Ballast Water Management: A Regulatory Road Map

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Overview

• Environmental Focus
• Ballast Water Management
• The Challenge
• The Solution – Ballast Water Convention
• Evolution of the Convention – The D2 Standard
• Factors to Consider
• The Approval Process
• Post Installation Survey Certification
• Port State Control
• Conclusion
Focusing on the Environment

Exhaust emissions (PM NO$_x$ So$_x$)

Garbage

Fire-fighting agents

Oil

Sewage (waste waters)

Refrigerants

Antifouling paints

Ballast water
Ballast Water Management

The introduction of unwanted aquatic organisms via ships’ ballast water is an internationally recognised problem.

The effects these introductions of can have an effect on human health, cause damage to local marine life and local economies.
What is the challenge?

Every year the world’s fleet moves 3 - 5 billion tonnes of ballast around the world.

Every day, 7000+ species of plants and animals are transported in ballast.

Every 9 weeks a new species is introduced somewhere in the world.
Some Species Found in Ballast Water

- Cholera
- Asian Sea Squirt & green alga
- Rainbow Jellyfish
- Zebra Mussel
- Mitten Crab
- Plankton
Why manage ballast water? Why have a ballast water convention?

European Zebra mussels cause an estimated $5bn per year in damages in North America.
The Solution:

International Convention for the Control and Management of Ships’ Ballast Water

Adopted Friday 13 February 2004
When will the Convention enter into force?

The convention will enter into force 12 months after at least 30 States, the combined merchant fleets of which constitute at least 35% of the gross tonnage of the world’s merchant shipping have ratified the Convention.

As of 1 April 2012 there were 33 ratifications of the Convention representing 26.46% of the GT of the world's shipping.

Albania, Antigua and Barbuda, Barbados, Brazil, Canada, Cook Islands, Croatia, Egypt, France, Iran, Kenya, Kiribati, Lebanon, Liberia, Malaysia, Maldives, Marshall Islands, Mexico, Mongolia, Montenegro, Netherlands, Nigeria, Norway, Palau, Republic of Korea, Saint Kitts and Nevis, Sierra Leone, South Africa, Spain, Sweden, Syrian Arab Republic, Trinidad & Tobago, Tuvalu
What does the convention require?

All ships will be required to:

• carry out ballast water and sediment management on all voyages

• have on board an approved ballast water management plan and a ballast water record book

• Ships of 400 gt and above subject to surveys and certification
Ballast water managements options

Ships are permitted to discharge ballast only if they have:

Carried out Ballast Water Exchange (BWE)

or

Used an approved ballast water ‘treatment’ system.

The convention is now shifting to a “treatment” requirement
Practical Compliance Considerations

- Japan has estimated that approximately 62,000 BW Treatment Systems will require fitting in this decade
- That number includes 1400 New buildings per year
- On average over 20 ships/day would need to be fitted to meet compliance date
- If you consider new construction schedules, and phasing in of requirements, largest chokepoint would be in 2017
- If assumptions hold, in 2017, 45 ships/day would need to be fitted with BWMS
- The numbers alone are staggering, but what about manufacturing capacity? Installation capacity and infrastructure? Etc…Currently approximately 100 shipyard with capacity
Evolution of the Convention: The D-2 standard

Discharge less than 10 viable organisms per cubic metre greater than or equal to 50 micrometers in minimum dimension;

Discharge less than 10 viable organisms per millilitre less than 50 micrometers in minimum dimension but greater than 10 micrometers in minimum dimension;

And discharge of the indicator microbes shall not exceed the specified concentrations.
Treatment standard

Indicator microbes, as a human health standard, shall include:

a. Toxicogenic *Vibrio cholerae* (01 and 0139) with less than 1 colony forming unit (cfu) per 100 millilitres or less than 1 cfu per 1 gram (wet weight) zooplankton samples;

b. *Escherichia coli* less than 250 cfu per 100 millilitres;

c. Intestinal Enterococci less than 100 cfu per 100 millilitres.
What do I have to do and when

Vessels constructed before 2009:

Ballast water capacity 1,500m$^3$ to 5,000m$^3$; **Exchange or Treatment** until 2014; **Treatment only** after 2014.

Ballast water capacity less than 1,500m$^3$ or more than 5,000m$^3$; **Exchange or Treatment** until 2016; **Treatment only** after 2016.

Vessels to comply by the first intermediate or renewal survey, which ever comes first, after the anniversary date of delivery.
What do I have to do and when

Vessels constructed on or after 2009:
Ballast water capacity less than 5,000m$^3$; **Treatment only**

Vessels constructed between 2009 and 2012:
Ballast water capacity more than 5,000m$^3$;
**Exchange** until 2016; **Treatment only** after 2016.

Vessels constructed on or after 2012:
Ballast water capacity more than 5,000m$^3$; **Treatment only**.
## What and when?

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**D1 = exchange**  **D2 = treatment**

* By the first intermediate or renewal survey after the date of delivery in 2014 or 2016
IMO vs USCG

- USCG Final Rule is expected to come into force 21 June 2012
- Current standard aligns with IMO until 2013, with potential deviation from 2013 – 2017
- Significant differences in Land-Based and Shipboard Testing Requirements
- USCG requires the following installation
  - System to be approved by USCG
  - Installation of approved system on existing ships during the 1st dry docking after 01 January 2014 or 2016 depending on ballast volume
  - Installation of approved system applies to new vessels delivered from 01 December 2013
Ballast Water Treatment

- Must be safe (For ship and crew)
- Must be environmentally acceptable.
- Must be cost-effective.
- Must work
- Must be approved
# Treatment Processes

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Factors to Consider When Selecting a Treatment System

- Approval Status/Recognition
- Ship type
- Ballast capacity
- Space required (foot print and volume)
- Flexibility of location of system components
- Effects of pressure drop

- Approval Time
- Integration with exiting systems
- Certified intrinsically safe
- Power availability
- Chemical availability
- Availability of Installation Facilities
- Operations Interruption

- Health and Safety
- Effects on tank structure/coatings
- Availability of consumables, spares and support (servicing)
- Additional crew workload
- Crew training

- Capital and Operating Cost
- System availability – delivery time
- Water Conditions in area of operation
- Maintenance Requirements
- Treatment Time

- Future Regulatory Standards
Treatment System Availability

- Current state of the industry
  - Approximately 50 available systems on the market
  - Approximately 20 of which are considered “fully approved”
  - 10-20 systems are currently at various stages of approval
  - 500 installations worldwide
The Approval Process - The IMO Model

IMO Approval Environmental impact (G9)

- Systems using an active substance
  - Basic approval
    - Land based testing
      - Ship-board testing
        - Final approval
          - Type approval certificate

- Systems NOT using an active substance
  - Land based testing
    - Ship-board testing
      - Final approval
        - Type approval certificate

IMO Approval Environmental impact (G8)

System Approval by flag state (G8)

- Issue of type approval certificate by flag (G8)
Approval Requirements

• Treatment systems are required to be approved in accordance with IMO G8 guidelines (MEPC. 174(58) or MEPC.125(53))

• If the system uses or produces an ‘active substance’ – the substance must be approved (basic and final) by the IMO in accordance with the IMO G9 Guidelines (MEPC.126(53))

• Currently 23 fully type approved systems in accordance with G8 available others expected in the coming months
Type Approval Process – USCG Model

- Land-Based Testing (ETV protocol)
- Shipboard Testing (STEP protocol)
- Environmental Testing – Shake, Rattle, and Roll
- Mechanical/electrical/engineering verification
Post Installation Surveys and Certification

International Ballast Water Management Certificate

Valid five years subject to:

Annual surveys
Intermediate survey
Renewal survey

(Interim Survey guidelines in BWM.2/Circ.7)
What will PSC be looking for? What will they check?

The PSC inspection guidelines for the BWM Convention are still under consideration by the IMO, but are believed to align with current PSC activity.

- An initial inspection

- A detailed inspection if there are clear grounds the vessel is not complaint with the Convention.

- If the PSCO's general impressions and visual observations on board confirm a good standard of compliance with the Convention, the PSCO should generally be content with an initial inspection.

- If there are “clear grounds” a more detailed inspection may be carried out.
PSC inspections

Initial inspection will consists of a check for:

- A valid Certificate
- An Ballast Water Management Plan (BWMP) approved in accordance with G4
- A type approval certificate for the BW treatment system
- A Ballast Water Record Book correctly completed
- Check of the onboard monitoring device

Plus may also include:

- For exchange a check of the salinity of random of tanks
- For treatment systems an indicative sample and analysis of the BW discharge.
Conclusion

• Time is a critical concern
• D-2 standard implementation is imminent
• To avoid potential bottlenecking as implementation date nears, engagement is essential
• Engage designers, manufacturers, regulators and class societies
• The value of the system is only realised when it can be demonstrated through a robust Type Approval process
Thank you

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