

MARINE ENVIRONMENT PROTECTION
COMMITTEE
63rd session
Agenda item 2

MEPC 63/INF.11
23 December 2011
Original: ENGLISH

HARMFUL AQUATIC ORGANISMS IN BALLAST WATER

Preview of global ballast water treatment markets

Submitted by the Institute of Marine Engineering, Science
and Technology (IMarEST)

SUMMARY

Executive summary: This document provides information on the scope of the world commercial market for ballast water management systems required to comply with the standard for ballast water treatment contained in regulation D-2 of the BWM Convention

Strategic direction: 2 and 7

High-level action: 2.0.1 and 7.1.2

Planned output: 2.0.1.13 and 7.1.2.3

Action to be taken: Paragraph 2

Related document: BLG 16/INF.4

Overview

1 The success of the IMO Ballast Water Management Convention will depend on the rapid development of a global Ballast Water Management Systems (BWMS) market by 2016. With this market still in its infancy, industry leaders and Governments in IMO Member States are looking for at least preliminary answers to questions about the potential size (and value) of the global markets for BWMS. The annex presents a document that aims to develop preliminary answers to these questions, including tentative estimates of the number of vessels that will need to install BWMS in various years and the expected cost of purchasing and installing various types of BWMS. It is based on 2009 and 2010 reports produced by the Maritime Environmental Resource Center (MERC), which includes an analysis of Lloyd's Fairplay, November 2009 global fleet data. It was concluded that the value of the global market for purchasing and installing BWMS between 2011 and 2016 will be in the range of US\$50 to \$74 billion.¹ The full version of this document, ***Preview of Global Ballast Water Treatment Markets***, D.M. King, P.T Hagan, M. Riggio and D.A. Wright, is in

¹ King D M, Riggio M, and Hagan P T. 2009. *Preliminary Analysis of Cost of Ballast Water Treatment Systems. MERC Ballast Water Economics Discussion Paper No.1.* Available at www.maritime-enviro.org/reports/Reports.html; King DM, Riggio M, and Hagan PT, 2010. *Preliminary Overview of Global Ballast Water Treatment Markets. MERC Ballast Water Economics Discussion Paper No.2.* Available at www.maritime-enviro.org/reports/Reports.html.

press in the international peer-reviewed Journal of Marine Engineering & Technology, Vol. 11, Issue 1 (January 2012).

Action requested of the Committee

2 The Committee is invited to note the information contained in this document.

ANNEX**PREVIEW OF GLOBAL BALLAST WATER TREATMENT MARKETS****Introduction**

1 Data were analysed by type of ship for "**delivered**" ships listed in the Lloyd's Fairplay database. With full compliance, it was estimated that more than 68,000 vessels in the global merchant fleet will install onboard BWMS before 2020 (Table 1).

Table 1: Vessel type by estimated ballast capacity

Sub-type	Count	Ballast capacity of <1,500m³	Ballast capacity of 1,500-5,000m³	Ballast capacity of >5,000m³
Barges	574	0	0	574
Bulk Carriers	8,110	0	0	8,110
Containership	4,724	0	0	4,724
Crude Oil Tanker	2,160	0	0	2,160
Chemical Tanker	1,474	0	0	1,474
Chemical/Oil Products Tanker	9,323	0	0	9,323
General Cargo Ship	18,187	0	16,535	1,652
Fishing Vessels	8,001	7,970	30	1
LNG Tanker	327	0	0	327
LPG Tanker	1,194	540	0	654
OSVs	2,000	1,923	0	77
Passenger (Cruise) Ship	515	0	479	36
Passenger-Passenger/Cargo (Ro-Ro)	3,359	3,324	35	0
Passenger Ship	2,942	2,941	1	0
Refrigerated Cargo Ship	2,542	0	2,538	4
Ro-Ro Cargo Ship	1,873	0	1,700	173
Livestock Carrier	101	0	90	11
Vehicle Carrier	784	0	196	588
TOTAL	68,190	16,698	21,604	29,888

2 Depending on a number of factors that are still uncertain, this estimate of the relevant global fleet may overstate or understate the size of the global BWMS market. For purposes of analysis, for example, it was assumed that all vessels will comply regardless of their age, even though it is likely that some older vessels will either be retired or rerouted so that they are not subject to ballast water regulations. This would result in lower demand for BWMS than what would be expected based on the size of the relevant fleet. On the other hand, to be in compliance, many larger ships in the relevant global fleet will most certainly require multiple ballast water treatment units, which would tend to make the market for BWMS larger than what is reflected by our estimate of the number of ships complying.

3 Although more than 7,000 fishing vessels under 1,000 deadweight tons (DWT) were included in this analysis of the global fleet, it was assumed that ships in this category are likely to comply through the use of less expensive products that are still to be determined, and these were therefore not considered in this analysis of BWMS markets. It was determined that the sub-types listed in Table 1 would be subject to IMO regulations for ballast water treatment. In the case of fishing vessels, only vessels of 300 gross tons or more were included. Other sub-types that were determined as not carrying ballast water or that would only be operating within one "Captain-of-the-Port Zone" (COPTZ) were also excluded.

Vessel type

4 Analyses indicated that more than 21,000 ships will be subject to the first round of IMO retrofit requirements, which includes those ships with ballast water capacity of 1,500-5,000 m³. These ships will be required to have BWMS starting in 2014. Of those ships, the great majority – more than 16,000 – are general cargo ships (Table 1). About two thirds of the demand for installation of technology to meet the IMO D-2 standard will be associated with meeting the 2016-deadline for ships with less than 1,500 m³ capacity (more than 16,000 ships) and with more than 5,000 m³ capacity (more than 29,000 ships).

Vessel size

5 The database was further sorted by DWT to develop a more comprehensive view of the various-sized vessels in the world merchant fleet subject to ballast water regulations (Table 2). Again, in the case of fishing vessels, only those of 300 gross tons or more were included in the analysis. More than 92 per cent of an estimated 8,001 fishing vessels subject to IMO ballast water regulations are less than 1,000 DWT. Given the slim operating profit margins of smaller fishing vessels, it is unlikely that they will be able to afford the types of BWMS that are the focus of this document, or will have room aboard to accommodate them. It is anticipated that these smaller fishing vessels will need to find some other way to comply with IMO ballast water regulations. In addition, the merchant fleet data were sorted according to age of ship.

Table 2: Vessel type by deadweight tonnage

Vessel type	World Fleet DWT						
	0 – 999	1,000 - 9,999	10,000 - 29,999	30,000 - 49,999	50,000 - 69,999	>=70,000	Total
Barges	274	275	15	8		2	574
Bulk Carriers	392	878	1,703	1,743	1,264	2,130	8,110
Containerships	6	788	1,628	1,013	812	477	4,724
Crude Oil Tankers	16	112	37	163	120	1,712	2,160
Chemical Tankers	423	806	164	79	1	1	1,474
Chemical/Oil Products Tankers	1,665	4,621	1,206	1,249	245	337	9,323
General Cargo Ships	5,921	10,612	1,409	223	22	0	18,187
Fishing Vessels	7,395	604	2	0	0	0	8,001
LNG Tankers	1	5	12	11	36	262	327
LPG Tankers	193	678	154	71	98	0	1,194
OSVs	600	1,399	1	0	0	0	2,000
Passenger (Cruise) Ships	243	227	45	0	0	0	515
Passenger -Passenger/ Cargo (Ro-Ro) Ships	2,327	997	35	0	0	0	3,359
Passenger Ships	2,883	58	1	0	0	0	2,942
Refrigerated Cargo Ships	832	1,453	254	3	0	0	2,542
Ro-Ro Cargo Ships	840	726	292	15	0	0	1,873
Livestock Carriers	22	68	9	2	0	0	101
Vehicle Carriers	13	183	558	28	2	0	784
TOTAL	24,046	24,490	7,525	4,608	2,600	4,921	68,190

Vessel age

6 Table 3 shows the world fleet by vessel type and age. The table includes 2009 newbuilds (1,804 ships) listed in the database as of November 2009. Because IMO granted a delay for the first set of ships subject to the regulations (those ships constructed in 2009 or later with a ballast water capacity of less than 5,000 m³), these ships now have until the vessel's second survey to comply, although the "**no later than December 31, 2011**" deadline will slip again, because full ratification did not occur before that date. More than 60 per cent of the new vessels listed as under construction in 2009 were bulk carriers, containerships, or tankers that are estimated to have greater than 5,000 m³ ballast water capacity, which do not require treatment technology for newbuilds until – putatively – 2012, depending on the timing of ratification.

Table 3: Vessel age by ship type

Vessel type	0-4 years	5-14 years	15-24 years	25+ years	2009 Builds	Total
Barges	27	30	125	387	5	574
Bulk Carriers	1,592	2,328	1,894	1,938	358	8,110
Containerships	1,650	1,881	675	323	195	4,724
Crude Oil Tankers	624	788	473	127	148	2,160
Chemical Tankers	281	278	501	338	76	1,474
Chemical/Oil Products Tankers	2,088	1,781	1,748	3,283	423	9,323
General Cargo Ships	1,705	2,692	3,779	9,794	217	18,187
Fishing Vessels	283	1,119	2,454	4,132	13	8,001
LNG Tankers	18	78	151	52	28	327
LPG Tankers	217	322	289	320	46	1,194
OSVs	491	245	220	889	155	2,000
Passenger (Cruise) Ships	58	157	109	183	8	515
Passenger – Passenger/Cargo (Ro-Ro)	287	674	670	1,702	26	3,359
Passenger Ships	222	788	776	1,128	28	2,942
Refrigerated Cargo Ships	62	298	945	1,232	5	2,542
Ro-Ro Cargo Ships	283	441	333	785	31	1,873
Livestock Carriers	0	7	6	88	0	101
Vehicle Carriers	221	213	191	117	42	784
TOTAL	10,109	14,120	15,339	26,818	1,804	68,190

Installation costs

7 Based on analysis that incorporated information from vendors and other sources, the range of expected BWMS purchase costs across system types and categories of ship types/sizes listed above was estimated to be \$640,000 to \$947,000. For all types of systems, there may be some economies of scale when purchasing bulk orders (e.g. 10 ships), reducing the cost of a system by \$40,000 to \$100,000 per unit, depending on the system type, although it is important to note that installation costs will vary widely, even within a particular ship type/size, depending on the characteristics of individual ships and the space and other requirements of specific types of BWMS. As a general rule it has been assumed in the majority of cases that a system will be installed aboard each qualifying vessel. However, depending on the number of ballast pumps aboard, at least two BWMS may be required. Additionally, on larger vessels containing very large volumes of ballast water, multiple BWMS may be required to handle the huge flow rates involved. A recent fleet installation involving two systems per ship and a bulk-equipment price resulted in a cost of approximately \$1,800,000 per vessel.

8 Even with all the necessary caveats due to uncertainty about implementation, enforcement, and compliance, the number of ships in the affected global fleet represents a massive potential global market for BWMS, perhaps 10,000 units per year (or 30 installations per day) for multiple years. Once all existing ships are in compliance, it is hoped that by 2017 or so, only newbuild ships will require the installation of BWMS, so global BWMS markets will then shrink to around 2,000 ships per year (five or so installations per day).

Installation logistics

9 Because of "**footprint problems**", many BWMS vendors offer modular systems that can be installed and connected together wherever there is adequate space. While these modular features make it possible for more BWMS to be considered potential candidates for installation aboard more types and sizes of ships, taking advantage of these modular features can add significantly to installation costs. As a general "rule of thumb", it might be assumed that installation costs would be approximately half the equipment cost. However, this 2:1 ratio could approach 4:3 if substantial footprint problems and increased fabrication needs are encountered.

10 Preliminary surveys of vendors and shipowners suggest that there will be minimal or no lost revenue from retrofitting a merchant ship with a BWMS as long as installation time fits within normal shipyard time. Hull painting is typically the critical path item in terms of limited shipyard capacity and usually requires a minimum of seven days. Interviews and follow-up discussions indicated that ballast water treatment retrofit could take up to one month to complete, depending on the degree of fabrication required. Although the cost of having a dedicated crew install a BWMS while the ship is at sea is slightly more expensive than having the system installed at a shipyard, survey information did not indicate that this would be a cost-prohibitive option for most vessel types if BWMS installation needs did not coincide with a routine shipyard visit. Interviews indicated that such installations have been successfully completed with no vessel downtime recorded. However, several ships may not have sufficient accommodation for the extra crew required for installation. This could mean installation would have to be done in stages, which would add to time and cost.