Safe Shipping of Bauxite

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DBTG - The International Dry Bulk Terminals Group

Dry Bulk Terminals Group

- Established in 1998
- Membership Association representing owners and operators of Dry Bulk Terminals across the world.
- Provide a forum and a voice for the international Dry Bulk Industry.
- Not-for-profit
- NGO status at the IMO

INTERNATIONAL
DRY BULK TERMINALS
GROUP

Dry Bulk Terminals Group - Agenda

To improve and drive up standards from a terminal perspective, in all matters;

- Operational
- Technical
- Safety &
- Regulatory

Partner Organisations

- The Coal Export Terminal Operators Association (CETOA)
- The North American Export Grain Association (NAEGA)
- The European Association of Professional Portside Storekeepers for Agribulk Commodities (UNISTOCK)
- The International Iron Metallics Association (IIMA)

Bauxite

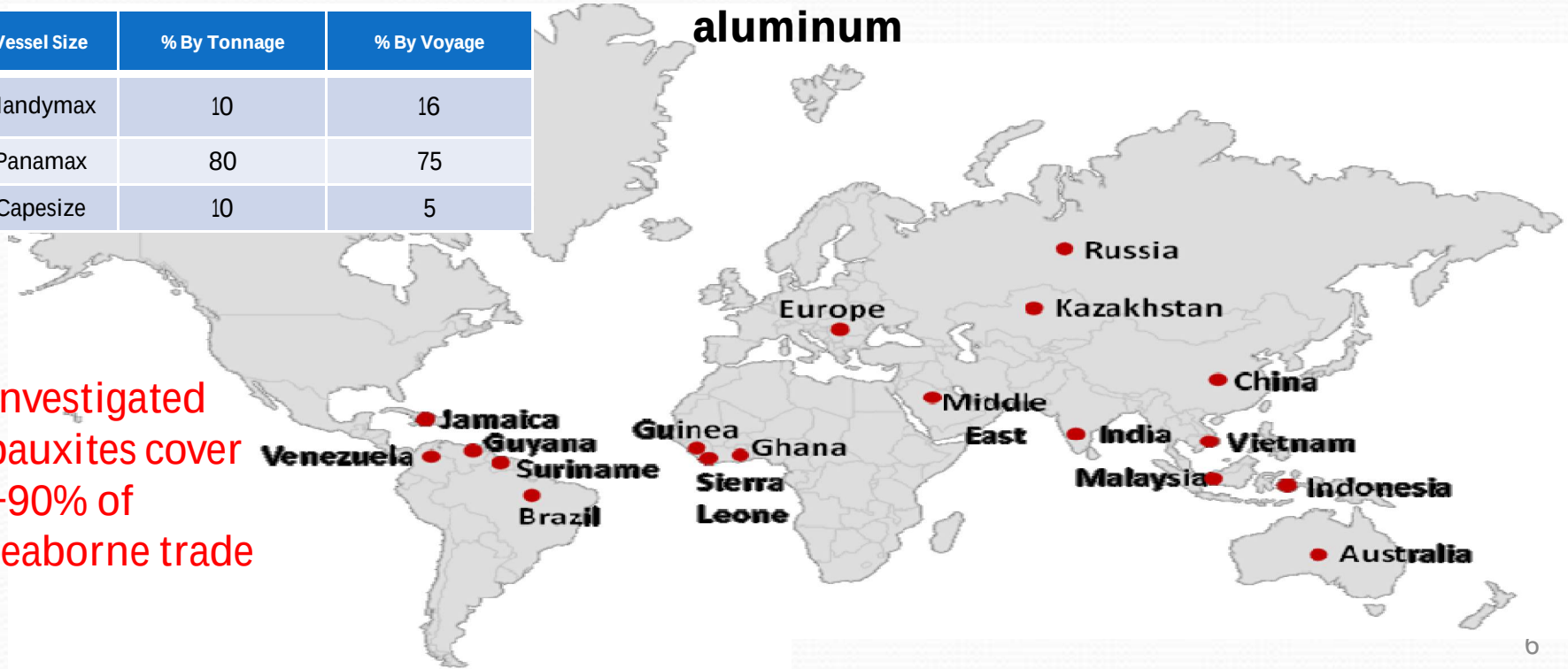





Sources of Bauxite in the World

Bauxite is the primary aluminum ore for most of the world's production of aluminum

Vessel Size	% By Tonnage	% By Voyage
Handymax	10	16
Panamax	80	75
Capesize	10	5



Investigated bauxites cover +90% of seaborne trade

Bulk Jupiter

- 56,000 dwt
- Loaded Malaysia
- 46,400 bauxite
- 19 crew
- 1 survivor – the cook
- Lost 1st January 2015

Background Info

2015	Jan	Bulk Jupiter Incident
	Early '15	P&I Clubs issue alert regarding the carriage of bauxite
	Sep	CCC2 / IMO Correspondence Group (CG) on bauxite properties was established
	Oct	IMO issues circular regarding the carriage of bauxite
	Dec	Key bauxite players start discussions on their technical research findings
2016	Feb	Formation of an informal industry group Global Bauxite Working Group (GBWB)
	Jun	GBWG meetings
	Sep	CCC 3 - IMO acknowledgement of GBWG and new CG
2017	Mar	GBWG draft report finalized and submitted for peer review
	Apr	GBWG report peer reviewed by Imperial College London
	May	GBWG peer review report submitted to CG
	Jun	CG report to CCC 4
	Sep	CCC 4 – CG Workshop & Present GBWG findings to IMO

GBWG Objectives

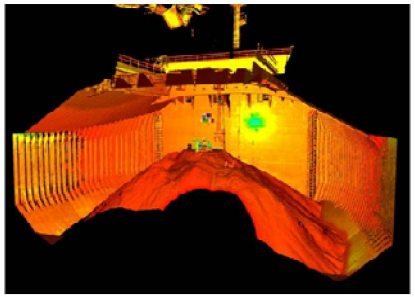
- Conduct research on the behaviour and characteristics of seaborne traded bauxites
- Determine science based, globally applicable criterion for the safe shipping of bauxites (Group A, Group C)
- Determine a global applicable Transportable Moisture Limit (TML) test for Group A bauxites
- Research outcomes peer reviewed for submission to CCC4 (Sept 2017)

Research Methodology

Laboratory Analysis & Testing

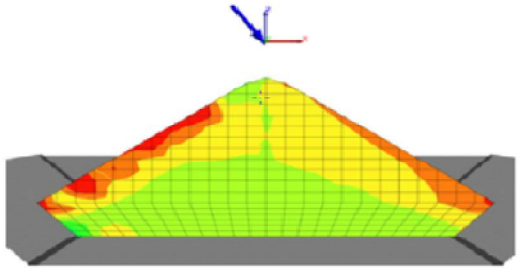
Vessel Monitoring

Cargo Observations

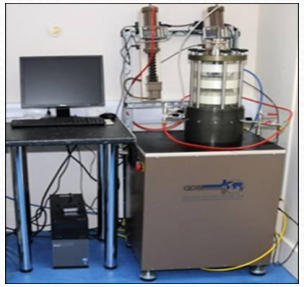


Scale Model Testing

Numerical Modeling

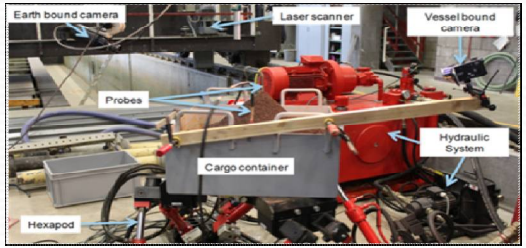


Research Tests Included



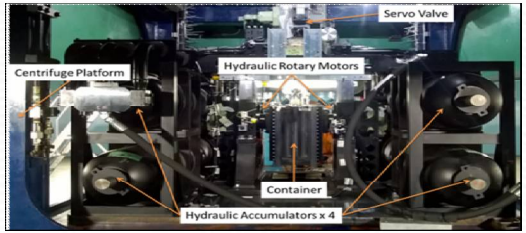
Cyclic Triaxial Tests

- Extreme case vessel motions
- Saturated, Undrained (Worst Case)
- Bauxites Resistance to Liquefaction
- Identifies amount of straining



Hexapod Tests (1G)

- Sea state and worse case roll motions
- High moisture contents but drained
- Confining Pressure not scaled
- Identifies any instability due to moisture



Dynamic Centrifuge Tests (50G)

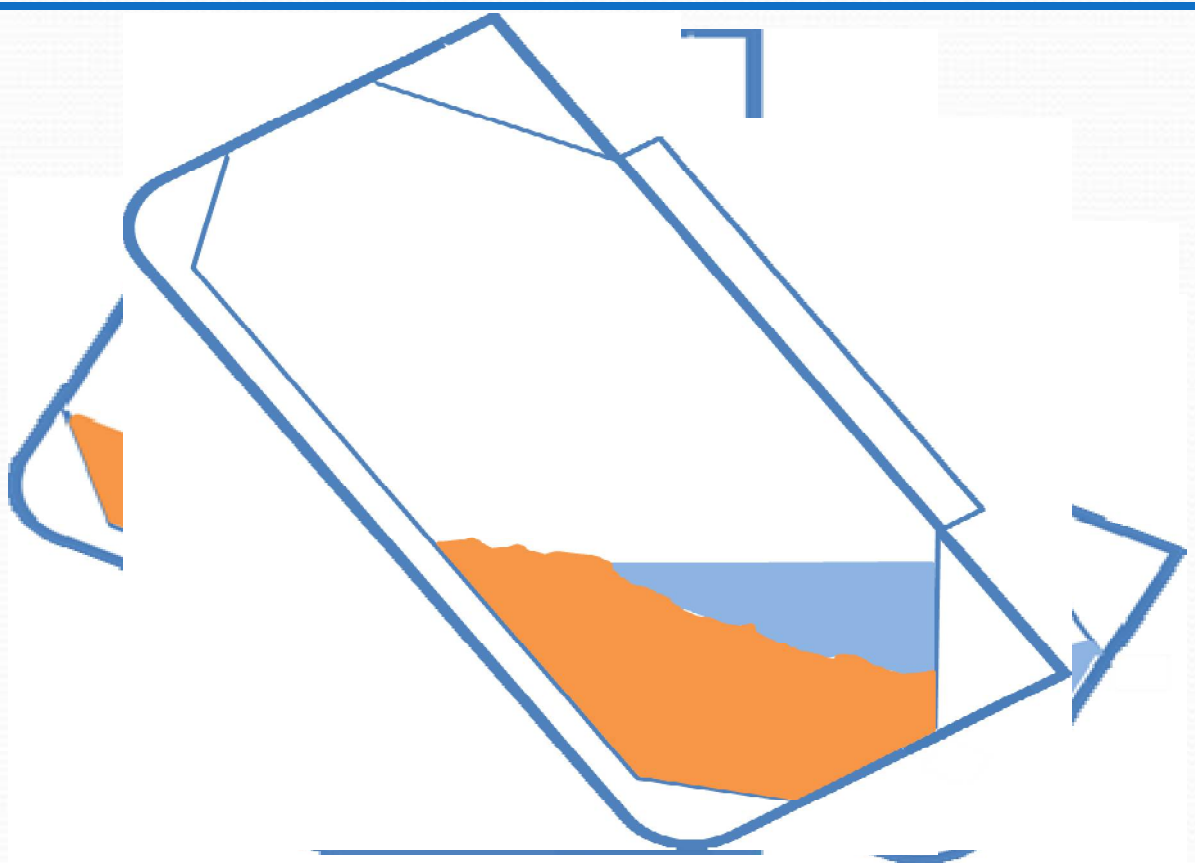
- Worst case rolling motions
- High moisture contents but drained
- Confining Pressure scaled
- Identifies any instability due to moisture

DC Test Video – Coarse Bauxite

DC Test Video – Fine Bauxite

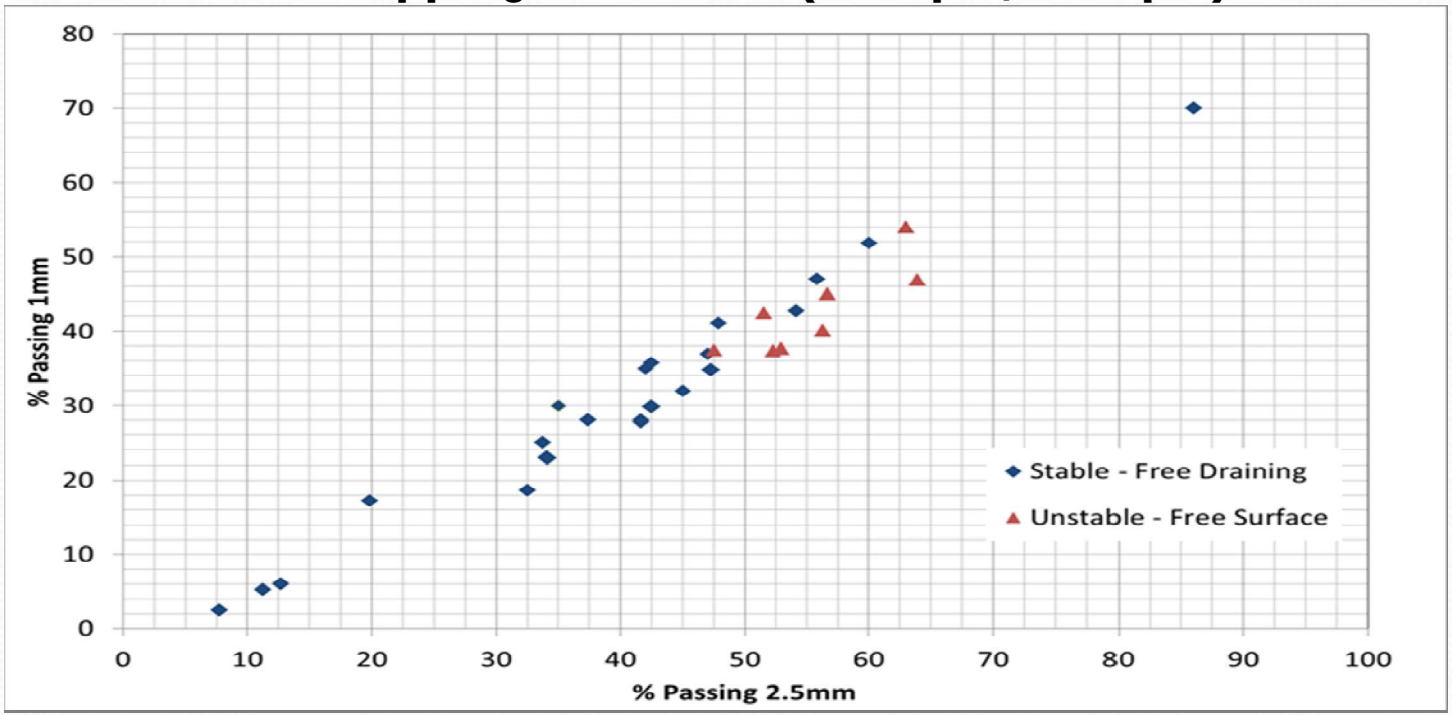
Cargo Behaviour in Real World

From Cargo Instability to Capsize

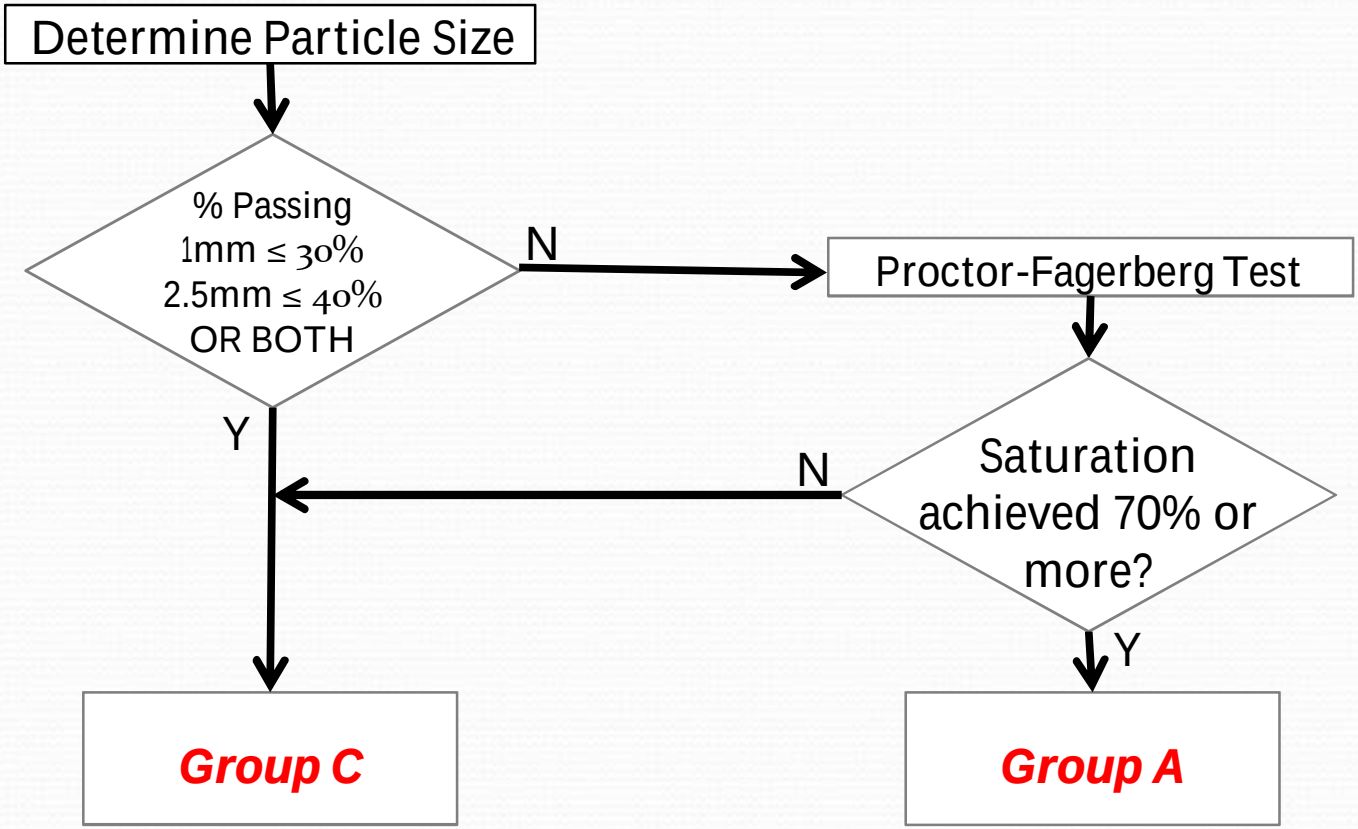


Criteria for Classification of Bauxite

Determine science based, globally applicable criterion for the safe shipping of bauxites (Group A, Group C)



Bauxite Classification Process



Vessel Behaviour due to FSE

GBWG Recommendations

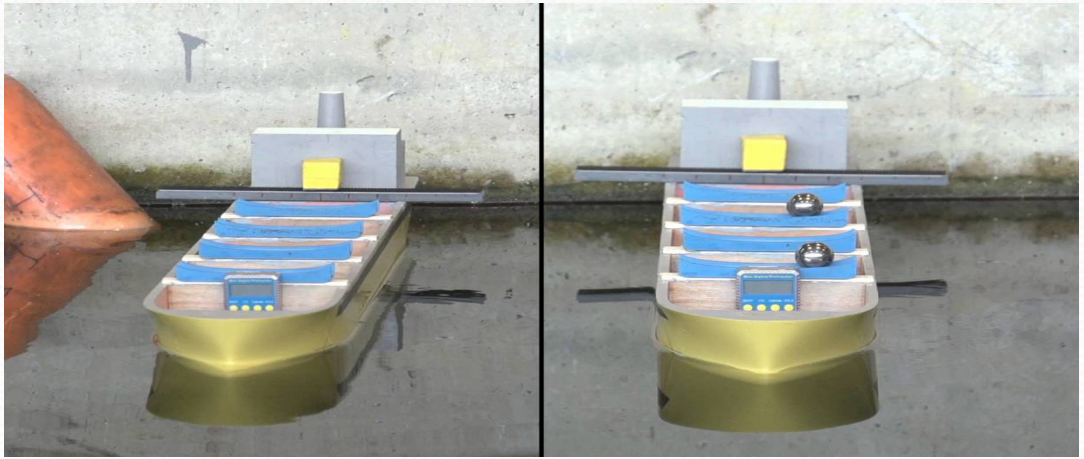
Proposed;

- Draft schedule for BAUXITE FINES Group A cargoes
- Modification of existing schedule for BAUXITE Group C cargoes
- Bauxite Proctor-Fagerberg Test methodology

- Consider a classification category for Group A “liable to liquefy” cargoes (other cargo instabilities due to moisture also need to be considered).
- Group A classification for cargoes that are hazardous - instability due to moisture.

Warning Signs

- Cargo slumping or flattening - the first sign of cargo instability providing the first “window of opportunity” to take action
- An atypical vessel motion (wobbling) - indicative of cargo instability
- If either are noticed, immediate corrective or preventative measures should be taken



Safety Considerations

- Recognition that the development of a list is indicative of vessel instability - measures to prevent loss of life should be implemented
- Recognition that a list may progress such that it exceeds the operational SOLAS limits for main engine (15deg static/22.5 deg dynamic) and launching of lifeboats (20 deg)
- Awareness that the list could impede lifeboat launching
- A catastrophic roll/sinking may lead to hull suction affecting personnel floating nearby the ship
- Regular visual inspection of cargo during the voyage is the best line for early detection of potential issues.

Thank you for your attention!