RINA GROUP

making the best together

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

Water ballast management

Tutto pronto per l'entrata in vigore?

ATENA Workshop

Genova, 17 May 2012

Andrea COGLIOLO

Sector Manager - Innovation & Research

Marine Business Solutions - RINA Services S.p.A.

RINA GROUP

making the best together

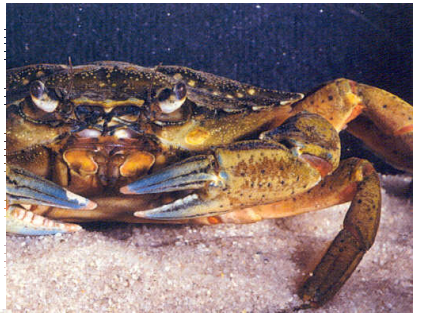
Ballast Water Management Convention

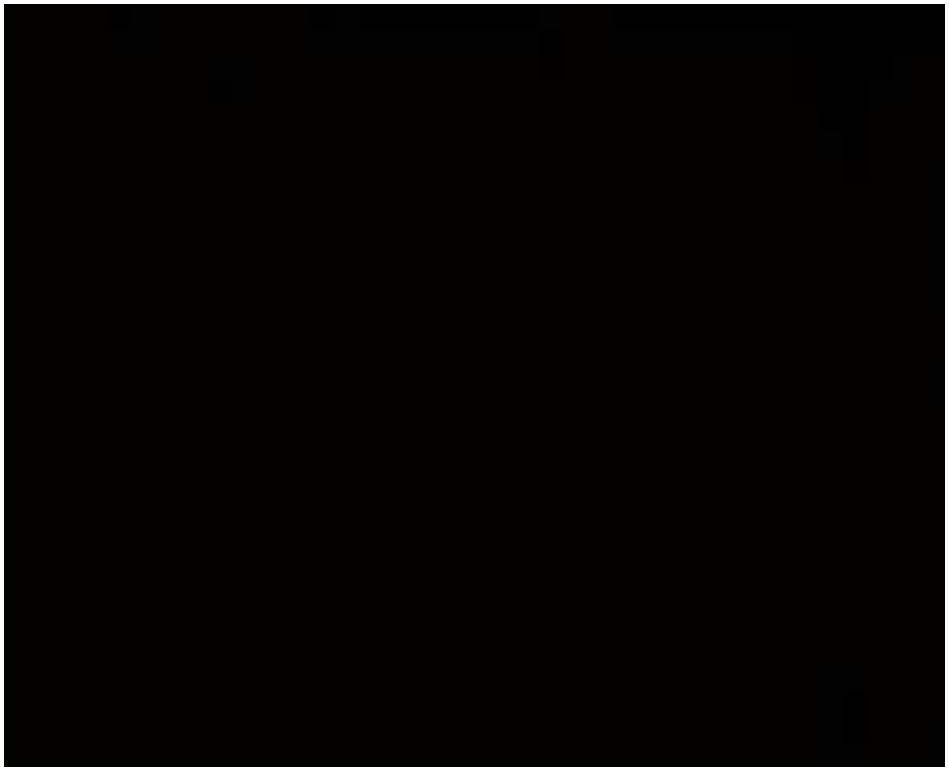
- Introduction
- Regulation timeline
- Overview on technologies
- The impact on the ship
- Criticalities
- Is the marine industry ready?

RINA GROUP

making the best together

Introduction BWMC - Why?



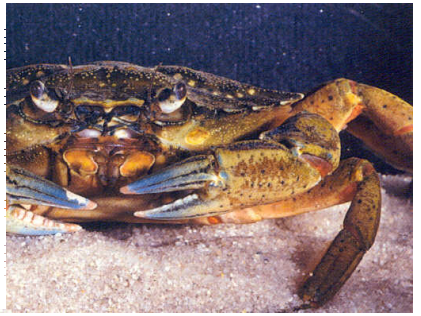


Downloaded from www.imo.org
Thanks to IMO-BBC

RINA GROUP

making the best together

Introduction BWMC - Why?



- Shipping transfers approximately 10 to 12 billion tonnes of ballast water across the globe each year
- From 3000 to 4500 different species being carried out in ships' ballast tanks around the world - bacteria, microbes, small invertebrates, eggs, larvae

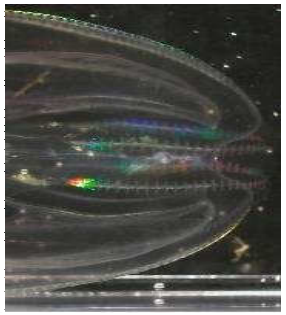
When all factors are favourable, an introduced species may establish a reproductive population and even become invasive, out - competing native species

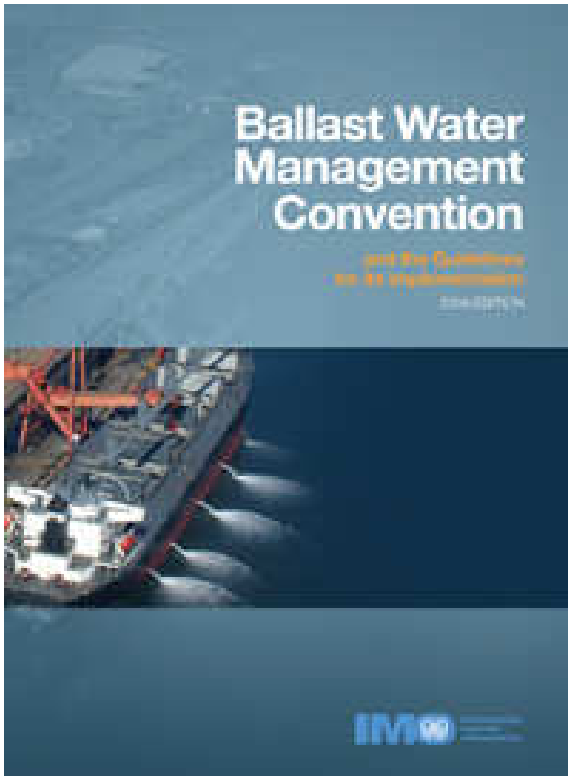
ECOSYSTEMS COULD BE CHANGED

RINA GROUP

making the best together

Introduction BWMC



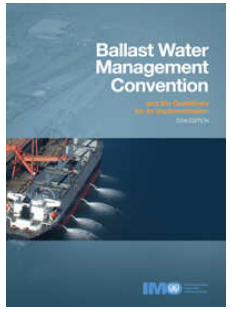


- Adoption: 12 February 2004
- Application: all ships (new and existing)
- Purpose: to minimize the transfer of harmful aquatic organisms and microbes from a certain geographical area to another one

RINA GROUP

making the best together

Regulation timeline

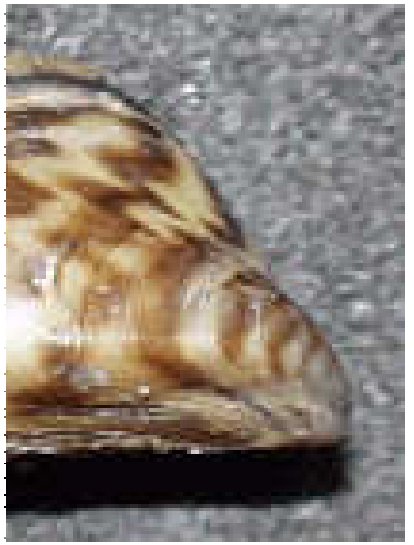


Status - May 2012

Conditions for the entry into force (Article 18)

12 months after the ratification by at least

- 30 States and
- 35 % of world merchant shipping ton



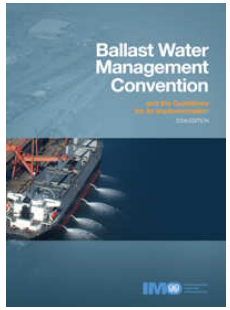
Status of the Convention

- 33 States and
- 26,46 % of world merchant shipping ton

RINA GROUP

making the best together

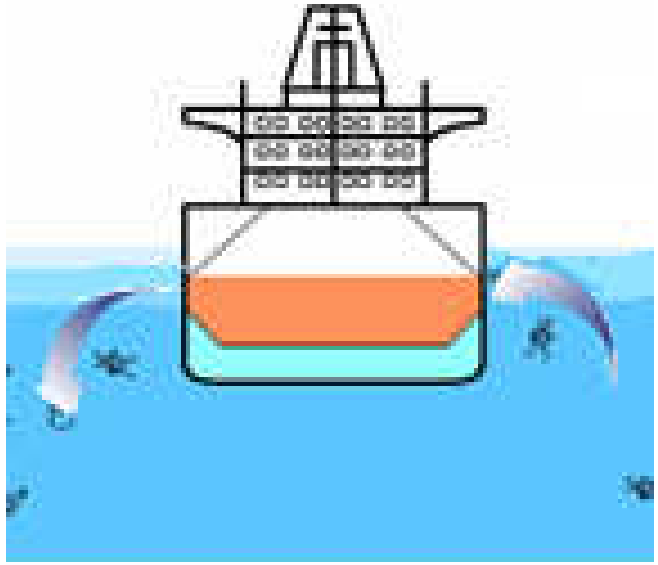
Regulation timeline



Standards

Standard D1: Ballast Water Exchange

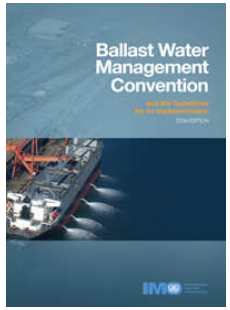
- 200 nautical miles from the nearest land
- water 200 meters in depth
- volumetric exchange efficiency of at least 95%



RINA GROUP

making the best together

Regulation timeline



Standards

Standard D2: Ballast Water Treatment

Quality of ballast water effluent in terms of:

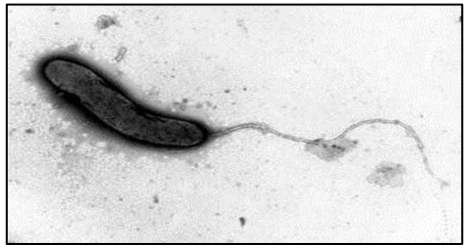
- Viable organisms

< 10 viable organisms per m^3 > 50 μ m in minimum dimension,
< 10 viable organisms per millilitre 10 μ m < minimum dimension < 50 μ m

- Microbes

concentrations shall not exceed:

a) toxicogenic vibrio cholerae: 1 colony forming unit (cfu) per 100 ml or 1 cfu per gram of zooplankton samples;
b) escherichia coli: 250 cfu per 100 ml
c) intestinal enterococci: 100 cfu per 100 ml



Minimum requirements of the BWM Convention when it will enter into force

Ship Keel laying	Ship Ballast Water Capacity BWC	2009	2010	2011	2012	2013	2014	2015	2016	2017
Before 1/1/2009	1.500 ≤ BWC ≤ 5.000						(*)			
	BWC < 1.500; BWC > 5.000								(*)	
1/1/2009-31/12/2009	BWC < 5.000			(1)						
	BWC ≥ 5.000								(*)	
1/1/2010-31/12/2011	BWC < 5.000		(**)							
	BWC ≥ 5.000		(***)						(*)	
on or after 1/1/2012	Any BWC				(**)					

Legenda	
	Ballast Water Exchange
	Ballast Water Treatment

(1) Ship constructed in 2009 and with a BWC of less than 5000 m3 are not required to comply with Ballast Water Treatment until their second annual survey, but not later than 31 December 2011.

(*) Not later than the first intermediate or renewal survey, whichever occurs first, after the anniversary date of delivery of the ship in the year of compliance with the standard applicable to the ship (2014 or 2016).

(**) The ship is constructed with a Ballast Water Treatment Plant

(***) The ship can be constructed without Ballast Water Treatment Plant

RINA GROUP

making the best together

Regulation timeline

USA example:
rules for both its own flagged ships and foreign ships in US ports and within the country's territorial waters

Phase 1: quality of effluent very close to IMO convention standards.

Phase 1: Implementation schedule for Phase 1 ballast-water management programme		
Ballast-water capacity (m3)	Construction date	Compliance date
New vessels (all capacities)	On or after 1 December 2013	On delivery
Existing vessels < 1,500	Before 1 December 2013	First drydocking after 1 1 2016
Existing vessels 1,500–5,000	Before 1 December 2013	First drydocking after 1 1 2014
Existing vessels > 5,000	Before 1 December 2013	First drydocking after 1 1 2016

RINA GROUP

making the best together

Regulation timeline

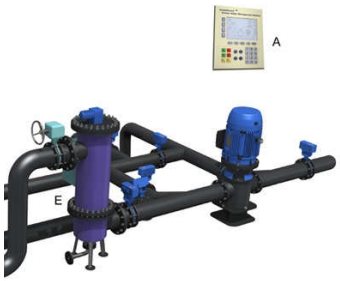
USA

Second phase, originally proposed for 2016 now postponed depending on the performance standards that treatment systems are able to achieve, set far more stringent quality of effluent:

e.g. living organisms > than 50 μ m

IMO BWMC: < 10 organisms m^3
USA phase 2: max 1 organism/100m^3

Overview on technologies

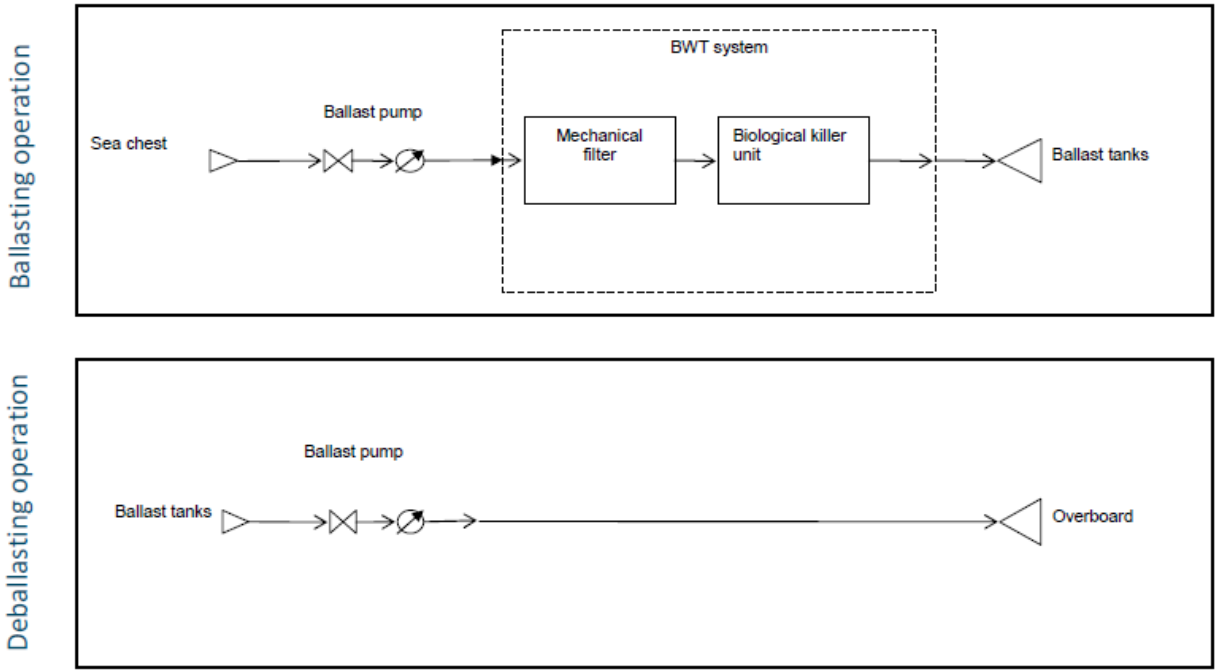


- Mechanical separation
  - Filtration
  - Centrifugal separation
  - …
- Chemical disinfection
  - Chlorination (Cl - ClO_2)
  - Active substances (e.g. peracetic acid, hydrogen peroxide, etc.)
  - …

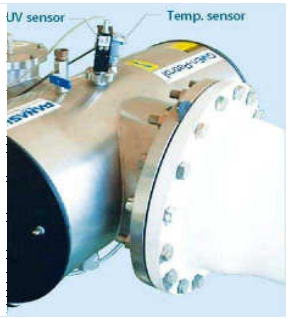
- Physical disinfection
  - Ultraviolet
  - Ultrasound
  - Deoxygenation
  - Electrolysis
  - Ozonization
  - Coagulation & Flocculation
  - Magnetic Separation Methods
  - …

Overview on technologies

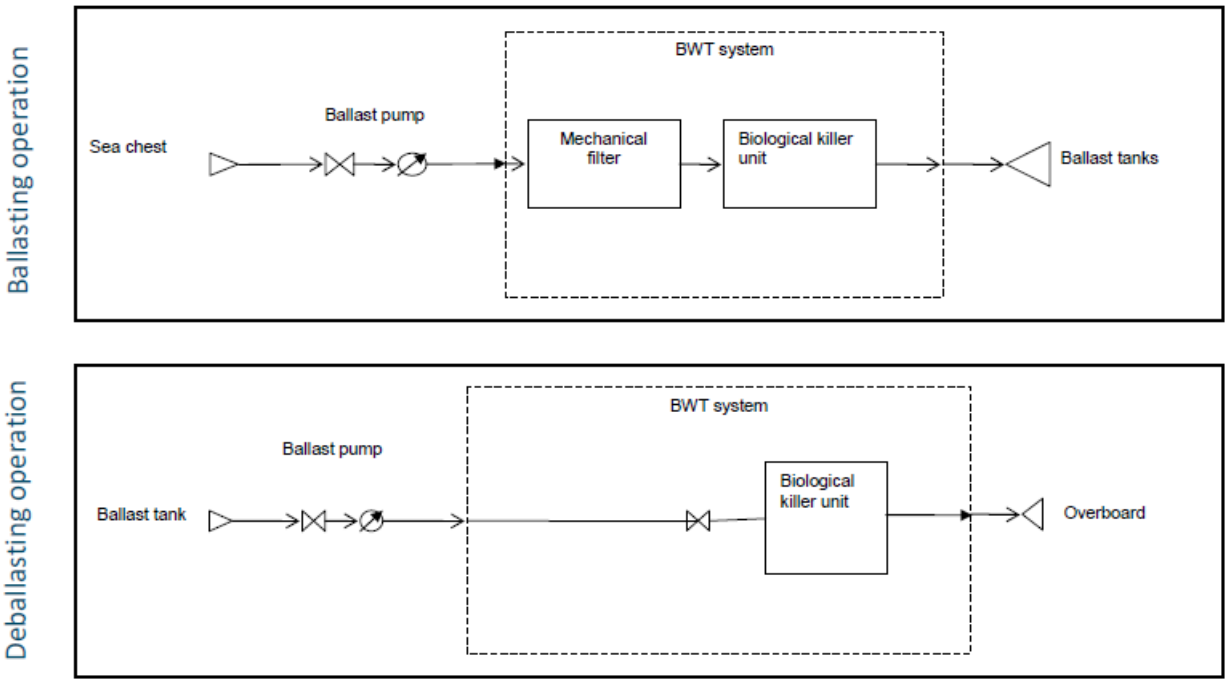
Scheme 1: Ballast system functionality scheme with water treatment (single passage)



Overview on technologies



Scheme 1: Ballast system functionality scheme with water treatment (double passage)



The impact on the ship

- Ballast system
  - Ballast water pump flow rates
  - Ballast system piping arrangement
  - …
- Arrangement of the space on board for
  - the installation of treatment equipment
  - the storage of consumable materials
  - ease maintenance, calibration and ballast water sampling
  - venting (or other measures) of spaces where chemical active substances are stored
  - …

The impact on the ship

- Ballast tanks
  - Coating and active substances compatibility
  - Ballast tank gauging and venting systems (pneumatic tank gauges may be affected by inerting of ballast tanks)
  - …
- Main source of electrical power
  - Additional electric power is required
  - In case of existing ships, it may be necessary to upgrade generators and control systems to cope with the additional power, monitoring and control requirements
  - …

The impact on the ship

- Hazardous areas
  - Use of Ex equipment
  - Separation of ballast water system for hazardous and non- hazardous areas
  - …
- Miscellaneous
  - Health and safety considerations (handling and storage of chemicals)
  - Training requirements (health and safety, control, monitoring and calibration)
  - Management of spares and consumables
  - On shore disposal of sediments
  - …

Criticalities

- The subject to be dealt with is complex
- International and national requirements are not aligned
- The impact is on both new and existing ships
- The cost is not negligible
- Many technical solutions are available causing uncertainty on the final choice
- Some problems have been reported on Type Approved solutions
- Sampling

RINA GROUP

making the best together

Is the marine industry ready?

Guideline for the Ballast Water Management Convention

- G1 Guidelines for Sediment Reception Facilities
- G2 Guidelines for Ballast Water Sampling for Port State Control
- G3 Guidelines for Ballast Water Management Equivalent Compliance
- G4 Guidelines for Ballast Water Management and Development of Ballast Water management plans
- G5 Guidelines for Ballast Water Reception Facilities
- G6 Guidelines for Ballast Water Exchange
- G7 Guidelines for Risk Assessment
- **G8 Guidelines for Approval of Ballast Water Management Systems**
- **G9 Procedure for Approval of Ballast Water Management Systems that make use of Active Substances**
- G10 Guidelines for Approval and Oversight of Prototype Ballast Water Treatment Technology Programmes
- G11 Guidelines for Ballast Water Exchange Design and Construction Standards
- G12 Guidelines on Design and Construction to Facilitate Sediment Control on Ships
- G13 Guidelines for Additional Measures Including Emergency Situations
- G14 Guidelines for Designation of Areas for Ballast Water Exchange

Regulatory Instruments are there

More than 40 systems are ready for commercialization

… but …

are we ready for 70.000 BWT system installation & certification according to the required schedule?

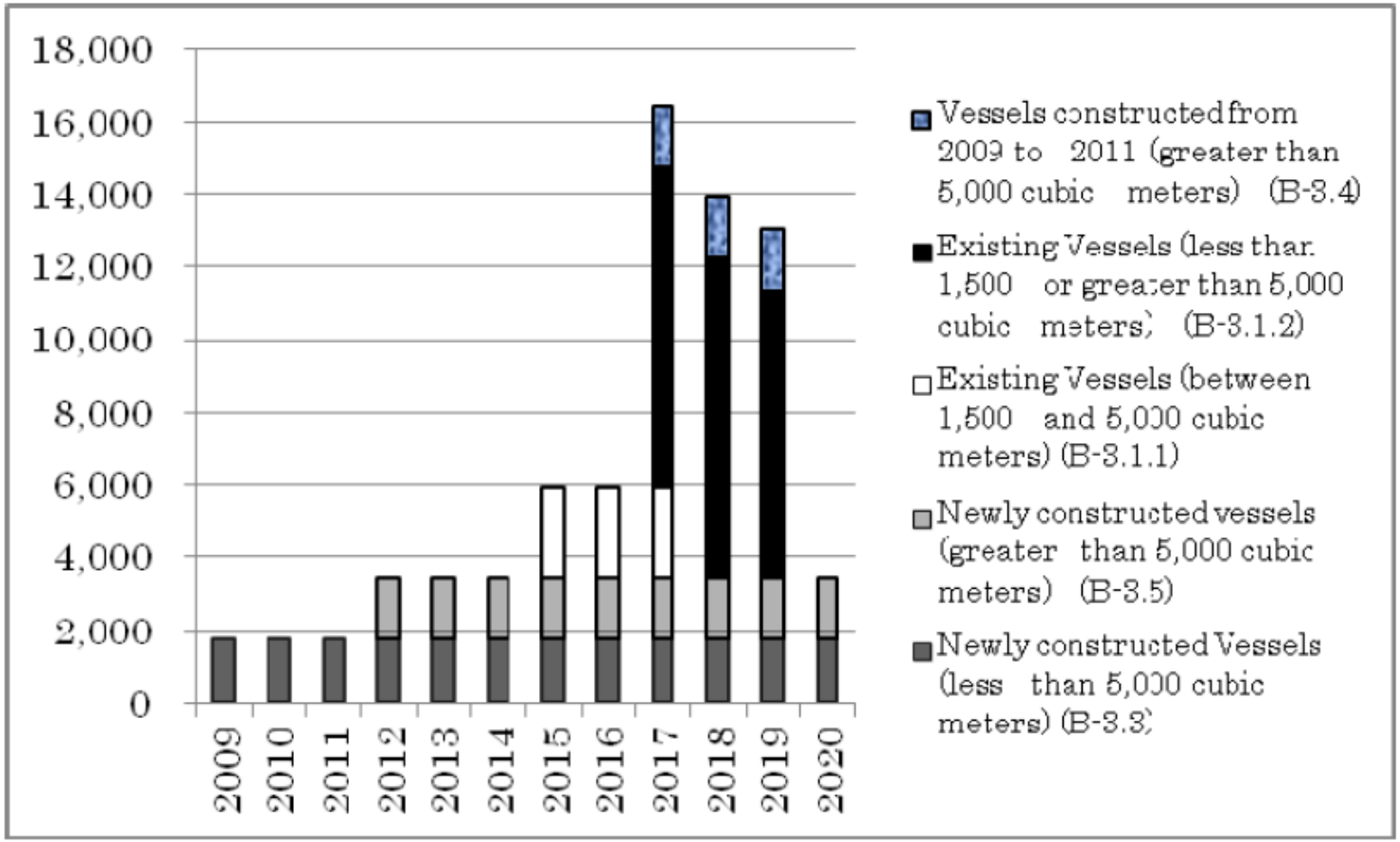


Figure 1: Estimated number of vessels required to install BWMS

Thank you