

Great Lakes / Ocean-Going Vessels

Issues and Concerns

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Outline:

- Who WE are
- How are Great Lakes ships differ from Ocean-Going vessels
- What we are NOT able to do
- What we ARE able to do
- What we are WILLING to do

Who We Are:

- Stake-holders, deeply invested in the welfare of the Great Lakes
- Residents of this community – we live, work and play here
- These waters sustain us in every way
- We have a PERSONAL stake in their welfare

How does this issue affect us?

- Almost every trip we make involves the movement of water from one port to another
- No Great Lakes ship has ever introduced an invasive species into the system
- We are effected to a MUCH greater degree than those who have introduced AIS into the system, yet NO treatment equipment is practical for use on a GL ship
- We acknowledge our participation as one of many vectors of potential spread within the GL system
- Just as most of you, we are victims of this issue
- We tire of being the “bad guy”

The background is a solid blue gradient. On the left side, there is a bright, glowing sunburst or lens flare effect that fades into the blue background. The text is centered in the lower half of the image.

We Are Different....

Lakers



Ocean Ships



Why do ships need ballast water?

- Immersion:

Ballast is used to immerse the propellers and thrusters, as well as to deepen the ship to reduce windage. It also permits control of the trim or relative draft of bow and stern for cargo handling and maneuvering.

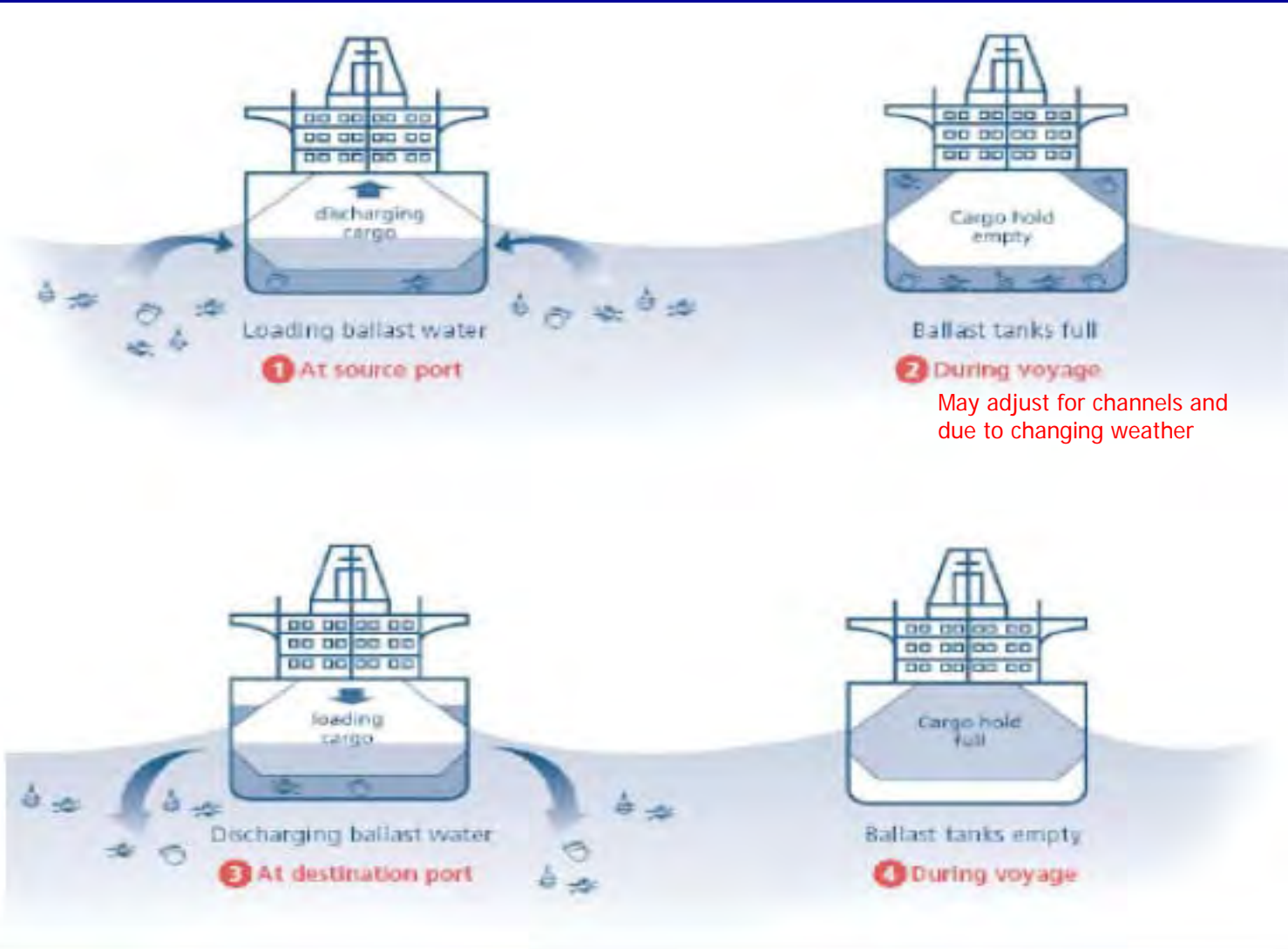
- Longitudinal stress control:

Use of ballast water permits the ship's officers to manage the bending stress on the hull, so that it will not break up in waves.

- Stability management:

Ballast water is used to lower the center of gravity of the ship to prevent potential capsizing.

Ballast is added or removed during cargo loading and unloading operations



Great Lakes ships –vs- Ocean ships on the Great Lakes

Invasives

- Ocean vessels *have* brought invasives to the lakes
- Lakers may speed up spread of invasives within the lakes

Vessel Arrangement

- Ocean vessels are smaller (up to 740' X 78'), have minimal ballast capacity and slow pumping rates
 - Minimum time spent in ballast
 - Loaded with cargo on both legs of voyage
 - Minimal time spent maneuvering- no need to submerge the bow and stern
 - Are designed to maximize cargo hold capacity for low density cargo (less space available for ballast tanks).

Vessel arrangement continued

- Great Lakes Ships are larger (up to 1013' X 105') and also have larger ballast capacity in proportion to their cargo capacity.
 1. Ballast needed for structural integrity (high ratio of length to depth).
 2. Loading rigs are low- vessels need to ballast deep.
 3. Hulls must also be deep in the water to fully submerge propeller, thruster and reduce windage to permit daily maneuvering in ports, rivers and around docks.
 4. Vessels typically carry higher density cargo and have enough internal volume to build larger capacity ballast tanks.

Ballasting operations can be restricted by ship draft and overhead clearance limitations at the loading and unloading docks. Ballasting is carefully managed **during** cargo loading and unloading operations.



How much ballast water can ships carry?

- Salt water vessel 12,000 mt 3.2 million gal.
- 1000 foot Lakes ship 44,000 mt 11.8 million gal.

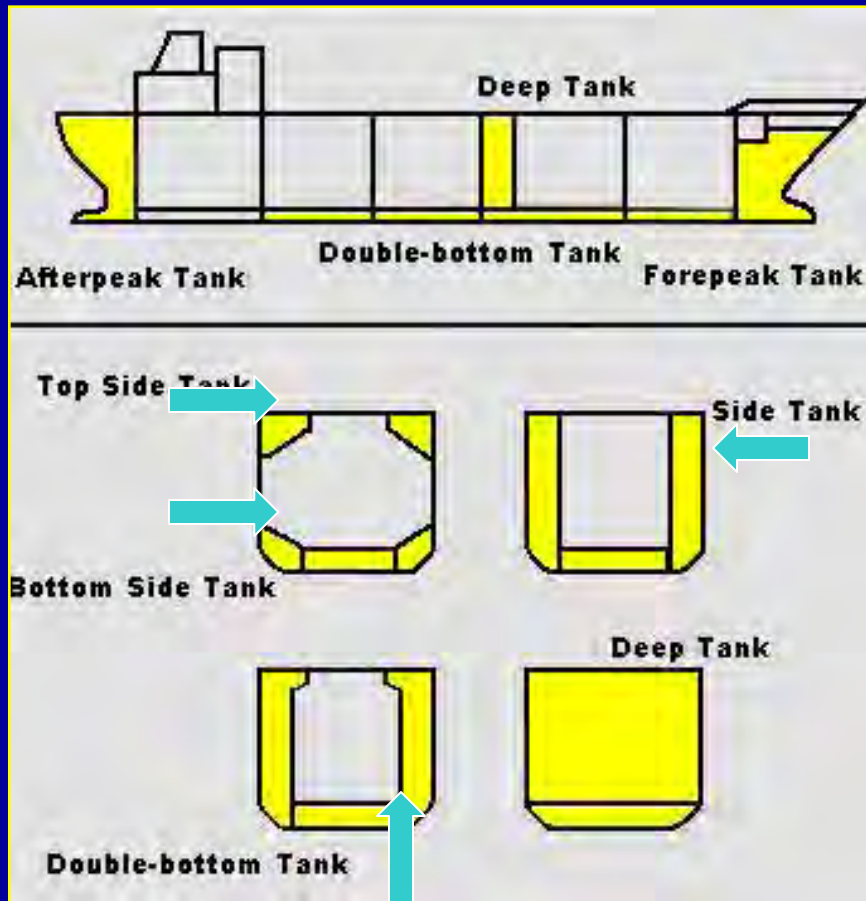
Typical pumping rates:

- Salt water vessel 2600 GPM , typically 2 pumps (Port time- days)
- 1000 foot Laker 20,000 - 60,000 GPM, 2 to 20 pumps (Port time- hours)

Range of ballast tank sizes:

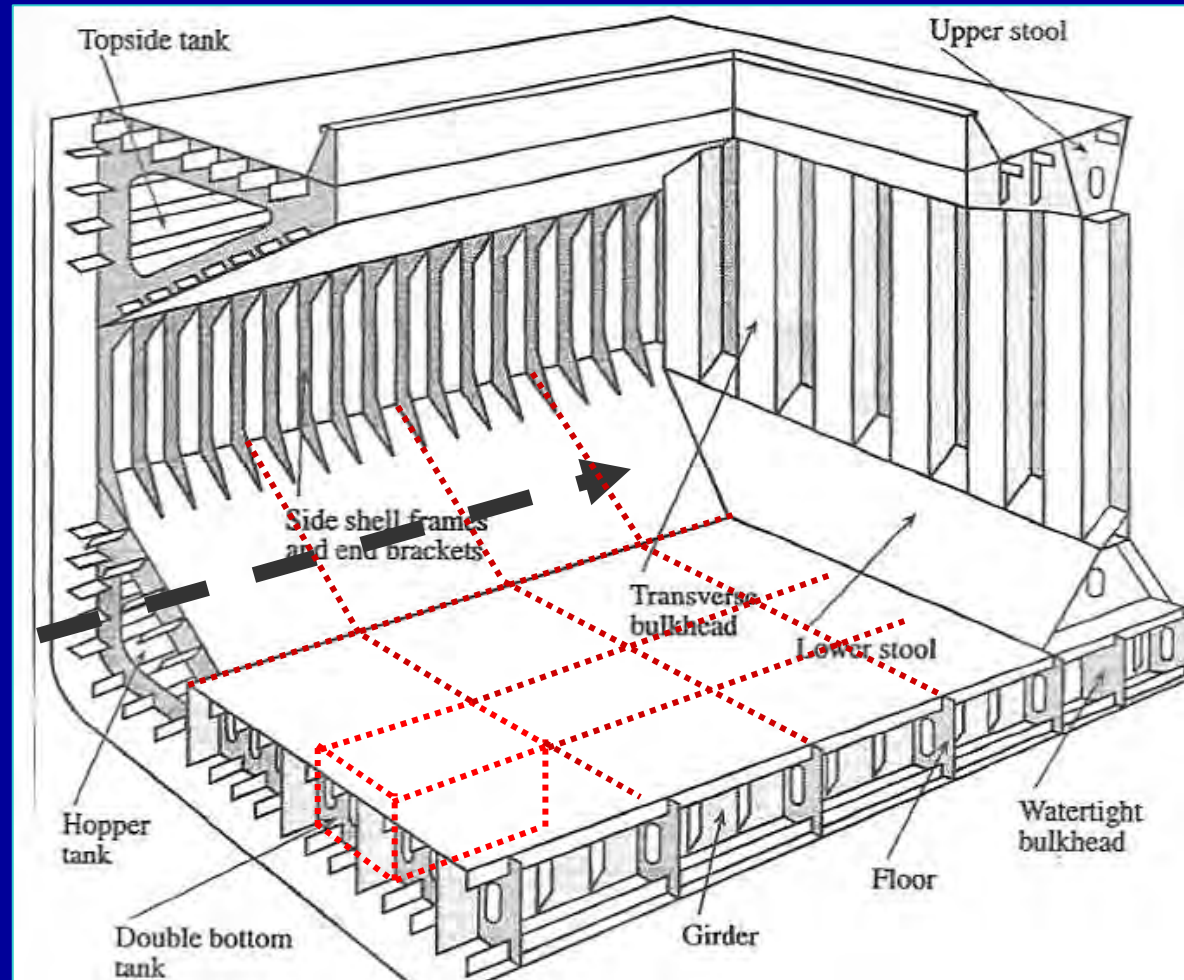
- Salt water vessel 400- 600 mt
- Laker 1000- 5000 mt

An Overview of Ballast Tank Architecture (Cargo Vessel)



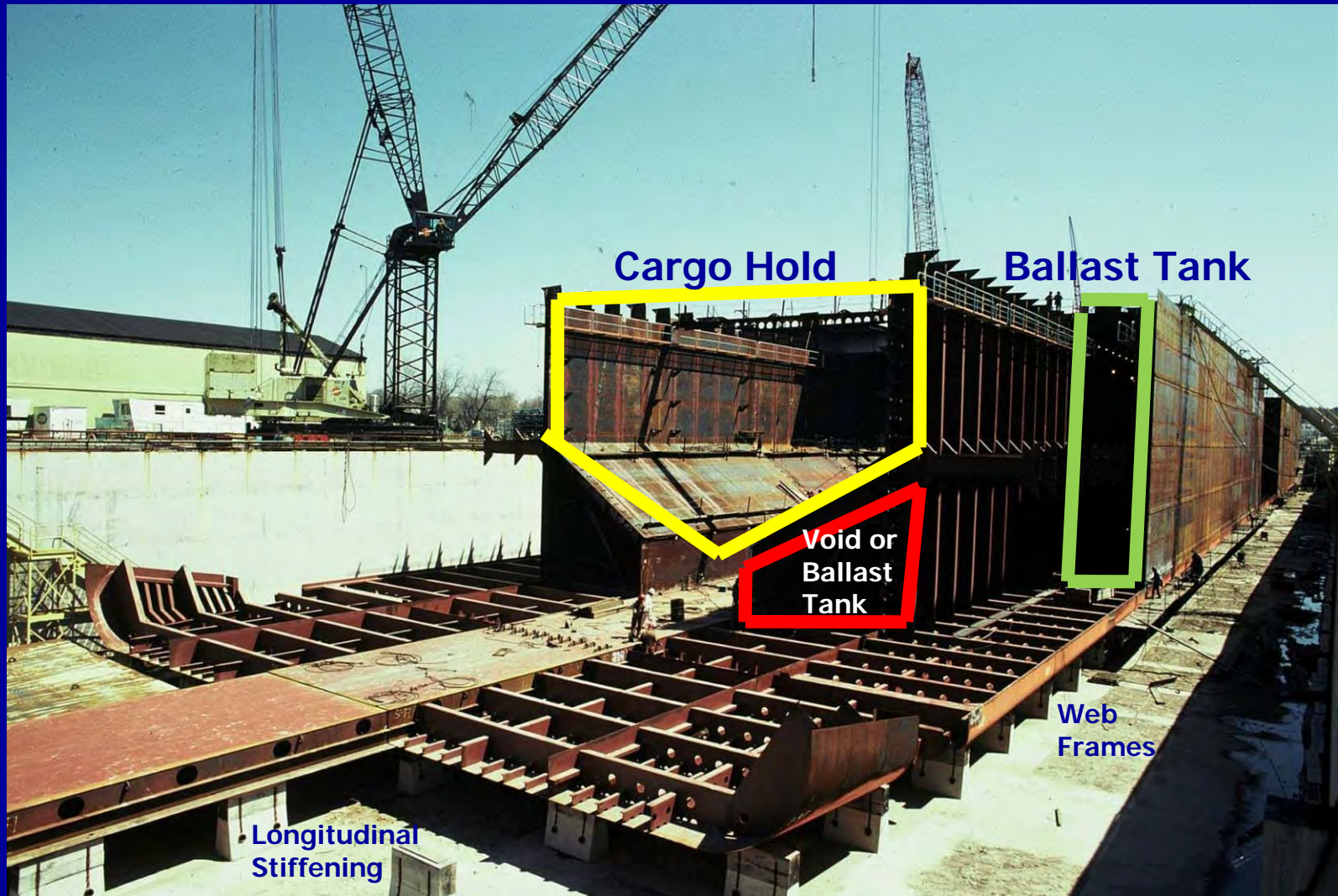
Typical Saltwater Bulk Carrier Ballast Tank Architecture

Ballast tanks are a honeycomb of individual bays or cells with lots of places to trap sediment and restrict water flow velocity



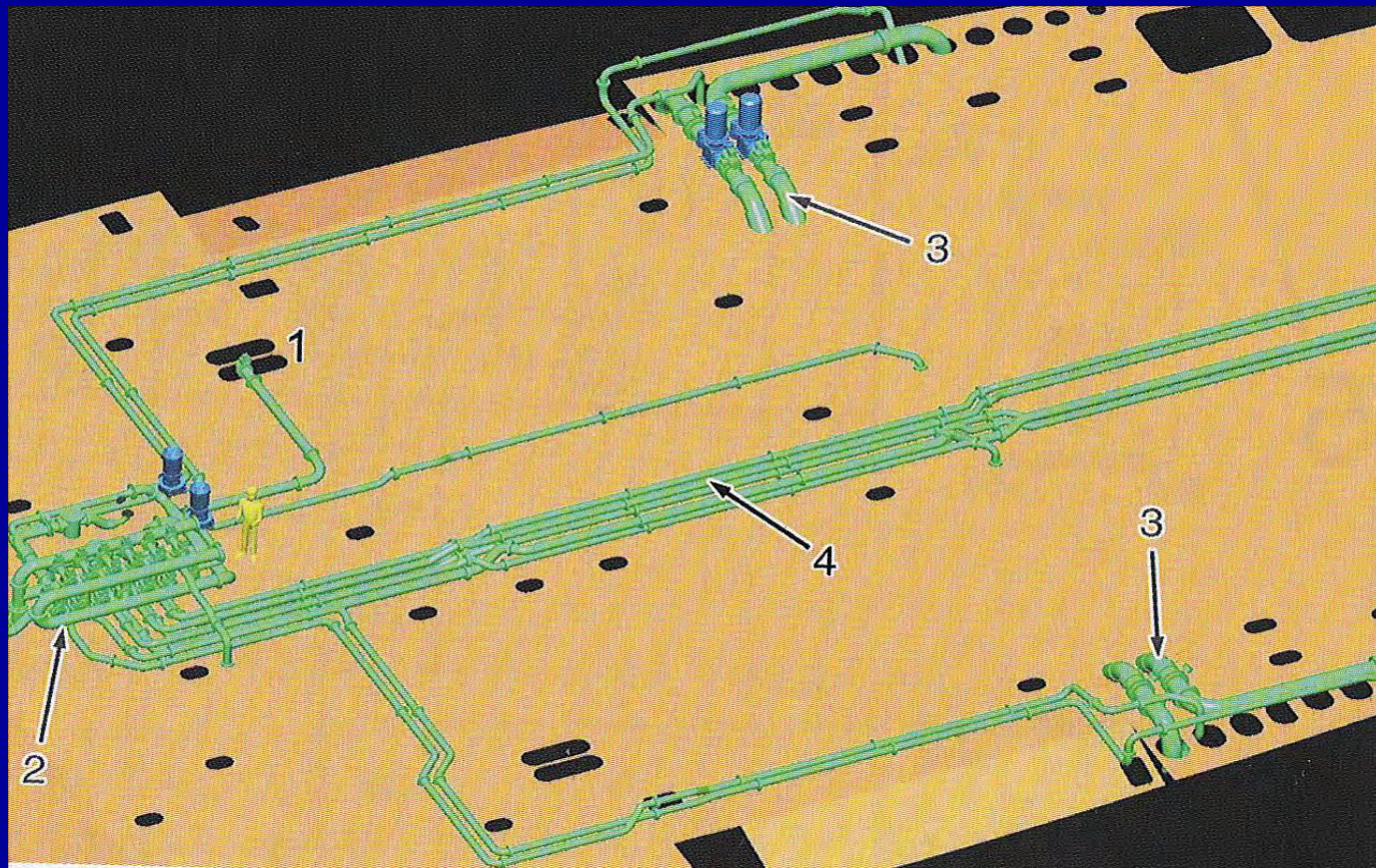
A ship can have as many as 20 ballast tanks

Internal structure of 1000 foot Laker (1,000' Edwin H. Gott Under Construction)



Tank Architecture: an insider's view





Ballast system diagram:

1. Overboard / seachest
2. Ballast manifold
3. Anti-heeling system if so equipped
4. Pipes to / from tanks

Ballast tank and piping arrangements on Great Lakes ships – Three types:

- 1. Ballast seachest, pumps and manifolds in engine room with separate dedicated pipe to each tank**
- 2. Ballast seachests and pumps in engine room with large headers the length of the ship and branch pipes that come off the header into each tank**
- 3. Separate seachest and pump for each tank, located adjacent to the tank**

The background of the slide is a photograph of a vast blue ocean meeting a blue sky with wispy white clouds. A bright sun is visible on the far left, creating a shimmering reflection on the water's surface.

What We Can't Do

Issues/ problems with IMO-Compliant Systems on Great Lakes Vessels

Fresh Water Application/US vetting

- Not yet vetted in US
- Not yet vetted in fresh water

Treatment rate concerns

- Not vetted at (and often not designed for) high pumping rates of Great Lakes ships
- Only a subset of mechanical systems will be available to handle pumping rates of Great Lakes Ships. (Needs to be evaluated separately)

Space and arrangement concerns

- Insufficient room in the engine spaces to install multiple mechanical systems to handle high pump rates
- Some Lakers have multiple pumps adjacent to ballast tanks. Need for multiple systems and associated space constraints
- Electrical power capacity is insufficient
- Some systems require salt water- on Great Lakes, salt would need to be added, adding space/cost requirements

Economic and practical impact of reduced rate treatment

- Need to review systems for potential impact on ballast transfer rates.
- Slow loading or unloading due to slow ballast treatment can result in up to 10% reduction in the capacity of the lakes-wide system of ships and docks.

Capital costs and operating costs are very sensitive

- The Lakes system is finely tuned and highly efficient with low margins of profitability. Ocean ships have a 2 to 3 week voyage, whereas the Great Lakes Ship have a 1 to 3 day voyage.
- Treatment and capital costs of as little as \$.01 per gallon can cost as much as \$120,000 per ballasting for a thousand foot ship - This is +25% of the entire revenue for the voyage and would render the cargo unprofitable.



What We CAN Do

We can DOSE

- Minimal investment in costly equipment
- Straight-forward, uncomplicated, achievable
- Suitable for adaptation to ALL types of ballast systems used on Great Lakes ships
- Many vessels already equipped with dosing systems for sediment surfactant injection

Proven Effective

- Dye-tests performed aboard ASC's Indiana Harbor in April, 2009
- Cooperative project with NPS (Isle Royale National Park)
- Demonstrated effective mixing of dye injected into ballast pump inlet
- Proven through an elaborate matrix of sampling points spaced strategically throughout several ballast tanks

Indiana Harbor – Dye Test Project

April, 2009

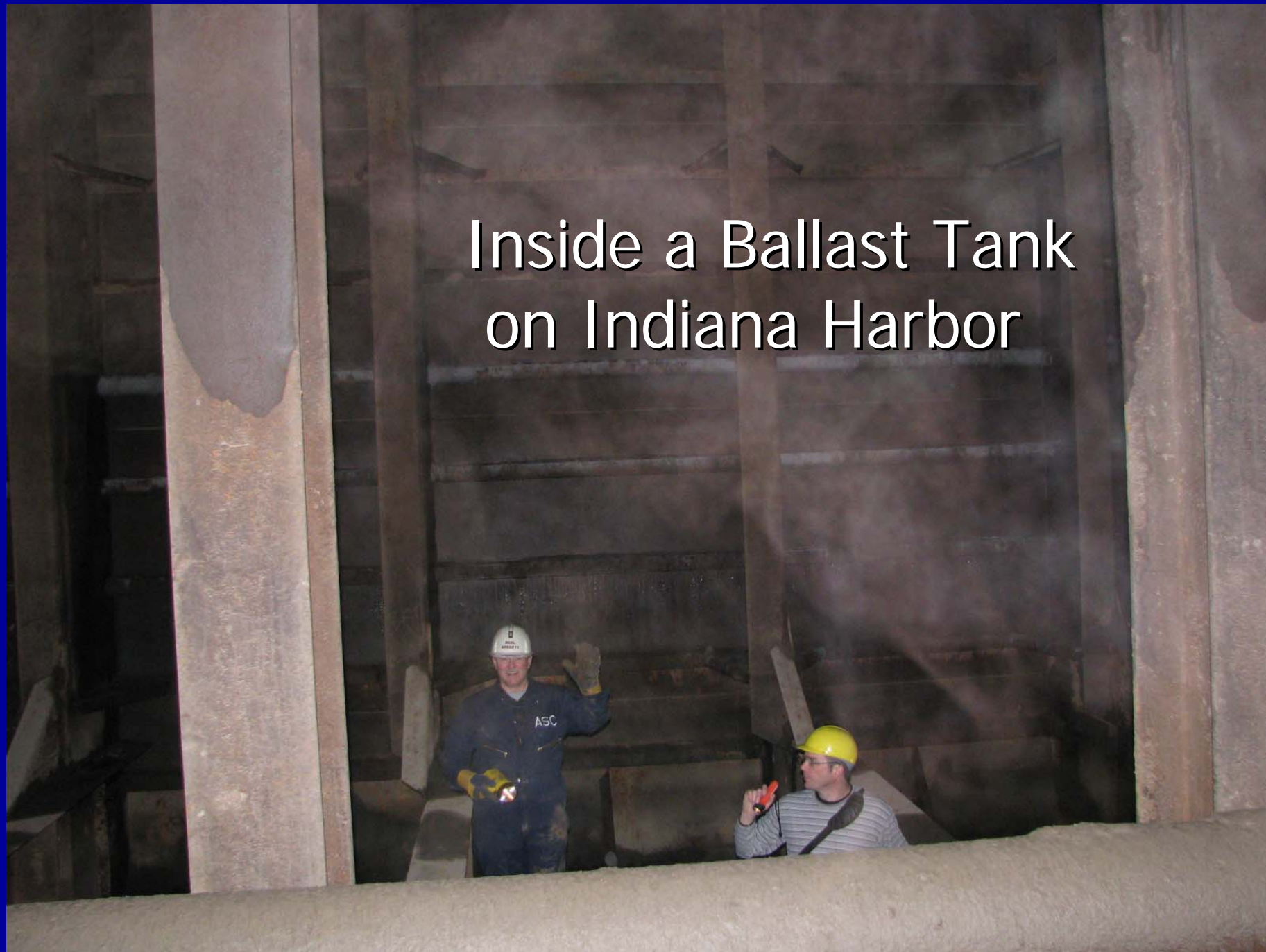


Plastic tubing from multiple sample points strategically placed at many points inside the tank

Ballast Tank access man-hole cover



Inside a Ballast Tank on Indiana Harbor



A full-page background image of a vast blue ocean under a bright blue sky with wispy white clouds. A bright sun is visible on the far left, creating a shimmering reflection on the water's surface.

What will we do?

What WILL we do? (speaking only for ASC now)

- Welcome state and federal regulators aboard our ships – we have nothing to hide, and encourage your interest
- Continue to participate in field tests in cooperation with GSI, NPS and others
- Assist in evaluating candidate systems/technologies
- Participate on a voluntary basis with YOUR approval and as permitted by Federal and State authorities in response to specific spread concerns
- Use in areas of known infestations, or specific outbreaks
- Continue to seek practical, efficient, safe, realistic solutions to common problems
- Partner to promote safe, practical, easily deployed solutions

What can YOU do, as part of the scientific/regulatory community?

Help us find a safe, economical, efficient, non-corrosive agent, that can be used in low dosage to address specific AIS spread concerns, and you will find a VERY willing Great Lakes shipping community, ready to act as a partner

And we can do this NOW



Thank You Very Much

Our Canadian Neighbors are Next