

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



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 9 weeks a new species is introduced somewhere in the world

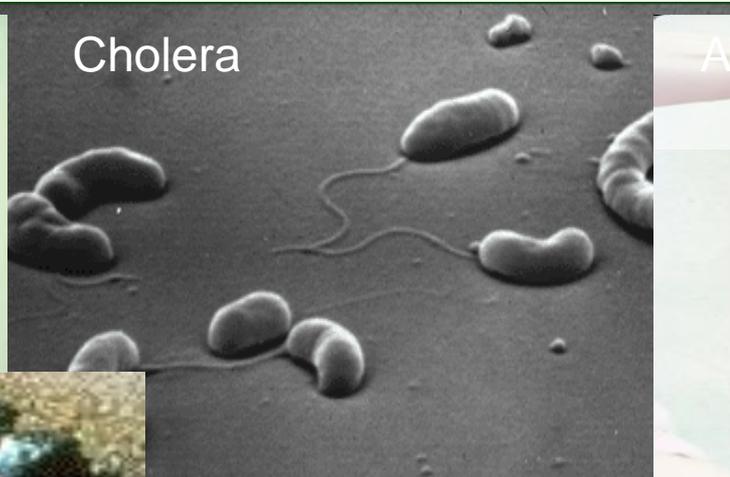
Every day, 7000+ species of plants and animals are transported in ballast

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

Some Species Found in Ballast Water



Plankton



Cholera



Asian Sea Squirt & green alga



Zebra Mussel



Rainbow Jellyfish



Mitten Crab

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 worlds shipping.

Albania, Antigua and Barbuda, Barbados, Brazil, Canada, Cook Islands, Croatia, Egypt, France, Iran, Kenya, Kiribati, Lebanon, Liberia, Malaysia, 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 1,500m³ to 5,000m³; **Exchange or Treatment** until 2014; **Treatment only** after 2014.

Ballast water capacity less than 1,500m³ or more than 5,000m³; **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 5,000m³; **Treatment only**

Vessels constructed between 2009 and 2012:

Ballast water capacity more than 5,000m³;

Exchange until 2016; **Treatment only** after 2016.

Vessels constructed on or after 2012:

Ballast water capacity more than 5,000m³; **Treatment only.**

What and when?

Built	BW M ³	2009	2010	2011	2012	2013	2014	2015	2016	
pre 2009 *	1500 - 5000	D1 or D2					D2*			
	<1500 >5000	D1 or D2							D2*	
2009	<5000	D2								
2009 to 2012	>5000	D1 or D2							D2*	
2012	>5000				D2					

D1 = exchange D2 = treatment

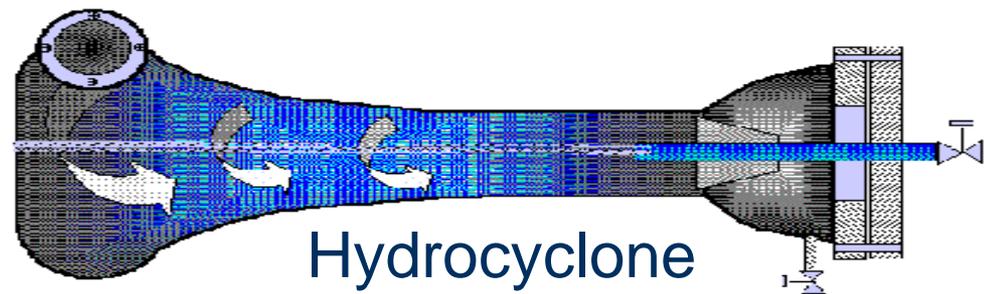
* By the first intermediate or renewal survey after the date of delivery in 2014 or 2016

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

Physical solid-liquid separation	Disinfection	
	Chemical	Physical
Filter	Chlorination	De-oxygenation
Hydrocyclone	Electro Chlorination	Ultraviolet
	Chlorine Dioxide	Ultrasonic
	Hydrogen Peroxide	
	Peracetic Acid	
	Vitamin K	
	Ozonation	

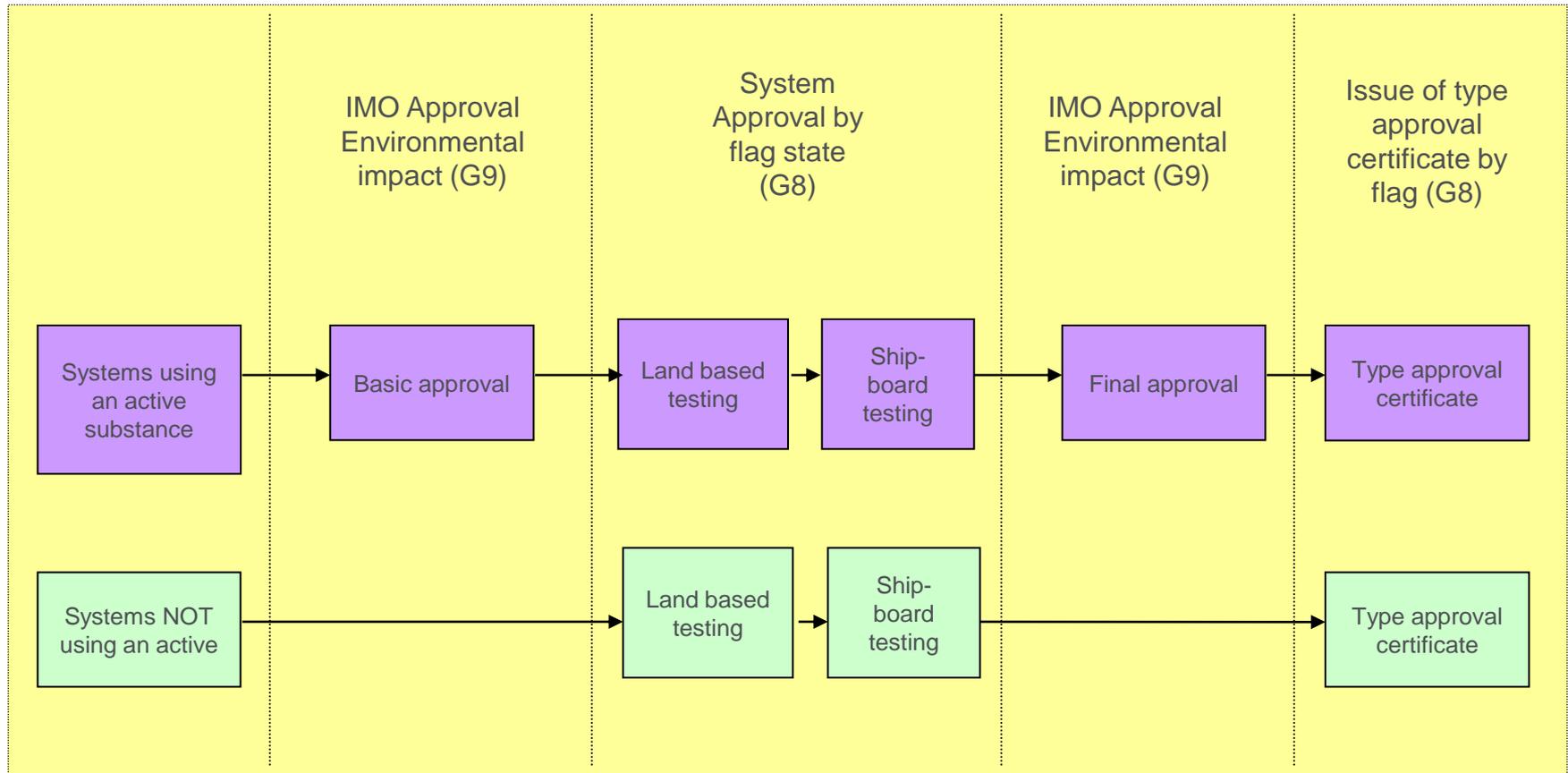
Factors to Consider When Selecting a Treatment System

- **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 existing 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



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 compliant 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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