Philip T. Jenkins & Associates, Ltd

Smithsonian Environmental Research Center

NOBOB RESEARCH

Best Management Practices Overview

September 2006

Research Funded By: GLPF USCG NOAA USEPA TC

Ballast Management Regulation Development

1989	Canada introduces Voluntary Ballast Exchange Guidelines for ships entering the Great Lakes.
1991	International Maritime Organization (IMO) endorses ballast exchange, issues preliminary guidelines.
1993	United States introduces mandatory regulations for ballast exchange, recording and reporting for ships entering the Great Lakes.
1997	IMO adopts Resolution A.868(20). Guidelines for the Control and Management of Ships Ballast Water to Minimize the Transfer of Harmful Aquatic Organisms and Pathogens.
2000	Shipping Federation of Canada introduces a Code of Best Practices for Ballast Water Management.

The Shipping Federation of Canada Code of Best Practices for Ballast Water Management

Basic principles:

Conduct ballast water management whenever practical and at every opportunity in order to:

- Ensure that residual ballast on board will be subjected to management practices.
- Minimize sediment accumulation in ballast tanks.
- Where mid-ocean exchange is practiced, subject fresh water organisms to an extended exposure to salt water.

www.shipfed.ca/eng/library

SFC Code Basic Principles

- Regular inspection of ballast tanks and removal of sediment.
- The ability for inspectors to verify compliance by maintaining records/logs of all required activities.
- Fostering of and support of scientific research through access to the ship and to the ballast tanks for water and sediment sampling.
- Cooperation and participation in standards development and the testing of treatment and management systems.
- Compliance with all regulations pertaining to ballast water management including open ocean exchange, all port state reporting requirements and the proper disposal of sediment.

SFC Code Basic Principles

A precautionary approach to the uptake of ballast through minimizing ballasting operations under the following conditions:

- In areas identified with toxic algal blooms, outbreaks of known populations of harmful aquatic organisms and pathogens, sewage outfalls and dredging activity.
- In darkness.
- In very shallow water.
- Where a ship’s propellers may stir up sediment.
- In areas with naturally high levels of suspended sediments.
- In areas where harmful aquatic organisms or pathogens are known to occur.

SFC Code Basic Principles

- In undertaking all ballast management processes

SAFETY OF THE SHIP IS PARAMOUNT

Salient Factors from the Great Lakes NOBOB Study Management Practices Assessment

- Sediment suspended in the incoming ballast will deposit on any horizontal surface and accumulate in any area where drainage may be inhibited.

- In forepeak and hopper side tanks where both the water table and horizontal surface areas are greatest, deposits are most significant.

Salient Factors from the Management Practices Assessment

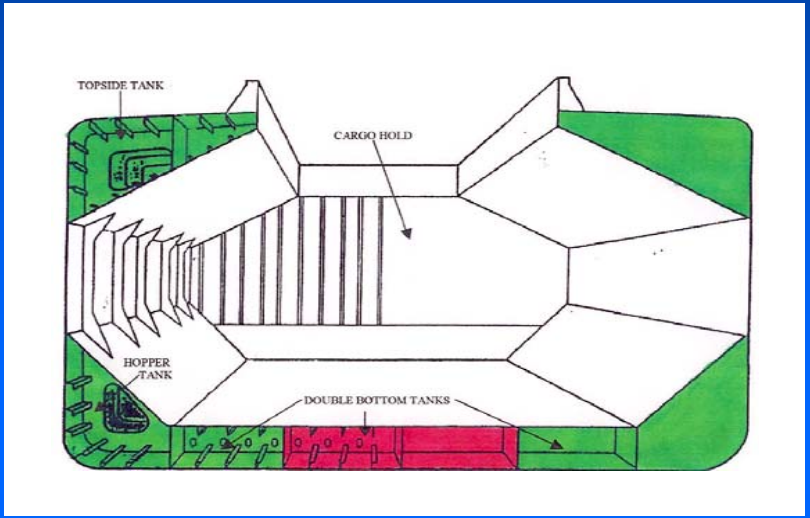
- Sediment deposits in a ship’s double bottom mainly in the hopper side tank section where the water column is deepest and thus accumulation greatest.

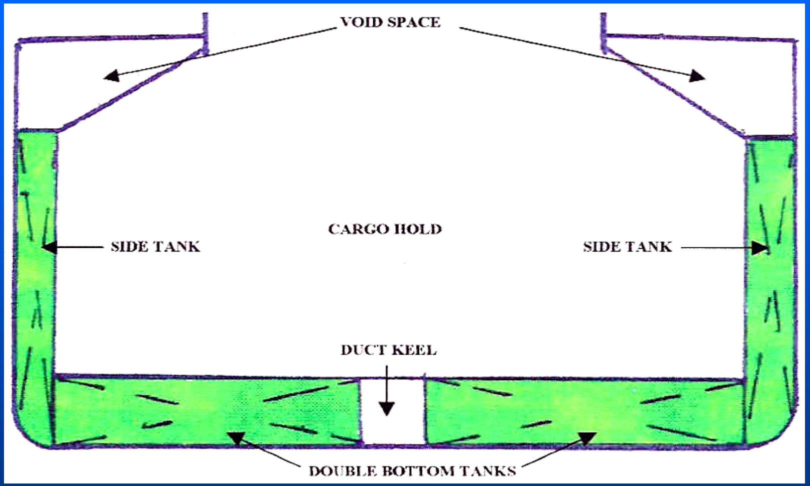
- Sediment collects on the bottom and bilge shell outboard of bottom internals and particularly if drainage is poor, Once allowed to accumulate it congeals and stratifies.

Salient Factors from the Management Practices Assessment

- Given the difficulties involved in tank cleaning – particularly on North Atlantic trades, and with cargoes both ways, considerable effort is being made to minimize sediment accumulation. 60 % of ships surveyed were estimated to be carrying less than 10 tonnes of sediment.

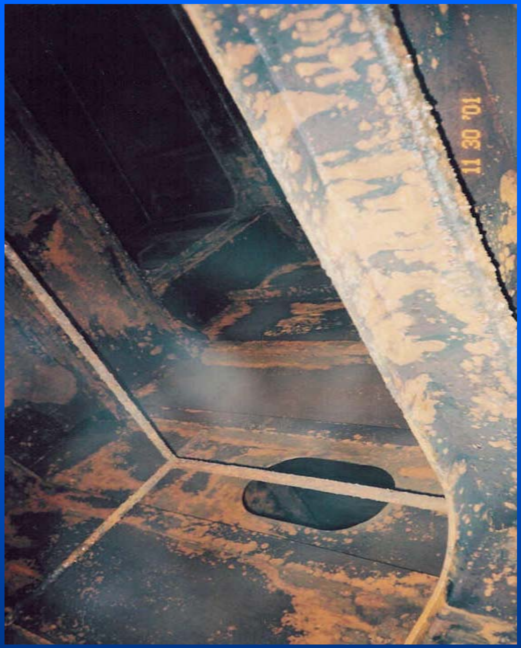
- One of the major difficulties is access to the tanks, which is frequently blocked by cargo.





Salient Factors from the Management Practices Assessment

- Crew wash down with sea water is the most common method for cleaning peak tanks, topside tanks and side tanks.



Salient Factors from the Management Practices Assessment

- Flushing with seawater, either when in NOBOB condition, or in conjunction with open ocean exchange, is most commonly utilized to clean double bottom and hopper side tanks.

- Flushing is effective in minimizing sediment accumulation, but only if practiced on every ocean passage irrespective of direction or destination.

- Higher salinity was associated with lower organism abundance in both water and sediment residuals.

Salient Factors from the Management Practices Assessment

- A significant number of ships in the Great Lakes/Northern Europe trade ballast in fresh water between cargoes on both Continents, and without a management process such as seawater flushing, transference of AIS in both directions is probable.
- Ships engaged in this trade are as likely to accumulate sediment ballasting within the Great Lakes, and to have more difficulty in flushing it out.

Ballast Management Regulation Development

2002 St. Lawrence Seaway makes compliance with SFC Code mandatory through regulation for ships entering from beyond the EEZ.

2004 IMO finalizes the International Convention for the Control and Management of Ship's Ballast Water and Sediment which contains both a Ballast Water Exchange Standard and Performance Standard.

2005 USCG introduce a policy outlining Best Management Practices for Ballast Water Residuals and Sediment for NOBOB ships.

2006 Canada introduces Ballast Water Control and Management Regulations with mandatory provisions for both BOBs and NOBOB's, including a Ballast Water Exchange Standard and Treatment Standard.

Transatlantic Ballast Exchange/Flushing Experiments

Best Management Practices Assessment Summary

- BMPs can be helpful in reducing invasion risk if applied regularly and routinely by:
  - Reducing sediment accumulation.
  - Reducing live propagule pressure and thus invasion risk.
- Maximum benefits (ecosystem and ship) require:
  - Exchange of turbid ballast water for cleaner water as soon as possible.
  - Routine use of tank flushing with saltwater.
- Data determined through the series of transatlantic experiments supports these new guidelines/regulations, but there are operational circumstances that can prevent NOBOBs from regular flushing .

Tank Flushing – Operational Problems

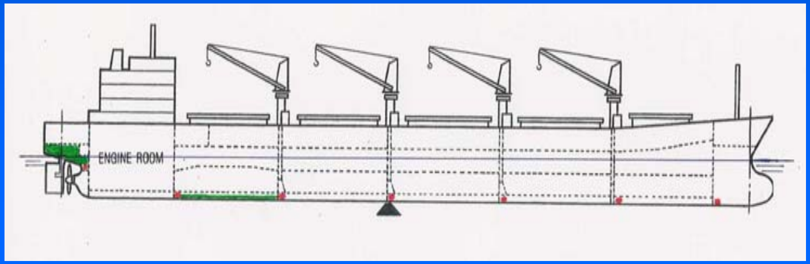
- Chemical tankers indicated that parcel separation would dictate whether they could flush any or all tanks on any given passage.
- Dry bulk carriers indicated that grain stability requirements would be the prime consideration relative to undertaking this process with an Eastbound cargo.

Tank Flushing - Operational Problems

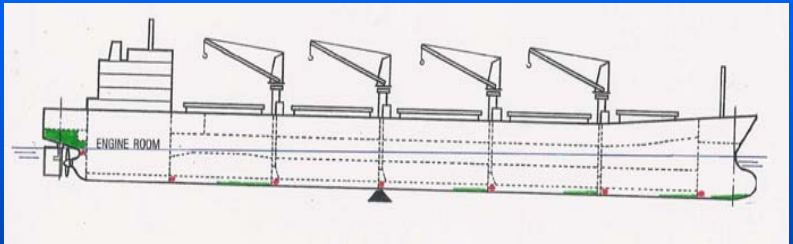
Although no ships in the survey gave safety as a reason for not flushing tanks, longitudinal stability makes the ability to flush tanks in the open ocean particularly sensitive to sea and swell conditions

Tank Flushing - Operational Problems

- Ships entering directly into the Seaway are generally loaded to arrive at maximum, even keel draft



- Unless trim by the stern can be achieved and maintained during the operation the ability to discharge the flush will be lost



Operational Problems - SFC Code Basic Principles

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Operational Problems - SFC Code Basic Principles

- This information can normally be ascertained by the ship by careful observation, however the berth the ship is given may not leave any alternative but to take ballast on board under these conditions.

- While IMO have strongly urged that Port States have their local authorities provide such information, there was little evidence of this being done. Without this it is unlikely the ship will be aware of such conditions existing .
- Under many circumstances the ship may have no alternative but to take substantial amounts of ballast under these conditions to facilitate cargo operations, to adjust trim and to offset hull stresses resulting from the removal of parcels of cargo.

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Acknowledgements

The Great Lakes NOBOB Project research team are grateful for the excellent cooperation received from members of both the United States Great Lakes Shipping Association and The Shipping Federation of Canada.

They wish to particularly acknowledge the owners, managers, masters, officers and crews of:

MV Atlantic Pendant	MT Jo Spirit
MV Federal Ems	MV Lady Hamilton
MV Irma	MV Marinus Green

without whose interest and willing assistance none of our single voyage or multi-season transoceanic research would t have been possible.