertake periodic reviews, as appropriate, to examine the applicable requirements for ships described in regulation B-3.1 as well as any other aspect of Ballast Water Management addressed in this Annex, including any Guidelines developed by the Organization.
- Such reviews of appropriate technologies shall also take into account:
  1. safety considerations relating to the ship and the crew
  2. environmental acceptability, i.e., not causing more or greater environmental impacts than they solve
  3. practicability, i.e., compatibility with ship design and operations
  4. cost effectiveness, i.e., economics and
  5. biological effectiveness in terms of removing, or otherwise rendering not viable, Harmful Aquatic Organisms and Pathogens in Ballast Water.
- The Committee may form a group or groups to conduct the review(s) described in paragraph 1. The Committee shall determine the composition, terms of reference and specific issues to be addressed by any such group formed. Such groups may develop and recommend proposals for amendment of this Annex for consideration by the Parties. Only Parties may participate in the formulation of recommendations and amendment decisions taken by the Committee.
- If, based on the reviews described in this regulation, the Parties decide to adopt amendments to this Annex, such amendments shall be adopted and enter

into force in accordance with the procedures contained in Article 19 of this Convention.

### **3.3.5 SECTION E - SURVEY AND CERTIFICATION REQUIREMENTS FOR BALLAST WATER MANAGEMENT**

#### **Regulation E-1: Surveys**

- Ships of 400 gross tonnage and above to which this Convention applies, excluding floating platforms, FSUs and FPSOs, shall be subject to surveys specified below:
  1. An initial survey before the ship is put in service or before the Certificate required under regulation E-2 or E-3 is issued for the first time. This survey shall verify that the Ballast Water Management plan required by regulation B-1 and any associated structure, equipment, systems, fitting, arrangements and material or processes comply fully with the requirements of this Convention.
  2. A renewal survey at intervals specified by the Administration, but not exceeding five years, except where regulation E-5.2, E-5.5, E-5.6, or E-5.7 is applicable. This survey shall verify that the Ballast Water Management plan required by regulation B-1 and any associated structure, equipment, systems, fitting, arrangements and material or processes comply fully with the applicable requirements of this Convention.
  3. An intermediate survey within three months before or after the second Anniversary date or within three months before or after the third Anniversary date of the Certificate, which shall take the place of one of the annual surveys specified in paragraph 1.4. The intermediate surveys shall ensure that the equipment, associated systems and processes for Ballast Water Management fully comply with the applicable requirements of this Annex and are in good working order. Such intermediate surveys shall be endorsed on the Certificate issued under regulation E-2 or E-3.

4. An annual survey within three months before or after each Anniversary date, including a general inspection of the structure, any equipment, systems, fittings, arrangements and material or processes associated with the Ballast Water Management plan required by regulation B-1 to ensure that they have been maintained in accordance with paragraph 9 and remain satisfactory for the service for which the ship is intended. Such annual surveys shall be endorsed on the Certificate issued under regulation E-2 or E-3.
  5. An additional survey either general or partial, according to the circumstances, shall be made after a change, replacement, or significant repair of the structure, equipment, systems, fittings, arrangements and material necessary to achieve full compliance with this Convention. The survey shall be such as to ensure that any such change, replacement, or significant repair has been effectively made, so that the ship complies with the requirements of this Convention. Such surveys shall be endorsed on the Certificate issued under regulation E-2 or E-3.
- The Administration shall establish appropriate measures for ships that are not subject to the provisions of paragraph 1 in order to ensure that the applicable provisions of this Convention are complied with.
  - Surveys of ships for the purpose of enforcement of the provisions of this Convention shall be carried out by officers of the Administration. The Administration may, however, entrust the surveys either to surveyors nominated for the purpose or to organizations recognized by it.
  - An Administration nominating surveyors or recognizing organizations to conduct surveys, as described in paragraph 3 shall, as a minimum, empower such nominated surveyors or recognized organizations to:
    1. require a ship that they survey to comply with the provisions of this Convention and
    2. carry out surveys and inspections if requested by the appropriate authorities of a port State that is a Party.
  - The Administration shall notify the Organization of the specific responsibilities and conditions of the authority delegated to the nominated

surveyors or recognized organizations, for circulation to Parties for the information of their officers.

- When the Administration, a nominated surveyor, or a recognized organization determines that the ship's Ballast Water Management does not conform to the particulars of the Certificate required under regulation E-2 or E-3 or is such that the ship is not fit to proceed to sea without presenting a threat of harm to the environment, human health, property or resources such surveyor or organization shall immediately ensure that corrective action is taken to bring the ship into compliance. A surveyor or organization shall be notified immediately, and it shall ensure that the Certificate is not issued or is withdrawn as appropriate. If the ship is in the port of another Party, the appropriate authorities of the port State shall be notified immediately. When an officer of the Administration, a nominated surveyor, or a recognized organization has notified the appropriate authorities of the port State, the Government of the port State concerned shall give such officer, surveyor or organization any necessary assistance to carry out their obligations under this regulation, including any action described in Article 9.
- Whenever an accident occurs to a ship or a defect is discovered which substantially affects the ability of the ship to conduct Ballast Water Management in accordance with this Convention, the owner, operator or other person in charge of the ship shall report at the earliest opportunity to the Administration, the recognized organization or the nominated surveyor responsible for issuing the relevant Certificate, who shall cause investigations to be initiated to determine whether a survey as required by paragraph 1 is necessary. If the ship is in a port of another Party, the owner, operator or other person in charge shall also report immediately to the appropriate authorities of the port State and the nominated surveyor or recognized organization shall ascertain that such report has been made.
- In every case, the Administration concerned shall fully guarantee the completeness and efficiency of the survey and shall undertake to ensure the necessary arrangements to satisfy this obligation

- The condition of the ship and its equipment, systems and processes shall be maintained to conform with the provisions of this Convention to ensure that the ship in all respects will remain fit to proceed to sea without presenting a threat of harm to the environment, human health, property or resources.
- After any survey of the ship under paragraph 1 has been completed, no change shall be made in the structure, any equipment, fittings, arrangements or material associated with the Ballast Water Management plan required by regulation B-1 and covered by the survey without the sanction of the Administration, except the direct replacement of such equipment or fittings.

**Regulation E-2: Issuance or Endorsement of a Certificate**

- The Administration shall ensure that a ship to which regulation E-1 applies is issued a Certificate after successful completion of a survey conducted in accordance with regulation E-1. A Certificate issued under the authority of a Party shall be accepted by the other Parties and regarded for all purposes covered by this Convention as having the same validity as a Certificate issued by them.
- Certificates shall be issued or endorsed either by the Administration or by any person or organization duly authorized by it. In every case, the Administration assumes full responsibility for the Certificate.

**Regulation E-3: Issuance or Endorsement of a Certificate by Another Party**

- At the request of the Administration, another Party may cause a ship to be surveyed and, if satisfied that the provisions of this Convention are complied with, shall issue or authorize the issuance of a Certificate to the ship, and where appropriate, endorse or authorize the endorsement of that Certificate on the ship, in accordance with this Annex.
- A copy of the Certificate and a copy of the survey report shall be transmitted as soon as possible to the requesting Administration.
- A Certificate so issued shall contain a statement to the effect that it has been issued at the request of the Administration and it shall have the same force and receive the same recognition as a Certificate issued by the Administration.

- No Certificate shall be issued to a ship entitled to fly the flag of a State which is not a Party.

**Regulation E-4: Form of the Certificate**

The Certificate shall be drawn up in the official language of the issuing Party, in the form set forth in Appendix I. If the language used is neither English, French nor Spanish, the text shall include a translation into one of these languages.

**Regulation E-5: Duration and Validity of the Certificate**

- A Certificate shall be issued for a period specified by the Administration that shall not exceed five years.
- For renewal surveys:
  1. Notwithstanding the requirements of paragraph 1, when the renewal survey is completed within three months before the expiry date of the existing Certificate, the new Certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing Certificate.
  2. When the renewal survey is completed after the expiry date of the existing Certificate, the new Certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of expiry of the existing Certificate.
  3. When the renewal survey is completed more than three months before the expiry date of the existing Certificate, the new Certificate shall be valid from the date of completion of the renewal survey to a date not exceeding five years from the date of completion of the renewal survey.
- If a Certificate is issued for a period of less than five years, the Administration may extend the validity of the Certificate beyond the expiry date to the maximum period specified in paragraph 1, provided that the surveys referred to in regulation E-1.1.3 applicable when a Certificate is issued for a period of five years are carried out as appropriate.
- If a renewal survey has been completed and a new Certificate cannot be issued or placed on board the ship before the expiry date of the existing Certificate,

the person or organization authorized by the Administration may endorse the existing Certificate and such a Certificate shall be accepted as valid for a further period which shall not exceed five months from the expiry date.

- If a ship at the time when the Certificate expires is not in a port in which it is to be surveyed, the Administration may extend the period of validity of the Certificate but this extension shall be granted only for the purpose of allowing the ship to complete its voyage to the port in which it is to be surveyed, and then only in cases where it appears proper and reasonable to do so. No Certificate shall be extended for a period longer than three months, and a ship to which such extension is granted shall not, on its arrival in the port in which it is to be surveyed, be entitled by virtue of such extension to leave that port without having a new Certificate. When the renewal survey is completed, the new Certificate shall be valid to a date not exceeding five years from the date of expiry of the existing Certificate before the extension was granted.
- A Certificate issued to a ship engaged on short voyages which has not been extended under the foregoing provisions of this regulation may be extended by the Administration for a period of grace of up to one month from the date of expiry stated on it. When the renewal survey is completed, the new Certificate shall be valid to a date not exceeding five years from the date of expiry of the existing Certificate before the extension was granted.
- In special circumstances, as determined by the Administration, a new Certificate need not be dated from the date of expiry of the existing Certificate as required by paragraph 2.2, 5 or 6 of this regulation. In these special circumstances, the new Certificate shall be valid to a date not exceeding five years from the date of completion of the renewal survey.
- If an annual survey is completed before the period specified in regulation E-1, then:
  1. the Anniversary date shown on the Certificate shall be amended by endorsement to a date which shall not be more than three months later than the date on which the survey was completed

2. the subsequent annual or intermediate survey required by regulation E-1 shall be completed at the intervals prescribed by that regulation using the new Anniversary date
  3. the expiry date may remain unchanged provided one or more annual surveys, as appropriate, are carried out so that the maximum intervals between the surveys prescribed by regulation E-1 are not exceeded.
- A Certificate issued under regulation E-2 or E-3 shall cease to be valid in any of the following cases:
    1. if the structure, equipment, systems, fittings, arrangements and material necessary to comply fully with this Convention is changed, replaced or significantly repaired and the Certificate is not endorsed in accordance with this Annex
    2. upon transfer of the ship to the flag of another State. A new Certificate shall only be issued when the Party issuing the new Certificate is fully satisfied that the ship is in compliance with the requirements of regulation E-1. In the case of a transfer between Parties, if requested within three months after the transfer has taken place, the Party whose flag the ship was formerly entitled to fly shall, as soon as possible, transmit to the Administration copies of the Certificates carried by the ship before the transfer and, if available, copies of the relevant survey reports
    3. if the relevant surveys are not completed within the periods specified under regulation E-1.1 or
    4. if the Certificate is not endorsed in accordance with regulation E-1.1.

## **4. BALLAST WATER MANAGEMENT PLAN**

**4.1 Purpose of the Plan:** The ballast water management plan aims to assist governments, appropriate authorities, ships' Masters, operators, owners, port authorities as well as other interested parties, in preventing, minimising and ultimately eliminating the risk of introducing harmful aquatic organisms and pathogens from ships' ballast water and associated sediments while protecting ships' safety. Treatment of ballast water is deemed as an acceptable method of reducing the invasion of harmful organisms. Good record keeping is critical to the success of a sound ballast water management program. The appointed ballast water management officer is responsible for ensuring the maintenance of appropriate records and that the ballast water management and treatment procedures are followed and recorded. It is the owners/managers or Master's responsibility to regularly review the plan and ensure that the information contained therein is accurate and updated.

**4.2 General:** The vessel is to maintain a Ballast Water Management Plan onboard for use by the vessel's Master and crew and port State authorities. This plan is to include:

- i) Vessel particulars
  - ii) Ballast tank arrangements
  - iii) Safety considerations
  - iv) A detailed description of the actions required by the crew to implement ballast water exchange method(s)
  - v) Detailed procedures for the disposal of sediments (at sea and ashore)
  - vi) Other operational considerations including communications with and reporting to coastal and port State authorities, and the designation of the officer onboard who is responsible for proper implementation of the Ballast Water Management Plan
- In addition, the Ballast Water Management Plan is to provide a listing and the details of any exemptions issued by the Administration in accordance with Regulation A-4 of the Convention, and where appropriate, a list of any Additional Measures issued by a Party to the Convention that are relevant to the vessel's trade. Detailed descriptions of any actions required by the vessel's crew to comply with the additional measures are also to be included in the Management Plan.

**4.3 Maintenance of the Ballast Water Management Plan:** The Ballast Water Management Plan is to be reviewed periodically by the Owner, Operator or Master to maintain its currency. Any changes to the provisions of the Ballast Water Management Plan are to be submitted for review and approval by ABS. The Ballast Water Management Plan is to be readily available for inspection upon request by authorities such as port State authorities.

**4.4 Operation of the ballast water management:** Ballast Water Management System (BWMS) means any system which processes ballast water such that it meets or exceeds the ballast water performance standard in regulation D-2. The BWMS includes ballast water treatment equipment, all associated control

equipment, monitoring equipment and sampling facilities. BWMS means equipment which mechanically, physically, chemically, or biologically processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of harmful aquatic organisms and pathogens within ballast water and sediments. Ballast water treatment equipment may operate at the uptake or discharge of ballast water, during the voyage, or at a combination of these events. Ballast water exchange can also be used for this vessel, but only to meet the standard described in regulation D-1. The applicable methods are: sequential method, flow through method and dilution method or a combination of those. Remove the complete paragraph if only treatment is applicable. Remove the exchange methods that are not applicable.

Ballast water exchange will be phased out as an acceptable method for complying with the Convention, depending on ballast water capacity and date for renewal survey of the vessel. Therefore ballast water treatment will be the only remaining option for complying with the Convention. Remove the complete paragraph if only treatment is applicable. During normal conditions the treatment system is to be used for ballast water operations, however it is possible to bypass this and then ballast exchange can be conducted. Remove the complete paragraph if only treatment is applicable. It is the responsibility of the ballast water management officer to decide which method is to be used (e.g. in port states where discharge of treated ballast water is not a requirement.) It is the Master's responsibility to control the safety of the vessel at all times. This includes evaluation of stability and longitudinal strength throughout the sequential exchange sequence. The sequence included in this document is only one example of an acceptable sequence for one specific loading condition. Remove the complete paragraph if only treatment is applicable. Remove the exchange methods that are not applicable. It must be ensured that the ballast water treatment system installed is approved in accordance with Regulation D-3 of the Convention. All systems (type) approved by any IACS Class society and physically inspected by Class' surveyor after installation should fulfill this requirement. The system should only be operated in accordance with the system design criteria and manufacturer's operational and maintenance instructions. When

the system encounters malfunctions or failure, these are to be recorded in the ballast water record book.

**4.5 Ballast water treatment criteria:** The criteria for selecting a treatment method be can summarized as followed: the safety of the crew and passengers, the effectiveness at removing target organisms, the ease of operating treatment equipment, the amount of interference with normal ship operations and travel times, the structural integrity of the ship, the size and expense of treatment equipment, the amount of potential damage to the environment and the ease for port authorities to monitor for compliance with regulations. However, ballast water treatment methods may have some negative effects on the ecosystem and/or the ship industry. When evaluating ballast water treatment options a number of general factors must be considered including cost, enforcement, the effectiveness of the method, and the risks the treatment may pose to human health and the environment. The monetary cost of a treatment method includes the expense of the equipment, the crew needed to operate the treatment equipment, and the time needed for the treatment operation. Many treatment methods require that ships be retrofitted with the necessary equipment or that new ships have the equipment included in their design, both of which may be quite expensive. Because crew members have many tasks to perform on a ship, any crew that is needed to operate the treatment may decrease the number of crew members that are available for other ship operations. If a treatment method slows down the journey of a vessel or causes excess fuel consumption the journey will be more expensive. Any treatment method should provide means for port authorities to easily monitor whether or not the treatment has been performed and if it was effective. This allows for enforcement of any laws regarding ballast water treatment. Because many treatment methods work by killing the organisms in ballast water, the method itself may pose a risk to human health or to the environment if the treatment is not properly contained in the ballast tanks. These risks and costs need to be evaluated and compared to the risk of introducing species to a port. Unfortunately no single ballast water management technique has been able to remove all organisms or all types of organisms from ballast tanks. A combination of different methods may prove to be more effective than one method alone, however little research has been conducted into this possibility. It is difficult

to implement treatments because ship owners are understandably reluctant to install technology that is expensive, unreliable, or time consuming.

**4.6 Ballast water treatment methods:** The major treatment methods includes: filtration, separation unit, flow-through system, dilution method, sedimentation and flotation methods and ballast water exchange in Open Ocean. While the physical removal of species in ballast water were carried out through: heat treatment, cooling treatment, Ultraviolet radiation, Gamma radiation, Ultra-Sonics, Microwave, rapid pressure changes, electrical removal of species in ballast water and magnetic fields. In addition, the chemical removal of species in ballast water can be applied through: Chlorination, Metal ions, Ozone, Hydrogen peroxide, Oxygen deprivation (de-oxygenation), Coagulants, pH adjustment, Alternating salinities in ballast water and area of discharge, Antifouling paints as ballast tank coatings and Organic biocides.

**4.6.1 Ballast Water Exchange:** Current ballast water regulations usually recommend minimizing the risk of introducing non-native species by exchanging ballast water in the open ocean. This method is effective because organisms from coastal waters are unlikely to survive in the open ocean and vice versa. Drawbacks to this method are: (1) it is difficult to completely remove sediments and residual water from the bottom of ballast tanks; (2) organisms stuck to the sides of the tank or structural supports within the tank will not be readily removed; and (3) during stormy or rough seas it is unsafe for a ship to exchange ballast water. Thus, organisms remaining inside the ballast tanks may be discharged at a later time into ports and harbors if the exchange fails to remove all organisms. There are also advantages to ballast tank exchange. Because it is done while the ship is en route, relatively little time is lost during the voyage. No additional equipment or operator training is needed for ballast exchange so the capital costs are low and it is a simple process to implement. Enforcement of ballast exchange laws can occur to some degree because open ocean waters have higher salinity levels than coastal waters and this difference can be detected by port authorities. In addition, Battelle, a research institution, is developing a quick and easy test for determining if ballast water exchange has occurred. The effectiveness of ballast water exchange could be improved by redesigning ballast tanks and pumping systems. Currently, most

ballast tanks have one pipe that pumps water in both directions, but not at the same time. With the addition of another pipe, ballast exchange could be achieved by continual flushing of the tank with one pipe bringing water into the tank and another pipe allowing water to exit the tank. This would be a safer means of exchanging ballast because the tanks would contain water at all times. Another means of improving current ballast tank flushing would be to remove the residual water and sediments from the bottom of ballast tanks. Pumps, which are relatively inexpensive, could be installed in the bottom of ballast tanks to remove these residual materials, thereby reducing the risk of introducing a nonnative species. Ballast tanks could also be redesigned with a sloping bottom or other structure that allows sediment and water to drain into a pump. Current ship designs often include structural supports and odd corners in the ballast tanks that trap organisms and ballast water. The possibility of trapping organisms in ballast tank structures could be reduced by designing ships that do not have these structures, redesigning these structures so they do not trap ballast water and organisms, or by installing small pumps in these areas to remove water during ballast exchange.

Three methods of ballast water exchange have been evaluated and determined to be acceptable to IMO via the sequential method, the flow-through method and the dilution method. A description of these methods is as follows:

i) **Sequential method** – A process by which a ballast tank intended for the carriage of water ballast is first emptied and then refilled with replacement ballast water to achieve at least a 95% volumetric exchange. The sequential method entails completely emptying ballast tanks of the coastal waters and refilling with open-ocean water. Emptying of certain tanks may lead to significantly reduced stability, higher vessel structural stresses, high sloshing pressures and/or reduced forward drafts which may then increase the probability of bow slamming. Margins are to be provided for stability and strength for all seagoing conditions, as specified in the vessel's approved trim and stability booklet and the loading manual. The loading conditions for the selected ballast water exchange method or methods are to be taken from the approved loading manual or trim and stability booklet. The

following items are to be evaluated when the sequential method is selected for ballast water exchange.

ii) **Flow-through method** – The flow-through method involves pumping replacement ballast water into the bottom of a full ballast tank, forcing existing ballast water out through an overflow or other arrangement. Ballast water equal to approximately three times the tank capacity must be pumped through the tank to achieve 95% effectiveness in eliminating aquatic organisms. The flow-through method does not typically alter stability, hull girder stress and vessel attitude. It therefore eliminates concerns of exceeding shear force and bending moment limits and concerns related to shallow forward and aft drafts and extreme trims. As with all methods, the Ballast Water Reporting Form provided in Appendix 1 is to be completed and transmitted to the next port where ballast water is discharged. In those instances where the flow-through method alters stability, hull girder stress or vessel attitude, a ballast water summary sequence table is to be submitted demonstrating that adequate strength and stability has been maintained.

iii) **Dilution method** – In the dilution method, replacement ballast water is filled through the top of the ballast tank and simultaneously discharged from the bottom at the same flow rate while maintaining a constant level in the tank throughout the ballast exchange operation. As with the flow-through method, ballast equal to approximately three times the tank capacity must be pumped through the tank to achieve 95% effectiveness in eliminating aquatic organisms. The dilution method has the advantages of the flow-through method with regard to maintaining the stability and strength and other similar benefits. By discharging water from the bottom of the ballast tanks, sediments are more easily removed. This method avoids the use of air vent pipes and the removal of manhole covers to discharge water over the deck. In addition to the design requirements the following safety precautions are to be taken and noted in the Ballast Water Management Plan if the dilution method is chosen:

i) Arrangements are to be made to automatically maintain the ballast water level in the tanks at a constant level.

ii) High and low water level alarms are to be provided where maintaining a constant level in a tank or hold is essential to the operational efficiency of the vessel during the ballast water exchange.

iii) The arrangements are to include the provision of a manual emergency stop for any operating ballast pump in case of valve malfunction or incorrect control actions.

The Ballast Water Exchange is the most common method to avoid transportation of harmful microorganisms from one area to another. Apart from this, there are other effective ways to prevent the transfer of microorganisms which will be listed below.

#### **4.6.2 Other treatment methods:**

- Taking on clean ballast: May be achieved through precautionary measures such as avoidance of shallow water, dredging operations and areas of known outbreak of disease or plankton bloom. But there may be little choice over where ballasting can take place.
- Certifying clean ballast: Ships may obtain laboratory analysis certifying ballast water is free of aquatic organisms or pathogens considered harmful by receiving states. Not seen as an effective method of minimising risk.
- Non-release of ballast water: Not an option for many ships, such as bulk carriers and tankers.
- Relying on differences of temperature/ salinity: Significant changes in ambient conditions between area of take-up/ receiving area can affect ability of aquatic organism to survive. But more research is needed and it depends on locations.
- Keeping water in ballast for long periods: Water maintained in ballast tanks for more than 100 days represent minimum risk, as most organisms do not survive the absence of light and higher iron content of ballast water. But tankers and bulk carriers may not have option of maintaining ballast water for three months.
- Sediment disposal: Many aquatic organism are present in sediment and all sources of sediment retention such as anchor cables should be routinely cleaned. Ship should be designed to minimise sediment retention.

- Reception facilities: Discharge of ships' ballast into reception facilities may provide adequate means of control. Dependent on these facilities being provided.
- Filtration: Filtering ballast water as it is taken on board would remove large particles such as small seaweeds, but would not rule out the uptake of microscopic organisms. Residues would be released in the area of ballasting, but capital costs to provide infrastructure to do this could be high.
- Ultra violet radiation: Effect varies with type of organism, with some highly resistant to U V radiation. But could be effective in combination with filtration. No toxic side effects, and no adverse effects on pipework, pumps or coatings.
- Ballast water heating: Potentially attractive solution. Heating to temperatures of 36-38C for 2-6 hours has been shown to kill zebra mussels. Temperatures above 40C for eight minutes can be lethal to all organisms. Dependent on availability of heat to treat ballast water during voyage; thermal stresses also need to be addressed.
- Use of chlorine as disinfectant: Effectiveness influenced by temperature, contact time and pH level. But there are environmental concerns about discharge of chlorinated ballast water. The reaction of chlorine with some organic compounds produces carcinogens.
- Electrolytically generated copper and silver ions: Effectiveness seems superior to chlorination, but some organisms can enhance their tolerance to high copper and silver concentrations. Environmental implications of concentrations required need further study.

## 5. CONCLUSION

Ballast Water has received during the last few years important attention in world level. When in ship enters ballast water, small aquatic organisms are imported in ballast water. The ships transport afterwards these organisms, often in a viable situation, and in other regions where they have expanded. All these organisms are harmful for the environment and have some serious impacts. To prevent all these impacts, global organizations enact some regulations and also some appropriate methods to avoid this phenomenon. The Convention will enter into force 12 months after ratification by 30 States, representing 35 per cent of world merchant shipping tonnage. The adoption of all the required Guidelines for the uniform implementation of the BWM Convention and the approval and certification of modern ballast water treatment technologies have removed the major barriers to the ratification of the instrument and a number of additional countries have indicated their intention to accede to this Convention in the near future. Some treatment systems use or generate one or more active substances which are used in the treatment process. In addition, some systems require a neutralizer to be used to ensure that on discharge of ballast any residues of the active substance used in the treatment process are made safe. Most of the current strategies to deal with the problems posed by ballast water focus on minimizing transport and recommend exchanges where ships discharge and refill their ballast tanks in the open ocean. The United Nations International Maritime Organization and the United States government recommend open ocean ballast water exchange; however, very few countries have adopted this recommendation as law.

Finally, as the technology is developing more and more, and the convention will enter in full force, this very serious problem will be eliminated.

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# CONTENTS

Chapter 1: Introduction.....	2
Chapter 2: Ecological and economic impacts of ballast water transportation.....	3
2.1 Ecological impacts.....	3
2.2 Economic impacts.....	5
2.3 Global response.....	5
2.4 The need for urgent action.....	6
Chapter 3: Ballast water convention.....	7
3.1 General.....	7
3.2 Articles and regulations.....	8
3.3 Regulations for the control and management of ships' ballast water and sediments.....	21
3.3.1 Section A – General provisions.....	21
3.3.2 Section B – Management and control requirements for ships.....	25
3.3.3 Section C – Special requirements in certain areas.....	29
3.3.4 Section D – Standards for ballast water management.....	32
3.3.5 Section E – Survey and certification requirements for ballast water management.....	35
Chapter 4: Ballast water management plan.....	42
4.1 Purpose of the plan.....	42
4.2 General.....	43
4.3 Maintenance of the ballast water management plan.....	43
4.4 Operation of the ballast water management.....	45

4.5 Ballast water criteria.....45

4.6 Ballast water treatment methods.....46

4.6.1 Ballast water exchange.....46

4.6.2 Other treatment methods.....49

Chapter 5: Conclusion.....51