OCEAN
Technologies Group

Ballast Water Management
Workbook

Date: 30/09/2020

Powered by

Seagull | Videotel

Contents

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.

1. International Convention for the Control and Management of Ships' Ballast Water and Sediments

Foreign marine species are introduced into new environments through ships ballast water, sediments in ballast tanks or attached to the hull and propeller. This introduction is a major threat to the ecosystems around the globe.

It has been estimated that approx. 3,000 to 4,000 million tons of untreated ballast water are discharged every year. Globally it has been estimated that ship ballast is transporting more than 10.000 species including living organisms and pathogens such as bacteria and viruses, which are discharged with the ballast water when the ships reach their destination.

More than 90 % of the world's trade measured by volume spends some of its lifetime on board a ship. Without shipborne transportation the world's economy would collapse. Further the use of ballast water is essential to the safe and efficient operation of shipping. As the ballast water with its content of foreign marine species and pathogens are a threat to ecosystems it is vital that active measures are put into place to minimize the spread of foreign species.

This is widely recognized and the **International Convention for the Control and Management of Ships' Ballast Water and Sediments** (hereafter referred to as "Convention") was adopted by the IMO in London 2004

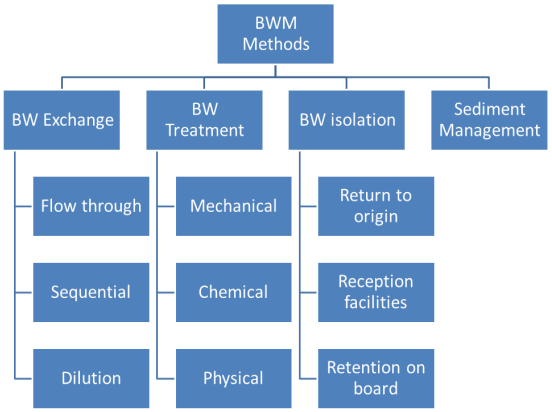
The Ballast Water Management Convention enters into force on September 9th 2017.
Finland ratified the ballast water management convention on September 8th 2016 bringing the number of ratifying nations up to 52, well over the required number of ratifying states which is 30, and passing the required representation of world merchant ship tonnage of

The stated aim of the Convention is to reduce the risks to the environment. The Convention with its Annex and supporting guidelines regulates management of ballast water and sediments from ships. The Annex is an integral part of the Convention meaning that reference to the annex is the same as reference to the Convention.

Aim of the Convention:
Prevent, minimize and ultimately eliminate the risks to the environment, human health, property and resources arising from the transfer of harmful aquatic organisms and pathogens through the control and management of ships' ballast water and sediments, as well as to avoid unwanted side-effects from that control and to encourage developments in related knowledge and technology

The Convention provides four different methods to achieve the aim.

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.



The applicable method for each ship depends on the ballast water capacity and the construction date of the ship.

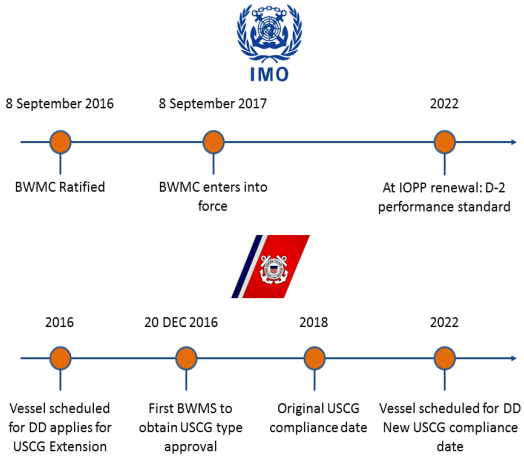
The date is determined by the first renewal survey of the International Oil Pollution Prevention (IOPP) Certificate after September 8th 2017.

Keel Laid	Ballast water Capacity	BWMC Regulation	Compliance date for the Ballast water performance standard - BWMC Annex section D-2
Before 2009	1,500 or more but less than 5,000	B-3.1.1	By the first renewal survey of the International Oil Pollution Prevention (IOPP) Certificate after 8 SEP 2017
	Less than 1,500 or more than 5,000	B-3.1.2	
During 2009 to 7 SEP 2017	Less than 5,000	B-3.1.3	
During 2009 but before 2012	5,000 or more	B-3.1.4	
During 2012 or after	5,000 or more	B-3.1.5	
On or after 8 SEP 2017	All ships	Article 3	By the completion date of the ship's construction

IMO Compliance dates

Under US Coast Guard (USCG) regulations the BW Exchange method is not accepted. Alternate management systems i.e. not type approved are allowed until type approved systems are ready. Shipowners can apply for extensions to the deadline for compliance with USCG regulations. The date for compliance with USCG regulations is determined by the first scheduled drydocking after June 21st 2012.

See a summary of the implementation schedules below.



IMO/USCG implementation dates

Annex D-2 to the Convention details the performance standard for discharged ballast water.

Viable organisms size / type	IMO criteria
Viable organisms > 50 µm in minimum dimension	< 10 Viable organisms / m^3
Viable organisms 10 - 50 µm in minimum dimension	< 10 Viable organisms / ml
Viable organisms < 10 µm in minimum dimension	
Escherichia coli	< 250 cfu / 100 ml
Intestinal Enterococci	< 100 cfu / 100 ml
Toxicogenic Vibrio cholerae (O1 and O139)	< 1 cfu / 100ml
	< 1 cfu / g wet weight zoo plankton
Note: cfu: Colony forming unit	

D-2 Performance standard

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.

Annex B-1 to the convention requires ships to develop, carry and implement a Ballast Water Management Plan (BWMP) approved by the flag state. The BWMP is specific to each ship and shall detail how the ship implements the requirements of the Convention and the associated guidelines.
A proper Ballast Water Management Plan will help to avoid operational delays which again will save both time and cost.

Annex B-2 to the convention requires ships to have a Ballast Water Record Book where records of all ballast water operations are documented.

Annex B-4 to the convention defines areas where ballast water exchange may be carried out as follows:

- conduct ballast water exchange at least 200 nautical miles from the nearest land and in water at least 200 metres in depth
- if unable to conduct ballast water exchange as above
    - as far from the nearest land as possible, and in all cases at least 50 nautical miles from the nearest land and in water at least 200 metres in depth.

When the requirements cannot be met areas may be designated by coastal States where ships can conduct ballast water exchange.

Annex B-5 to the convention requires all ships to remove and dispose of sediments from spaces designated to carry ballast water.

Training and education

Annex B-6 to the convention 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 and,
- appropriate to their duties, be familiar with the ship's ballast water management plan.

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.

Particular regard should be made to matters of ship safety and maintenance of records. All in accordance with the information contained in the IMO guidelines on ballast water management.

The ballast water management plan should include description of:

- training and education on ballast water management practices and the systems and,
- procedures used on board that ship.

The Ballast Water Management Convention calls for a number of guidelines to be developed to guide the implementation of the specific articles and regulations. There are 14 guidelines in total, and they are often referred to with the letter G and a number for example G2.

In addition to the requirements set out in Ballast Water Management Convention it is very important that you are aware of any national and/or regional requirements that can affect your ballast water operation.

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.

2. Exercises

Ensure that you have access to the International Convention for the Control and Management of Ships' Ballast Water and Sediments including the guidelines accompanying the Convention before you start on the exercises. It can also be beneficial to have access to the vessels Ballast Water Management Plan when completing this course. All questions and exercises are marked with a score; to get full score try to answer all questions as comprehensive as possible. All questions must be answered and a score of 75% is required to pass the course.

Exercise 1 (5 marks)

It is essential that sounding pipes, air pipes and non-return devices in the ballast tanks are in good order. How do you ensure these components are in working properly on board your vessel, and what can be the consequence if they are not working properly?

Exercise 2 (5 marks)

Ballast water operation must continuously be monitored, which safety precautions must be considered before start-up of a ballast water operation? What may be the consequences if we do not take these safety precautions seriously?

Exercise 3 (5 marks)

Consult your ship's certificates. When is your ship due to comply with the IMO performance standard – Annex D-2 to the Convention? Make reference to the dates on the relevant document stating the expiry date and the classification society issuing the certificate.

Exercise 4 (5 marks)

Consult your ship's certificates. When is your ship due to comply with the USCG regulations on ballast water management? Make reference to the dates on the relevant document stating the reference date and the classification society issuing the document.

Exercise 5 (5 marks)

Describe the four methods for ballast water management available to ships. Describe which of the methods that are applicable to your ship today and explain why.

Exercise 6 (5 marks)

Consult the G6 guidelines. List the 3 accepted methods for ballast water exchange at sea.
Discuss each of the methods and explain strengths and weaknesses.

Exercise 7 (6 marks)

Consult your ship's documentation on ballast tanks and pumps. Select two tanks and state the volume of each tank.

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.

State the pumping capacity available for each tank.

Calculate the time it would require to carry out ballast water exchange for the tanks using the sequential method to meet the 95% volumetric exchange requirement in the Convention.

Explain how you would carry out the exchange.

Exercise 8 (3 marks)

Ballast sediment can be a reservoir of foreign organisms and pathogens.

Consult the G4 guidelines. Describe how uptake of harmful organisms and pathogens may be minimized during ballast water uptake.

Exercise 9 (5 marks)

Consult the G6 guidelines.
Describe the training and familiarization requirements for ships' officers and crew

Exercise 10 (6 marks)

Describe the four main technologies utilized in ballast water treatment systems.

Select one technology and discuss strengths and weaknesses of the technology.

Exercise 11 (5 marks)

Consult the G2 guidelines (section 5). Describe how the samples needed to determine compliance with the Convention should / should not be taken.

Who are the G2 guidelines intended for?

Exercise 12 (5 marks)

Consult the G4 guidelines. Describe the procedure for removal of sediments and which considerations must be done before this operation is commenced.

How often are sediments removed from the ballast tanks on board your vessel?

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.

3. Document status

Issue no.	Date	Author
1667 A 1667 A1 1667 A2 1667 A3	12.10.2004 30.03.2006 22.05.2006 26.02.2007	AB AB AB AB
1667 A4	01.01.2008	AB
1667 A5	19.06.2009	AB
1667 B1	30.08.2012	AB
1667 B2	20.11.2014	AB
1667 C1	17.01.2017	AB
1667 C2	20.09.2017	AB
1667 C3	15.08.2018	AB
1667 C4	03.10.2018	AB
1667 4.0	26.11.2020	ILG

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.

4. Changes in the document

Issue no.	Paragraph no.	Description
1667 A1	Para 1.2 Para 1.5 Para 2.1 Chapt. 3 Para 4.7 Exercise 2	Updated text with reference. Updated with "Note" Added text before Annex B. Added reference. Changed text to "..several methods under development" Added note since CBT is not updated.
1667 A2	Para 1.5 Para 1.8 Para 4	Added text to paragraph. Added text to paragraph. Added text with marks
1667 A3	Para 1.0	Added new paragraph 1.9, Evaluation of on board course.
1667 A4	Para 1.5 – 1.8	Updated with new email and text.
1667 A5	Para 1.3	Added prerequisites. New numbers on para after this.
		Text on front page changed to Procedure and workbook.
		Exercise2 has been revised.
1667 B1		Major revision of workbook and procedure, WB divided into part A and B.
1667 B2	Para 1.9	Removed "CBT Login ID" added "Ships flag"
1667 C1		Major revision, chapters 2 and 3 are new.
1667 C2		Added text in chapter 2
1667 C3	Para 1.7 Para 4	Updated text Updated evaluation form
1667 C4		Replaced e-learning module #27 with modules #421 and #422
1667 4.0		New Ocean TG course template. Split procedure and workbook, changed version numbering

Copyright © 2020 – Ocean Technologies Group
This document is submitted in confidence and contains proprietary information, which should not be distributed, edited or reproduced without written permission of Ocean Technologies Group.