

FINAL REPORT

**MAN OVERBOARD (LOSS OF LIFE)
FROM OCEAN SUCCESS
WITHIN SINGAPORE TERRITORIAL WATERS
ON 4 MARCH 2018**

MIB/MAI/CAS.034

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

22 October 2018

The Transport Safety Investigation Bureau

The Transport Safety Investigation Bureau (TSIB) is the air and marine accidents and incidents investigation authority in Singapore. Its mission is to promote aviation and marine safety through the conduct of independent investigations into air and marine accidents and incidents.

TSIB conducts marine safety investigations in accordance with the Casualty Investigation Code under SOLAS Regulation XI-1/6 adopted by the International Maritime Organization (IMO) Resolution MSC 255(84).

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CONTENTS

SYNOPSIS	1
DETAILS OF THE SHIP	2
1 FACTUAL INFORMATION.....	3
1.1 Sequence of events	3
1.2 The ship and crew.....	7
1.2.1 The incident ship and crew.....	7
1.2.2 The SAR assisting tugs and crew	8
1.3 Additional information.....	9
1.4 Autopsy report.....	11
1.5 Safety Management System and operation procedures	11
1.6 Code of Safe Working Practices (COSWP).....	14
1.7 MOB drill requirements	14
1.8 Environmental condition	15
2 ANALYSIS.....	16
2.1 The occurrence	16
2.2 Donning of PPE and the SMS	17
2.3 MOB actions, drills and training.....	18
2.4 Incidental findings	19
3 CONCLUSIONS.....	21
4 SAFETY ACTIONS	22
5 SAFETY RECOMMENDATIONS	23

SYNOPSIS

In the morning of 4 March 2018, a Singapore registered tanker Ocean Success, after completing its bunker operation at the west of Singapore, off the port limits, was making way for Singapore western pilot boarding ground 'A' to receive inbound harbour pilot. At about 0638H, one of the crew members, the Bosun, fell overboard while preparing a ladder for pilot boarding.

A search and rescue operation was launched. At about 0645H, Sea Tetra located the Bosun motionless in the water. Efforts were made to revive him but were unsuccessful. The Bosun was officially pronounced dead at 1023H by shore medical personnel.

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

The investigation revealed that the Bosun had likely fallen into the water while leaning over the safety railing on the ship to gain a better sight of the pilot ladder's height above the water line. The crew involved in the task were not wearing a safety harness or a floatation device as per company's requirements. The investigation also revealed inadequacies in actions after the man overboard occurrence.

DETAILS OF THE SHIP

Name	Ocean Success
IMO number	9400978
Flag	Singapore
Classification society	American Bureau of Shipping (ABS)
ISM ¹ RO	ClassNK / ABS ²
Operator / ISM Manager ³	Ocean Tankers Pte Ltd
Owner	An Ya Shipping Pte Ltd
Type	Oil / chemical tanker
Construction	Steel
Delivery date	5 January 2012
Gross tonnage	11,999
Length overall	144.22m
Moulded breadth	23.00m
Moulded depth	12.40m
Summer draft	8.90m
Main engine(s)	Diesel, MAK 7M43C x 1 Set
Engine power	6300 KW x 500 RPM
Propeller	Controllable pitch propeller
Speed	Laden – 15.49 Knots, ballast – 16.11 Knots



Oil / chemical tanker - Ocean Success

¹ International Management Code for the safe operation of ships and for pollution prevention.

² ClassNK conducted 2nd Annual Verification Audit and endorsed the Document of Compliance certificate of the company on 31 May 2017. ABS carried out a renewal audit and issued a Safety Management Certificate to Ocean Success on 16 March 2017.

³ Referred to as the 'Company' under the ISM Code.

1 FACTUAL INFORMATION

All times used in this report are Singapore Time (UTC + 8H), unless otherwise stated.

1.1 Sequence of events

1.1.1 On 3 March 2018, the Singapore registered tanker Ocean Success (OS) was anchored using her starboard anchor outside Singapore port limits but within Singapore territorial waters, for the purpose of taking stores and bunkers. Stores replenishment was completed on the same day.

1.1.2 At about 0405H on 4 March 2018, bunkering operations were completed. After the bunker surveyor disembarked using the starboard side pilot ladder, the ladder was heaved up, clear of the water, using a tripping line⁴ forming a U-shape (see **Figure 1**). A Mooring Master⁵ was expected to board at the anchorage about two hours later to assist in the ship's departure. The OS would then pick up a PSA Marine Pilot (harbor pilot) at Singapore western pilot boarding ground 'A' for the ship's entry into the port of Singapore.

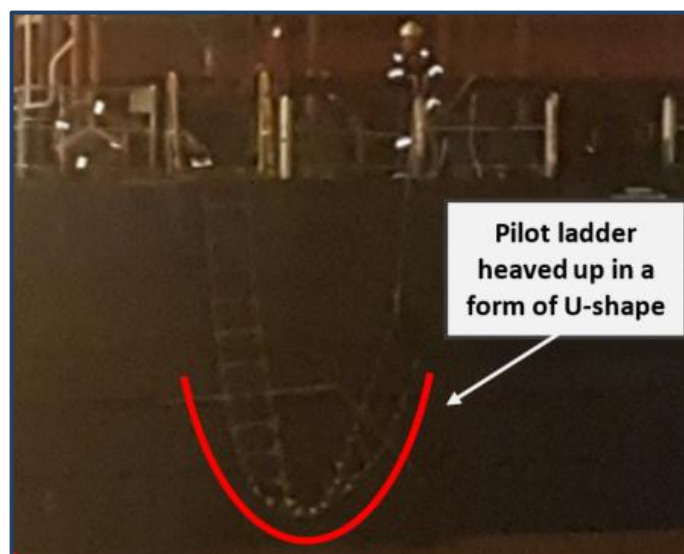


Figure 1 – Starboard pilot ladder heaved up in a U-shape form (annotated)
(Source: The ISM Manager)

⁴ A rope attached to the pilot ladder's base to facilitate heaving and lowering the ladder. The OS' pilot ladder was a manual rigging type without mechanical hoist. This practice of using the tripping line was supposed to make the process of rigging/unrigging easier. However, the line posed tripping hazard to the pilot boarding and disembarking. The practice was not in line with the SOLAS requirement - Chapter V, Reg 23, and was restricted practice in the company's Safety Management System.

⁵ It was a common practice for this operator to arrange a Mooring Master from a private company to assist the Master for navigating the ship outside Singapore port limits.

- 1.1.3 At about 0610H, the Master of OS came up to the bridge to take over the con⁶, and instructed the anchoring team to proceed to the forward station to prepare heaving up the anchor. The anchoring team comprised of the Chief Officer, the Bosun and a Deck Cadet (DC). All of them had their own walkie-talkie switched on and a portable hand torch.
- 1.1.4 At about 0620H, with the main engines ready, the Mooring Master boarded OS via an escort tug (An Shun), using the pilot ladder on the port side. This ladder was secured after the Mooring Master boarded. OS then commenced heaving its anchor.
- 1.1.5 By about 0634H, the anchor was aweigh and then secured. OS started moving out on a nearly westerly course from the anchorage with the engine telegraph first at Dead Slow Ahead and then to Slow Ahead. The Master of OS instructed the Chief Officer via walkie-talkie to prepare⁷ the pilot ladder at the starboard side for the boarding of harbor pilot about 30 minutes away.
- 1.1.6 By about 0635H, the ship's engine was at Half Ahead with OS doing a speed of about 3.5kts. The Bosun, overhearing the Master's instructions for the pilot ladder, left the forward station to prepare the pilot ladder at the pilot boarding station, located near the midship on the starboard side. The DC then came to the pilot boarding station after switching off the power to the windlass.
- 1.1.7 Around the same time, on his way back to the accommodation using the elevated walkway, the Chief Officer saw that the Bosun was tying the tripping line of the pilot ladder back onto the safety railing on the ship's side, presumably after adjusting the pilot ladder. The Chief Officer asked him if everything was OK, but the Bosun did not reply and he continued with his work. The Chief Officer, noting that the DC was assisting the Bosun, then continued his way to the accommodation.
- 1.1.8 According to the DC, at about 0636H, the Bosun asked him to check if the pilot ladder was about one meter above the water level as required for the pilot to board.
- 1.1.9 At about 0637H, OS' engine telegraph was set to Full Ahead with a headway of about 5kts, and intending to head south towards Singapore pilot boarding ground.

⁶ Conning means taking over control of the ship's navigation from another officer.

⁷ About 1m above water level as required by Singapore pilot station for safe boarding from their pilot boat. It was typical for the Bosun to perform these tasks with the assistance of his crew. DC would typically assist the Bosun for tasks on board.

- 1.1.10 The DC looked over the ship's side from a position which was about 3 meters forward of the pilot boarding station, to check the height of the ladder above the water line. At about this time, the DC heard a shout of "Cadet" from the direction where Bosun stood earlier. When the DC turned to look towards him, he saw the Bosun falling down to the ship's side just below the deck level with his body upside down and into the water.
- 1.1.11 As the ship continued to move ahead, the DC ran towards the aft of the ship to maintain visual sight with the Bosun, who was by now in the water. DC shouted "Bosun overboard" about 3-4 times over the walkie-talkie in a panicky voice⁸. The lifebuoy located near the pilot boarding station was not released by the DC.
- 1.1.12 By about this time, OS was at a speed of about 7.5kts. For a brief moment the Master doubtfully⁹ enquired with the Mooring Master if the call of person overboard was from his own ship. The Mooring Master dismissed the doubt nonchalantly. At about 0639H, the Master realized¹⁰ that the report of Bosun overboard was indeed from his ship, and requested the Mooring Master to inform the tug boats¹¹ in the vicinity to look out for the Bosun. The Master ordered a helm of starboard 10° and started reducing the main engine to gradually stop. The lifebuoy¹² located on the starboard bridge wing was not released by the bridge team¹³.
- 1.1.13 The DC, who was trying to maintain visual contact on the Bosun, had reached the poop deck at the accommodation area, however, he could not see the Bosun clearly in the water. Meanwhile, the Chief Officer after overhearing the communication between the Master and DC on his walkie-talkie, joined in to look for the Bosun at the poop deck. By this time, the team could barely see the reflective tapes of Bosun's dark blue overalls with their torch which was shining into the water.
- 1.1.14 Within a minute of the occurrence, Sea Tetra, a tug boat in the vicinity, proceeded to the reported incident location. Four other tugs (see **Figure 2**) in the vicinity also responded to the incident location, one after another.

⁸ Extracted from Voyage Data Recorder (VDR) audio.

⁹ The crew on-board OS and many ships in the vicinity of OS may have been using the same UHF channel of the walkie-talkie.

¹⁰ Clarified from the DC that the Bosun overboard was from Ocean Success.

¹¹ Number of tugs were available at the Operator's disposal for their own ships' arrival and departure anchorage or ship to ship operations.

¹² SOLAS Chapter III Reg 7.1.3 - Lifebuoy with self-igniting light and Self-activating smoke signal fitted on both sides of the bridge wing with a quick release arrangement that will automatically release and activate the signal. It is designed to be used for man overboard (MOB) actions from the bridge.

¹³ The Third Officer attempted to release the bridge lifebuoy about few minutes after the MOB was confirmed, but the Master stopped him, citing ineffectiveness as the Bosun had drifted further astern.

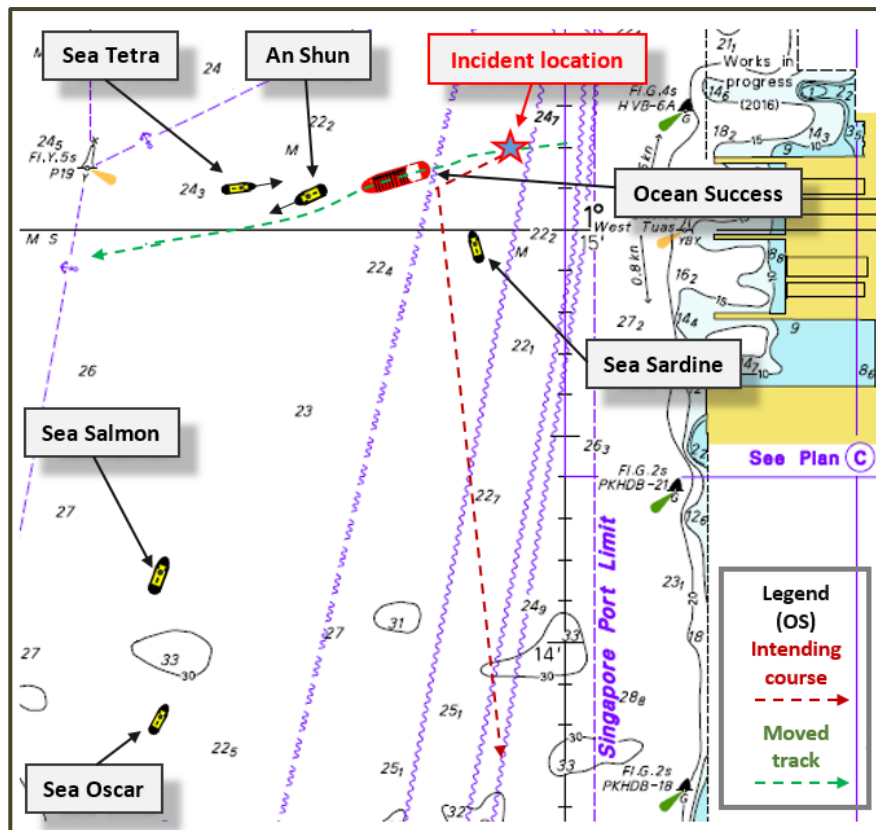


Figure 2 – At 0640H, positions of OS and tugs in the vicinity (Not to the scale, for illustration purpose)

- 1.1.15 By about 0642H, OS' headway caused her to move further away from where the Bosun had fallen and by this time the engine had been stopped. The bridge team attempted to locate the Bosun using the binoculars and the searchlight on the bridge wing but were unable to locate him.
- 1.1.16 By about 0645H, the Sea Tetra arrived at the occurrence location, and sighted a partially floating body, facing down, and later identified to be the fallen Bosun from OS. The body was recovered about 0.1nm from the location where the Bosun had fallen into the water.
- 1.1.17 At about 0655H, the Sea Tetra recovered¹⁴ the body of the Bosun onto its deck. The Master of the Sea Tetra carried out vital sign checks but there appeared to be no signs of life. The Master still administered cardio pulmonary resuscitation (CPR) to the Bosun, but was unsuccessful in reviving him.
- 1.1.18 At about 0819H, the body of the Bosun was transferred back to OS. Subsequently the body was taken away by the Singapore Police Coast

¹⁴ The freeboard of Sea Tetra was about 1.3m The crew used two ropes looped around his thigh and chest to retrieve the Bosun.

Guard at 0935H on the same day. The Bosun was officially pronounced dead at 1023H on the same day.

- 1.1.19 The bridge recorded the time of occurrence as 0639H and in position Latitude 01° 15.19' N and Longitude 103° 35.59' E, about 0.3nm outside Singapore's western port limits in its territorial waters.

1.2 The ship and crew

1.2.1 The incident ship and crew

- 1.2.1.1 OS was classed as a chemical and oil tanker, with total capacity of 19,000 cubic meters in six cargo tanks. She was engaged in a tramping service and at the time of the occurrence was drawing a mean draft of about 4.5m and a freeboard about 7.5m at midship.

- 1.2.1.2 The ship was manned with 21 crew on-board. The Master, age 47, from Bangladesh, held a valid Certificate of Competency (COC) Class 1 (Deck) issued from United Kingdom, and a valid Certificate of Endorsement (COE) for the COC from the Maritime and Port Authority of Singapore (MPA). He had an in-rank experience of about five and half years and had joined OS two months ago.

- 1.2.1.3 The Chief Officer, age 50, from Russia, held a valid COC Class 1 (Deck) issued from the Russian Federation, and a valid COE from the MPA. He had about three years' experience as Chief Officer and worked for the same company more than eight years. He had been on OS about five months and like most ships, was the head of the deck department and was one of the four safety officers on-board the ship.

- 1.2.1.4 The Third Officer, age 30, from Bangladesh, held a valid COC Class 3 (Deck) issued from Bangladesh and COE issued from the MPA, and had served in-rank about one year. He joined OS in Dec 2017 and was the duty officer assisting the Master on the bridge at the time of occurrence.

- 1.2.1.5 The Deck Cadet, age 31, from Singapore, was on his second ship as a cadet, and had been on-board for about two months. He completed phase one of the pre-sea induction training in 2016 and other relevant safety training courses according to STCW 1978, as amended, in Singapore prior joining his first ship.

- 1.2.1.6 The deceased Bosun, age 57, was a Chinese national who was about 165cm in height. He was certified medically fit for his intended duty at sea prior joining the ship on 15 September 2017. There were no records to

indicate that he was under medication during his service on-board. At the time of the occurrence, his records of hours of rest and work complied with 'Hours of rest' requirements in accordance with the the company's Safety Management System (SMS) and the Maritime Labour Convention¹⁵, 2006. Information from the toxicology report provided to the investigation team did not reveal the presence of any alcohol in his body.

1.2.1.7 The Bosun joined the company in 1993 as ordinary seaman. He became an able seafarer (Deck) and was promoted to Bosun in 2010. He held the following valid training certificates in accordance to STCW 1978, as amended, issued by China Maritime Safety Administration on 18 December 2013:

- a) Basic Training
- b) Proficiency in survival craft and rescue boats other than fast rescue boats
- c) Basic training for oil and chemical tanker cargo operations
- d) Advanced training for oil tanker cargo operations

1.2.1.8 Documentation obtained indicated all above crew involved had also undergone new-joining familiarisation training within stipulated timeframe of the SMS.

1.2.1.9 The Mooring Master¹⁶, age 60, from Indonesia, at the time of occurrence, coordinated with the assisting tugs to aid the Search and Rescue (SAR) operation.

1.2.2 The SAR assisting tugs and crew

1.2.2.1 At the time of the occurrence, there were five Singapore registered tug boats in the vicinity of OS including the escorting tug boat, An Shun, which was the leading tug ahead of OS. Its role was to warn other small craft in the vicinity to avoid crossing OS' bow. The others were Sea Oscar, Sea Salmon, Sea Sardine and Sea Tetra. All were similar size tugs of about 500GT and operated by the same operator as OS. The Sea Sardine was less than half a mile but responded later while the Sea Tetra was just over half a mile away

¹⁵ SMS & Maritime Labour Convention, 2006 – stipulate minimum ten hours of rest in any 24-hour period and 77 hours in any seven-day period.

¹⁶ A master mariner, who held COC class 1 (deck), and obtained Mooring Master Training certificate from Pertamina Maritime Training Center in Indonesia. His role was to pilot the operator's ships in and out of the off-port limits area and to perform the navigational duty for ship-to-ship transfer operation whenever required.

from OS and her engines were on standby. The Sea Oscar and Sea Salmon were about 1.5nm away and not engaged in any other operations.

1.2.2.2 After hearing the request from the Mooring Master to locate the Bosun over the walkie-talkie on channel 17¹⁷, the Sea Tetra responded first and proceeded to the occurrence location. The body of the Bosun was sighted few minutes later at about 0645H. The other tugs stood down after the body was recovered onto the Sea Tetra.

1.2.2.3 The Master of the Sea Tetra, age 36, from Indonesia, held a valid COC Class 2 issued by Indonesia Directorate General of Sea Transportation and a valid COE issued by the MPA, and held a revalidation certificate of Medical First Aid conducted in Indonesia in October 2015. The crew who assisted the Sea Tetra's Master in recovering the fallen Bosun held valid training certificates according to STCW 1978, as amended.

1.3 Additional information

1.3.1 There were two sets of pilot ladders on-board OS, which were kept at the port and starboard side close to the rigging area of the pilot boarding station¹⁸. Both ladders required manual rigging. At the time of the occurrence, the starboard side ladder had been pre-rigged before the bunkering operation with the last step of the ladder at a height of less than two metres above the water line. After bunkering, it was heaved up in a U-shape using a tripping line, clear from the water line.

1.3.2 According to the DC, when he arrived at the pilot boarding station, he saw that the Bosun stood at the aft side of the ladder near to the lifebuoy storage location. He was wearing a safety helmet with the chin strap turned up above the helmet¹⁹. A hand torch was hung over his shoulder along with a walkie-talkie (see **Figure 3**).

¹⁷ Channel 17 was a common walkie-talkie channel used among all of operators' tug boats at the outside port limits area.

¹⁸ In direct line of sight from the bridge windows. Deck lights were switched off to facilitate safe navigation in hours of darkness.

¹⁹ After the incident, the Bosun's safety helmet was found lying on deck near to ship side (see **Figure 4**). The company's Safety Management System requires person to wear safety helmet secured to the chin.

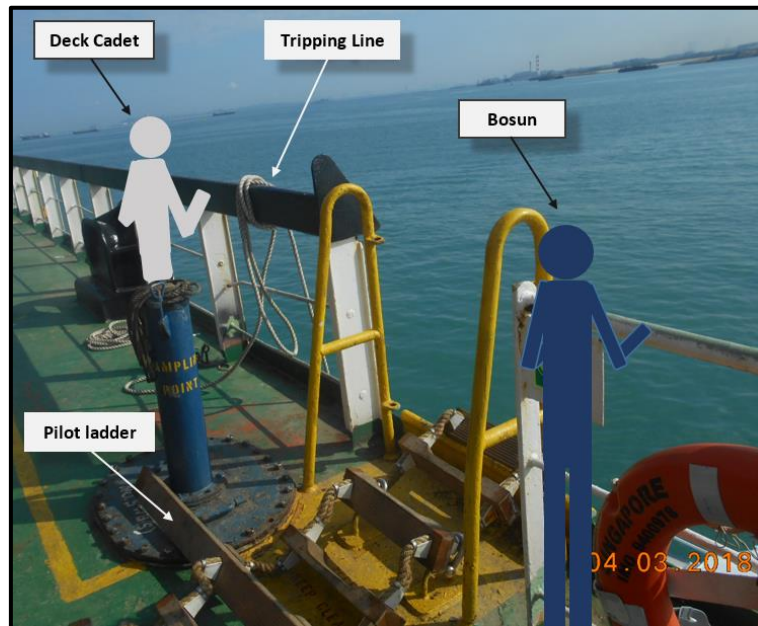


Figure 3 – Crew’s positions at the time of occurrence
(Not to the scale, for illustration only)

- 1.3.3 The Bosun and DC, were not wearing any floatation device. The walkie-talkie and the portable hand torch were not found on the Bosun’s body after the Sea Tetra recovered him from water.
- 1.3.4 The distance measured from the safety railing to the ship’s side was about 48cm. The height of the safety railing from the main deck was about 104cm. The height of the 1st rung and the 2nd rung of the railing above the main deck was about 24cm and 64cm respectively (see **Figure 4**).

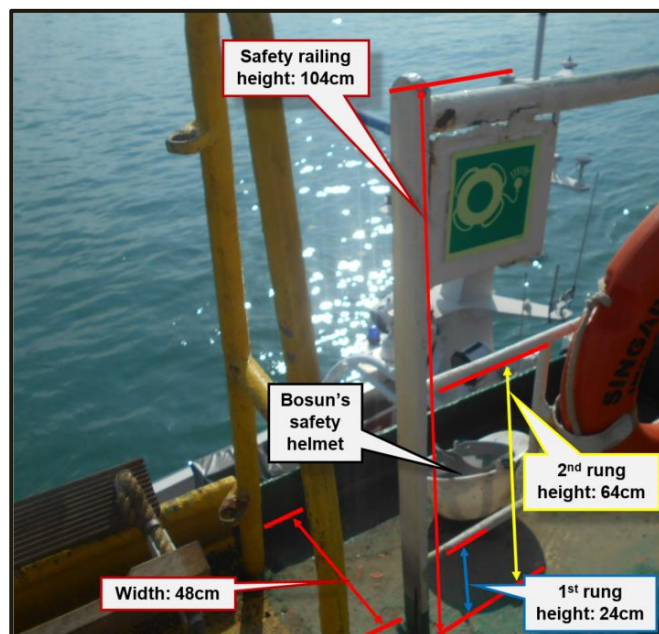


Figure 4 – The location view of the occurrence

1.4 Autopsy report

- 1.4.1 An autopsy conducted by the Forensic Medicine Division of the Singapore Health Sciences Authority revealed the cause of death as drowning.
- 1.4.2 The report also revealed that the deceased had suffered some external injuries on his scalp, right lower back, left elbow, left thigh and below the left patella (kneecap). Those injuries did not lead to the death of the Bosun.
- 1.4.3 No fractures and abnormality were present internally in his body.

1.5 Safety Management System and operation procedures

- 1.5.1 The company was issued with a Document of Compliance (DOC) on 19 June 2015 by Nippon Kaiji Kyokai (ClassNK) with a validity till 20 July 2020, to operate oil and chemical tankers. A Safety Management Certificate (SMC) was issued to OS by American Bureau of Shipping (ABS) on 16 March 2017 with validity till 10 May 2022. There were no non-conformity or observations raised during the last annual audit for DOC and SMC.
- 1.5.2 The SMS manual, amongst others, included the organisational policies, procedures, and checklists in accordance with ISM Code. A strict zero drug and alcohol policy was also included in the manual. It was one of Master's many responsibilities to conduct an annual review of the SMS on-board and to report its deficiencies to the company for improvement. The last review by the Master of its SMS was carried out one year ago.
- 1.5.3 Shipboard operations were classified as key operations²⁰ and critical operations²¹ in the SMS.
- 1.5.4 A key operation in the Bridge and Navigation Procedures section (*Regulation No. OT-TK-4-2*) of the SMS manual stated that:

13.3 Prior boarding of the Pilot, it is the duty of the OOW²² to ensure that the Pilot Ladder is properly rigged. To ensure personal safety, the Pilot ladder shall be rigged with a minimum of two persons donning lifejackets especially during rough weather, in the night and low visibility under the

²⁰ Are those where errors may become apparent only after they have created hazardous situations or when accidents have occurred.

²¹ Are those where an error may immediately cause an accident or a situation which could threaten people, the environment or the ship.

²² OOW - Officer of the Watch, an officer in charge of a navigational watch.

supervision of a responsible officer having means of (communication)²³ with the navigation bridge...

- 1.5.5 A working overside process was also a key operation (*Regulation No. OT-TK-4-12*) and the procedure stated:

2.1 All personnel who are working aloft, overside or in any other area where there is a risk of falling more than two meters, should wear a safety harness attached to a lifeline...

2.2 Personnel working overside (near ship's rail or over the ship's rail) should wear a lifejacket or Working Lifevest with Safety Harness and line attached to a strong point.

2.4 Personnel working at a height or over the side shall always be supervised by a responsible member and under continuous observation in the vicinity.

7 ...Before any work over side is carried out, it is necessary to identify the hazards and then ensure that they are eliminated or effectively controlled. A permit-to-work shall be duly completed and verified prior commencing any work over the side.

- 1.5.6 As per the Personal Equipment (PPE) procedure (*Regulation No. OT-TK-4-13*) in the SMS, the company was to provide necessary PPE and required that work must not be performed without its appropriate use. The SMS further stated that lifejacket should be provided where there is a risk of falling overboard. A working lifevest may be worn in place of lifejackets for non-emergency cases such as rigging pilot ladders. Personnel working overside should wear a lifejacket or working lifevest with safety harness. Lifevests were readily available for use on-board for such tasks.

- 1.5.7 As per the SMS (*Regulation No. OT-TK-4-16*), Risk Assessments were required to establish hazards, identify risks and introduce additional control measures by the use of permits to work, warning signs and use of PPE. A Risk Assessment dated 16 October 2013, and reviewed on 31 January 2018 listed three work activities, one of them being working overside. This form captured hazards of fall from height and the use of PPE. Existing controls to mitigate these risks were 'strict compliance with the SMS on PPE'. Additional controls to reduce the risk were 'conduct of work under supervision of a responsible officer' and for the Chief Officer to implement

²³ Added missing word "communication" for clarity.

the controls. A permit to work documented to be valid from 0530H to 1330H on 4 March 2018 for rigging/securing the pilot ladder was authorized²⁴ by the Chief Officer (as a routine task). When enquired, the DC was not aware of this permit or its requirements as per SMS.

- 1.5.8 The SMS also required all newly joined crew to receive a familiarisation briefing on-board, which was recorded in a form of 'Familiarisation Checklist for Newly Joined Personnel'. The form included two parts - Part-A related to SOLAS required emergency training²⁵ that was to be completed within 24 hours of joining, or prior to the ship departure. Part-B required familiarisation with company's SMS manual, other related shipboard safety and emergency information, to be completed within 2 weeks of joining. Knowing what to do in an emergency if a person falls overboard, was covered in Part-B²⁶.
- 1.5.9 The Man Overboard (*Regulation OT-TK-8-7*) (MOB) procedure in the SMS stated the sequence of actions to be taken to be taken by the officer of the watch to who a MOB is reported, such as raising the emergency alarm, ordering helm hard over towards the side on which the person fell, release of the bridge wing MOB buoy, posting of a lookout and keeping main engines ready for maneuvering.
- 1.5.10 The SMS' Safe Work Practices (*Regulation OT-TK-11-1*) prohibited the use of tripping lines (i.e. ropes connected to the base of the ladder) under any circumstances.
- 1.5.11 The SMS (*Regulation OT-TK-11-1*) had four designated Safety Observers on-board each individual ship. For OS, one of Safety Observers was the Chief Officer, who concurrently held a position as the safety officer on-board. In addition to the core work, their role was to observe unsafe behaviours or conditions and to stop work or activities which could cause potential harm to the crew or ship. Ensuring proper PPE was an example cited under this section.

²⁴ The authorisation was granted at 0630H and permit was documented as completed at 0635H.

²⁵ SOLAS Chapter II, Regulation 15, Instructions, on-board training and drills; Chapter III, Regulation 19, Emergency training and drills.

²⁶ This checklist did not make any reference to the relevant sections within the SMS for dealing with a MOB scenario.

1.6 Code of Safe Working Practices (COSWP)

1.6.1 The COSWP²⁷ is a reference publication widely used by the maritime industry for safe working practices on-board ships. It provides, among others, guidance and advice on safe working procedures and practices. A copy of COSWP was on-board OS.

1.6.2 The relevant paragraphs in the COSWP are extracted below:
Chapter 8, section 8.10.1 – Protection from falls

All personnel who are working at height (i.e. in any position from which there is a risk of falling) should wear a safety harness (or belt with shock absorber) attached to a lifeline...

Chapter 8, section 8.12.1 – Protection against drowning

Where work is being carried out in an exposed position where there is reasonably foreseeable risk of falling overboard, a lifebuoy with sufficient line should be provided. In addition, and as appropriate a working lifejacket, a personal floatation device or a buoyancy aid should be worn...

1.7 MOB drill requirements

1.7.1 SOLAS does not specify the frequency of the MOB drill to be conducted, but such a drill should ensure that crew are familiar with the plans, procedures and equipment for recovery of persons from the water. According to the flag State, the company is responsible for identifying potential emergency shipboard situations and establish programmes for drills and exercises in the SMS²⁸ to prepare for such emergency situations.

1.7.2 MOB drill was to be conducted once every 6-months as per the company's SMS procedures. Apart from the MOB drill, OS also conducted a drill which required the rescue boat to be launched monthly²⁹ to test the launching appliances. The last MOB drill was conducted in November 2017. Although the Master and Chief Officer participated in this drill, the Third Officer and DC joined the vessel after this drill. Part-B of the familiarization checklist had been duly documented (see paragraph 1.5.8).

²⁷ The COSWP published by the UK Maritime and Coastguard Agency (MCA) provides best practice guidance for improving health and safety on board ships. The flag State issued a shipping circular No. 25 of 2017 to its flagged ships on the carriage on-board of safe working practice publications.

²⁸ ISM Code Element 8.1 and 8.2 – establish programmes for drills to prepare for emergency actions.

²⁹ 9 Dec 2017, 5 Jan 2018 and 6 Feb 2018.

1.8 Environmental condition

- 1.8.1 At the time of the occurrence, the weather was fair, visibility was good and the sky partly cloudy. The wind was light airs. The sea was calm and a flood tide of approximately 1 to 2kts.
- 1.8.2 The occurrence took place during the hours of darkness before twilight.

2 ANALYSIS

2.1 The occurrence

- 2.1.1 Other than the DC, there was no other person at the site of occurrence who could shed light on how the occurrence may have taken place. When the Bosun told the DC to check the position of the ladder from a distance, the DC was standing about 5 metres (3 metres from the ladder) away from him looking down. From his peripheral vision, the DC recalled seeing the Bosun standing close to the safety railing, possibly with one leg over the first rung. While the DC was attempting to check the height of the ladder, it is possible that Bosun too may have also tried to establish the ladder's height above the water line himself.
- 2.1.2 Given the Bosun's height of 165cm, it would not be possible for the Bosun to be able to sight and assess the ladder's height above the water line, if he stood on the main deck. This position was about half a metre inboard of the ship's side, and at a height of one metre above the deck (see **Figure 5**). A fall from this position was unlikely.
- 2.1.3 In order for him to fall from this position, he would have to increase his height above the safety railing. If his foot was on the first rung, his body would be raised by about 24cm. A step onto the second rung would have raised his body even more, causing his upper body to lean over the safety railing. If indeed he attempted to gain a better visual sight he may have lost his balance from this position.

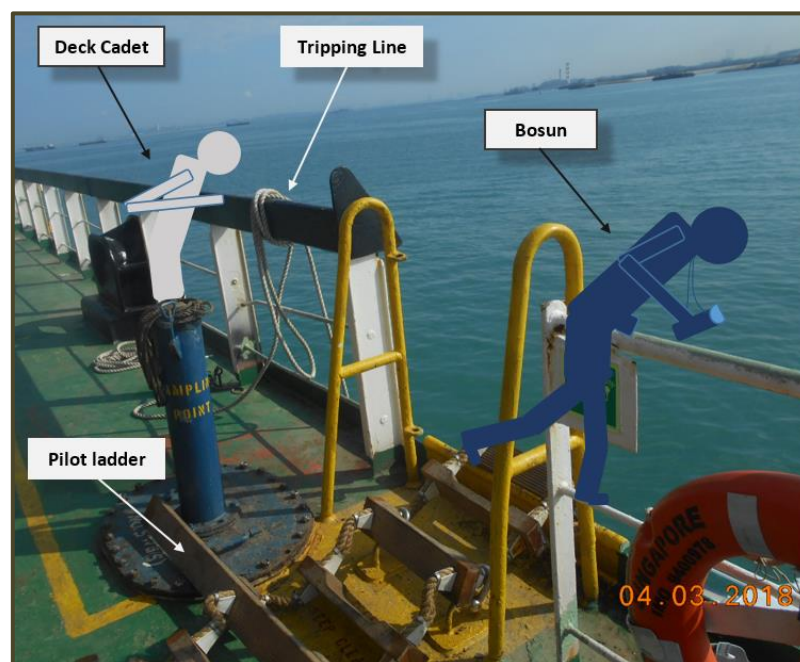


Figure 5 – Possible position of Bosun prior to the accident
(Not to scale, for illustration only)

2.1.4 The Bosun fell from a height of about eight metres. This fall and possible injuries could have affected his ability to swim. A flotation device could have minimised the possibility of him drowning.

2.1.5 The injuries, such as to the scalp and elbow cited in the autopsy report could either have been inflicted by his body coming in contact with the safety railing and/or the main deck between the railing and the ship's side, or the torchlight and walkie-talkie that he had on him prior to the occurrence. The Bosun was wearing a safety helmet but it was not properly strapped to his chin. While injuries to the other part of the body could not be prevented, a properly worn safety helmet could have minimised head injuries.

2.2 Donning of PPE and the SMS

2.2.1 Despite the company's SMS requiring personnel involved in rigging pilot ladder (especially when working over the ship's safety railing), to don a safety harness and a life vest, both the DC and Bosun had not done so. While the ladder was already considered as rigged, the ladder may have required adjustment, which would have posed a risk to someone falling overboard in this process.

2.2.2 There was no responsible officer supervising this task at the location as required by the company's SMS. Safety of self and co-workers is the prime priority while working on-board any ship, to achieve utmost safety, by ensuring all personnel put on appropriate PPE to eliminate risks assessed while performing different types of tasks. It was evident that the persons involved had not ensured compliance with the requirements of the SMS or taken into account of the recommendations in the COSWP section 8.10.1, especially considering the risks of falling overboard.

2.2.3 The Chief Officer, despite being the Safety Officer and the head of deck department, did not intervene³⁰ when he passed by the duo on the way back to the accommodation. Had he done so, or ensured proper supervision by a responsible officer, the outcome may have been different.

2.2.4 The Risk Assessment form indicated that rigging the pilot ladder was a routine task under a critical operation. However, the SMS required the activity involved in rigging a pilot ladder to be a key operation. There is a mismatch in the classification of rigging a pilot ladder in the Risk Assessment form and the SMS. In addition, being indicated as a routine activity in the Risk Assessment form, it was apparent that the nature of this

³⁰ The Bridge team too could not sight the pilot boarding station in the hours of darkness.

activity (routine in nature) shipboard management would not deem such an activity³¹ to be dangerous and thus might have negated the need for ensuring that personnel involved donned appropriate PPE such as safety harness and life vests. The DC had not been briefed on the risk of this critical operation on-board.

2.2.5 The Bosun's safety helmet with the chin strap turned upwards, though not contributing to his death, may too have been an indicator on the importance paid to the use of PPE on-board OS.

2.2.6 While the SMS catered for instructions and safe procedures for the safe operation of ships and responding to emergency situations, it was deemed that the implementation of the SMS requirements lacked in several areas. For example: the use of appropriate PPE, implementing safety precautions, the prohibition on the use of tripping lines, supervision of tasks by responsible persons and familiarity of personnel with key and critical operations.

2.2.7 Considering that safety observers may not be present at places where work is being performed, a mechanism to ensure compliance with requirements of the SMS would be desirable, so that any crew can raise an intervention to stop the task if it was being conducted in an unsafe manner or not as per company's SMS.

2.3 MOB actions, drills and training

2.3.1 The DC's initial calls of MOB and subsequent communication over the walkie-talkie did not attract the attention of any one on-board OS, especially the bridge team, that the person overboard was from OS. This was because the DC did not prefix the ship's name when communicating over the walkie-talkie. Although the Master felt that the call was from his ship's crew, on being dismissed by the Mooring Master, he did not interrogate further until more calls continued (see Paragraph 1.1.12).

2.3.2 It is considered a good practice to use the ship's name before conveying messages over walkie-talkie. If the DC had used a call-sign, for e.g. "*Ocean Success bridge – man overboard on the starboard side*", to convey a specific message that required action, it may have caught the immediate attention of the bridge team.

³¹ This type of work had been performed several times before the occurrence and is common on ships involved in routine embarkation / disembarkation of persons using the pilot ladder.

- 2.3.3 Though the Master gave helm orders, reduced the ship's speed and asked for tug's in the vicinity to search for the Bosun, the ship's alarm was not raised and the bridge MOB lifebuoy was not released immediately by the bridge team as required by the company's SMS.
- 2.3.4 The company's SMS clearly stated the sequence of actions to be taken by the Officer of the Watch in the event of a report of MOB. However, there was no specific procedure on actions³² to be taken by any person other than the Officer of the Watch who witnesses a man overboard situation.
- 2.3.5 As the DC had not participated in the company's six-monthly MOB drill since joining, there is a likelihood that he was not fully familiar with actions to be taken when witnessing a man overboard despite a documented familiarization³³ checklist (see Paragraph 1.1.11).
- 2.3.6 Although SOLAS does not prescribe the frequency of a MOB drill, abandon ship drills are required to be conducted monthly. SOLAS also requires launching of rescue boats³⁴.
- 2.3.7 Actions to be taken in a MOB scenario should be second nature to crew on-board. To ensure effective familiarisation, the investigation team is of the view that MOB drill should be conducted more frequently, e.g. in conjunction with the rescue boat lowering drill. Having the MOB drill in conjunction with the launching of rescue boat or lifeboat (as appropriate) provides an added advantage in reviewing the recovery plans and procedures developed as per the company's SMS.

2.4 Incidental findings

- 2.4.1 It was a practice on-board OS to look over the ship side to check the height of the pilot ladder above water line. This action poses an inherent risk of falling overboard as the person would have to lean over the safety railing. If safety precautions are not taken, the risk of crew falling overboard increases. It was also a practice on-board to have a tripping line affixed to the pilot ladder's base so as to facilitate recovery of the ladder back on-board the ship. This tripping line posed a potential hazard to a pilot boarding the vessel. The company should review this process of rigging of pilot ladder for the

³² Such as using appropriate call-sign to convey a specific message that required action.

³³ ISM Code Element 6.3 and 6.5 – related to familiarisation of duties for safety and the SMS for all personnel concerned.

³⁴ SOLAS 74 III/19.3.3.6, as amended, is intended to require a monthly launching of a rescue boat (lifeboats which are rescue boats should be launched 3-monthly) for testing the rescue boat, the launching system, the familiarity of persons forming a part of the rescue team when the boat is launched.

safety of its crew while also ensuring that pilot ladders are safe for pilot boarding.

- 2.4.2 The Bosun's dark coveralls, though with reflective stripes, could barely be seen in the light conditions when the incident occurred. A brighter overall may have been able to better assist in rendering assistance such as deploying lifebuoys.

3 CONCLUSIONS

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 The Bosun on-board OS may have stood on the rungs of the safety railing to look overboard to check the height of the pilot ladder above water line without a safety harness. In doing so, he exposed himself to the risk of falling overboard which resulted in his fall into the water.
- 3.2 The Bosun fell from a height of about eight metres. He had likely injured himself during the fall which affected his ability to swim. A flotation device, as required by company's SMS could have minimised the possibility of him drowning.
- 3.3 The DC was likely not fully familiar with actions to be taken in a MOB scenario. The company's SMS did not include specific procedure on actions to be taken by any person other than the Officer of the Watch who witnesses a man overboard situation.
- 3.4 In the absence SOLAS requirements for frequency of a MOB drill, it would be desirable for such a drill to be conducted more frequently such as in conjunction with the launching of rescue boat or lifeboat (as appropriate).
- 3.5 The SMS manual identified the task of rigging pilot ladder as a key operation, whereas the Risk Assessment form indicated it as a routine task under a critical operation.
- 3.6 The implementation of SMS requirements lacked in several areas on-board OS, such as use of appropriate PPE, implementing safety precautions, the prohibition on the use of tripping lines, supervision of tasks by responsible officer and familiarity of personnel with key and critical operations.
- 3.7 Though there was a team of safety observers on-board, a mechanism to ensure compliance with requirements of the SMS would be desirable so that any crew can raise an intervention to stop a task if it was being conducted in an unsafe manner or not as per company's SMS.

4 SAFETY ACTIONS

During the course of the investigation and through discussions with the investigation team, the following safety actions were initiated by the company.

4.1 On 4 May 2018, the ISM Manager reviewed the rigging procedures for pilot ladder. The improved procedures included a tabular form³⁵ for computing the length of pilot ladder to achieve the required height above water. In addition, the pilot ladder was also marked at one metre intervals upwards from the bottom most step, in order to minimise the risk of falling overboard.

4.2 On 22 May 2018, the ISM Manager reviewed its SMS manual and the relevant sections were amended as follows:

- Training Procedures (*Regulation OT-TK-9-1*), section 6.4 - the frequency of the MOB drill was amended to once every two-months instead of previously six-monthly.
- Bridge and Navigation Procedures section (*Regulation No. OT-TK-4-2*) (refer to para 1.5.4) was amended to include requirements of wearing a safety harness while preparing the pilot ladder.
- Specified the requirement for PPE to be donned when conducting a work activity (near or outside of ship's rail) to avoid ambiguity and subjective interpretation by ship's crew.

4.3 Areas of mandatory donning of life vest were marked in red at pilot boarding station (see **Figure 6**).



Figure 6 – Mandatory life vest zone
(Source: the ISM Manager)

³⁵ The company believes that this new work method should not require crew members to lean overboard to check the ladder's height above the water thereby reducing the probability of falling overboard during this task.

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 For the ISM Manager of OS

5.1.1 To implement a mechanism within the SMS so as to give any crew the confidence for stopping a task if it is not in compliance with SMS or is considered unsafe. **[TSIB-RM-2018-021]**

5.1.2 To review its SMS on the classification of the task of rigging pilot ladders to be consistent with the Risk Assessment form to provide better clarity to the crew. **[TSIB-RM-2018-022]**

5.2 For the Flag Administration of OS

5.2.1 To encourage the Owners, ISM Managers and Masters of SRS, to plan man overboard drill in conjunction with the launching of rescue boat or lifeboat (as appropriate) for ensuring effective crew familiarization with actions to be taken in a man overboard scenario. **[TSIB-RM-2018-023]**

- End of Report