

The Danish Maritime Accident Investigation Board
Carl Jacobsens Vej 29
DK-2500 Valby
Denmark

Tel. +45 91 37 63 00

Email: dmaib@dmaib.dk

Website: www.dmaib.com

Outside office hours, the DMAIB can be reached on +45 23 34 23 01.

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Front page: Picture of starboard bridge wing on SELANDIA SWAN. Source: DMAIB.

The marine accident report is available from the website of the Danish Maritime Accident Investigation Board (www.dmaib.com).

The Danish Maritime Accident Investigation Board

The Danish Maritime Accident Investigation Board is an independent unit under the Ministry of Business and Growth. It carries out investigations as an impartial unit that is, organizationally and legally, independent of other parties. The board investigates maritime accidents and occupational accidents on Danish and Greenland merchant and fishing ships, as well as accidents on foreign merchant ships in Danish and Greenland waters.

The Danish Maritime Accident Investigation Board investigates about 140 accidents annually. In case of very serious accidents, such as deaths and losses, or in case of other special circumstances, either a marine accident report or a summary report is published, depending on the extent and complexity of the events.

The investigations

The investigations are carried out separately from the criminal investigation, without having used legal evidence procedures and with no other basic aim than learning about accidents with the purpose of gaining and promoting an understanding of safety. Consequently, any use of this report for other purposes may lead to erroneous or misleading interpretations.

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1. SUMMARY

The findings from the investigation have indicated that, on 23 July 2015, the 3rd officer was inspecting the lifebuoys mounted on the bridge wings while he was alone on watch on the bridge. During the inspection of the starboard lifebuoy, he accidentally lost his footing and fell overboard between 1005 and 1010 local time.

Within 15 minutes the crewmembers realized that the 3rd officer was missing and they immediately responded as if he had fallen overboard and initiated the man overboard procedures. Several ships participated in the search, but were unsuccessful in locating the 3rd officer. He was located and recovered by a rescue helicopter deployed from the Danish JRCC. Resuscitation was commenced immediately after he was recovered from the sea, but was not successful. He was pronounced dead at Aalborg University Hospital at 1619 local time.

The accident was a result of an absence of clear instructions on how to go about inspecting the lifebuoy. In the absence of instruction or guidance, he made a detailed inspection of the only item he could – namely the light. Neither the workplace nor the lifebuoy was designed for maintenance work. In order to carry out that inspection he had to climb the guard rail, thereby exposing himself to the risk of falling overboard. Presumably, he did not don a harness and fall arrester, because the risk of falling was not apparent to the 3rd officer as he was still behind the guard rail.

The company has notified DMAIB about several preventive measures that have been implemented after the accident.

2. FACTUAL INFORMATION

2.1 Photo of the ship



*Figure 1: SELANDIA SWAN
Photo: Claus Schaeffe*

2.2 Ship particulars

Name of vessel:	SELANDIA SWAN
Type of vessel:	Chemical/products tanker
Nationality/flag:	Denmark
Port of registry:	Middelfart
IMO number:	9371787
Call sign:	OYIN2
DOC company:	Uni-Tankers A/S
IMO company no. (DOC):	4012481
Year built:	2008
Shipyard/yard number:	Gisan Gemi Ins. San - Istanbul Yard/hull No. 40
Classification society:	DnV GL
Length overall:	147.50 m
Breadth overall:	138.00 m
Gross tonnage:	11,711
Deadweight:	17,998 t
Draught max.:	9.49 m
Engine rating:	6,300 kW
Service speed:	14 knots
Hull material:	Steel

2.3 Voyage particulars

Port of departure:	Rotterdam, Netherlands
Port of call:	Ust-Luga, Russia
Type of voyage:	International
Cargo information:	In ballast condition
Manning:	16
Pilot on board:	No
Number of passengers:	0

2.4 Weather data

Wind – direction and speed:	Southwest 11 m/s
Wave height:	1.5-2.0 m
Visibility:	Good
Light/dark:	Light
Current:	Northeast 0.7 knots

2.5 Marine casualty or incident information

Type of marine casualty/incident:	Fall overboard
IMO classification:	Very serious casualty
Date, time:	23 July 2015 at approximately 1010 LT (UTC+2)
Location:	North Sea, off the coast of Jutland, Denmark
Position:	56°57.82' N - 007°56.93' E
Ship's operation, voyage segment:	In passage, mid-water
Place on board:	Bridge deck
Human factor data:	Yes

2.6 Shore authority involvement and emergency response

Involved parties:	Thyboroen Rescue Station: MARTHA LERCHE and FRB 16 Hanstholm Rescue Station: C.B. CLAUDI Noerre Vorupoer Rescue Station: MRB 31 Hanstholm Rescue Station: LRB 22 JRCC Denmark: Rescue helicopter 514
Resources used:	Five coast rescue station boats and one rescue helicopter
Speed of response:	Approximately two hours
Actions taken and results achieved:	Crewmember evacuated by rescue helicopter and brought to the hospital.

2.7 Relevant ship's crewmembers

Master	Held certificate of competency STCW 2/II – master mariner. 64 years old. He had been employed with the shipping company for approximately 25 years and had served on SELANDIA SWAN for six months.
3 rd officer	Held certificate of competency STCW 2/I – mate. 38 years old. Had been employed with the company for approximately two years and had served on SELANDIA SWAN for six months.

2.8 Scene of the accident

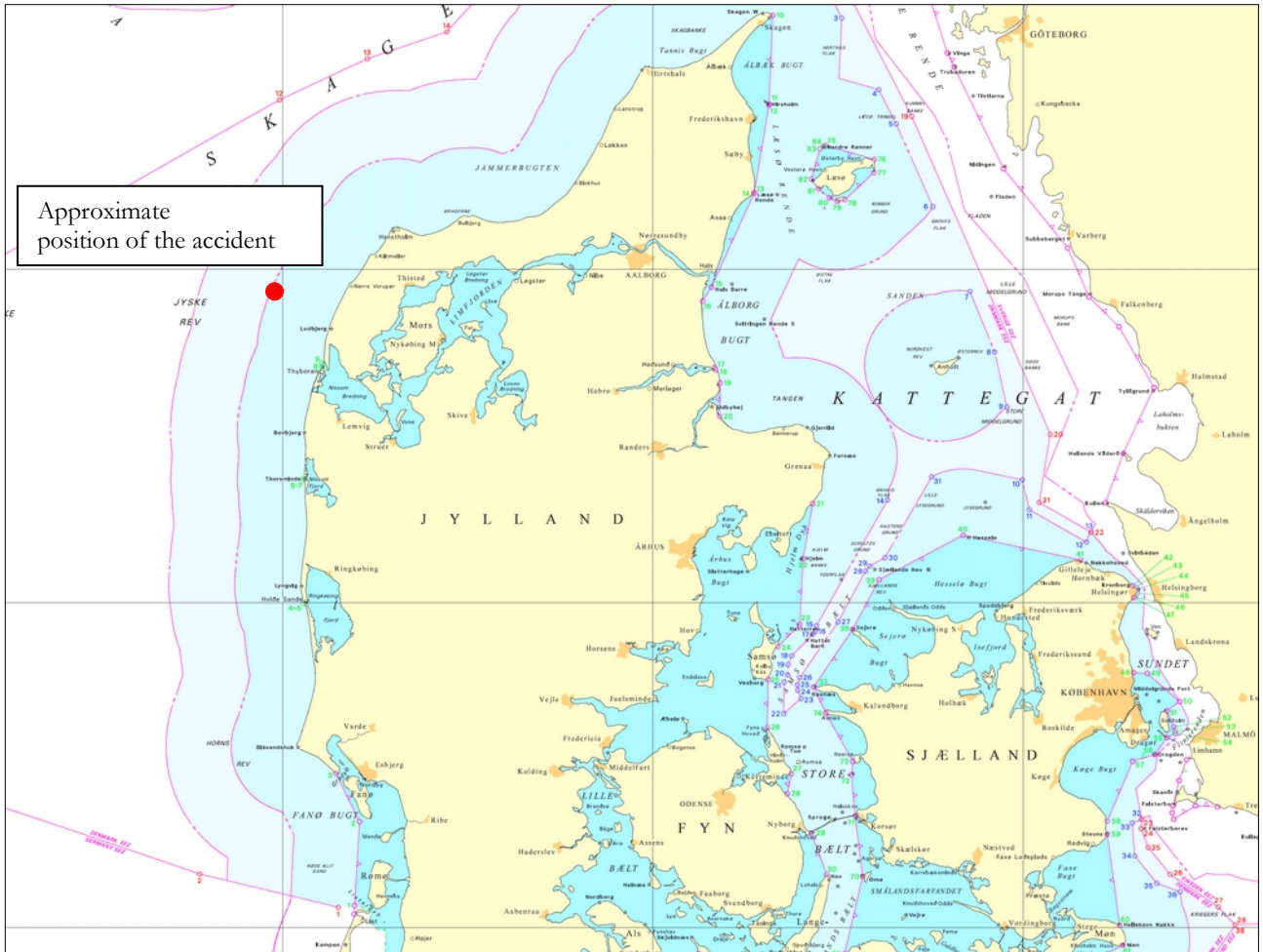


Figure 2: Scene of the accident. North Sea
Source: Danish Geodata Agency, chart D

3. NARRATIVE ABOUT THE ACCIDENT

3.1 SELANDIA SWAN

SELANDIA SWAN was a chemical and oil tanker in worldwide trade, carrying a variety of products. It was owned and operated by the Danish company Uni-Tankers A/S.

SELANDIA SWAN was at anchor at Scheveningen anchorage, Netherlands, from 17 July 2015 until 21 July 2015, awaiting orders for the next voyage. The waiting period was spent with normal routine work and no unusual events occurred.

Statements of time in this report are given in local time in Denmark (UTC+2), unless otherwise specified.

3.2 The accident

In the following narrative, some information will be missing because the 3rd officer perished as a result of the accident. Events will be reconstructed in the section containing the investigation results.

On 21 July 2015 at 2025, the anchor was weighed on SELANDIA SWAN and the ship departed from Scheveningen anchorage heading for Ust-Luga, Russia, via the North Sea along the coast of Jutland, Denmark. The first two days of the voyage were uneventful and the crew carried out routine work.

On the day of the accident, 23 July 2015, the chief officer was on watch from 0500 until 0900. The ship was on a north-easterly course at a speed of 9 knots.

As part of a morning routine, the master went to the bridge and had a short conversation with the watchkeeping officer. It was noted that the weather was good with light winds and good visibility. There was no traffic in the area of significance to the ship.

Shortly before 0900, the 3rd officer arrived on the bridge to take over the watch until 1200. There was a normal handover and small talk.

Usually the watchkeeping officer would be in contact with the duty able seaman (AB) via UHF radio during the day if assistance was needed on the bridge, e.g. extra lookout or steering.

At 1000, there was a break for fifteen minutes when the crew met for coffee and tea. The master, chief engineer, 2nd engineer and cadet met in the meeting room/office one deck below the bridge.

During the morning break, at 1005, one of the ABs went to the bridge to call his family over the ship's internet phone. As he entered the bridge, he went directly to the cordless internet phone that was mounted on the port side of the bridge centre console, while shouting to the 3rd officer that he was about to use the phone. He did not notice the presence of the 3rd officer, but assumed that he was preoccupied at the chart table or was using the toilet. While in conversation with a family member, he started to move around on the bridge. He noticed that the 3rd officer was not to be seen anywhere. As he walked to the open outer door on the starboard side bridge wing, he saw a slipper lying on the grating by the lifebuoy¹. After a short search on the bridge he realized that the 3rd officer was missing. He immediately hung up and contacted the duty AB on the UHF who came to the bridge within a few

¹ Lifebuoy with a self-activating smoke signal.

minutes. The two ABs had a short conversation about the whereabouts of the 3rd officer after which one of the ABs rushed to the meeting room.

At approximately 1015, the AB entered the meeting room visibly upset and told the crew that the 3rd officer was missing and that the bridge was unmanned. The master got up and hurried to the bridge followed by the AB and the chief officer.

When they arrived on the bridge, it quickly became apparent that the 3rd officer was missing. The AB told the master about the slipper and the master immediately acted on the assumption that the 3rd officer had fallen overboard. After the master had activated the general alarm, he organized a search of the entire ship that would be ongoing while the master was initiating the Williamson turn².

The chief officer and one of the ABs went to the deck areas and forecandle to search for the missing 3rd officer and prepare the lifesaving equipment. After a short search, they were stationed on the forecandle as lookouts trying to spot the 3rd officer in the water while maintaining radio contact with the master on the bridge. Meanwhile, the 2nd engineer and cadet searched the engine rooms.

The search results were reported to the master on the bridge and it was apparent that the 3rd officer was nowhere to be found. Two ABs, one engineer and the 2nd officer were posted as lookouts on the bridge after having finished searching the ship.

10 minutes after the master had arrived on the bridge, a pan-pan message was transmitted from the ship's VHF by voice and DSC. Shortly after, the Danish coast radio station, Lyngby Radio, replied and informed the master that the Joint Rescue Coordination Centre (JRCC) would be notified about the situation. Lyngby Radio thereafter relayed the pan-pan message to all stations via DSC and voice in English and Danish.

Approximately 15 minutes after the master had called Lyngby Radio, the JRCC contacted SELANDIA SWAN and notified the master that the rescue helicopter was on its way to the position of the ship. Thereafter, several messages were received by Lyngby Radio about nearby ships participating in the search for the missing 3rd officer. Three nearby ships actively assisted in the search.

At approximately 1250, 2 hours and 35 minutes after the 3rd officer was reported missing, the master on SELANDIA SWAN could, at a distance of approximately one nautical mile, see that the rescue helicopter hoisted the rescue swimmer and a person up from the water.

The 3rd officer had perished by drowning when the rescue helicopter crew found him. Resuscitation attempts were made during the flight and at Aalborg University Hospital, Denmark, but they were unsuccessful. He was pronounced dead at 1619 local time.

After the 3rd officer had been found, SELANDIA SWAN continued its voyage north towards Skagen, Denmark, where the DMAIB and the Danish Police made an investigation of the circumstances and concluded that the 3rd officer had fallen overboard as a result of an accident.

² The Williamson turn is a maneuver used to bring a ship or boat under power back to a point it previously passed through, often for the purpose of recovering a man overboard.

4. INVESTIGATION DATA

SELANDIA SWAN's navigation bridge had closed bridge wings with outer doors on each side facing aftwards. In the picture below (figure 3) the starboard side bridge wing can be seen from where the AB noticed the open outer door and a slipper lying on the grating. The aim of the investigation of the navigation bridge was to establish the time when the 3rd officer fell overboard and the causal circumstances of the accident.



Figure 3: Picture of the starboard side bridge wing
Source: DMAIB

4.1 The investigation of the scene of the accident

An investigation of the navigation bridge indicated that the 3rd officer fell overboard while he was inspecting the buoy mounted on the outside of the starboard side bridge wing (figure 4).

This assumption was based on the fact that a slipper belonging to the 3rd officer was found by the starboard side lifebuoy, and there were indications that the 3rd officer was in the process of inspecting and dismantling the light caps from the lifebuoys (figure 4) on each side of the navigation bridge.



Figure 4: Picture of the starboard side lifebuoy
Source: DMAIB

The slipper that was found on the grating by the starboard side lifebuoy was identified as belonging to the 3rd officer. The other slipper was not found.

The light cap on the starboard side lifebuoy was found to be partly unscrewed (figure 4).

One of the light caps and two O-rings from the port side lifebuoy were found on the chart table on the port side of the bridge (figure 5). The light bulb was found mounted on the smoke signal and showed no sign of being defective.

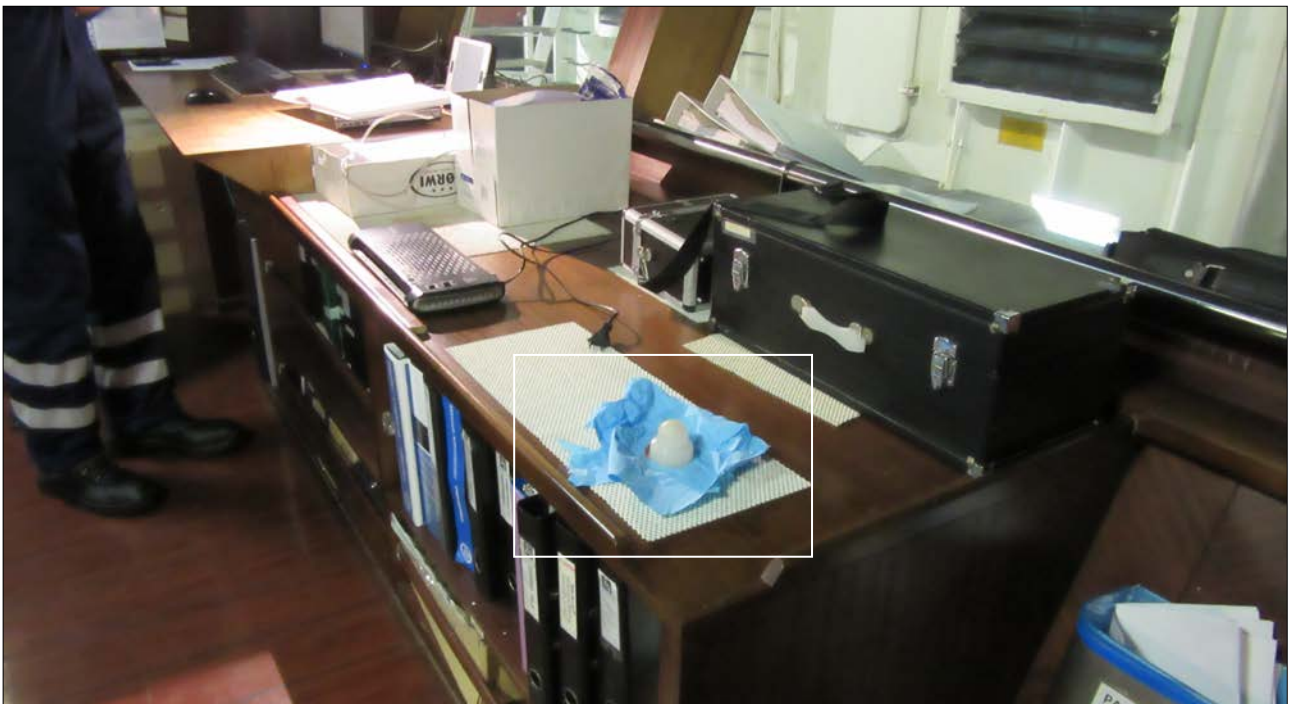


Figure 5: Picture of the light cap as it was found on the chart table
Source: DMAIB

The workplace for inspecting the starboard lifebuoy can be seen in the picture below (figure 6).



Figure 6: Overview of the workplace
Source: DMAIB

On the starboard side, where the 3rd officer's slipper was found, the guard rail was 103 cm in height with two intermediate bars with between 20 and 30 cm clear width. The buoy was mounted on a steel bracket by the passageway on the outside of the guard rail stanchion (figure 6), which made it inconvenient to access.

The only way to have a complete view of the lifebuoy was either to lean over the guard rail or to kneel on the grating to have a view between the intermediate bars. It would most likely be considered inexpedient to dismantle the smoke signal from the bracket, because it was difficult for one person to hold the device while removing the locking pin at a risk of dropping the smoke signal overboard.

The 3rd officer was 173 cm tall, which would make it difficult for him to lean over the guard rail without stepping up on the intermediate bar. It is therefore likely that the 3rd officer stepped on the intermediate bar and leaned over the guard rail in order to loosen the light cap with the purpose of inspecting the light. In that process he most likely fell overboard.

4.2 Establishing the timeframe for the accident

In the ship's deck logbook the position at 1000 was noted in the 3rd officer's handwriting, which was, according to the VDR, precisely concordant with the actual position of the ship, which means that the position was noted exactly at 1000.

SELANDIA SWAN was equipped with a voyage data recorder (VDR) that was retrieved shortly after the accident. There were three microphones on the bridge that recorded sound from each side of the bridge and from the centre conning station. An analysis of the VDR recordings indicated that, within a few minutes after he had taken over the watch, the 3rd officer was alone on the bridge. The recorded

sounds from the bridge indicate that the 3rd officer was alternating between standing by the conning station by the radar and walking around on the bridge.

At 10^h04^m50^s, sounds from the 3rd officer walking were heard.

At 10^h05^m22^s, the AB was heard entering the bridge, calling out, and shortly after speaking on the internet phone.

The bridge was equipped with a bridge watch alarm that was to be reset every 15 minutes by activating a push button. Otherwise the general alarm would be activated. Presumably the 3rd officer had fallen overboard less than 15 minutes before the master came to the bridge at 1016, because the bridge watch alarm had not been activated and the AB did not reset the watch alarm.

There was no sound on the VDR recordings indicating the exact time when the 3rd officer fell overboard. The investigation has shown that it occurred between 10^h04^m50^s when he was heard walking and within five minutes after the AB arrived on the bridge, i.e. 10^h10^m when the AB saw the slipper outside on the starboard bridge wing (figure 3) and realized that he was alone on the bridge. It is uncertain if the 3rd officer fell overboard shortly before the AB entered the bridge or while he was using the internet phone.

4.3 The lifebuoy with self-activating smoke signal

4.3.1 Description

It is a mandatory requirement in SOLAS³ that cargo ships above 500 GT on international voyages are equipped with a lifebuoy with a self-activating smoke signal that can be released from the navigation bridge. The buoy is to be used if a crewmember or passenger falls overboard, in which case the buoy is to be released into the sea where it will float, emitting orange smoke and flashing lights. It thereby aids the crew in locating the person in the water.

In order to release the lifebuoy, a handle is removed (figure 6) which holds the buoy in place. As the buoy is falling out of the holder, the weight of the buoy pulls the locking pin that holds the smoke signal in place. Both the buoy and the smoke signal are then released and fall into the sea.

The lifebuoy with self-activating smoke signal was not deployed by the crewmembers on SELANDIA SWAN during the search for the 3rd officer because it was deemed to be too late to be effective, considering the ship's speed and the time that had passed. Furthermore, the man-over-board features of the GPS and ECDIS were considered to be more effective.

The lifebuoys that were mounted on the bridge wings on board SELANDIA SWAN were of the brand Comet. They were manufactured and certified according to the standards set out by the IMO⁴, and the installation was surveyed and approved by the classification society.

4.3.2 Maintenance of the lifebuoys

The chief officer was responsible for the inspection and maintenance of the safety equipment and the 3rd officer carried out the daily work of inspection and maintenance. The 3rd officer was the only one involved in the inspection, and the other crewmembers were, therefore, not knowledgeable about the work.

³ SOLAS 74, as amended, chapter III, regulation 7.1.3.

⁴ SOLAS 74, as amended. IMO Resolution MSC 81 (70), part 1.

The maintenance system on board prompted a notification monthly that the buoy was to be inspected. However, the system did not specify *how* the buoy was to be inspected.

During the investigation no manual from the manufacturer or any other written instruction on how to go about inspecting the buoy was found. Furthermore, no spare parts for the buoys were found, which meant that, if a deficiency was found, then repairs could not be carried out. The 3rd officer had done the inspection for the past six months that he had been on board. None of the other crewmembers had observed the 3rd officer inspecting the lifebuoys.

In an information pamphlet from the manufacturer of the lifebuoys that the DMAIB has obtained it is specified that the buoys were not to be dismantled, but were to be replaced at the date of expiry, which indicates that they did not require preventive maintenance. The expiry date of the buoys on SELANDIA SWAN was November 2015.

The maintenance system stated that the buoy was due for inspection on 17 July 2015 and was therefore six days overdue at the time of the accident.

5. ANALYSIS AND CONCLUSION

5.1 The accident

The findings from the investigation have indicated that, on 23 July 2015, the 3rd officer was inspecting the lifebuoys mounted on the bridge wings while he was alone on watch on the bridge. During the inspection of the starboard lifebuoy, he accidentally lost his footing and fell overboard between 1005 and 1010 local time.

Within 15 minutes the crewmembers realized that the 3rd officer was missing and they immediately responded as if he had fallen overboard and initiated the man overboard procedures. Several ships participated in the search, but were unsuccessful in locating the 3rd officer. He was located and recovered by a rescue helicopter deployed from the Danish JRCC. Resuscitation was commenced immediately after he was recovered from the sea, but was not successful. He was pronounced dead at Aalborg University Hospital at 1619 local time.

5.2 The work routine and workplace

This occupational accident occurred during the 3rd officer's routine inspection of the lifesaving equipment. The 3rd officer had made monthly inspections of the lifebuoys since he had signed on the ship 6 months prior to the accident and was therefore familiar with the task. There is no available information about his practical approach to the task, because he was not supervised and nobody had seen him perform the job. It has not been possible to verify what motivated the 3rd officer to dismantle the light cap on the buoy while it was still in place. An inspection of the light bulb by the DMAIB showed that the bulb was intact and functioning.

There was no readily available method to verify the functioning of the buoy without dismantling it from the bracket. In lack of instructions or guidance from the preventive maintenance system, the 3rd officer had to use his own judgement. The 3rd officer presumably inspected the light and smoke signal while it was in place as it involved a certain risk of dropping the lifebuoy overboard when dismantling it for inspection. The guard rail was too high for him to lean over, and he therefore stood on the intermediate bar while doing the inspection. During the inspection he lost his footing and fell overboard.

The accident was therefore not a result of a lack of structural barriers, but rather due to the absence of clear instructions on how to go about inspecting the buoy. In the absence of instruction or guidance, he made a detailed inspection of the only item he could – namely the light. Neither the workplace nor the lifebuoy was designed for maintenance work. In order to carry out that inspection he had to climb the guard rail, thereby exposing himself to the risk of falling overboard. Presumably, he did not don a harness and fall arrester, because the risk of falling was not apparent to the 3rd officer as he was still behind the guard rail.

That the 3rd officer made the inspection during his navigational watch has not been deemed relevant for the accidental event, because it relates to general watchkeeping practises that are not directly associated with the accident.

6. PREVENTIVE MEASURES TAKEN

After the accident, the operator has implemented several preventive measures:

- The work descriptions in the maintenance systems will be revised so they are more specific in describing the work tasks during monthly and weekly inspections on components that require visible inspection.
- Two railing extensions have been mounted on the bridge wings thereby making the railing higher.
- The company has decided to limit the number of different types of lifebuoys.