

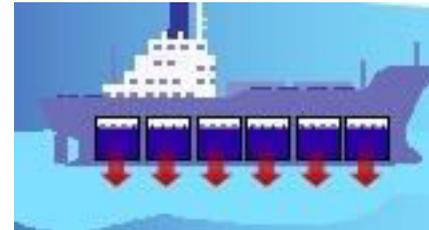
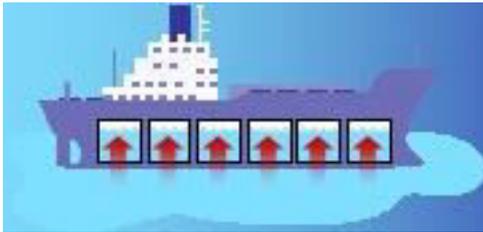
Dr. A.C. Anil
National Institute of Oceanography,
Dona Paula, Goa.

Ballast Water Management



Ballast water exchange standard (IMO Reg. D-1)

At least 95% volumetric exchange of ballast water



Regulation

Ballast water quality standards

IMO 'D2' standards for discharged ballast water

Organism category	Regulation
Plankton, >50µm in minimum dimension	<10 cells/m ³
Plankton, <10 µm	<10 cells/ml
Toxicogenic <i>Vibrio cholera</i> (O1 and O139)	<1 cfu*/100 ml
<i>Escherichia coli</i>	<250 cfu*/100 ml
Intestinal <i>Enterococci</i>	<100 cfu*/100 ml

* colony forming unit

Ballast water management for ships (IMO Reg. B-3)

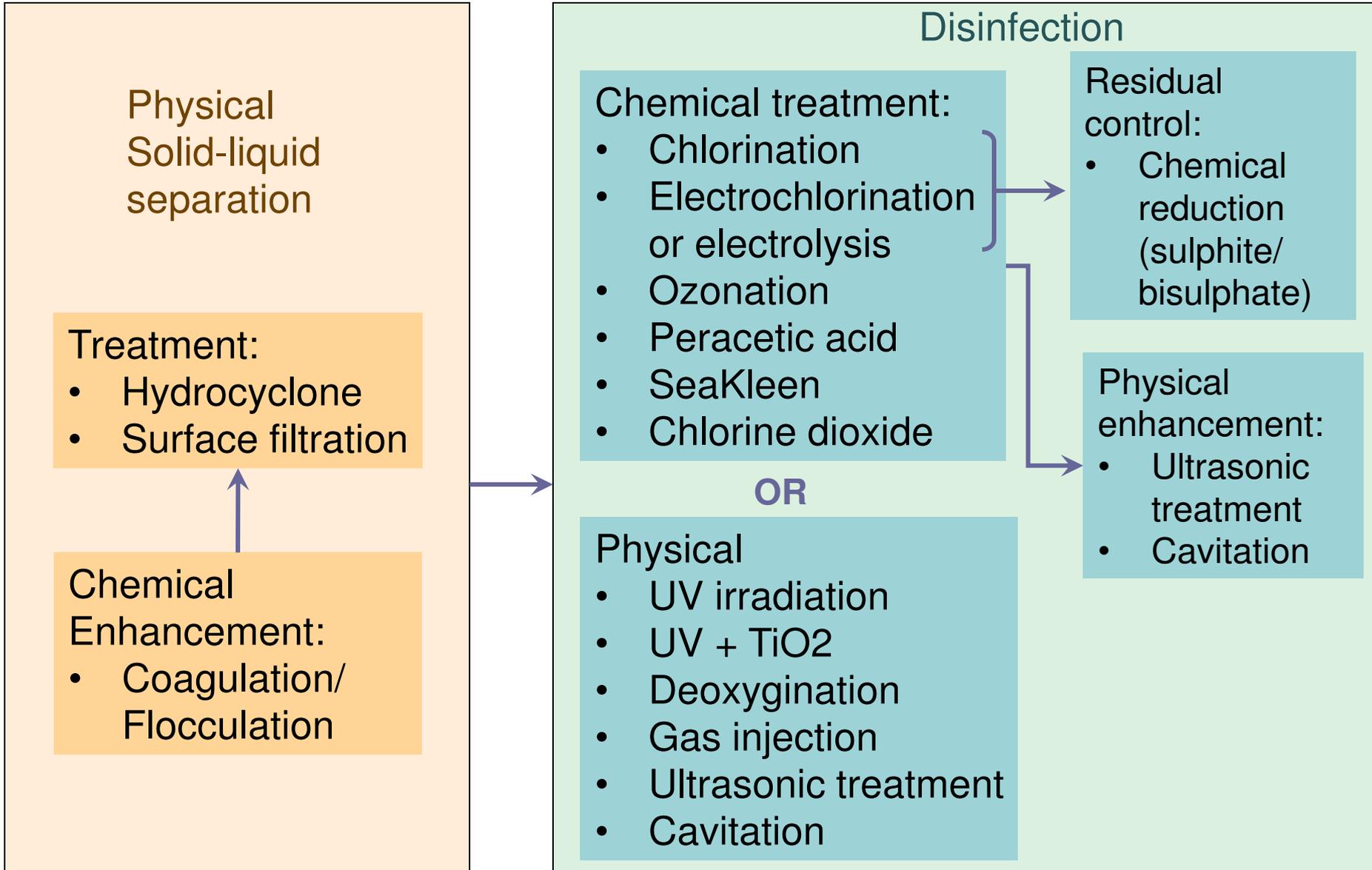
	Keel laying	BW Volume, m ³	'08	'09	'10	'11	'12	'13	'14	'15	'16	'17	'18
Existing Ships	<2009	<1,500		D-1/D-2								D-2	
	<2009	1,500~5,000		D-1/D-2						D-2			
	<2009	>5,000		D-1/D-2								D-2	
New Ships	≥2009	<5,000		D-2									
	2009~2011			D-1/D-2								D-2	
	≥2012	≥5,000					D-2						

Approval pathway for Ballast Water Treatment Systems

	Approval of environmental impact of discharged ballast water (MEPC)	Approval of system (Flag States)		Approval of environmental impact of discharged ballast water (MEPC)	Issue of type approval certificate (Flag State)
Systems using active substances*	Initial approval	Land based testing	Ship board trials	Final approval	Type Approval Certificate
Systems not using active substances ⁺		Land based testing	Ship board trials		Type Approval Certificate

* Includes chemical disinfectants, e.g. chlorine, ClO₂, ozone; + Includes techniques not employing chemicals, e.g. deoxygenation, ultrasound

Generic ballast water treatment technology process options



Conclusions

1. By May 16, 2011, 14 systems had received G8 Type Approval certificates, two of which (Techcross and Alfa Laval) also have Type Approval for an explosion proof system.
2. A number of other suppliers expect Type Approval in late 2011 or 2012.
3. The systems that have obtained G8 Type Approval demonstrate that a wide range of technologies, with or without the use of active substances, are suitable for the treatment of ballast water to meet the D-2 standard.
4. The use of active substances and the need to undergo the approval process specified in the G9 guidelines do not present a significant barrier to obtaining G8 Type Approval.
5. It is now apparent that technologies to treat ballast water to meet the D-2 standard within the International Convention for the Control and Management of Ship's Ballast Water and Sediments are available and established, with over 200 such systems reported as being installed worldwide.

Steps to selecting a treatment system

Initial key aspects

Vessel type and characteristics.
Trading pattern.
Ballast capacity and flow rate requirements.

Technical and operational considerations

Time required for treatment to be effective.
Ballast and treatment pumping rates.
Ballast system characteristics (for example, the number of independent systems on board oil tankers).
Health and safety.
In-service requirements.
Explosion proof equipment (for oil tankers, for example).
Power requirements and onboard systems.
Effects on tank coatings and corrosion considerations.
Controls and alarms.
Space constraints.

Steps to selecting a treatment system

Treatment options

Combination filtration and treatment.
Chemical options such as chlorination, ozone, deoxygenation and peracetic acid.
Mechanical means such as cavitation.
UV radiation.
Ultrasonic.

Vendor selection and specification reviews

Vendor experience in supplying similar systems.
Equipment approvals.
Commercial considerations.

Installation planning

At sea or dry docking considerations for existing ships.
Inclusion in build specifications for new builds.

Exceptions

The following ships are exempt from compliance with the Convention:

- Ships not designed or constructed to carry ballast water.
- Ships operating within the territorial waters of the flag state with which they are registered. The flag state may require these ships to comply with the Convention based on their own judgement.
- Ships operating only in waters under the jurisdiction of another flag state, subject to authorisation for exclusion from the Convention by the latter flag state.
- Ships operating only in waters under the jurisdiction of one flag state and on the high seas, subject to authorisation by the flag state controlling the operating waters.
- Any warship, naval auxiliary or other ship owned or operated by a state and used, for the time being, only on governmental non-commercial service.
- Ships with permanent ballast water in sealed tanks that are not subject to discharge.

Approach - India

- Decision Support System (DSS) – based on risk assessment for regulations under D-1
- Move ahead with regulation D-2 by adopting technology verification and certification and suitably modify DSS

Improving the information base for Decision Support System

- ✓ Port biota baseline survey
- ✓ Risk assessment
- ✓ Database on aquatic invasive species
- ✓ Database on ballast water reporting forms - electronic
- ✓ Identification of areas in which ballasting & deballasting should be prohibited
- ✓ Establishing ballast water management programmes for ports
- ✓ Regional cooperation

