

FINAL REPORT

**FATALITY ON-BOARD THE
BULK CARRIER STELLA ANNABEL
AT SEA
ON 18 JANUARY 2017**

MIB/MAI/CAS.013

**Transport Safety Investigation Bureau
Ministry of Transport
Singapore**

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The Transport Safety Investigation Bureau

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SYNOPSIS

On the afternoon of 18 January 2017, when the Singapore registered bulk carrier Stella Annabel was on passage from Hong Kong to Dampier, Australia, steaming to moderate to rough seas, the crew of the vessel were performing a non-routine activity to free up the port anchor fluke which was stuck in the hawse pipe.

Several attempts were made to free up the anchor fluke which included passing a mooring rope over the crown of the anchor from the outboard side and moving the anchor chain from the forecastle deck with a hydraulic jack.

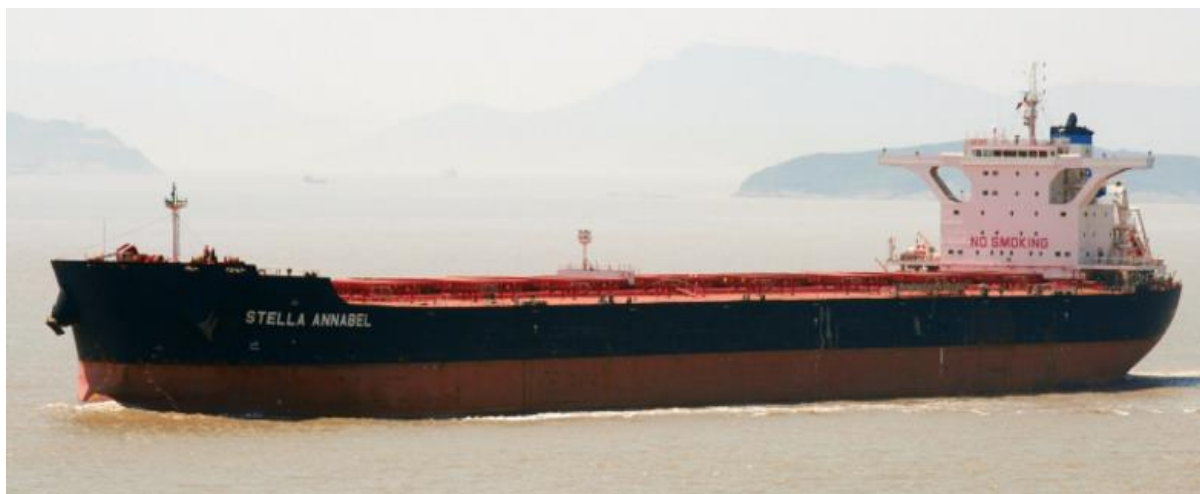
Eventually, the Bosun was instructed by the Master to enter the hawse pipe to free up the anchor fluke using the hydraulic jack. In the process, the anchor chain moved and pinned the Bosun against the upper side of the hawse pipe, resulting in his death.

The TSIB classified the occurrence as a Very Serious Marine Casualty and launched an investigation.

The investigation revealed that an uncoordinated heaving of the port anchor led to the fluke being stuck in the hawse pipe. Several unsafe activities undertaken by the vessel's crew attempting to free up the anchor fluke had put the crew at risk while the vessel was underway.

The unauthorised hot work, absence of risk assessments for non-routine activities as well as stop work authority were indicative of a lack of effective implementation of Safety Management System (SMS) on-board Stella Annabel. While there was risk assessment performed for entering the hawse pipe, the senior officers had underestimated the risks involved.

DETAILS OF THE VESSEL



Name	Stella Annabel
IMO Number	9604196
Call Sign:	9V9081
Flag:	Singapore
Ship type	Bulk Carrier
Builder	Dalian Shipbuilding Industry Co. Ltd., China
Year Keel Laid	2010
Owner	Stella Annabel Shipping Pte. Ltd.
Operator / ISM Manager ¹	Stella Shipmanagement Pte. Ltd. ²
Gross / Nett tonnage	94710 / 59527
Length overall / LBP	295.00m / 285.00m
Breadth (extreme)	46.00m
Depth (moulded)	24.80m
Draught (Summer)	18.10m
Main engine(s)	MAN B & W 6S70MC-C
Max. Continuous Rating	18660kW @ 91RPM

¹ Referred to as the 'Company' under the ISM Code.

² Management of the vessel was taken-over by Thome Shipmanagement Pte. Ltd. on 20 June 2018

1 FACTUAL INFORMATION

All times used in this report are ship's mean time, which was eight hours ahead of the UTC³.

1.1 Sequence of events

- 1.1.1 On 16 January 2017, the bulk carrier Stella Annabel weighed her port anchor for departing Hong Kong Anchorage and bound for Dampier, Australia, for loading of cargo. The Bosun was operating the anchor windlass for heaving the anchor and the Chief Officer was overall in-charge of the anchor station. At about 1610H, the Chief Officer reported to the bridge that the anchor was aweigh and it was subsequently sighted out of the water at about 1650H.
- 1.1.2 While bringing the anchor home⁴, the Chief Officer noted that the flukes were stuck (i.e. as opposed to being at an angle against the shank under normal operations) and he verbally (and hand) signaled for the Bosun to stop heaving.
- 1.1.3 The Bosun continued heaving the anchor until one of the flukes entered the hawse pipe and got stuck (see Figure 1).



Figure 1: One of the flukes of the port anchor stuck inside the hawse pipe (Image on the right fluke viewed from inside the hawse pipe)

³ UTC – Coordinated Universal Time, is the primary time standard by which the world regulates clocks and time.

⁴ The act of housing the anchor chain and the anchor in the chain locker and hawse pipe respectively. The anchor chain (cable) is secured after the anchor is brought home, for sea passage.

- 1.1.4 The duo made a few attempts to free up the anchor from the hawse pipe by lowering the anchor chain but were unsuccessful. The Chief Officer then reported the situation to the Master who was on the bridge.
- 1.1.5 The Master instructed for the port anchor to be secured for sea passage in an “as-is” condition and for it to be rectified the next day. On 17 January, i.e. the next day, the crew⁵ made several attempts to free the stuck anchor fluke using the windlass by lowering and heaving the anchor, but were unsuccessful and the Master was informed.
- 1.1.6 The Master then decided to try using a mooring rope to free the anchor. On his instructions⁶, at about 1030H the Bosun was first tasked to enter the hawse pipe to inspect the anchor fluke. A Jacob’s⁷ ladder was then rigged over-side under the Chief Officer’s supervision to pass a mooring rope over the crown of the port anchor with a view to use the winches to pull the anchor downwards. This method was also not successful until the end of the day in freeing the stuck port anchor fluke (see **Figure 2**).

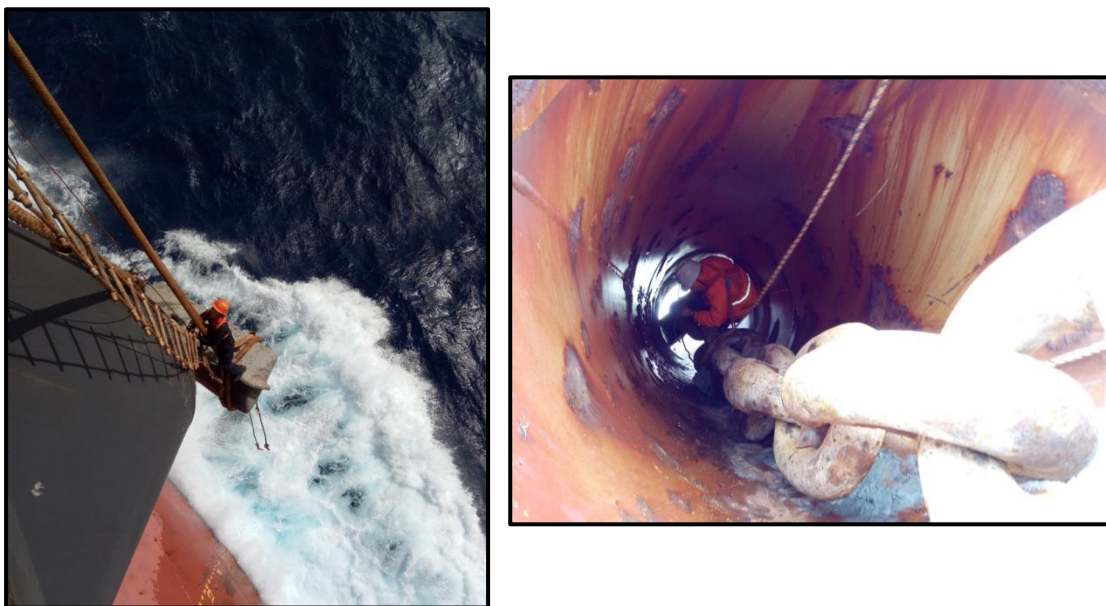


Figure 2: Bosun working over-side to fix a mooring rope over the crown of the anchor. (Image on the right shows Bosun inspecting the anchor fluke from inside the hawse pipe on Day 1)

⁵ Comprised of Chief Officer, 2nd Engineer, Bosun and Fitter.

⁶ The Chief Officer raised concern and voiced his objection to the proposal as he was concerned about the safety of his crewmember working over-side and inside the hawse pipe whilst the vessel was underway.

⁷ Jacob’s ladder – a flexible hanging ladder, consisting of vertical ropes supporting horizontal, historically round and wooden rungs.

- 1.1.7 The Master aborted the operation and convened a meeting involving the vessel's senior officers⁸ to devise a plan to free the anchor.
- 1.1.8 During the meeting, the Master proposed two methods to be done on Day 2 (18 January 2017) for freeing the port anchor fluke-
- (i) Using a hydraulic jack positioned on the forecastle deck outside the hawse pipe and a long pipe to free the stuck anchor fluke from the hawse pipe (i.e. support of the hydraulic jack to be welded on the bow stopper stand);
 - (ii) Using a hydraulic jack and pipe suitably positioned inside the hawse pipe to force the anchor chain (cable) to move.
- 1.1.9 Having previously objected to the plan of freeing up the port anchor fluke while underway, the Chief Officer claimed that he did not want to participate in the plan⁹. The Master decided to proceed with the two proposed methods on the following day with the assistance of the Bosun and the Fitter.
- 1.1.10 On 18 January 2017 at about 0800H, in the presence of the Chief Officer, Chief Engineer, Bosun, Able Seafarer Deck (ASD) and Ordinary Seaman (OS), the Master instructed the Fitter to weld¹⁰ a support to the hydraulic jack below the bow stopper and use a long pipe to free the stuck anchor fluke. This attempt was unsuccessful as the long pipe was bent and damaged during the jacking up process.

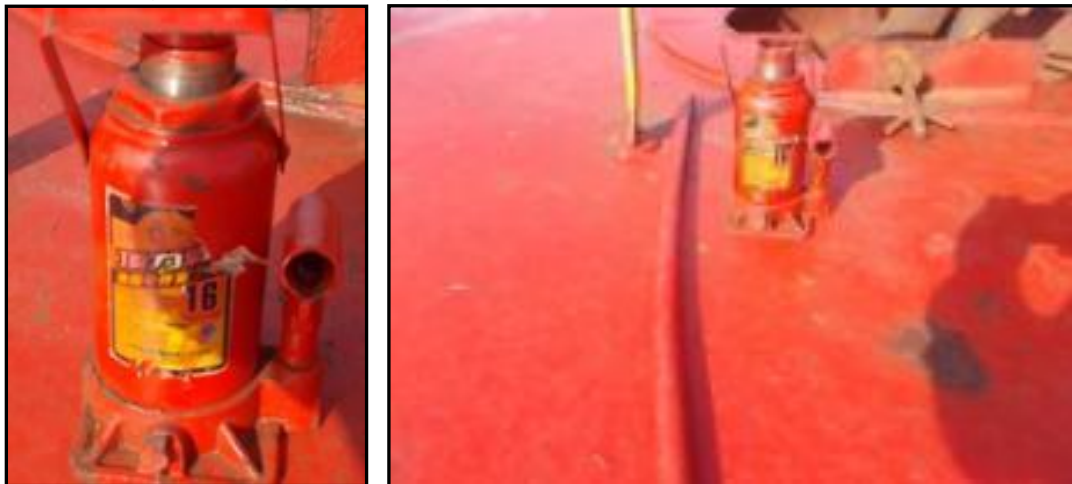


Figure 3: The hydraulic jack and long pipe (bent as a result)

⁸ Master, Chief Officer, Chief Engineer and 2nd Engineer – no meeting minutes were documented.

⁹ Record shows that the Chief Officer signed off the tool-box meeting form which contains the risk assessment of the non-routine activities to be performed on the next day (refer to footnote 11).

¹⁰ There was no hot-work permit documented for this activity. The Company's procedures required that prior to performing any hot work, the Company was to be informed and a hot-work permit be issued for a specific duration.

- 1.1.11 Based on witnesses' accounts, the Master then indicated a position inside the hawse pipe where he wanted the hydraulic jack to be positioned and instructed the Fitter to enter the hawse pipe and to weld another support for the hydraulic jack.
- 1.1.12 The Fitter duly followed the Master's instructions at about 1350H and exited the hawse pipe uneventfully around 1430H after welding a support for the hawse pipe. This hot work activity too was not known to the Company.
- 1.1.13 At the instructions of the Master, the Bosun entered the hawse pipe at about 1500H to position the hydraulic jack against the anchor chain and started operating the jack to move the anchor chain. In this process, the anchor chain moved with a jerk and trapped the Bosun against the inner (upper) wall of the hawse pipe at around 1510H (see **Figure 4**).



Figure 4: Bosun trapped between the anchor chain and the upper part of the hawse pipe

- 1.1.14 The Bosun was retrieved from the hawse pipe and found motionless and the crew performed first aid but could not revive him. The Master informed the Company, who then instructed for the Master to divert the vessel to Sanya, China, where the Bosun's body was off-loaded before the vessel continuing on its passage to Dampier.
- 1.1.15 No other crew member was injured in the occurrence. By the time the vessel arrived at Sanya, according to the vessel's crew, after the anchor chain moved by the hydraulic jack operated by the Bosun, the anchor fluke became free by itself.

1.2 Personnel involved

- 1.2.1 The vessel was manned by 22 crew members¹¹ from the People's Republic of China (P.R.C) and the Philippines, including:

Rank	Date joined Company	Date joined Vessel	No. of months in present rank
Master (P.R.C)	11-Jan-2017	11-Jan-2017	46 months
Chief Officer (P.R.C)	10-Apr-2013	12-Dec-2016	40 months
Chief Engineer (P.R.C)	17-Apr-2015	03-Sep-2016	07 months
Bosun (P.R.C)	29-Dec-2014	11-Jan-2017	54 months
Fitter (P.R.C)	12-Dec-2016	12-Dec-2016	10 months

- 1.2.2 The officers held valid Certificates of Competency issued by China Marine Safety Authority (MSA) and flag endorsement by the Maritime and Port Authority of Singapore (MPA) for serving in their respective capacity on the vessel. The crew held valid certification for their respective ranks.
- 1.2.3 The personnel involved had documented receiving more than 10 hours of rest in the preceding 24-hour period in accordance Maritime Labour Convention (MLC) requirements.
- 1.2.4 According to information provided by the Company, the crew members were scared of refusing the Master's instructions.

1.3 Meteorological and environmental condition

- 1.3.1 The weather conditions logged in the logbook at the time of occurrence was BF scale 5 with north-easterly winds. Wave height of BF 4 was logged to be from NE.
- 1.3.2 As reflected in the logbook, the weather close to the time of the accident was cloudy with north-easterly winds between 17 and 21 knots. With a recorded wave scale of 4, the sea state would have been considered to be between moderate and rough.

¹¹ The ASD had been onboard for less than a month with most of them joining the vessel with the Master
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1.4 Safety Management System (SMS)

- 1.4.1 A copy of a Safety Management System (SMS) was available on-board the vessel. The SMS contained organisational policies, procedures, manuals, checklists, etc. for various shipboard operations.
- 1.4.2 A section in the SMS manual provided guidance on risk assessment for the vessel's crew to identify and reduce the hazards and risks. The SMS provided guidance for the Master and crew regarding, hot work, working over-side, entry into enclosed and narrow areas. Typically, work was not required to be performed inside a hawse pipe. However, there was no specific guidance on non-routine operations in the SMS manual.
- 1.4.3 There was no evidence that a hot work permit for the welding task or a working over-side permit (for fixing the mooring rope to the crown of the port anchor) was completed in accordance with Company's SMS.
- 1.4.4 The SMS did not have provisions for addressing authority-gradient to give the seafarers confidence to object to the work assigned (stop work) if they feel that the work was unsafe¹². A copy of the Code of Safe Working Practices for Merchant Seafarers (COSWP) was on-board the vessel.
- 1.4.5 A risk assessment for freeing up the anchor chain dated 17 January 2017 was documented along with a tool-box meeting form¹³. The contents are reproduced below -

Hazard	Effect	Severity	Likelihood	Risk	Control Measures
Releasing and jumping of anchor chain	Crew injury/death	Moderate	Likely	Moderate	Keep the chain tight
Slipping inside the hawse pipe	Crew injury/death	Low	Occasional	Low	Fitter welding for holding the body inside the pipe (<i>sic</i>)
Inadequate lighting	Crew injury/death	Low	Occasional	Low	Using torch

¹² COSWP – Chapter 2.8.3 – Personnel who find a condition that they believe to be hazardous or unsafe, should immediately report it to a responsible person who should take appropriate action.

¹³ Risk assessment and tool box meeting were signed by Chief Officer and approved by the Master. Members signed off on the tool box meeting were the Bosun, four deck crew, and two deck cadets. Tool box meeting was dated 17 and 18 January 2018.

Unfavourable weather conditions	Crew injury/death	Low	Occasional	Low	Wear PPE if weather deteriorates
Fatigue	Crew injury/death	Low	Occasional	Low	Comply with rest hour requirements
Communication	Crew injury/death	Low	Occasional	Low	Continuous comms with walkie talkie

2 ANALYSIS

2.1 Housing the anchor

2.1.1 When the anchor was aweigh and sighted clear of the water, recognizing that the position of the fluke could likely pose a problem for securing the anchor in the hawse pipe, the Chief Officer gave verbal and hand signals to the Bosun to stop heaving from a position which provided a clear line of sight on the port anchor.

2.1.2 It could not be established why the Bosun continued to heave until the fluke got stuck in the hawse pipe. An uncoordinated heaving of the anchor could not be ruled out.

2.2 Risk assessment for freeing the fluke

2.2.1 In the opinion of the Master, as long as the anchor chain was able to be secured in an “as-is” condition for the voyage to Australia, the anchor likely did not pose a concern to the vessel, its equipment or the voyage. However, being unable to use the port anchor in an emergency situation may have influenced the Master’s decision to rectify the problem while underway, i.e. the next day. Instead of commencing the voyage to Australia, it would have been ideal for the Master to consider stopping the vessel and not commence the sea passage, if the urgency of freeing the anchor fluke from the hawse pipe (and subsequent proper securing) was imminent.

2.2.2 At the instructions of the Master, the crew had performed the following non-routine activities in attempting to free the anchor fluke, while the vessel was underway:

- Inspect the hawse pipe from inside
- Going over-side using Jacob’s ladder
- Freeing the anchor fluke with hydraulic jack from inside of the hawse pipe

2.2.3 The above listed non-routine activities are considered to be unsafe activities and required considerable planning and detailed risk assessments. However, there were no risk assessments done for the first two items listed.

2.2.4 Although a risk assessment was conducted to free the fluke from inside of the hawse pipe, the severity of the hazard of slipping in the hawse pipe was

classed as “low”, despite the typical angled construction of a hawse pipe and the probability of occurrence (occasional), as was evident in the circumstances that led to the Bosun’s death.

- 2.2.5 The hazard of releasing and jumping of anchor chain was classified as moderate risk. Even with the risk control measures in keeping the chain tight with extra lashing on the chain to prevent its movement, the investigation team is of the view that the shipboard senior officers did not fully appreciate the risks and the severity of the injury, and the crew were instructed to perform an unsafe act by entering the hawse pipe to free the fluke while the vessel moved and swayed¹⁴ to seas and swells.

2.3 Implementation of SMS

- 2.3.1 A SMS is required to be designed for the safe operations¹⁵ of the ships and is intended to assign accountability both on-board a vessel or ashore. The SMS is to ensure that all the activities on-board the ship are conducted in a safe manner. The various unsafe activities, absence of hot work permit and risk assessment for non-routine activities, indicated that there was a lack of effective implementation of SMS on-board the vessel.
- 2.3.2 While it could not be established the kind of relationship among the senior officers and between the senior and junior officers on-board the vessel, a typical shipboard organisation has defined levels of authority. The Chief Officer though claimed to have voiced objection to the Master’s plan for the crew to perform unsafe act, had signed the risk assessment form and was present on-site privy to the actions being performed. There was no evidence of any intervention by any of the crew member to attempt to stop the unsafe act.
- 2.3.4 Although Chapter 2.8.3 of the COSWP has a provision for personnel to report a hazardous or unsafe condition, it was not implemented on-board the ship. A formal stop work authority and procedure may have allowed for an intervention to be documented and would have allowed for any of the crew on-board to raise an objection without fear of being reprimanded by

¹⁴ In moderate to rough seas, the vessel would have likely experienced rolling motion in sync with the directions of the waves. Coupled with the pitching and pounding movements of the vessel could add to the varying degrees and direction of the vessel’s movement.

¹⁵ International Safety Management (ISM) Code Element 7 – The Company should establish procedures, plans and instructions, including checklists as appropriate, for key shipboard operations, concerning the safety of personnel, ship and protection of the environment. The various tasks should be assigned to qualified personnel.

the senior officer, as such an intervention would be backed by the Company in line with its safety policies.

3 CONCLUSION

From the information gathered, the following findings, which should not be read as apportioning blame or determining liability to any particular organisation or individual, are made.

- 3.1 An uncoordinated heaving of the port anchor led to the fluke getting stuck in the hawse pipe.
- 3.2 The decision to then free up the anchor fluke by putting the crew at risk of injury was inappropriate because the vessel was underway and subject to dynamic forces experienced during moderate to rough seas.
- 3.3 The shipboard senior officers had likely underestimated the severity of the risk involved in performing the freeing up of the anchor fluke from within the hawse pipe.
- 3.4 The SMS did not contain a formal stop work authority and procedure. Such a mechanism would allow for an intervention to be made by any of the crew member to stop an unsafe act.
- 3.5 The unauthorized acts of performing hot work, working over side, entering a constrained space such as the hawse pipe were indicative of ineffective implementation of the SMS.

4 SAFETY ACTIONS

Arising from discussions with the investigation team, the following safety actions were taken by the Company.

- 4.1 Shore side training to be enhanced especially regarding risk assessment and job hazard analysis for senior officers. Senior officers to be trained in carrying out risk assessment before joining the vessel.
- 4.2 Crew safety awareness to be enhanced by conducting training. Promote safety culture on-board by enhancing training procedures ashore as well as on-board.
- 4.3 Selection procedures for all deck and engine officers to be enhanced, especially focusing on the safety attitude of the senior officers.
- 4.4 Reviewed the SMS, to include a STOP Work Procedure for reporting of unsafe acts to enhance the reporting procedures in the Company's SMS.
- 4.5 Fleet wide training circular issued on the use of STOP Work Procedure for stopping unsafe acts.

5 SAFETY RECOMMENDATIONS

A safety recommendation is for the purpose of preventive action and shall in no case create a presumption of blame or liability.

- 5.1 The Company, Stella Shipmanagement, to review its procedures to ensure that the Safety Management System is effectively implemented on-board its fleet. **[TSIB-RM-2018-031]**

- End of Report -