Nō te rere moana Aotearoa
MARITIME NEWZEALAND

Advisory Circular

ISSUE NO. 300-1, MAY 2016

Part 300 – Ballast Water Management

Contents

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1. General

1.1 Purpose of advisory circulars

Maritime New Zealand (MNZ) advisory circulars are designed to give assistance and explanations about the standards and requirements set out in the maritime rules. However, the notes in advisory circulars should not be treated as a substitute for the rules themselves, which are the law.

If an advisory circular sets out how a rule can be satisfied, then compliance with that advice ensures compliance with the rule. Other methods of complying with the rule may be possible; however MNZ would first need to be satisfied that those alternative methods were of an equivalent standard to the advice in the advisory circular. The advisory circular would then be amended to include those equivalents.

This advisory circular (AC) 300-1 supports Maritime Rules Part 300 and when a number reference such as 300.5 is used it relates to a specific rule within Part 300.

1.2 Application of Rule Part 300

It is important to note that Maritime Rule Part 300 applies to New Zealand ships and foreign ships in New Zealand jurisdiction (including FSU's, FPSO's and floating platforms) that are designed or constructed to carry ballast water on an international voyage.

Part 300 does not apply to warships or permanent ballast carried on ships.

1.3 Purpose of Part 300

Part 300 gives effect to the provisions of the International Convention for the Control and Management of Ships' Ballast Water and Sediments 2004.

2. Guidelines for ballast water management (G4 Part I – MEPC.127(53))

2.1.1 Introduction

Ballast water is essential to control trim, list, draught, stability, or stresses of the ship. However, ballast water may contain aquatic organisms or pathogens which, if introduced into the sea including estuaries, or into fresh water courses, may create hazards to the environment, human health, property or resources, impair biological diversity or interfere with other legitimate uses of such areas.

The selection of appropriate methods of ballast water management should take into account the need to ensure that Ballast Water Management practices used to comply with this Part do not cause greater harm than they prevent to the environment, human health, property or resources of any States and the safety of ships.

2.1.2 Ship operational procedures

PRECAUTIONARY PRACTISES

Avoiding unnecessary discharge of ballast water

If it is necessary to take on and discharge ballast water in the same port to facilitate safe cargo operations, care should be taken to avoid unnecessary discharge of ballast water that has been taken up in another port.

Managed ballast water which is mixed with unmanaged ballast water is no longer in compliance with rule 300.100.

Minimizing the uptake of harmful aquatic organisms, pathogens and sediments

When loading ballast, every effort should be made to avoid the uptake of potentially harmful aquatic organisms, pathogens, and sediment that may contain such organisms. The uptake of ballast water should be minimized or, where practicable, avoided in areas and situations such as:

- in areas identified by the port State in connection with advice provided by ports;
- in darkness when organisms may rise up in the water column;
- in very shallow water;
- where propellers may stir up sediment; or
- where dredging is or recently has been carried out.

BALLAST WATER MANAGEMENT OPTIONS

Ballast Water Exchange

Ballast water exchange is to be conducted in accordance with subpart F and take into account this circular.

The voyage should be planned taking into account when ballast water exchange in accordance with subpart F can be carried out.

Because of the possibility that partially exchange may encourage re-growth of organisms, ballast water exchange should only be commenced in any tank if there is sufficient time to complete the exchange to comply with the standard in rule 300.120 and the ship can comply with the distance from land and minimum water depth criteria in rule 300.122. As many complete tanks should be exchanged to the standard in rule 300.120 as the time

allows, if for any tank the standard in rule 300.120 cannot be fully met the exchange should not be commenced for that tank.

If ballast water exchange is not undertaken for the reasons in rule 300.122(2), i.e. if the master reasonably decides that such exchange would threaten the safety or stability of the ship, its crew, or its passengers because of adverse weather, ship design or stress, equipment failure, or any other extraordinary condition, then details of the reasons ballast water exchange was not undertaken are to be recorded in the Ballast Water Record Book.

A port State may designate areas in which exchange may be conducted taking into account the Guidelines on designation of areas for ballast water exchange. Designated areas should only be used for those ballast water tanks that are intended to be discharged in the port of that State and that could not be exchanged in accordance with rule 300.120.

Ballast Water Management Systems

Ballast Water Management Systems installed for compliance with rule 300.140 are to be approved in accordance with rule 300.101 for New Zealand registered ships and for foreign registered ships to be approved by the Administration of the flag state. Such systems are to be operated in accordance with the system design criteria and the manufacture's operational and maintenance instructions. The use of such systems should be detailed in the ship's Ballast Water Management Plan. All failures and malfunctions of the system are to be recorded in the Ballast Water Record Book.

Discharge to ballast water reception facilities

If ballast water reception facilities provided by a port State are utilized, rule 300.103(2) applies.

Prototype ballast water treatment technologies

Prototype ballast water treatment technologies should be used within a programme approved by the Director in accordance with subpart H.

SEDIMENT MANAGEMENT

Rule 300.104 requires that all ships shall remove and dispose of sediments from spaces designated to carry ballast water in accordance with the ballast water management plan.

All practical steps should be taken during ballast uptake to avoid sediment accumulation, however, it is recognized that sediment will be taken on board and will settle on tank surfaces. When sediment has accumulated, consideration should be given to flushing tank bottoms and other surfaces when in suitable areas, i.e. areas complying with the minimum depth and distance described by rule 300.122.

The volume of sediment in a ballast tank should be monitored on a regular basis.

Sediment in ballast tanks should be removed in a timely basis in accordance with the Ballast Water Management Plan and as found necessary. The frequency and timing of removal will depend on factors such as sediment build up, ship's trading pattern, availability of reception facilities, work load of the ship' s personnel and safety considerations.

Removal of sediment from ballast tanks should preferably be undertaken under controlled conditions in port, at a repair facility or in dry dock. The removed sediment should preferably be disposed of in a sediment reception facility if available, reasonable and practicable.

When sediment is removed from the ship' s ballast tanks and is to be disposed of by that ship at sea, such disposal should only take place in areas outside 200 nm from land and in water depths of over 200 m.

Part 300 Appendix A (footnote) requires that ships constructed in or after 2009 should, without compromising safety or operational efficiency, be designed and constructed with a view to minimize the uptake and undesirable entrapment of sediments, facilitate removal of sediments, and provide safe access to allow for sediment removal and sampling, taking into account the Guidelines for sediment control on ships (G12). This also applies to ships constructed prior to 2009, to the extent practicable.

2.1.3 Recording procedures

Procedures for ships

To facilitate the administration of ballast water management and treatment procedures on board each ship, a responsible officer is to be designated in accordance with rule 300.80 to ensure the maintenance of appropriate records and to ensure that ballast water management and/or treatment procedures are followed and recorded.

When carrying out any ballast water operation the details are to be recorded in the Ballast Water Record Book together with any relevant exemptions.

Where a port State requires information on ships ballast operations, relevant documentation, which takes account of the information requirements of the Convention, should be made available to the port State.

Procedures for port States

Port States should provide ships with details of their requirements concerning ballast water management including:

- the location and terms of use of areas designated for ballast water exchange under Regulation B-4.2 of the Convention;
- any additional measures determined under Regulation C-1 of the Convention;
- warnings concerning ballast uptake and any other port contingency arrangements in the event of emergency situations; and
- the availability, location, capacities of reception facilities that are provided for the environmentally safe disposal of ballast water and/or sediments, under Article 5 and Regulation B-3.6.

To assist ships in applying the precautionary practices described above, port States are required to endeavour to notify mariners of area(s), where ships should not uptake Ballast Water due to known conditions. Similar notification should be given for areas where the uptake of ballast water should be minimized, such as:

- areas with outbreaks, infestations or known populations of harmful organisms and pathogens;
- areas with current phytoplankton blooms (algal blooms, such as red tides);
- nearby sewage outfalls;
- areas where a tidal stream is known to be the more turbid;
- areas where tidal flushing is known to be poor;
- nearby dredging operations; and
- nearby or in sensitive or estuarine sea areas.

2.1.4 Training and education

Rule 300.80(3)(b) requires 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.

Training for ships' masters and crews as appropriate should include instructions on the requirements of the Convention, the ballast water and sediment management procedures and the Ballast Water Record Book particularly having regard to matters of ship safety and maintenance of records in accordance with the information contained in these Guidelines.

The Ballast Water Management Plan should include training and education on ballast water management practices and the systems and procedures used on board the ship.

3. Guidelines for the development of ballast water management plans (G4 Part II – MEPC.127(53))

3.1.1 Introduction

These Guidelines have been developed to assist with the preparation of a ship's Ballast Water Management Plan (hereafter referred to as the "Plan"). The Plan must be approved by the Administration of the flag state (for NZ ships this is the Director of Maritime New Zealand) or by a recognised organization holding the appropriate delegated powers.

These Guidelines are intended to provide a basis for the preparation of the Plans for individual ships. The broad spectrum of ships for which Plans are required makes it impractical to provide specific guidelines for each ship type. For a Plan to be effective and to comply with rule 300.80, it must be carefully tailored to the particular ship for which it is intended. Properly used, the Guidelines will ensure that all appropriate issues that may be applicable to a particular ship are considered in developing the Plan.

The issues that may require consideration include but are not limited to: type and size of ship, volume of ballast carried and total capacity of tanks used for ballast, ballast pumping capacity, ship and crew safety issues, voyage type and length, the ship' s typical operational requirements, and ballast water management techniques used on board.

3.1.2 Concept of the Plan

The Plan is required to be onboard the ship and available to guide personnel in safe operation of the Ballast Water Management system employed on a particular ship. Effective planning ensures that the necessary actions are taken in a structured, logical, and safe manner.

For the Plan to accomplish its purpose, it must be:

- realistic, practical, and easy to use;
- understood by ship' s personnel engaged in ballast water management, both on board and ashore;
- evaluated, reviewed, and updated as necessary; and
- consistent with the operational ballasting requirements of the ship.

The Plan is intended to be a simple document. Inclusion of extensive background information on the ship, its structure, etc., should be avoided, as this is generally available elsewhere. If such information is relevant, it should be kept in annexes, or an existing document or manual reference should be made to the location of the information.

The Plan is a document to be used on board by the ship's personnel engaged in ballast water management. The Plan must therefore be available in a working language of the ship's personnel. A change in the personnel and or the, working language or would require the issuance of the Plan in the new language(s).

The Plan should be readily available for inspection by officers authorized by a Party to the Convention.

3.1.3 Exemptions

Details of any relevant exemptions should be retained with the Plan.

Any exemption granted is to be recorded in the Ballast Water Record Book.

3.1.4 Review of the Plan

Regular review of the Plan by the owner, operator, or master should be conducted to ensure that the information contained is accurate and updated. A feedback system should be employed which will allow quick capture of changing information and incorporation of it into the Plan.

Changes to the provisions of this Plan will need Administration approval.

3.1.5 Mandatory provisions

Rule 300.80 provides that the Plan shall be specific to each ship and shall at least:

- detail safety procedures for the ship and the crew associated with Ballast Water Management as required by Part 300;
- provide a detailed description of the actions to be taken to implement the Ballast Water Management practices required by Part 300;
- detail the procedures for the disposal of sediments at sea and to shore;
- include the procedures for co-ordinating shipboard Ballast Water Management that involves discharge to the sea with the authorities of the State into whose waters such discharge will take place;
- designates the officer on board in charge of ensuring that the Plan is properly implemented;
- contain the reporting requirements for ships provided for under the 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 should be provided.

The Ballast Water Management Plan should give guidance on the ballast handling procedures to be followed, including:

- uptake of ballast water;
- step-by-step procedures and sequences for the Ballast Water Management System used; and
- any operational or safety restrictions including those associated with the Ballast Water Management System used. This will also assist ship's personnel when responding to enquiries from inspection officers authorized by a Party.

Safety aspects of the Ballast Water Management system used should include, as applicable, guidance on:

- stability to be maintained at all times to values not less than those recommended by the International Maritime Organization (or required by the national laws of the ship's flag state);
- approved longitudinal stress and, where applicable, torsional stress values are to be maintained within permitted values;
- transfer or exchange of ballast that can generate significant structural loads by sloshing action in partially filled tanks. If these operations include partially-filled tanks, consideration should be given to carrying out the operation in favourable sea and swell conditions such that the risk of structural damage is minimized;
- wave-induced hull vibrations when carrying out ballast water exchange;
- forward and aft draughts and trim, with particular reference to bridge visibility, slamming and minimum forward draft;
- the effects of any potential hazards and occupational health that may affect ship' s personnel shall also be identified together with any safety precautions that need to be taken; and

- the possible effects of tank over pressurization.

If a ship is able to complete at least 95 per cent volumatic exchange in less than three pumped volumes, documentation indicating that this ballast water exchange process has been approved under rule 300.121 should be provided in the Plan.

The Plan should also include procedures for the disposal of sediments and in particular:

- on the sediment removal or reduction at sea, and when cleaning of the ballast tanks to remove sediments;
- regarding the safety consideration to be taken if tank entry is required to remove sediments; and
- regarding the use of port reception facilities for sediments.

The Plan should clearly identify the officer in charge of ballast water management and outline his/her duties which should include:

- ensuring that the Ballast Water Management performed follows the procedures in the Plan;
- ensuring that the Ballast Water Record Book and any other necessary documentation are maintained; and
- being available to assist the inspection officers authorized by a Party for any sampling that may need to be undertaken.

The Plan should contain guidance on the recording requirements according to ship's Ballast Water Record Book provided for under this Convention including details of exemptions granted to the ship.

In addition to the above, the Plan should include the following:

- A foreword which should provide the ship's crew with explanations on the need for ballast water management and for record keeping. The foreword should include a statement that, "This Plan must be kept available for inspection on request by an authorized authority".
- Ship particulars including at least:
  - ships' name, flag, port of registry, Gross Tonnage, IMO number, length (BP), beam, international call sign; deepest ballast drafts (normal and heavy weather);
  - the total ballast capacity of the ship in cubic meters 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 officer in charge for implementing the Plan.
- Information on Ballast Water Management System used on board, including:
  - ballast tank arrangement;
  - ballast capacity plan;
  - a ballast water piping and pumping arrangement, including air pipes and sounding arrangements;
  - ballast water pump capacities;
  - the Ballast Water Management System used on board, with references to operational and maintenance manuals held on board;
  - installed ballast water treatment systems; and
  - a plan and profile of the ship, or a schematic drawing of the ballast arrangement.

- Information on the ballast water sampling points, including:
  - A list or diagrams indicating the location of sampling and access points in pipelines and ballast water tanks, to enable crew members to assist the authorized officers of a Party that have reason to obtain samples.
  - This section should make clear that sampling of ballast water is primarily a matter for the authorized inspection officers, 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 inspection officers.
  - The authorized inspection officers should be advised of all safety procedures to be observed when entering enclosed spaces.

- Provisions for crew training and familiarization, including:
  - requirements of a general nature regarding Ballast Water Management;
  - training and information on ballast water management practices;
  - ballast water exchange;
  - ballast water treatment systems;
  - general safety considerations;
  - the Ballast Water Record Book and maintenance of records;
  - the operation and maintenance of installed ballast water treatment systems;
  - safety aspects associated with the particular systems and procedures used onboard the ship which affect the safety or human health of crew and passengers and/or the safety of the ship;
  - precautions for entering tanks for sediment removal;
  - procedures for the safe handling and packaging of sediment; and
  - storage of sediment.

3.1.6 Non-mandatory information

In addition to the provisions required by Part 300, the owner/operator may include in the Plan, as appendices, additional information such as: provision of additional diagrams and drawings, shipboard equipment and reference materials.

Non-mandatory information may also include manufactures manuals (either as extracts or complete) or reference to the location on board of such manuals and other relevant material.

3.1.7 Standard format for the ballast water management plan

PREAMBLE

The ballast water management plan should contain the information required by rule 300.80.

For guidance in preparing the plan the following information is to be included. The plan should be specific to each ship.

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 resolution MEPC MEPC.127(53) (The Guidelines). 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.

Note: The Plan is to be written in the working language of the crew, if the text is not in English the plan is to include a translation into English.

SHIP PARTICULARS

At least the following details should be included:

- Ships' name;
- Flag;
- Port of registry;
- Gross Tonnage;
- IMO number;
- Length (BP);
- Beam;
- International call sign;
- Deepest ballast drafts (normal and heavy weather);
- Total ballast capacity of the ship in cubic meters 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

Should contain a brief introduction for the ship's crew, explaining the need for ballast water management, and the importance of accurate record keeping.

PLANS/DRAWINGS OF THE BALLAST SYSTEM

Plans or drawings of the ballast system for example:

- ballast tank arrangement;
- ballast capacity plan;
- a ballast water piping and pumping arrangement, including air pipes and sounding arrangements;
- ballast water pump capacities;
- the ballast water management system used onboard, with references to detailed operational and maintenance manuals held on board;
- installed ballast water treatment systems; and

- 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 co-ordinating 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 relevant exemptions granted to the ship.

APPROVING AUTHORITY

Details and stamp of approving authority.

4. Guidelines for ballast water exchange (G6 – MEPC.124 (53))

4.1.1 Introduction

The purpose of these Guidelines is to provide shipowners and operators with general guidance on the development of ship specific procedures for conducting ballast water exchange. Whenever possible ship owner and operators should enlist the assistance of qualified experts in tailoring ballast exchange practices for various conditions of weather, cargo and stability. The application of processes and procedures concerning ballast water management are at the core of the solution to prevent, minimize and ultimately eliminate the introduction of harmful aquatic organisms and pathogens. Ballast water exchange offers a means, when used in conjunction with good ballast water management practices, to assist in achieving this solution.

Ballast water exchange introduces a number of safety issues, which affect both the ship and its crew. These Guidelines are intended to provide guidance on the safety and operational aspects of ballast water exchange at sea.

Given that there are different types of ships, which may be required to undertake ballast water exchange at sea, it is impractical to provide specific guidelines for each ship type. Shipowners are cautioned that they should consider the many variables that apply to their ships. Some of these variables include type and size of ship, ballast tank configurations and associated pumping systems, trading routes and associated weather conditions, port State requirements and manning.

4.1.2 Responsibilities

Shipowners and operators should ensure, prior to undertaking ballast water exchange, that all the safety aspects associated with the ballast water exchange method or methods used onboard have been considered 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 should be undertaken at regular intervals.

The Ballast Water Management Plan is to include the duties of key shipboard control personnel undertaking ballast water exchange at sea. Such personnel should be fully conversant with the safety aspects of ballast water exchange and in particular the method of exchange used on board their ship and the particular safety aspects associated with the method used.

In accordance with rule 300.122(2) 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 shall not be required to comply with rule 300.122(1).

1. When a ship does not undertake ballast water exchange for the reasons stated in paragraph above, the reasons shall be entered in the Ballast Water Record Book.

2. Foreign port or coastal States 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)(MEPC.161(56).

4.1.3 Ballast water exchange requirements

Exchange of ballast water in deep ocean areas or open seas offers a means of limiting the probability that harmful aquatic organisms and pathogens be transferred in ships ballast water.

Rule subpart F requires that:

- ships performing ballast water exchange in accordance with this rule shall do so with an efficiency of at least 95 per cent volumetric exchange of ballast water; and
- for ships exchanging ballast water by the pumping-through method, pumping through three times the volume of each ballast water tank shall be considered to meet the standard described in paragraph 1. Pumping through less than three times the volume may be accepted provided the ship can demonstrate that at least 95 per cent volumetric exchange is met.

There are three methods of Ballast Water exchange which have been evaluated and accepted by the International Maritime Organization. The three methods are the sequential method, the flow-through method and the dilution method.

The flow-through method and the dilution method are considered as “pump through” methods.

The three accepted methods can be described as follows:

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.

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.

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 and maintaining a constant level in the tank throughout the ballast exchange operation.

4.1.4 Safety precautions associated with ballast water exchange

Three methods of carrying out ballast water exchange at sea each has particular safety aspects associated with it that should be considered when selecting the method(s) to be used on a particular ship.

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

- 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 should also be taken of the loading conditions and the envisaged ballast water exchange method or methods to be used;
- the ballast pumping and piping system taking account of the number of ballast pumps and their capacities, size and arrangements of ballast water tanks; and
- 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.

Particular account should be taken of the following:

- stability which is to be maintained at all times and not less than those values by national legislation;
- longitudinal stress, and where applicable torsional stress values, not to exceed permitted values with regard to prevailing sea conditions;
- exchange of ballast in tanks where significant structural loads may be generated by sloshing action in the partially filled tank to be carried out in favourable sea and swell conditions such that the risk of structural damage is minimized;
- wave-induced hull vibrations when carrying out ballast water exchange;
- limitations of the available methods of ballast water exchange in respect of sea and weather conditions;
- forward and aft draughts and trim, with particular reference to bridge visibility, slamming, propeller immersion and minimum forward draft; and
- additional workloads on the master and crew.

Having undertaken an evaluation for a particular ship and the exchange method or methods to be used, the ship should be provided with procedures, advice and information appropriate to the exchange method(s) identified and ship type in the Ballast Water Management Plan. The procedures, advice, and information in the Ballast Water Management Plan, may include but is not limited to the following:

- avoidance of over and under-pressurization of ballast tanks;
- free surface effects on stability and sloshing loads in tanks that may be slack at any one time;
- maintain adequate intact stability in accordance with an approved trim and stability booklet;
- permissible seagoing strength limits of shear forces and bending moments in accordance with an approved loading manual;
- torsional forces;
- forward and aft draughts and trim, with particular reference to bridge visibility, propeller immersion and minimum forward draft;
- wave-induced hull vibrations when performing ballast water exchange;
- watertight and weathertight closures (e.g. manholes) which may have to be opened during ballast exchange must be re-secured;
- maximum pumping/flow rates - to ensure the tank is not subjected to a pressure greater than that for which it has been designed;
- internal transfers of ballast;
- admissible weather conditions;
- weather routeing in areas seasonably affected by cyclones, typhoons, hurricanes, or heavy icing conditions;
- documented records of ballasting and/or de-ballasting and/or internal transfers of ballast;
- contingency procedures for situations which may affect ballast water exchange at sea, including deteriorating weather conditions, pump failure and loss of power;
- time to complete the ballast water exchange for each tank or an appropriate sequence thereof;
- continual monitoring of the ballast water operation; monitoring should include pumps, levels in tanks, line and pump pressures, stability and stresses;
- a list of circumstances in which ballast water exchange should not 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;

- ballast water exchange at sea should be avoided in freezing weather conditions. However, when it is deemed absolutely necessary, particular attention should 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 build up of ice on deck; and
- 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.

During ballast water exchange sequences there may be times when, for a transitory period, one or more of the following criteria cannot be fully met or are found to be difficult to maintain:

- bridge visibility standards (SOLAS V/22);
- propeller immersion; and
- minimum draft forward.

As the choice of acceptable ballast water exchange sequences is limited for most ships, it is not always practicable to dismiss from consideration those sequences where transitory noncompliance may occur. The practical alternative would be to accept such sequences provided an appropriate note is placed in the Ballast Water Management Plan to alert the ship's master. The note would advise the master of the nature of the transitory non-compliance, that additional planning may be required and that adequate precautions need to be taken when using such sequences.

In planning a ballast water exchange operation that includes sequences which involve periods when the criteria for propeller immersion, minimum draft and / or trim and bridge visibility cannot be met, the Master should assess:

- the duration(s) and time(s) during the operation that any of the criteria will not be met;
- the effect(s) on the navigational and manoeuvring capabilities of the ship; and
- the time to complete the operation.

A decision to proceed with the operation should only be taken when it is anticipated that:

- the ship will be in open water;
- the traffic density will be low;
- an enhanced navigational watch will be maintained including if necessary an additional look out forward with adequate communications with the navigation bridge;
- the manoeuvrability of the vessel will not be unduly impaired by the draft and trim and or propeller immersion during the transitory period; and
- the general weather and sea state conditions will be suitable and unlikely to deteriorate.

On oil tankers, segregated ballast and clean ballast may be discharged below the water line at sea by pumps if the ballast water exchange is performed under the provisions of rule 300.120, provided that the surface of the ballast water has been examined either visually or by other means immediately before the discharge to ensure that no contamination with oil has taken place.

4.1.5 Crew training and familiarization

Appropriate training for ships' masters and crews should include instructions on the safety issues associated with ballast water exchange based upon the information contained in these Guidelines. Instruction should be provided on the ships' Ballast Water Management Plan including the completion of required records.

Ships' officers and crew engaged in ballast water exchange at sea should be trained in and be familiar with the following as appropriate:

- the ship's ballast pumping and piping arrangements, positions of associated air and sounding pipes, positions of all compartment and tank suctions and pipelines connecting them to ship's ballast pumps and, in the case of use of the flow through method of ballast water exchange, the openings used for release of water from the top of the tank together with overboard discharge arrangements;
- the method of ensuring that sounding pipes are clear, and that air pipes and their non-return devices are in good order;
- the different times required to undertake the various ballast water exchange operations including the time to complete individual tanks;
- the method(s) in use for ballast water exchange at sea if applicable with particular reference to required safety precautions; and
- the need to continually monitor ballast water exchange operations.

5. Guidelines for ballast water exchange design and construction standards (G11 – MEPC.149(55))

5.1.1 Introduction

These Guidelines outline recommendations for the design and construction of ships to assist compliance with Part 300.

These Guidelines have been developed to give guidance to shipbuilders, ship designers, owners and operators of ships in designing safe, environmentally acceptable, technically achievable, practicable, and cost effective ballast water exchange as required in rule subpart F.

These Guidelines should be applied without compromising the ship's safety and operational efficiency and taking into account the design of ship types, which may have special safety considerations for example container ships and bulk carriers.

5.1.2 Ballast water exchange – design and construction considerations

General considerations

When designing and constructing a ship that will operate with ballast water exchange the following considerations should be taken into account:

- maximizing the efficiency of ballast water exchange;
- increasing the range of sea conditions under which ballast water exchange may be conducted safely;
- shortening the time to complete ballast water exchange (thereby increasing the types of voyages under which ballast water exchange can be undertaken safely); and
- minimizing the accumulation of sediments (refer to Guidelines on design and construction to facilitate sediment control on ships (G12)).Consideration at the design phase of new ships

When designing new ships the following aspects related to ballast water management equipment should be considered:

- ballast water management and the processes chosen to achieve it, should be considered as a component of the ship' s design;
- design and installation of the ballast water pumping and piping system should ensure that ease of operation and maintenance is maximized;
- ballast tank design should facilitate all aspects of ballast water management;
- installation of monitoring and/or recording equipment for all ballast water operations and treatment processes. If any records are automatically recorded by the equipment they should be in a format that can easily be retained and be made readily available to appropriate authorities;
- remote data management;
- the design of the ballast water exchange system should be such that it facilitates future compliance of the standards set in rule subpart F, minimizing the need to install new equipment/retrofitting and to carry out dry-docking and/or hot work. It should reduce, as far as possible, the costs of any adaptation for this purpose. Special consideration should be given to the feasibility of combining ballast water exchange methods with ballast water treatment technologies, aiming at meeting, in the future, the standards of rule subpart G. Adequate spaces for new complementary equipment and pipelines, which may be necessary to meet future standards under rule subpart G, should also be considered and planned.

Where designing new ships ballast water systems designs should take special account of the need for sampling the ballast water by port State control or other authorized organizations. The sampling arrangements should enhance the quality and ease of sampling of ballast water or sediments, without the need to enter potentially dangerous spaces or partially filled ballast tanks.

Where ballast water exchange at sea is the chosen method, when designing new ships the following aspects should be considered:

- design of ship structures to enable ballast water exchange to be conducted at various sea states/swell conditions and provide to the ship information on the maximum sea state that ballast water exchange can be conducted;
- minimize the burden on ships crew (e.g. minimize the number of operational steps, the number of partially loaded tanks and the time taken);
- minimize the risk of tank over/under pressurization;
- minimize the flow of ballast water on deck;
- maintaining bridge visibility standards (SOLAS V/22), propeller immersion and minimum draft forward at any stage of a designed ballast water exchange operation;
- the consequences of ballast water exchange at sea, including stability, hull girder strength, shear forces, torsional stresses, resonance, sloshing, slamming and propeller immersion.

The ballast water exchange methods currently in use are the sequential, flow-through (tank overflow) and dilution methods:

- where the sequential method is to be used, particular attention should be given to the ballast tank layout, total ballast capacity, individual tank configuration and hull girder strength. If the plan requires simultaneously empting and refilling closely matched diagonal tanks then consequential torsional stresses should be considered. Still water bending moments, shear forces and stability should remain at or within safe limits;
- where the flow through method is to be used adequate provision should be made to avoid the risk of over pressurization of ballast tanks or ballast piping. The installation of additional air pipes, access hatches (as an alternative to deck manholes), internal overflow pipes (to avoid flowing over the deck) and interconnecting ballast trunks between tanks where applicable and possible may be considered. Water on decks and/or direct contact poses a safety and occupational health hazard to personnel. The design should, where possible, be such that it avoids water overflowing directly on to decks to avoid the direct contact by personnel with the ballast water;
- where the dilution method is to be used adequate provision should be made for appropriate piping arrangements to facilitate the ballast water pumping into the previously ballasted tanks through the top of the ballast tank and, simultaneously, discharging the ballast water through the bottom of the tank at the same flow rate while maintaining a constant ballast water level in the tank throughout the exchange operation. Adequate provision should also be made to avoid the risk of over pressurization of ballast tanks or ballast piping. The hydrodynamic performance of the ballast tank is crucial to ensure full water exchange and sediment scouring.

5.1.3 Design considerations to enhance management, control and operational strategies

Sea chests

The following should be considered:

- sea chest design should be such that sediment accumulation is minimized; and

- provision of a high sea chest.

Ballast tanks

The design of ballast tanks should also take account of the Guidelines on design and construction to facilitate sediment control on ships (G12).

Ship-to-shore ballast transfer arrangements

If consideration is given to providing ship-to-shore connections to transfer ballast to shore-based ballast water reception facilities, the arrangements should be compatible with a recognized standard such as those in the Oil Companies International Marine Forum (OCIMF) “Recommendations for Oil Tankers Manifolds and Associated Equipment”. It is recognized that this standard was originally produced for oil transfer connections, however the general principles in this standard can be applied to connections for ballast transfer in particular the sections related to flanges and connection methods.

6. Guidelines on design and construction to facilitate sediment control on ships (G12 – MEPC.209(63))

6.1.1 Introduction

Water taken up as ships' ballast can contain solid alluvial matter that, once the water is becalmed in a ship's ballast tank, will settle out onto the bottom of the tank and other internal structures.

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.

Rule 300.104 requires that all ships remove and dispose of sediments from spaces designated to carry ballast water in accordance with the Ballast Water Management Plans. These Guidelines are to assist ship designers, shipbuilders, owners and operators to design ships to minimize the retention of sediment. Guidance on the management of sediment is contained in the Guidelines development of ballast water management plans (G4 Part B).

6.1.2 Design for reducing accumulation of sediment

Ballast water tanks and their internal structure should be designed to avoid the accumulation of sediment in a ballast tank. The following should, as far as is practicable, be taken into account when designing ballast tanks:

- horizontal surfaces to be avoided wherever possible;
- where longitudinals are fitted with face bar stiffeners, consideration should be given to fit the face bar stiffeners below the horizontal surfaces to aid drain off from the stiffeners;
- arrange for induced flows of water, either by pump forces or gravitational forces, to wash along horizontal or near horizontal surfaces so that it re-suspends already settled sediment;
- where horizontal stringers or webs are required, drainage holes to be as large as possible, especially if edge toe-stops are fitted where horizontal stringers are used as walkways, to encourage rapid flow of water off them as the water level in the tank falls;
- internal girders, longitudinals, stiffeners, intercostals and floors, where fitted, should incorporate extra drain holes which allow water to flow with minimal restriction during discharge and stripping operations;
- where inner members butt against bulkheads, their installation should be such as to prevent the formation of stagnant pools or sediment traps;
- scallops should be located at the joints of the inner bottom (tank top) longitudinals or intercostals and floors to allow for good airflow, and thus drying out of an empty tank. This will also allow air to escape to the air pipe during filling so that minimum air is trapped within the tank;
- pipeline systems should be designed such that, when deballasting, disturbance of the water in the tank is as powerful as possible, so that the turbulence re-suspends sediment; and
- flow patterns in ballast water tanks should be studied (for example by the use of Computational Fluid Dynamics (CFD)) and considered, so that internal structure can be designed to provide effective flushing. The amount of internal structure in double bottom tanks will reduce the scope for improving flow patterns. The hydrodynamic performance of the ballast tank is crucial to ensure sediment scouring.

Any designs depending upon water flow to re-suspend sediment should, as far as possible, be independent of human intervention, in order that the workload of ships' crews is minimal when operating the system.

The benefits of design concepts for reducing sediment accumulation are that there is likely to be good sediment removal while deballasting, with minimum retention of sediment in the tanks, and therefore a reduction or no need for removal by other means.

The design of all ships should provide safe access to allow for sediment removal and sampling.

The design of ballast water systems should, as far as practicable, facilitate installation of high sea suction points on each side of the ship.

When practical, equipment to remove suspended matter at the point of uptake should be installed.

7. Guidelines for ballast water reception facilities (G5 – MEPC.153(55))

7.1.1 Introduction

The purpose of these guidelines is to provide guidance for the provision of facilities for the reception of ballast water as referred to in rule 100.12. These guidelines are not intended to require that a Party shall provide such facilities. The guidance is also intended to encourage a worldwide uniform interface between such facilities and the ships without prescribing dedicated shoreside reception plants.

These guidelines apply to ballast water reception facilities referred to in the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Convention), Regulation B-3.6.

7.1.2 General requirements for ballast water reception facilities

A ballast water reception facility should be capable of receiving ballast water from ships so as not to create a risk to the environment, human health, property and resources arising from the release to the environment of Harmful Aquatic Organisms and Pathogens. A facility should provide pipelines, manifolds, reducers, equipment and other resources to enable, as far as practicable, all ships wishing to discharge ballast water in a port to use the facility. The facility should provide adequate equipment for mooring ships using the facility and when applicable safe anchorage.

7.1.3 Provision of ballast water reception facilities

When considering the requirements of these facilities many factors will have to be taken into account, these should include but not be limited to:

- regional, national and local legislation which will affect the facility and related to the items below;
- site selection;
- ship type and size that will use the facility;
- ship configurations;
- mooring requirements;
- handling of ballast water;
- sampling, testing and analysis of ballast water;
- storage and of conditions of ballast water;
- environmental benefits and costs;
- proximity of available sites to local ports;
- effect on the environment in construction and operation of the facility;
- training of facility staff;
- human health;
- safety;
- maintenance;
- operational limitations;
- waterway access, approaches and traffic management; and
- the amount of ballast water likely to be received.

7.1.4 Treatment and disposal of received ballast

Disposal of ballast water from a reception facility should not create a risk to the environment, human health, property and resources arising from the release or transfer to the environment of Harmful Aquatic Organisms and Pathogens

Treatment methods applied to the ballast water should not produce effects that may create a risk to the environment, human health, property and resources.

Where ballast water is disposed into the aquatic environment it should at least meet the ballast water performance standard specified rule subpart G.

7.1.5 Suspended matter

Ballast water discharged from a ship should be accepted by the ballast water reception facility including its suspended matter.

7.1.6 Capabilities of a reception facility

Details of the capabilities and any capacity limitations of a treatment facility should be made available to the ships that intend to use the facility.

The details made available to ships should include but not be limited to:

- maximum volumetric capacity of ballast water;
- maximum volume of ballast water that can be handled at any one time;
- maximum transfer rates of ballast water (cubic metres per hour);
- hours of operation;
- ports, berths, areas where access to the facility is available;
- ship-to-shore pipeline connection details (pipeline size and reducers available);
- if ship or shore crew are required for duties such as to connect or disconnect hoses;
- contact details for the facility;
- how to request use of the facility including any notice period and what information is required from the ship; and
- other relevant information.

The facility should provide ship to shore connections that are compatible with a recognized standard such as those in the Oil Companies International Marine Forum (OCIMF) “Recommendations for Oil Tankers Manifolds and Associated Equipment”. It is recognized that this standard was originally produced for oil tankers however the general principles in this standard can be applied to connections for ballast transfer on other ship types in particular the sections related to flanges and connection methods.

7.1.7 Training

Personnel in charge of and those employed in the provision of a ballast water reception facility including the treatment and disposal of ballast water should have received adequate instruction. Frequent training should include but not be limited to:

- the purpose and principles of the Convention / Part 300;
- the risks to the environment and human health;
- risk associated with the handling of ballast water including both general safety and human health risks;
- safety;
- adequate knowledge of the equipment involved;

- a sufficient understanding of ships using the facility, and any operational constraints;
- the ship/port communication interface; and
- an understanding of New Zealand disposal controls.

The training should be organized by the manager or the operator of the reception facility and delivered by suitably qualified professionals.

8. Guidelines for Sediment Reception Facilities (G1 - MEPC.152(55))

8.1.1 Introduction

The purpose of these guidelines is to provide guidance for the provision of facilities for the reception of sediments that are provided in accordance with rule 100.12. The guidance is also intended to encourage a worldwide uniform interface between such facilities and the ships without prescribing dedicated shoreside reception plants.

These guidelines apply to sediment reception facilities referred to in the International Convention for the Control and Management of Ships' Ballast Water and Sediments (the Convention), Article 5 and Regulation B-5.

8.1.2 General requirements for reception facilities

Article 5 of the Convention requires that: "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."

A facility should provide the resources to enable, as far as practicable, their use by all ships wishing to discharge sediment from ballast water tanks.

Each Party shall report to the Organization and, where appropriate, make available to other Parties, information on the availability and location of any reception facilities for the environmentally safe disposal of sediments.

8.1.3 Provision of sediment reception facilities

When considering the requirements of these facilities many factors will have to be taken into account, these should include but not be limited to:

- regional, national and local legislation which will affect the facility and related to the items below;
- site selection;
- collection, handling and transport of sediment;
- sampling, testing and analysis of sediment;
- storage of sediment and storage conditions;
- estimated required capacity (volume/weight) including moisture content of the sediment the facility will handle;
- environmental benefits and costs;
- proximity of available sites to local ballast tank cleaning and repair facilities;
- effect on the environment in construction and operation of the facility;
- training of facility staff;
- equipment required to off load sediment from ships, such as cranes;
- human health;
- safety;
- maintenance;
- operational limitations; and
- waterway access, approaches and traffic management.

8.1.4 Treatment, handling and disposal of received sediment

Disposal, handling and treatment measures applied to the sediment shall avoid unwanted side effects that may create a risk to or damage to the environment, human health, property or resources.

Personnel involved in the handling of sediment should be aware of the possible risk to human health associated with sediment from ships ballast water tanks. Personnel should be adequately trained and be provided with suitable personal protective clothing and equipment.

8.1.5 Capabilities of a reception facility

Reception facilities should be designed, taking into account the ship types that may be anticipated to use them and consideration should be given to the requirements for ballast tank cleaning that may take place and of repair facilities in the area(s) the reception facility serves.

Details of the capabilities and any capacity limitations of reception process (facilities and equipments) should be made available to ships wishing to use the facility. The details made available to ships should include but not be limited to:

- maximum capacity (volume or weight) of sediment;
- maximum volume or weight that can be handled at any one time;
- packaging and labelling requirements;
- hours of operation;
- ports, berths, areas where access to the facility is available;
- ship-to-shore transfer details;
- if ship or shore crew are required for the transfer;
- contact details for the facility;
- how to request use of the facility including any notice period and what information is required from the ship; and
- other relevant information.

8.1.6 Training

Personnel in charge of and those employed in the provision of a sediment reception facility including the treatment and disposal of sediment, should have received adequate instruction. Frequent training should include but not be limited to:

- the purpose and principles of Part 300;
- the risks to the environment and human health;
- risk associated with the handling of sediment including both general safety and human health risks;
- safety;
- adequate knowledge of the equipment involved;
- a sufficient understanding of ships using the facility, and any operational constraints;
- the ship/port communication interface; and
- an understanding of New Zealand disposal controls.

The training should be organized by the manager or the operator of the reception facility and delivered by suitably qualified professionals.

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ISBN 978-0-478-44794-1

Published by
Maritime New Zealand, PO Box 25620 Wellington 6146, New Zealand