



SAFETY INVESTIGATION REPORT

202001/002

REPORT NO.: 01/2021

January 2021

The Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011 prescribe that the sole objective of marine safety investigations carried out in accordance with the regulations, including analysis, conclusions, and recommendations, which either result from them or are part of the process thereof, shall be the prevention of future marine accidents and incidents through the ascertainment of causes, contributing factors and circumstances.

Moreover, it is not the purpose of marine safety investigations carried out in accordance with these regulations to apportion blame or determine civil and criminal liabilities.

NOTE

This report is not written with litigation in mind and pursuant to Regulation 13(7) of the Merchant Shipping (Accident and Incident Safety Investigation) Regulations, 2011, shall be inadmissible in any judicial proceedings whose purpose or one of whose purposes is to attribute or apportion liability or blame, unless, under prescribed conditions, a Court determines otherwise.

The report may therefore be misleading if used for purposes other than the promulgation of safety lessons.

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This safety investigation has been conducted with the assistance and cooperation of the Norwegian Safety Investigation Authority.

SUMMARY

On 02 January 2020, *Stara Planina* was steaming at reduced speed due to main engine issues, which had occurred on 01 January, and adverse weather conditions. It was noticed that mooring ropes stored on the poop deck had scattered, while some of them were hanging over the vessel's guard rails due to the inclement weather.

A party of crew members endeavoured to secure these mooring ropes. Two crew members were assisting from the poop deck, while the rest were handling the ropes on the

MV STARA PLANINA **Two manoverboards** **in position 66° 05.0' N 005° 26.3' E,** **02 January 2020**

first deck.

At one point, two consecutive, large waves washed over the poop deck, causing the two crew members working on the poop deck to fall overboard.

A search for the two crew members was carried out, involving two Search & Rescue helicopters from Norway's coast guard; however, the operation was unsuccessful.

Considering the safety actions taken by the Company, no recommendations have been made by the MSIU.



MV Stara Planina

FACTUAL INFORMATION

The vessel

Stara Planina (Figure 1) was a bulk carrier of 25,327 gross tonnage, owned by Stara Planina Shipping Limited and operated by Navigation Maritime Bulgare of Bulgaria. The vessel was built by Bulyard Shipbuilding Industry E.A.D., Bulgaria, in 2007 and was classed with Det Norske Veritas – Germanischer Lloyd (DNV-GL). The vessel had a length overall of 186.45 m and a moulded breadth of 30.00 m. *Stara Planina*'s summer draft was 11.81 m, corresponding to a summer deadweight of 42,704 metric tonnes. At the time of the occurrence, the vessel was drawing a maximum draft of 11.10 m.

Propulsive power was provided by a MAN-B&W 6S50MC Mark 7, 6-cylinder marine diesel engine, which produced 8,340 kW at 117 rpm. This drove a single, fixed-pitch propeller, enabling the vessel to reach an estimated speed of 14 knots.

Crew

Stara Planina's Minimum Safe Manning Certificate required a crew of 14. There were 19 crew members on board. All crew members were Bulgarian nationals, except for one Ukrainian. The working language on board was Bulgarian.

The master had spent 29 years at sea, 11 years of which in the rank of a master with an STCW¹ II/2 Certificate of Competence. He had obtained his Certificate in 2008. He had always served on board Company's operated ships.

The chief officer had joined *Stara Planina* on 15 November 2019 from Vila do Conde, Brazil. He had started his seafaring career in 1994 and served for about eight years as a

¹ IMO. (2010). *The Manila amendments to the annex to the International convention on standards of training, certification and watchkeeping for seafarers (STCW), 1978*. London: Author.

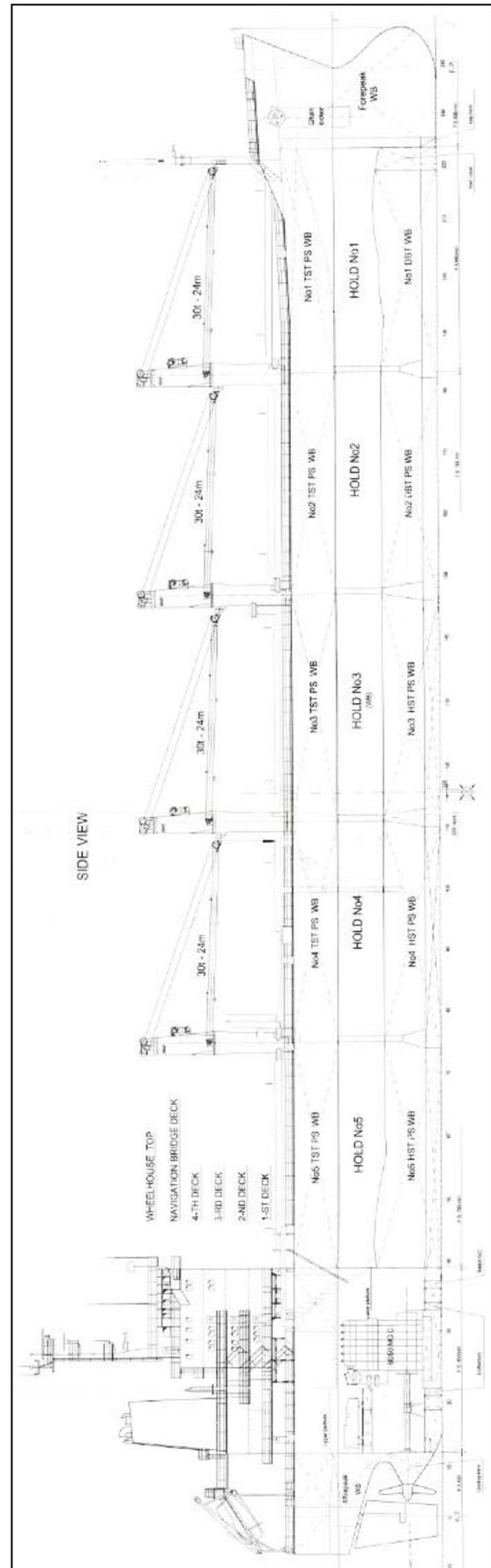


Figure 1: General arrangement of *Stara Planina*

chief officer with an STCW II/2 Certificate of Competence. He had obtained his Certificate in 2004. At sea, the chief officer kept the 0400 – 0800 watch.

The bosun had a total of 10 years of experience at sea and had been working in the rank of bosun for the previous six months. The bosun did not have any watchkeeping duties.

The deck trainee joined *Stara Planina* on 03 August 2019 from St. Petersburg, Russia. He had been on board for five months when the occurrence happened, and it was his first employment at sea. The deck trainee was not assigned any watchkeeping duties.

Environment

On 02 January 2020, several low-pressure systems were in the area of the North Atlantic and the Norwegian Sea. The wind around the time of the occurrence at *Stara Planina*'s position was reported to be coming from a Southwesterly direction with Force 10 on the Beaufort scale. The waves were recorded to have been eight metres high and approaching the vessel's bow from a West Southwesterly direction. The visibility was around five nautical miles (nm) and the sky was overcast. The air and sea temperatures were both 5 °C.

Weather forecast and the planned passage

Prior to the departure from Murmansk on 28 December 2019, the master had been expecting to pass a low-pressure system, which was moving towards the East, few nautical miles North of Murmansk.

The wind was not expected to exceed Beaufort Force 8 until 01 January, when another low-pressure system was forecast to pass close to *Stara Planina*'s planned voyage. By 02 January, it was anticipated that the vessel would reach the sheltered waters off the Eastern coast of Scotland.

Main engine malfunction

On the early morning of 01 January 2020, however, the main engine panel indicated a high temperature alarm for the cooling water system of cylinder no. 5. This was subsequently followed by an expansion tank low level alarm.

The engineers immediately investigated the alarms and concluded that a crack had developed in the cooling water jacket of cylinder no. 5. The main engine was subsequently slowed down and the cooling water supply to cylinder no. 5 was shut off.

Due to the inclement weather, the engineers could not carry out any repairs to the faulty cooling water jacket. Therefore, it was decided to continue the passage with reduced main engine revolutions and with cylinder no. 5 isolated, until sheltered waters could be reached, and the necessary repairs effected.

The vessel proceeded with her main engine running on half ahead, which in calm weather normally gave an output speed of about nine knots; however, due to the unfavourable weather conditions on the day of the occurrence, the vessel's maximum speed was recorded to be around three knots.

Narrative²

The vessel departed Murmansk on 28 December 2019, with a West Southwesterly wind reaching Beaufort Force 7. Her main engine was running on full revolutions and was able to reach an average speed of about 10 knots. The master's intention was to pass on the peripheral of the low-pressure system that was expected on 01 January 2020.

At noon time, when the vessel was still in Russian territorial waters, the heavy weather checklist was completed. This included a confirmation that all loose objects and

² Unless otherwise specified all times refer to ship's time (UTC + 3).

equipment that were located on the open decks, had been secured.

At around 0600, on 01 January 2020, an unexpected main engine malfunction necessitated the vessel to slow down. Thereafter, the vessel continued her voyage at a slower speed. By noon of the same day, the wind was recorded to have intensified to Beaufort Force 9 from a Westerly direction, with waves reaching heights of eight to 10 m. Due to the inclement weather and the main engine slow down, the vessel was only covering an average distance of about 12 nm per watch. Furthermore, it was reported that the vessel was rolling and pitching heavily.

At around 1000, on 02 January 2020, the second engineer observed loose mooring ropes around the poop deck, with some dangling over the vessel's guard rails (Figure 2). He immediately notified the third officer, who was keeping a navigational watch on the bridge, via telephone.

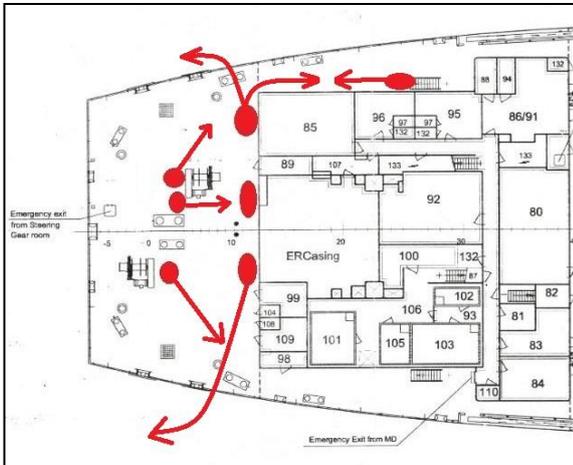


Figure 2: Poop deck. Red dots indicate the stowed position of the mooring ropes. The arrows indicate the direction that the mooring ropes were scattered

The third officer conveyed the message to the bosun. As the chief officer was resting at that time, the bosun proceeded to take advice from the master. Nonetheless, the master requested that the chief officer is informed immediately.

Reportedly, the master advised the chief officer to proceed to the area with the bosun, assess the situation and, should the need arise, cut the ropes and throw them overboard. He also advised the chief officer to conduct a verbal risk assessment before proceeding to the area.

The bosun and an OS changed into their working clothes and cold weather protective clothing, and headed towards the first deck, where they found the chief officer already there. Prior to departure, a total of seven mooring ropes on the poop deck had been secured on pallets. Figure 3 shows one of the mooring ropes secured to an adjacent fitting by means of two smaller (orange) ropes.



Figure 3: One of the mooring ropes on the poop deck, secured on a pallet and an adjacent fitting

The crew attempted to lift the ropes from the poop deck to the first deck, however this proved to be difficult. The ropes were heavy to carry and most of them were entangled with other mooring ropes. The chief officer opted to go down to the poop deck, hoping that he could facilitate the process. The chief officer's first action was to heave back on board one of the mooring ropes, which was hanging over the guard rails on port side. He then proceeded to untangle one of the mooring ropes and pass it over to the bosun and OS. Since the operation was tedious and difficult, the chief officer asked the bosun to request more assistance.

At around 1100, two ABs and the deck trainee arrived on the first deck to assist. The operation moved to the starboard side and, at one point, the deck trainee was seen on the poop deck assisting the chief officer. As the crew could not untangle two of the mooring ropes on the starboard side, the crew members secured them to the guard rails of the poop and first decks (Figure 4).

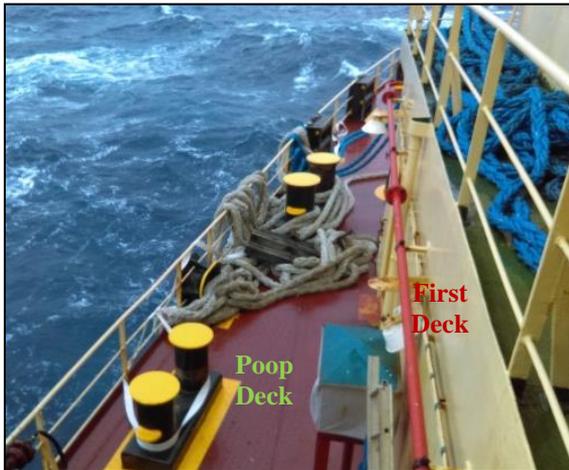


Figure 4: Situation on starboard side, two ropes secured to the railings of the poop deck, while the end of one of the ropes was hauled onto the first deck

The operation then moved to the central area of the poop deck and then back again to the port side. At these stages, both the deck trainee and the chief officer were working from the poop deck while the rest of the crew members were assisting from the first deck. At one point, the chief officer was heard telling the deck trainee that he needs to be secured with a rope.

At around 1215, the second officer and the third officer joined the deck party on the first deck, while the master took over the navigational duties of the vessel.

At around 1240, the last mooring rope was secured on the first deck. Reportedly, it was understood that the operation was now complete, and both the chief officer and the deck trainee started making their way back from the poop deck.

The crew reported that at this moment, a large wave suddenly washed over the poop deck from starboard to port sides. Unexpectedly, a second larger wave washed on board from the same direction and within seconds of the first one. Both the chief officer and the deck trainee were swept overboard. Figure 5 shows the position of the crew members at the time of the accident.



Figure 5: Simulation of the crew's location when the waves washed over the poop deck

Reports from various witnesses indicated that when the first wave struck on board, the deck trainee had proceeded to hold onto a drainpipe, while the chief officer had already made his way to the port side towards the ladder. However, soon after the second wave struck, several crew members noticed orange, winter jackets floating in the water. It soon became clear that both the chief officer and the deck trainee had been washed overboard.

Search and Rescue

The master was soon informed of the matter via telephone. The wheel was immediately ordered hard over to the port side. Due to the low speed and inclement weather conditions, it took over 20 minutes for *Stara Planina* to turn back on a reciprocal course and to proceed towards the man overboard (MOB) position.

In the meantime, the master broadcasted a PAN-PAN³ call over the VHF. Shortly after, the second and third officers arrived on the bridge and more frequent broadcasts were made over the VHF. Additionally, an MF DSC alert was sent to all stations. Soon thereafter, the broadcasts over VHF were escalated to MAYDAY⁴. Contact was also established with the Norwegian Coastguard over the satellite phone at around 1330.

A total of six lifebuoys were released overboard, including the two from the bridge wings. The liferaft embarkation ladder was also rigged on the vessel's side and crew members were posted as lookouts at several high points on the vessel.

The Norwegian Coastguard deployed two search and rescue helicopters to assist in the operation. The helicopters were able to identify two of the lifebuoys that were thrown by the vessel's crew; however, there was no sign of the two MOB's. By 2200, the search and rescue operation was terminated by the Coastguard and the ship was authorised to proceed towards her destination. However, on instructions from the Company, the vessel remained on location until 1200 of the following day.

Inconsistencies

During the safety investigation, the MSIU came across several inconsistencies on the operation on the poop deck, which could neither be clarified by the Company nor by the crew members⁵.

All crew members, who were involved in the operation, stated that both the chief officer

³ The radiotelephony PAN-PAN denotes an urgency signal and that for the time being it does not denote grave and imminent danger.

⁴ MAYDAY denotes grave and imminent danger.

⁵ This is understandable given the emergency at the time, and that there was no other reliable source of information (say, CCTV) which could be used by the MSIU and the Company to confirm the dynamics of the accident.

and the deck trainee had ropes tied around their waists (Figure 6). Most of the crew members could not confirm whether the other end of their rope was secured to the vessel during the recovery of the mooring ropes. One of the crew members stated that the rope was not secured to any part of the vessel, as the other end was noticed lying free on deck. Another crew member stated that the chief officer and the deck trainee were tied together with the same rope.

However, all crew members confirmed that when the two large waves washed over the poop deck, both the chief officer and the deck trainee were not secured to any part of the vessel⁶

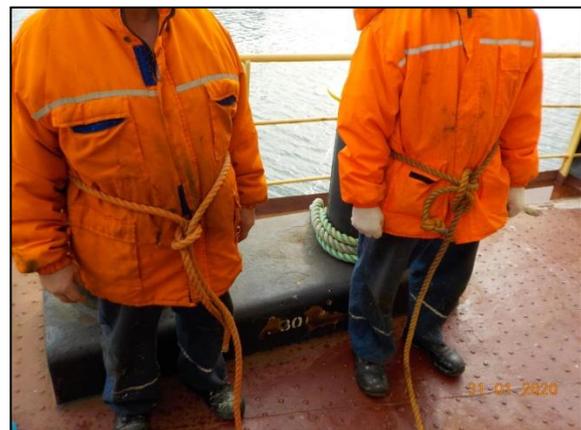


Figure 6: Simulation of how the rope was tied around the chief officer's and deck trainee's waists

Working clothes

Both the chief officer and the deck trainee were reportedly wearing boiler suits, winter jackets and trousers, safety shoes and gloves.

Industry guidelines

The UK's Code of Safe Working Practices for Merchant Seafarers (COSWP), as amended, provides guidelines for the safe

⁶ This point will be discussed in the Analysis section of this safety investigation report.

movement on board the vessel in adverse weather conditions⁷.

Section 11.12.5 of this Code states amongst others:

Any seafarers required to go on deck during adverse weather should wear a lifejacket suitable for working in, a safety harness (which can be attached to lifelines) and waterproof personal protective equipment including full head protection and should be equipped with a water-resistant UHF radio. Head-mounted torches should be considered.

Factors compromising survival in cold water

In water, the human body cools four to five times faster than in air. The initial response of the body to immersion in cold water may include the inability to hold one's breath, an involuntary gasp followed by uncontrollable breathing and the inevitable increase of stress on the heart. These responses normally last for about three minutes and are a reaction of the body to the sudden fall in skin temperature.

Long-term immersion cools the vital organs such as the heart and lungs to hypothermic levels⁸, depending on several factors, including the worn clothing. The survival time in sea water, at a temperature of 5 °C, with the immersed person wearing only working clothes, is predicted to be less than an hour⁹.

⁷ Maritime and Coastguard Agency. (2019). *Code of Safe Working Practices for Merchant Seafarers* (2015 - Amendment 4 ed.). London: TSO.

⁸ The normal core body temperature is between 36.5 °C and 37.5 °C. Hypothermia starts when the core body temperature drops to below 35 °C.

⁹ Brooks, C. J. (2001). Survival in cold water: a report prepared for Transport Canada. Retrieved from https://www.nts.gov/news/events/Documents/fishing_vessel-5-Hiscock-CBrooks-Survival-In-Cold-Water-2001.pdf

The safety investigation did not exclude the possibility of the two crew members sustaining injuries while being washed overboard. This would have compromised even more their situation in the cold water.

ANALYSIS

Aim

The purpose of a marine safety investigation is to determine the circumstances and safety factors of the accident as a basis for making recommendations, and to prevent further marine casualties or incidents from occurring in the future.

Cooperation

During the safety investigation, the MSIU received all the necessary assistance and cooperation from the Norwegian Safety Investigation Authority.

Immediate cause of the accident

Two consecutive, unexpected large waves (the second one reportedly larger than the first), washed over the poop deck where the chief officer and the deck trainee were located. Reportedly, both crew members were not secured to the vessel, given that the securing operation of the mooring ropes had been completed.

The safety investigation hypothesized that a sudden roll of the vessel was possibly induced by the waves. Furthermore, the force of the wave itself may have been too strong for the chief officer and the deck trainee to react, leading to their fall overboard.

Fatigue

Until the occurrence, all crew members' hours of rest records respected the

requirements of the STCW Code¹⁰ and MLC, 2006¹¹. The chief officer had been resting after his (0400 to 0800) morning watch, for three hours prior to being woken up by the bosun. The deck trainee had started his work at 0800, following 15 hours of rest. The MSIU, however, could not confirm the quality of their rest hours.

Nonetheless, in the absence of evidence, which could have indicated that the crew members' actions or behaviour were symptomatic of fatigue, fatigue was not considered as a contributory factor to this accident.

Storage of mooring ropes

On 28 December¹², the bosun and the chief officer made inspection rounds on deck to ensure that all weather decks were secured in preparation for the onset of the inclement weather. Amongst other things, an inspection of the garbage collection area and the aft mooring station was carried out and confirmed to be in order.

During this safety investigation, it transpired that it was customary for the aft mooring ropes to be stowed in the manner described earlier in this safety investigation report. The rationale behind this procedure was that at the aft mooring station, there were no enclosed storage spaces for the mooring ropes.

It was observed that the mooring ropes were not stored on the first deck (at a higher level than the poop deck). The bosun clarified that this would have only been carried out, if

instructed / authorised by one of the officers at management level.

However, such instructions were not discussed prior to the accident, potentially because the crew members had never experienced issues with mooring ropes being scattered on mooring platforms by green seas. Hence, the stowage of the mooring ropes at a higher level was not considered to be safety critical.

Securing of mooring ropes

The mooring ropes were secured on pallets, using two smaller ropes, and crossed and wound around a fixed structure. It was noted that the smaller ropes did not secure the mooring rope in its entirety, but only the topmost coils (Figure 3).

This procedure may have sufficed in fair weather conditions, when the movements of the vessel would have been limited. However, considering the rolling and pitching movements of the vessel in inclement weather, coupled with the wash of the waves over the poop deck from time to time, may have led to the bottom coils of the mooring ropes to slip out of the securing and scatter around the deck.

It appeared that the approach applied to secure the aft mooring ropes, did not suffice to prevent the mooring ropes from scattering around the poop deck and over the rails in the encountered adverse weather conditions.

Risk assessment and acceptance of risk

Reportedly, the first crew member at the mooring station was the chief officer. Soon after, he was joined by the bosun and the OS. Although a written risk assessment was not conducted, it was clear to the safety investigation that some form of dynamic risk assessment had been conducted by the chief officer.

¹⁰ IMO. (2010). *The Manila amendments to the annex to the International convention on standards of training, certification and watchkeeping for seafarers (STCW)*, 1978. London: Author.

¹¹ ILO. (2006). *Maritime Labour Convention*. Genève: Author.

¹² The bosun could not recollect the exact date of this operation. It was assumed that this was carried out on the same day the Company's heavy weather checklist was completed.

The first action that was taken by the chief officer was to pull the mooring rope back on board, which was hanging over the port side of the vessel. Seemingly, it was perceived that this rope posed the highest threat to the safety of the vessel, as it would have led to dire consequences, had it fouled the propeller. However, to analyse this situation and mitigate what was perceived to be a critical situation, the chief officer had no other option but to accept personal risk and proceed to the poop deck.

The chief officer's plan was to have three crew members working from the first deck, although eventually, this proved to be futile and impossible, given that the ropes were entangled and very heavy. Reportedly, the chief officer was the one interchanging between the first deck and the poop deck during this operation. At one point, more crew members were called to assist, including the deck trainee.

It was unclear when the deck trainee went down to the poop deck to assist the chief officer, however, the safety investigation was informed that at some point, the chief officer requested the deck trainee to secure himself. This was indicative that the chief officer was appreciative of the occupational risk involved. Reports confirmed that subsequently, both the chief officer and the deck trainee had ropes secured around their waists.

While the chief officer and the deck trainee were working on the poop deck, no large waves had washed over. On their way back, both the chief officer and the deck trainee released the line which they were using to secure themselves, suggesting that it was either impossible to walk back to the accommodation block with the line secured around their waists, and / or the task was considered complete and they were walking away from what was considered to be the hazardous area.

Protection against exposure to cold water

Although the air and sea temperatures were identical on the day of occurrence, as already mentioned in this safety investigation report, cold water presented a much greater risk to survival than cold air.

It was noted that both the chief officer and the deck trainee were wearing working clothes, a winter jacket and cold weather clothing. Coupled with the weather conditions in the area, their survival time in the water would have likely been considerably shortened.

A prima facie, one may argue a better chance of survival in the water, if a person is wearing head wear and several layers of clothing, especially under an immersion suit. Additionally, a lifejacket could assist the person in the water to keep still and reduce the loss of energy through movement.

However, this is not necessarily the case. Working with a lifejacket on top of the working clothes would be cumbersome. Then, the task in hand was viewed as an immediate threat to the vessel's safety and donning one of the vessel's lifejackets, and a waterproof PPE (as was indicated in the COSWP), would have either slowed or even restricted their movements, potentially creating an equally dangerous situation.

Vessel's manoeuvrability

The main engine malfunction was not considered to be a direct contributor. However, taking also into consideration the adverse weather conditions, it did reduce the much-needed available power and hence the vessel's manoeuvrability. In fact, the master attributed the long duration for the vessel to turn around (approximately 20 minutes) to the lack of power and low speed.

On the day of the occurrence, the speed of the vessel was barely reaching three knots, making it very difficult to manoeuvre and turn around. The time taken to turn around

and manoeuvre may have compromised the chance to recover the lost crew members.

Other findings

The crew used ropes around their waists. Although the plan to secure oneself had been put in practice, this did not provide the necessary protection to the two crew members. A fall of a crew member from a height, while being secured with a rope, would result in internal/external injuries in the abdominal region and back. A safety harness is designed to prevent such injuries¹³.

Additionally, it was reported that on board *Stara Planina*, there were no inflatable lifejackets. Although these are not a requirement in the SOLAS Convention¹⁴, inflatable lifejackets allow crew members more flexibility while performing the necessary tasks, without compromising their safety.

CONCLUSIONS

1. The chief officer and the deck trainee were lost overboard when unexpected waves washed over the poop deck.
2. Both the chief officer and the deck trainee were not secured to the vessel when unexpected waves washed over the poop deck.
3. The immersion in, and exposure to cold water may have shortened the survival time of the chief officer and the deck trainee.

4. The crew members were not wearing any lifejackets while working exposed on deck, in adverse weather conditions.
5. Communication on an alternative stowage arrangement of the aft mooring ropes was not considered to be safety critical.
6. It appeared that the approach applied to secure the aft mooring ropes, did not suffice to prevent the mooring ropes from scattering around the poop deck and over the rails in the encountered adverse weather conditions.
7. The chief officer and the deck trainee released the line which they were using to secure themselves, suggesting that it was either impossible to walk back to the accommodation block with the line secured around their waists, and / or the task was considered complete and they were walking away from what was considered to be the hazardous area.
8. The slow speed of the vessel due to the adverse weather conditions and the main engine malfunction made it difficult to turn around the vessel's heading in the shortest of time.
9. A regular rope was used instead of a safety harness.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION¹⁵

Navigation Maritime Bulgare have taken the following safety actions in response to this occurrence:

- a Safety Circular was circulated to all the Company's fleet;
- the case to be discussed with senior officers during ISM seminars;

¹³ During the consultation process, the Company advised that safety harnesses were available on board all Company vessels at the time of the accident. To this extent, the MSIU was unable to identify the reasons as to why these had not been used.

¹⁴ IMO. (1974). *International convention for the safety of life at sea, as amended*. London: Author.

¹⁵ **Safety actions shall not create a presumption of blame and / or liability.**

- extraordinary meetings were held on board Company vessels to bring this accident to attention to all crew;
- consideration was given to locate safer storages on board Company vessels for the forward and aft mooring ropes;
- the accident and the results from the company's safety investigation were discussed with masters and chief engineers during their pre-boarding briefings;
- meetings with all Company masters were organized to discuss the accident and to provide further proposals to avoid similar incidents in the future;
- inflatable lifejackets have been supplied to all Company vessels.

SHIP PARTICULARS

Vessel Name:	<i>Stara Planina</i>
Flag:	Malta
Classification Society:	DNV-GL
IMO Number:	9381873
Type:	Bulk Carrier
Registered Owner:	Stara Planina Shipping Ltd.
Managers:	Navigation Maritime Bulgare
Construction:	Steel
Length Overall:	186.45 m
Registered Length:	177.90 m
Gross Tonnage:	25,327
Minimum Safe Manning:	14
Authorised Cargo:	Dry bulk

VOYAGE PARTICULARS

Port of Departure:	Murmansk, Russia
Port of Arrival:	Constanta, Romania
Type of Voyage:	International Voyage
Cargo Information:	37,668 metric tonnes of fertilizer
Manning:	19

MARINE OCCURRENCE INFORMATION

Date and Time:	02 nd January 2020 at 12:40 LT
Classification of Occurrence:	Very Serious Marine Casualty
Location of Occurrence:	66° 05.0' N 005° 26.3' E
Place on Board	Poop deck
Injuries / Fatalities:	Two fatalities
Damage / Environmental Impact:	None reported
Ship Operation:	Transit
Voyage Segment:	In passage
External & Internal Environment:	The wind was blowing from South West with 44 knots of speed. Estimated wave height was recorded as 8 m high. Visibility was 5 nm with both the air and sea temperatures at 5 °C.
Persons on board:	19