Port of Antwerp

The environment and the Port of Antwerp

A. Heylen
Ballastwater

- What
- Impact
- Ballastwater management tips
- Technical means
- International regulation IMO ballastwater convention
- Local situation
What is ballastwater?

- In ships, ballast is used to maintain balance, stability and structural integrity, especially when the ship is empty of cargo.
- Ships have carried solid ballast, in the form of rocks, sand and metal for thousands of years. Modern ships use water as ballast.
The problem - impact

- Marine species are being carried around the world in ships’ ballast water.
- When discharged into new environments, they:
  - May become invasive
  - Can disrupt the native ecology
  - Can have an impact on economy (fisheries, …)
  - Can cause disease and death of human beings
Facts

- 12 billion of tonnes of ballast water are carried around the world each year
- 4,500 different species are carried around the world in ships’ ballast
- Every 9 weeks a marine specie invades a new environment somewhere in the world
- Invasive marine species are one of the four greatest threats to our oceans
Alien invaders - putting a stop to the ballast water hitch-hikers

Great Lakes

- Invasion of alien species to the Great Lakes dates back to the opening of St. Lawrence Seaway in 1959. By 2006, over 120 alien species had been identified, including the European zebra mussel and the tiny fish.

- Possible solutions to minimize the risk of introducing harmful aquatic organisms with ballast water:
  - Ballast water exchange in deep sea, as far as possible from source.
  - Non-release of ballast water.
  - Tailing the ballast water on ports such as with heating, chilling, or ultraviolet radiation.
  - Deploying the ballast water in special reception areas at the port.

Tropical Green Algae

- Coated with algae: Breeding grounds for small fish and invertebrates. In 1994, it was first recorded covering an area of 1,000 square meters off Mauritius. Today, thousands of hectares along the coasts of France, Spain, Bay of Biscay.

Round Goby

- Origin: Neogobius melanostomus
- Native to the Black Sea, first introduced to the Great Lakes in 1988.

European Zebra Mussel

- Origin: Dreissena polymorpha
- Introductions to the Great Lakes in 1988.

European Triplet Calm

- Origin: Cottus gobio
- Introductions to the Great Lakes in 1988.

Northern Pacific Kelp

- Origin: Undaria pinnatifida
- Introduced to Tasmania and Port Phillip Bay, Australia.

Giant Fan Worm

- Origin: Sabella Nigrisaeformis
- Introduced to southern parts of Australia.

Northern Pacific Sculpin

- Origin: Astacias amurensis
- Introduced to Tasmania and Port Phillip Bay, Australia.

- Possible ballast water impacts:
  - ballast water per ship: several hundred thousand to over 100,000,000 liters, depending on the size and purpose of the vessel.
  - Number of species per ship: 100 species of animals and plants transplanted (bacteria, viruses, algae...).

Ballast water is a crucial element in world trade, transporting more than 50% of goods and commodities around the world. Ballasting of ships is a necessary requirement to keep safe operation when sailing empty to pick up cargo or with a light load, and it has been recognized for years that the only effective way to stop the spread of unwanted organisms is to prevent them being dumped in foreign ports.
• IMPACT
American Ctenophore (Comb Jelly)

(Mnemiopsis leidyi)

Origins: East coast of the Americas
Introduced to: The Black Sea
First sighting: 1970s

The comb jelly (an organism with similarities to a jellyfish) is a voracious predator on zooplankton, fish eggs and larvae - thereby depriving other species of this source of food. It has been largely responsible for the collapse of the sprat and anchovy fishing industries in the Black Sea.
Great Lakes
Invasion of alien species to the Great Lakes dates back to the opening of St Lawrence Seaway (1959). By 1996, more than 130 alien species had been identified, including the European zebra mussel and the goby fish.

EUROPEAN ZEBRA MUSSEL
(Dreissena polymorpha)
Origins: Eurasia
Introduced to: Great Lakes
First sighting: 1980s

In 1990, the United States federal government pledged 11 million US dollars per year to fight the zebra mussels, which were causing problems by swarming near water intake pipes of power plants and factories, in some cases clogging them completely. The zebra mussel also competes with native fish for plankton, affecting native fish populations.
Toxic Algae (Red/Brown/Green Tides)
Various species

Native to: Various species with broad ranges.
Introduced to: Several species have been transferred to new areas in ships’ ballast water.
Impacts: May form Harmful Algae Blooms. Depending on the species, can cause massive kills of marine life through oxygen depletion, release of toxins and/or mucus. Can foul beaches and impact on tourism and recreation. Some species may contaminate filter-feeding shellfish and cause fisheries to be closed. Consumption of contaminated shellfish by humans may cause severe illness and death.
North Pacific Seastar
*Asterias amurensis*

**Native to:** Northern Pacific

**Introduced to:** Southern Australia

**Impacts:** Reproduces in large numbers, reaching ‘plague’ proportions rapidly in invaded environments. Feeds on shellfish, including commercially valuable scallop, oyster and clam species.
Chinese mitten crab

- Origins: Asia (Korea to southeast China)
- Introduced to European waterways
- First sighting 1992
- These migrating crabs have clogged California’s water delivery facilities and disrupted fish operations
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### Ballastwater capacities in % of DWT

<table>
<thead>
<tr>
<th>Type of Vessel</th>
<th>Capacity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ULCC &gt; 300,000</td>
<td>30%</td>
</tr>
<tr>
<td>ULCC &gt; 200,000</td>
<td>30%</td>
</tr>
<tr>
<td>Suezmax tankers (120,000-200,000)</td>
<td>30%</td>
</tr>
<tr>
<td>Aframax tankers (80,000-120,000)</td>
<td>30%</td>
</tr>
<tr>
<td>Older an/or smaller tankers</td>
<td>20%</td>
</tr>
<tr>
<td>LNG/LPG tankers</td>
<td>20-30%</td>
</tr>
<tr>
<td>OBO's and Ore/Oil tankers</td>
<td>30%</td>
</tr>
<tr>
<td>North Sea shuttletankers (60-120,000)</td>
<td>40-50%</td>
</tr>
<tr>
<td>Bulkcarriers Capesize</td>
<td>20%</td>
</tr>
<tr>
<td>Bulkcarriers Panamax (60,000-80,000)</td>
<td>20%</td>
</tr>
<tr>
<td>Bulkcarriers Handysize (20,000-60,000)</td>
<td>20%</td>
</tr>
<tr>
<td>General cargo</td>
<td>10-15%</td>
</tr>
<tr>
<td>RoRo's</td>
<td>20-25%</td>
</tr>
<tr>
<td>Vehicle carriers</td>
<td>20-25%</td>
</tr>
<tr>
<td>LASH vessels</td>
<td>30%</td>
</tr>
<tr>
<td>Container vessels</td>
<td>10-15%</td>
</tr>
<tr>
<td>Post Panamax Container vessels</td>
<td>30%</td>
</tr>
</tbody>
</table>
Ballastwater management tips

- Perform open ocean exchange if safety permits
- Minimize ballasting in ports and costal areas
- Minimising the uptake of organisms during ballasting
- Reduce invasions via hull and anchor fouling
- Avoid ballast uptake at night
- Avoid ballast uptake in ‘hot spots’
• Mechanical and physical treatment:
  – Filtration
  – Separation
  – Sterilisation via
    • Ozone
    • Ultraviolet light
    • Electric current
    • Heat treatment
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GENERAL ARRANGEMENT

FIGURE 4

MSI SYSTEM—"CAPE MAY" GENERAL ARRANGEMENTS

MARITIME SOLUTIONS, INC.
Chemical treatment adding biocides to ballast water to kill organisms
Ballast water treatment

- It must be safe
- It must be environmentally acceptable
- It must be cost-effective
- It must work
IMO resolution A.868(20)
Guidelines for the control and management of ship’s ballastwater to minimize the transfer of harmful aquatic organisms and pathogens was adopted
27 November 1997
In February 2004 the International Convention for the Control and Management of Ship’s Ballastwater and Sediments, 2004 was agreed.
• Twelve months after ratification by:
  – 30 States
  – Representing 35% of world tonnage
Current Ratification Status
As of today 6 countries have ratified the Convention
• Saint Kitts and Nevis
• The Syrian Arab Republic
• Spain
• Nigeria
• Tuvalu
• Maldives
Ballastwater Convention

- Ballastwater Management Plan
  - Articles
- Annex
  - Section A: General provisions
  - Section B: Management and Control Requirements for Ships
  - Section C: Special Requirements in Certain Areas
  - Section D: Standards for Ballastwater Management
Section B – Requirements

- Ballastwater Management Plan
  - safety procedures
  - implementation of the plan
  - disposal of sediments
  - procedures for coördination BWM with coastal states
• D1 ~ 95% volumetric exchange
• D2 ~ treatment system
• D4 ~ prototype technologies can make the ship immune to the regulation for 5 years
1. > 200 nm from and and > 200 metres depth
2. > 50 nm from land and > 200 metres depth
3. Port State may designate exchange areas
   • Ship cannot be made to deviate from voyage for 1 and 2 above. Ship shall not be required to comply with 1, 2 or 3 if it would threaten the safety of the ship
Existing Ships (built before 2009)

- Ballast capacity 1500 tot 5000 m³:
  - D1 ~ 95% exchange, or – D2 ~ BW
  treatment standard – until 2014 and then must comply with D2

- Ballast capacity < 1500 or > 5000 m³:
  - D1 ~ 95% exchange, or – D2 ~ BW
  treatment standard – until 2016 and then must comply with D2
New Ship Constructed 2009 with BW capacity < 5000 m³
• D2 (ballastwater performance standard)

New Ship Constructed 2009 with BW capacity > 5000 m³
• D1 (ballastwater exchange) or D2 …
• … until 2016 then D2
Ballastwater exchange at sea is
- Time consuming
- Risky business
- Schip’s captains do not like it
Regulate the discharge of:

- Ballast water
- Cleaning water

Now: everything is prohibited
In Antwerp

• Made a draft proposal in consultation with and advise of:
  – City environmental department
  – Flemish environmental organisation
  – Flemish waste department
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In Antwerp

- Comments:

  You as port are not competent
  \[ \pm \text{ 2 years standstill} \]
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Problems

- Discharge license
- Everything in a reception facility?

Some figures:
- $\pm 30\%$ of the GT is BW-cap
- 8000 TEUS CTR-ship: $\pm 20,000m^3$ BW-cap
- Bulk-carriers with BW in a hold: 15,000$m^3$
  20,000$m^3$ ballast tanks excluded
- Ro-ro vessels: automatic ballasting
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Solutions?

- Prohibit ballasting?
- Analyse before discharge?
- Waiting time?
- Controls: Antwerp 15,000 ships/year
- 65,000 inland navigation personnel?
- Costs?
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Solutions?

- Ports can not solve the problem!  
  Concurrence regio Rotterdam/le Havre

- **BW** should be ok before entering
  - BW-convention of IMO (BW exchange)
  - Treatment on board:
    - Chemical
    - Heat
    - UV-light
    - Electric currents
    - ...
    - Combination of ...
In Antwerp

- Big ships arrive fully loaded
  bulk carriers (ore-coal-grain) – oil tankers
- Draft limited to 15,5m at HT
- Do not discharge BW in Antwerp
- Other ships: not the large quantities
- Competition Regio Rotterdam/le Havre