GUIDANCE NOTES
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INTERNATIONAL SHIP CLASSIFICATION

GUIDELINES FOR DEVELOPMENT OF SHIP'S BALLAST WATER MANAGEMENT PLAN

2020

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CHAPTER 1 GENERAL

1.1 Objective

1.1.1 The Guidelines intend to provide guidance for development of ship's ballast water management plan (hereinafter referred to as BWMP) in compliance with Regulation B-1 of Annex to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (hereinafter referred to as "the Convention"), and for surveyors of International Ship Classification (hereinafter referred to as ISC) in approval of BWMP in accordance with Regulation B-1 of the Convention.

1.2 Application

1.2.1 The Guidelines apply to ships designed and constructed to carry ballast water and classed with ISC.

1.3 General requirements

1.3.1 The Guidelines contain only provisions of the Convention and relevant guidance. Attention is to be paid to other relevant provisions by the flag Administration and port State authority when conducting ballast water management to a specific ship.

1.3.2 For the ships navigating in the waters under the jurisdiction of U.S.A, attention is to be paid to that the requirements of the management of biofouling are to be included in the Ballast Water Management Plan.

1.4 Basis for development of the Guidelines

1.4.1 The Guidelines are developed mainly on the basis of the following IMO documents. When using the Guidelines, subsequent revision of these documents is to be noticed:

(1) International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 and the amendments;

(2) Guidelines for Ballast Water Management and Development of Ballast Water Management Plans (MEPC.127(53), as amended by MEPC. 306(73));

(3) Guidelines for Ballast Water Exchange (MEPC.288(71));

(4) Guidance on Contingency Measures under the BWM Convention (BWM.2/Circ.62);

(5) Issuance of Ballast Water Management Certificates Prior to Entry Into Force of the BWM Convention and Ballast Water Management Plans Approved According to Resolution A.868(20) (BWM.2/Circ.40).

1.5 Definitions

1.5.1 For the purposes of the Guidelines, the following definitions apply:

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

(2) *Sediments* mean matter settled out of Ballast Water within a ship.

(3) *Ballast Water Management* means mechanical, physical, chemical, and biological processes, either singularly or in combination, to remove, render harmless, or avoid the uptake or discharge of harmful aquatic organisms and pathogens within ballast water and sediments.

(4) *Ballast Water Management System (BWMS)* means any system which processes ballast water such that it meets or exceeds the ballast water performance standard in Regulation D-2. The BWMS includes ballast

water treatment equipment, all associated control equipment, piping arrangements as specified by the manufacturer, control and monitoring equipment and sampling facilities. The BWMS does not include the ballast water fittings, which may include piping, valves, pumps, etc., that would be required if the BWMS was not installed.

(5) *Harmful Aquatic Organisms and Pathogens* mean 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.

(6) *Ballast Water Capacity* means the total volumetric capacity of any tanks, spaces or compartments on a ship used for carrying, loading or discharging Ballast Water, including any multi-use tank, space or compartment designed to allow carriage of Ballast Water.

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

(8) *Administration* 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 engaged in exploration and exploitation of the seabed and subsoil thereof adjacent to the coast over which the coastal State exercises sovereign rights for the purposes of exploration and exploitation of its natural resources, including Floating Storage Units (FSUs) and Floating Production Storage and Offloading Units (FPSOs), the Administration is the Government of the coastal State concerned.

(9) *Port State authority* means any official or organization authorized by the Government of a port State to administer or enforce standards and regulations relevant to the implementation of national and international shipping control measures.

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

(11) *Ballast Water Management Plan (BWMP)* means a document to be retained and used on board a ship that describes the process and implementation procedure of ballast water management of the particular ship, as specified in Regulation B-1 of the Convention.

CHAPTER 2 DEVELOPMENT OF BALLAST WATER MANAGEMENT PLAN

2.1 General requirements

2.1.1 The objective of Ballast Water Management Plan is to guide personnel on board ship in safe and reasonable operation of the ballast water management system so as to ensure that ballast water management is in compliance with management standards specified in the Convention.

2.1.2 The Plan is to be:

(1) realistic, practical and easy to use;

(2) understood by ship's personnel engaged in ballast water management, both on board and ashore, and evaluated, reviewed, and updated regularly; and

(3) consistent with the operational ballasting requirements of the ship.

2.1.3 The Plan is to be in compliance with applicable international and national ballast water management standards.

2.1.4 The plan is a document provided to the personnel engaged in ballast water management onboard the ships, therefore, it is to be written in the working language of personnel on board the ship. If the language used is not English, French or Spanish, a translation into one of these languages is to be included.

2.1.5 BWMP is to be a separate document, which is to be prepared in a convenient format, considering harmonization with other relevant documents. Inclusion of extensive background information on the ship, its structure, etc., is to be avoided, as this is generally available elsewhere. If such information is relevant, it is to be kept in annexes, or an existing document or manual reference is to be made to the location of the information.

2.1.6 The Plan is to be kept on board and readily available for inspection by port State control or quarantine officers.

2.2 BWMP development process

2.2.1 In general, BWMP development process is to include:

(1) selection of ballast water management standards applicable to the ship;

(2) confirmation of ballast water management method to the particular ship;

(3) confirmation of relevant control procedures for implementation of ship's ballast water management;

(4) collection and analysis of plans and information of ship's ballast water system;

(5) safety evaluation for confirmation of measures for ballast water management;

(6) confirmation of format and structure of BWMP and completion of BWMP.

2.2.2 Standard format for the ballast water management plan is provided in Appendix 2 to the Guidelines.

2.2.3 The Guidelines give recommendations on what information is to be included into corresponding paragraphs with respect to items in the standard format of the BWMP and how such content is to be prepared. It is not required for a BWMP specific to a ship to contain all the items but only to contain those associated with ballast water management measures adopted by the ship.

2.2.4 During development of BWMP, the selected method of ballast water exchange is to be subject to safety evaluation according to Chapter 3 of the Guidelines to prove feasibility of the exchange method specific to a ballast tank. If the evaluation result shows that this method is not applicable to certain tank, alternative exchange method is to be considered.

2.3 Requirements for contents of BWMP

2.3.1 Overall structure

2.3.1.1 BWMP is to at least include or cover the following four parts:

(1) preamble or introduction;

(2) arrangement of ballast system;

(3) ballast water management;

(4) appendices.

2.3.2 Preamble or Introduction

2.3.2.1 "Preamble or Introduction" in the plan is to contain a general description of the ship and the plan, including:

(1) plan development basis;

(2) brief account of the purpose of the plan and the necessity of ballast water management;

(3) current valid version of BWMP and identification of revision status;

(4) control requirements for development, review, approval or revision of BWMP;

(5) the requirement of 2.1.6 of this Chapter.

2.3.2.2 At least, the following details are to be stated in the plan:

(1) ship's name;

(2) ship type;2.3.2.4

(3) IMO number;

(4) classification registration No.;

(5) ship's call sign;

(6) flag;

(7) port of registry;

(8) ship owner;

(9) gross tonnage;

(10) principal dimensions of ship;

(11) total ballast capacity of the ship;

(12) quantity and capacity of ballast pumps;

(13) quantity, capacity, center of gravity and maximum free surface moment of dedicated ballast tanks onboard;

(14) ballast water gauging unit (in m);

(15) officer designated for ballast water management and his duties;

(16) main methods used for ballast water management onboard;

(17) other information of ship.

2.3.2.3 Duties of officer designated for ballast water management

(1) To facilitate the implementation of ballast water management and treatment procedures on board, a responsible officer is to be designated to ensure the maintenance of appropriate records and to ensure that ballast water management and/or treatment procedures are followed and recorded.

(2) The duties of the officer designated for ballast water management are to be stated in the plan, including:

① ensuring that ballast water treatment or exchange is in compliance with procedures specified in BWMP;

② preparation of Ballast Water Reporting Form prior to entry into a port;

③ assisting port State control or quarantine officers for any sampling that may need to be undertaken;

④ maintaining Ballast Water Record Book;

⑤ other duties specified by the Company;

⑥ operational duties during ballast water operation.

2.3.3 Arrangement of ballast water system

2.3.3.1 Ballast water system of the ship, including ballast tanks, piping, pumping, arrangement of monitoring sampling points and ballast water management system (BWMS) are mainly described in the "Arrangement of Ballast Water System" part of the Plan in order to familiarize quarantine officers with the system.

2.3.3.2 Ballast tank arrangement and capacity

(1) Plan and profile of the ship, or a schematic drawing of ballast arrangement is to be included in BWMP; and

(2) The following are to be indicated in a table:

① capacity of each tank and pumps available for the tank;

② pumps' rated discharge capacity.

2.3.3.3 Arrangement of piping and pumping and ballast water sampling points

(1) Schematic drawings of piping of ballast system and those of arrangement of ballast control system are to be included in BWMP. The drawings are to indicate location of valves, identification No. and location and discharge capacity of each ballast pump.

(2) Sampling and access points of pipes and tanks may be indicated in a table or schematic diagram to enable crew members to assist quarantine officers to promptly obtain ballast water samples.

(3) Arrangement of ballast water sampling points is to ensure the representative quality and ease of sampling of ballast water, without the need to enter potentially dangerous spaces or partially filled ballast tanks. Reference may be made to the following:

① appropriate modification of manholes, where possible, to facilitate the lowering of sampling equipment;

② installation of sampling pipes inside the air pipe. Sampling pipes should be terminated at a convenient location on the top or side of the air pipe, so that a sampling pump may be easily fitted to the outlet;

③ installation of stand-alone sampling pipes that directly penetrate into the ballast tanks with the ends of sampling pipes located within tanks to ensure representative ballast water samples are taken;

④ the sampling pipe may also be fitted inside the sounding pipe to take representative samples;

⑤ provision for in-line sampling from either the ballast pump or the ballast pipework, to permit sampling either during ballasting or de-ballasting operations.

(4) If method of flow-through or dilution is employed, sampling points are not to be arranged inside overflow pipes.

2.3.3.4 Ballast Water Management Systems (BWMS)

(1) BMMP is to include the arrangement of ballast water management systems, and

(2) BMMP is to indicate the number, model and rated treatment capacity;

(3) BMMP is to include the copy of Type Approval Certificate or Marine Product Certificate and/or other documentary evidence of BWMS.

2.3.3.5 Example of ballast water arrangement in specific conditions

BWMP is to include ballast water arrangements under different ballast conditions, including normal ballast condition, minimum good weather departure condition and adverse weather ballast condition (as appropriate).

2.3.4 Ballast water management

2.3.4.1 General

(1) The “Ballast Water Management” part in BWMP mainly describes procedures for ballast water operation and procedures for safety of the ship and the crew, and such procedures are to be in compliance with the Convention and dependent on the prioritized method of ballast water management for the ship.

(2) One or more of the following methods may be used for ballast water management:

① ballast water exchange, including sequential method, flow-through method and dilution method (see 3.2 of the Guidelines);

② ballast water treatment, including mechanical method, physical method, chemical method and combined method, etc.;

③ prototype ballast water treatment technologies;

④ discharge to reception facilities;

⑤ retention of ballast water on board for future discharging into the areas where the ballast water was loaded.

(3) Following procedures and safety considerations are to be included as a minimum:

① safety considerations in ballast water exchange at sea;

② procedures for ballast water operation;

③ procedures for disposal of sediments;

④ procedures for crew training and education;

⑤ procedures for coordination with port States/coastal States;

⑥ procedures for ballast water reporting and recording control.

2.3.4.2 Safety considerations

(1) BWMP is to include cases where safety of ballast water exchange may be affected. Ballast water exchange is to be carried out only in an assumed safe condition, in particular with respect to structural and stability aspects. Attention is to be paid to the following:

①weather condition;

②training of officers and crew;

③free surface effect and sloshing load in partially-filled tanks;

④maintenance of adequate stability according to an approved trim and stability booklet;

⑤permissible limits of shearing force and bending moment according to an approved trim and stability booklet;

⑥minimum fore and aft drafts with reference to bow slamming and propeller immersion;

⑦ bridge visibility.

(2) Weather condition

① Ballast water exchange is not to be carried out when weather does not permit. It is to be stipulated that it is the responsibility of the master to decide whether the ballast water exchange is to be conducted.

②Cases (e.g. sea condition and wind velocity) in which ballast water exchange is not to be conducted are to be included in BWMP to assist the master in his decision as to the need of carrying out ballast water exchange operation.

③ Ballast water exchange is to be avoided as far as possible in seasonal heavy weather conditions (typhoon, hurricane and whirl) or areas affected by severe ice condition and an alternative route is to be selected. Generally, ballast water exchange is to be avoided in freezing weather condition.

④ Where above conditions are unavoidable, ballast water exchange may be carried out provided that safe operation is ensured as far as weather conditions are concerned.

(3) Training of officers and crew

Before sailing, it is to be ensured that appropriate officers and crew members have been trained. All personnel responsible for conducting ballast water exchange are to familiarize themselves with the following:

① detailed arrangement of pumping, including air pipes and overflow pipes, and all pumps involved, for better cooperation between deck crew members;

② operation condition of air pipe connections and air/overflow pipes (monitoring of air/ overflow pipe air lock, floating ball malfunction, freezing or inadvertent closing is to be maintained);

③ knowledge of anticipated allowable time duration for ballast water exchange at sea;

④ methods of ballast water exchange, including risks and consequences involved with each method in respect of ship's stability and strength, and advantages of each method or the possibility of its use for treatment;

⑤ procedures for recording, sampling and gauging, to prove adequate recording required by the regulations;

⑥ limitation of ballast pump capacity (if any).

(4) Loading manual

As far as practicable, the selected exchange method is to be such that the stability and strength curves of each possible condition during ballast water exchange may be calculated by officers by using an onboard loading manual.

2.3.4.3 Procedure for ship's ballast water operation

(1) General

The procedure for ship's ballast water operation is to include following operations associated with ballast water management:

①uptake of ballast water;

②ballast water exchange;

③ballast water treatment;

④other ballast water treatment process.

(2) Uptake of ballast water

The procedure is at least to provide for following precautionary requirements associated with ballasting operation:

①measures to minimize the uptake of harmful aquatic organisms, pathogens and sediments in association with ballasting operation.

②appropriate routing plan by the master to minimize ballast uptake.

③avoidance of the uptake of ballast water in following areas and conditions:

a. water areas proposed and identified by the port State;

b. in darkness when bottom-dwelling organisms may rise up in the water column;

c. in very shallow waters;

d. where propellers may stir up sediments; or

e. where dredging is or recently has been carried out.

(3) Ballast water exchange

The procedure is at least to provide for following operational requirements for ballast water exchange:

① General principles

a. Personnel on board are to be familiar with ballast water and sediments requirements of the port State authority and treatment procedures, including access to information on preconditions for entry into port.

b. Where options are required for compliance of ballast water exchange or alternative ballast water treatment or control, the ship, for the purpose of safety, is to prepare in advance and develop a voyage plan for ballast operation.

c. When preparing a voyage plan, attention is to be paid to "safety considerations" in 2.3.4.2.

d. Where safety options are not available, regardless of all cases or certain cases, operational limitations are to be stated in the procedure in all cases. The description will assist the master in his reply to questions raised by a quarantine officer.

e. It is to be indicated that ballast water exchange by any method is to be carried out at the required[①] distance from land and in the required water depth, in order to meet the standards in Regulation D-1[②] of the BWM Convention.

② Operational procedures and safety considerations are to be given to the methods selected for ballast water exchange. The following are for guidance in procedure development:

(4) Ballast water exchange - Sequential method

① By this method of ballast water exchange, a ballast tank is first emptied and then refilled with replacement ballast water while the ship is in navigation condition. Since additional load is induced at sea depending on sea condition and ship' structure may as a result be affected, technical details are different from those of ballasting in port.

② The sequence of ballast water exchange is at least to show the following typical load cases as specified in the approved stability manual:

a. normal ballast condition and if applicable, heavy ballast condition;
b. loading condition including ship's maximum ballast capacity;
c. typical ballast loading condition with good safety limitation;
d. ship's ballast loading condition with critical stability, flooding position and/or strength.

③ The sequence of ballast water exchange is to include a brief account of the following information for the beginning and the end of each step:

a. ballast water capacity of each ballast tank;
b. pumps involved;
c. anticipated time duration;
d. strength values in permissible range;
e. stability information considering free surface effect during filling or discharging operation;
f. fore and aft drafts;
g. other information.

④ It is recommended to restore original condition after each step of exchange. The decision is to be made as to whether the next step is to be carried out taking into account of factors such as position of ship, weather forecast, machinery performance and crew fatigue. Ballast water

① Refer to Regulation B-4 of the BWM Convention.

② Ballast water exchange is to be in compliance with the standards in Regulation D-1 of the Convention.

exchange operation is to be suspended or temporarily stopped, if any factor is considered to be unfavorable.

⑤ Effects of heeling due to asymmetrical emptying or refilling are to be considered to ensure that the ship is in an upright condition during all steps. Measures are to be in place during practical operation to avoid list during pumping.

⑥ The steps are to be in compliance with requirements concerning trim and draught so that slamming or emergence of propeller may be avoided during ballast water exchange operation and the bridge visibility is within the permissible limits.

⑦ Just as overpressure is to be avoided during refilling, excessive vacuum in ballast tanks resulting from emptying is also to be avoided.

⑧ Verification is to be carried out in each step that requirements for strength and minimum stability are complied with.

(5) Ballast water exchange - Flow-through method

① Since flow-through method leads to little change to ship condition, the method has an advantage in adverse weather condition when application of sequential method is inadequate. However, before application of flow-through method, certain risks and concerns are to be addressed, see 2.3.4.2 of the Guidelines “safety considerations”.

② A procedure for ballast water exchange appropriate to flow-through method is to be established, listing sequence of treatment process of each ballast tank using flow-through method. A simple table may be employed to indicate specific ballast tanks and their capacities in each step, pumps available and anticipated time duration for exchange of three times the volume of each tank.

③ Attention is to be paid to flow-through method being used to overfill partially filled ballast water tanks. For the sake of safety, it must be checked whether any tank is first emptied and if so, the tank is to be refilled full. Otherwise, ballast tanks are to be filled full with ballast water and the ballast water is to be pumped through filled up ballast tank if ship condition permits. In any case, the change to ship condition is to be observed in a manner similar to sequential method, and it is to be checked that adequate longitudinal strength, stability, mean draft, fore draft, etc. are maintained.

④ After each step, decision is to be made as to whether the next step is to be carried out taking into account of factors such as position of ship, weather forecast, machinery performance and crew fatigue. Ballast water exchange operation is to be suspended or temporarily stopped, if any one factor is considered to be unfavorable.

(6) Ballast water exchange - Dilution method

① Dilution method has an advantage similar to that of flow-through method in ballast water exchange. However, since dilution method adopts the same rate for pumping in and pumping out, attention is to be paid to safety concerns associated with excessively high or low pressure of ballast tanks subjected to exchange operation, see 2.3.4.2 of the Guidelines “safety considerations”.

② A procedure for ballast water exchange appropriate to dilution method is to be established, listing sequence of treatment process of each ballast tank using dilution method. A simple table may be employed to indicate specific ballast tanks and their capacities for each step, pumps available and anticipated time duration for exchange of three times the volume of each tank.

③ In any case, the change to ship condition is to be observed in a manner similar to sequential method, and it is to be checked that adequate longitudinal strength, stability, mean draft, fore draft, etc. are maintained.

④ After each step, decision is to be made as to whether the next step is to be carried out taking into account of factors such as position of ship, weather forecast, machinery performance and crew fatigue. Ballast water exchange operation is to be suspended or temporarily stopped, if any factor is considered to be unfavorable.

(7) Ballast water treatment

① Where the ballast water management system (BWMS) is intended, such system is to be acceptable to the port State authority.

② The procedure is to describe safety operational procedures or instructions to ballast water treatment (mechanical, physical, chemical or biochemical methods) used on board. A reference to the product operation, maintenance and safety manual is acceptable.

③ The estimated time range of ballast water treatment for each ballast tank is to be described.

④ A description of ensuring that the ballast water flow does not exceed the rated treatment capacity of the ballast water management system is to be available.

(8) Other ballast water management methods

① Where alternative ballast water management systems are intended, e.g. discharging to reception facilities, such methods are to be acceptable to the port State authority.

② The procedure is to describe operational procedures or instructions to other ballast water management methods used on board, and operational requirements for discharging to reception facilities.

(9) Contingency measures[③]

In the case of a ship unable to manage ballast water in accordance with its approved Ballast Water Management plan to meet the D-1 or D-2 standard, communication between the ship and the port State is to occur. The ship and the port State are to consider the following as possible contingency measures:

① actions predetermined in the Ballast Water Management plan of the ship;

② discharging ballast water to another ship or to an appropriate shipboard or land-based reception facility, if available;

③ managing the ballast water or a portion of it in accordance with a method acceptable to the port State;

④ ballast water exchange carried out to an approved plan in accordance with regulation B-4 to meet the standard in regulation D-1. The ship and the port State should consider the potential disruption to the cargo handling operation plan of the ship and the potential impact to relating parties including port operators and cargo owners; or

⑤ operational actions, such as modifying sailing or ballast water discharge schedules, internal transfer of ballast water or the retention of ballast water on board the ship.

2.3.4.4 Procedure for sediments management

(1) General

The procedure is to describe following operations in relation to control and removal of sediments in ballast tank:

①avoidance of uptake of sediments;

②removal of sediments by crew;

③ Refer to IMO Guidance on Contingency Measures under the BWM Convention (BWM.2/Circ.62).

③removal of sediments ashore.

(2) Avoidance of uptake of sediments

① The procedure is to describe all reasonable measures for avoiding uptake of sediments during ballasting and best time for ballasting to provide guidance for the master.

② In addition to the avoidance of uptake of ballast water as specified in 2.3.4.3(2) ③, following measures for avoiding uptake of sediments are to be considered in developing BWMP:

a. If ballast water is to be loaded at an estuary, the operation is to be carried out at flood tide;

b. If water is muddy, it is advisable to load a minimum quantity of ballast water necessary for safe navigation before proceeding to cleaner waters to continue ballasting until the ship is fit for navigation;

c. If the clearance between ship's bottom and seabed or base material of river bottom is small, the use of high level sea inlets for ballasting is to be considered.

(3) Removal of sediments by crew at sea

①The procedure is to describe timing and operational methods in relation to removal of sediments in ballast tanks. Available methods include:

a. manual hose washing in ballast tank;

b. manual dredging of sediments in ballast tank;

c. using deflocculant to make sediments suspending again;

d. using dedicated tank washing and stripping systems.

② The procedure is to describe measures to be taken for the safety of ship and personnel during sediments removal operation.

(4) Removal of sediments ashore

① The procedures may specify removal and disposal of sediments from ballast tanks in port or in dock, including safety measures for personnel.

② The procedure may specify that sediments be removed from ballast tanks by shore-based specialized cleaning service provider.

2.3.4.5 Procedure for training and education

The procedure is to describe training requirements for onboard personnel engaged in ballast water management and operation, taking into account the following factors:

① familiarization of officers and crew with their duties on ballast water management of the ship on which they serve;

② familiarization of the master and personnel conducting ballast water operation with conventions, regulations and guidelines related to ballast water management;

③ familiarization with the ship's BWMP;

④ familiarization with the ship's ballast water management system and its operation;

⑤ familiarization with filling up ballast water record and log;

⑥ safety considerations specified in 2.3.4.2 of the Guidelines.

2.3.4.6 Procedure for coordinating with port States/coastal States

The procedure is to describe coordination for ballast water discharging in waters of port States/coastal States, e.g. authorities to be contacted and submission of report, etc.

2.3.4.7 Procedure for ship's ballast water reporting and recording

(1) The procedure is to describe the reporting of implementing ship's ballast water management and treatment and the format to be used, including at least the following:

① Identification of the officer responsible for recording ballast water operation and maintaining the records;

② Date, geographical position, ballast tanks and cargo holds, quantity of ballast water loaded or discharged, temperature and salinity of ballast water during loading or discharging of ballast water are at least to be recorded. BWMP is to include the format of Ballast Water Report (Ballast Water Reporting Form in Appendix 1 of the Guidelines may be adopted);

③ The master is to be required, in case the ship is unable to conduct the ballast water management procedures and/or treatment method(s) specific to the ship as required by BWMP or the port State due to weather, sea condition or other inoperable factors, as far as practicable to report this to the port State authority before entering the waters under its jurisdiction.

(2) BWMP is to include the format of Ballast Water Record Book (Ballast Water Record Book in Annex II, Appendix 3 of the Guidelines may be adopted) which is to include Record of Loading and Discharging of Ballast Water and Record of Abnormal Events;

(3) The records are to be available to the port State authority;

(4) Retention period of the Record Book is to be specified (at least 2 years on board and additional 3 years as minimum kept by the Company afterwards).

2.3.5 Appendices

This part may contain all recording formats, referenced documents and drawings associated with BWMP and implementation of BWMP, including requirements of flag States, regulations of Ballast Water Convention and relevant guidelines.

2.4 Evaluation and revision of BWMP

2.4.1 The shipowner or the master is to be responsible for regular evaluation of BWMP to ensure its timeliness and correctness.

2.4.2 Any change or revision to the approved BWMP which may affect compliance with the Convention is to be subject to re-approval by the organization that approved the original BWMP.

2.5 Plans and documents to be submitted for approval of BWMP

2.5.1 The following plans and documents are to be submitted for approval:

(1) BWMP;

(2) Safety evaluation report for ballast water exchange;

(3) Plans of hull, machinery and electrical related to the installations of ballast water management system (as appropriate);

(4) Schemes and drawings of modification (as appropriate).

2.5.2 For approval of BWMP, the following plans and information are to be submitted to ISC for information:

2.5.2.1 Sequential method:

(1) General arrangement;

(2) Lines drawing;

(3) Capacity plan;

(4) Loading manual (or calculations for stability, shear forces and bending moments in various loading conditions);

(5) General arrangement of ballast piping system;

(6) Arrangement of engine room (or plans and information showing quantity, position and discharge

capacity of ballast pumps);
(7) Arrangement of manhole covers for all ballast tanks on board;
(8) General arrangement of air pipes and sounding devices.
Detailed information for light weight distribution is to be submitted, if not included in (4).
Detailed information for permissible still water bending moment and permissible still water shear force is to be submitted, if not included in (4).
Detailed information for tank capacity calculations or tank capacity sounding table is to be submitted, if not included in (4).
The above (2) and (4) may be replaced by loading computer software.
2.5.2.2 Flow-through method or dilution method (plans included in 2.5.2.1 need not be resubmitted):
(1) Ballast piping system;
(2) Arrangement of ballast tanks;
(3) Specification of ballast pumps;
(4) Arrangement of air pipes, overflow pipes and sounding pipes;
(5) Structural details of ballast water inlet and overflow port.
2.5.2.3 Ballast water management system (plans included in 2.5.2.1 or 2.5.2.2 need not be resubmitted)
(1) Capacity plan;
(2) General arrangement of ballast piping system;
(3) Arrangement of engine room (or plans and information showing quantity, position and treatment capacity or discharge capacity of ballast water management systems (BWMS) and ballast pumps);
(4) Arrangement of manhole covers of all ballast tanks on board;
(5) General arrangement of air pipes and sounding devices;
(6) Strengthening for seating of the additional ballast water management systems (BWMS) (may be included in the relevant structure plans, as appropriate).

CHAPTER 3 SAFETY EVALUATION

3.1 General requirements

3.1.1 According to Regulation B-3 of the Convention, ballast water exchange at sea is one of the management measures that may be used by ships. However, ballast water exchange introduces a number of safety issues, which affect the safety of both the ship and its crew. Therefore, safety evaluation of methods of ballast water exchange and development of ship specific procedures for conducting ballast water exchange are at the core of adopting appropriate methods of ballast water exchange. The procedures for ballast water exchange and the relevant guidance are to be reflected in BWMP.

3.1.2 It is to ensure that all safety aspects associated with ballast water exchange method or methods used onboard have been duly considered prior to undertaking ballast water exchange, and that suitably trained personnel are onboard. A review of the safety aspects, the suitability of the exchange methods being used and the aspects of crew training is to be undertaken at regular intervals.

3.1.3 In accordance with requirements of the Convention, if the master reasonably decides that to perform ballast water exchange would threaten the safety or stability of the ship, its crew or its passengers, because of adverse weather, the ship's design, stress, equipment failure or any other extraordinary condition, a ship is not to be required to comply with Regulations B-4(1) and B-4(2) of the Convention. In this case:

(1) when a ship does not undertake ballast water exchange for the reasons stated in paragraph above, the reasons are to be entered in the Ballast Water Record Book;

(2) the port or coastal State concerned may require that the discharge of ballast water must be in accordance with procedures determined by them taking into account the Guidelines for additional measures including emergency situations (G13).

3.1.4 If, during ballast water exchange using sequential method, certain steps are not in full compliance with safety evaluation criteria specified in paragraph 3.5.3, an appropriate note is to be placed in BWMP, based on the evaluation of the following, to alert the master and advise him of the nature of the non-compliance, the additional measures (paragraph 3.6 or 3.7) to be considered and/or the precautions to be taken:

(1) steps that will not comply with any of the safety criteria during the operation and duration of such steps;

(2) the effect(s) of such "noncompliance" on the navigational and manoeuvring capabilities of the ship; and

(3) limitations to be imposed on ballast water exchange (e.g. weather and sea conditions).

3.1.5 A decision to proceed with ballast water exchange operation is to be taken by the master only when it is anticipated that:

(1) the ship will be in open water;

(2) the traffic density will be low;

(3) an enhanced navigational watch will be maintained including (if necessary) an additional lookout forward with adequate communications with the navigation bridge;

(4) the manoeuvrability of the vessel will not be unduly impaired for non-compliance with certain safety criteria; and

(5) the general weather and sea state conditions will be suitable and unlikely to deteriorate during the intended operation time period.

3.2 Methods of ballast water exchange

3.2.1 The following three methods of ballast water exchange at sea have been evaluated and accepted by

IMO:

(1) Sequential method – a process by which a ballast tank intended for the carriage of ballast water is first emptied and then refilled with replacement ballast water to achieve at least a 95 per cent volumetric exchange.

(2) Flow-through method – a process by which replacement ballast water is pumped into a ballast tank intended for the carriage of ballast water, allowing water to flow through overflow or other arrangements. For ships exchanging ballast water by the flow-through method, pumping through at least three times the volume of each filled ballast water tank at deep sea is to be required.

(3) Dilution method – a process by which replacement ballast water is filled through the top of the ballast tank intended for the carriage of ballast water with simultaneous discharge from the bottom at the same flow rate, passing through at least three times the volume of each filled ballast water tank and maintaining a constant level in the tank throughout the ballast exchange operation.

3.2.2 Exchange methods other than the above three ones are to be used only after evaluation and acceptance by IMO.

3.3 Safety considerations

3.3.1 Each method of ballast water exchange has particular safety aspects associated with it, and the following considerations are to be addressed when selecting a method to be used on a particular ship:

(1) avoidance of over and under-pressurization of ballast tanks;

(2) free surface effects on stability and sloshing loads in tanks that may be slack at any one time;

(3) maintaining adequate intact stability in accordance with an approved trim and stability booklet;

(4) complying with permissible shear forces and bending moments in seagoing conditions as required in an approved loading manual;

(5) torsional forces;

(6) forward and aft draughts and trim, with particular reference to bridge visibility, propeller immersion and minimum forward draft;

(7) wave-induced hull vibrations when performing ballast water exchange;

(8) watertight and weathertight closures (e.g. manholes) which may have to be opened during ballast exchange must be re-secured;

(9) maximum pumping/flow rates – to ensure the tank is not subjected to a pressure greater than that for which it has been designed;

(10) internal transfers of ballast;

(11) admissible weather conditions;

(12) weather routeing in areas seasonably affected by cyclones, typhoons, hurricanes, or heavy icing conditions;

(13) documented records of ballasting and/or de-ballasting and/or internal transfers of ballast;

(14) contingency procedures for situations which may affect ballast water exchange at sea, including deteriorating weather conditions, pump failure and loss of power;

(15) time to complete the ballast water exchange for each tank or an appropriate sequence thereof;

(16) continual monitoring of the ballast water operation; monitoring is to include pumps, levels in tanks, line and pump pressures, stability and stresses;

(17) a list of circumstances in which ballast water exchange is not to be undertaken. These circumstances may result from critical situations of an exceptional nature or *force majeure* due to stress of weather, known equipment failures or defects, or any other circumstances in which human life or safety of the ship

is threatened;

(18) ballast water exchange at sea is to be avoided in freezing weather conditions. However, when it is deemed absolutely necessary, particular attention is to be paid to the hazards associated with the freezing of overboard discharge arrangements, air pipes, ballast system valves together with their means of control, and the buildup of ice on deck; and

(19) personnel safety, including precautions which may be required when personnel are required to work on deck at night, in heavy weather, when ballast water overflows the deck, and in freezing conditions. These concerns may be related to the risks to the personnel of falling and injury, due to the slippery wet surface of the deck plate, when water is overflowing on deck, and to the direct contact with the ballast water, in terms of occupational health and safety.

3.3.2 After evaluation of safety considerations specific to a ship, procedures, suggestions and information appropriate to safety considerations specified in 3.3.1 are to be included in BWMP, based on the identified method of ballast water exchange and ship type.

3.4 Safety evaluation

3.4.1 When identifying the ballast water exchange method(s) for a particular ship, an evaluation is to be made which should include:

(1) the safety margins for stability and strength contained in allowable seagoing conditions, as specified in the approved trim and stability booklet and the loading manual relevant to individual types of ships. Account is also to be taken of the envisaged ballast water exchange method or methods to be used;

(2) the ballast pumping and piping system taking account of the quantity of ballast pumps and their capacities, size and arrangements of ballast water tanks; and

(3) the availability and capacity of tank vents and overflow arrangements, for the flow-through method, the availability and capacity of tank overflow points, prevention of under and over pressurization of the ballast tanks.

3.4.2 Safety evaluation is to be carried out in accordance with paragraphs 3.5, 3.6 and 3.7 of the Guidelines.

3.5 Sequential method

3.5.1 A proper ballast water exchange sequence is to be established.

3.5.2 The following are to be taken into account in safety evaluation of steps of sequence of ballast water exchange:

(1) intact stability;

(2) longitudinal strength;

(3) propeller immersion;

(4) bridge visibility.

3.5.3 Criteria for safety evaluation

(1) Intact stability

Applicable stability criteria in loading manual (or calculations of stability, shear forces and bending moments in various loading conditions) are to be satisfied.

(2) Longitudinal strength

Permissible values specified in loading manual (or calculations of stability, shear forces and bending moments in various loading conditions) are to be satisfied.

(3) Propeller immersion

Propeller is to be fully immersed at minimum aft draft during each step of ballast water exchange.

(4) Bridge visibility

The length of the blind area outside of the bridge forward of bow is to be taken as two ship's lengths (overall length of the ship) or 500 meters, whichever is the less.

3.5.4 Check condition for safety evaluation

During safety evaluation, the following loading conditions with worst stability and/or strength are to be chosen for calculation in accordance with typical conditions in the loading manual:

(1) mid-voyage full load condition (with 50% consumables);

(2) mid-voyage ballast condition (with 50% consumables).

For container ships, the mid-voyage full load condition is to be considered and the loading condition with the rated maximum/near maximum number of containers is to be chosen as far as possible; for bulk carriers, the mid-voyage ballast condition (including heavy ballast) is to be considered; and for tankers, the mid-voyage ballast condition is to be considered.

3.6 Flow-through method

3.6.1 The method is applicable to but not limited to the following compartments:

(1) cargo holds intended for carriage of ballast water in heavy ballast condition;

(2) topside tanks in light ballast condition;

(3) fore and aft peak tanks.

3.6.2 The following are to be included in safety evaluation of flow-through method:

(1) ballast pumping and piping system, taking account of the quantity of ballast pumps, their capacities and pressure heads;

(2) the availability and capacity of tank overflow points for the flow-through method, and requirements for crew training;

(3) prevention of under and over pressurization of ballast tanks during ballast water exchange.

3.6.3 The following considerations are to be taken into account in the evaluation and corresponding operational procedures, suggestions and guidance are to be included in BWMP:

(1) maximum pumping/flow rates to ensure the tank is not subjected to a pressure greater than that for which it has been designed;

(2) all tanks are subjected to ballast water exchange three times the full volume of the tank capacity when conducting ballast water exchange simultaneously in more than one tanks to reduce overflow resistance and avoid over high pressure in ballast tanks;

(3) rate of ballast water exchange is taken into account in arrangement of ballast piping and overflow ports;

(4) admissible weather conditions;

(5) time to complete the ballast water exchange for each tank or an appropriate sequence thereof;

(6) continual monitoring of ballast water operation, including pumps, levels in tanks, line and pump pressure, etc.;

(7) watertight and weathertight closures (e.g. manholes) which may have to be opened during ballast exchange must be re-secured;

(8) hull vibration induced by ballast water exchange;

(9) personnel safety, including precautions which may be required when personnel are required to work on deck at night, in heavy weather, when ballast water overflows the deck and in freezing conditions.

3.6.4 System design requirements

3.6.4.1 For existing ships:

(1) For systems in need of modification, relevant schemes and drawings are to be included in the safety evaluation report for approval.

(2) The ballast tank is not to be subjected to a pressure greater than that for which it has been designed when conducting ballast water exchange by flow-through method at maximum flow rate (or maximum permissible flow rate), and this is to be verified by piping resistance calculation or onboard testing.

3.6.4.2 For newbuildings:

(1) The side discharge ports and uptake inlets for ballast water are to be far apart to prevent contamination of incoming ballast water.

(2) The internal arrangement of ballast tanks, including that of ballast water uptake inlets and discharge ports, is to achieve complete exchange of ballast water and facilitate removal of sediments.

(3) The area of the air pipe in ballast tank is to be not less than 1.25 times that of the filling pipe. Where a sampling pipe is installed within the air pipe, the area of the sampling pipe is to be deducted.

(4) Generally, the area of the ballast water overflow pipe is to be not less than that of the air pipe as required above.

(5) The efficiency of ballast water exchange is to be improved by laying, where necessary, additional piping in double bottom ballast tanks and fore and aft peak tanks where stagnation of ballast water is significant.

(6) Unless specially approved, an air pipe head fitted with automatic closing device is not to be used for ballast water overflow. Overflowing of ballast water on deck is to be avoided.

3.6.5 Calculation of resistance to overflow in ballast tank

(1) By flow-through method, which ensures the tank is full with water, concerns such as excessive bending moments, shearing forces and local stresses are avoided. However, ballast tank and piping may still be overpressurized as a result of the presence of resistance drop of overflow pipes, thus damaging hull structure. Overflow resistance calculation may be employed to ensure the tank pressure will not be greater than its design pressure when conducting ballast water exchange by flow-through method at maximum permissible exchange rate, as follows:

$$P_{cal} = \rho g h_p + \triangle P_{dyn} < P_{design}$$

where: P_{design}: design pressure of the tank, determined by design value of hull structure, in MPa;

ρ : density of seawater, in kg/m^3;

h_p : height of top of the overflow pipe above tank bottom, in m;

g : gravity acceleration, in m/s^2;

ΔP_{dyn} : calculated overflow resistance of overflow pipes, in MPa.

(2) In case design pressure specific to a tank is not available, reference may be made to formulas included in rules in relation to hull structural calculation. Where tank is loaded up to the air pipe or overflow pipe, the static pressure P_{design} at upper part of the tank is determined by:

$$P_{design} = \rho g h_{air} + P_{drop} \text{ kN/m}^2$$

where: h_{air} : height of top of the air pipe above tank bottom, in m;

P_{drop} : air pipe overflow resistance considered in structural design, in MPa.

Therefore, the following is to be satisfied to avoid presence of overpressure in ballast tank:

$$\triangle P_{dyn} < P_{drop} + \rho g (h_{air} - h_p)$$

For ballast water exchange using flow-through method, the air pipe resistance drop P_{drop} may be taken as 25 kN/m^2 in structural design. Where longer pipes or bending connections or valves are used, greater values of drop in pipe pressure may be taken, provided that relevant calculations are presented.

(3) Overflow pipe resistance may be calculated by using the formulas and resistance coefficient data acceptable to ISC or recognized internationally, e.g. Hazen-Williams method, Darcy-Weisbach method or

Practical Manual for Ship Design (Machinery) etc.

(4) Ballast tank pressure relates mainly to arrangement of overflow pipes and flow rate during ballast water exchange. Maximum permissible overflow pipe flow rate or pressure drop curve related to overflow pipe flow rate may be given in hydraulic calculation, provided that pressure of ballast tank does not exceed permissible value.

(5) Since the actual capacity of ballast pumps may be greater than the rated one, their pumping rate is to be limited to be not more than that determined in overflow pipe resistance calculation, both for resistance calculation and in ballast exchange operation.

(6) Flow rate is to be considered independently for each tank when more than one tank is subjected simultaneously to ballast water exchange.

3.7 Dilution method

3.7.1 Dilution method has the advantage of flow-through method, requires separate ballast pumps for discharging and consequently will not lead to any overpressure in ballast tank. Therefore, the method is applicable to almost all tanks for ballast water exchange. Due to complicated modification of piping, however, the method is not recommended for the existing ships.

3.7.2 In safety evaluation of dilution method, the following are to be considered:

(1) ballast pumping and piping system, taking account of the quantity of ballast pumps, their capacities and pressure heads;

(2) ensuring consistent rate of pumping in and pumping out to avoid any other safety problems arising from change of pressure or liquid level in ballast tank during ballast water exchange.

3.7.3 The following factors are to be taken into account in evaluation, and corresponding operational procedure, suggestions and guidance are to be included in BWMP:

(1) ensuring consistent rate of pumping in and pumping out to avoid pressure occurring in ballast tank during ballast water exchange;

(2) ensuring all tanks are subjected to a ballast water exchange by three times the tank capacity when conducting ballast water exchange simultaneously in more than one tanks;

(3) efficiency of ballast water exchange is to be taken into account in arrangement of ballast piping and overflow ports;

(4) time to complete the ballast water exchange for each tank or an appropriate sequence thereof;

(5) continual monitoring of ballast water operation, including pumps, water levels in tanks, line and pump pressure etc.;

(6) hull vibration induced by ballast water exchange.

3.7.4 System design requirements

(1) For systems in need of modification, relevant schemes and drawings are to be included in the safety evaluation for approval.

(2) Consistent rate of ballast water pumping in and pumping out is to be ensured by fitting level gauging and monitoring devices, high and low level alarms.

(3) The side discharge ports and uptake inlets for ballast water are to be far apart to prevent contamination of incoming ballast water.

(4) The internal arrangement of ballast tanks, including that of ballast water uptake inlets and discharge ports, is to achieve complete exchange of ballast water and facilitate removal of sediments.

(5) The area of the air pipe in ballast tank is to be not less than 1.25 times that of the filling pipe. Where a sampling pipe is installed within the air pipe, the area of the sampling pipe is to be deducted.

(6) The efficiency of ballast water exchange is to be improved by laying, where necessary, additional piping in double bottom ballast tanks and fore and aft peak tanks where stagnation of ballast water is significant.
(7) Flow rate and time duration are to be considered independently for each tank when more than one tank are subjected simultaneously to ballast water exchange.

APPENDIX 1
EXAMPLE BALLAST WATER REPORTING FORM

Date of Submission(DD/MM/YY)_____ Time of Submission(24:00 GST) _____ AMENDED FORM: Yes□ No□

1. SHIP INFORMATION	2. VOYAGE INFORMATION	3. BALLAST WATER USAGE AND CAPACITY		
Ship Name:	Arrival Port:			
IMO Number:	Arrival Date(DD/MM/YYYY):	Total Ballast Water on Board:		
Owner:	Agent:	Volume:	Units	No. of Tanks and Holds in Ballast
Type:	Last Port: Country:		m^3	
GT:	Next Port: Country:	Total Ballast Water Capacity:		
Date of Construction(DD/MM/YYYY):	Next Port(2): Country:	Volume:	Units	Total No. of Ballast Tanks and Holds on Ship
Flag:	Next Port(3): Country:		m^3	

4. BALLAST WATER MANAGEMENT

Total No. Ballast Water Tanks to be discharged: _____

Of tanks to be discharged, how many: underwent exchange: _____ were treated using a Ballast Water Management System: _____

Please specify Ballast Water Management System used, if any (Manufacturer, Model): _____

If no Ballast Water Management conducted, state reason why not: _____

Approved Ballast Water Management plan on board? YES□ NO□ Management plan implemented? YES□ NO□

Ballast water record book on board? YES□ NO□

Does ship carry an International Ballast Water Management Certificate: YES□ NO□

Date of issue (DD/MM/YYYY): _____ Expiry Date (DD/MM/YYYY): _____

Authority that issued Certificate: _____ Place of issue: _____

Date Required to Meet Regulation D-2 (DD/MM/YYYY): _____

5. **BALLAST WATER HISTORY: RECORD ALL TANKS/ HOLDS containing water taken on board to control trim, list, draught, stability or stresses of the ship, regardless of ballast water discharge intentions, on page 2. Note: BW Sources are the last BW uptakes prior to any Ballast Water Management practices.**

6. **RESPONSIBLE OFFICER'S NAME AND TITLE**:

Ship Name:_____ IMO Number:_____ Arrival Date: _____

Tanks/Holds List multiple sources/tanks separately	TANK CAPACITY	BW SOURCES		CURRENT VOLUME (m^3)	BW MANAGEMENT PRACTICES							PROPOSED BW DISCHARGE			
		DATE DD/MM/ YY	PORT or LAT. LONG.		DATE DD/MM/ YY	Start Point* Lat. & Long.	End Point* Lat. & Long.	VOLUME Used* (m^3)	% Exch*	METHOD (DM/SM/FM, T)	SALINITY (PSU)	DATE DD/MM/ YY	PORT or LAT. LONG.	VOLUME (m^3)	SALINITY (PSU)

Ballast Water Tank Codes: Forepeak = FP, Aftpeak = AP, Double Bottom = DB, Wing = WT, Topside = TS, Cargo Hold = CH, Other = O.

Methods: DM= Dilution, SM=Sequential, FM= Flow Through , T=Treatment.

Complete columns with (*) only if exchange was conducted.

Appendix 2 STANDARD FORMAT FOR THE BALLAST WATER MANAGEMENT PLAN[①]

PREAMBLE

The ballast water management plan should contain the information required by Regulation B-1 of the Convention.

INTRODUCTION

At the beginning of each plan, wording should be included to reflect the intent of the following text.

1 This Plan is written in accordance with the requirements of Regulation B-1 of the International Convention for the Control and Management of Ships' Ballast Water and Sediments, 2004 (the Convention) and the associated Guidelines.

2 The purpose of the Plan is to meet the requirements for the control and management of ship's ballast water and sediments in accordance with the Guidelines for Ballast Water Management and the Development of Ballast Water Management Plans (G4) (MEPC.127(53), as amended by MEPC.306(73)). It provides standard operational guidance for the planning and management of ships' ballast water and sediments and describes safe procedures to be followed.

3 This Plan has been approved by the Administration and no alteration or revision shall be made to any part of it without the prior approval of the Administration.

4 This Plan may be inspected on request by an authorized authority.

SHIP PARTICULARS

At least the following details should be included:

Ships' name;

Flag;

Port of registry;

Gross Tonnage;

IMO number[②];

Length (BP);

Beam;

International call sign;

Deepest ballast drafts (normal and heavy weather);

Total ballast capacity of the ship in cubic meters(m^3) and other units if applicable to the ship;

A brief description of the main ballast water management method(s) used on the ship; and

Identification (rank) of the appointed ballast water management officer.

INDEX

An index of sections should be included to reference the content of the Plan.

PURPOSE

A brief introduction should be contained for the ship's crew, explaining the need for ballast water

① Refer to resolution MEPC.127(53), as amended by MEPC.306(73).

② In accordance with resolution A.1117(30), IMO Ship Identification Number Scheme.

management, and the importance of accurate record keeping.

PLANS/DRAWINGS OF THE BALLAST SYSTEM

Plans or drawings of the ballast system for example:

1) ballast tank arrangement;
2) ballast capacity plan;
3) a ballast water piping and pumping arrangement, including air pipes and sounding arrangements;
4) ballast water pump capacities;
5) the ballast water management system used onboard, with references to detailed operational and maintenance manuals held on board;
6) installed ballast water treatment systems; and
7) a plan and profile of the ship, or a schematic drawing of the ballast arrangement.

DESCRIPTION OF THE BALLAST SYSTEM

A description of the ballast system.

BALLAST WATER SAMPLING POINTS

Lists and/or diagrams indicating the location of sampling and access points in pipelines and ballast water tanks.

A note that sampling of ballast water is primarily a matter for the authorized authority, and there is unlikely to be any need for crew members to take samples except at the express request, and under the supervision, of the authorized authority.

OPERATION OF THE BALLAST WATER MANAGEMENT SYSTEM

A detailed description of the operation of the Ballast Water Management System(s) used on board. Information on general ballast water management precautionary practices.

SAFETY PROCEDURES FOR THE SHIP AND THE CREW

Details of specific safety aspects of the ballast water management system used.

OPERATIONAL OR SAFETY RESTRICTIONS

Details of specific operational or safety restrictions including those associated with the management system which affects the ship and/or the crew including reference to procedures for safe tank entry.

DESCRIPTION OF THE METHOD(S) USED ON BOARD FOR BALLAST WATER MANAGEMENT AND SEDIMENT CONTROL

Details of the method(s) used on board for the management of ballast and for sediment control including step-by-step operational procedures.

PROCEDURES FOR THE DISPOSAL OF SEDIMENTS

Procedures for the disposal of sediments at sea and to shore.

METHODS OF COMMUNICATION

Details of the procedures for coordinating the discharge of ballast in waters of a coastal State.

DUTIES OF THE BALLAST WATER MANAGEMENT OFFICER

Outline of the duties of the designated officer.

RECORDING REQUIREMENTS

Details of the record-keeping requirements of the Convention.

CREW TRAINING AND FAMILIARIZATION

Information on the provision of crew training and familiarization.

EXEMPTIONS

Details of any exemptions granted to the ship under Regulation A-4.

APPROVING AUTHORITY

Details and stamp of approving authority.

CONTINGENCY MEASURES

Contingency measures undertaken on a case-by-case basis after a determination that ballast water discharged from a ship is not compliant.

APPENDIX 3
FORM OF BALLAST WATER RECORD BOOK

INTERNATIONAL CONVENTION FOR THE CONTROL ANDMANAGEMENT OF SHIPS' BALLAST WATER AND SEDIMENTS

Period From: …… To: ……

Name of Ship .....

IMO number .....

Gross tonnage .....

Flag .....

Total Ballast Water capacity (in m^3) .....

The ship is provided with a Ballast Water Management plan □

Diagram of ship indicating ballast tanks:

1 Introduction

In accordance with regulation B-2 of the Annex to the International Convention for the Control and Management of Ships' Ballast Water and Sediments, a record is to be kept of each Ballast Water operation. This includes discharges at sea and to reception facilities.

2 Ballast Water and Ballast Water Management

"Ballast Water" means water with its suspended matter taken on board a ship to control trim, list, draught, stability, or stresses of a ship. Management of Ballast Water shall be in accordance with an approved Ballast Water Management plan and taking into account Guidelines3 developed by the International Maritime Organization.①

3 Entries in the Ballast Water Record Book

Entries in the Ballast Water record book shall be made on each of the following occasions:

3.1 When Ballast Water is taken on board:

.1 Date, time and location port or facility of uptake (port or lat/long), depth if outside port

.2 Estimated volume of uptake in m^3

.3 Signature of the officer in charge of the operation.

3.2 Whenever Ballast Water is circulated or treated for Ballast Water Management purposes:

.1 Date and time of operation

.2 Estimated volume circulated or treated (in m^3)

① Refer to the Guidelines for Ballast Water Management and the Development of Ballast Water Management Plans (G4) (MEPC.127(53), as amended by MEPC.306(73)).

.3 Whether conducted in accordance with the Ballast Water Management plan

.4 Signature of the officer in charge of the operation.

3.3 When Ballast Water is discharged into the sea:

.1 Date, time and location port or facility of discharge (port or lat/long)

.2 Estimated volume discharged in m^3 plus remaining volume in m^3

.3 Whether approved Ballast Water Management plan had been implemented prior to discharge

.4 Signature of the officer in charge of the operation.

3.4 When Ballast Water is discharged to a reception facility:

.1 Date, time, and location of uptake

.2 Date, time, and location of discharge

.3 Port or facility

.4 Estimated volume discharged or taken up, in m^3

.5 Whether approved Ballast Water Management plan had been implemented prior to discharge

.6 Signature of officer in charge of the operation.

3.5 Accidental or other exceptional uptake or discharges of Ballast Water:

.1 Date and time of occurrence

.2 Port or position of the ship at time of occurrence

.3 Estimated volume of Ballast Water discharged

.4 Circumstances of uptake, discharge, escape or loss, the reason therefore and general remarks

.5 Whether approved Ballast Water Management plan had been implemented prior to discharge

.6 Signature of officer in charge of the operation.

3.6 Additional operational procedure and general remarks.

4 Volume of Ballast Water

The volume of Ballast Water onboard should be estimated in m^3. The Ballast Water record book contains many references to estimated volume of Ballast Water. It is recognized that the accuracy of estimating volumes of ballast is left to interpretation.

RECORD OF BALLAST WATER OPERATIONS

SAMPLE BALLAST WATER RECORD BOOK PAGE

Name of Ship: .....

Distinctive number or letters .....

Date	Item (number)	Record of operations/signature of officers in charge

Signature of master .....