



Ballast Water Management – Impacts on vessels

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Requirements for Ballast Water Treatment Technologies

- ✚ Safety aspects; should not impair health and safety of ship or personnel
- ✚ Environmental acceptability; should not present any unacceptable harm to environment or public health
- ✚ Practicability; compatibility with ship design and operations
- ✚ Biological effectiveness in terms of removing, or otherwise rendering not viable, harmful aquatic organisms and pathogens in ballast water
- ✚ Cost effectiveness



Ballast Water Management – Impacts on vessels (1/7)

- ✚ BWM is complex issue due to:
 - International regulations
 - Technical solutions and requirements onboard ships
 - Environmental acceptance

- ✚ Impacts depend on following matters:
 - Retrofit or new building
 - Selected treatment technology
 - Operational issues

- ✚ Retrofit or new building:
 - Space available for treatment equipment
 - Age of the vessel
 - Locations for components



Ballast Water Management – Impacts on vessels (2/7)

- ✚ Selected treatment technology
 - Footprints between 0.25 and 25 m² for a 200 m³/h unit, with a mean value of 7 m²
 - For a unit of ten times this flow capacity, less information available
 - Maturity of technology
 - Logistics for consumables and spare parts

- ✚ Operational issues
 - Ballast water capacity
 - Effects on operation pressure levels, flow rates, power consumption, sediment management,
 - Time frame for ballasting operations; BWM should not cause any delays to ships' operations
 - Geographical aspects, shipping route, water quality (e.g. salinity, TSS), ecological aspects
 - Safety aspects, training, corrosion, effects on coating in tanks, pumps and pipes



Ballast Water Management – Impacts on vessels (3/7)

✚ Ballast water capacity:

- Range from several cubic meters (sailing boats and fishing boats) to hundreds of thousands of cubic meters (large cargo carriers)
- Large tankers > 200,000 m³ of ballast water

Vessel Types	Typical Pumping Rates (m ³ /h)
Dry bulk carriers	5,000–10,000
Ore carriers	10,000
Tankers	5,000–20,000
Liquefied-gas carriers	5,000–10,000
Oil bulk ore carriers	10,000–15,000
Container ships	1,000–2,000
Ferries	200–500
General cargo vessels	1,000–2,000
Passenger vessels	200–500
Roll-on, roll-off vessels	1,000–2,000
Fishing vessels	50
Fish factory vessels	500
Military vessels	50–100
Float-on, float-off vessels	10,000–15,000
Heavy lift vessels	5,000
Military amphibious assault vessels	5,000
Barge-carrying cargo vessels	1,000–2,000



Ballast Water Management – Impacts on vessels (4/7)

Utilization of biocides in BWM

- Attractive alternative due to their potential for destroying a wide range of organisms
- Biocides have been used for drinking and waste water disinfection, use for ballast water treatment differs from these applications
- In BWMS currently approved SEDNA[®] system is using PERACLEAN[®] OCEAN
- Biocides must fulfil the requirements set for BWMS's
- Environmental acceptance and safety issues are crucial
- Basically biocides requires bulk storage room, dosing and monitoring system
- Sediment management to be considered



Ballast Water Management – Impacts on vessels (5/7)

- ✚ Ships are required to have on board and implement a Ballast Water Management Plan approved by the Administration
- ✚ The Ballast Water Management Plan is specific to each ship and includes a detailed description of the actions to be taken to implement the Ballast Water Management requirements and supplemental Ballast Water Management practices



Ballast Water Management – Impacts on vessels (6/7)

- ✚ In July 2009, 8 treatment options have final approval, 16 treatment options have basic approval granted by IMO, according to G9 Guidelines
- ✚ Additionally, some methods available which do not require IMO approval (i.e. methods tested according to G8 Guidelines such as UV disinfection)

SEDNA ® OCEAN Ballast Water Management System (using PERACLEAN®) *	Germany
Alfa Laval/ Wallenius PureBallast System *	Norway
NEI	Liberia
Electro Clean System (ESC) *	Republic of Korea
OceanSaver® Ballast Water Management System *	Norway
Hyde Marine Hyde Guardian™	United Kingdom
TRO Ballast Water Management System (CleanBallast) *	Germany
NK03 BlueBallast System (Ozone) *	Republic of Korea
Hitachi Ballast Water Purification System (ClearBallast) *	Japan
Greenship Sedinox Ballast Water Management System *	Netherlands

Systems marked with *
= systems that use an active substance that has final approval

Ref. Lloyds, 2009

- ✚ Globally around 30-40 companies active in BW business



Ballast Water Management – Impacts on vessels (7/7)

✚ Time frame:

Baujahr	BW [m ³]	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
< 2009	1500 ~ 5000	D1/D2						D2					
< 2009	<1500 >5000	D1/D2						D2					
> 2009	< 5000							D2					
≥ 2009 < 2012	> 5000							D1/D2					
≥ 2012	> 5000							D2					

Ref.: Zettelmaier, 2009.

✚ Up to year 2019, around 50,000 ships should be equipped with BWTS



REACH & BPD

- ✚ **REACH** - European Community Regulation on chemicals and their safe use (EC 1907/2006)
- ✚ Deals with the **R**egistration, **E**valuation, **A**uthorisation and Restriction of **C**hemical substances
- ✚ Entered into force on 1 June 2007

- ✚ **Biocidal Product Directive (BPD)** 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market
- ✚ According to the Directive, Member States had to transpose the rules before 14 May 2000 into national law
- ✚ Aims to harmonise the European market for biocidal products and their active substances, and to provide a high level of protection for humans, animals and the environment



SeaKleen, Peraclean & Mexel vs REACH & BPD

- ✚ SeaKleen is a natural product (active principle vitamin K3)
- ✚ IMO's Final Approval granted to SEDNA system
- ✚ Seakleen and SEDNA: no need to consider REACH and/or BPD issues?
- ✚ Mexel 432/336/0 product is in conformity with REACH and BPD since:
 - ✚ Use of raw materials were declared according to the REACH regulation
 - ✚ Active ingredient was notified in BPD and it is actually evaluated for its inclusion in the annex one of BPD
 - ✚ In France, the Mexel 432/336/0 product is declared as biocidal product in BPD



References / Further information

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- ✚ IMO MEPC Report. 2009. Lloyds Register.
- ✚ REACH - http://ec.europa.eu/environment/chemicals/reach/reach_intro.htm
- ✚ BPD - <http://ec.europa.eu/environment/biocides/index.htm>