Report on the investigation into the capsizing

of

JBB RONG CHANG 8, IMO No. 8783529

at Muar, Malaysia

on

21 March 2018

Commonwealth of Dominica
Maritime Administration

Office of the Deputy Maritime Administrator
for Maritime Affairs

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Pursuant to the IMO Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) Resolution MSC.255(84) the Dominica Maritime Administration, Office of Maritime Affairs has investigated this casualty.

This investigation has been conducted under the authority contained in Section 47 (1) of the Dominica Maritime Regulations 2002 (CDP 102)

Report of Casualty Investigation

Capsize of Sand Dredger

“JBB RONG CHANG 8”

On 21 March 2018

At Muar, Malaysia

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I Objective

1. The objective of this investigation is to -

a) look into the causes of difficulties experienced in ensuring safety and pollution prevention;
b) look into possible violations of the prevailing law; and
c) look into possible faults or failures on the part of crew, owners or operators which might require action in respect of any licenses, certificates or documents,

aiming at coming out with possible means of avoiding them in the future to improve safety of life and property at sea as well as to minimize pollution of the marine environment.

2. Safety recommendations made shall in no case create a presumption of liability or blame and that the report has not been written, in terms of content and style, with the intention of it being used in legal proceedings.

II Background

Photo of Capsized JBB Rong Chang 8 (rescuer standing on her flat bottom) – Star Online

3 MV JBB Rong Chang 8 (JRC8) overturned in the waters off Parit Jawa in position latitude 1°5.9'N, longitude 103°30.9'E, off Muar, Malaysia on 21 March 2018, Wednesday, morning.

4 The Malaysian Maritime Enforcement Agency's Batu Pahat base received the distress call at 0850 hours in that morning. The Chinese owned Commonwealth of Dominica-registered vessel had a total of 9 crew and 9 dredging staff, comprising one Malaysian, one Indonesian and 16 Chinese. After the casualty and the sea and rescue operation 5 survivors were rescued, 5 deceased and 8 are still missing.

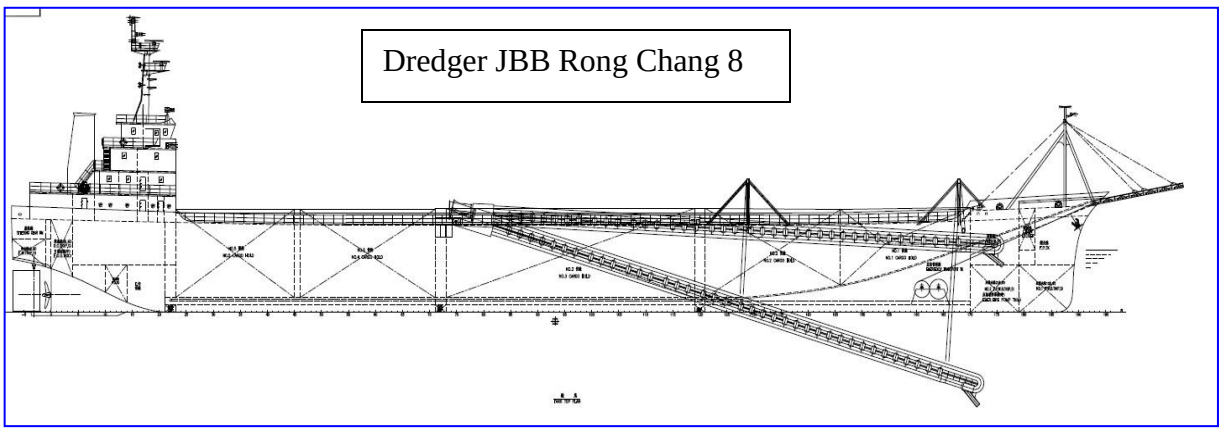
5 Oil boom was laid around the vessel to contain the fuel oil that was gradually escaping from the vessel.

III Facts

6 **Description of Vessel**:

VESSEL NAME	OFFICIAL NUMBER	IMO NUMBER	CALL LETTERS
JBB RONG CHANG 8	50814	8783529	J7DM2
VESSEL TYPE	HOME PORT	CLASS SOCIETY	ENCUMBRANCE
SUCTION HOPPER DREDGER	PORTSMOUTH	SING-LLOYD	NO
OWNER		ADDRESS DETAILS	
SEAGATE SHIPPING SDN. BHD.		NO.27A, JALAN HARMONIUM 23/13 TAMAN DESA TEBRAU 81100, JOHOR BAHRU, MALAYSIA	

PREVIOUS NAME:	N/A	PREVIOUS COUNTRY OF REG. AND #:	N/A		
BUILD DATE:	12 OCT 2016	BUILDER & LOCATION:	ANHUI CONGYANG TAIHANG SHIPBUILDING CO., LTD CHINA		
KEEL LAID DATE:	18 JUN 2015	HULL MATERIAL:	STEEL	DEADWEIGHT:	8460.00
GROSS TONS:	6200	NET TONS:	3463	HEIGHT:	N/A
LENGTH (Art. 2.8):	121.80 m	DEPTH:	8.80 m	BREADTH:	18.80 m
PROPULSION:	1470 kW	NO. OF ENGINES:	2	NO. OF DECKS:	1
ENGINE TYPE:	DIESEL	MANUFACTURER:	NINGBO C.S.I POWER & MACHINERY GROUP CO., LTD		



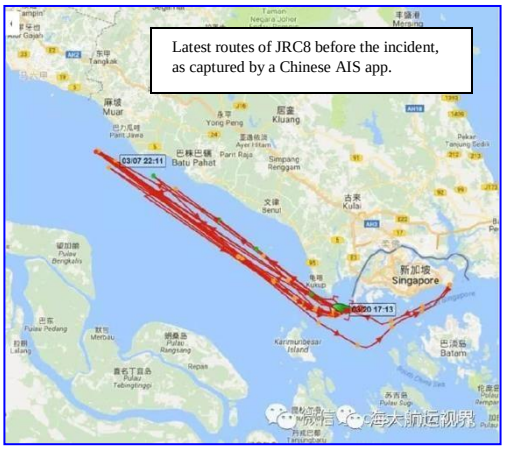
7 **RC8's voyage particulars**:

a) **Ports of call** – JRC8 plied between sea sand dredging areas off Muar in Malaysia and reclamation areas in Singapore. Dredging took about 6 to10 hours and dumping took about about 2.5 hours. Enroute duration was about 7 to 9 hours to reclamation area at Tuas and 8 to 9 hours to the reclaimation are at Changi. JRC8 could do about 20 trips in a month (routes in diagram)

b) **Cargo information** – sea sand for reclaiming land from the sea.

c) **Manning** – JRC8 had reported carrying 9 Ship's Crew and 9 dredging staff comprising 1 Malaysian, 1 Indonesian and 16 Chinese. Refer to the Staff List onboard.

d) **Bunkering** – Bunkering was conducted in the Outside Port Limits (OPL) off Singapore.



8 **Casualty particulars**:

a) **Type** – Capsize.

b) **Date and time** - 21 March 2018 at about 0740 hours.

c) **Position** – Latitude 1°5.9'N, Longitude 103°30.9'E in the Malacca Strait off Muar, Malaysia.

d) **Internal and external environment** –

i. **On board** – reported by survivors to be in usual condition of a routine job.

ii. **Ship operation and voyage segment** – JRC8 was reported to be completing sand dredging at reported incident location. She was scheduled to dump the sand in Singapore. Weather reported was fine and clear. The depth of water at incident location was at about 30 metres.

iii. **Human factors data** – One dredging staff was at the bow lifting the suction pipe when the dredging operation was near to completion. The Master and an able-bodied seaman (Liang Caiman) were on the navigational bridge of the JRC8. It was about 0740 hours in the morning of the day of the incident – a normal day with routine operation and works.

iv. **Consequences** (for people, ship, cargo, environment, other) – the incident lost 13 lives (5 dead and 8 missing). Cargo was also returned to the seabed at location. Although there was reported oil pollution it was reported to be contained. By 8 June 2018, the JRC8 was salvaged. Shortly after the incident, the flag administration stopped all other similar dredgers under the same flag and operated by the same company in an attempt to stem the problem from proliferating. The other vessels were released for work after the operator rolled out temporary countermeasures to ensure safer operation of such dredgers while investigation was underway.

e) **Shore authority involvement and emergency response** -

i. **who was involved** – the Malaysian authorities for SAR, medical, security and other marine logistics were involved with the support of the operator, in the entire SAR effort. The flag administration was involved from the onset, furnishing necessary information for the SAR and rectification and salvage effort and in investigating into the cause.

ii. **means used** – helicopters, surface craft and personnel were deployed for the SAR operation for a week.

iii. **speed of response** – adequately responsive as experience with past casualties had brought about great improvement in speed of response.

iv. **actions taken** – SAR was conducted which 5 lives were saved. Salvage was carried out in June, almost 3 months after the incident due to settlement between owners and insurance companies.

v. **results achieved** – for capsizing incidents like this, rescue results is relatively good in that area of calm and warm sea water in spite of the strong tidal current.

IV Narrative

9 It was a usual day on 21 March 2018 at the usual location off Muar in Malaysia while the JRC8 was dredging sand. Air was light and sea was slight with good visibility. At about 0738 hours, the JRC8 reported to the shore control that sand dredging was completed at about 0735 hours.

10 There was one dredging staff on the forecastle looking after the dredging operation, watching over the suction pipe and filling of the holds. The Master was stationed on the bridge and in charge of the navigation of JRC8.

11 The JRC8 was then listed slightly to the port when the suction pipe was still in the seabed. At about 0738 hours, the staff located on the forecastle informed the master that sand mining operation has completed at about 0735 hours. The master got the radioman to inform the office. He then ordered for the suction pipe to be lifted.

12 At about 0739 hours, the dredging staff stationed at the forecastle reported to the bridge that the pipe was cleared of the seabed as the No. 2 set of lifting block was out of the water surface (usually this is the level that the pipe draghead would be cleared of the seabed). The JRC8 developed a further list of about 1° to the port. This was also usual as the weight of the pipe and its content would be counter-balanced by the weight of the prime movers for the dredging system which was installed on the port side of the vessel.

13 Engines were thrusted slowly ahead as the pipe was off the seabed. Just as the vessel was moving ahead, the lifting wire snapped with a loud sound. Then, the second wire snapped under added load. At that time when the pipe was lifted off the seabed, the estimated weight was about more than 200 tonnes (weight of the long water pipe and sand suction pipe plus weight of the sand and water in the 2 pipes). With the wire parted, the pipe draghead fell back into the seabed. The JRC8 was then already moving ahead at about 0.6 knot still steming the tide (usual direction of vessel during dredging).

14 The master immediately pulled the engines astern but due to the forward momentum, the vessel could not stop. Suddenly, the JRC8 took a jerk and listed more to the port. The sand cargo started to shift to the port side of the holds and this caused the JRC8 to heel even more to the port.

15 Finally, in less than 30 seconds from the start of the heeling, the JRC8 capsized on her own port side. Liang Rong Bin, Wu Liang Fu and Yang Qui managed to swim out of the capsizing JRC8. The rest of the other crew and dredging staff were trapped in the vessel as the JRC8 flipped over. To-date, 5 people survived the ordeal and 13 others lost their lives.

V Analysis of Evidences

16 The flag administration appointed a team of investigators who went about the investigation in stages at various locations, viz –

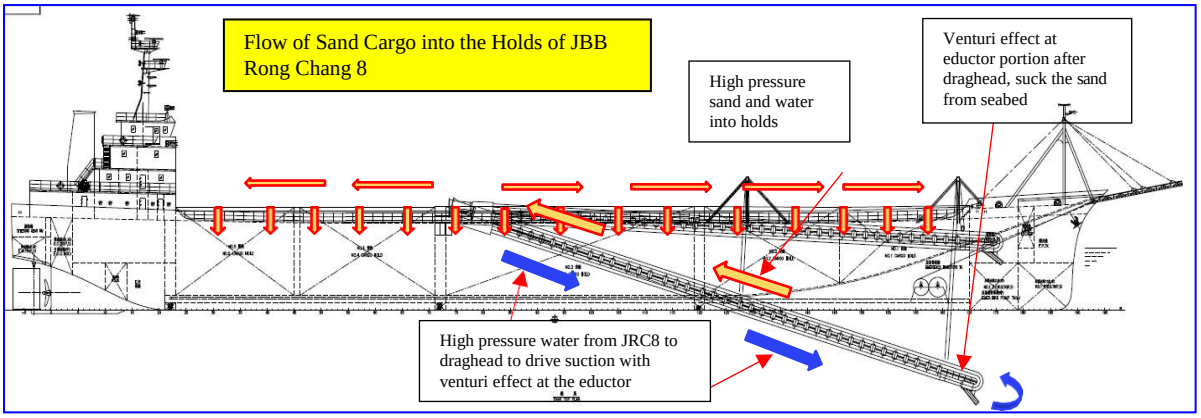
a) familiarization with the operation of sand dredgers – visited the sand dredger "JBB Yuhang 67" anchored off the Forest City and gathered the facts of the incident from the operator's office in Johor Bahru Malaysia on 12 April 2018;
b) corresponded with the investigation teams from the Malaysian Marine Department and owner/operator;
c) boarded the salvaged JRC8 on 12 June 2018 to search for evidence from the salvaged JRC8; and
d) finally discussed and analysed the evidence and facts wrapping them up in the report.

17 The findings from the investigation revealed the following –

a) Context and environment of events related to the marine casualty or incident –
   i. The events leading up to the capsizing of the JRC8 was rather uneventful with routine works being performed by the dredging staff on the JRC8. It could therefore be assumed that the incident was not due to unexpected and disruptive work processes or operations onboard or external of the JRC8.
   ii. The location of work was in an area familiar to the dredging staff. The weather and sea condition reported at the material time was good. It could therefore be assumed that the incident was also not due to the environment the vessel was in at that time.

b) Human erroneous actions and omissions –
   The dredging staff on the JRC8 had been onboard and performing the same job for some time prior to the incident. The JRC8 had been operating in the area on that trade pattern for about a year prior to the incident. There was no report of any accident of this nature. The capsizing of the JRC8 could therefore not have been caused by errors or omissions of the crew.

c) Events involving hazardous material –
   i. The job of the JRC8 was to dredge and transport sand from the seabed in the sand resource areas to the reclamation areas. Sand was "dredged" by suction effect created by the venturi system in the pipe section when a high velocity flow of water runs. Sand was therefore "sucked" from beneath the seabed to the cargo holds of the JRC8 by an extremely high velocity flow of seawater. The sand was then "threw" from the pipe end, into the holds of the JRC8 via a "common rail" pipeline running from aft to forward above the holds of the ship, along with the water creating a slurry cargo of sea sand in the hopper of cargo holds of the JRC8.



   ii. The sand which is in a slurry form especially with the water on top of the sand pile became hazardous as it could literally "flow" uncontrollably. Cargo shift and Free Surface Effects were inadvertently created.

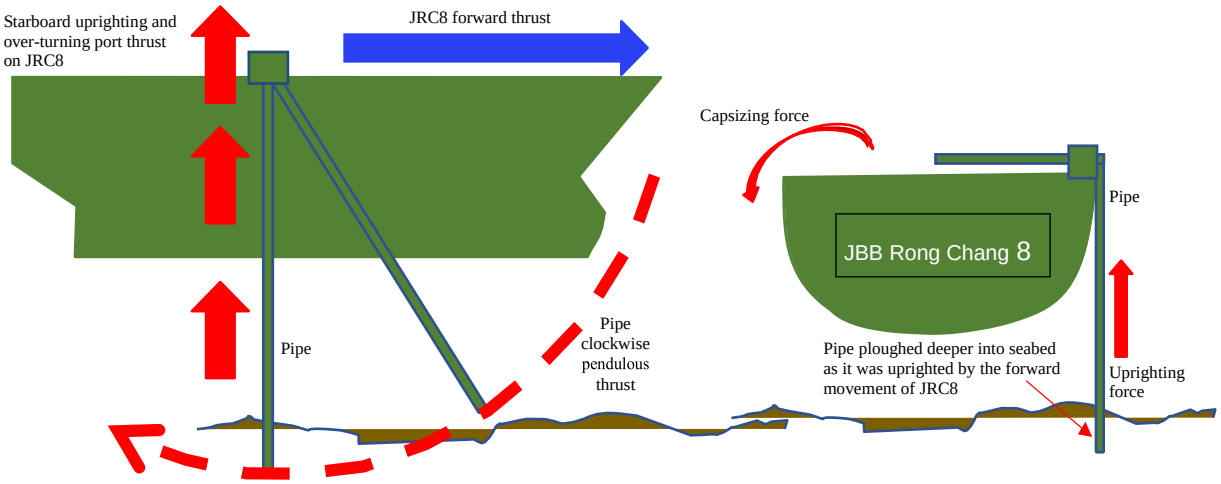
d) Environmental effects –

At the material time, the weather was reported to be of light air and clear visibility. The sea was calm. This suggested that the incident was not due to environmental effects.

e) Equipment failures –

i. After the wires parted, the JRC8 took a sudden and greater heel to port because of the "push" exerted by the pipe (the usual working angle at the joint onboard the JRC8 of the pipe leading into the seabed was about 70° lead forward) on the pipe joint at the starboard side of the main deck (the suction and water pipes arrangement was at the starboard side of JRC8).

ii. The pipe was supposed to lead 70° forward during normal dredging operation. When the wires were broken, the 200 tonnes pipe was being dragged over the seabed by the moving JRC8 such that the pipe dug deeper into the seabed and came to an upright position singlely-crutching the starboard side of the JRC8 higher than when the pipe was at about 70° during normal dredging operation.



iii. This sudden port heel caused the slurry sand in the full holds to shift correspondingly to the port of the JRC8 thereby causing her port deck to be awashed and righting arm of her stability vanished altogether. The JRC8 therefore capsized on her portside at location.

iv. The lifting wires were reported to have been renewed in September 2017 (refer to the attachment). The certificate of inspection of the wire rope verifies that the breaking strength is 1104 KN which according to calculation meet the requirement of such load, which in this case is the entire pipe system using such wire falls.

f) External influences -

There was pressure from the Company to transport as much sand and as quickly as possible resulting in the JRC8 hastily using the main engine and commenced her voyage as soon as the pipe was off the seabed. Commercial pressure was evident.

i. On June 11, 2018, after the ship is salvaged and re-floated, it was found that the parting of the wire rope could have due to the wire jumping off the sheaves after some fishing nets were strung around the wire ropes suggesting that the wire could have jump off the sheaves and was jammed between the sides of the sheaves resulting in tremendous amount of stress on the wire and causing it to part.

g) Contributing factors of the marine casualty or incident involving person-related functions, shipboard operations, shore management or regulatory influence –

i. The master had started the engine to move the JRC8 forward even before the pipe was completely lifted out of the water, housed and secured.
As a result of the forward moment of the vessel, a heeling force was created on the starboard side of the JRC 8 as the suction pipe hit the seabed and caused an uprighting moment which thrust the starboard upwards and the vessel to suddenly list to port side.

VI Conclusions

18 It could therefore be concluded that the JRC8 capsized because of the combination of collective factors:

a) The wire rope parted due to entangled fishing nets on the wires forcing it to jump sheaves and created tremendous amount of friction and stress when it was jammed between the sheaves.
b) The broke-free pipe fell deeper into the seabed and the entire length of the pipe was forced to turn upright by the forward movement of the vessel causing the heeling forces to heel the vessel to the portside;
c) The heeling forces caused the JRC8 to heel to port resulting in the shift of the slurry cargo of sand in the holds increasing the heeling forces which were quickly changing into capsizing forces; and
d) Added to the tenderness of the JRC8, the capsizing forces quickly turned over the JRC8 on her port side.

VII Recommendations

19 The investigation brought up some safety measures that should be developed to prevent casualty of suchnature in the future. These safety actions are as follows:

a) Design and maintenance of the wirefalls for the suction pipe of such dredgers should be done in accordance with the rules of lifting appliances such as cargo cranes and derricks.
b) Procedures for the safe completion of dredging work must to be established with caution that the vessel must be safely secured prior to the commencement of sea passage;
c) Strength and stability for each loading should be calculated to ensure safe operation of such dredgers and verified by the Master;
d) Dredging staff on such dredgers to be trained thoroughly on the dredging operation before being deployed to work on such dredger;
e) Master and Ratings must be fully certified to STCW requirement and the manning must be in compliance with the minimum safe manning certificate;
f) Thorough and regular audits of the compliance with above measures should be implemented immediately.

VIII Confidentiality

20 This Casualty Investigation Team was authorised by the Administration of The Commonwealth of Dominica with the objective to improve the safety of life at sea and avoiding similar incidents. They are not intended to apportion blame or liability towards aby particular organization or individual.

This report shall be kept confidential within the Administration and must not be made available to any party unless the Administration authorised it.
