



**The Bahamas  
Maritime Authority**

## **THE COMMONWEALTH OF THE BAHAMAS**

**“M.V Bulk Jupiter”**

**IMO Number 9339947**

**Official Number 8001956**



**Report of the marine safety investigation into the loss of a bulk  
carrier in the South China Sea on January 2<sup>nd</sup> 2015**

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*It should be noted that the Bahamas Merchant Shipping Act, Para 170 (2) requires officers of a ship involved in an accident to answer an Inspector's questions fully and truly. If the contents of a report were subsequently submitted as evidence in court proceedings relating to an accident this could offend the principle that individuals cannot be required to give evidence against themselves. The Bahamas Maritime Authority makes this report available to any interested individuals, organizations, agencies or States on the strict understanding that it will not be used as evidence in any legal proceedings anywhere in the world.*

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## SECTION 1: SUMMARY

- 1.1 All times are given in local time (LT), (UTC +8).
- 1.2 The Bulk Jupiter, a supramax bulk carrier, was built in 2006 and had completed her first special survey in August 2011 whilst under the Panamanian Registry. In September 2011 the vessel changed flag and was registered by the Bahamas Maritime Authority (BMA).
- 1.3 The Bulk Jupiter had sailed from Maptaphut, Thailand on the 09<sup>th</sup> December 2014 in order to arrive at the anchorage off Kuantan, Malaysia on the 12<sup>th</sup> December. The vessel remained at anchor until berth space became available on the 16<sup>th</sup> December at which point the vessel embarked a pilot and proceeded alongside her allocated berth to load a cargo of bauxite.
- 1.4 Once alongside cargo loading operations were delayed due to heavy and prolonged rainfall until 2100 on the 17<sup>th</sup> December, at which point loading commenced into holds 1, 3, 4 and 5. The loading of hold 2 was delayed until 18<sup>th</sup> December.
- 1.5 The East coast of Malaysia had endured record-breaking rainfall over the month of December, recording the highest monthly rainfall in the history of Kuantan at 1806.4mm over a 22 day period.
- 1.6 Loading continued for an extended period of time through a combination of heavy rain and technical delays due to various crane faults. On completion of the loading of all 5 holds the vessel sailed on the 30<sup>th</sup> December at 2124 with one pilot on board.
- 1.7 The vessel commenced the voyage to South West Lamma, Hong Kong, in order to bunker prior to continuing on to its final destination of Qingdao, China to discharge 46,400 tonnes of bauxite. Whilst en route the Master received a weather forecast by 'FleetWeather' notifying the vessel of a tropical storm in the region and was provided with alternative waypoints in order to reduce the exposure to gale force winds and waves between 2.5-4m from the North East.
- 1.8 At 0654 on the 2<sup>nd</sup> January the Japanese Coast Guard received a distress alert and immediately initiated a search and rescue operation.
- 1.9 The Bulk Jupiter foundered on 2<sup>nd</sup> January 2015 between 0654 and approximately 0700. The location of the vessel at the time of the distress alert was approximately 150NM to the south east of Vietnam in position 09° 01'01"N 109° 15'26"E.
- 1.10 Of the nineteen (19) crew only the Chief Cook was rescued and sixteen (16) crew members remain missing. The last known position 09° 01'01"N 109° 15'26"E remained the centre of the search and rescue area by Vietnamese Coastguard until the search and rescue assets were told to stand down on, or about, the 06<sup>th</sup> January.



## M.v Bulk Jupiter – Marine Safety Investigation Report

- 1.11 The Chief Cook was rescued from the sea approximately 8 hours after the ship sank and the bodies of the Master and Chief Officer were recovered near this time. They were all retrieved from the water by the tug boat 'm.v Olng Muttral' during a coordinated rescue operation between a passing container vessel 'm.v Zim Asia' and the Vietnamese Coastguard. Unfortunately the Master was in a very poor condition and despite the tug crew's best efforts to revive him, he did not survive. The Chief Officer was recovered on board already deceased.
- 1.12 The Chief Cook remained on the 'm.v Olng Muttral' overnight before being transferred to rescue vessel 'SAR 413' on the morning of the 3<sup>rd</sup> January. The 'SAR 413' arrived at the port of Vung Tau, Vietnam at approximately 1600 on the 04<sup>th</sup> January.

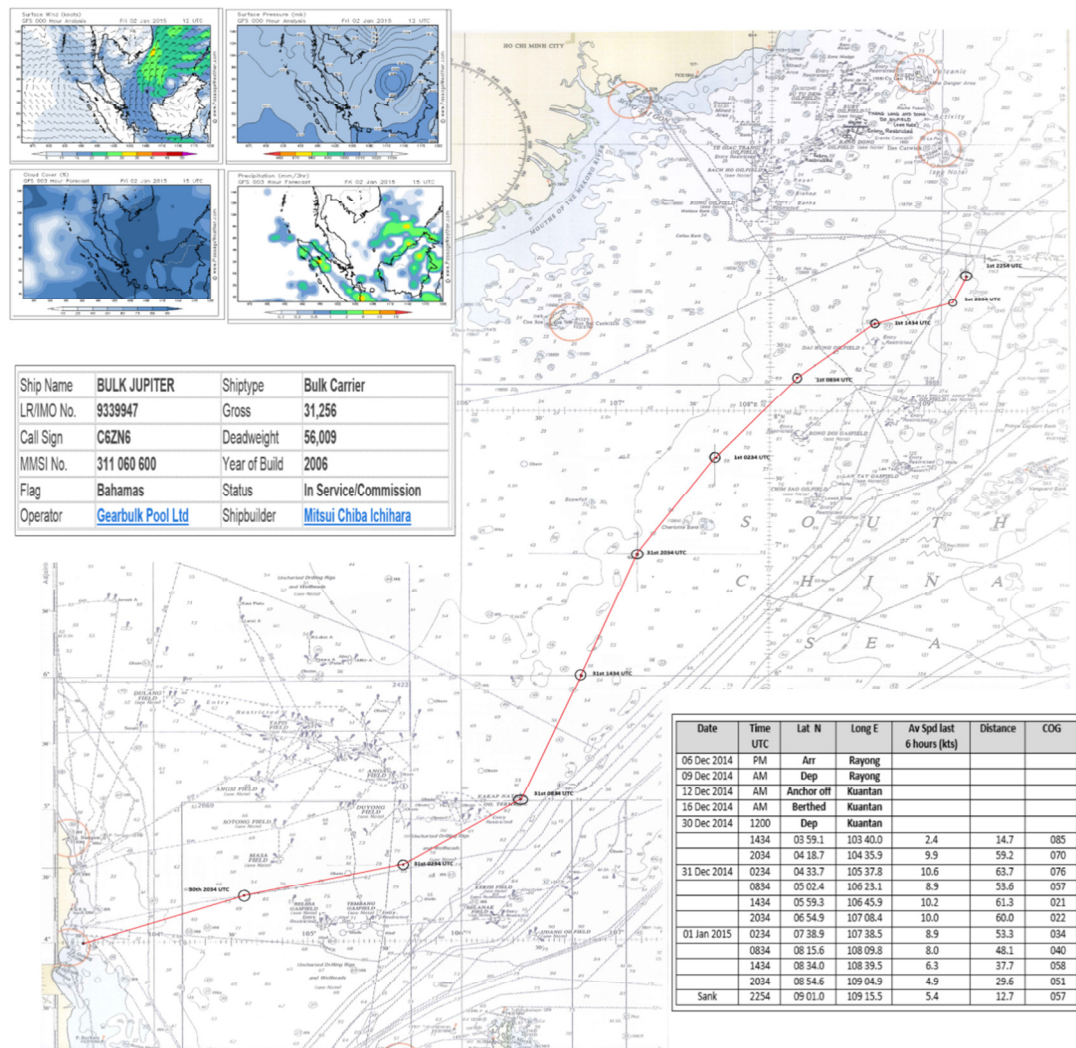


Figure 1: Route sailed by 'm.v Bulk Jupiter'

## SECTION 2: DETAILS OF VESSEL

2.1.1 The Bulk Jupiter, a bulk carrier which had been registered under the flag of the Commonwealth of the Bahamas since 2011. Principal details as at 01<sup>st</sup> January 2015 as follows:

IMO Number	9339947
Date of Build	01 Jan 2006
Builder	Mitsui Engineering & Shipbuilding Co. Ltd Chiba Works
Tonnage	31256 (Gross)
Length (overall)	189.99 m
Length (bpp)	182.00 m
Breadth	32.26 m
Depth	17.90 m
Draught	12.55 m
Class Society	Nippon Kaija Kyokai (NKK)
Class Entry	Bulk Carrier
Class Notation	Strengthened for heavy cargoes, Hold Nos.2 and 4 may be empty NS*(BC, SHC2, 4E) (ESP) MNS*(MO)
Propulsion	1 x Mitsui Man B & W 6s50MCC
Brake Shaft Power	9480.00 kW
Service speed	14.5 kts
No. of Crew	19
Capacity of Tanks	FO 2,509.00, FW 428.00, WB 30,283.00 (m <sup>3</sup> )
Capacity of Holds	No. 1 Hold 12,713.5 (m <sup>3</sup> ) No. 2 Hold 14,709.9 (m <sup>3</sup> ) No. 3 Hold 14,652.0 (m <sup>3</sup> ) No. 4 Hold 14,709.8 (m <sup>3</sup> ) No. 5 Hold 14,025.6 (m <sup>3</sup> ) Total 70,810.7 (m <sup>3</sup> )

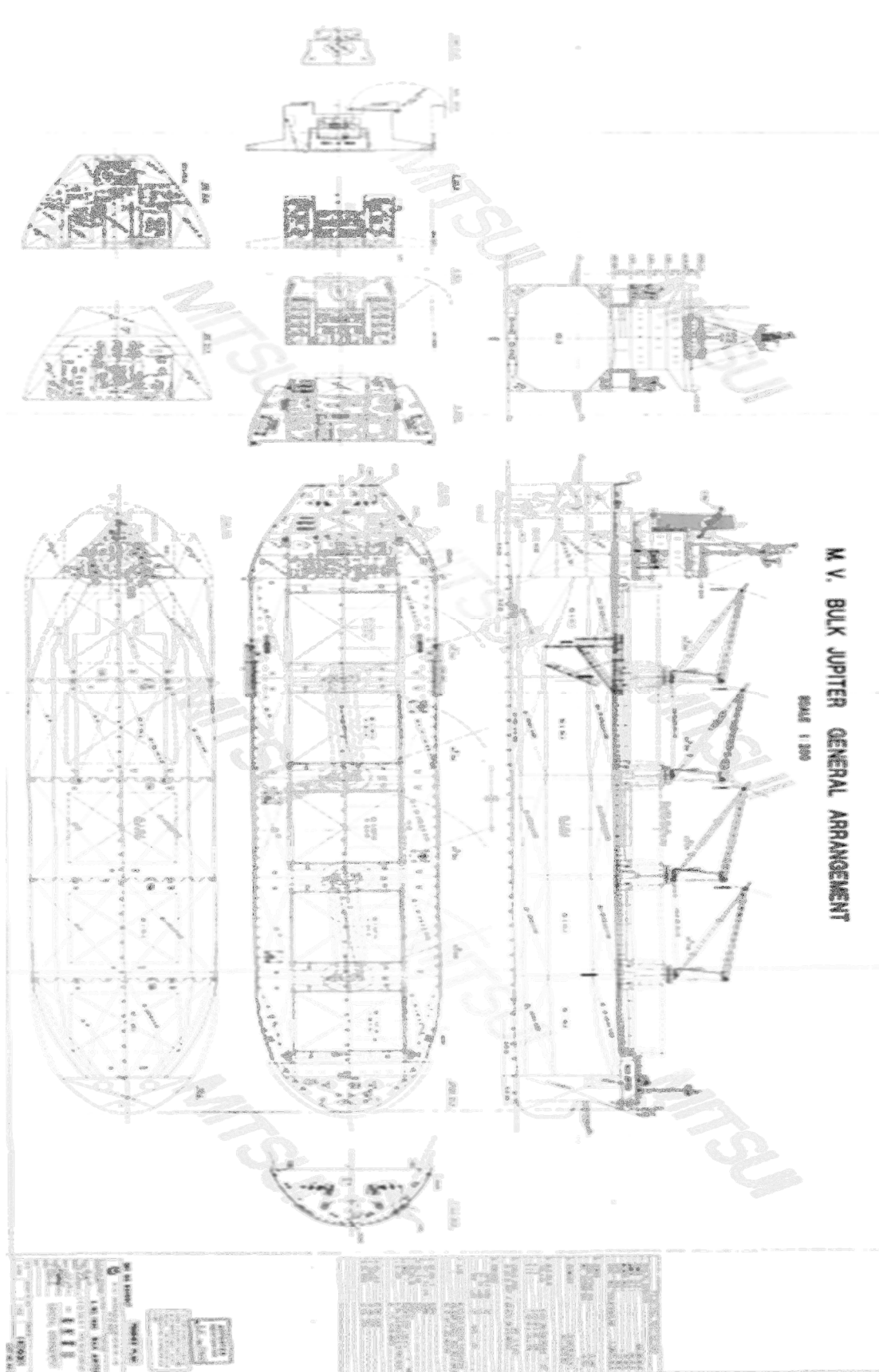


Figure 2: 'M.v Bulk Jupiter' general arrangement plan

- 2.1.2 The vessel was owned by Gearbulk Shipowning Ltd, Bermuda. The vessel was operated by Gearbulk Pool Ltd, and managed by Gearbulk Norway AS ('the Company'), which was also responsible for the technical management of the vessel. At the time of the incident the vessel held all the necessary and valid statutory certification.
- 2.1.3 Bulk Jupiter was under Time Charter with Winning Shipping Ltd based in Singapore. The contract agreement was signed on the 09<sup>th</sup> December 2014 which stipulates reporting requirements and detailed instructions to which Bulk Jupiter is understood to have complied. The BMA attempted to establish a line of communication with Winning Shipping Ltd to confirm the extent to which Bulk Jupiter had complied however no response was received.

## **2.2 CONDITION OF VESSEL (CLASS, FLAG & MANAGER'S INSPECTIONS)**

- 2.2.1 The Bulk Jupiter fulfilled the required surveys mandated by International Conventions and as described under the Harmonised System of Survey and Certification A.1053(27) and the International Code on the Enhanced Programme of Inspections during Surveys of Bulk Carriers and Oil Tankers (2011 ESP code) both as amended with completion dates as follows:

Special Survey	Aug 2011
Annual Survey	Sep 2013
Annual Survey	May 2014
Intermediate Survey	Jul 2014

Having completed the first special survey in August 2011 the vessel was in its second 5-year survey period. The next dry dock of the vessel was scheduled to be held in May 2016.

- 2.2.2 Bulk Jupiter was issued with a Certificate of Compliance with the International Maritime Solid Bulk Cargoes (IMSBC) Code on the 24<sup>th</sup> April 2014. The certificate attested that the vessel was suitable for the carriage of bulk cargoes as endorsed and in accordance with the IMSBC code provided that the vessel was maintained in good order; that the cargo be loaded as per the approved loading manual and stability information; that the nominal specific gravity of any cargo should not exceed the allowable value; and that the general note appended to the certificate should be followed.
- 2.2.3 On the 22<sup>nd</sup> February 2014, the vessel underwent its annual Flag State Inspection conducted by an approved Bahamas Maritime Authority Nautical Inspector. No new deficiencies were observed. Two deficiencies regarding the correct filling out of the vessel's Articles of Agreement and 'Entry into enclosed space permits' from the previous had been closed out and one regarding the availability of a 'Noise level Report' remained outstanding.
- 2.2.4 The Company periodically inspected the vessel in accordance with Safety Management System (SMS) procedures. The last physical inspection by a Technical Superintendent was carried out between the 04<sup>th</sup> and 05<sup>th</sup> September 2014 in Onsan, South Korea. During this inspection the propeller was polished

and no adverse observations affecting the vessel's structural condition or water tight integrity were made.

- 2.2.5 The vessel's ballast tanks were inspected by the crew and Superintendent in accordance with the Company SMS procedures. Records indicate that all tanks, except Wing tank No 2(S), had been inspected between March and October 2014.
- 2.2.6 The Company operated a computerised interactive planned maintenance system (AMOS) that could be polled from ashore. Records completed by the vessel's staff do not indicate any structural integrity matters that might affect the watertightness, weathertightness or structural integrity of the vessel.

## **2.3 CREW PARTICULARS**

- 2.3.1 At the time of the incident the vessel had a complement of 19 crew. The crew were all nationals of the Philippines and comprised Master, Chief Officer, 9 'deck' department, 6 'engine' department and 2 'galley' department members. A Safe Manning Document (SMD) was issued by the Commonwealth of the Bahamas on 12<sup>th</sup> October 2011; the vessel not only met the requirements of the SMD but was provided with excess personnel in all departments.
- 2.3.2 The Master (45 years of age) of the vessel held an Unlimited Master Mariner Certificate at the management level (II/2)<sup>4</sup> required by the Standards of Training, Certification and Watchkeeping (STCW) issued by the Republic of the Philippines on 18<sup>th</sup> November 2008 and endorsed by the Commonwealth of the Bahamas on 26<sup>th</sup> September 2013, and was duly recognized in accordance with the provisions of Regulation I/10 of the STCW 1978 convention. He had previously sailed on board the Bulk Jupiter on 4 separate occasions and had most recently joined on 18<sup>th</sup> November 2014 in Surabaya, Java. In total he had sailed over 300 days with bauxite cargoes on three separate voyages.
- 2.3.3 The Chief Officer (29 years of age) embarked in Portland, USA on 03<sup>rd</sup> October 2014. He held a Chief Officer's Certificate, STCW II/2, issued by the Republic of the Philippines on 19<sup>th</sup> July 2012 and endorsed from the Commonwealth of the Bahamas on 18<sup>th</sup> November 2013 in accordance with the provisions of Regulation I/10 of the STCW 1978 convention. He spent his sea going career with the Company advancing through the ranks from 3<sup>rd</sup> Officer in 2008, 2<sup>nd</sup> Officer in 2012 and Chief Officer in July 2012.
- 2.3.4 The Chief Engineer (42 years of age) held STCW III/2<sup>5</sup> Chief Engineering Officer qualification at the management level since June 2003, endorsed by the Commonwealth of the Bahamas and duly recognized in accordance with the provisions of regulation I/10 of the STCW 1978 convention. He joined the

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<sup>4</sup> Specification of minimum standard of competence for Masters and Chief Mates on ships of 500 gross tonnage or more.

<sup>5</sup> Specification of minimum standard of competence for the Chief Engineer Officers and Second Engineer Officers on ships powered by main propulsion machinery of 3,000kW propulsion power or more.

vessel on 04<sup>th</sup> September 2014 in Onsan, South Korea; having previously sailed on board bulk carriers.

- 2.3.5 The 2<sup>nd</sup> Officer (32 years of age) held the Deck Officer Class 3 (Officer in Charge of a Navigational Watch) certificate issued in September 2003 by the Republic of the Philippines, and a Certificate of Competence in October 2013 and endorsed by the Commonwealth of the Bahamas on 18<sup>th</sup> December 2014 in accordance with the provisions of Regulation I/10 of the STCW 1978 convention. He had sailed on on board 4 general cargo vessels in the capacity of 3<sup>rd</sup> Officer from October 2007 – July 2011 and was promoted to 2<sup>nd</sup> Officer in October 2011 and sailed on board a further 2 general cargo vessels, one of which was the Bulk Jupiter until January 2015. He joined the Bulk Jupiter in Kuantan, Malaysia on 17<sup>th</sup> December 2014.
- 2.3.6 The 3<sup>rd</sup> Officer (23 years of age) held the Deck Officer Class 3 (Officer in Charge of a Navigational Watch) certificate issued in September 2012 by the Republic of the Philippines, and a Certificate of Competence on 06<sup>th</sup> November 2012 and endorsed by the Commonwealth of the Bahamas on 26<sup>th</sup> November 2012 in accordance with the provisions of Regulation I/10 of the STCW 1978 convention. He had sailed on board a general cargo vessel from June 2010 for one year prior to joining the Bulk Jupiter in June 2011. He joined the vessel for the last time in New Orleans, USA on 07<sup>th</sup> February 2014.
- 2.3.7 The 2<sup>nd</sup> Officer who was on board on arrival at Kuantan conducted a handover with his relieving officer on the 17<sup>th</sup> December 2014 and departed the vessel at 1700. He sailed with the Gearbulk fleet since 2004 as a cadet, subsequently promoted to Junior 3<sup>rd</sup> Officer in 2008, Third Officer in 2010 and 2<sup>nd</sup> Officer in December 2011. He joined the Bulk Jupiter on 13<sup>th</sup> February 2014 in New Orleans. He provided the investigators with a statement on the 08<sup>th</sup> January 2015.
- 2.3.8 The Chief Cook (42 years of age) joined Gearbulk in 1996 starting as a cleaner before being promoted to Messman in 1998. In 2004 he was promoted to Chief Cook and sailed on 7 general cargo vessels within Gearbulk's fleet. He was recorded as having consistently demonstrated excellent performance in the course of his duties. He joined the Bulk Jupiter on 15<sup>th</sup> May 2014 in Jiangyin, China.
- 2.3.9 The remainder of the crew on board at the time of the incident, all nationals of the Philippines, joined the vessel in 2014.

## **2.4 PORT OF KUANTAN**

- 2.4.1 A BMA investigator visited the Port of Kuantan to view and inspect port facilities and infrastructure from 18<sup>th</sup> January to 21<sup>st</sup> January 2015. The visit involved discussions with Port Controller, Deputy Port Regulator and the Pilot who was on board during the departure of the Bulk Jupiter. Outside the confines of the port a visit was also conducted on Inspectorate Malaysia (part of the Bureau Veritas group), who offer a service to shippers to test bauxite samples



for moisture, flow moisture point (FMP)<sup>6</sup>, transportable moisture limit (TML)<sup>7</sup> and particle size.

2.4.2 Kuantan Port Authority is a federal body that was established on 01<sup>st</sup> September 1974 and placed under the responsibility of the Malaysian Ministry of Transport. The port started operating in 1984 and was then privatised in 1998.

2.4.3 The authority is, inter alia, responsible for issuing the license to the port operator; issuing operational and maintenance standards; regulating all issues pertaining to marine activities and pilotage; and to ensure the safety of the port and its activities.

The port's activities are regulated by:

- i. Port Authorities Act 1963, incorporating amendments up to 2006
- ii. Kuantan Port Authority By-Laws 1980



Figure 3: Port of Kuantan

<sup>6</sup> Flow moisture point means the percentage moisture content (wet mass basis) at which a flow state develops under prescribed method of test in a representative sample of the material.

<sup>7</sup> Transportable Moisture Limit (TML) of a cargo which may liquefy means the maximum moisture content of the cargo which is considered safe for carriage in ships not complying with the special provisions of subsection 7.3.2. (IMSBC Code Chapter VII Part A-1.7 Definitions)



- 2.4.4 The port is operated by Kuantan Port Consortium (KPC), wholly owned by IJM Corporation Berhad, a public listed company on Bursa Malaysia<sup>8</sup>. The operation of the port was taken over by KPC on 01<sup>st</sup> January 1998 when it was privatised under a 30-year lease.
- 2.4.5 Kuantan Port Consortium Sdn Bhd has, in collaboration with the Government, commenced a port expansion project of a new deep water terminal (Figure 4) intended to commence operation early 2016 and catering for vessels up to 150,000 DWT.
- 2.4.6 Kuantan port is located on the eastern seaboard of Malaysia facing the South China Sea. The port offers more than 4 kilometres of berths to accommodate a wide variety of cargo vessels and can handle a variety of cargoes that includes Liquid bulk (oil), containers, break bulk and bulk. The layout of the port can be found in figure 3 above.
- 2.4.7 Loading and discharging of dry bulk cargoes is carried out on the port's multi-purpose berths that are equipped to handle cargoes such as mineral ores, fertiliser, grain, and animal feed.

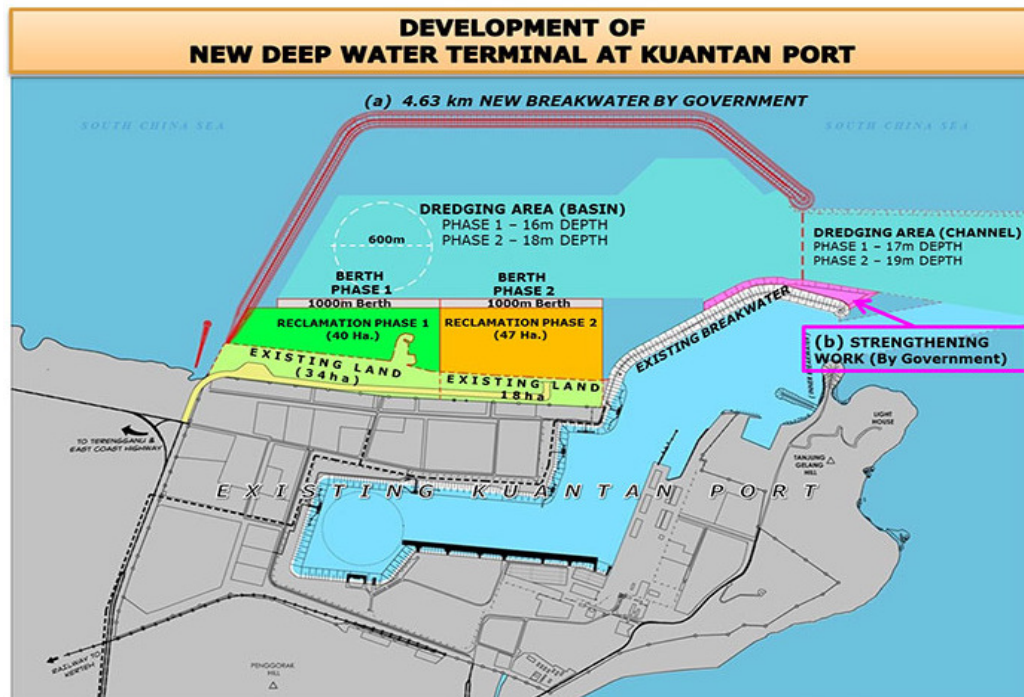


Figure 4: Planned expansion in progress

- 2.4.8 Bauxite is loaded at the multipurpose berths in Kuantan using vessels' own cargo gear (Figure 5). Bauxite is usually loaded on to road trucks and carried to loading berths from in-port area stock piles, storage facilities near the port or directly from the mines.

<sup>8</sup> Formerly known as Kuala Lumpur Stock Exchange



Figure 5: Loading with vessel's cranes and grabs

- 2.4.9 The loaded trucks, which are generally not covered as shown in figure 6, if coming from within the port or nearby stockpiles, dump the cargo on to the quayside (Figure 6).



Figure 6: Truck unloading Bauxite on quayside

- 2.4.10 Stevedores operating the cranes use grabs to load the cargo on board in accordance with a loading plan provided by the vessel. Tally men located ashore keep an approximate estimate of where and in which hold the bauxite is being loaded. The total amount of the cargo loaded is calculated by draught survey at the start and completion of cargo operations.
- 2.4.11 During periods of rain vessels generally close their hatch covers to prevent any moisture from entering cargo holds and maintain the cargo in a dry condition. However, any cargo left on the quayside is left uncovered and therefore exposed to the elements.

## 2.5 EXPORT OF BAUXITE

- 2.5.1 Between 2001 and 2005<sup>9</sup>, Malaysia's production of bauxite fell from 64,161t to 4,735t. Production since that time has been variable increasing to 295,176t in 2008 before falling to 121,873t in 2012<sup>10</sup>. Since 12<sup>th</sup> January 2014 the Indonesian government has enforced a ban on the export of unprocessed nickel ore and bauxite, the consequence of which saw a marked rise in production in Malaysia.
- 2.5.2 Kuantan historically exported iron ore but with dwindling ore prices this trade has significantly reduced. Many new bauxite mines in the region of Kuantan have opened within the last year and the international demand has seen the under-utilised port infrastructure revitalised.
- 2.5.3 Exports of bauxite from Kuantan started in April 2014 and the first month's export recorded a figure of 91,590t. Exports peaked during the month of November 2014 with 839,583t. During the month of December 2014 fourteen (14) bulk carriers loaded 642,529t of bauxite in Kuantan and loaded. Since the port began exporting in April 2014 it has handled almost 4 million tonnes of bauxite. It is understood that there are about ten companies involved in the export of bauxite and that all of this cargo was destined for ports in the People's Republic of China.
- 2.5.4 Bauxite is the main ore used in the production of aluminium and is reddish-brown in colour. It is extracted in the Kuantan area using the open-cast mining method as deposits are found near the surface. The surface material, in this case topsoil, is easily removed by earth moving machinery.



Figure 7: Open cast mining

<sup>9</sup> The People's Republic of China and South East Asia Mineral Production 2001-2005, a product of the world mineral statistics database

<sup>10</sup> World mineral production 2008-2012





Figure 8: Open storage of processed Bauxite

- 2.5.5 There are a number of mines dotted around Kuantan Port with varying sizes of operations. Some mines simply excavate bauxite and transport the product via trucks while other, typically larger, mines both excavate and process the mineral. In either case, there is no covered storage facility that affords any protection from the rain or surface water runoff. Occasionally protection was provided to the bauxite when it was transported by truck from outside the port; it was covered by a tarpaulin (Figure 9).



Figure 9: Truck transporting Bauxite covered by tarpaulin

- 2.5.6 There were a large number of stock piles located within the port, some large and some small, suggesting a number of shippers were involved. KPC required the shipper to maintain at least 10% of the intended cargo to be loaded within the

port so as not to delay loading operations. None of the stock piles were covered (Figure 10 and 11) and there was no evidence of any tarpaulins that could be used in the event it rained.



Figure 10: Uncovered stockpile in port

- 2.5.7 There were a number of facilities that were capable of providing protection to the bauxite from the rain. However, these facilities were found ear-marked and used for iron ore fines.



Figure 11: Open storage of Bauxite in port

- 2.5.8 The cargo loaded on Bulk Jupiter came direct from the mine and was reported by Spring Energy SDN BHD, to be 'raw and unwashed'. It is understood that another vessel loading around the time of Bulk Jupiter's accident was loading 'processed' bauxite i.e. high-pressure washed and graded.

2.5.9 There was at least one laboratory testing facility<sup>11</sup> in the Kuantan area. This facility was capable of determining the moisture content, establishing the FMP, TML, and the particle size of the intended cargo.

2.5.10 International Maritime Solid Bulk Cargoes (IMSBC) Code Resolution MSC.268(85), as amended, conveys the carriage requirements of typical cargoes shipped in bulk.

*“...together with advice on their properties and methods of handling, are given in the schedules for individual cargoes. However, these schedules are not exhaustive and the properties attributed to the cargoes are given only for guidance. Consequently, before loading, it is essential to obtain current valid information from the shipper on the physical and chemical properties of the cargoes presented for shipment.”*

2.5.11 Bauxite is specifically listed within Appendix 1 to the IMSBC Code (Individual Schedules for Solid Bulk Cargoes) and must be transported in accordance with the provisions in its schedule (see figure 12). The Code para 1.2.1 specifies that “The shipper shall provide appropriate information about the cargo to be shipped” while para 1.2.2 states that “The master shall consider to consult the authorities at the ports of loading and discharge, as necessary, concerning the requirements which may be in force and applicable for the carriage.”

2.5.12 Section 4.2 of the Code describes the requirements for the Provision of Information including certificates of test, where the Code requires such testing. The Individual Schedule for bauxite contains no test requirements.

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<sup>11</sup> Bureau Veritas Group commenced testing of minerals, metals and coal in Malaysia in March 2013, the first testing laboratory in Malaysia to provide TML/FMP testing for Iron Ore and other commodities.

A brownish, yellow claylike and earthy mineral. Moisture content: 0% to 10%. Insoluble in water.

**CHARACTERISTICS**

<b>ANGLE OF REPOSE</b>	<b>BULK DENSITY (kg/m<sup>3</sup>)</b>	<b>STOWAGE FACTOR (m<sup>3</sup>/t)</b>
Not applicable	1190 to 1389	0.72 to 0.84
<b>SIZE</b>	<b>CLASS</b>	<b>GROUP</b>
70% to 90% lumps: 2.5 mm to 500 mm 10% to 30% powder	Not applicable	C

**HAZARD**

No special hazards.

This cargo is non-combustible or has a low fire-risk.

**STOWAGE & SEGREGATION**

No special requirements.

**HOLD CLEANLINESS**

No special requirements.

**WEATHER PRECAUTIONS**

No special requirements.

**LOADING**

Trim in accordance with the relevant provisions required under sections 4 and 5 of the Code.

**PRECAUTIONS**

Bilge wells shall be clean, dry and covered as appropriate, to prevent ingress of the cargo.

**VENTILATION**

No special requirements.

**CARRIAGE**

No special requirements.

**DISCHARGE**

No special requirements.

**CLEAN-UP**

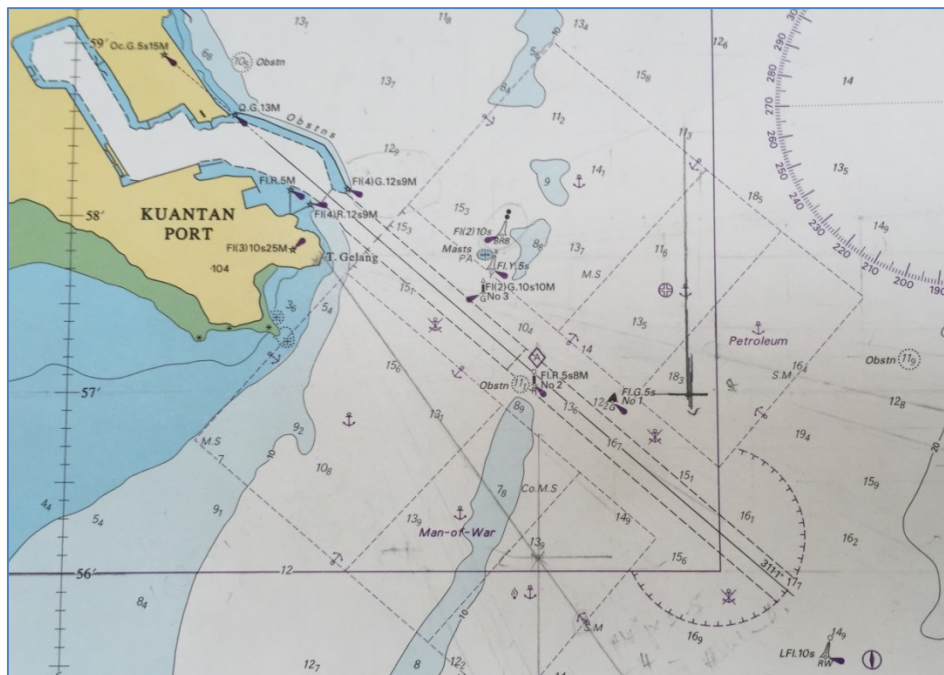
No special requirements.

Figure 12: Extract of Bauxite description as listed within IMSBC Code individual schedule



## SECTION 3: NARRATIVE OF EVENTS

- 3.1 All times are given in local time (LT), (UTC +8).
- 3.2 The Bulk Jupiter departed Maptaphut, Thailand on the 09<sup>th</sup> December 2014 having discharged 53,565t of coal. The vessel sailed at 1724 in order to arrive at the pilot station in Kuantan by 1700 on the 12<sup>th</sup> December 2014 covering a distance of 603nm at an average economical cruising speed of 8.3kts.
- 3.3 On arrival at Kuantan pilot station at approximately 1612 on the 12<sup>th</sup> December 2014 the vessel was informed to proceed to anchor and await further instructions. It is known that vessels alongside in port were delayed in loading and unable to sail due to the significant rainfall hampering the loading process. Throughout the period at anchor the vessel continued to send daily reports to the charterers and to the operators keeping them well informed; the actual arrival time alongside was not confirmed until the afternoon of the 16<sup>th</sup> December 2014.



**Figure 13: Port of Kuantan, Malaysia - Chart BA 1379**

- 3.4 On the 16<sup>th</sup> December 2014 the vessel sailed from the anchorage and proceeded to enter Kuantan Port with one pilot embarked and two tugs made fast. The vessel berthed alongside CB01 at 2200 and a draught survey was carried out prior to loading.

- 3.5 Loading commenced on the following evening, 17<sup>th</sup> December, at 2100. Over the course of the next 13 days loading of bauxite occurred intermittently in order to ensure 46,400t was evenly distributed on board within all 5 holds and as weather conditions allowed.
- 3.6 The Panamanian registered bulk carrier 'm.v Medi Okinawa' arrived in Kuantan on the 25<sup>th</sup> December and remained at anchor until 02<sup>nd</sup> January. She berthed in the same berth as the Bulk Jupiter until she sailed on the 21<sup>st</sup> January having discharged the cargo of bauxite loaded following sampling and analysis proof of failure of the cargo to meet the description contained in the declaration provided.
- 3.7 The 'm.v Orchid Island', a Panamanian registered bulk carrier, sub-chartered to Winning Shipping Pte Ltd, arrived in Kuantan on the morning of the 27<sup>th</sup> December in order to load 43,200t of bauxite bound for a discharge port in North China.
- 3.8 At 1650 on the 29<sup>th</sup> Dec 2014 loading of cargo hold number 3 on the Bulk Jupiter was completed with 9,600t of bauxite. Completion of cargo holds 1, 2, 4 & 5 was reported at 1715 on the 30<sup>th</sup> December 2014 and a draught survey was carried out. The vessel had loaded a cargo of 46,400t of bauxite in bulk and draughts were recorded as 11.2 metres, even keel.
- 3.9 The local weather conditions reported for the outbound passage were benign with nothing significant to report. The height of tide on departure at 2000 was 2.3m.
- 3.10 After clearing the breakwater the vessel was observed to be rolling about 2° to 3° degrees in a low swell. The pilot did not note any abnormal behaviour in the way the vessel handled while she was being pulled off the berth or manoeuvred through the port and channel.
- 3.11 At 2110 the pilot disembarked Bulk Jupiter to the pilot boat just before the fairway buoy and observed Bulk Jupiter alter her course to 070° degrees, which was approximately her next intended course. The Master advised Gearbulk and Winning shipping that the estimated time of arrival (ETA) at Qingdao was 1000 on the 8<sup>th</sup> January 2015.
- 3.12 The vessel increased speed to 10kts in order to make the most economical speed bound for Qingdao, China to discharge the bauxite. On the 30<sup>th</sup> December the vessel's ETA at Qingdao, China was communicated to Winning Shipping and Gearbulk by the normal means of a daily noon report. The ETA at Qingdao was the 8<sup>th</sup> January at 1000. In order to reach the destination on time the vessel was required to sail 2460NM at an average speed of 10kts. As the vessel began her passage the weather deteriorated – forecasted NE Beaufort scale 6-7, wind speed 24-34kts, sea state 4-6 and an average wave height of 2.2m.
- 3.13 On the 31<sup>st</sup> December the vessel received instructions from Winning Shipping to bunker in South West Lamma, Hong Kong. The vessel acknowledged receipt and altered the navigational passage plan accordingly. The ETA was reported as 5<sup>th</sup> January at 0900 with a distance of 982NM at an average speed of 9.71kts. At this point the weather system had deepened in the vicinity of the vessel as it proceeded north keeping the strong Force 7 (near gale) fine on the bow.

- 3.14 New Year's Eve was celebrated in the crew mess area with all crew attending with the exception of the Junior 3rd Officer and possibly the duty AB who were on watch (2000 - 2400). According to the Chief Cook *"there was no alcohol at the party apart from a little champagne for those who wanted to 'raise a glass' at midnight"*. The Chief Cook finished clearing up after the gathering at approximately 0130.
- 3.15 From approximately 2300 on the 31<sup>st</sup> December the vessel started to slowly reduce speed. The vessel's required speed to make good was 10.3kts; over the course of the next 31 hours the vessel consistently reduced speed by approximately 0.5kts every 3 hours.
- 3.16 The following morning the vessel received an email from their weather routing provider "FleetWeather" highlighting the adverse weather conditions expected in the region.

"TO: MASTER, BULK JUPITER  
FM: FLEETWEATHER  
GOOD DAY. REMNANTS OF TROPICAL DEPRESSION JANGMI ARE NOTED IN THE CENTRAL SULU SEA, SLOWLY MOVING SW. IN THE PAST 12HOURS OR SO, SYSTEM HAD ENTERED A HOSTILE ENVIRONMENT LEADING TO THE EVENTUAL DISSIPATION. FLEETWEATHER WILL CONTINUE TO CLOSELY MONITOR SITUATION, ADVISING FURTHER ON TROPICS ONLY IF NEEDED. MEANWHILE, NEAR-GALE TO GALE CONDITIONS ARE EXPECTED THROUGHOUT THE SOUTH CHINA SEA ASSOCIATED WITH THE NE MONSOON. IN ATTEMPT TO LIMIT EXPOSURE TO HEAVY WEATHER ASSOCIATED WITH THE NE MONSOON AND STRONG ADVERSE CURRENT ALONG THE COAST OF VIETNAM, FLEETWEATHER RECOMMENDS VESSEL COMMENCE IMMEDIATE RL-10N/111E, RL-19N/120E, THEN MOST DIRECT TO QINGDAO VIA EAST OF TAIWAN AS CONDITIONS AND SAFE NAVIGATION PERMIT."

Figure 14: 'FleetWeather' Forecast email transmission

- 3.17 The above recommended alteration of route was provided in order to reduce the influence of the North Easterly wind and sea state on the vessel by re-routing the vessel to the East and further offshore to mitigate the effects of the monsoon, while the vessel proceeded on a north easterly course.
- 3.18 In response to this weather warning and recommended re-route of the vessel, the Master requested an alternative route be provided, due to the vessel now bunkering in Hong Kong, which is located approximately 1020NM to the south west of Qingdao.
- 3.19 The evidence made available suggests the last external email transmitted from the Master to Gearbulk and Winning Shipping Ltd was sent on the 01<sup>st</sup> January at 1254, confirming ETA of 0900 on 05<sup>th</sup> January at South West Lamma Anchorage. The Master tended to email both the operator and the charterer with external correspondence pertaining to the vessel's activities collectively.
- 3.20 On the morning of the 2<sup>nd</sup> January the Chief Cook awoke at around 0600 and proceeded to the galley to prepare for the first meal of the day. From his

recollection the weather was starting to deteriorate as the vessel was rolling more heavily than the previous day. With the galley setup he then returned to his cabin (see figure 15) on 'B' deck.

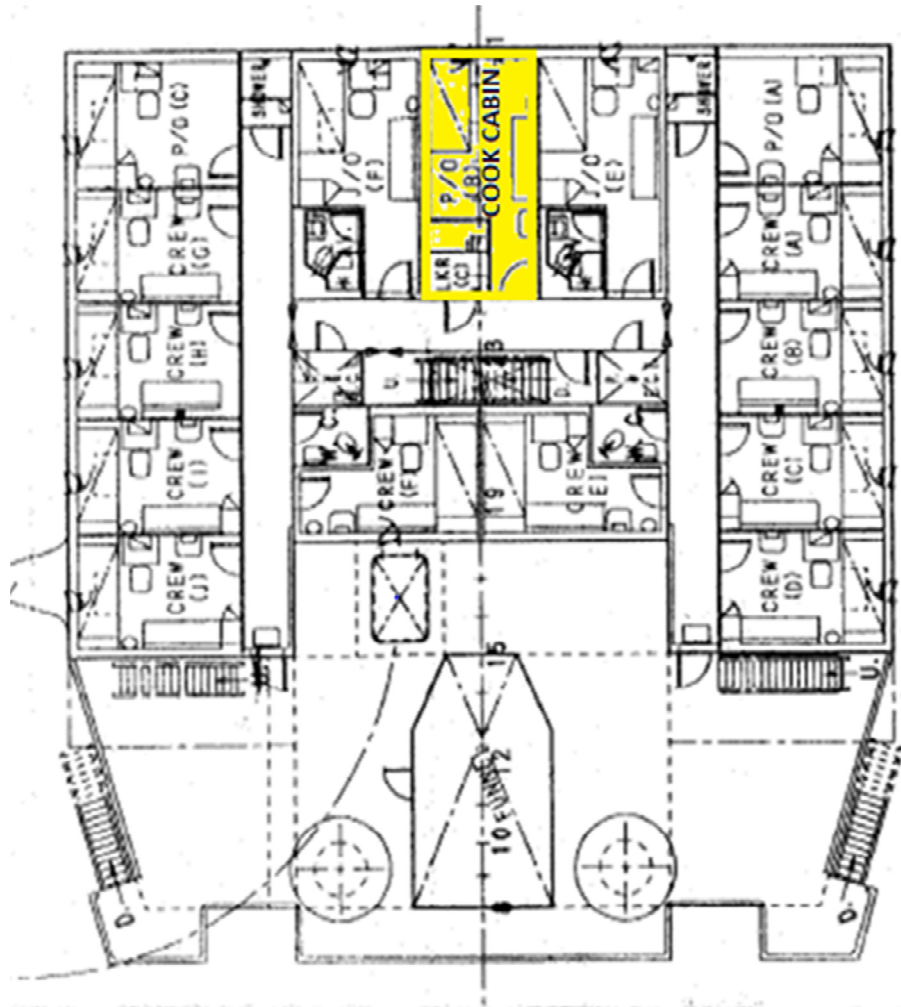


Figure 15: Chief Cook's cabin (highlighted), 'B' Deck

- 3.21 At approximately 0640 the general alarm was sounded followed by an announcement by the Master directing all crew to proceed to the bridge. The Chief Cook put on his overalls and started to make his way to the bridge but before arriving on the bridge deck he was met by fellow crew members (number unknown) who instructed him to proceed to the port side lifeboat located on A deck (see figure 16).
- 3.22 The Chief Cook returned to his cabin to collect his lifejacket, immersion suit and driving license ID. He later recalled that while in his cabin he felt the vessel suddenly starting to roll more heavily, particularly to starboard. He left his cabin in order to make his way to the port side lifeboat, at this point the vessel suffered a black out, emergency lights then came on, and the vessel stopped rolling and adopted approximately a 45° list to starboard<sup>13</sup>.

<sup>13</sup> Evidence gathered from Chief Cook witness statement

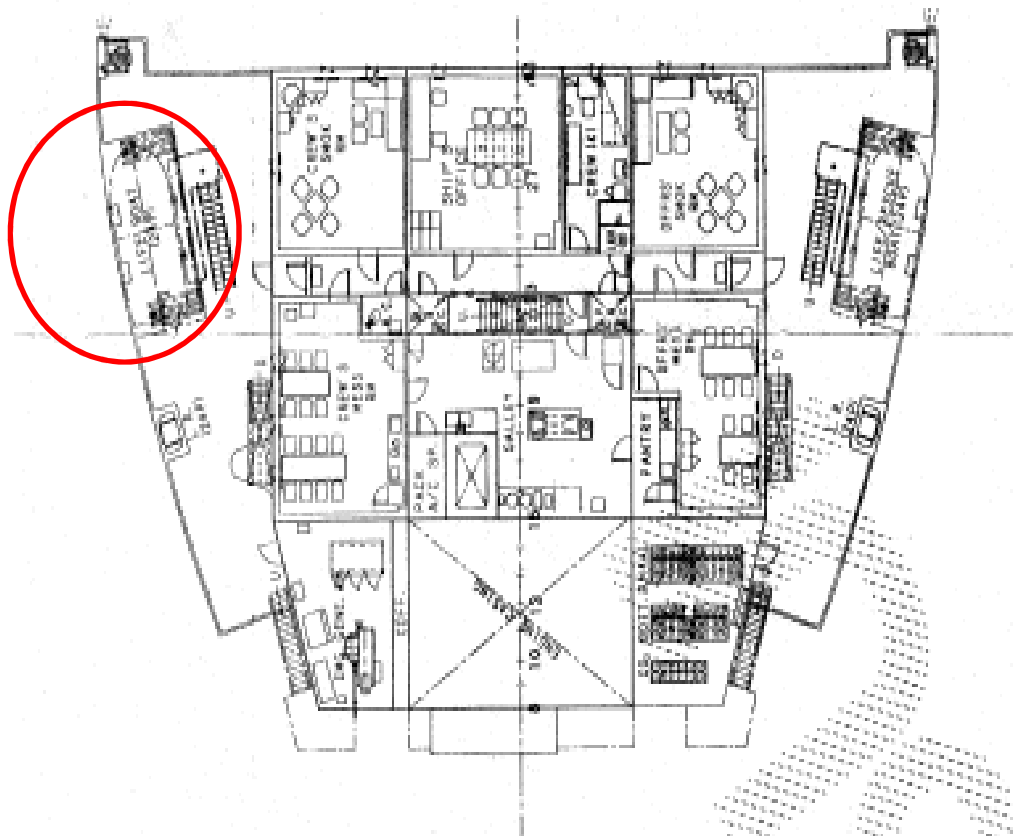


Figure 16: 'A' Deck, port and starboard lifeboat access (port highlighted)

- 3.23 Due to the angle of list the Chief Cook was unable to make his way to the port side access door, at which point he made the decision to utilize the internal staircase and proceed up to 'C' deck where he met the Master. He instructed the Chief Cook to follow him and together they exited the accommodation block via the starboard side access door (see figure 17). No other crew were seen on board by the Chief Cook after this point in time.
- 3.24 Having exited the accommodation area of the vessel both men found themselves on a small platform (see figure 18), on the starboard side, aft external stairway with the waves washing over them. The Master, wearing his lifejacket, jumped into the sea followed shortly after by the Chief Cook who at this point had donned his lifejacket - neither were wearing an immersion suit. The Chief Cook confirmed that he did see a life raft in the sea but was unable to reach it; he did notice that no one was present inside. The two men stayed together while swimming away from the vessel prior to it sinking. As they looked back from a safe distance, despite the heavy seas they could just see that the vessel had almost disappeared beneath the waves.

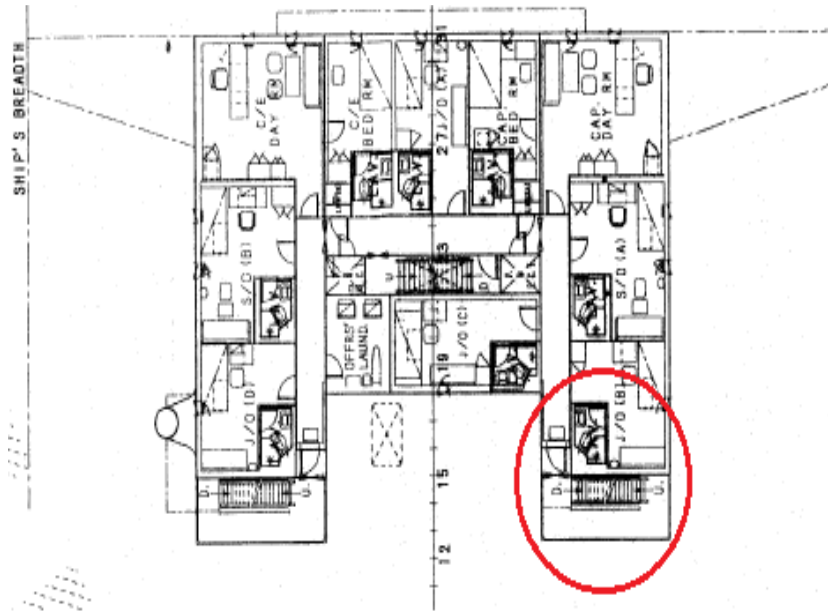


Figure 17: 'C' Deck, starboard aft, external stairway (highlighted)

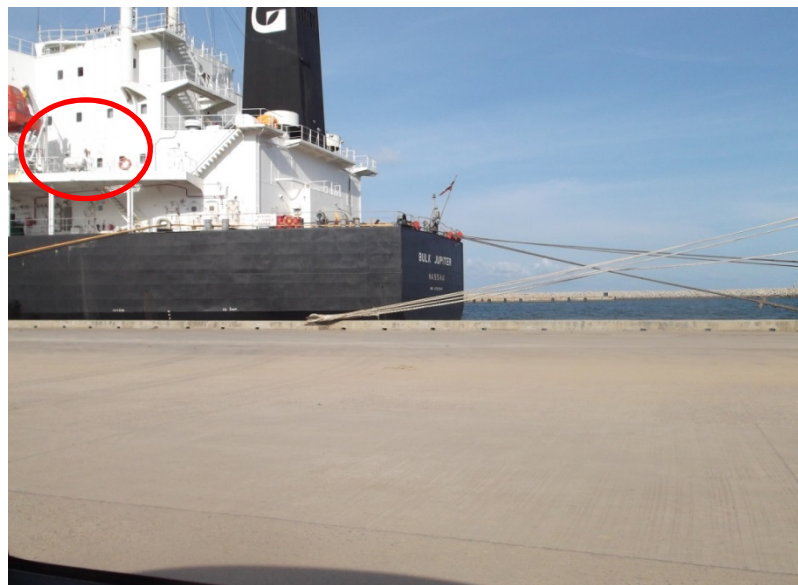


Figure 18: 'C' Deck, port aft, external platform (highlighted)  
similar to that of the starboard platform

- 3.25 At 0654 the Japanese Coast Guard and Maritime Rescue Coordination Centre (JCG MRCC) received an undesignated distress alert from the Bulk Jupiter in position 09° 01'01.00" N 109° 15'26.01" E underway at a speed of 4.3kn on a heading 210°. Immediately after receiving the distress alert the JCG relayed the information to all vessels in the region and began the Search & Rescue operation. Repeated attempts to contact the vessel on all communication channels were exhausted with no response.



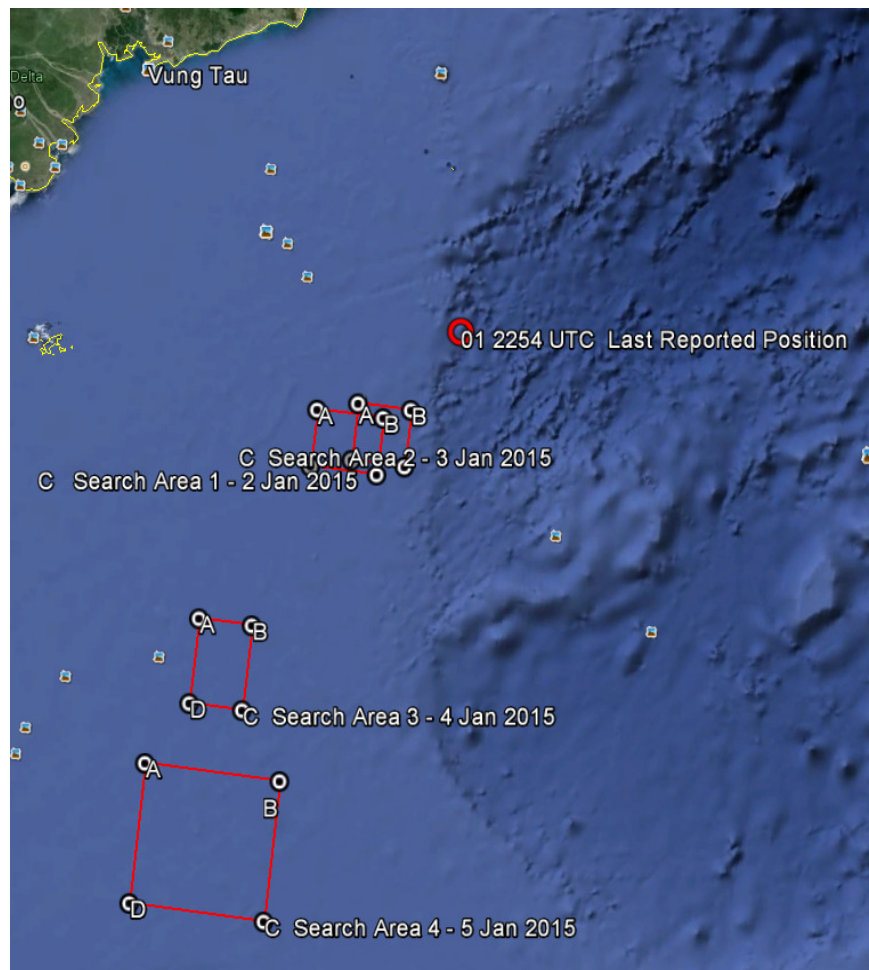


Figure 19: SAR Operating Area and Search Boxes

- 3.26 At 0700 on the 2<sup>nd</sup> January Vinamarine (Vietnam Maritime Administration) received EPIRB distress signal in position 08°58'56" N 109°14'94" E (approximately 150 NM off the coast of Vietnam). After receiving this radio beacon transmission Vinamarine directed the local Search & Rescue Coordination Centre and requested other competent agencies to carry out a search and rescue operation.
- 3.27 At around 0700 on the 2<sup>nd</sup> January, Vietnam Maritime Search and Rescue Coordination Centre (Vietnam MRCC) received information from Vietnam Maritime Communication and Electronics Company (Vishipel) that a distress signal from EPIRB of the Bulk Jupiter was activated in position 08°58'56" N 109°14'94" E. Vietnam MRCC tried to contact the vessel but was unsuccessful in receiving a transmission back from the vessel. At the same time, Vietnam MRCC received information from Singapore Maritime Port Authority that the vessel had also sent out a distress signal in the above position.
- 3.28 Sunrise on the morning of the 2<sup>nd</sup> January was 0712 in the vessel's approximate position.



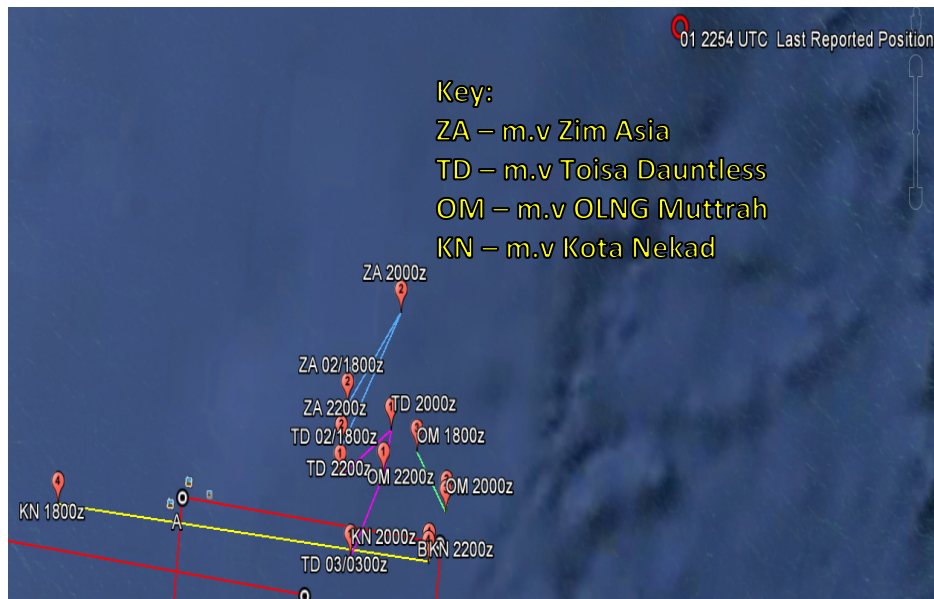


Figure 20: SAR Search Pattern as of 3<sup>rd</sup> January

- 3.29 Vietnam MRCC requested Visipel (Vietnam Maritime Communication and Electronics LLC) to broadcast a warning message to all vessels in the vicinity, the content of which we have not been provided with. A recipient of that NAVTEX message from Vung Tau MRCC (undesignated distress) on Digital Selective Calling (DSC)<sup>14</sup> was ‘m.v Zim Asia’ (Liberia, IMO 9226982), a fully cellular container vessel at 0945 hours.
- 3.30 The Master of the ‘m.v Zim Asia’ sounded the vessel’s general alarm and activated the “plan for recovery of persons from the water”. A lifeboat and life raft were spotted and an approach on both made. No persons were found present inside or in the vicinity of these craft. Over the course of the next 2 hours the vessel was involved in multiple telephone calls with various MRCC’s in the region; namely Singapore, Ho Chi Minh, Vung Tau and Vietnam MRCC who requested the vessel remain in the present position and maintain a sharp lookout for survivors. At this stage the Master commenced coordination as ‘On-Scene-Coordinator’.
- 3.31 At approximately noon that same day, ‘m.v Pan Uno’ (Malta, IMO 9226982), a bulk carrier, and ‘m.v Kota Nekad’ (Singapore, IMO 9390252), a fully cellular container vessel, reported their presence in the area by their active participation in the SAR effort.

<sup>14</sup> *Digital selective calling* (DSC) means a technique using digital codes which enables a radio station to establish contact with, and transfer information to, another station or group of stations, and complying with the relevant recommendations of the International Radio Consultative Committee (CCIR).

- 3.32 At 1410 ‘m.v Zim Asia’ reported sighting two persons (Master and Chief Cook) in immersion suits<sup>15</sup> and believed them both to be alive. Tug boat ‘m.v OLNG Muttrah’ (Oman, IMO 9715385) was called to assist and by 1556 the two crew were recovered on board, only the Chief Cook was alive.
- 3.33 Later that day at 1902 a flashing light was spotted in the water, the source of the light is not known but was assumed to be from a lifejacket. ‘M.v OLNG Muttrah’ approached the position of the light and noted one deceased person who was not recovered due to the high sea state.
- 3.34 ‘M.v Zim Asia’ continued to search the area conducting a “south west north east” search pattern (figure 20). Over the course of the next three days an expanding search area was created to the south west (figure 19). At 1042 on the 3<sup>rd</sup> January the ‘m.v Zim Asia’ was relieved by ‘SAR 413’ (IMO 9287261), a Vietnamese Coastal Search and Rescue vessel (see figure 35) who continued the search and coordination efforts. ‘M.v Zim Asia’ passage to Xiamen was then resumed.
- 3.35 Vinamarine ordered Vietnam MRCC to widen the search and rescue area and request Rescue Committee (NSRC) to send aircraft and specialized vessels of other forces to take part in the rescue effort.
- 3.36 On the 3<sup>rd</sup> January m.v ‘Toisa Dauntless’ (Bahamas, IMO 9307322), an anchor handling tug supply vessel arrived on scene at approximately 0100 hours to assist in the SAR effort. At 0809, ‘m.v SAR 413’ received the one recovered body and rescued crew member from ‘m.v OLNG Muttrah’ and one recovered body from ‘m.v Kota Nekad’ which was later confirmed as the Chief Officer. At 1440 the Vietnam Ministry of Defence deployed one helicopter from Vung Tau and ‘m.v CSB 4034’ (Coastguard vessel) from Phu Quy to the scene to assist in the effort to find the remaining crew members.
- 3.37 The following morning, NSRC deployed 2 aircraft and 1 hydroplane to the scene to maintain the SAR effort in daylight. At 1530 ‘SAR 413’ arrived at its base in Vung Tau, some 150NM from the scene, in order to disembark the Chief Cook and the 2 deceased crew members.
- 3.38 A total of 9 vessels and 3 aircraft were assisting with the SAR operation in the hope of finding the remaining crew. The SAR effort continued for a further 2-3 days however no further crew were located.

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<sup>15</sup> Witness statements provided by the Masters of the vessels engaged in the SAR operation are inconsistent in regard to whether the recovered crew members were wearing immersion suits or not.

## SECTION 4: ANALYSIS AND DISCUSSION

### 4.1 AIM

- 4.1.1 The purpose of the analysis is to determine the contributory causes and circumstances of the accident as a basis for making recommendations to prevent similar events occurring in the future.

### 4.2 GENERAL OBSERVATIONS

- 4.2.1 The investigation conducted has focused predominantly on two areas of potentially contributory causes to the loss of life of the 18 crew members on board on the 2<sup>nd</sup> January. The first being what internal or external factors caused the vessel to adopt a heavy, unrecoverable list to starboard and the second, why was there only 1 survivor, 2 recovered persons and 16 members of the crew lost at sea.
- 4.2.2 With the quantity of evidence made available by multiple sources a comprehensive analysis of the events leading up to the foundering of the Bulk Jupiter is possible. However, due to the geographical location of the vessel and the constraints associated with recovery or underwater survey, the lack of physical evidence has precluded the ability to confidently determine a definitive causal event.
- 4.2.3 Between the 17<sup>th</sup> December and the 30<sup>th</sup> December a total of 202.81 hours (8.45 days) of loading was lost due to rain and crane (No.1 crane stabilizing wire motor problem) malfunction. The weather over the course of December progressively worsened and it has been reported by the Meteorological station at Mardi Sungai Baging (approximately 6 miles north of Kuantan Port) that December 2014 held the record for the highest rainfall since records began in 1915. After the Bulk Jupiter sailed from Kuantan weather conditions deteriorated, particularly to the North, and were forecast (Fugro Weather) to be gale force winds and very rough seas deriving from tropical depression 'Jangmi' dominating the weather system in the region.
- 4.2.4 Since March 2012 the Master had served on vessels engaged in the transport of a variety of cargoes. Relevant to this investigation it was noted that the cargo was bauxite on three separate occasions. Of the multitude of cargoes carried under the Masters responsibility approximately 60% were categorised as Group C cargoes under the Code. The remainder were Group B cargoes with one exception - Coal which is categorised as a Group B (and A) cargo. Due to its chemical and structural characteristics, Coal not only proves chemically hazardous but also may liquefy (not applicable to all variants of coal).
- 4.2.5 It can be determined from Class, PSC, Flag and Company survey and inspection records that the vessel's crew were well versed in the operation of Life Saving Appliances (LSA) and conducted training on a regular basis to ensure that familiarity with operating procedures was maintained. Abandon ship drills were conducted regularly with the Master reporting back to the Company any

necessary remarks which could be published for the benefit of the Gearbulk fleet.

- 4.2.6 The vessel was last dry docked in Shanghai between the 9<sup>th</sup> and 22<sup>nd</sup> May 2014. During the dry dock, ClassNK inspected her hull and internal tanks to the extent required for the age and type of vessel. Records show ClassNK surveyed the fore peak tank, aft peak tank and water ballast tank (WBT) No 3 (port and Starboard), which included the topside tanks. No defects were noted during the surveys. The surveyor also carried out an internal examination of all cargo holds and did not record any defects. During the dry dock, the managers took the opportunity to repair some damage in WBT No 1 (port and starboard), WBT No 2 (starboard) and WBT No 4 (starboard), which had been caused by a grounding incident and had been noted in an earlier survey in September 2013. The repairs were completed to the satisfaction of the attending class surveyor. There is no evidence to suggest Bulk Jupiter was not structurally sound, as indicated during recent inspections and surveys by ClassNK.
- 4.2.7 LOAD-ACE is a loading computer program provided on board the vessel, to assist the Master to calculate trim, stability and longitudinal strength on board the vessel in accordance with the loading manual issued by Mitsui Engineering & Shipbuilding Company. The Load-Ace system is approved by ClassNK for control of loading conditions and calculations.
- 4.2.8 Prior to departure the Master ran the software programme producing a report which highlighted whether the vessel conforms to its designed stability, trim and longitudinal strength requirement. All three calculations resulted in an allowable condition to sail with 46,400t of bauxite in the condition declared by the shipper.
- 4.2.9 The vessel's average speed between the 31<sup>st</sup> December and the 1<sup>st</sup> January noon report was not as required. The average speed required to arrive on time at South West Lamma anchorage, Hong Kong for bunkers was 9.71kts but the average speed of the vessel over the course of the previous 24 hours was 8.71kts. This reduction in average speed is attributed to significant reductions in speed from 10.3kts to 6.5kts over that period. The following 24 hours led to further reductions in speed eventually steadying at 4.3kts. By the 1<sup>st</sup> January at 2300 the vessel was steaming at 4.3kts until the morning of the 2<sup>nd</sup> January. The reasons for the significant and unexpected speed reductions are unknown.
- 4.2.10 Given the weather conditions a reduction of 1-2kts to reduce slamming, reduce risk of waves breaking over the bow and reduce pitch and roll and mitigate any structural stress exerted on the hull could be expected. A reduction in speed of up to 5kts cannot be explained without evidence. However, it is possible that the reduction was a reaction to the weather conditions and an effort to reduce the roll and or pitch and reduce the yaw generated between waves. It is also possible, although there is no evidence, that propulsion or other mechanical failures were being experienced.
- 4.2.11 Despite the manner in which this vessel was operated, maintained and the satisfactory surveys and inspections conducted, the vessel was unable to maintain sufficient buoyancy to remain afloat during a routine voyage in heavy weather. Although the crew were alerted to the situation, the vessel foundered

within approximately 20 minutes. Taking into account the speed with which the vessel capsized the likelihood of the crew being able to gain access to life saving appliances and arrangements is low, and the time to operate the devices during the embarkation phase of abandonment was insufficient to ensure their safe use and survival.

- 4.2.12 The Charterers, Winning Shipping, have not been forthcoming in providing any information to assist in this investigation. This is regrettable as the instructions requested from the Master, to which he must comply, under the terms of the Charterers General Instructions, state under section “Cargo availability/Dead Freight” the Charterers request from the Master a daily record of any quantity of drainage cargo moisture pumped overboard during the voyage, and report the drained amount every 48 hours. On arrival at discharge port the vessel is required to present upon request a complete statement with the Masters signature, indicating the daily and total amount of water pumped out. The reason for this instruction is to avoid any cargo claim incurred due to cargo short-landing at discharge port. The vessel was underway for a total of 56.5 hours; no evidence has been provided to confirm or deny that a daily record was being recorded by the Master and sent to Winning Shipping. This vital piece of evidence could assist in determining the Master’s awareness of whether water was present in the cargo holds and what subsequent action was conducted as a result.

### 4.3 CARGO LOADING AND POSSIBLE LIQUEFACTION

- 4.3.1 Bauxite schedule within Appendix 1 of the IMSBC Code is described “*as a brownish, yellow claylike and earthy material. Moisture content: 0% to 10%. Insoluble in water.*” Figure 21 below is an extract of the Schedule for Bauxite which states the requisite parameters which the cargo must conform in order to be considered Bauxite.

#### CHARACTERISTICS

ANGLE OF REPOSE	BULK DENSITY (kg/m <sup>3</sup> )	STOWAGE FACTOR (m <sup>3</sup> /t)
Not applicable	1190 to 1389	0.72 to 0.84
SIZE	CLASS	GROUP
70% to 90% lumps: 2.5 mm to 500 mm 10% to 30% powder	Not applicable	C

#### HAZARD

No special hazards.

This cargo is non-combustible or has a low fire-risk.

Figure 21: Extract of Bauxite Schedule as per Appendix 1 of IMSBC Code

- 4.3.2 Prior to loading any cargo, under Section 4 of the Code “4.2.1*the shipper shall provide the Master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for the proper stowage and safe carriage of the cargo to be put into effect.*”

- 4.3.3 The signed declaration<sup>16</sup> provided by OXY PTE LTD (shippers) on 11<sup>th</sup> December in Kuantan concludes two vital pieces of information which may have been early indicators as to the condition of the cargo prior to loading bauxite. The date at which the declaration was made was 6 days prior to the vessel commencing loading and was signed by the shipper when the Bulk Jupiter was still on passage to Kuantan anchorage from Thailand. Rainfall figures (Figure 22)<sup>17</sup> for the days preceding the 11<sup>th</sup> December indicate that 122.2mm of rainfall had fallen in Kuantan. However, 377.6mm of rain had fallen in the same region between the signature of the declaration and the vessel commencing loading (6 days later).

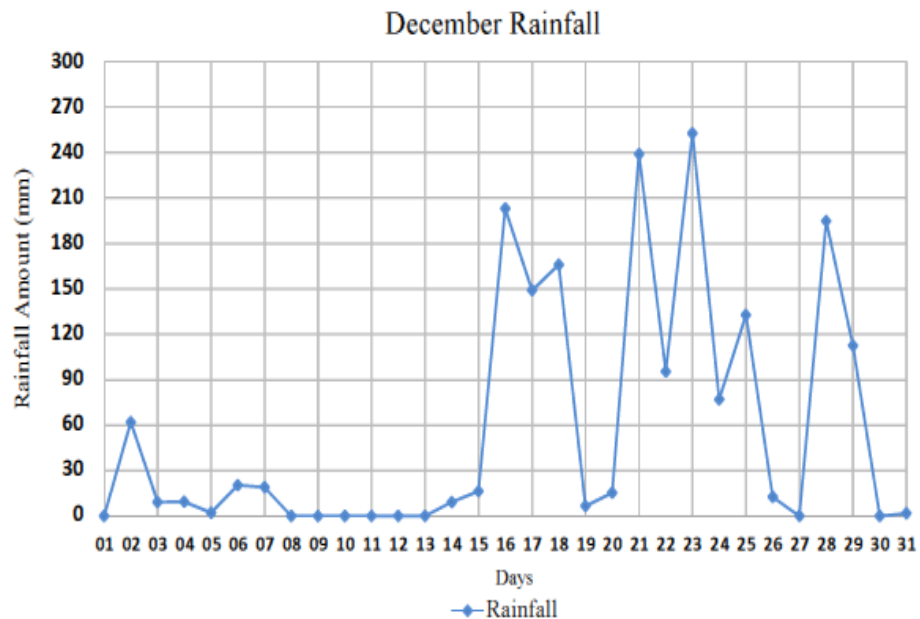


Figure 22: December rainfall in Kuantan

- 4.3.4 It is not known whether the declaration indicated a true reflection of the composition of Bauxite loaded, given the general description exactly corresponds to the Individual Schedule for bauxite in the Code. Due to the quantity of rainfall in the intervening period between the 11<sup>th</sup> and 17<sup>th</sup> December it is concluded extremely unlikely that the moisture content remained at 10%, as declared, especially considering the method with which the bauxite was mined, transported and stored whilst exposed to the elements.
- 4.3.5 A comparison has been conducted between the declaration provided to the vessel (see appendix V) and the mandatory characteristics (Figure 21). The general specifications of bulk cargo within the Code stipulate the size (composition) of the cargo. It is clear that a maximum of 90% of the cargo is to be between 2.5mm - 500mm and the remaining 10% to be of powder. The declaration (appendix V), accounts for a maximum of 90% of particles between 2.5mm - 500mm but does not stipulate the composition of the remaining 10%.

<sup>16</sup> FORM FOR CARGO INFORMATION for Solid Bulk Cargoes (MSC 85/26/Add.2 Annex 3)

<sup>17</sup> Provided by Malaysian Meteorology Department on 21 January 2015 giving daily aggregate rainfall for month of December

The stowage factor expresses the number of cubic metres which one tonne of cargo will occupy. Bauxite is required not to exceed a stowage factor of 0.84m<sup>3</sup>/t however the declared figure is 0.88 m<sup>3</sup>/t; therefore it can be determined that a higher proportion of powder and/or moisture was present, if this figure was determined through accurate testing.

- 4.3.6 A further comparison has been conducted between the cargo declarations provided for 'M.v Bulk Jupiter', 'M.v Orchid Island' and 'M.v Medi Okinawa' contained within appendix V, VI and VII respectively. A broad comparison between all three declaration forms identify that, with the exception of date, gross mass, shipper and vessel name, the information declared is exactly the same. A 10% moisture content is declared on all three declarations but, it is known that the average moisture content of Bulk Jupiter's cargo was 21.3%, the average moisture content of Medi Okinawa's cargo was 15.01% and photographic evidence (appendix II, figures 32 and 33) of Orchid Island's holds shows pooled liquid on the surface of the cargo. The cargo declaration forms provided to all three vessels bear little resemblance to the cargo loaded, it can therefore be determined that the declaration forms are considered generic and provide no useful information on the actual cargo as loaded.
- 4.3.7 A conscious decision by the Master to minimize the ingress of rainwater into the hold was evident throughout the loading process. The significant delays declared within the daily reports indicated this fact and highlighted to Gearbulk that precaution was being exercised as the loading schedule was interrupted regularly due to rainfall.
- 4.3.8 Based on the information provided, Gearbulk recommended a 'Can Test'<sup>19</sup> be conducted as a check test for approximately determining the possibility of moisture content as an auxiliary method. The following email exchanges occurred on the 24<sup>th</sup> December between the Company ship manager and the Master stating "*Since the cargo is very wet, would suggest to do Can testing as per IMSBC code. Although not listed in appendix A, it is better to be cautious.*" Reply from the Master, "*what do you mean by testing procedure please clarify*", the Company replied with the reference to the test and a brief description as to how to conduct it "*it is typically performed by an alert Master before loading any particular parcel of cargo*". The Master replied "*Understood and found also in the IMSBC code thanks for the info*". The exchanges indicate a lack of understanding of the practical method of determining excessive moisture content of a bulk cargo. It cannot be determined from the evidence provided whether the test was carried out and, if so, what the result of this test. Given the vessel remained alongside for a further 6 days there was ample opportunity to conduct this auxiliary method of testing on board.
- 4.3.9 The Company raised concerns to the Master about the moisture content, based on the reports from the Master stating that the cargo was wet. The individual schedule for bauxite indicates 'no special hazards' in relation to the risks involved if the moisture content is above that of the schedule, nor does it indicate that any hazard exists should the moisture limit be above that specified (10%). The exchanges that took place on the 24<sup>th</sup> December between the Company and the Master illustrates a concern by the Company of an indication

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<sup>19</sup> 'Can Test' IMSBC Code Section 8 para 8.4.1



that the cargo is not as declared and the consequential risk regardless of that stipulated within the Code.

- 4.3.10 Gearbulk Cargo Operations Standing Order provides guidance and direction for Masters to take into account during the preplanning and implementation of cargo evolutions in order to achieve a safe operation of loading. A TML test is not required for Group C cargoes; the precaution to conduct a test demonstrated effective risk management controls were in place to mitigate potential risk through continuous or periodic monitoring. After the 24<sup>th</sup> December no follow up question was asked as to the result of the Can Test. The Safety Management System was not robust enough to follow up on a concern raised by the Master of one of its vessels. Although Gearbulk standing orders use the phrase “*if required*”, as per the Code, having been directed due to an acknowledgement that the cargo was “*very wet due to*” accumulated rain water, the results of such test should have been formally requested.
- 4.3.11 On various occasions while the vessel being alongside and loading, daily situational reports (SITREP’s) stated that the cargo was extremely wet due to the rainfall. The final document attesting to this was the ‘Statement of Facts’ declared by the Master and the agent acting on behalf of the Charterers which contained the comment: “*Bauxite cargo transported by truck and stow at open quayside and wetted by the rain prior loading*”. It can therefore be concluded that the Charterers and Master were aware of the wet condition of the cargo, but does not confirm if they were aware of any risk involved if the moisture content was above that listed in the Individual Schedule for Bauxite within the Code. No guidance within the Code refers to the risk of high moisture content for Group C cargoes, in particular, risk of liquefaction.
- 4.3.12 Additionally, it has come to light that the exporters (Good Boss Resources SDN, BHD) had instructed SGS Mineral Services to test samples of Bauxite from the 17<sup>th</sup> – 30<sup>th</sup> December. In total 10 consecutive tests were conducted testing on 46,400t of Bauxite over the course of the 13 days, testing the equivalent of 5000t representative samples per day. The results of the tests<sup>23</sup>, in particular the moisture content values can be seen in figure 23 below. The 21.3% average moisture content recorded for the bauxite loaded on board the Bulk Jupiter exceeds the IMSBC Code schedule and the declared moisture content by 11.3%.

	Lot1	Lot2	Lot3	Lot4	Lot5	Lot6	Lot7	Lot8	Lot9	Lot10	Wt. Ave
	5000M	5000M	5000M	5000M	5000M	5000M	5000M	5000M	5000M	1400M	Lot 1 10 46400M
	T	T	T	T	T	T	T	T	T	T	
Moistur	22.0%	21.0%	21.4%	20.7%	21.0%	21.3%	20.8%	21.3%	22.3%	21.8%	21.3%

Figure 23: Moisture content results (%) from Bulk Jupiter

- 4.3.13 The results of the tests undertaken by SGS were reported to the exporters on the 17<sup>th</sup> January 2015. This date exceeded the intended arrival date of the vessel in

<sup>23</sup> See Appendix III (SGS Analysis Report)

Qingdao, China and therefore it is understood by this fact alone that the testing was not for the benefit of the Master or the Company, to determine cargo composition for the benefit of determining overall stability prior to sailing from Kuantan on the 30<sup>th</sup> December.

#### **Loading mv Orchid Island**

- 4.3.14 Prior to loading the ‘m.v Orchid Island’ a draught survey was conducted by a representative from SGS Malaysia SDN BHD. Noting the uncovered stockpile of bauxite ashore the Chief Officer asked the surveyor whether it was their and the surveyor confirmed that it was. The Chief Officer then raised a concern in regard to the condition of the cargo, having been exposed to the rain and likely to be wet, the surveyor replied “*it was in good condition to load and that it would not be a problem*”. The vessel loaded 43,200t of bauxite and sailed from Kuantan on the 1<sup>st</sup> January to Northern China. Whilst en route the charterer, Mitsui O.S.K. Lines (MOL) contacted the Master on the 3<sup>rd</sup> January informing him of the loss of the Bulk Jupiter. The charterers were aware of the fact that both vessels had loaded bauxite from Kuantan, and instructed the Master to check the cargo as soon as the weather had improved. The Chief Officer inspected the cargo on the morning of the 5<sup>th</sup> January and later commented

*“to my horror I saw that the cargo in No.4 hold had liquefied and the surface of the cargo was now flat and moving to port and starboard in a jelly-like fashion. There were also pools of water in each corner of the surface of the cargo”.*

The Master initiated soundings to be made and commenced discharging liquid from the holds, in total 71.11t of water was discharged from the bilges. The vessel was directed to proceed to a safe haven and deviate from discharge port and proceed to the port of Qingdao, China. On arrival in Qingdao the Japanese P&I association instructed Brookes Bell Shanghai to provide a preliminary report, which concludes

*“The results of my inspections lead me to conclude that the bauxite, if tested in a laboratory for flow characteristics, would certainly be shown to be Group A and furthermore, that it was in dangerous condition with significant proportions of the cargo stows likely to have moisture content (MC) in excess of the flow moisture point (FMP).”<sup>24</sup>*

#### **Loading the mv Medi Okinawa**

- 4.3.15 Bauxite was loaded on board the ‘m.v Medi Okinawa’ in all 5 holds. The Bahamas Maritime Authority highlighted the likely condition of the cargo not being as declared to the Panamanian Authorities who in turn notified the operator of the vessel and they conducted a TML test of the bauxite. The results of the TML test conducted are provided in Figure 24. All the holds were tested, the results of such testing confirmed that the bauxite on board the ‘m.v Medi Okinawa’ exceeded the upper 10% moisture content limit, required under the Individual Schedule for bauxite within the Code. The average moisture content of the cargo was 15.01% despite it being declared at 10%. This evidence

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<sup>24</sup> Brookes Bell Shanghai Preliminary report dated 16<sup>th</sup> January 2015, by Dr Nicholas Crouch, Scientist Partner

however can only be used as an indication as to the condition of the cargo loaded on board the Bulk Jupiter. It cannot be established that the Bauxite originated from the same location, spent the same amount of time exposed to the elements or transported in the same manner to the vessel.

HATCH No.;			1	HATCH No.;			4
No	Samples	MOISTURE %	No	Samples	MOISTURE %	No	Samples
1	FWD/PORT	18.15	1	FWD/POR	15.37		
2	FWD/CENTER	15.47	2	FWD/CEN	14.31		
3	FWD/STBD	18.46	3	FWD/STBD	13.65		
4	MID/PORT	16.08	4	MID/PORT	14.23		
5	MID/CENTER	17.19	5	MID/CEN	14.75		
6	MID/STBD	16.02	6	MID/STBD	13.43		
7	AFT/PORT	15.99	7	AFT/PORT	13.60		
8	AFT/CENTER	16.63	8	AFT/CEN	14.21		
9	AFT/STBD	17.34	9	AFT/STBD	14.29		
HATCH No.;			2	HATCH No.;			5
No	Samples	MOISTURE %	No	Samples	MOISTURE %	No	Samples
1	FWD/PORT	15.59	1	FWD/POR	14.45		
2	FWD/CENTER	16.58	2	FWD/CEN	14.82		
3	FWD/STBD	14.41	3	FWD/STBD	14.49		
4	MID/PORT	15.86	4	MID/PORT	14.62		
5	MID/CENTER	15.69	5	MID/CEN	15.01		
6	MID/STBD	16.71	6	MID/STBD	14.59		
7	AFT/PORT	15.03	7	AFT/PORT	14.35		
8	AFT/CENTER	15.79	8	AFT/CEN	14.59		
9	AFT/STBD	15.77	9	AFT/STBD	14.57		
HATCH No.;			3				
No	Samples	MOISTURE %					
1	FWD/PORT	13.96					
2	FWD/CENTER	14.52					
3	FWD/STBD	14.30					
4	MID/PORT	13.35					
5	MID/CENTER	13.59					
6	MID/STBD	13.78					
7	AFT/PORT	13.46					
8	AFT/CENTER	13.42					
9	AFT/STBD	12.99					

Figure 24: 'm.v Medi Okinawa' TML test results

- 4.3.16 In accordance with the Code, bauxite is not susceptible to liquefaction. It cannot be stated definitively that liquefaction occurred on the Bulk Jupiter and the causes of the vessel foundering cannot categorically be attributed to the transportation of bauxite. However, if the cargo does not conform to the physical characteristics as per the schedule then it is plausible that liquefaction occurred as the product characteristics as carried in this case are unknown.
- 4.3.17 In a statement made by the off-going 2<sup>nd</sup> Officer who departed the vessel on the 17<sup>th</sup> December, he referred to a conversation with the Chief Officer in which he asked “*whether the cargo was in a good condition for loading*” the response was that “*the Chief Officer confirmed that it was but he did give any details.*” The 2<sup>nd</sup> Officer in addition tried to get the stevedores to cover the cargo left on the jetty but the stevedores did not speak very good English “*and were very reluctant to work during the heavy rain*” the unloaded cargo was therefore left exposed.
- 4.3.18 The composition of transportable bauxite in accordance with the code is 70% to 90% lumps: 2.5 mm to 500 mm & 10% to 30% powder. If the bauxite loaded on board the Bulk Jupiter had a higher proportion in percentage of powder then it

could perhaps be considered at risk of liquefaction due to a greater proportion of small particles coupled with the presence of water which cannot be disputed. In accordance with the Code, section 7.2.1 the phenomenon may be described as follows:

*“.1 the volume of the spaces between the particles reduces as the cargo is compacted due to the vessel motion, etc;  
.2 the reduction in space between cargo particles causes an increase in water pressure in the space; and  
.3 the increase in water pressure reduces the friction between cargo particles resulting in a reduction in the shear strength of the cargo.*

- 4.3.19 Under the stimulus of compaction and the vibration which occurs whilst underway the moisture may be sufficient enough to initiate liquefaction. The Code section 7 states in paragraph 7.2.4 *“In the resulting viscous fluid state cargo may flow to one side of the ship with a roll but not completely return with a roll the other way. Consequently the ship may progressively reach a dangerous heel and capsize quite suddenly.”*
- 4.3.20 The reference above refers to the movement of cargo; however consideration should also be given for free surface effect<sup>25</sup>. The unrestricted movement of this water from side to side within the bulk cargo hold(s) could cause significant dynamic forces to act against the vessels righting moment. Repeated oscillations of increasing magnitude are commonly associated with the free surface effect; it is not a necessary condition as a sufficient moment can be generated on one side of the vessel alone, greater than the overall center of gravity and ultimately result in capsize.
- 4.3.21 The available evidence gathered including sources provided by witness statement, daily situational reports, and statement of facts indicate, in all likely circumstances, the moisture content of the cargo had been exceeded by a sufficient amount to generate a degree of free surface water within the cargo holds causing the metacentric stability of the vessel whilst underway to become unstable.
- 4.3.22 The Australian Maritime Safety Authority, and other interested parties, have initiated a research project with the aim of investigating the behavior of the bauxite and the validity of the Bauxite Individual Schedule. The intention is to have a complete and independently reviewed body of work within the context of a Correspondence Group (CG) under the direction of the International Maritime Organization (IMO) by March 2016. The CG would then make recommendations on test effectiveness, any new tests that may be necessary and any changes to schedules that may be required and report the findings of the research to the IMO sub-committee on Carriage of Cargoes and Containers (CCC) 3 thereafter.

#### **4.4 CARRIAGE OF CARGO**

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<sup>25</sup> Loss of GM due to the unobstructed atharwtship movement of water.

4.4.1 It is vital to understand the relationship between the shipper, charterer and Master when determining the levels of responsibility mandated and interpreted and the degree of understanding of instruments available to all parties.

4.4.2 To start this analysis it is important to understand who is responsible for what and how that responsibility manifests. Regulation 2 of Chapter VI of SOLAS regulates on the carriage of cargoes in bulk form, as follows:

*.1 The shipper shall provide the master or his representative with appropriate information on the cargo sufficiently in advance of loading to enable the precautions which may be necessary for the proper stowage and safe carriage of the cargo to be put into effect. Such information shall be confirmed in writing and by appropriate shipping documents prior to loading the cargo on the ship.*

*.2 In the case of bulk cargo, information on the stowage factor of the cargo, the trimming procedures, likelihood of shifting including angle of repose, if applicable, and any other relevant special properties. In the case of a concentrate or other cargo which may liquefy, additional information in the form of a certificate on the moisture content of the cargo and its transportable moisture limit.*

4.4.3 The competence of a Master is demonstrated by his qualification under STCW, in accordance with Part A of Chapter II A-II/2, which stipulates that the Master is required to demonstrate the “*plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes.*” One of the criteria for evaluating competence in accordance with STCW Part A of Chapter II A-II/2, ‘Cargo handling and stowage at the management level’, is to be able to recognise “*unacceptable or unforeseen variations in the condition or specification of the cargo are promptly recognized and remedial action is immediately taken and designed to safeguard the safety of the ship and those on board*”. Recognition of the condition of the cargo was highlighted, in daily reports to the Company but the results of action thereafter remain unknown.

4.4.4 The relationship between the Master and terminal representative is such that they “... *shall agree on a plan*”<sup>27</sup>. The Loading or Unloading Plan shall ensure those operations are conducted in accordance with the agreed plan. “*If during the loading or unloading... the Master has the right to suspend operation and the obligation to notify accordingly the appropriate authority of the port State with which the plan has been lodged. The master and the terminal representative shall ensure that corrective action is taken.*”

4.4.5 At any point a Master is responsible for the safe loading and stowage of cargo on board and if he deems the cargo does not meet the declaration provided by a shipper he has the authority to decline that cargo and request further tests until he is satisfied that the cargo meets that of the Individual Schedule within the Code.

4.4.6 In order to ascertain the reason for the Master not heeding the guidance provided within the IMSBC Code<sup>28</sup> it could be construed that he was under, or felt under,

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<sup>27</sup> Code of Practice for the Safe Loading and Unloading of Bulk Carriers (BLU Code)

<sup>28</sup> ‘Sampling and Testing’ IMSBC Code Section 4 para 4.5.2

significant commercial pressure. The 'Time Charter, Charter Party' stipulates that the Master shall "...prosecute his voyages with the utmost despatch, and shall render all customary assistance with ship's crew and boats. The Captain (although appointed by the Owners), shall be under the orders and directions of the Charterers as regards employment and agency; and Charterers are to load, stow, trim and discharge the cargo at their expense under the supervision of the Captain, who is to sign or authorise the Charterers or their agents to sign on his behalf Bills of Lading for cargo as presented, in strict conformity with Mate's receipts."

- 4.4.7 In addition the contract also stipulates that "*The owners to remain responsible for the navigation of the vessel, acts of pilots and tugboats, insurance, crew and all other matters, same as when trading for their own account.*"
- 4.4.8 The above direction provided by the Charterer clearly states that the Master is afforded adequate responsibility to conduct his duties as required under STCW A-II/2. Clause 30 of the Charterers contract states that "*A cargo of Bauxite in bulk to be loaded in accordance with the International Maritime Solid Bulk Cargoes Code (IMSBC Code) or any subsequent revisions thereof and/or applicable local regulations in effect at the time of loading.*"
- 4.4.9 In order to determine the commercial pressure which may have reduced the options available to the Master to request further tests of the cargo, to determine accurately the moisture content, under the Charter Party contract, Clause 30, stipulates that the Charterer is to "...pay for all expenses, consequences and time lost due to and or in connection with the carriage of charters intended carriage of such commodities or goods." Therefore the Master would be under no doubt that, although not actively encouraged to test cargo more frequently than the mandatory instruments require, he would have been entitled to request testing without recrimination.
- 4.4.10 Gearbulk operations manual provides the Master with direction and guidance in order to facilitate the carriage of cargoes whether under charter or otherwise. The below statement provides specific direction to the Master which was particularly relevant guidance whilst in Kuantan.

*"Do not load any cargo during rainy weather if in Master's opinion it will cause damage to cargo being loaded or to cargo already stowed in the holds or to be stowed in the holds. It is up to the Master to decide whether/when it is necessary to close hatches to avoid wetting of cargo already in the holds. If any doubt call in local P & I, do not accept any letters of indemnity from Charterers/supercargo or shippers if offered, but consult with Gearbulk immediately for further instructions."*

There was no evidence to suggest a local P&I representative attended the vessel.

- 4.4.11 In line with the SMS procedures required by the Company, daily reporting of all vessels is required. Figure 25 and 26 are extracts taken from noon reports on the 31<sup>st</sup> December and 1<sup>st</sup> January respectively. The Company requires this information as part of the Vessel Reporting System (VRS). It is unclear why no data have been submitted for cargo holds 1-5 for relative humidity, dew point,



and vent status or cargo condition. It is unknown whether a physical inspection occurred and whether the data provided were to the Company's satisfaction.

*“Vessels are to make inspections of the cargo holds minimum twice a day, under the responsibility of the Chief Officer, to monitor the condition of the cargo. If any cargo movement or damage has occurred or appears likely to occur it may be necessary to conduct inspections more frequently. Special attention should be paid to the importance of achieving the most favourable temperature condition in the holds in order to avoid contamination by condensation. The results of these inspections are to be included in the daily hold condition report, for all vessels this is included in the daily position reports in the VRS.”<sup>29</sup>*

We know from the two noon reports that information normally required and expected by the Company (as per direction given above) did not meet that requirement. The reasons for the lack of detail, such as inclement weather precluding physical inspection of holds, have not been stated on either report. It is unlikely given the time scale, in particular the last noon report (01/01/2015), whether the Company had sufficient time to analyse and seek clarification from the Master as to the information provided and if the condition of the cargo is known.

DAILY HOLD CONDITION							
Cargo		<input type="radio"/> NO Cargo Onboard <input checked="" type="radio"/> Cargo Onboard					
Chief Officer		Renner Karl R. Abogadie					
HOLD	Dry Bulb°C	Wet Bulb°C	Relative Humidity %	Dew Point	Vent. Status	Cargo Condition after Inspection	Empty
1	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
2	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
3	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
4	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
5	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
OUTSIDE	27.0	24.0	78.19	22.87			
General Comments							

Figure 25: Extract from Bulk Jupiter's Noon report on 31/12/2014

<sup>29</sup> GB Operations Manual, 004 Hold Inspections, page 175

DAILY HOLD CONDITION							
Cargo		<input type="radio"/> NO Cargo Onboard <input checked="" type="radio"/> Cargo Onboard					
Chief Officer		Renner Karl R. Abogadie					
HOLD	Dry Bulb°C	Wet Bulb°C	Relative Humidity %	Dew Point	Vent. Status	Cargo Condition after Inspection	Empty
1	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
2	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
3	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
4	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
5	0.0	0.0	100.00	0.00	none	Bauxite	<input type="checkbox"/>
OUTSIDE	27.0	24.0	78.19	22.87			
General Comments							
ME cyl. oil cons. 184 ltrs. Recieve from Charterer Bunker arrange in HongKong .							

Figure 26: Extract from Bulk Jupiter's Noon report on 01/01/2015

## 4.5 HEAVY WEATHER

- 4.5.1 The statement provided by the Chief Cook contains several factors that are possible indications of an unstable cargo. However the downgraded tropical depression delivering gale force winds and very rough seas apparent from the description of the vessel's motion are also worthy of consideration as a contributory factor.
- 4.5.2 A weather report produced by 'm.v Toisa Dauntless' at 1000 on the 3<sup>rd</sup> January descibed the conditions as North Easterly wind 30kts, wave height of 5m. The recorded weather experienced over the period (see Figure 27) provides data on wave height and wind periodicity for the duration of the SAR operation. The data provided by 'm.v Toisa Dauntless' is considered an accurate reflection of the experienced conditions, particulalry when aligned with that of the recorded data from other sources.

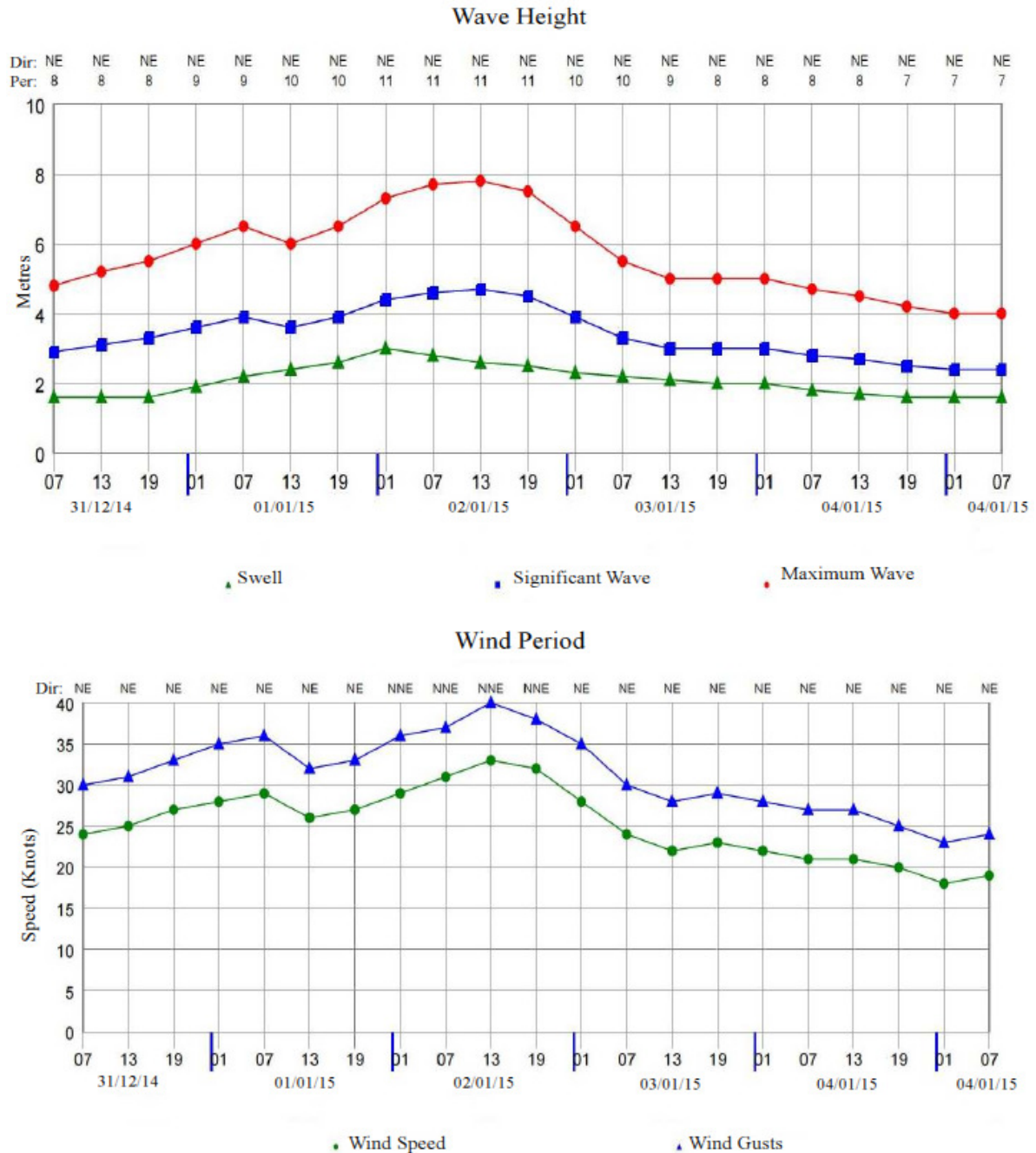


Figure 27: Actual recorded data for wave height and wind strength for the region

4.5.3 ‘FleetWeather’ provided a proactive service to the Charterers to minimize vessels exposure to heavy weather. In fulfilling this objective the Bulk Jupiter was advised to proceed further off-shore (easterly) to avoid the remnants of the tropical depression ‘Jangmi’. The decision made by the Master to request an alternative route did not expose the vessel in the intervening period to excessive forces. The significant wave height<sup>30</sup> of 4.7m was recorded on the 2<sup>nd</sup> January at 1400, based on this height, the highest recorded since departing Kuantan, and

<sup>30</sup> Significant Wave Height is defined as the average of the highest 1/3<sup>rd</sup> of the waves.

the vessels air draft<sup>31</sup> of 9.45m, on average therefore allowing a height of 4.75m between the highest wave and the top of the hatch combings. Adequate enough distance to ensure they were not submerged.

- 4.5.4 The Chief Cook recalled the deterioration in weather on the 1<sup>st</sup> January and attributed the rolling of the vessel to the inclement weather, especially compared to the previous day. Meteorological data for the period indicates that the weather was deteriorating but not significantly. The average wind strength for that period had increased by 2kts; this will not directly correlate to a small increase in wave height as the fetch will generate a greater wave height which had increased on average by 0.6m over the same 24 hour period. The swell direction was from the NE, the vessel's route placed the sea on the bow and fine on the port bow as the vessel sailed east north east on a heading of 060°. The direction of the swell would indicate that the vessel would tend to slam, even at slow speeds (4-6kts) rather than observe a rolling motion as described. Notwithstanding this, it is entirely possible that a combination of both fore-and-aft and atharwtship motion may have been apparent as the vessel makes headway under helm.
- 4.5.5 The last AIS signal transmitted from the Bulk Jupiter was received on the 1<sup>st</sup> January at 2254(GMT), given this was the time of the safety distress signal which must be operated manually it can be determined that someone, probably the Master, was on the bridge at the time. What was also transmitted was the vessel's speed at 4.3kts and, in the final moments prior to sinking, a course of 210°.

#### **4.6 ABANDON SHIP**

- 4.6.1 The witness account of the events prior to abandoning the vessel highlight the limited time available for the crew to muster on 'A' deck lifeboat station, don lifesaving equipment and abandon the ship in accordance with procedures as trained. The timeline indicates that from approximately 0640 when the Master sounded the general alarm and requested the crew to muster on the bridge, to the receipt of the EPIRB transmission at 0700 the window of opportunity to launch lifeboats and abandon in an orderly way was unlikely to be more than 20 minutes. It is confirmed from the records retained by the Company that the vessel had conducted the required emergency training and drills in accordance with prescribed regulation 19 within SOLAS Chapter III.
- 4.6.2 Bulk Jupiter conducted six (6) abandon ship drills over the course of the preceding 6 months and noted two concerns, on two separate occasions, to management in regard to their conduct when reported via AMOS. The last drill was conducted on the 6<sup>th</sup> December and included a full muster of personal with lifejackets and immersion suits along with a simulated launch of the lifeboats. Abandon ship drills are to be conducted every month, the reports received from the Master in relation to the monthly drills conclude that 2 out of the 6 drills conducted were reported as being too slow, the crew are required to familiarize themselves with the procedures in order to reduce the time taken for the crew to abandon ship. The last drill conducted for the month of December makes no

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<sup>31</sup> Hatch cover (1-5) closed & secured is 20.65m from keel. Draft @ 11.20m = 9.45m Air Draft

reference to the time taken to abandon the vessel; on the whole the drill was reported satisfactory.

4.6.3 Lifeboat release drills are incorporated within the abandon ship drill. During such drills physical launching and recovery does not need to be demonstrated but safe operation of the launching and recovering operation is demonstrated without the need to put the lifeboat in the water. Under SOLAS<sup>32</sup> each vessel shall conduct a launch and recovery of the lifeboat every 3 months during an abandon ship drill. The Bulk Jupiter conducted the last lifeboat launch and recovery drill on the 29<sup>th</sup> November whilst at anchor at Tanjung Bara, Indonesia. The drill concluded that both lifeboats were operational with no defects reported.

4.6.4 Successful emergency procedures rely on accurate and timely communication. In accordance with SOLAS<sup>33</sup> *“all survival craft required to provide for abandonment by the total number of persons on board shall be capable of being launched with their full complement of persons and equipment within a period of 10 minutes from the time the abandon ship signal is given.”*

According to the witness statement, no abandon ship signal was given to the entire crew; sufficient time therefore cannot be assumed was given in order for them to achieve successful abandonment. In addition and in accordance with Gearbulk Damage Control Booklet, *“...in response to damage, the Master should immediately sound the general alarm to the crew members in their muster stations, and inform them of the situation, and prepare lifeboats for launching as necessary. The Master should then assess the situation, and confer with his senior officers.”*

4.6.5 The paragraph above provides the Master with direction, in the event of a developing situation, any action required to ensure timely preparation for launching lifeboats as necessary. The Chief Cook confirmed that the Master called the crew to the bridge by P.A and general alarm and had instructed those crew members present to proceed to the Port lifeboat station and don lifejackets and immersion suits. This has been determined based on the information provided by the witness statement, specifically *“I ran into a number of crew coming down from the bridge telling me to go to the port side lifeboat”*.

4.6.6 Bearing in mind the time of day at which the vessel adopted a list to starboard the majority of the crew, excluding watch keepers would have been either sleeping or preparing for the day in their cabins. With little notice, the vessel took a list to starboard that was reported as 45°. It is likely that this list continued to increase before the point of vanishing stability was attained, the starboard aft external platform was submerged, an angle suspected as being greater than 45°. Therefore, given the majority of the crew would be located on ‘B’ deck, within cabins, their only means of escape was via the port side aft door leading to the external staircase. The speed with which the vessel adopted a list,

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<sup>32</sup> Regulation 19 Section III para 3.3.33.2 - Every crew member shall participate in at least one abandon ship drill and one fire drill every month. (Chapter III, Part B) 3.3.3 Except as provided in paragraphs 3.3.4 and 3.3.5, each lifeboat shall be launched, and manoeuvred in the water by its assigned operating crew, at least once every three months during an abandon ship drill.

<sup>33</sup> SOLAS 74/78 Section III (Part B) Regulation 31, para 1.5 Cargo Ships (Additional Requirements), Survival Craft and Rescue Boats

considering the location of the crew, the probability that any crew member managed a means of escape from the accommodation area is low.

- 4.6.7 It is also likely that the angle of list which was greater than the maximum angle<sup>34</sup> under which it was possible to safely lower the lifeboat. In addition to this, as the exact timings of abandonment are unknown - there may have been insufficient time for the crew to physically launch the lifeboat or life rafts prior to the vessel adopting a 45° angle of heel.
- 4.6.8 It is known that the Master and Chief Cook proceeded to the starboard aft ladder platform on 'C' deck prior to abandoning ship (see figure 28); it was observed by the Chief Cook that he suspects that the vessel was "*at an angle of heel of approximately 45°*" as the platform edge was at sea level. The vessel quickly reached the point of vanishing stability which is a point of unstable equilibrium. Any heel smaller than this angle will allow the vessel to right itself, while any heel greater than this angle will cause a negative righting moment (or heeling moment) and force the vessel to continue to roll over. When a vessel reaches a heel equal to its point of vanishing stability, any external or internal force can cause the vessel to capsize. Therefore at the point where the deck was submerged, an internal factor, such as unstable cargo, cargo displaced to starboard or a free surface water effect generating enough momentum to initiate a heavy roll to starboard, when combined with the effects of the shifting of the cargo would lead to the vessel exceeding the vanishing point.

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<sup>34</sup> 4.4.1.1 All lifeboats shall be properly constructed and shall be of such form and proportions that they have ample stability in a seaway and sufficient freeboard when loaded with their full complement of persons and equipment, "and are capable of being safely launched under all conditions of trim of up to 10° and list of up to 20° either way"



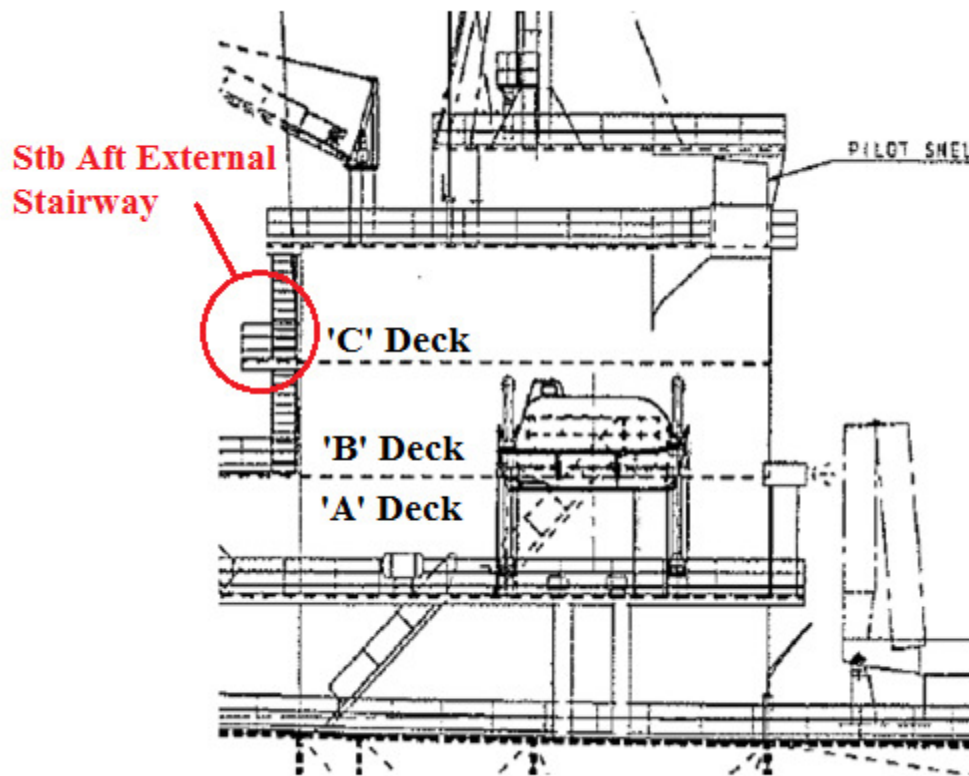


Figure 28: Master and Chief Cook disembarkation location

- 4.6.9 The life rafts on board were capable of being manually launched or released by hydrostatic release mechanism. It is likely that the life rafts were released hydrostatically and not manually due to their vacant condition.
- 4.6.10 The Chief Cook was physically fit as a consequence of his daily exercise routine but he was unable to reach a life raft once in the water due to the sea conditions. Therefore it is likely that the remainder of the crew, if they had abandoned the vessel in time, would also not have been able to reach a life raft or lifeboat. The probability that a proportion of the crew were unable to abandon the vessel cannot be discounted. Those that did would certainly need to have been competent swimmers and physically fit to increase the probability of survival.



Figure 29: Bulk Jupiter lifeboat as seen from 'm.v Zim Asia'

#### 4.7 SEARCH AND RESCUE EFFORT

- 4.7.1 Command and control of the SAR effort was coordinated by Vietnam MRCC. Lines of communication were maintained primarily via Inmarsat C between Vietnam MRCC and 'm.v Zim Asia' whilst acting as On-Scene-Coordinator. The Master of the 'm.v Zim Asia' reported key events to Vietnam MRCC throughout the duration of the SAR effort; however during the dialogue it was felt by the Master that more support was required to manage the scale of the operation. The Master required more support to assist with the engagement of other vessels, advice on search plans and receive information in regard to future support expected in the area.
- 4.7.2 According to the On-Scene-Coordinator 'm.v Kota Nekat' reported a total of six (6) persons sighted in the water, only one person was recovered on board. 'M.v Zim Asia' reported sighting two (2) unresponsive persons in the water, neither recovered. 'M.v OLNG Muttrah' was informed of two (2) crew in the water, both alive, one recovered unconscious who later died (Master) and the second recovered and survived (Chief Cook). Every vessel *"shall have ship-specific plans and procedures for recovery of persons from the water"*<sup>35</sup>. Given the weather conditions it certainly would have hampered the recovery and may under the circumstances deemed impossible, particularly for a vessel with a high freeboard. It was recorded that 'm.v OLNG Muttrah' did not have sufficient capacity on board to accommodate more bodies and therefore restricted overall capacity to three. Had the tug boat been aware of further support (SAR 413) being dispatched to support the operation the tug boat may have been able to make an exception in this instance and not restrict the vessel to only three (3) persons.
- 4.7.3 Coordinating such an operation from a container ship not designed to regularly undertake such a task without sufficient expertise or an increase in manpower,

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<sup>35</sup> SOLAS Ch III Life-Saving Appliances and Arrangements Regulation 17-1 Recovery of persons from the water.

sustaining the duty of On-Scene-Coordinator can prove extremely challenging. The crew of the 'm.v Zim Asia' deserve significant recognition for their hard work. A demanding task of coordinating multiple vessels, personnel and maintaining lines of communication drain available resources on board and lead to crew fatigue. An increase in manpower or greater support from shore side agencies may have led to a more accurate account of personnel located in the water and possibly even recovery.

- 4.7.4 Four (4) further vessels, owned by Gearbulk, Norway AS, were tasked to pass through the area and participate in the SAR effort as defined by daily projected drift and current patterns. Sunbird Arrow (Bahamas, IMO 9323821) was the first of four vessels on scene and remained in the area for five days. Kingbird Arrow (Bahamas, IMO 9635389), Hawk Arrow (Bahamas, IMO 8313685) and Plover Arrow (Bahamas, IMO 9144407) passed through the area conducting a 'snake search' pattern; only minor debris sighted and a lifejacket confirmed not to be from the Bulk Jupiter.

## SECTION 5: CONCLUSIONS

- 5.1 There is significant documentary evidence to identify that the 46,400t of bauxite loaded over the course of the 13 day period had an average moisture content of 21.3%. Despite this, there is no physical evidence to confirm what caused the vessel to adopt an unrecoverable list to starboard and subsequent capsizing.
- 5.2 In total 186.55 hours of loading was lost due to rainfall - the equivalent of 7 days of loading over the period. The infrastructure available to adequately store and transport bauxite in Kuantan increased the exposure of the bauxite to the elements. Despite the crew's diligent response to the rain by continually opening and closing the hatch covers to reduce the ingress of water, the cargo remained exposed whilst on the quay side, in stock piles and in the trucks.
- 5.3 The Bulk Jupiter's Master and senior crew members were well versed in dry bulk cargo operations. They were well supported by a management team who proactively engaged with the vessel. The company's SMS procedures encompassed sufficient guidance and advice to the Master and Chief Officer in order for them to conduct safe handling of cargo.
- 5.4 An independent inspection was not requested by the Master to verify the properties of the cargo prior to loading on board. Considering the extreme weather conditions and storage facilities available it was acknowledged that the cargo was very wet and that measures to protect the cargo on shore from further rain were not effective in preventing further wetting. The absence of an independent inspection resulted in the cargo being loaded without its physical properties and moisture content being verified against the parameters of the IMSBC Code schedule or the cargo declaration form.
- 5.5 The Company provided adequate guidance and direction to the Master and maintained a level of management sufficient to allow normal operations to be conducted safely. However three factors failed to raise adequate awareness or warning signs: the uncharacteristic speed reduction en-route, the results of the requested 'Can Test' and the incomplete noon reports that should have informed the Company on the condition of the cargo in the holds.
- 5.6 Every 48 hours a report should be generated and provided to the Charterers if any water had been drained from the bilges during the transit in accordance with the Charterers Voyage Instructions. No correspondence has been received from the Charterers and therefore it cannot be determined whether the cargo was draining free water and/or whether anyone on board was aware and was taking action to discharge any water accumulating in the hold bilges.
- 5.7 The previous class and special survey inspections indicate no structural integrity failures; the vessel had fulfilled diligently all prior certification conformity requirements and as such the likelihood of a catastrophic structural failure is considered low.

- 5.8 The actions taken of the Master in the final stages of the extreme circumstances pertaining prior to the vessel foundering were not wholly in accordance with Company guidance nor mandated actions in the event of a serious casualty and impending abandonment. It is known that not all members of the crew were fully aware of the seriousness of the situation and subsequent actions required to maximise the prospects of survival.
- 5.9 Initial response during the SAR effort was communicated throughout the region to good effect. The number of vessels in the region participating in the operation demonstrated the effectiveness of the regional coordination centres.
- 5.10 As the SAR effort progressed, information between On-Scene-Coordinator and the Coordination centre became less detailed, particularly in regard to the duration of the operation and the availability of assets in the region. Had it been known that designated SAR assets were being dispatched to the search area the recovery of the deceased and subsequent retention on board may have been less of a cause for concern for the attending vessels.
- 5.11 Having deduced that the probability of structural failure is low, as a singular causal event, it can be concluded most probable that either liquefaction or a free surface effect induced an unrecoverable list. When considering the conditions in the order that they occurred, there can only be very few circumstances that cause a vessel to capsize so quickly with minimal warning. The reliability of the information provided on the cargo declaration, in particular the composition of cargo, the probability of liquefaction occurring is considered high. A further causal event, for which would only occur if the cargo is sufficiently compacted is a free surface effect generated on top of the cargo. Notwithstanding this, if the cargo had liquefied, a free surface effect will also occur, with similar catastrophic effect. Another related phenomenon associated with both liquefaction and free surface effect occurs when the cargo slides to one side of the vessel and fails to return to where it came from. This particular effect would be inevitable once the angle of heel is greater than the angle of repose of the cargo, if untrimmed, or if the cohesion between the particles of the cargo is insufficient when an angle of heel is induced.

## SECTION 6: RECOMMENDATIONS

### **Recommendations for the Operator:**

- 6.1 The operator should ensure that awareness training is implemented for vessels crew involved in the direct transportation of bulk cargoes. The training should be designed to raise awareness of the inherent risks, management of the risk and what are the signs of a cargo not fulfilling its IMSBC schedule.
- 6.2 The operator should consider a review of the Safety Management System to include a 'follow-up' mechanism that would capture outstanding tasks/reminders specific to individual occurrences i.e. follow up on the results of a requested 'test' that should have been carried out.
- 6.3 The operator should ensure a hazard data sheet for bauxite is included within Company Cargo Manual.

### **Recommendation for the Shipper:**

- 6.4 The Shipper should review the procedure and their obligation of declaration of cargo and ensure before loading, to obtain current valid information on the physical properties of the cargo. The shipper must also provide accurate information about the cargo to be shipped in accordance with the IMSBC Code.

### **Recommendations for Port State:**

- 6.5 Provide published guidance on the testing, sampling and surveying procedures for the port of Kuantan and ensure its implementation.
- 6.6 Review qualification of Port State officials inspecting and declaring cargo and restrict declaration to qualified officials only.

### **Recommendations for the Flag State:**

- 6.7 The Bahamas should consider, together with other interested states, proposing to the International Maritime Organisation a review of the IMSBC Appendix 1 schedule for bauxite and its associated Group C rating and composition.



## SECTION 7: ACTIONS TAKEN AFTER THE EVENT

### **Actions taken by Owners:**

- 7.1 The Company have provided financial compensation to the Next of Kin including the establishment of a scholarship scheme that will cover the educational expenses for the dependents up to completion of college. Next of Kin and selected family members were invited to Manila to meet the Owner of the Company and a memorial service was held.
- 7.2 All Next of Kin had access to an individual contact person within Magsaysay, providing follow up home visits during and after the search and rescue operation. This service remains available and some family members continue to benefit from this support.
- 7.3 The Chief Cook has been compensated at the same level as the Next of Kin, provided medical insurance for him and his family for the next 10 years and been provided with counselling as and when required.
- 7.4 Gearbulk has refused to load bauxite from Kuantan on any of their vessels for the foreseeable future. In addition, the loading of bauxite in any other port is conditional on sampling and analysis to confirm the cargo is Group C as specified. This also applies to all other concentrates.

### **Industry & NGO's:**

- 7.5 The following urgent advisory notices alerting to the risk of possible liquefaction of cargoes of bauxite that may originate from Malaysia have been issued by Skuld, North of England P&I, GARD (Marine Insurance P&I, UK P&I (LP Bulletin 1025, 1027) and Britannia P&I.
- 7.6 Further, GARD have released urgent advisory notices alerting to the risk of possible liquefaction of cargoes of bauxite that may originate from Brazil.
- 7.7 Intercargo and BIMCO have provided assistance by ensuring maximum industry awareness in regard to the risk of possible liquefaction of cargoes of bauxite has been disseminated to their members.

### **Flag State:**

- 7.8 The Bahamas Maritime Authority has submitted a proposal to the Carriage of Cargoes and Containers sub-committee (CCC 2) which calls for immediate action on amendments to the IMSBC Code.

## SECTION 8: GLOSSARY

AIS – Automatic Identification System

AMOS – Asset Management Operating System (Planned Maintenance System)

COC – Certificate of compliance

EPIRB – Emergency Position Indicating Radio Beacon

Free Surface Effect – The effect of unobstructed movement of liquid on the vessel's stability.

FMP – Flow moisture point means the percentage moisture content (wet mass basis) at which a flow state develops under prescribed method of test in a representative sample of the material.

GM – a measure of the ship's initial stability (metacentric height).

GMDSS – Global Maritime Distress and Safety System

Group C – Consists of cargoes which are neither liable to liquefy (Group A) nor to possess chemical hazards (Group B).

IMSBC Code – International Maritime Solid Bulk Cargoes Code

MRCC – Maritime Rescue Coordination Centre

NKK – Nippon Kaija Kyokai (Recognised Organisation)

Overall Stability - A general measure of a vessel's ability to resist capsizing in a given condition of loading.

Righting Moment (RM) – Vessel's true tendency to resist inclination and return to equilibrium as a result of the couple created by the transverse movement of the centre of buoyancy relative to the centre of Gravity.

SAR – Search and Rescue

SOLAS – International Convention on the Safety of Life at Sea

STCW II/2 – Mandatory minimum requirements from certification of masters and chief mates on ships of 500 gross tonnage or more.

TML – Transportable Moisture Limit of a cargo which may liquefy means the maximum moisture content of the cargo which is considered safe for carriage in ships not complying with the special provisions of IMSBC Code section 7.3.2.

## LIST OF APPENDICES

- I. Beaufort Scale of wind force
- II. Additional photographs
- III. SGS Analysis Report on Bulk Jupiter
- IV. Statement of Facts includes attestment to wet cargo
- V. M.v Bulk Jupiter Signed Cargo Declaration
- VI. M.v Orchid Island Signed Cargo Declaration
- VII. M.v Medi Okinawa Signed Cargo Declaration

## Appendix I: Beaufort Scale of Wind Force

**BEAUFORT SCALE OF WIND FORCE**

Beaufort number	Descriptive term	Wind speed equivalents		Specifications for observations on board ship (open sea)
		Metres/second	Knots	
0	Calm	0–0.2	<1	Sea like a mirror
1	Light air	0.3–1.5	1–3	Ripples with the appearance of scales are formed, but without foam crests
2	Light breeze	1.6–3.3	4–6	Small wavelets, still short but more pronounced; crests have a glassy appearance and do not break
3	Gentle breeze	3.4–5.4	7–10	Large wavelets; crests begin to break; foam of glassy appearance; perhaps scattered white horses
4	Moderate breeze	5.5–7.9	11–16	Small waves, becoming longer; fairly frequent white horses
5	Fresh breeze	8.0–10.7	17–21	Moderate waves, taking a more pronounced long form; many white horses are formed (chance of some spray)
6	Strong breeze	10.8–13.8	22–27	Large waves begin to form; the white foam crests are more extensive everywhere (probably some spray)
7	Near gale	13.9–17.1	28–33	Sea heaps up and white foam from breaking waves begins to be blown in streaks along the direction of the wind
8	Gale	17.2–20.7	34–40	Moderately high waves of greater length; edges of crests begin to break into the spindrift; the foam is blown in well-marked streaks along the direction of the wind
9	Strong gale	20.8–24.4	41–47	High waves; dense streaks of foam along the direction of the wind; crests of waves begin to topple, tumble and roll over; spray may affect visibility
10	Storm	24.5–28.4	48–55	Very high waves with long overhanging crests; the resulting foam, in great patches, is blown in dense white streaks along the direction of the wind; on the whole, the surface of the sea takes a white appearance; the tumbling of the sea becomes heavy and shock-like; visibility affected
11	Violent storm	28.5–32.6	56–63	Exceptionally high waves (small and medium-sized ships might be for a time lost to view behind the waves); the sea is completely covered with long white patches of foam flying along the direction of the wind; everywhere the edges of the wave crests are blown into front; visibility affected
12	Hurricane	32.7 and over	64 and over	The air is filled with foam and spray; sea completely white with driving spray; visibility very seriously affected

Obtained from Manual on Marine Meteorological Services Volume I – Global Aspects WMO-No. 558 2012 edition [http://library.wmo.int/pmb\\_ged/wmo\\_558\\_en-v1.pdf](http://library.wmo.int/pmb_ged/wmo_558_en-v1.pdf)

Appendix II: Additional Photographs



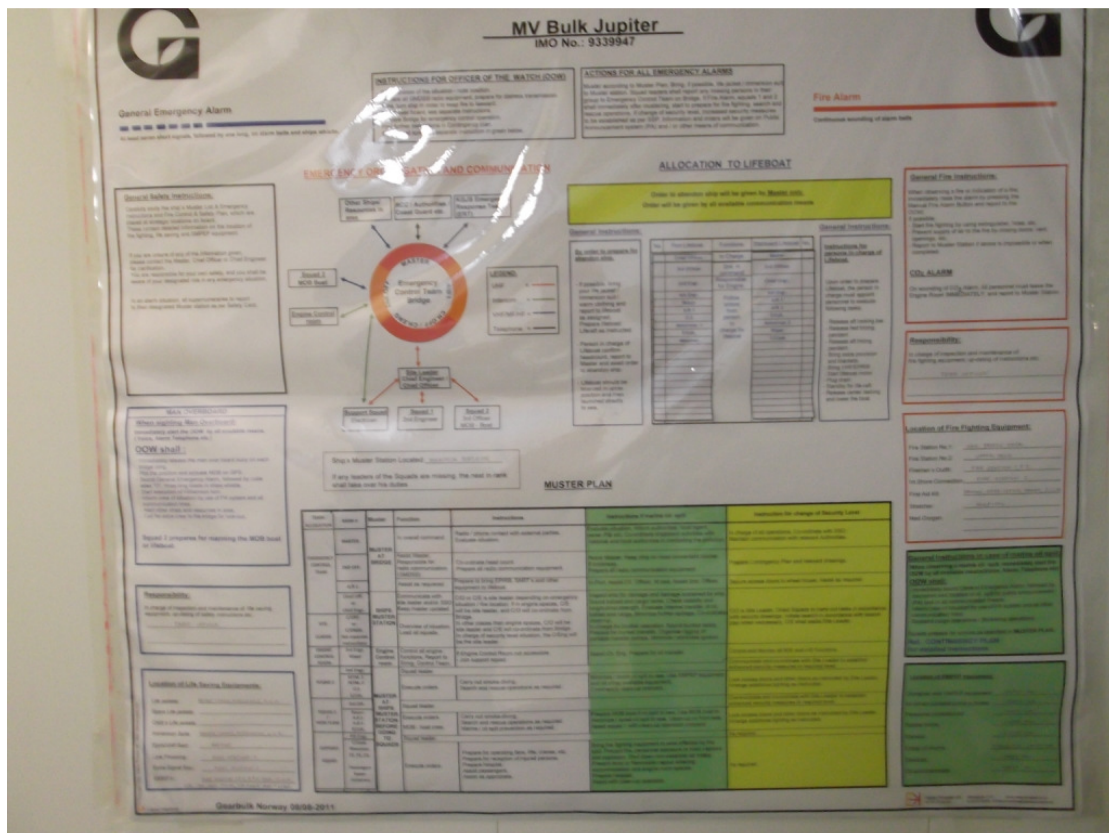
Figure 30: Bulk Jupiter cargo hatches and grab cranes (photo date 25/02/2012)



## M.v Bulk Jupiter – Marine Safety Investigation Report



**Figure 31: Bulk Jupiter starboard life boat (photo date 25/02/2012)**



**Figure 32: Bulk Jupiter General Emergency Alarm Data Sheet (supplied by Gearbulk) present on board**





Figure 33: General view of hold No. 4 on board 'm.v Orchid Island' at Qingdao, China



Figure 34: General view across hold No. 4 on board 'm.v Orchid Island', note extensive splatter on bulk head





Figure 35: 'm.v Medi Okinawa' alongside container berth, Kuantan, embarking Bauxite



Figure 36: M.v SAR 413 (Vietnam SAR vessel)



Appendix III: SGS Analysis Report on Bulk Jupiter

SGS

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YOUR REF: 10246474  
DATE RECEIVED: DEC 23, 2014  
DATE REPORTED: JAN 14, 2015

Report No. : LPMI/36650-36652&36826-36828/14&00094-00097/15  
Company : Messrs. SGS (Malaysia) Sdn. Bhd.  
Wisma SGS, Lot 603, Pandamaran,  
42000 Port Klang, Selangor D.E.

ANALYSIS REPORT

One (1) sample said to be BAUXITE, contained in a polythene bag and sealed, was received from M/s. SGS (M) Sdn. Bhd, Port Klang.

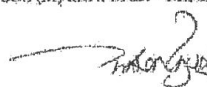
SAMPLE DESCRIPTION:-

CLIENT : M/S. GOOD MAN VENTURE SDN. BHD.  
DATE SAMPLING : 17<sup>TH</sup> TO 30<sup>TH</sup> DEC, 2014  
VESSEL : M.V. BULK JUPITER  
PLACE OF SAMPLING : KUANTAN PORT, PAHANG  
SAMPLE MARKING : WEIGHTED AVERAGE = LOT 1 TO LOT 10  
QUANTITY : AHT 46,400.0 MTS (ABOUT FORTY SIX THOUSAND FOUR HUNDRED DECIMAL ZERO METRIC TONS)

On analysis of the samples, the following results were obtained :-

<u>TEST PARAMETERS</u>		<u>TEST METHODS</u>	<u>RESULTS</u>
Moisture	%	OVEN DRY	21.3 (Two one decimal three)
On dry basis :-			
Alumina, Al <sub>2</sub> O <sub>3</sub>	%	AAS	40.3 (Four zero decimal three)
Silica, SiO <sub>2</sub>	%	GRAVIMETRIC	4.80 (Four decimal eight-zero)
Iron as Fe <sub>2</sub> O <sub>3</sub>	%	TITRIMETRIC	26.8 (Two six decimal eight)

SGS (M) SDN. BHD. - MINERAL LAB SERVICES

  
TAN KENG GUAN  
B.SC. (HONS) AMIC  
ASST LAB MANAGER

Pg. 1 of 1

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SGS (Malaysia) Sdn. Bhd. : Wisma SGS, Lot 603, Laboh Raja Baru, Kawasan Perindustrian PKAS, Pandamaran 42000 Port Klang, Selangor Darul Ehsan, Malaysia.  
Company No. 100717 : +6 (03) 3165 2320 / +6 (03) 3165 2329 [www.sgs.com](http://www.sgs.com)

Member of the SGS Group (SGS SA)

## Appendix IV: Statement of Facts

**TRANSEAWAYS SHIPPING SDN BHD**

**STATEMENT OF FACTS**

NAME OF THE VESSEL	<b>MV BULK JUPITER V048</b>
PORT OF LOADING	<b>KUANTAN, MALAYSIA</b>
PORT OF DISCHARGE:	<b>NORTH CHINA</b>
CARGO QUANTITY:	<b>46400.00 MT</b>
DESCRIPTION OF CARGO	<b>BAUXITE IN BULK</b>
QUANTITY OF CARGO AS PER B/L's	<b>46400.00 MT</b>
QUANTITY OF LOADING	<b>46400.00 MT</b>

**VESSEL MOVEMENT**

DATE	TIME LOCAL
12.12.2014	1812 HRS
16.12.2014	2050 HRS
16.12.2014	2136 HRS
16.12.2014	2230 HRS
12.12.2014	1812 HRS
AS PER CHARTER PARTY	
17.12.2014	2100 HRS
30.12.2014	1715 HRS
30.12.2014	2000 HRS
MAP TA PHUT - THAILAND	
NORTH CHINA	
09.01.2014	0700


  

ARRIVAL CONDITION			DEPARTURE CONDITION		
	DRAFT			DRAFT	
FWD	4.20	MT	FWD	11.20	MT
AFT	6.12	MT	AFT	11.20	MT
ROB			ROB		
HFUEL OIL	1000.130	MT	HFUEL OIL	1000.00	MT
DIESEL OIL	138.100	MT	DIESEL OIL	138.00	MT
LUBE OIL	-	MT	LUBE OIL	-	MT
F/WATER	100.00	MT	F/WATER	100.00	MT

WE HEREBY THAT THE ABOVE IS TRUE AND CORRECT

**M/V BULK JUPITER**  
Bahamas  
Call Sign: C62NS  
130760 - 9330947  
UNREGISTERED

  
AGENT FOR  
OWNER / CHARTERERS

SHIPPER / CONSIGNEE


**REMARKS:** *Permanic cargo transported by truck and stored open outside & wetted by the rain prior loading.*

# M.v Bulk Jupiter – Marine Safety Investigation Report

## Appendix V: M.v Bulk Jupiter Signed Cargo Declaration

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### FORM FOR CARGO INFORMATION for Solid Bulk Cargoes


BCSN <b>BAUXITE</b>	
Shipper : <b>OXY PTE LTD</b> <b>6 BATTERY ROAD</b> <b>#42-55, SINGAPORE 049909</b>	Transport document number
Consignee : <b>TO ORDER</b>	Carrier
Name/means of transport : <b>MV.BULK JUPITER</b> Port/place of departure : <b>KUANTAN PORT,</b> <b>MALAYSIA</b>	Instructions or other matters
Port/place of destination : <b>MAIN PORT OF CHINA</b>	
General description of the cargo : <b>METALLURGICAL GRADE BAUXITE IN BULK</b> Type of material/particle size : <b>2.5MM - 500MM 70%-90%</b> Density : <b>1,311 KG/M3</b> Sulphur : <b>NIL</b>	Gross mass (kg/tonnes)  <b>46,000 METRIC TON</b>
Specifications of bulk cargo, if applicable : Stowage factor : <b>0.88 M3 / TON</b> Angle of repose, if applicable : <b>NOT APPLICABLE</b> Trimming procedures : Chemical properties if potential hazard* : <b>NIL</b> * e.g., Class & UN No. or "MHB"	
Group of the cargo : <input type="checkbox"/> Group A and B * <input type="checkbox"/> Group A * <input type="checkbox"/> Group B <input checked="" type="checkbox"/> Group C * For cargoes which may liquefy (Group A and Group A and Group B cargoes)	Transportable moisture limit <b>NOT APPLICABLE</b> Moisture content at shipment <b>10%</b>
Relevant special properties of the cargo (e.g., highly soluble in water)	Additional certificate(s)* <input type="checkbox"/> Certificate of moisture content and transportable moisture limit <input type="checkbox"/> Weathering certificate <input type="checkbox"/> Exemption certificate <input type="checkbox"/> Other (specify) * If required
<b>DECLARATION</b> I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded and confirm that cargo being loaded is a marine non-pollutant and not EHS (Environmentally Hazardous Substance), for which cargo residues can be disposed to sea.	Name/status, company/organization of signatory : <b>OXY PTE LTD</b>  Place and date : <b>KUANTAN, MALAYSIA, 11TH DEC 2014</b>    Signature on behalf of shipper

Document2

## Appendix VI: M.v Orchid Island Signed Cargo Declaration

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Page 25

**FORM FOR CARGO INFORMATION**  
for Solid Bulk Cargoes

BCSN <b>BAUXITE</b>	
Shipper : <b>MULTIMETALS RESOURCES SDN BHD</b> <b>PT86211 KAWASAN PERINDUSTRIAN</b> <b>SEMAMBU, JALAN INDUSTRI 9,</b> <b>25350 KUANTAN PAHANG</b>	Transport document number
Consignee : <b>TO ORDER</b>	Carrier
Name/means of transport : <b>MV ORCHID ISLAND</b> Port/place of departure : <b>KUANTAN PORT,</b> <b>MALAYSIA</b>	Instructions or other matters
Port/place of destination : <b>MAIN PORT OF CHINA</b>	
General description of the cargo : <b>METALLURGICAL GRADE BAUXITE</b> Type of material/particle size : <b>2.5MM - 500MM 70%-90%</b> Density : <b>1,311 KG/M3</b> Sulphur : <b>NIL</b>	Gross mass (kg/tonnes) <b>45,000MT</b>
Specifications of bulk cargo, if applicable : Stowage factor : <b>0.88 M3 /TON</b> Angle of repose, if applicable : <b>NOT APPLICABLE</b> Trimming procedures : Chemical properties if potential hazard* : <b>NIL</b> * e.g., Class & UN No. or "MHB"	
Group of the cargo : <input type="checkbox"/> Group A and B * <input type="checkbox"/> Group A * <input type="checkbox"/> Group B <input checked="" type="checkbox"/> Group C * For cargoes which may liquefy (Group A and Group A and Group B cargoes)	Transportable moisture limit <b>NOT APPLICABLE</b> Moisture content at shipment <b>10%</b>
Relevant special properties of the cargo (e.g., highly soluble in water)	Additional certificate(s)* <input type="checkbox"/> Certificate of moisture content and transportable moisture limit <input type="checkbox"/> Weathering certificate <input type="checkbox"/> Exemption certificate <input type="checkbox"/> Other (specify) * If required
<b>DECLARATION</b> I hereby declare that the consignment is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded and confirm that cargo being loaded is a marine non-pollutant and not EHS (Environmentally Hazardous Substance), for which cargo residues can be disposed to sea.	Name/status, company/organization of signatory : <b>MULTIMETALS RESOURCES SDN BHD</b> Place and date : <b>KUANTAN, PAHANG, MALAYSIA 08 DECEMBER 2014</b>  Signature on behalf of shipper

Document 2



## Appendix VII: M.v Medi Okinawa Signed Cargo Declaration

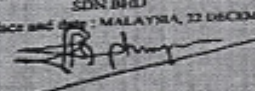
ROM : KREATIF SELARAS SB

FOX UN : 609-5147733

22 Dec. 2014 11:53 AM P2

MSC 85/26/ADD.2  
ANNEX 3  
Page 25

**FORM FOR CARGO INFORMATION  
for Solid Bulk Cargoes**

BCSN: BAUXITE Shipper: KREATIF SELARAS MINING SDN BHD BANOUNAN KURNIA SETTA, NO. 1, JALAN RESAR, 25000 KUANTAN, PAHANG, MALAYSIA		Transport document number
Consignee: TO ORDER		Carrier
Name/means of transport: MV MEDI OKINAWA Port/place of departure: KUANTAN PORT, MALAYSIA		Instructions or other matters
Port/place of destination: MAIN PORT OF CHINA		
General description of the cargo: METALLURGICAL GRADE BAUXITE Type of material/particle size: 2.5MM - 500MM 70%-90% Density: 1.311KG/M3 Sulphur: NIL		Gross mass (kg/tonnes) 56,000 MT
Specifications of bulk cargo, if applicable: Stowage factor: 0.88 MP/TON Angle of repose, if applicable: NOT APPLICABLE Trimming procedures: Chemical properties if potential hazard*: NIL * e.g., Class & UN No. or "MSB"		
Group of the cargo: <input type="checkbox"/> Group A and B * <input type="checkbox"/> Group A * <input type="checkbox"/> Group B <input checked="" type="checkbox"/> Group C * For cargoes which may liquefy (Group A and Group B cargoes)		Transportable moisture limit NOT APPLICABLE Moisture content at shipment 10%
Relevant special properties of the cargo (e.g., highly soluble in water)		Additional certificate(s)* <input type="checkbox"/> Certificate of moisture content and transportable moisture limit <input type="checkbox"/> Weathering certificate <input type="checkbox"/> Exemption certificate <input type="checkbox"/> Other (specify) * If required
<b>DECLARATION</b> I hereby declare that the consignments is fully and accurately described and that the given test results and other specifications are correct to the best of my knowledge and belief and can be considered as representative for the cargo to be loaded and can confirm that cargo being loaded is a marine non-pollutant and not BHS (Environmentally Hazardous Substance), for which cargo residues can be disposed to sea.		Name/status, company/organization of signatory: KREATIF SELARAS MINING SDN BHD Place and date: MALAYSIA, 22 DECEMBER 2014  Signature on behalf of shipper

Document ID: 3 E V W 8

OFF NO: 000013

FOR: 000013

OUT: 000013

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REF: 000013