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PRODUCTION OF A MANUAL ENTITLED "BALLAST WATER MANAGEMENT – HOW TO DO IT"

First draft of manual entitled: "Ballast Water Management: How to do it"

Submitted by IMarEST

SUMMARY

Executive summary:	As volunteered at PPR 1, IMarEST has been working on producing a draft of the manual entitled "Ballast Water Management – How to do it". This submission contains the first draft of such a document.
Strategic direction:	7.1
High-level action:	7.1.2
Planned output:	7.1.2.5
Action to be taken:	Paragraph 5
Related documents:	Resolution A.1061(28); MEPC 65/2/10, MEPC 65/22; PPR 1/2, PPR 1/6 and PPR 1/16

Introduction

1 At PPR 1, the Sub-Committee noted with appreciation the offer of IMarEST (PPR 1/6) to support, through access to its network of experts, the Organization in the production of a manual entitled Ballast Water Management: How to Do it. The IMarEST since PPR 1 has engaged with the IMO Secretariat, its expert members and with representatives of France, the Netherlands, the Republic of Korea and Singapore to develop the first draft of the manual.

2 The IMarEST Ballast Water Expert Group (BWEG) have contributed text to the manual dependent on their specific areas of expertise and have additionally acted as reviewers. The BWEG was established in 2010 and is comprised of senior IMarEST members with expertise in all areas of ballast water management, including testing, treatment, sampling, monitoring and compliance. In addition, the BWEG has representation from other relevant constituencies, including classification societies, the International Chamber of Shipping, the North Sea Ballast Water Opportunity (NSWBO) Project, various national Administrations associated with the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004, and others.

The draft manual

3 The draft of the manual contained in the annex reflects text received from individual members of the BWEG and was reviewed at a working meeting.

4 There are a number of gaps in the draft where the BWEG members did not consider that they had the level of expertise to develop the appropriate text, or where it was considered that there were issues still in discussion. Assuming acceptance of the draft, this text will be developed in conjunction with the IMO Secretariat over time as and when issues are resolved by the Sub-Committee and will be completed closer to publication. In addition, it should be noted that the figures provided are indicative examples and are subject to change.

Action requested of the Sub-Committee

5 The Sub-Committee is invited to consider the draft of the manual entitled "Ballast Water Management: How to Do It" and, if in agreement that the work is continued, make suggestions for improvements.

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ANNEX

BALLAST WATER MANAGEMENT: HOW TO DO IT

PREFACE

This publication entitled "Ballast water management: How to do it" is published by the International Maritime Organization (IMO) to provide advice on the process of ratification, implementation and enforcement of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (BWM Convention).

This manual provides useful practical information to Governments, particularly those of developing countries, Administrations, shipowners, port State control agencies, environmental agencies and other stakeholders on the implications of ratifying, implementing and enforcing the BWM Convention. The aim is to encourage the further ratification and proper implementation and enforcement of the Convention, but it should be noted that, for legal purposes, the authentic text of the BWM Convention should always be consulted.

It is emphasized that the annex to the BWM Convention will be a living document that develops over time, once the Convention enters into force. This manual does not attempt to be fully up-to-date and the reader is strongly advised to consult any recent updates of the instruments through IMO documents and publications.

CONTENTS

CHAPTER 1 – Introduction: The Ballast Water Management Convention

Invasive aquatic species present a major threat to marine ecosystems and shipping has been identified as a major pathway for introducing species to new environments. The problem increased as trade and traffic volume expanded over the last few decades and in particular with the introduction of steel hulls, allowing vessels to use water instead of solid materials as ballast. The effects of the introduction of new species have in many areas of the world been devastating. Quantitative data show the rate of bio-invasions is continuing to increase at an alarming rate. As the volumes of seaborne trade continue overall to increase, the problem may not yet have reached its peak.

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 management system.

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.

PART I – RIGHTS AND OBLIGATIONS

CHAPTER 2 – Structure and components of the BWM Convention

The BWM Convention is a legal instrument composed of various documents (articles, annex, resolutions and guidelines) which should be considered as forming a single whole. These documents are described briefly below as they are referred to in this manual and relate to the situation as at [date].

2.1 International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004

Article 1 – Definitions
Article 2 – General obligations
Article 3 – Application
Article 4 – Control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments
Article 5 – Sediment reception facilities
Article 6 – Scientific and technical research and monitoring
Article 7 – Survey and certification
Article 8 – Violations
Article 9 – Inspection of ships
Article 10 – Detection of violations and control of ships
Article 11 – Notification of control actions
Article 12 – Undue delay to ships

Article 13 – Technical assistance, co-operation and regional co-operation
Article 14 – Communication of information
Article 15 – Dispute settlement
Article 16 – Relationship to international law and other agreements
Article 17 – Signature, ratification, acceptance, approval and accession
Article 18 – Entry into force
Article 19 – Amendments
Article 20 – Denunciation
Article 21 – Depositary
Article 22 – Languages

2.2 Annex – Regulations for the control and management of ships' ballast water and sediments

2.2.1 Section A – General provisions

This section includes definitions, application and exemptions. Regulations include:

Regulation A-1	Definitions
Regulation A-2	General applicability
Regulation A-3	Exceptions
Regulation A-4	Exemptions
Regulation A-5	Equivalent compliance

2.2.2 Section B – Management and control requirements for ships

This section highlights the requirement for ships to implement and have on board a Ballast Water Management Plan approved by the Administration, to maintain a Ballast Water Log Book to record ballast water movements (uptake, treatment, exchange, circulation, discharge) and to adopt measures for ballast water management. Regulations include:

Regulation B-1	Ballast water management plan
Regulation B-2	Ballast water record book
Regulation B-3	Ballast water management for ships
Regulation B-4	Ballast water exchange
Regulation B-5	Sediment management for ships
Regulation B-6	Duties of officers and crew

2.2.3 Section C – Special requirements in certain areas

This section details that a Party, individually or jointly with other Parties, may impose on ships additional measures to prevent, reduce, or eliminate the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments. Regulations include:

Regulation C-1	Additional measures
Regulation C-2	Warnings concerning ballast water uptake in certain areas and related flag State measures
Regulation C-3	Communication of information

2.2.4 Section D – Standards for ballast water management

This section details the standards for ballast water management including regulation D-1 "ballast water exchange standard", which requires an efficiency of 95 per cent volumetric exchange of ballast water with marine water (at least 200 nautical miles from the nearest land and in water at least 200 metres in depth) and regulation D-2 "ballast water performance

standard", which concerns water quality for discharge, related to specified maximum concentrations of micro-organisms. In addition this section details the approval requirements for ballast water management systems. Regulations include:

Regulation D-1	Ballast water exchange standard
Regulation D-2	Ballast water performance standard
Regulation D-3	Approval requirements for ballast water management systems
Regulation D-4	Prototype ballast water treatment technologies
Regulation D-5	Review of standards by the Organization

2.2.5 Section E – Survey and certification requirements for ballast water management

This section details the requirements for initial certification and renewal surveys, including examples of the Ballast Water Management Certificate and form of the ballast water record book. Regulations include:

Regulation E-1	Surveys
Regulation E-2	Issuance or endorsement of a Certificate
Regulation E-3	Issuance or endorsement of a Certificate by another Party
Regulation E-4	Form of the Certificate
Regulation E-5	Duration and validity of the Certificate

2.3 Technical Guidelines

The following Guidelines relating to the uniform implementation of the BWM Convention have been developed and adopted since MEPC 53. The Guidelines are kept under review by the MEPC and will be updated as new technologies emerge and additional knowledge becomes available.

- Guidelines for sediment reception facilities (G1)
- Guidelines for ballast water sampling (G2)
- Guidelines for ballast water management equivalent compliance (G3)
- Guidelines for ballast water management and development of ballast water management plans (G4)
- Guidelines for ballast water reception facilities (G5)
- Guidelines for ballast water exchange (G6)
- Guidelines for risk assessment under regulation A-4 of the BWM Convention (G7)
- Guidelines for approval of ballast water management systems (G8)
- Procedure for approval of ballast water management systems that make use of Active Substances (G9)
- Guidelines for approval and oversight of prototype ballast water treatment technology programmes (G10)
- Guidelines for ballast water exchange design and construction standards (G11)
- Guidelines on design and construction to facilitate sediment control on ships (G12)
- Guidelines for additional measures regarding ballast water management including emergency situations (G13)
- Guidelines on designation of areas for ballast water exchange (G14)
- Guidelines for ballast water exchange in the Antarctic treaty area (MEPC.163(56))

2.4 Actions required

Those concerned with the ratification and implementation of the BWM Convention should study the documents outlined in this chapter in order to understand the general implications. Further study and in-depth understanding will be necessary for those concerned with particular aspects of ratification and implementation. Guidance on this is given in the following chapter of this manual.

CHAPTER 3 – Rights and obligations under the BWM Convention

Many of the articles of the BWM Convention set down definite requirements. These are in addition to the regulations of the annex and some require specific actions by the Parties. Those articles which do require action are referred to in the following paragraphs in some detail, with the appropriate action indicated. Other articles are mentioned only in order to complete the picture.

3.1 Definitions

Most of the definitions contained in article 1 are straightforward but a number of definitions are worth mentioning, in order to make it quite clear what the BWM Convention does and does not cover.

With respect to the definition of Administration, this means the Government of the State under whose authority the ship is operating. With respect to a ship entitled to fly a flag of any State, the Administration is the Government of that State. With respect to floating platforms, including Floating Storage Units (FSUs) and Floating Production Storage and Offloading Units (FPSOs) the Administration is the Government of the coastal State over which exploration and exploitation of the sea-bed is occurring.

Note: In the context of this document Administration simply refers to the appropriate Government authority with responsibility for implementing and/or enforcing the requirements of a legal instrument.

Ballast water means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of the ship.

With respect to ballast water management, this means any mechanical, physical, chemical and/or biological process, used 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.

Harmful aquatic organisms and pathogens means aquatic organisms or pathogens which, if introduced into the sea, including estuaries, or into freshwater courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

Sediments means matter settled out of ballast water within a ship.

Ship means a vessel of any type whatsoever operating in the aquatic environment and includes submersibles, floating craft, floating platforms, FSUs and FPSOs.

3.2 General obligations

Under article 2, General obligations, Parties undertake to give full and complete effect to the provisions of the Convention and the annex 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. Parties are given the right to take, 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 should ensure that ballast water management practices do not cause greater harm than they prevent to their environment, human health, property or resources, or those of other States.

3.3 Application

The BWM Convention applies to (1) ships entitled to fly the flag of a Party; and (2) ships not entitled to fly the flag of a Party but which operate under the authority of a Party. The BWM Convention does not apply to (a) ships not designed or constructed to carry ballast water; (b) ships which only operate in national waters or national waters and on the high seas (unless the relevant Party determines otherwise); (c) any warship, naval auxiliary or other ship owned or operated by a State and used, in the interim, on government non-commercial service; and (d) permanent ballast water in sealed tanks on ships, that is not subject to discharge.

3.4 Control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments

Each Party shall require that ships comply with the requirements of the BWM Convention and shall take effective measures to ensure that those ships comply with those requirements. Furthermore, each Party must develop national policies, strategies or programmes that promote the attainment of the objectives in the BWM Convention for ports and waters under its jurisdiction.

3.5 Sediment reception facilities

Under article 5, Sediment reception facilities, Parties undertake to ensure that ports and terminals where cleaning or repair of ballast tanks occurs have adequate reception facilities for the reception of sediments.

3.6 Scientific and technical research and monitoring

Article 6, Scientific and technical research and monitoring, calls for Parties individually or jointly to promote and facilitate scientific and technical research on ballast water management; and to monitor the effects of ballast water management in waters under their jurisdiction.

3.7 Survey and certification

Ships are required to be surveyed and certified (article 7: Survey and certification).

Other Parties should accept a certificate issued under the authority of a Party to the BWM Convention.

3.8 Violations

The BWM Convention requires Parties to prohibit violations and to establish sanctions under their law and take procedures against offenders.

National legislation implementing the BWM Convention should reflect these requirements, and a maritime Administration is required to fulfil these obligations.

3.9 Inspection of ships

Ships may be inspected by port State control officers (article 9: Inspection of ships), who can verify that the ship has a valid certificate; inspect the ballast water record book; and/or sample the ballast water. If there are concerns, then a detailed inspection may be carried out and "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."

3.10 Detection of violations and control of ships

Parties to the BWM Convention agree to cooperate in monitoring compliance with it and detecting violations. Where requested or felt necessary, a coastal or port State shall inspect a ship in order to collect evidence to verify whether it has made a prohibited discharge and, where such a discharge is proved, shall take appropriate measures. A port State shall, in response to a request from another Party, inspect a ship in order to collect evidence or to verify whether it has committed a violation in other waters.

Legislation and an Administration are required to fulfil this obligation.

3.11 Notification of control actions

If an inspection indicates a violation the ship shall be notified. A report shall be forwarded to the Administration, including any evidence of the violation. In addition, the recognized organization responsible for the issue of Certificates shall be notified. The port State authority concerned shall also notify the next port of call of all relevant information about the violation.

3.12 Undue delay to ships

All possible efforts shall be made to avoid a ship being unduly detained or delayed. Where undue delay does occur, the ship is entitled to compensation for any loss or damage suffered.

A competent and efficient maritime Administration is required to fulfil this obligation.

3.13 Technical assistance, co-operation and regional cooperation

Under 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 to train personnel; to ensure the availability of relevant technology, equipment and facilities; to initiate joint research and development programmes; and to undertake other action aimed at the effective implementation of this Convention and of guidance developed by the Organization related thereto.

3.14 Communication of information

Parties to the BWM Convention undertake to provide IMO with documents as follows (for circulation, where appropriate, of the information to all Parties):

.1 any requirements and procedures, including 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; and

.3 any requirements for information from a ship which is unable to comply with the provisions of the Convention.

3.15 Dispute settlement

Parties shall settle any dispute between them concerning the interpretation or application of this Convention using peaceful means of their own choice.

3.16 Relationship to international law and other agreements

Nothing in the BWM 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.

3.17 Signature, ratification, acceptance, approval and accession

The BWM Convention is open for accession by any State. States may become Parties to the Convention by ratification, acceptance or approval, if they had signed the Convention subject to ratification, acceptance or approval before 1 June 2005; or by accession.

3.18 Entry into force

This article provides the conditions and timing of entry into force of the BWM Convention, being twelve months after the date on which not less than thirty States, the combined merchant fleets of which constitute not less than 35% 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.

3.19 Amendments

This article provides the procedures for amendments to the BWM Convention. It should be noted that any Party may propose an amendment to this Convention. Proposed amendments need to be submitted to the Secretary-General of IMO or to a conference of Parties and amendments need to be adopted by a two-thirds majority.

3.20 Denunciation

Parties to the BWM Convention may terminate their obligations at any time by notifying the Secretary-General of IMO after the expiry of two years from the date on which this Convention enters into force for that Party.

3.21 Depositary

The Convention is deposited with the Secretary-General of the IMO.

3.22 Languages

The BWM Convention is established in the Arabic, Chinese, English, French, Russian and Spanish languages.

CHAPTER 4 – Jurisdiction

[Text to be completed at a later date.]

PART II: Meeting Obligations

CHAPTER 5 – Means of meeting obligations

5.1 Participation

Ratification, acceptance, approval or accession to the BWM Convention and its implementation require the participation of the following stakeholders:

.1 Government of the State (the political body having power to conclude international agreements)

.2 Administration – legal

.3 Administration – maritime

.4 Shipowners and operators

.5 Port authorities

Each stakeholder should know exactly what its institutional rights, obligation and responsibilities are, the responsibilities of its staff and the requirements to be imposed on ships and ports.

As previously stated, in the context of this document Administration refers to the appropriate Government authority with responsibility for implementing and/or enforcing the requirements of a legal instrument.

5.2 Consultation

When a State is considering ratifying, accepting, approving or acceding to the BWM Convention it is likely that many organizations that fall within the stakeholder categories listed in paragraph 5.1 above, should be consulted in order to be properly prepared to implement and enforce all of the obligations and requirements.

5.3 Government of the State

The political desire of a State to accept, approve, accede to or ratify the BWM Convention is fundamental. Governments may wish to become parties to the BWM Convention because of:

.1 marine environmental concerns for waters under their jurisdiction;

.2 concerns over water quality, which affects the populations, or land areas under their jurisdiction;

.3 desire to have uniform enforcement of the BWM Convention;

.4 benefits to their shipowners (worldwide acceptance of ships);

.5 benefits to their ports (means of control of pollution); or

.6 concern for the worldwide environment.

Advice to Governments may come from the public at large, from their own maritime or environmental Administration and from their maritime industry.

It should be recognized that whereas Parties to the BWM Convention have obligations, they also have privileges. Parties accept the obligation to minimize and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through ships ballast, in return for which they have the privilege of not having harmful aquatic organisms and pathogens introduced by other Parties. (If they are, and the introduction occurs within their territorial waters, they have the right to take legal action.) A non-Party does not accept the obligations to place restrictions upon its ships and, therefore, its ships cannot face legal action for failing to comply (except in the territorial waters of a Party if apprehended and Parties shall apply the requirements of the present Convention as may be necessary to ensure that no more favourable treatment is given to such ships). It has to accept, however, that failure to accept such obligations means that when its own territorial waters are affected it does not have the privilege under the BWM Convention to insist upon legal action against the ship concerned.

5.4 Administration – legal

Once the political desire has been established and a decision made to become a Party, it is necessary to consider the means of ratifying and implementing the BWM Convention.

5.5 Administration

The responsible Administration will have by far the greatest administrative task in the implementation of the BWM Convention. It is likely that this body will provide advice to the legal branch and the Government of a State on one hand, and will advise the shipping industry and port authorities on the other. The maritime Administration also has responsibility for the approval of treatment systems in accordance with the IMO Guidelines.

5.6 Shipowners and operators

Shipowners will need to select and equip ships for their operational needs and train seafarers, especially their merchant marine officers, in order to meet the requirements of the BWM Convention. This includes ensuring that the ballast water management plan is being executed. An outline of these requirements is given in part IV of this manual in chapters 8 to 12, under the heading of the respective sections of the annex of the BWM Convention.

5.7 Port authorities

The main concern of port authorities, next to enforcement in port, will be the provision of adequate sediment reception facilities and the quality and volume of the discharged water. Port State authorities should communicate their inspection requirements in order to promote a worldwide uniform interface between such authorities. Guidelines for port State control under the BWM Convention (resolution MEPC.252(67)), provides advice in this area.

5.8 Impact of the BWM Convention

The impact of the BWM Convention will vary dependent on the role of the stakeholder. When considering the necessary means of meeting its obligations under the BWM Convention, a State should recognize that the impact will vary according to whether it is a flag State, a port State or a coastal State. Most States will be all three, but for example some may be very large flag States but have little in the way of port or coastal State responsibilities or vice versa.

The impact of the BWM Convention will also vary with the trade of a port State and the type of ship for a flag State.

5.9 Obligations

All stakeholders involved with the BWM Convention need to consider and meet their obligations with respect to:

- preparation of legislation, including regulations;
- survey and certification;
- inspection;
- design and construction requirements;
- equipment requirements;
- operational requirements;
- documentation;
- procedures; and
- agreements with other Governments.

5.10 Developing a compliance strategy for the Convention

5.10.1 Why compliance?

Under article 2(1) of the Convention, parties accept to undertake comprehensive actions in order to prevent, reduce and ultimately eliminate the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments. In accordance with this obligation, a Party to the BWM Convention will need to implement a range of monitoring, compliance and enforcement mechanisms to give force and effect to the Convention. Compliance with the Convention should primarily focus on preventing the transfer of harmful aquatic organisms, and not simply on apprehending and punishing violators. The extent to which education, incentives, monitoring and policing programmes are used by a State to ensure compliance with the BWM Convention depends upon the type of jurisdiction that the State enjoys over a ship.

5.10.2 Strategies for ensuring compliance

An effective compliance programme should incorporate all of the following elements:

.1 compliance monitoring through routine inspections, surveys, and/or examinations;

.2 reporting procedures;

.3 adequate investigations of violations reported or otherwise detected;

.4 a system of adequate sanctions in respect of violations;

.5 education and public awareness programmes; and

.6 cooperation and coordination with other Parties.

A compliance programme should be adaptable enough to allow compliance priorities to respond to prevailing circumstances. One or more of its elements may be more salient for a State Party depending on key variables, including the state of the national fleet, the type of ships calling at ports of the State Party, the emergence of new equipment/procedural Convention standards, the availability of human and technological resources within the Administration and the familiarity of relevant stakeholders with the Convention.

In setting priorities for a compliance strategy, the Administration should undertake an exercise to identify which ships have the highest potential for being in violation, or where a violation would be most significant.

5.10.3 Awareness

Any compliance strategy should take into consideration that resources spent on education and prevention will save resources that might have been spent on prosecution. Education and prevention strategies are necessary to sensitize all potential stakeholders about how they can assist in protecting the marine environment from non-native species invasions. In this way, they may prove a cost-effective resource for States Parties with limited financial or policing resources. Public education can also engender more positive behaviour from consumer-oriented operations such as the cruise lines.

5.10.4 Cooperation and coordination of port State control

Article 10.4 of the BWM Convention, as well as several important IMO resolutions, lay the ground work for the doctrine of cooperation and interchange as a mutual effort of enforcement among Parties to the Convention.

Such cooperation is an important tool in fostering clarity and uniformity in implementation and compliance objectives, in collecting evidence and in enforcement procedures. Cooperation may take several forms, such as joint investigations of violations, supplying information about a particular ship, gathering evidence of a violation, and prosecuting flag State ships within the jurisdiction of another country for provable BWM Convention violations. Reciprocal arrangements in respect of investigations and compliance monitoring will be particularly valuable for Parties which are geographically proximate and/or which share common mechanisms for enforcement. Such arrangements can be formally achieved through Memoranda of Understanding (MoUs) on port State control. Nine MoUs on port State control [see example Figure: xx] are in existence worldwide, including in Europe, Africa, Asia, Latin

America and the Caribbean. Proper regional cooperation and exchange of boarding results among participating Administrations are an effective enforcement tool and can also reduce the requirement for individual States to board all vessels.

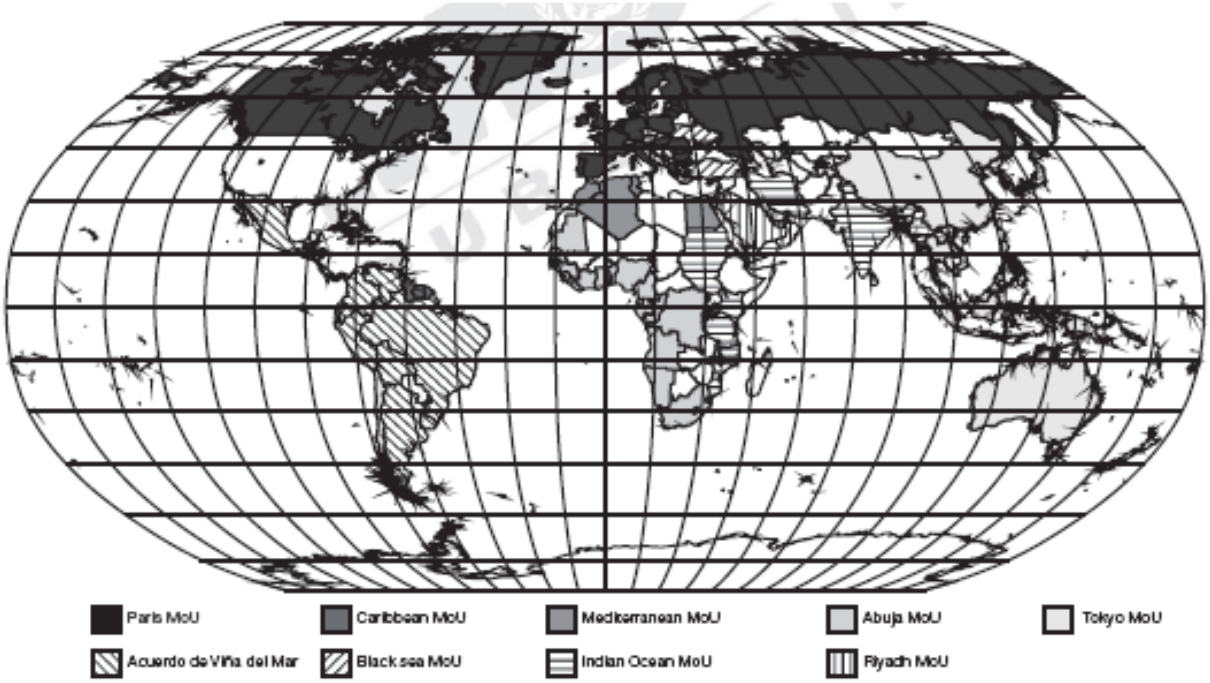


Figure 2 – *Overview of the nine MoUs on port State control*

[**Example Figure: xx]**

PART III: LEGAL ASPECTS

CHAPTER 6 – Integrating the BWM Convention into national law

6.1 General

It is assumed that every State Administration will have a legal department or lawyers, which may be attached to its Administration or to a larger administrative department such as, for example, a Department of Transport. It is further assumed, for the purposes of this manual, that these legal administrators (or lawyers) will have primary responsibility for the legislation that is necessary to implement the BWM Convention. Whatever the form of the Administration, it must be considered desirable for a single body to be given the overall responsibility for ratification, legislation and implementation. The legal system will vary from State to State, but the principal legal actions necessary for integrating the BMW Convention into national law and implementation are likely to be as outlined in example [Figure: xx] and in the following paragraphs.

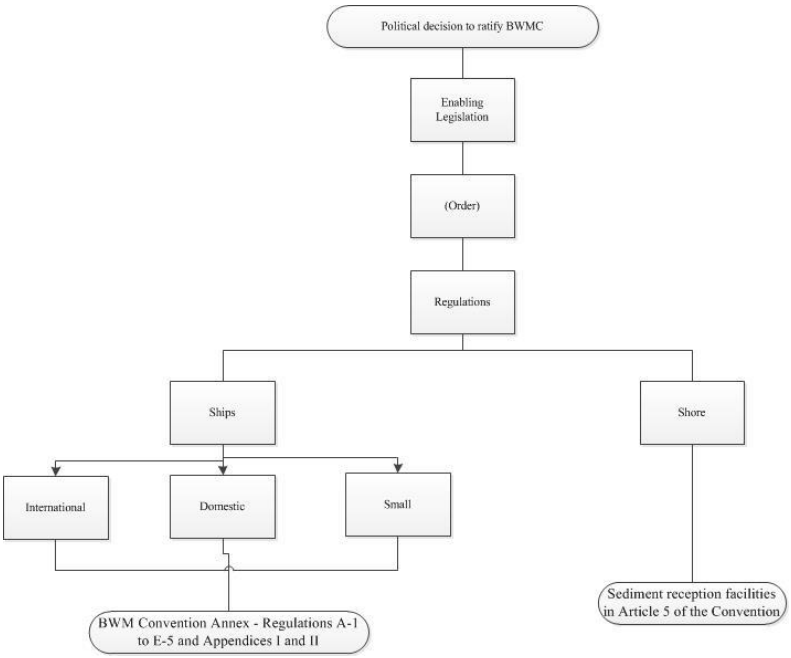


Figure: xx

6.2 Instrument of accession

[This section will be completed prior to publication.]

6.3 Enabling legislation

It is necessary to consider whether existing legislation gives the power through which the BWM Convention may be integrated into the national legal system. This facility may exist in maritime legislation such as a Mercantile Marine Act, Merchant Shipping Act, or similar legislation. A decision is then necessary on whether any such existing maritime legislation needs amending or whether new legislation, specifically for the purpose of implementing the BWM Convention, is required. It is advisable to look at how other international maritime

conventions, such as the International Convention for the Safety of Life at Sea (SOLAS), the International Convention on Load Lines, the International Regulations for Preventing Collisions at Sea, and the International Convention for the Prevention of Pollution from Ships (MARPOL), have been introduced. It is important that implementation of amendments to the BWM Convention and associated resolutions and recommendations be permitted. These are frequent and subject in many cases to implementation by an early stated date.

It should be borne in mind that the Convention enters into force three months after the deposit of an instrument of accession. The implementing legislation should therefore enter into force not later than at that time.

To ensure that this will be the case, the preparation of such legislation has to be initiated well in advance of the accession to the Convention. This timing is obviously particularly important if the implementing legislation is to be adopted by a parliament, congress, etc.

6.4 Order

The legal system of some States may permit regulations to be made directly under the enabling legislation; others require an "order" approved by their Government (e.g. parliament, assembly, congress, legislative assembly, etc.) to bring the various parts of subsidiary legislation into effect.

6.5 Regulations

[To be completed at a later date.]

CHAPTER 7 – Legal aspects of enforcement

7.1 What are violations?

It is important that legislation or regulations implementing the BWM Convention establish the elements of a BWM Convention violation such that enforcement personnel or courts are able to ascertain whether clear objective evidence of a violation is present.

[Examples to be added at a later date.]

While it is recognized that States have different standards of proof under their individual legal systems, in general, States should allow for the reception of a wide variety of credible evidence, including circumstantial evidence, to indicate violations of the BWM Convention. The gathering, presentation and admitting of evidence for BWM Convention violations must be carefully developed by States, where practicable in cooperation with other States, for the effective enforcement of the Convention.

7.2 Sanctions

Article 8(1) of the BWM Convention states that "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".

The type of sanctions applicable to varying violations under the Convention is a matter for determination of the individual Party and may be a function of several legal, political and economic circumstances. Moreover, the approach to sanctions in civil law and in common law jurisdictions may also differ. As sanctions can be very effective as a compliance tool, it is necessary for States to prescribe sanctions that are at least in harmony with applicable systems in neighbouring States or territories so as to avoid the perception that some States

have less stringent sanctions than others, as this is one way of insinuating a "safe haven" to the potential violator. On the other hand, sanctions may take voluntary mitigation efforts and self-reporting into account. Such a progressive system is easier and less expensive to police and preserves prosecutorial assets for larger cases where substantial harm has occurred.

Flag States should adopt sanctions for those activities that defeat the purposes of the regulations, such as intentional falsification of records required by the BWM Convention. All States should adopt sanctions for such matters as witness tampering, suborning perjury, interference with law enforcement officials and similar offences.

Sanctions for these types of violations may be deemed criminal and could thereby serve as an important tool in promoting truthfulness in reporting, monitoring and other regulatory requirements. It is important to note that swift and certain sanctions for violations will have an important deterrent effect. It is also important to note that merely providing for the imposition of sanctions in national legislation will not, on its own, achieve significant benefits. Such sanctions should be supported by effective technical procedures for gathering evidence.

PART IV: IMPLEMENTATION

CHAPTER 8 – General provisions: Implementing Section A

8.1 Definitions

Seven terms are defined in regulation A-1: anniversary date, ballast water capacity, company, constructed, major conversion, from the nearest land and Active Substance. These seven terms are the basis of the Convention's comprehension, but there is always the possibility for a State to add more definitions if it thinks those will help clarify the system.

8.2 General applicability

Regulation A-2 is the **key stone** giving its goal to the Convention:

> "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."

More generally, Section A of the annex to the Ballast Water Management Convention deals with the scope of the regulations. When implementing the Convention, the Government of a State Party to the Convention first has to define precisely the scope of those regulations. For example, if it is recognized that the text of the Convention only applies to international voyages a decision needs to be made as to whether a Government wants those rules to also apply to national journeys where it is noted that it is at the discretion of the State. Nonetheless, it is likely that ports are to be equally concerned with introduced species, whether they come from the other side of an ocean or from other national ports.

8.3 Exceptions

Regulation A-3 provides for exceptions that are justified by several reasons:

- ensuring the safety of a ship in emergency situations or saving life at sea;
- accidental discharge resulting from damage;
- avoiding or minimizing pollution incidents;

- uptake and discharge on the high seas of the same ballast water and sediments; and

- discharge at the same location where the whole of that ballast water originated providing that there has been no mixing with unmanaged ballast water from other areas.

The first three reasons highlighted above are classic ones for maritime rules, whereas the fourth and fifth ones are specific to ballast water and might therefore raise questions. Extra attention needs to be paid to them.

8.4 Exemptions

Regulation A-4 constitutes a way to start implementing the Convention with some flexibility, giving the government of a State Party to the Convention the possibility, in the waters under its jurisdiction, to grant exemptions to certain ships so that they do not apply ballast water management rules.

Therefore, the Government of a State Party to the Convention needs to anticipate that work on its exemptions policy should be undertaken at least one year in advance of the Convention entering into force, in order to be able to provide ship-owners with the necessary information to apply for an exemption.

Exemptions can be granted for a determined period, not exceeding 5 years, to certain ships and according to certain motives and conditions:

- the ship has to be exploited exclusively between specified ports or locations;

- the ship has to fill its ballast tanks only with water coming from those specified ports or locations; and

- a risk analysis has to be performed prior to the exemption demand.

The exemption possibility is meant to apply to individual ships or a group of similar ships on specified voyages or similar specified voyages and particular attention needs to be paid to short-sea shipping in this specific case.

Moreover, Guidelines (G7) provide assistance in the granting of exemptions. When being used these need to be adapted to the local conditions. These local conditions can include both biogeography and biodiversity and these conditions should be used by the Government of the State to define its exemptions policy and to ensure clear internal guidelines are followed in making any decisions.

Whereby this regulation primarily addresses the port State authorities, the flag State authority has to be involved in the first instance, in order to centralize information and address enquiries raised by the port State authorities concerned by the demand. Indeed, an exemption decision can only be granted if all States concerned agree that the risk analysis presented by the shipowner demonstrates there is no risk of invasion.

The study of an exemption demand and its possible granting procedure can be developed in three stages:

- risk based analysis (according to Guidelines (G7)) proposed by a shipowner when asking for exemption;

- study of this analysis by all the port States concerned, with the flag State coordinating the consultation; and

- communication of any granted exemption to IMO, which can be done by the flag State on behalf of all the port States concerned.

8.5 Equivalent compliance

A simplified application of the Convention can be used in relation to pleasure craft and craft used for search and rescue through regulation A-5 and Guidelines (G3). If the Government of a State Party to the Convention has decided to apply the Convention's principles to national journeys, it can chose to apply those rules to ships in national navigation.

CHAPTER 9 – Management and control requirements for ships: implementing Section B

9.1 Ballast water management for ships

The specific provisions of the Convention require, inter alia, the development of individual ships' ballast water management plans, the maintenance of appropriate records and the compliance with certain concentration-based discharge limits which are dependent on the date of construction and ballast-water capacity of the ship in question.

The Convention stipulates two standards for discharged ballast water. The D-1 standard covers ballast water exchange while the D-2 standard covers ballast water treatment. The Convention requires either the D-1 or the D-2 standard after entry into force. If entry into force occurs prior to 1 January 2017, the Convention will require compliance with the D-2 standard according to the schedule in Table 1.

Table 1: Compliance timetable

Constructed year		**BW capacity (m^3)**	**New schedule**
Before 2009		Between 1500 and 5000	1st IOPP renewal survey after entry into force of the Convention
		Less than 1500 or greater than 5000	1st IOPP renewal survey after the anniversary date of delivery of ship in 2016
2009 or after		Less than 5000	1st IOPP renewal survey after entry into force of the Convention
	Between 2009 and 2011	5000 or more	1st IOPP renewal survey after the anniversary date of delivery of ship in 2016
	After 2011	5000 or more	1st IOPP renewal survey after entry into force of the Convention

However, if the Convention enters into force after 31 December 2016, the applicable date of compliance with the D-2 standard is that of the first renewal survey for all ships. Ships built after entry into force will be required to have a treatment system installed at delivery.

Article 4 of the Convention, Control of the transfer of harmful aquatic organisms and pathogens through ships' ballast water and sediments, calls for Parties to:

- require ships to which the Convention applies flying their flag or operating under their authority to comply with the requirements of the Convention and to take effective measures to ensure that those ships comply with those requirements; and

- with due regard to their particular conditions and capabilities, to 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 the Convention.

One of the following options can achieve compliance with the Convention:

- as an interim measure exchange the ballast water as specified by regulation D-1 until regulation D-2 applies for the specific ship;

- treat the ballast water by using a type approved ballast water management system in accordance with regulation D-2; or

- implement other methods of ballast water management accepted as alternatives to the requirements described in regulation B-3, 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.

9.2 Ballast water management system methods

Ballast water management systems, treatment methods and technologies have developed rapidly in preparation for the anticipated ratification of the BWM Convention.

Current options include:

- mechanical treatment, i.e. filtration, separation or destruction;

- physical treatment, i.e. ultraviolet light, electric currents, heat treatment, deoxygenation;

- chemical treatment. i.e. those making use of Active Substances;

- combinations of the above; and

- in addition, sediment management, i.e. either by separation and return to local uptake water (compliant to the Convention) or removal for disposal.

Alternative methods of compliance could include carriage of permanent ballast in sealed tanks, no ballast on board or discharge of ballast water to an approved reception facility. Ships conducting ballast water management shall discharge ballast water in accordance with the following standards:

[example Table xx)]

Microorganism category	Regulation
Plankton, size > 50 µm	< 10 viable cells/m^3
Plankton, size 10-50 µm	< 10 viable cells/mL
Toxicogenic Vibrio cholerae	< 10 cfu/100 mL
Escherichia coli	< 250 cfu/100 mL
Intestinal Enterococci	< 100 cfu/100 mL

9.3 Ballast water exchange (BWE)

Ballast water exchange allows for rapid implementation of the Convention by initially requiring ships to discharge and replace ballast water taken in port or coastal areas with water from the open sea defined as 200 nmi from land and at 200 metres depth. This procedure aims at reducing the propagule pressure by limiting aquatic organisms that could become established in other coastal waters. Aquatic organisms taken up with ballast water from the open sea are likely to be far fewer in number and less capable of establishing a bio-invasion in the receiving coastal waters.

The D-1 standard specifies that:

- a 95% volumetric exchange of the ballast water shall be achieved;

- if the exchange operation involves pump-through of ballast tanks, at least three times the volume of the individual tank shall be conducted (unless pumping through less than three times the volume can be demonstrated to meet at least 95% volumetric exchange); and

- exchange operations should as far as practical be conducted at least 200 nmi from the nearest land and in water of at least 200 m in depth. (If a vessel cannot comply with these distances, the exchange is to be conducted as far from the nearest land as possible, but at least 50 nmi from the nearest land and in depth of at least 200 m).

A ship shall not be required to deviate from its intended voyage, or delay the voyage, in order to comply with any particular requirement for distances from the nearest land or water depths. A ship conducting ballast water exchange shall not be required to comply with regulation D-1 if the master reasonably decides that such exchange operation 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.

The IMO have recognized three methods of BWE detailed in Guidelines (G6).

- sequential method – a ballast tank is first emptied and then refilled with replacement ballast water to achieve at least a 95% volumetric exchange;

- flow-through method – replacement ballast water is pumped into a ballast tank allowing water to flow through overflow or other arrangements, at least three times the tank volume of each tank shall be considered to meet the standard; and

- dilution method – replacement ballast water is filled (pumped) through the top of the ballast tank with simultaneous discharge from the bottom at the same flow rate and maintaining a constant level in the tank throughout the ballast exchange operation. At least three times the tank volume is to be pumped through the tank.

BWE is an interim measure intended to be phased out when all relevant ships are required to comply with the D-2 standard.

9.4 Sediment management

Aquatic organisms can also settle out of the ballast water and can continue to exist within the sediment. These organisms can survive for long periods after the water they were originally in has been discharged. They may thereby be transported from their natural habitat and discharged in another port or area where they may cause injury or damage to the environment, human health, property and resources. All ships to which the BWM Convention apply have to 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.

Each Party to the BWM Convention 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.

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.

Properly carried out ballast water sediment management will be essential for any form of ballast water management to be compliant under all conditions at all times. Thus, ships will not be able to comply with the Convention and their ballast water management plan if proper disposal of sediments from ballast water management is not possible on an adequate scale. Guidelines (G12) provides details on ballast water tanks and how their internal structure should be designed to avoid the accumulation of sediment in a ballast tank.

As well as design considerations, ballast water sediment management will, under normal circumstances, entail manual labouring hosing down ballast water tanks, from the top all the way down to the bottom and, after flushing the tank bottom, digging up remaining mud and sediments which have to be carried or lifted up to the main deck for further containment or direct disposal to a shore reception facility.

Ships should during ballasting operations, as far as practicable, make every effort for limiting the uptake of ballast water with potential high concentrations of sediments.

9.5 Ballast water management plan (BWMP)

The Convention requires every ship to carry a ship-specific BWMP approved by its flag State or a recognized organization on behalf of the flag State.

Regulation B-1 specifies that a BWMP shall:

- 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:

  - at sea; and
  - to shore;

- include the procedures for the coordination of 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.

IMO adopted associated guidelines in 2005, Guidelines for ballast water management and development of ballast water management plans (G4). There are seven mandatory aspects of the BWMP and Guidelines (G4) offer more details in addition to providing a standard format BWMP.

Example of a basis index of a BWMP:

- preamble

- introduction

- ship particulars

- index

- purpose

- plans/drawings of the ballast system

- description of the ballast system

- ballast water sampling points

- ballast water sampling procedures

- operation of the ballast water management system

- safety procedures for the ship and crew

- operational or safety restrictions including tank entry

- description of the method(s) used on board for the ballast water management and sediment control

- procedures for the disposal and handling of sediments

- methods of communication

- duties of the ballast water management officer

- recording requirements

- crew training and familiarization

- approving authority details and stamp

The plan should be reviewed in accordance with the ISM Code. Any changes would then need to be reapproved by the flag State or recognized organizaton on behalf of the flag State.

9.6 Ballast water record book (BWRB)

The Convention specifies that all ships shall have on board a BWRB in a format which shall at least contain the information of Appendix II to its annex. The BWRB may be in an electronic format, or may be integrated into other record/log book systems. Entries in the BWRB shall be signed by the officer in charge of the operation and each completed page shall be signed by the master.

All ballast water operations should be fully recorded without delay and the entries in the BWRB should be made as follows:

- when ballast water is taken on board;

- whenever ballast water is circulated, transfered between tanks or treated for ballast water management purposes;

- when ballast water is discharged into the sea;

- when ballast water is discharged to a reception facility;

- accidental or other exceptional uptake or discharge of ballast water;

- additional operational procedure and general remarks; and

- exemptions including emergency procedures.

It is recommended that the numbering in the BWRB follow the Convention's Appendix II form for ease of reference.

The BWRB entries containing the minimum information of Appendix II include date/time and location, port or facility of uptake (latitude/longitude), depth if outside port, as well as estimated amount of ballast water uptake or discharge in cubic metres, and whether the BWMP was implemented prior to discharge.

The BWRB shall be kept on board the ship for a minimum of two years and be kept in custody by the company for a minimum of an additional three years.

The International Ballast Water Management Certificate, the ballast water management plan and the ballast water record book will be available for review by port State control inspectors and other authorities in connection with verifying compliance with the Convention's requirements.

9.7 Duties of officers and crew

Regulation B-6 states that officers and crew shall be familiar with their duties in the implementation of ballast water management particular to the ship on which they serve and shall, appropriate to their duties, be familiar with the ship's ballast water management plan. Officers and crew engaged in ballast water operations should be familiarized and trained in the operation of the installed BWMS and their associated duties. In addition to instructions in the general aspects of BWM and the requirements of the BWM Convention, ship-specific training should include operational procedures and maintenance of the BWMS and all related safety considerations, as detailed in the BWMP and the manufacturer's BWMS operating manual.
To facilitate the implementation, administration and execution of the BWMP, a qualified and responsible officer shall be designated (regulation B-1.5). The duties of the designated officer should be specified in the BWMP; such duties could include but are not limited to:

- having responsibility for proper implementation of the BWMP including familiarization and training of officers and crew with ballast water management related duties;

- ensuring that the ballast water management operations follow procedures laid down in the BWMP;

- preparing the ballast water declaration/reporting form prior to arrival in port;

- providing assistance to crew and officers under port State control and other inspections;

- witnessing any sampling of ballast water that may need to be undertaken;

- ensuring that sediment management is implemented and carried out in accordance with the BWMP;

- monitoring and ensuring that the BWRB is properly kept up to date;

- overseeing that other ballast water management and sediment management tasks specified by the BWMP are carried out; and

- having operational responsibility during ballast water exchange.

CHAPTER 10 – Special requirements in certain areas: implementing Section C

[Text to be added at a later date.]

CHAPTER 11 – Standards for ballast water management: implementing Section D

11.1 Ballast water exchange standard.

[Text to be included at a later date.]

11.2 Ballast water performance standard

[Text to be included at a later date.]

11.3 Approval requirements for ballast water management systems

Regulation D-3 stipulates the basis for ballast water management system (BWMS) approval and directs Administrations, manufacturers and shipowners to the guidelines and procedures developed for the approval process.

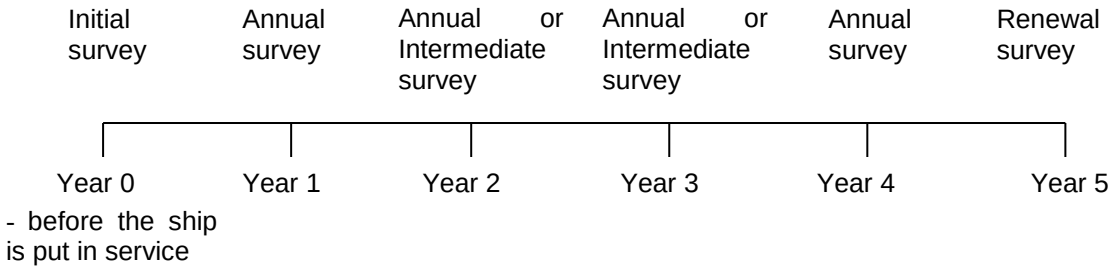
All BWMS, even if Active Substances are not utilized, must obtain approval in accordance with Guidelines (G8). Systems that use Active Substances must also obtain Procedure (G9) approval. Per regulation D-3, BWMS used to comply with the Convention must be safe in terms of the ship, its equipment and the crew. Both Guidelines (G8) and Procedure (G9) aid Administrations in the approval process for ensuring that a BWMS complies with regulation D-3. Administrations conducting BWMS approvals should refer to both of these guidelines in particular.

CHAPTER 12 – Survey and certification requirements for ballast water management: implementing Section E

Survey and certification guidelines for the purpose of meeting the BWM Convention are provided in the Interim Survey Guidelines under the Harmonized System of Survey and Certification (BWM.2/Circ.7) in accordance with regulation E-1 of the BWM Convention. Herewith, the Interim Survey Guidelines are updated in accordance with the most recent HSSC Guidelines (resolution A.1053(27)), dated 20 December 2011.

12.1 Surveys (regulation E-1)

Surveys are required for all ships of 400 gross tonnage and above to which the Convention applies. Certificates or endorsements are to be issued indicating completion of surveys. Before the ship is put in service an initial survey is required to verify that the ballast water management plan and any associated structure, equipment, systems, fittings, arrangements and material or processes comply fully with the requirements of the Convention. Ships are also subject to annual and intermediate surveys, which must occur within three months before or after each anniversary date. The Certificate must also be renewed at a full renewal survey, at a date specified by the Administration but not exceeding every five years, to verify full compliance (associated structure, equipment, systems, fittings, arrangements and material or processes) with the applicable requirements of the BWM Convention. These survey requirements are outlined in [example Figure xx (below)].



[Example Figure: xx]

An additional survey will also be required after a change, replacement, or significant repair of the structure, equipment, systems, fittings, arrangements and material necessary to achieve full compliance with the BWM 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.

Organizations with responsibility for issuing survey certificates will have individual checklists when undertaking the process of issuing a certificate. However, a number of common principles are likely to apply, as follows:

Annual, intermediate and renewal survey:

- Does the vessel have a valid class certificate?
- Are all statutory certificates valid?
- Has it been checked that the ship's complement complies with the minimum safe manning document and that the master, officers and ratings are certificated as required by the STCW Convention?

General Information:

- name of ship
- port of registry
- owner
- gross tonnage
-
- builders
- date of building contract
- date of delivery
- IMO no.
- call sign
- type of ship
- ballast water carrying capacity
- hull no.
- deadweight
- date on which keel was laid

The **initial survey** with regard to ballast water management could include, for example (A.1053(27), Section 4.1):

Pre-check before boarding:

- Examination of the design and construction plans (regulation B-5).

- Examination of the ballast water management plan (regulation B-1).

- Examination of the plans for the installation of the ballast water management system.

- If needed, examination of the plans for installation of a prototype ballast water treatment technology (regulation D-4).

After boarding:

- Is an approved ballast water management plan on board and has the following been confirmed:

- Administration;

- approval date; and

- approval details.
- Is there a designated officer on board in charge of ensuring that the plan is properly implemented?

- Is the plan 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.

- Is the ballast water record book available? (regulation B-2)

- Is a ballast water record book of the required format (may be in electronic form or integrated into another record book) on board?

- Is the ballast water management system type approved?

- Has the Type Approval Certificate(s) for the ballast water management system(s) been sighted on board? (regulation D-3/note, this survey requirement is relevant only when the performance standard according to regulation D-2 is applicable)

- Confirm that a statement has been provided that electrical and electronic components are tested.

- Are the equipment manuals available for the major components?

- Is there an operation and technical manual specific to the ship available?

- Are there installation specifications available for the BWMS?

- Are there installation commissioning procedures available for the BWMS?

- Are there initial calibration procedures for the BWMS?

- Are the sampling facilities provided and are they arranged to collect representative samples before the ballast discharge point? (Guidelines For Ballast Water Sampling (G2))

- Does the ballast water management system conform to the Type Approval Certificate?

- Has the installation of the ballast water management system been carried out according the manufacturer's equipment specifications?

- Are the operational inlets/outlets located correctly as shown on the pumping and piping arrangement drawings?

- If applicable, are the bulkhead penetrations installed correctly?

- Confirm that the control and monitoring equipment is functioning properly.

- Is the ballast water management system recording device working properly?

- Are there any consumables? Is there enough on board?

- Confirm the overall installation and operation of the ballast water management system, including alarms, audible or visual.
- Are Active Substances or chemicals needed? Is there enough on board?

- If applicable, are dosage instructions for Active Substances or chemicals available on board?

- Confirm that pumps, pipes and valves are correctly installed and that the requirements of MARPOL Annex I, regulation 18, are met, if applicable.

- Is there sufficient maintenance space or means for maintenance available?

- If the ballast water management system is a prototype, is the installation satisfactory? (regulation D-4)

- If the ballast water management system is a prototype, is statement of compliance available? (regulation D-4)

If the relevant above steps are completed satisfactorily, then the Ballast Water Management Certificate should be issued. (regulation E-2, E-4 and E-5)

The following should be checked during an **annual** survey:

- check whether any new equipment has been fitted and, if so, confirm that it has been approved before installation and that any changes are reflected in the certificate;

- confirm that the ballast water management plan is on board;

- check whether the appropriate entries have been made in the ballast record book (regulation B-2). Entries shall be made on each of the following occasions:

  .1 when ballast water is taken on board;

.2 whenever ballast water is circulated or treated for ballast water management purposes;

.3 when ballast water is discharged into the sea;

.4 when ballast water is discharged to a reception facility; and

.5 accidental or other exceptional uptake or discharge of ballast water;

- view the Type Approval Certificate for the ballast water management system;
- view the records of the recording device;
- view, if applicable, the statement of compliance for a prototype ballast water treatment technology;
- verify, if applicable, that there is evidence that the prototype ballast water treatment technology is continuing to be operated in accordance with approved procedures (regulation D-4);
- examine the ballast water management system and confirm its satisfactory operation;
- confirm, if applicable, that the Active Substances required by the manufacturer's recommendations are provided on board;
- confirm, if applicable, that the dosage instructions for the Active Substances are available on board;
- examine, if applicable, the prototype ballast water treatment technology and confirm its satisfactory operation; and
- safety devices have been verified as operational to the satisfaction of the attending surveyor.

The following should be checked during an **intermediate** survey:

Has an examination of the ballast water management system been carried out for obvious defects, deterioration or damage including examination of associated pumps, piping and fittings for wear and corrosion? (regulations D-3 and D-4/note, this survey requirement is relevant only when the performance standard according to regulation D-2 is applicable)

The following should be checked during a **renewal** survey:

In addition to the requirements of the annual survey, the following is to be completed:

Has an examination of the ballast water management system been carried out for obvious defects, deterioration or damage including examination of associated pumps, piping and fittings for wear and corrosion? (regulations D-3 and D-4/note, this survey requirement is relevant only when the performance standard according to regulation D-2 is applicable)

In addition to the requirements of the annual and intermediate surveys, the following is to be completed:

- if necessary by simulated test or equivalent, has the satisfactory operation of the ballast water management system been confirmed? (regulation D-3/note, this survey requirement is relevant only when the performance standard according to regulation D-2 is applicable); and

- if applicable, if necessary by simulated test or equivalent, has the satisfactory operation of the ballast water management system been confirmed (regulation D-4)

12.2 Issuance or endorsement of a Certificate (regulation E-2)

After successful completion of a survey conducted in accordance with regulation E-1, the Administration shall ensure that a ship is issued a Certificate. A Certificate issued under the authority of a Party shall be accepted by the other Parties and regarded for all purposes covered by the BWM 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.

12.3 Issuance or endorsement of a Certificate by another Party (regulation E-3)

At the request of the Administration, another Party may cause a ship to be surveyed and, if satisfied that the provisions of the BWM 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.
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.

12.4 Form of the Certificate (regulation E-4)

The Certificate shall be drawn up in the official language of the issuing Party, in the form set forth in appendix I to the annex of the BWM Convention. Refer to regulation E-4 for language requirements of the certificate.

12.5 Duration and validity of the Certificate (regulation E-5)

A Certificate shall be issued for a period specified by the Administration that shall not exceed five years. 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. Under certain conditions, the validity of the Certificate may be extended to allow for the ship to complete its voyage to the port in which it is to be surveyed. However, no Certificate shall be extended for a period longer than three months.

If an annual survey is completed prior to 3 months before the anniversary date then: the Anniversary date shown on the Certificate shall be amended; the subsequent annual or intermediate survey shall be completed using the new Anniversary date; 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 are not exceeded.

A Certificate 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 the BWM Convention is changed, replaced or significantly repaired and the Certificate is not endorsed;

.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; or

.4 if the Certificate is not endorsed in accordance with regulation E-1.1.

CHAPTER 13 – Ballast water sampling

13.1 Overview

Ballast water sampling represents a very complex procedure; the information contained below has been allocated to major aspects of on-board ballast water sampling:

- general frame;
- sampling points;
- sampling from discharge pipe;
- sampling protocols;
- ballast water sampling during port State controls; and
- additional tables and lists.

13.2 General frame

To assess the quality of the ballast water on board ships and decide whether a ship is in compliance with the regulations of the Ballast Water Management Convention, samples have to be taken and analysed either directly on board the ship or in a land-based laboratory.

Ballast water samples taken on board ships have to reflect the live organism concentration and composition of chemicals of the entire ballast water volume, which may comprise several thousand tons. However, experience shows that organisms and chemical compounds are not homogeneously distributed across the entire ballast water volume of a ship, which is stored in several ballast water tanks with sometimes a very complex design depending on the size and the type of the vessel. In addition, the sampling of ballast water has to be executed in a way which excludes any artificial impact on the targeted aquatic organisms as these have to be detected alive. Given these circumstances the representative sampling of ballast water is the most crucial aspect of on-board testing for compliance with the regulations of the Ballast Water Management Convention according to the D-1 and D-2 standards formulated therein.

To achieve consistency in on-board compliance testing of ballast water, uniform protocols for sampling and analysis of ballast water are essential.

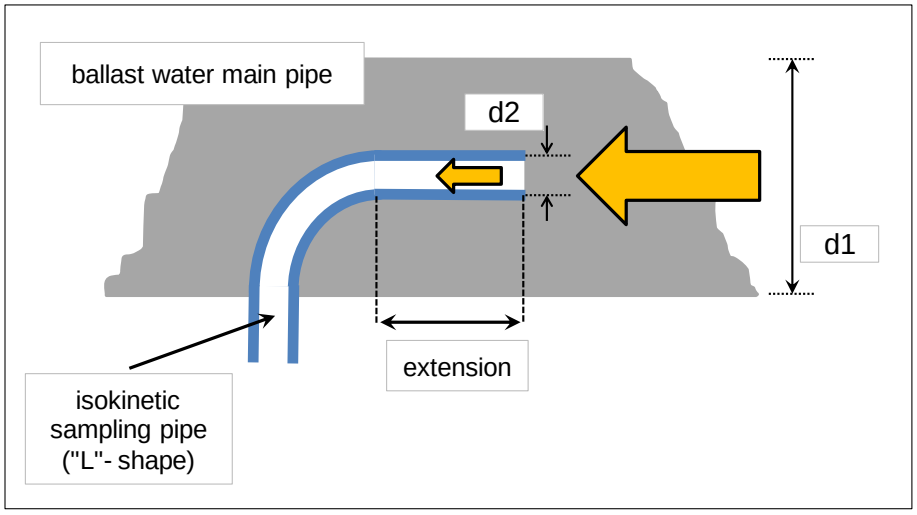
13.3 Sampling points

Sampling of ballast water may be executed at various locations on board a ship: directly from the ballast water tanks via manholes, through sounding pipes, through air pipes or directly from the discharge line. In-tank sampling via manholes, sounding and air pipes should only be used in cases where the treatment of the ballast water is executed during the uptake or during holding times. In-tank sampling must not be executed when the ballast water is treated prior to discharge.

The sampling of ballast water to determine the compliance with the Ballast Water Management Convention standards should be executed via the ballast water discharge pipe near the discharge point.

13.4 Sampling of ballast water from discharge pipes

Taking a representative sample of ballast water from within the discharge pipe can only be executed when the flow volume in the discharge pipe is partly deviated towards outside the discharge pipe. Ideally this can be achieved by the installation of an isokinetic pipe. Even though small aquatic organisms are neutrally buoyant and true isokinetic sampling of ballast water therefore is deemed to be unnecessary (Guidelines (G2)), the sampling of ballast water via isokinetic pipes inside discharge pipes is regarded to yield the highest possible sample representativeness reflecting the organism concentrations and the composition of chemicals in the entire ballast water volume of a ship.



[Example – Figure xx]: Schematic view of isokinetic pipe (blue) for ballast water sampling from discharge pipes (yellow arrows indicate water flow)

In general sampling ports installed in discharge pipes are equipped with a valve, which is opened for sampling.

As installations like valves represent a source of harmful impacts on the targeted, highly sensitive aquatic organisms, only two types of valves have been identified to be appropriate for ballast water sampling: diaphragma valves and ball valves for isokinetic sampling ports

and to direct flow volumes. During sampling procedures these valves have to be fully opened.

13.5 Protocol for on-board sampling of ballast water

The representativeness of ballast water samples is not only determined by the adequate technical installations such as isokinetic pipes but also – and to a considerably large extent – by an adequate sampling procedure defining the sample volume, the number of samples and the timing of the sampling.

In principle two different sampling procedures can be considered:

.1 to sample the entire discharge of the ballast water on board a ship. This generates high numbers of samples over a long period of sampling time and requires the sampling personnel to stay on board over a significant long period of time; or

.2 to collect ballast water samples in intervals across the period of deballasting. This results in a wide range of potential sample volumes, total number of samples and duration of sampling which can be adapted to the specific conditions of the ship to be tested for compliance.

The two major sampling techniques are:

.1 through an isokinetic pipe installed in the discharge pipe the ballast water is directed through a filter skid, which separates the target organisms defined in the D-2 standard of the Ballast Water Management Convention. The sample volume, the total number of samples and the timing of the sampling procedure is variable and can be adapted to the specific conditions of the ship; and

.2 through an isokinetic pipe installed in the discharge pipe the ballast water is directed to a continuous drip sampler, which collects a cumulative sample of ballast water across a desired period during deballasting. The sample volume, the total number of samples and the timing of the sampling procedure is variable and can be adapted to the specific conditions of the ship.

Both sampling techniques should be used for the different target organisms as defined in the D-2 standard of the Ballast Water Management Convention for indicative and detailed analysis of ballast water.

For aquatic organisms ≥ 50 µm:

Isokinetic sampling port and filter skid

For aquatic organisms > 10 µm and < 50 µm and aquatic bacteria:

Isokinetic sampling port and continuous drip sampler

The recommended sample volume for ballast water differs for the organism groups as defined in the D-2 standard of the Ballast Water Management Convention:

[Example Table xx]: Recommended sample volumes for organism groups of the D-2 Standard

IMO organism group D-2 standard	Recommended sample volume
Aquatic organisms ≥ 50 µm	≥ 1000 litres
Aquatic organisms > 10 µm and < 50 µm	≥ 1 litre
Aquatic bacteria	≥ 0.5 litre

Samples taken for the analysis of small aquatic organisms might require further processing to reduce the concentration of the sample down to smaller, manageable volumes by filtration. If this is the case, the small aquatic organisms ≥ 50 µm have to be filtered through a filter material with a mesh size of 50 µm in diagonal and the small aquatic organisms > 10 µm and < 50 µm have to be filtered through a filter material with a mesh size of 10 µm in diagonal.

In order to rinse and wash the target organisms from the filter into the sample container, appropriate solutions have to be used, which ensure that the sample is not impacted or altered.

13.6 Ballast water sampling during port State controls

A four stage approach may be undertaken for inspections of ships for compliance with the D-2 standard of the Ballast Water Management Convention:

- stage 1: initial inspection;
- stage 2: detailed inspection;
- stage 3: indicative analysis of ballast water; and
- stage 4: detailed analysis of ballast water.

It is most likely the sampling of ballast water will be required in stage 3 and possibly stage 4.

Preparatory steps include:

.1 personnel carrying out the on-board compliance testing will require training to adequately perform the sampling and analysis protocols;

.2 personnel carrying out the on-board compliance testing have to be provided with all necessary documents (permits) to enter the harbour areas and provided with the necessary, adequate personal protective equipment (PPE);

.3 logistic for the execution of on-board compliance testing have to be set-up prior to the start of any such testing. This includes the transport of the personnel and the material to the harbour, the chain of custody (e.g. labelling the generated ballast water samples) as well as the transport of generated ballast water samples in an uninterrupted cooling chain to land based laboratories for further analysis; and

.4 after boarding the ship the individual responsible for compliance testing should meet with members of the ship's crew in order to become familiarized with the particular on-board conditions for sampling and analysis including specific on-board safety and security procedures, especially for the activities on the technical decks of the ships, i.e. where the sampling will be executed.

13.7 Additional tables

[Example – Table xx]: Minimum requirement for sampling documentation

Sampling date	dd.mm.yyyy
Ship information	name, distinctive numbers/letters, port of registry, gross tonnage, IMO number, year built, capacity of ballast water
Sampled tank	Identification, capacity, type and position
Ballast water management system	Type, brand, date of last treatment
Origin of ballast water	Marine area, latitude/longitude of uptake
Sampling point	Type of sampling port, location in the ship
Sample	Identification code, sampling technique used, sampling time start/end, ballast water volume filtered/sampled
Sample processing	Concentration of sample by filtration, volume after filtration, preservation of sample
Transport to laboratory	Particular transport conditions (uninterrupted cooling chain)

CHAPTER 14 – Approval of ballast water management systems (Guidelines (G8))

14.1 Overview of Guidelines for approval of ballast water management systems (Guidelines (G8))

The purpose of Guidelines (G8) is to assure uniform and proper application of the BWM Convention regulation D-3 and set forth the requirements for ballast water management system (BWMS) testing, design and construction, as well as to verify that approved systems meet regulation D-2 standards and are safe for vessel crew, the environment and public health. The guidelines are aimed at Administrations, equipment manufacturers and shipowners to assist with the requirements for determining equipment suitability.

14.2 Applicability

Guidelines (G8) applies to the approval of BWMS in accordance with the Convention intended for installation on board ships required to comply with regulation D-2.

14.3 Summary of Guidelines (G8) requirements

The testing requirements to obtain approval of a BWMS are detailed in the Guidelines (G8) annex, parts 2 and 3. Equipment manufacturers should submit information that fulfils Guidelines (G8) requirements for evaluation by the Administration and, when the requirements are fulfilled, the Administration should issue a Type Approval Certificate for the BWMS.

14.4 Background

Regulation D-2 of the Convention provides the ballast water discharge performance standard that ships must meet. Regulation D-3 contains the approval requirements for approval of ballast water management system.

14.5 Definitions

Refer to Guidelines (G8), Section 3 for definitions.

14.6 Technical specifications

Guidelines (G8), section 4 outlines the technical specifications that Administrations approving BWMS should verify during the approval process. These include:

.1 any substances utilized are acceptable to the Administration in regard to adequate storage, application within the BWMS and onboard ships, and proper mitigation measures are in place for any introduced hazards;

.2 proper audible and/or visual alarms, as well as recording by control equipment, are incorporated into the BWMS in the event of by-passing the treatment for cleaning, calibration, repair, or equipment failure, as applicable;

.3 maintenance and troubleshooting procedures are clearly defined by the BWMS manufacturer, adequate access is to be provided on board for conducting maintenance and all repairs/maintenance are recorded;

.4 BWMS access beyond the essential areas, e.g. for routine maintenance and troubleshooting, requires breaking of a seal;

.5 in order to avoid essential ship systems being impaired, restricted or degradable by the use of BWMS or in the event of a BWMS emergency, the BWMS has suitable by-passes or overrides, which are to be recorded by control equipment, as needed to protect the safety of the ship and/or crew; and

.6 appropriate facilities are available to check the performance of BWMS components that take measurements and calibration records should be available on board for inspection.

Administrations approving a BWMS need to verify that the treatment equipment is robust and suitable for working in the shipboard environment and designed to minimize dangers to persons on board. The BWMS equipment should be simple and effective and, if intended to be outfitted in locations on board where flammable atmospheres may exist, be appropriately designed in accordance with relevant safety rules and regulations.

BWMS should incorporate control and self-monitoring equipment that allows automatic operation per the manufacturer's specifications, records function and/or failures of the equipment and facilitates compliance with regulation B-2 of the Convention.

14.7 Typical documentation requirements for the approval process

Section 5 of Guidelines (G8) provides details on the documentation that an Administration should receive from a manufacturer for approval of a BWMS. The following is a brief summary of the required documentation:

.1 detailed description of the BWMS, including ship installation requirements;

.2 equipment manuals that contain, inter alia, technical details, drawings, installation arrangements and operation/maintenance information;

.3 methods of conditioning the treated ballast water prior to discharge, as applicable, and an assessment of discharged water that includes treatment

residuals and/or by-products, as well as toxicity testing in accordance with Procedure (G9);

.4 description of any waste streams produced by the BWMS and actions for proper disposal/management; and

.5 technical section of a manual including information on, inter alia, monitoring and control devices, special requirements to maintain system boundaries, sampling devices and commissioning test or guidance to satisfy the manufacturer's specific installation criteria.

14.8 Procedures for approval and certification

A BWMS that fulfils the requirements of Guidelines (G8) may be approved for installation on board ships. Administrations should issue a Type Approval Certificate in the format as shown in the Guidelines (G8) appendix. The Type Approval Certificate should contain specific information about the BWMS including, but not limited to:

.1 BWMS type or model and applicable equipment drawings for the approved equipment;

.2 components of BWMS that are type approved including the manufacturer for each component, their operating range and possibility of other components that can be substituted;

.3 flow rates, salinities, ballast water treatment capacities, temperature regimes, minimum holding time or any other limiting conditions, as applicable;

.4 if the BWMS is subjected to Procedure (G9) approval, limiting conditions and recommendations of the GESAMP-BWWG are to be included, as applicable;

.5 summary of land-based and shipboard test results;

.6 if the approval is based upon a Type Approval Certificate issued by another Administration or based upon separate testing or testing already carried out under another Administration, such certificate should identify the Administration involved; and

.7 a validity date for the Type approval Certificate.

A BWMS approved by one Administration may be approved for use on vessels under another Administration. Should a BWMS previously approved by one Administration fail type approval in another country, the countries concerned should consult with one another to reach a mutually acceptable agreement.

14.9 BWMS installation requirements

Section 7 of Guidelines (G8) provides details about the location of sampling facilities to collect representative samples of a ship's ballast water that a BWMS should include. Position of sampling points may be determined by the Administration and should best suit the treatment technique and equipment function.

14.10 Installation survey and commissioning procedures

After a BWMS has received approval from an Administration, Guidelines (G8), section 8, specifies that the following documentation should be verified by an Administration during a BWMS installation survey and commissioning:

.1 a copy of the BWMS Type Approval Certificate;

.2 a statement from the Administration (or authorized representative) that the electrical and electronic components have been type-tested in accordance with Guidelines (G8), annex, Part 3 specifications;

.3 the manufacturer's technical and operation manuals for the BWMS equipment; and

.4 the manufacturer's installation specifications and installation commissioning procedures, including initial equipment calibration, as applicable.

The Administration should verify that:

.1 the BWMS installation was carried out in accordance with the manufacturer's installation and equipment specifications;

.2 the installed BWMS conforms with the pumping and piping arrangement drawings, as well as the Type Approval Certificate issued by the Administration or its representative;

.3 the installation workmanship is satisfactory and in accordance with the relevant standards; and

.4 the BWMS control and monitoring equipment operates properly.

14.11 Specifications for pre-test evaluations of the system documentation

This part of the Guidelines (G8) annex provides guidance to assist with a pre-testing evaluation of a BWMS's readiness to undergo the approval process, as well as an evaluation of the proposed test requirements and procedures. The required documentation should be submitted to the Administration by the BWMS manufacturer as a pre-requisite to, and in advance of, the approval testing.

14.12 Readiness evaluation

During a readiness evaluation the approving Administration should examine and evaluate the following aspects of the BWMS, inter alia:

.1 design and construction to ensure proper and safe operation of the BWMS on board ships. Health and safety of the ship's crew, interactions of the BWMS with the ship's systems and/or cargo, or potential adverse environmental effects should be considered; and

.2 an evaluation of the manufacturer's research and development efforts, if any, under operational shipboard conditions.

14.13 Test proposal evaluation

The Administration should evaluate the BWMS test plan proposal for installing, calibrating, and operating/maintaining the BWMS during type approval testing to identify any potential human health or environmental concerns, as well as management of treatment by-products or waste streams, if applicable.

14.14 Documentation

As part of the BWMS pre-testing evaluation, the following documentation should be submitted to the Administration:

.1 technical manual;

.2 BWMS drawings;

.3 information about the BWMS installation arrangements and the scope of the ships the BWMS is intended to be installed on, which can later be used for the ship's ballast water management plan; and

.4 information on any potential environmental and/or public health impacts.

Specific information about the test set-up for land-based testing may also be included, such as the sampling needed to ensure proper BWMS function and efficacy, as well as information about compliance with applicable environmental or human health standards during the type approval testing process.

14.15 Test and performance specifications for approval of ballast water management systems

This part of the Guidelines (G8) annex specifies the quality assurance and quality control procedures that should be implemented by the testing body during the shipboard and land-based testing of a BWMS. The steps required for a complete test cycle and the criteria for successful testing are detailed for both shipboard and land-based testing.

14.16 Quality assurance and quality control procedures

The testing body should implement a quality control program during testing in accordance with recognized international standards that are acceptable to the Administration. In summary, the quality control program should consist of the following:

.1 Quality Management Plan (QMP) that addresses the quality management structure and policies of the testing body; and

.2 Quality Assurance Project Plan (QAPP) which is a project specific technical document pertaining to the BWMS being tested, the test facility, and other testing implementation details.

14.17 Shipboard tests and success criteria

Administrations should refer to part 2 of Guidelines (G8) to understand the requirements for successful shipboard testing of a BWMS. Part 2 defines a shipboard test cycle (i.e. ballast uptake, storage, treatment, and discharge) and details of how the performance of the BWMS should be evaluated in a shipboard environment. In brief, the following information and results should be supplied to the satisfaction of the Administration:

.1 test protocol corresponding to the planned test cycles (prior to testing);

.2 documentation on the treatment rated capacity (TRC) of the BWMS and confirmation that it operates at the TRC for which it is intended to be approved notwithstanding the consistency with normal ballast operation of ship;

.3 results of three consecutive, valid shipboard test cycles that demonstrate treated ballast water discharge compliance with regulation D-2;

.4 organism concentration limit ballast water uptake for both control and treatment tank and discharge standards to demonstrate test cycle validity;

.5 sampling regime information to meet the required sample sizes/volumes and replications for both control and treatment tank;

.6 the time period the testing cycles were conducted over (not less than six months);

.7 data regarding salinity, temperatures, particulate organic carbon and total suspended solids; and

.8 data regarding BWMS operation over the test period, including, but not limited to:

.9

.1 records of BWMS operation, volumes and locations of ballast uptake and discharge;

.2 possible explanations for an unsuccessful shipboard test cycle, if applicable;

.3 BWMS maintenance and repair records, as applicable; and

.4 engineering parameter monitoring data, as well as control and monitoring equipment function records.

14.18 Land-based testing and success criteria

Land-based testing serves to determine the biological efficacy and environmental acceptability of a BWMS, as well as to evaluate the repeatability and comparability of the treatment equipment. Administrations should refer to section 2.3 of the annex to Guidelines (G8) to understand the requirements for successful land-based testing of a BWMS. The section defines a land-based test cycle (i.e. ballast uptake, storage, treatment and discharge), the land-based test set up and design criteria and details of how BWMS performance should be evaluated.

In general, successful land-based testing consists of:

.1 five (5) valid test cycles in at least two different salinities (i.e. a minimum total of 10 valid test cycles), with each test cycle taking place over a five (5) day period;

.2 testing in varied water qualities with a wide range of organisms;

.3 proper operation of the BWMS at the specified treatment rated capacity; and

.4 analysis of treated water discharge to:

.1 verify compliance with regulation D-2; and

.2 evaluate aquatic toxicity, in accordance with Procedure (G9) for BWMS that make use of Active Substances.

The land-based test set up should be representative of how the BWMS would be installed on a ship, including the complete BWMS, piping and pumping arrangements and a storage tank that is shielded from light to simulate a ballast tank. The control and treatment simulated ballast tanks should each have a capacity of at least 200 m^3 and be cleaned between test cycles. Facilities for sampling should be included in the test set up.

Ballast water treatment equipment scaling

This section of the Guidelines (G8) annex provides the criteria in the event BWMS equipment scaling is required and the documentation a manufacturer is required to provide to the Administration. Inline treatment systems may be downscaled as per the given criteria but in-tank systems should be tested on a scale similar to verification of full scale effectiveness. For further guidance on equipment scaling refer to BWM.2/Circ.33.

Land-based test design – inlet and outlet criteria

Guidelines (G8) specifies the water quality parameters that must be met at the different test salinities, as well as the organism concentrations that must be in the influent water during the land-based test cycles. The guideline allows the minimum test organism concentrations to be either naturally occurring or cultured species to meet the testing criteria; viruses and bacteria do not need to meet minimum concentration requirements, but should be measured and recorded in both the influent and discharge water.

Land-based monitoring and sampling

Monitoring and sampling of water during land-based testing determines the biological efficacy and environmental acceptability related to the BWMS. Guidelines (G8) specifies that environmental parameters (e.g. dissolved oxygen, pH) are measured at specific times and locations during land-based testing, and that separate samples are collected for biological and aquatic toxicity analysis. The volumes of the samples and testing methods for evaluation are also detailed and should be followed for proper implementation of the guideline. The criteria for determining the validity of a test cycle, and the statistical analysis of the results that should be performed, are specified in part 2 of the annex to Guidelines (G8).

Reporting of the test results

Upon completion of the approval tests, a detailed report including the test design, analytical methods and test results should be submitted to the Administration. The biological efficacy results should be accepted if the land-based and shipboard testing conducted in accordance with the Guidelines (G8) annex demonstrates the BWMS has met the standard in regulation D-2 in all test cycles, as specified in paragraph 4.7 of the Guidelines (G8) annex, part 4.

14.19 Specification for environmental testing for approval of ballast water management systems

Part 3 of the annex to Guidelines (G8) provides Administrations with details regarding the requirements to test and verify the quality and reliability of electrical and electronic components of a BWMS to perform in ship board environment. The electrical and electronic components of the BWMS should be tested in the standard production configuration at an approved laboratory.

14.20 Test specifications

Guidelines (G8) provides detailed specifications on the required test parameters for electrical and electronic components. The testing includes:

.1 vibration;

.2 temperature;

.3 humidity;

.4 protection against heavy seas;

.5 fluctuation in power supply; and

.6 inclination.

The BWMS manufacturer should provide the Administration with evidence of compliance with the environmental tests as detailed in Guidelines (G8).

14.21 Sample analysis methods for the determination of biological constituents in ballast water

In part 4 of the Guidelines (G8) annex, guidance is provided regarding the sampling methods used to determine the biological efficacy of a BWMS. Administrations should refer to part 2 of the Guidelines (G8) annex for additional details.

Samples for evaluating BWMS performance should be collected, handled, stored and analysed using widely accepted standard methods, and these methods should be clearly described in test plans and reports. Due to the variations expected in samples, in species composition and the anticipated rarity of organisms in treated ballast water, alternative methods may be considered when standard methods are not available or applicable. Details about alternative methods, as well as any research conducted to validate such methods, should be provided in test plans and reports. The number of viable organisms in test samples should be evaluated by appropriate methods and aquatic toxicity tests should be performed in accordance with Procedure (G9).

When the sample analysis verifies compliance with the requirements in paragraph 4.7 of this part, the test cycle should be deemed successful.

14.22 Appendix to Guidelines (G8)

The Appendix provides Administrations with an example template of the Type Approval Certificate that should be issued when a BWMS has successfully completed approval testing to the satisfaction of the Administration.

CHAPTER 15 – Approval of BWMS using Active Substances (Procedure (G9))

15.1 Overview of the Procedure for approval of ballast water management systems that make use of Active Substances (G9)

The principles of the approval process are based upon regulations D-3 and D-5. These describe that ballast water management systems should be safe for the ship, its equipment and crew. Next, as the technologies should not cause more environmental impact than they solve, these systems must meet the standards of environmental acceptability. For this reason, it is required that ballast water management systems that make use of Active Substances undergo a separate approval procedure additional to that of Guidelines (G8), as described in Procedure (G9) (Procedure for approval of ballast water management systems that make use of Active Substances (G9)) and accompanying procedures and methodology for the conduct of work under Procedure (G9). The guideline and procedures not only describe the technical aspects but also the role and duties of all stakeholders in the process, including manufacturers, Administrations of IMO Member States and the IMO. In support of the evaluation process in MEPC a special expert group was established to advise MEPC on the approval of such systems, the Ballast Water Working Group of the Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP-BWWG). The GESAMP-BWWG, established in November 2005, reviews all proposals submitted to IMO, in preparation for the BWM Convention, for approval of ballast water management systems that make use of Active Substances. GESAMP-BWWG reports to IMO on whether such proposals present unreasonable risk to the environment, human health, property or resources in accordance with the criteria specified in Procedure (G9). The Group does not evaluate the operation or design of the systems, or their effectiveness, only their potential for environmental and human health risks.

The GESAMP-BWWG not only advises on the approval of the systems under Procedure (G9), the Group also has developed a Methodology for information gathering and conduct of work. The Methodology was first published in BWM.2/Circ.13 (June 2008). MEPC 62 decided that GESAMP-BWWG should take stock on a regular basis. Based on such stock-taking workshops by GESAMP-BWWG, methodology updates were published as BWM.2/Circ.13/Rev.1 (April 2012) and BWM.2/Circ.13/Rev.2 (April 2014).

The approval of systems to determine the acceptability of Active Substances and Preparations containing one or more Active Substances and their application in ballast water management systems was firstly described in resolution MEPC.126(53) adopted in 2005. In April 2008, this was subsequently superseded by the revised Procedure (G9) (resolution MEPC.169(57)) adopted at MEPC 57. Current approval processes follow the Methodology developed by GESAMP-BWWG.

Regular updates of information on obtained Basic and Final Approvals are made in accordance with section 8.3 of Procedure (G9). The technical requirements have been revised based on experience with the approval process. Recent workshops thoroughly reviewed inconsistencies between the Methodology and circulars such as BWM.2/Circ.28 and BWM.2/Circ.37, the latter describing the information that should be made available in proposals for approval of BWMS in accordance with Procedure (G9).

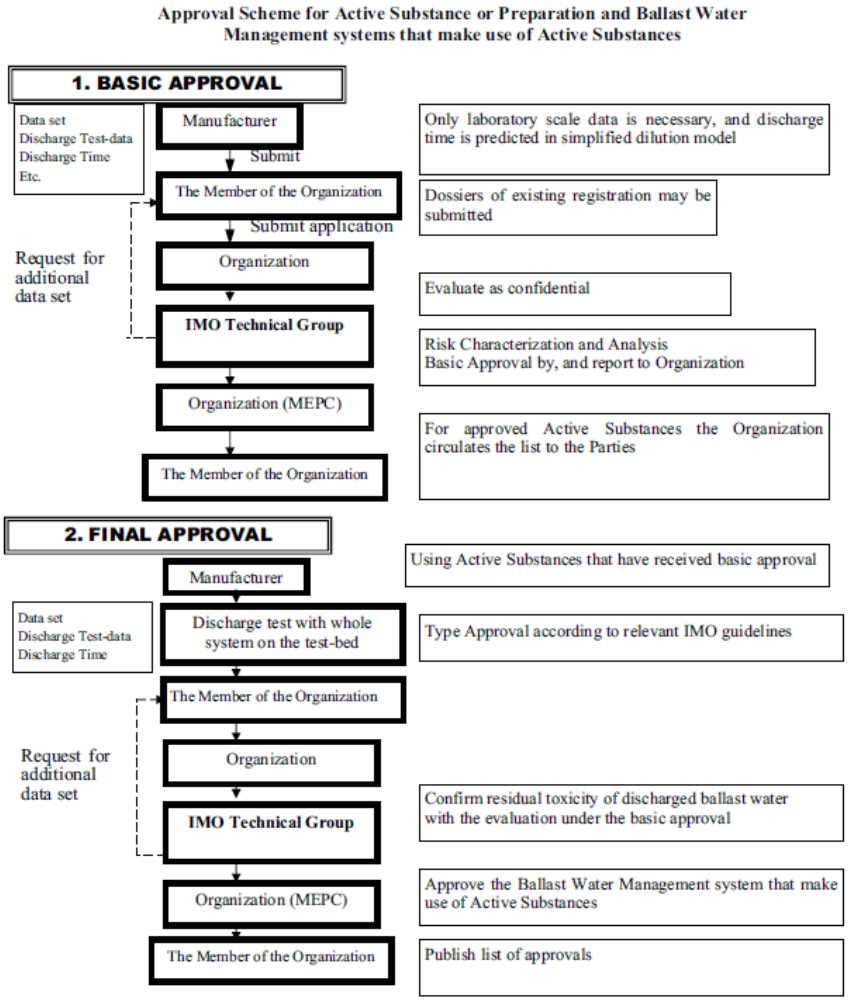
15.2 Applicability

Procedure (G9) applies to the approval of BWMS that make use of Active Substances in accordance with the Convention to comply with regulation D-3. Note that the term 'Active Substances' is described in the definitions section.

15.3 Procedures for approval and certification

Manufacturers submit information on their technology in a proposal document (dossier) to a national Administration. Member State Administrations should check for the quality and completeness in the dossiers against the latest information of the Methodology before the official submission of the application for Basic or Final Approval to IMO. Eventually, IMO approval may be granted by the Marine Environment Protection Committee based on the independent advice provided by the GESAMP-BWWG.

As the Group is to review the dossiers submitted by members and report to the Organization on its findings, they may request additional data from Administrations during the approval process. The approval scheme is two-staged; Basic Approval has to be granted first, followed by Final Approval. Ultimately, evaluations from the GESAMP-BWWG will be reported to the MEPC (see paragraph 8.2 of Procedure (G9)). In connection with the submission of the application for approval a fee is paid to the IMO to cover the services provided by the GESAMP-BWWG.



[Example Figure: xx]

15.4 Summary of Procedure (G9) requirements

Equipment manufacturers should include in their dossiers a chemical identification of chemical compounds, including Active Substances, Preparations and any other Relevant Chemical, even those generated on board. For BWMS that make use of Active Substances, in particular chlorine based systems, special attention is drawn at the formation of disinfection by-products (DBPs). The description of chemical compounds should include a data-set including physical and chemical properties, mammalian toxicity, environmental fate and effects. Following this information, a risk characterization is described that is based upon information on persistency, bioaccumulation and toxicity (PBT) and specified testing on toxicity of the treated ballast water. The evaluation includes criteria on both human safety and environmental protection. The requirements for Basic Approval are more general, as theoretical studies, literature data and simplified testing can fulfil the data requirements. For Basic Approval, the GESAMP-BWWG reviews the comprehensive proposal, along with any additional data submitted, as well as other relevant information available to the Group, and reports to the Organization.

For Final Approval, more detailed tests and full assessments are required, based on full-scale testing of the ballast water management systems. The application for Final Approval should include tests performed as part of the land-based type approval process using the treated ballast water discharge and must specifically address the concerns identified during the consideration for Basic Approval. Results are based on tests under type approval testing under Guidelines (G8), e.g. field or full-scale testing, and include test results using two types of water. Note that the Final Approval dossier should also confirm the evaluation in Basic Approval of the risks to the ship and personnel including consideration of the storage, handling and application of the Active Substance.

15.5 Background

Regulation D-3, paragraph 2 contains, the approval requirements for systems that make use of Active Substances. The procedure and standards are described in Procedure (G9).

15.6 Definitions

Active Substances are defined by the Convention as "substances or organisms, including a virus or a fungus that have a general or specific action on or against harmful aquatic organisms and pathogens". One may refer to Procedure (G9), section 2, for additional definitions. In addition, relevant definitions are described in document MEPC 66/2/6 (Report of the Fifth Stocktaking Workshop of the GESAMP-BWWG), describing for example Basic Approval and Final Approval definitions.

15.8 Technical specifications

Procedure (G9), sections 4, 5, 6 and 7, describe the technical requirements, while a more detailed guidance on technical requirements is found in circular BWM.2/Circ.13/Rev.2. The Methodology gives thorough guidance on all aspects needed for a complete data-set. The required data contain:

- detailed physical and chemical properties of the Active Substance or Preparation, such as reactivity towards materials, vapour pressure, and melting and boiling points; and

- data on effects on aquatic plants, invertebrates and fish and other biota. The effects are to include acute and chronic toxicity, (indications of) endocrine disruption and carcinogenic and mutagenic effects. All substances above a

certain threshold of the log K_{ow} (a measure for solubility of the substance in water) are more likely to end up in sediment and therefore need to be reviewed on their specific effects on sediment organisms. For compounds that are above the thresholds for the bioconcentration factor (BCF), the biomagnifications, persistence in the food web and potential effects need to be described.

The Methodology outlines the mammalian toxicity data that should be submitted for approval. Details are provided in the Methodology (BWM.2/Circ.13/Rev.2); in summary, the topics include acute toxicity, effects on skin and eye, repeated-dose toxicity, chronic toxicity, developmental and reproductive toxicity, carcinogenicity, mutagenicity/genotoxicity and toxicokinetics.

For compounds that are commonly described in ballast water treatment, data is gathered in a database at IMO. The current database includes 41 substances and is available upon request via IMO. For these compounds, no other data is to be added in the proposal, unless it is scientifically justified.

Using these data, a risk characterization is described by including a hazard identification (i.e. what substances are used and what are their effects?), one of the principles as stated in section 6 in technical circular BWM.2/Circ.13/Rev.2. Other elements are dose (what concentrations are expected?) and exposure (what is the intensity, frequency and exposure to an agent?). All information leads to risk characterization (how does the data lead to a quantification of risks?). Interesting to note is that another technical group (GESAMP EHS Working Group or WG1) applies a hazard-based approach in the IMO review process for evaluating harmful substances carried by ships. In contrast to this, the evaluation of ballast water systems by the GESAMP-BWWG follows a risk-based approach.

Based upon information on persistency, bioaccumulation and toxicity (PBT) the risk for environmental and human effects is characterized in combination with actual testing on the toxicity of treated ballast water. Discharge concentrations are calculated with the MAMPEC model, using the dataset and measurements from the testing. The resulting environmental risks are compared to safety thresholds for environmental risks, e.g. PNEC values (predicted no effect concentrations). Human exposure scenario (HES) models were developed to compare the exposure to human based thresholds, e.g. DMEL (derived minimal effect levels). Requirements for Basic Approval are more general and the data may be derived from theoretical studies, literature data and may include simplified testing to fulfil data requirements. For Final Approval, toxicity testing is specified in detail and should be derived in combination with ballast water management system efficacy testing for Guidelines (G8) type approval. Following the risk assessment, several risk mitigation or risk management options may be included. For example, specific requirements exist on the methods to monitor the total residual oxidants (TRO). The latter is required as this is relevant to check for the production of DBPs in ballast water which may pose a risk to the environment and human health.

15.9 Typical documentation requirements for the approval process

For a submission to IMO, all data reports and references are included in the actual dossier. For example, this includes full test reports from chemical and toxicological laboratories, data sources and technical information on systems.

15.10 Appendix to Procedure (G9)

The appendix provides Administrations with an approval scheme for BWMS that make use of Active Substances, outlining the Basic and Final Approval process.

CHAPTER 16 – Implementing the Guidelines for the uniform implementation of the BWM Convention

[Text to be added at a later date.]

CHAPTER 17 – Duties of shipowners

[Text to be added at a later date.]

CHAPTER 18 – Equipment requirements for ships – the options

The BWM Convention defines two ballast water management standards:

- regulation D-1 specifies the standard for ballast water exchange; and
- regulation D-2 specifies the ballast water treatment performance standard.

18.1 Ballast water exchange

Ballast water exchange is based on the assumption that the coastal water used as ballast water differs largely in biotic and a-biotic conditions from offshore ocean waters. The latter, being high-saline and very poor in nutrients contains far less organisms, which are also very different form the coastal ones. A repetitive exchange of ballast water in such areas should result in minimizing organisms and pathogens. The organisms from coastal or fresh waters will not survive when discharged into deep oceans with its different physical and chemical characteristics, while oceanic organisms will not survive in coastal waters, let alone in freshwater environments. By exchanging ballast water the probability of transferring organisms and pathogens through ballast water is considerably reduced.

When this option is chosen, at least 95% of the total ballast water volume should be exchanged. Different options of BW exchange are available:

- sequential method;
- flow-through method; and
- dilution method.

When using the flow-through method, at least three times the volume of each individual tank should be pumped through. If less than three times the volume is not achieved, the exchange may still be accepted if it can be proven that 95% volumetric exchange was achieved.

18.2 Treatment

Ballast water exchange in open seas has major operational consequences with regard to stability and stresses, in particular in heavier weather conditions. Apart from that it may not be as effective in reducing the transfer of invasive organisms or pathogens as envisaged. The Convention therefore requires a management plan on board the ship to reduce the number of organisms such that the risk of invasive species is minimized. The most common approach is the installation of a ballast water management system. Other methods that give equivalent protection are allowed, although not many have as yet surfaced.

There are different ballast water management systems available and in development. Generally these technologies can be categorized into three types based on their primary mechanism; mechanical, physical and chemical. These treatment technologies will be described separately in the next paragraphs.

18.2.1 Mechanical treatment

Mechanical treatment can be done by filtration, cyclonic separation and electro-mechanical separation. Mechanical treatment is generally only done at intake and can be used on short and long voyages.

Screen and disk filters can be used at ballast water intake to reduce sediment and organisms. Mesh sizes of these filter screens vary between about 5 and 200 µm (1 µm = 0.0001 cm). The smaller the mesh size, the more will be filtered prior to intake. Filters with a mesh size of 50 µm or less are commonly applied in BWMS to achieve the standard described in regulation D-2.

Most filters are self-cleaning with back flushing cycles. Waste water from the back flush is discharged directly overboard. Together with the resistance of the filter this self-cleaning procedure will form pressure drops and affect the flow rate negatively.

Cyclonic separation uses centrifugal forces to separate solid particles from water. However this is only possible with particles having a specific gravity higher than that of water. Electro-mechanical separation works with a flocculent injection that attaches to the sediment and organisms. Solid particles are then removed by filtration and magnetic separation.

18.2.2 Physical treatment

Physical treatment can be done by ultraviolet irradiation (UV), de-oxygenation, cavitation and ultrasound. UV is used to eliminate or damage organisms (phytoplankton, zooplankton, human pathogens and bacteria) by damaging the cell membrane to such extent that the organism is not able to reproduce. The effectivity is dependent on the turbidity and the transmission of the water. Most ballast water treatment systems using UV come together with a mechanical treatment beforehand. In general fresh water has a lower transmission so the UV can penetrate less deep and hence can treat less volumes per time unit than in saline waters.

The advantage of UV is that this treatment can be performed at intake and discharge of ballast water to assure that all organisms will not be able to reproduce. This treatment is possible on long and short voyages. Power consumption of UV lamps is relatively high and should be considered including the fact that UV treatment is flow rate dependent.

Removing dissolved oxygen in the ballast water is called de-oxygenation and eliminates aerobic organisms. Oxygen is replaced by inert gases (often nitrogen). Although de-oxygenation can be positive to prevent corrosion, it is important to use inert gas, which does not react chemically, to avoid any oxidative or hydrolytic effects. De-oxygenation can require a long period which should be considered when having a fleet employed on short voyages.

In the shipping industry, cavitation normally negatively affects materials and should be prevented. However, this can be used in order to damage membranes of organisms assuring that they are not able to reproduce when discharged into the environment. Care should be taken to protect against the possible effects of hydrodynamic forces and ultrasonic oscillations on materials and the environment, including humans. This treatment can be done on long and short voyages.

18.2.3 Chemical treatment

Ballast water can be chemically treated by administering chemicals (Active Substances) or Preparations, or by producing Active Substances on board. Care should be taken when using disinfectant Active Substances; they can kill living organisms in the water but also affect humans. Commonly used Active Substances are chlorine, chlorine dioxide, ozone,

peroxide and sodium hypochlorite. Chlorine can also be generated on board by using an electrolytic cell and having enough dissolved salt in the ballast water. Active Substances should be depleted or be neutralized (including possibly created toxic by- and end products) before discharging into the environment to be environmentally acceptable. Therefore, voyages of more than three days are recommended to assure to achieve the desired killing rate in the tank, to allow the chemical by- and end products to degrade and to prevent large volumes of neutralizing reagents to be stored on board. Treatment making use of Active Substances is not dependent on flow rates of the pumps and, when not produced on-board, it requires low power consumption.

Classification societies normally impose strict installation guidelines on such plants, to prevent the risk of explosion from the hydrogen gas by-product and to minimize toxic leaks.

18.2.4 Combinations of treatment techniques

As discussed already briefly in the above paragraphs, treatment technologies can be combined and differ in rate of application, holding time, power consumption and effects on other ship instruments or structure. A combination of different treatments can reduce the limitations of an individual technology. Therefore, many ballast water management systems include a combination of two or more technologies. When taking into consideration all ballast water management systems on the market at the time of writing, the most common combination is a mechanical system in combination with either UV or a chemical disinfection.

18.3 Water from public water supply

The use of drinking or potable water for ballast water has been subject to much debate for several reasons. The main concern is on ethical grounds, combined with lacking international standards. The United States Coast Guard rule-making process allows for the use of United States potable water as ballast water, but does not recognize other sources of drinking water for this purpose. It should be noted that the source water, which is always fresh water, may still be contaminated with organisms or human pathogens. To eliminate such contamination sources, potable water still needs to be disinfected to a certain degree. This is usually done by adding a solution of commercially available chlorine. In practice this source of ballast water will only be a solution for ships with a small ballast water volume and infrequent ballasting, or in emergency conditions.

18.4 Discharge to shore facilities

Having shore facilities available to receive, process and redistribute ballast water would be an ideal solution for assisting in implementing the BWM Convention and for reducing the overall costs of implementation. Reception facilities should be responsible for and capable of the supply of high quality ballast water that meets the international standard. Such a solution would in particular be useful for older ships, for which installing a BWMS would no longer be economically feasible, ships lacking space for BWM equipment or those on designated trading routes. To be successful some hurdles need to be overcome. Many harbours lack a proper infrastructure to accommodate the intake or supply of ballast water to and from the ship and the shore facility. Moreover, ballasting and deballasting activities should be running in parallel with the ships' loading and unloading process. A disturbance in the flow of ballast water will therefore immediately affect the loading operations of the ship. Finally, the global flow in ballast water is not in an equilibrium for each port or region, which implies a net in- or outflow from certain regions in the world. Nevertheless, for certain areas or harbours shore facilities could be a feasible option. In particular in vulnerable areas, such as the UNESCO Heritage International Wadden Sea, where a regional port has taken such initiative.

Another factor to be considered for many vessels will be the requirements on ballast pump sizing and system design, depending on the point of discharge to shore on the vessel, considering most ballast pumps are low down in the machinery spaces. The head required to achieve this at the flow rate necessary to match the loading/unloading of the vessel and the pressure requirements at the point of delivery may make the pumps prohibitively large and expensive. Large pipework passing through upper sections of the vessel may not be practicable either. These system design elements must be carefully considered before proceeding down this route.

18.5 Guidance for port State control

Irrespective of the methods applied to disinfect the ballast water the discharged water should meet the quality standard as indicated in regulation D-2. It is the obligation of port State control or the designated authorities to ensure adequate control and, when required, inspection of the ballast water record book and management options. A tiered approach to inspections is recommended. The first tier of survey will be limited to the ballast water record book, which can be inspected on board or at an earlier stage if the ballast water records have been submitted electronically prior to arrival in the port of destination. In most cases this first tier inspection will turn out to be sufficient. On a more infrequent basis, a second tier of inspection can be implemented and the ballast water management plan will be reviewed. This may result in a physical inspection of the BWMS and assessment of the familiarization of the crew with its use. As a further action and third tier of inspection, there can be actual inspection of the ballast water during discharge (see article 9, of the BWM Convention and Guidelines (G2)). This can be a first line or indicative inspection and can be a rather crude inspection or, in case of suspicious results, an in-depth survey and testing of the ballast water. The latter is a far more time consuming and costly action and may have implications on the ship's schedule. Upon gross exceedance of the regulation D-2 discharge standard the ongoing ballast water discharge can be stopped. In case of malfunctioning, repair of the BWMS will be required. Alternatively the deballasting can be continued in a safe alternative procedure (e.g. shore facility or in dedicated area).

If possible, the ship's ballast water documentation should benefit from information from measuring and monitoring tools confirming the specified efficacy as indicated in the BWM plan. Currently, a large variety of in-line or discrete sampling and measuring tools are becoming available that are capable of measuring generic or specific elements indicative of the efficacy of the BWMS. Such tools can support monitoring of the performance of a system on board.

PART V: TECHNICAL ASPECTS OF ENFORCEMENT

Chapter 19 – Pollution detection and response

19.1 Detection

An approved ballast water management system (BWMS) when properly operated should not give rise to pollution. Such BWMS, whether disinfecting by making use of Active Substance or by physical means, is evaluated for environmental acceptability during the type approval process. In the first case, Procedure (G9) is followed to ensure harmful substances from the treatment will not be present in the discharge; for physical treatment environmental acceptability is evaluated as part of Guidelines (G8). Monitoring the operation of the BWMS will reveal whether the system is functioning as it should.

Only when the BWMS is not functioning properly, the discharge may contain harmful substances. The first indication of such failure will be obtained from the monitoring device. Regular checks or a warning signal upon failure are important.

The risk of pollution should be clearly separated from the risk of not minimizing the harmful aquatic organisms by treatment. Risk of pollution can occur when a voyage is cut short, so the lag time needed to render the treatment disinfectant harmless cannot be met, or because a failure occurred in properly dosing the disinfectant.

Pollution, irrespective of the operation of a BWMS, can also occur if the area of uptake is polluted by a persistent or slowly degradable source of contamination. Such situation is not relevant for the ins and outs of operating a BWMS, hence will not be incorporated in this chapter. Guidance for preventive action in such cases is given in BWM.2/Circ.17, paragraph 10.

When risk of pollution is envisaged the ballast water will not be safe to discharge and the port of call should be notified. Prevention should always be the first aim. If the situation is beyond the stage of prevention then contingency planning becomes an actual need.

19.2 Response – contingency measures

The situation of potentially polluted ballast water is only one of the cases where contingency measures would be needed.

Other situations are:

- failure of the treatment process so organisms will survive in the ballast water; and
- ships without an properly functioning BWMS.

Contingency measures to meet the challenges of either polluted or not (or not adequately) disinfected ballast water are best placed on shore and preferably in the port of call. If no facility is available in the port of call, the nearest port or location holding a contingency facility is to be sought. The facility can consist of a reception facility for polluted/untreated ballast water or a treatment unit available in the port of call that can process the ballast water by a port-based treatment system. A first such port-based BWMS is being developed by the ship-building industry in close cooperation with a port where it will be based. The initiative as such will set an example of ballast-water oriented contingency planning.

The IMO Guidance for emergency situations (BWM.2/Circ.17), although specifically targeted at a risk of release of invasive species, nevertheless contains several items that also apply for pollution. An emergency response should take into account the nature of the pollution (what chemicals and/or contaminants and at which expected quantities), the natural characteristics of the area of release and the contingency capacity of the country or region likely to be affected. In order to minimize damage and to enable rapid normalization of the operation of ports and ships, industry cooperation will be needed at the time of the emergency. As this is a rather complex operation, "in practice, such measures are likely to be very simple and may only be identifiable for situations where ballast water discharges from certain vessels need to be prevented" (BWM.2/Circ.17).

If polluted ballast water has accidentally been released, then ways to mitigate the damage have to be identified. Again the characteristics of the contamination and of the area(s) affected are crucial, together with knowledge of the contingency preparedness in the area. A risk assessment may be needed. It is also needed to notify all stakeholders of an emergency situation; according to BWM.2/Circ.17, this should be the responsibility of an appointed (lead) agency overseeing the emergency situation and procedures.

As to mitigation measures, much can be learnt from pollution response knowledge from other sources of pollution in dissolved form, such as dissolved chemicals and eutrophic waters. It is unlikely that pollution resulting from ballast water operations will be in solid or in

heavy-oily form; hence techniques to contain such sources of pollution (booms around the spill or discharge) will not be applicable.

Support from shore-based contingency measures, such as initiatives facilitated by ports, should strongly be encouraged.

CHAPTER 20 – Strategies for inspection

20.1 Guidance for port State control

Port State control (PSC) is the inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with those rules.

States that are Parties to the Ballast Water Management Convention shall be entitled to check foreign ships' conformity with its requirements, in accordance with articles 9 to 11 of the convention.

To verify compliance with the requirements of the BWM Convention, the PSC procedure can be described as a four-stage inspection, according to the guidelines:

.1 the first stage, the "initial inspection", should focus on documentation and ensuring that an officer has been nominated for ballast water management on board the ship and to be responsible for the ballast water management system, and that the officer has been trained and knows how to operate the system;

.2 the second stage, the "more detailed inspection", where the operation of the ballast water management system is checked and the PSC officer clarifies whether the ballast water management system has been operated properly according to the ballast water management plan and the self-monitored operational indicators verified during type approval procedures bearing in mind that IMO type approvals have limitations related to water quality (i.e. salinity, temperatures);

Note: A more detailed inspection shall be carried out, whenever there are clear grounds for believing, after the initial inspection, that the condition of the ship or of its equipment or crew does not substantially meet the relevant requirements of the Convention. Clear grounds shall exist when the inspector finds evidence which in his/her professional judgement warrants a more detailed inspection of the ship, its equipment or its crew (conditions are defined in article 9.2 of the BWM Convention).

.3 the third stage where sampling is envisaged: indicative analysis (using operational or performance indicators) can be undertaken at any time throughout the discharge, to identify whether the ship is meeting the ballast water management performance standard described in the BWM Convention (regulation D-2), and

.4 the fourth stage, in cases where the analysis identifies that the system is exceeding the D-2 standard, incorporates a detailed analysis to ascertain the non-compliance with the D-2 standard.

Regardless of the stage of inspection where it occurs, whenever clear grounds have been identified that the ship poses a threat to the environment, human health, property or resources through a PSC inspection, if the crew/operators discover the BW treatment is

and/or was not proper, or when there are grounds for implementing a detailed analysis to ascertain the non-compliance with the BWM standard, the Master of the ship should be informed immediately and the ship should not undertake any further ballast water discharge. Any discharge taking place should therefore be stopped immediately. If the crew/operators discover the ballast water treatment is and/or was not proper, then all discharges should be stopped

If a ship has violated the BWM Convention, the PSC officer may take steps to warn, detain or exclude the ship or grant such a ship permission to leave to discharge ballast water elsewhere, as long as it is in compliance with the Convention, or seek repairs. In exercising his/her functions, the PSC officer should use professional judgement to determine whether to detain the ship until any noted non-conformities to the BWM Convention are corrected or to permit a vessel to sail with non-conformities, which do not pose an unreasonable threat of harm to the marine environment.

[Example Figure xx to be inserted once a port State control process has been agreed.]

PART VI: ORGANIZATION [section to be completed]

CHAPTER 21 – **Basic maritime Administration**

CHAPTER 22 – **Delegation of duties by the maritime Administration**

CHAPTER 23 – **Training of personnel**

CHAPTER 24 – **Guidelines, codes and other IMO publications relevant to the BWM Convention**