



To: Whom it may concern.

Bergen 17th June, 2016

Dear Sir/Madam,

As you might be aware, Gearbulk lost its ship *M/V Bulk Jupiter* at sea on the 2nd of January, 2015, with the tragic loss of 18 lives. This was quite probably a preventable loss that would not have happened were it not for the inaccurate declaration of the properties of the cargo of bauxite loaded at the Malaysian port of Kuantan.

Gearbulk would like to take this opportunity to appeal to all cargo owners, shippers, and other interested parties to ensure that the classification and declaration of bulk cargoes is accurate. This will ensure that the master on board all ships is in a position to make well informed decisions regarding its safe and efficient handling, stowage and carriage. Shipping is after all, a collaborative endeavour.

Since the accident, Gearbulk has tried to establish the cause of the capsizing and take whatever steps are necessary to prevent a recurrence. It has considered the investigation by the Bahamas Maritime Authority and other organisations in addition to conducting its own, and the conclusions drawn are explained below in an effort to share our experience with partners in the industry.

Bulk Jupiter

Bulk Jupiter was a Bahamas flagged conventional bulk cargo carrier of 56,009 dwt built in Japan in 2006 and chartered out to load 46,000 tonnes of bauxite in bulk from Kuantan in Malaysia to Qingdao in China. She was structurally sound, seaworthy in all respects, compliant with all regulations, and manned in excess of the minimum requirement set by the Flag State. The master and senior officers were appropriately qualified and had sufficient experience in their rank.

At the time of sailing from Kuantan, all stability parameters, shearing forces and bending moments of the ship were well within acceptable range and consistent with the cargo and other variables on board. The pilot who conned the ship out of Kuantan confirmed that he had observed nothing that would have raised any concern for stability or ship behaviour.

The voyage

During the loading period at Kuantan that lasted 14 days, the area received record breaking rainfall and the cargo was reported each day by the ship to be 'very wet'. Precautions were taken in shutting the covers of the cargo holds during periods of rain.

Weather routing for the passage by professional service providers ashore had been arranged by the charterer to provide guidance to the master on the best route to follow to the destination.

From the time she sailed from Kuantan, *Bulk Jupiter* faced increasingly inclement weather; gale force winds and very rough seas, that under normal circumstances the ship should have been able to handle safely. Some 57 hours later in the early hours of the 2nd of January 2015, *Bulk Jupiter* capsized and sank about 150 miles South East of Vietnam.

Findings

The proximate cause of the capsizing of *Bulk Jupiter* is that the cargo contained a much higher proportion of clay and silt consistency particles and could not have been considered to be granular in nature as stated. That when combined with the high level of moisture caused it to liquefy and flow in the cargo holds of the ship. The report by the Bahamas Maritime Authority (as attached), has highlighted the significant documentary evidence that showed that the 46,400t of bauxite loaded on *Bulk Jupiter* had an average moisture content of 21.3% compared with the declared 10%. While there is no physical evidence to confirm that this is the cause for the ship to capsize, it does provide a substantial reason why the ship would incline to one side as a result of the movement of the liquefied cargo to an angle where the intact stability dropped to below zero and became a capsizing force.

The inclement weather encountered on passage that, in combination with a liquefying cargo, led to the capsizing of the ship would have been a contributing factor.

The cargo

The declaration by the shippers stated that moisture content at shipping was 10% and a particle size of at least 2.5mm constituted 70-90% of the cargo. Under the IMSBC Code, there is no requirement for the Transportable Moisture Limit (TML), normally defined as 90% of the Flow Moisture Point to be stated for Group C cargo and in this case the Shippers did not.

The Master would not have known, nor would he have been expected to know, where the cargo loaded on *Bulk Jupiter* was mined or stored ashore and for how long. Having been advised that the cargo was classified as Group C as per the *International Maritime Solid Bulk Cargoes Code*, (IMSBC Code), he would have assumed that liquefaction was not a risk. His reported concern on the cargo being very wet, was possibly considering a lower cargo weight at the discharge port after water draining from the cargo into the hold bilges while on passage was pumped out.

Bauxite being classified as Group C cargo implies that the cargo does not possess any chemical hazard and was not liable to liquefy, providing that the moisture content did not exceed 10% and particle size of at least 70% of the cargo was greater than 2.5mm. A bauxite cargo outside these parameters may still not liquefy, providing its Flow Moisture Point (FMP), that is specific to each type of cargo, is not exceeded. The particle size of a Group C cargo would have allowed the water to drain to the cargo hold bilges and be pumped out.

Bauxite at the time of mining varies in consistency depending upon the percentage that can be classified as clay, silt, sand or gravel. To classify as a Group C cargo, at least 70% should be gravel in consistency. Higher concentration of gravel consistency is achieved by removing the fines to a tailings lagoon before shipment and the resulting cargo is referred to as 'processed', but in the case of bauxite loaded on *Bulk*

Jupiter, the cargo was delivered alongside in the same 'raw and unwashed' condition as it was mined containing various particle sizes and not adequately granular in consistency to be classified as Group C.

The mine from which the cargo for Bulk Jupiter was mined was considered a 'wet mine', one that is below the ground water table and given the permeability of the raw cargo, it is likely that the cargo was nearly saturated when it was delivered alongside. This state of cargo will display a low shear strength and consequently an increased tendency to flow.

Liquefaction is used in shipping to generally describe the loss of shear strength resulting in the flow of cargo in the hold. Softening of the bauxite cargo as a result of the movement and vibration of the ship, also referred to as 'cyclic softening' in the case of bauxite with a higher than normal clay-like consistency would progressively worsen with time; the particle size becoming finer during the passage of the vessel. The

IMSBC Code envisages this type of liquefaction failure in section 7.2.1, and it is this failure that is considered to have led to the capsizing of *Bulk Jupiter*.

After sailing, the normal movement of the ship at sea would have resulted in the liquefying of the upper part and compacting of the lower part of the incorrectly declared cargo. Liquefying of the cargo would have resulted in the movement of a significant proportion of the cargo mass with the natural movement of the ship and this would have been accentuated by the free surface effect of any released water that came to the surface of the cargo. Once the cargo mass started moving to one side of the holds, the incline to that side would have slowly increased resulting in more cargo moving to the same side, eventually reaching a point where the stability turned negative resulting in a capsizing moment.

Actions taken

Gearbulk has decided not to load bauxite at Kuantan on any ship under its control. It has also decided that all future bauxite and other concentrates loaded at all ports will be loaded only after truly representative samples are analysed to confirm that the cargo is Group C as specified.

In addition, should any conditions exist that may result in a change to the stated nature of the cargo such as the exposure to water or the discovery of different grades of cargo mixed together, a representative sample will be analysed again to ensure continued safety of carriage.

Assistance of the P&I Club of the ship will be sought when in any doubt.

A strong focus on the risk posed by liquefaction as also general safe working practices when handling bulk cargoes has been put in place at the cargo-related courses conducted in-house for officers serving on the ships.

Gearbulk's internal procedures have been updated accordingly and we understand a process has been initiated in the IMO to review the classification of bauxite.

We would however, like to end this letter as it started and take this opportunity to appeal to all cargo owners, shippers, and other interested parties to ensure that the classification and declaration of bulk cargoes is accurate. This will ensure that the master on board all ships is in a position to make well informed decisions regarding its safe and efficient handling, stowage and carriage.

We lost 18 of our colleagues in this tragic and likely preventable loss. We must all do what we can to avoid this from happening again.

Your continued support in our quest for safe and sustainable shipping is solicited.

Yours sincerely



Ketil Andreassen

Managing Director

Attached: The ship's Flag State, The Bahamas Maritime Authority's report of the marine safety investigation into the loss of *M/V Bulk Jupiter*.

<http://www.bahamasmaritime.com/wp-content/uploads/2015/08/Bulk-Jupiter-Final-Report-August-2015.pdf>