• **Introduction to the BWM Convention and BWM options**

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**About the workshop**

- Several BWM related courses have been held in the region
  - Introductory
  - Legal
  - PBBS
- First IMO-GloBallast training on the CME aspects of the BWM Convention
- Developed in partnership with IUCN and WMU, with support from the Total Foundation and the MPA of Singapore
- Pilot training – the first step towards a training course to be delivered in all regions
- Your feedback is therefore **crucial!**
The issue

- Shipping crucial part of the global economy
- ‘Competes’ with other crucial human activities in the marine environment
- Impacts?

Crude oil seaborne trade
Main inter-area movements in million metric tonnes, 1994

WORLD TRADE 1,400 million tonnes

Area totals include smaller routes not shown separately.
Ballast water - necessary for safe shipping

Impacts over time: oil pollution vs marine bio-invasions
Global Response to BW Issue

At IMO

- IMO-MEPC 1991
- IMO-Res. A.774(18) in 1993
- IMO-Res. A.866(20) in 1997
- IMO-BWM Convention 2004

UN wide/global

- UN Conference on Env. and Dev.1992 (Rio de Janeiro)
- WSSD 2002 (Johannesburg)

The International Convention on Ballast Water Management

- Adopted on 13th of Feb. 2004
- 27 countries are Parties as of March 2011
- Ratification process through parliament in a number of other countries
- Entry into Force – Needs 30 Countries / 35 % World GT
Plethora of national and regional BWM regulations

Structure of the IMO BWM Convention

- Preamble
- 22 Articles
- Annex (regulations)
- Guidelines
## Contracting Parties as of March 2011

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<thead>
<tr>
<th>Albania</th>
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<tr>
<td>Antigua and Barbuda</td>
<td>Marshall Islands</td>
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## Objective of the Convention: Preamble

**WHAT:** “to prevent, reduce and ultimately eliminate the risks to the environment, human health, property and resources caused by the transfer of aquatic organisms and pathogens” by ships

**HOW:** “through the control and management of ships’ ballast water and sediments”

The discharge of ballast water into the sea shall be managed according to the provisions of the BWM Convention.
Articles - Highlights

- Article 1 – Definitions
- Article 2 – General Obligations
- Article 3 - Application
- Article 4 – Obligations for Parties
- Article 5 - Sediment Reception Facilities
- Article 6 - Scientific and Technical Research
- Article 7 - Survey and Certification
- Article 8 - Violations
- Article 9 - Inspection of Ships
- Article 10 – Detection of violations and control of ships
- Article 11 - Notification of control actions
- Article 12 – Undue delay
- Article 13 – Technical Assistance
- Article 14 – Communication of information

Regulations - Highlights

- Section A - General Provisions
- Section B - Management and Control Requirements for Ships
- Section C - Special Requirements in Certain Areas
- Section D - Standards for Ballast Water Management
- Section E - Survey and Certification Requirements for Ballast Water Management

Appendices
- Form of International BWM Certificate
- Form of ballast water record book
General obligations: Article 2

Article 2.1
Parties undertake to give full effect to the provisions of this Convention to prevent, minimize and ultimately eliminate the transfer of Harmful Aquatic Organisms and Pathogens through the control and management of ships’ ballast water and sediments.
Article 1: Definitions

- “Ballast Water” means water with its suspended matter taken on board a ship to control trim, list, draught, stability or stresses of a ship.
- “Sediments” means matter settled out of ballast water within a ship.

Application - Article 3

- Ships of a Party or operating under the authority of a Party;
- All ships that carry ballast waters; with the exception of ships carrying permanent ballast water in sealed tanks, not subject to discharge;
- Ships engaged in international travel, unless otherwise determined;
- Excluded in principle: warships, naval auxiliary or other ships owned or operated by a state and used on government non commercial service.
Generic Options for Ballast Water Management

**NO BALLAST ONBOARD OR NON DISCHARGE**
- Sequential

**EXCHANGE**
- Flow Through
- Dilution*

**ON-BOARD TREATMENT**
- Mechanical: Filtration, Cyclonic separation
- Chemical: Disinfectant, Organic biocides
- Physical: Heat, Ultra violet, Ultra sound

**ISOLATION**
- Shore Reception facilities

### BWM Convention: Management Options

1. **Ballast Water Exchange** to meet “D1” Standards
2. **Ballast Water Treatment** to meet “D2” Standards
3. Alternate Options to provide equivalent environmental protection as Options 1/2
Open ocean exchange to meet the D-1 Standard

Option 1 – Empty-Refill

Original water | Empty | New ocean water

Option 2 – Flow Through

Original water | 1 tank exchange | 2 tank exchange | 3 tank exchange

3 times exchange

BWMC Highlights, Section B

Regulation B-4 Ballast Water Exchange

- BWE should be undertaken:
  - 200 nm and 200 m depth, or if not possible
  - 50 nm and 200 m depth, or if not possible
  - in areas designated by the Port State, however
  - neither deviation nor delay of the ship
  - BWE should only be undertaken when safety of the ship is guaranteed
Safety during ballast water exchange

Ballast Water Treatment
to meet the D-2 standard
### D2 Standards

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<th>Maximum number</th>
<th>volume</th>
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<tr>
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<td>1 tonne</td>
</tr>
<tr>
<td>Size = 10 to 50 microns</td>
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<td>1 mL</td>
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<tr>
<td><strong>Microbes (colony forming units, cfu)</strong></td>
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<tr>
<td>V. Cholerae</td>
<td>1</td>
<td>100 mL</td>
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<tr>
<td>E. Coli</td>
<td>250</td>
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<tr>
<td>E. Cocci</td>
<td>100</td>
<td>100 mL</td>
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### Generic Treatment Process Options (examples)

**Primary Treatment:**
- Filtration
- Centrifugation

**Chemical Treatment:**
- Chlorination
- Electrochlorination
- Ozonation
- Peracetic acid
- Chlorine dioxide
- Ferrate (Fe-VI)

**Physical Treatment (PT):**
- UV irradiation
- UV-Advanced Oxidation
- Deoxygenation
- Ultrasonic
- Cavitation
- Shear force

**Residual Control (if needed):**
- Chemical reduction
Approval of BWM Systems

• Guidelines for approval of Ballast Water Management Systems (G8)

• Procedure for Approval of BWM systems that make use of Active Substances G(9)
Costs

• Depends on the size of the system
• Cost range 100k – 1,000k or above
• Operating cost ranges from US$0.01-0.2/tonne of ballast water
Availability of BW Treatment Systems

Out of approximately 50 systems under development:

- 27 have been given Basic Approval
- 18 have been given Final Approval
- 12 systems have been given Type Approval

Current time frames

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<td>5000 or more</td>
<td>treat</td>
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Sources of information

- IMO Website
- *Ballast Water Treatment Technology: Current status.* Lloyd’s Register (available from their website)
- *Review of two decades of progress in the development of management options for reducing or eradicating phytoplankton, zooplankton and bacteria in ships’ ballast water,* Aquatic Invasions (2009), Vol.4, issue 3, p 521-565

Alternative BWMS – currently under development
Regulation B-3, Paragraph 7

“Other methods of Ballast Water Management may also be accepted as alternatives to the requirements described in paragraphs 1 to 5, provided that such methods ensure at least the same level of protection to the environment, human health, property or resources, and are approved in principle by the Committee.”

Potential alternative methods

- No Ballast / Zero Discharge Methods
  - Zero Ballast Water Concepts
  - Storm Ballast Only Concept
  - Internal Ballast Concept
  - Potable Ballast Concepts

- Continuous Flow Methods
  - Buoyancy Control Concepts
  - Enhanced Ballast Tank Exchange Concepts
Some Articles and Regulations - Highlights

Article 5 - Sediment Reception Facilities

- Where cleaning and repair of BW tanks occurs
- Safe disposal of sediments (should not damage the environment)

Article 6 - Scientific and Technical Research

- Parties shall promote, facilitate and monitor research on BW Management (BWM)

Article 7 - Survey and Certification

- Each party shall survey and certify its ships
Article 8 - Violations

- The violations to the requirements of the Convention shall be **prohibited** and **sanctions** established under the law;
- The sanctions provided by the law shall be adequate in **severity** to discourage violations.
  - Alleged violations should be **investigated**
  - If violation is proven, the State shall **prosecute**

Article 9 - Inspections of Ships

- Includes inspection of BW record book, validity of Certificate and BW sampling -> **no undue delay**
- ships without valid certificate -> detailed inspection and no BW discharge until proven harmless
Article 13 - Technical Assistance, Co-operation and Regional Co-operation

- Train personnel, availability of technology, equipment and facilities, joint research, implementation of BWMC

Article 14 - Communication of Information

- Each Party shall report to IMO on BWM requirements and on availability of reception facilities

**Flag State obligations**

- ensure compliance by vessels flying their flag, and that operational requirements are met
- enact domestic laws to implement the Convention
Flag State obligations, continued

- on each vessel, an officer is designated with BWM responsibility
- crew members are adequately trained
- establish appropriate procedures for the issuing of the International Ballast Water Management Certificate.

Port State Obligations

- enact domestic laws
- establish a CME system, including inspection of vessels
- Ensure adequate facilities for sediment reception
- notify IMO and other Parties of national requirements
Port State Obligations

- notify IMO and other Parties of national requirements and procedures for BWM and any requirements for ships unable to comply with the Convention.

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IMO-GloBallast and Republic of Turkey

Global R&D Forum and Exhibition on
Ballast Water Management

Compliance Monitoring and Enforcement – the Next R&D Challenge and Opportunities
26 – 28 October 2011

Pre-Conference Shipbuilders’ Forum
25 October 2011
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