

Invasive and unwanted

IMO Ballast Water Management Convention - What is the ultimate goal and implication

Prof Dr. Marcel Veldhuis PhD MEA-nl





content

Introduction

- >Intention of IMO BWM Convention
- Current status (FQs, lessons learned)
- >Innovative solutions
- Is it all that bad at the moment !!!
- >The future





- toxic phytoplankton, biology behind BW treatment







The Problem: Marine biodiversity, invasive organisms and <u>ballast water of ships</u> ???

> Ballast water per se is OK

- The issue is Invasive Marine Species = Alien Invasive Species = non-indigenous organisms
- > 1 of 5 major threats to World's oceans;
- > Other 4 major threats are:
 - > climate change
 - > land-sourced marine pollution,



- overexploitation of living marine resources,
- physical alteration/destruction of habitat.









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Impacts

Ecological

> new invasion every 9 weeks

Economical

- Iosses in 100s of billions euro/year globally
- ➤ Tentative calculation results in documented costs species in Europe (IEEP-Project): 11.4 billion €/year (1.8 control, 9.6 damage)

> Human health

- Paralytic shell fish poisoning
- Cholera outbreaks







- importance of transport in spreading organisms
- Ballast Water capacity ship ~ 35% cargo cap.
- Transport 3* 10⁹ ton/year







Dreissena polymorpha

- •Infest >40% US waterways.
- •Fouls water intake pipes of industry.
- •Costs > US\$1 B to date



States with zebra mussels in inland and adjacent waters.







Ten of the Most Unwanted

Marine plants, animals and microbes are being carried around the world attached to the hulls of ships and in ships' ballast water. When discharged into new environments, they may become invaders and seriously disrupt the native ecology and economy. Introduced pathogens may cause diseases and death in humans.

1

The species presented here are for illustrative purposes only. Their introduced ranges may be greater than depicted. There are numerous other examples of serious marine bio-invasions around the world.













IMO/Ballast Water Convention 2004: The Regulation D-2, Ballast Water Performance Standards

reads:

- discharge less than 10 viable organisms
 per cubic metre greater than 50 µm
- discharge less than 10 viable organisms
 per ml in size range 10-50 µm
- restriction to number of indicator microbes
 (bacteria): V. cholereae, E. coli, enterococci
- > Almost drinking water













IMO has agreed 5 Primary Criteria for new BWT systems. Must be:

- ≻safe,
- >environmentally acceptable, (G9 procedure)
- > practicable,
- >cost effective, and
- >biologically effective.





Current status; FQs

>2004 BWM Convention

- 2015 11 years later no ratification, 59 new invasions have happened (1 every 9 weeks)
- Several updates of G9 guideline
- >2015 revision/update of G8 guideline
- >2012 USCG Rulemaking, with their own TA procedures





Current status; FQs why not adopted by ship owners ?

>BW is cost factor without revenues

Reduction in sediment

Entirely new piece of equipment,

- No proven reliability
- Complex retrofit installation
- Complex (multiple components)
- > Chemicals, and analytical procedures
- New instrumentation from non-maritime companies, but !!
 - Many water cooling systems use electrolysis to clean water
 - Chemicals are not unknown on board of ships





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Static to dynamic testing (MEA-INNOVATOR, 2012) Fresh water; underestimated water type !!!













> hydrocyclones,

> filtration,

- heat treatment,
- !! Market 20 billion euro !! 40% of industry in NS region
- > UV treatment,
- > ozone treatment,
- > chemical treatment (chlorine, formaline, PERACLEAN Ocean),

waste water treatment

- electro-ionization, !!!!!!
- > gas-super/under saturation,
- > combinations of above,
- 'silver bullets'









Innovative ideas

Drinking/potable water for ballast water

Van Oord BWM system
External drinking water source

>water maker Van Oord



> Mobile BWM system (DAMEN

concept)





Marine ingenuity







Lessons learned

- D2-Standard should be legally defendable, unfortunately biology differs largely
- No single step treatment
- Treatment may take some time (mindays)
- Results vary with test conditions (artificial soup) versus natural conditions
- Filtration, crucial step but does not obey common physical laws (biology)
- > Where are the marine biologist?





Future: How to procede

- First USCG TA BWM System?
- Smart ballasting
- New designs of BW tanks, system
- BWM system; Improvement and innovation (sediment !)
- Feed-back from the fleet
- Universal TA procedures and certificates
- NA, class, ship-owners should take their responsibilities (audit not witnessing)















without ballast

MEA-NL Sluiskolkkade 2 1779 GP Den Oever the Netherlands

Email: m.veldhuis@mea-nl.com

MEA-nl is an independent research and test facility

www.mea-nl.com







