



SAFETY INVESTIGATION REPORT

202209/026

REPORT NO.: 14/2023

September 2023

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 UK's Marine Accident Investigation Branch.

MT VS SALOME **Fatal overboard fall of a crew member** **while disembarking at** **Teesport anchorage** **on 26 September 2022**

SUMMARY

On 26 September 2022, the master of *VS Salome* had just signed off and was disembarking the vessel while at anchor, on to a service boat, using the port side pilot ladder. He was carrying a backpack under his inflatable lifejacket.

As he was descending the pilot ladder, he lost balance from the first step onto the next step and fell into the water. The life jacket inflated, but it took the vessel's crew and the service boat about 15 minutes to

recover him.

Despite attempts to revive him, the master died of cardio-respiratory arrest associated with cold water immersion.

Taking into consideration the safety actions taken by the Company, no recommendations have been made. Recommendations were made to the service boat owners, addressing the maintenance of FFA, and the recovery of persons falling overboard.



FACTUAL INFORMATION

The vessel

VS Salome was a Maltese-registered oil and chemical tanker of 5,039 GT. It was built in Türkiye in 2007, at the Adik Anadolou Shipyard in Tuzla. The vessel's registered owners were Valloebey Salome Ltd., and since August 2022, it was managed by Hellespont Shipmanagement GmbH & Co. KG, based in Hamburg. Bureau Veritas (BV) acted as the classification society, while American Bureau of Shipping (ABS) acted as the recognised organisation, in terms of the International Safety Management (ISM) Code, for the vessel.

The vessel had an overall length of 120.98 m, a breadth of 17.20 m, and a summer displacement of 7,915 tonnes, corresponding to a summer draft of 6.86 m. Propulsive power was provided by a MAK medium speed direct drive internal combustion diesel engine, producing 3,840 kW at 600 rpm. This drove a single, controllable pitch propeller, enabling the vessel to reach a service speed of 14.0 knots.

Manning

The Minimum Safe Manning Certificate of *VS Salome* stipulated a crew of 13 persons. At the time of the occurrence, there were 18 persons on board; 15 crew members, the outgoing master, and two Indian technicians. The crew members were Filipino nationals and the working language on board was English.

The master

The disembarking master was a 55-year-old Filipino national, holder of a valid STCW II/2 certificate of competence. He had started his seafaring career in 1990 and became a master in 2008. He had been working on small and medium sized oil and chemical tankers. The master had completed a contract of almost eight months on board,

having joined the vessel on 04 February 2022.

The master was certified as being medically fit and a medium built person with a height of 153 cm and a weight of 63 kg. At the time of the accident, he was wearing warm clothing and old working leather gloves, laced sports shoes, and an inflatable life jacket, which had a buoyancy of 150 N.

Course of events¹

VS Salome arrived at Teesport 'Whiskey anchorage' and anchored using the port anchor at 1636 on 20 September. The vessel had loaded 5,436 mt of used cooking oil at Rotterdam for discharge at Teesport and Immingham. In addition to the crew members, the vessel had two ultrasonic thickness measurement (UTM) technicians and an additional master, who was to take over command after the handover process would have been completed.

There was a delay in the vessel's berthing and as the UTM technicians had completed their assignment, it was decided to land them ashore on 26 September, using a service boat. The Company also asked the master if the relieving master had completed the familiarisation process and therefore ready to take over the command. The disembarking master confirmed that the process had been completed and that arrangements could be made for his disembarkation, together with the technicians.

At about 1117, the Company confirmed that arrangements would be made for the disembarkation of all three persons. The change in command was recorded in the deck logbook to have been completed at 1200 on 26 September, and the master set about to pack his personal effects.

¹ Unless otherwise stated, all times local time UTC +1.

The service boat *Portunus* (**Figure 2**), an ex-pilot boat operated by Cook Marine Ltd., was tasked to pick up the disembarking personnel at 1145. By 1310, it departed from the base station in Hartlepool. *Portunus* was manned by a skipper and a deckhand.



Figure 2: Service boat *Portunus*

After lunch, at about 1300, *VS Salome*'s bosun was instructed to rig the port side pilot ladder so that the personnel could disembark when the service boat arrived. After the ladder was rigged, the crew proceeded to bring the master's luggage on to the deck.

Portunus arrived off *VS Salome* at about 1336 and, observing that the sea was rough, asked the vessel to prepare the main engine so that a lee could be provided for the disembarking personnel. While the vessel's main engine was being prepared, *Portunus* passed three inflatable lifejackets to be worn before disembarkation.

The attending crew, along with the two UTM technicians, transferred the disembarking personnel's luggage on to the service boat, using a line. The bosun was then tasked to standby forward to monitor the anchor chain.

Shortly afterwards, the disembarking master arrived on deck, followed by the deck cadet,

who was carrying his backpack. The cadet asked the master if he should pass the backpack to the boat, however, the master told him that he would be carrying the backpack, and that he should assist him with putting the straps over his shoulders.

One of the ABs then asked the disembarking master if he should first send away his backpack to the service boat, but the master again replied in the negative, and that he could manage. The master was given the last inflatable lifejacket and one of the UTM technicians assisted him to don it.

By about 1356, the main engine was prepared. The disembarking master took a VHF radio from one of the ABs and asked the bridge to go 'dead slow' on the main engine and the wheel 'hard to port'. A short while later, after a lee had been achieved, the disembarking master stepped on to the first rung of the pilot ladder. A reconstruction of the positioning of the pilot ladder is shown in **Figure 3**.



Figure 3: The pilot ladder

The master was in the process of placing his left foot on the second rung, when his foot slipped, and his shoe came off. He lost his balance and fell backwards into the water between the vessel and the service boat that had yet to come alongside in a position to receive the disembarking personnel. The lifejacket inflated upon his entry in the water. On board the vessel, the manoverboard alarm was raised by the crew over the VHF radio. Crew members threw a lifebuoy with a line attached to it to the master, and encouraged him to hold on to the lifebuoy, which the master did. The main engine was also stopped.

The service boat skipper also raised the distress alarm (MAYDAY) on the VHF radio at 1358 and joined in the rescue efforts. The recovery efforts proved challenging because of the rough seas. The pilot ladder was immediately lowered to the water level for the master to hold on but, although conscious and holding on to the lifebuoy, he was unable to hold on to the ladder, when he was pulled towards it.

In the meantime, the third mate climbed down the pilot ladder to hold on to the master but had to climb back due to the sea and swell. The service boat attempted to snag the master to recover him on to the manoverboard cradle (**Figure 4**) but could not do so.

At about 1403, the service boat reported that the master had lost consciousness and was drifting under the stern of the vessel, out of sight of the crew and service boat. However, in a few minutes, the master floated clear of the vessel's stern and was caught by the service boat's boat hook and pulled towards the aft end of the service boat to recover him from the water, using the dedicated manoverboard cradle (**Figure 4**).

The master's backpack hampered his rescue as it kept getting snagged on the cradle. The skipper then climbed down on to the cradle to lift the master on it before being hoisted to

deck level at about 1413. The skipper initially checked the master for vital signs and proceeded to provide cardiopulmonary resuscitation (CPR), while he directed the deck hand to proceed to the lifeboat station, which was better equipped to deal with such an emergency.



Figure 4: Manoverboard rescue cradle

It took *Portunus* about 15 minutes to reach the lifeboat station, where paramedics took over. The master did not survive and was pronounced dead shortly afterwards.

Following the accident, a random alcohol test was carried out on the crew members. All tests returned negative readings.

Cause of death

It was reported that a forensic postmortem took place at James Cook University Hospital on Tuesday, 27 September. The preliminary cause of death was recorded as cardio-respiratory arrest.

No injuries were noted and there were no definitive features of drowning. Moreover, there were no features to indicate that death was due to something other than immersion in cold water.

Environment

At the time of the accident, the sea was rough. The winds were from the Northwest, Beaufort Force 7 with a two-metre swell. Visibility was good and the air and sea temperature were both 13 °C. *VS Salome* was generally stable at the time of transfer.

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 this safety investigation, the MSIU received all the necessary assistance and cooperation from the UK's Marine Accident Investigation Branch.

Cause of the accident

The loss of the master's left shoe suggested that while descending the pilot ladder, his left foot did not make full contact with the depth of the second ladder rung, possibly triggering the loss of balance.

It also appeared that when he was descending on to the second rung, he lost his shoe and balance when he was in the process of transferring his weight from the right leg on to the left leg. The loss of balance was more than likely to have been caused by the heavy backpack that weighed just over 10 kg. This would have exacerbated his situation to recover his balance. Moreover, it also explained the eyewitness' accounts that when the master let go of his right hand (that was holding on to the right stanchion), he pivoted to the left, and fell backwards.

The safety investigation also considered an alternative scenario where, while descending the ladder, the master may have inadvertently stepped on to the rubbing strake (**Figures 3 and 5**) that had a round profile and protruded by about 8 cm from the hull. It was observed that although the pilot ladder steps rested firmly, the steps were held off the ship side because of the rubbing strakes, which may be also viewed as a trip hazard.

However, a closer inspection of the pilot ladder led to the exclusion of this scenario. It appeared to be an unlikely one because the distance between the rubbing strake and the first rung was too narrow for the master to accidentally insert his foot on the rubbing strake instead of the ladder rung (**Figure 3**). The crew members witnessing the accident recalled that it was the loss of the master's left shoe which had led him becoming unbalanced and, unable to regain it back, he fell backwards.

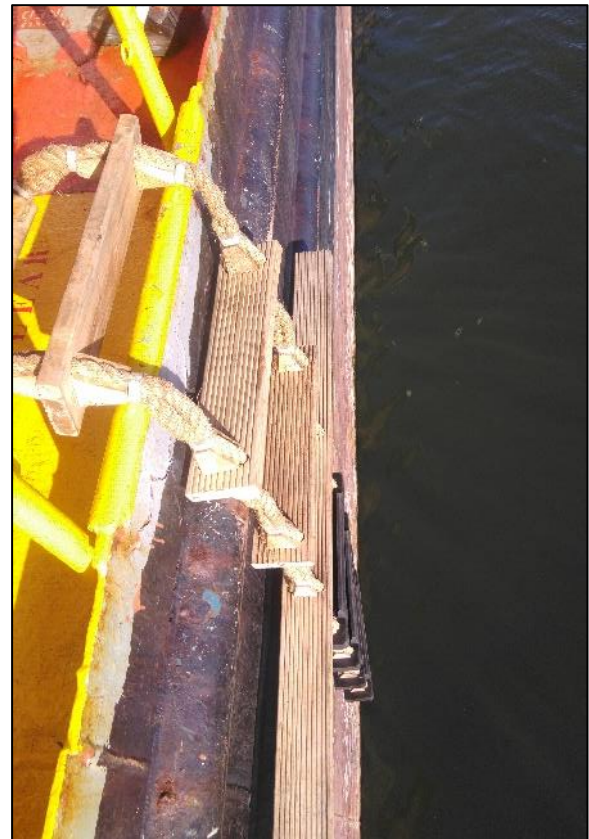


Figure 5: View of the pilot ladder from top

Considering the physical condition of the pilot ladder, which had been installed in June 2022 and the eyewitness accounts, the safety investigation also excluded the possibility that the accident had occurred due to the condition of the ladder, and / or the way it had been rigged.

Eyewitnesses observed that the master stepped on to the pilot ladder before the service boat was able to receive the disembarking personal. The safety investigation analysed these actions to understand the rationale behind this. Two possible scenarios were hypothesised:

1. the master was fully aware of the condition of the swell and his stepping on the ladder would have minimised the time, which *Portunus* would have had to spend alongside to receive him; and
2. the action of stepping on the pilot ladder may have been the master's signalling to the service boat skipper that he was ready to disembark the vessel.

Inflatable lifejacket

The inflatable lifejacket activated as soon as the master entered the water. However, there were several issues on how the life jacket had been donned. The safety investigation determined that the crotch strap had not been secured, as required.

The lifejacket had been donned over the backpack, which resulted in two safety considerations. Due to the bulkiness of the backpack worn by the master, the crotch line could not be made fast (**Figures 6 and 7**)².



Figure 6: Back straps of the lifejacket

With no crotch strap made fast, when inflated, the lifejacket would just ride upwards and possibly obstruct the face, resulting in either breathing difficulties, or water inhalation.

The second issue was that once the lifejacket became inflated, to release the extra weight of the wet backpack and its contents, the master would not have been able to release it without first removing his life jacket.

However, the most significant backpack issue in this case, was that it hampered the rescue efforts during the attempts to pull the casualty on the manoverboard cradle.

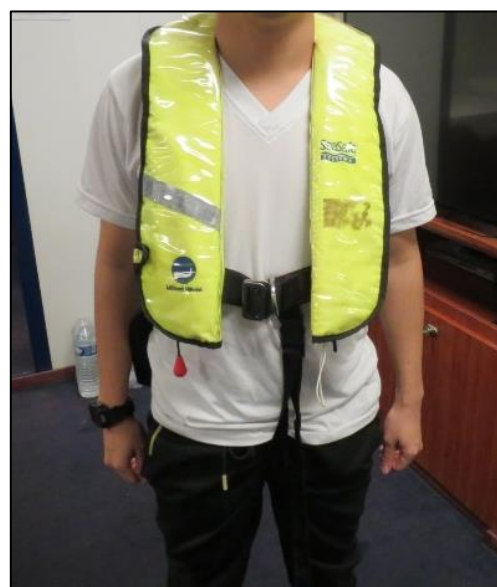


Figure 7: View from forward

² **Figures 6 and 7** show the proper way to don an inflatable lifejacket but do not show how the master's backpack would have interfered with the lifejacket and the prevention of the crotch strap from being secured.

Cold water immersion

Literature classifies drowning into two main events – immersion (upper airway is above water) and submersion (upper airway is under water). Information available suggested that the master was exposed to the effects of immersion. Effects of immersion include cardiorespiratory responses to skin and deep body temperature, including cold shock and physical incapability³.

Three stages occur when a body is exposed to cold water immersion:

1. cold shock due to skin cooling;
2. cooling of superficial nerves and muscles in the limbs; and
3. hypothermia, which is the cooling of deep body tissues, followed by loss of consciousness.

The indications were that the master succumbed to cold water immersion.

The inflatable lifejacket as a protective safety barrier system

The master had to disembark the vessel after the relieving master had observed two loading and discharging operations, given that he was new to the Company. He was expecting to disembark on completion of the discharging operation at Teesport although eventually, the disembarkation took place when the vessel was still at anchor.

The safety investigation analysed the disembarkation of the master and identified three potential factors, which had a critical role in the outcome of this event:

1. the interference of the backpack with the lifejacket;
2. the protective clothing worn by the master before and during his disembarkation; and

³ Bierens, J. J. L. M., Lunetta, P., Tipton, M., & Warner, D. S. (2016). Physiology of drowning. *Physiology*, 31(2), 147-166. <https://doi.org/10.1152/physiol.00002.2015>

3. additional protection against cold water exposure.

The vessel's risk assessment related to the crew's disembarkation using the pilot ladder identified "*proper training on wearing the life jacket / life vest making sure it is properly secured before ascending and descending on the ladder,*" as a control measure. The safety investigation was unable to confirm whether the master had sighted this risk assessment or not at some point during his time on board.

However, the matter under consideration goes beyond the actual paperwork related to this risk assessment. Several crew members who had participated in the risk assessment were present on deck when the master was about to step on the pilot ladder. None of them remarked on the fact that the lifejacket's crotch strap had not been made fast.

Like any other safety critical domain, safety on board relies significantly on teamwork, interactions, and dynamics⁴. The safety investigation had no information on the leadership style which had been adopted by the master during the time he was in command of the vessel. However, there was no information, which could have suggested that this lack of communication was a consequence of excessive power differential, affecting the crew members' psychological safety⁵.

⁴ Gregory, M. E., Hughes, A. M., Benishek, L. E., Sonesh, S. C., Lazzara, E. H., Woodard, L. D., & Salas, E. (2021). Toward the development of the perfect medical team: critical components for adaptation. *Journal of Patient Safety*, 17(2), e47-e70. <https://doi.org/10.1097/PTS.0000000000000598>

⁵ Safety literature defines 'psychological safety' as the amount of comfort that members of a team have with speaking up, asking questions, and voicing their concern, without fearing negative consequences.

The inflatable lifejacket was intended to protect the master from submersion - which it did. However, drowning by submersion was not the only hazardous element, which persons must mitigate once they find themselves in the water. Immersion and exposure to very cold water was another hazard for which, the life jacket would not provide any protection in the eventuality of an overboard fall.

It remained unclear to the safety investigation as to why the crew members were selective on the type of protection to be worn, given that in the eventuality of a manoverboard situation, the hazards of hypothermia and drowning are closely related. Moreover, the safety investigation did not consider this as a case of risk prioritisation, since the risk associated with hypothermia was not addressed at all.

Notwithstanding that the risk of an overboard fall and hypothermia are closely related (to the extent that the former may lead to the latter), the fact that the lifejacket was donned over the backpack, suggested that the crew members (including the master) either considered the risk of falling overboard as rather remote, or there was no perceived unacceptable risk to personal safety; hence, the wearing of the lifejacket was perhaps more of a formality rather than due to the concern of an overboard fall.

The temperature to which the body is exposed, and the duration of that exposure, are part of the equation which determines the extent of risk of hypothermia. Whilst clothing can be considered as a passive protection barrier system against hypothermia, active protection barrier systems⁶ were not available to reduce the risks of hypothermia, albeit that there may be

⁶ An example of an active protection barrier system would be an inflatable wet weather jacket. A wet weather jacket is a weatherproof coat with an integrated inflatable lifejacket. It is not watertight and therefore, it only reduces the risk of hypothermia.

no approval / legal requirement for their carriage.

It was evidently clear that the retrieval of the master from the cold water was problematic – perhaps more than expected. Then, the prevailing weather conditions were of no help during the recovery of the master from the water. The safety investigation believes that the issue of hypothermia was multifaceted. The master may have been wearing warm clothes. However, his initial actions upon entering the water and the additional weight of the backpack and its contents, would have exacerbated flushing⁷, leading to limited use of his limbs and hands, and eventually the ability to grab and hold on to flotation devices.

Under such circumstances, a manoverboard rescue pole would have been of significant help to recover the master and pull him towards the rescue cradle – even when he started losing the use of his limbs due to hypothermia.

Disembarking at anchor

Whilst the embarkation / disembarkation at anchor carries an elevated degree of risk in comparison to a disembarkation when the vessel is alongside, the master's fall was not attributed to the vessel's motion in the rough seas.

The decision of the master to disembark at anchor cannot be analysed in isolation. A post-accident reconstruction of the events may easily lead to a conclusion that his choice to descend the pilot ladder was an irrational one, and which he could have avoided.

⁷ Flushing is the process of cold water penetrating through the clothing. It is one of the main causes of body temperature drop.

However, the safety investigation has considered various (contextual) factors⁸, which may have led to the master's (and technicians') decision to disembark at anchor rather than alongside:

1. the technicians had completed their tasks on board;
2. the handover process had been completed with the other master;
3. a lee had been provided to the vessel;
4. the delay in the vessel's berthing;
5. the sense of commitment to disembark (once arrangements for the service boat had been made); and
6. the type of vessel (it is not uncommon for crew changes on tankers to be affected offshore rather than inside terminals).

Clearly related to the master's decision to disembark at anchor showed acceptance of an elevated risk. The way risk is perceived will affect the understanding of risk and, of course, whilst the measures taken (*e.g.*, wearing an inflatable lifejacket) would have appeared to be objective, the measures would not be more objective than the risk itself. This is mainly due to contextual factors which influence one's perception of risk (perceived risk *vs.* actual risk), its assessment, and eventual decisions made.

Other findings

The safety investigation established that the life jacket had not been serviced since June 2016. Whilst the postponement of any service is discouraged, the physical condition of the lifejacket was not determined to be contributory to the accident, given that it had inflated as designed upon the master's entry into the water.

CONCLUSIONS

1. The master lost his balance while descending and transferring his weight from the right leg on to the left leg. His left leg slipped on the second rung, lost his shoe and eventually his balance. The loss of balance was likely to have been exacerbated by the heavy backpack he was carrying.
2. The safety investigation determined and excluded the possibility that the accident had occurred due to either the condition of the ladder or that it had been incorrectly rigged.
3. The inflatable lifejacket would not have supported the master fully as the crotch strap had not been secured.
4. The heavy, wet backpack worn under the lifejacket would have exacerbating the flushing process.
5. The backpack also hindered the master's recovery from the water.
6. Although the life jacket inflated as designed and that this was not contributory to the accident, the safety investigation determined that it had not been serviced since June 2016.

SAFETY ACTIONS TAKEN DURING THE COURSE OF THE SAFETY INVESTIGATION⁹

During the safety investigation, the Company has taken the following safety actions:

- The pilot boarding position of the vessel has been reviewed and modified (**Figure 8**);

⁸ Similar to behaviour-generating mechanisms.

⁹ **Safety actions and recommendations shall not create a presumption of blame and / or liability.**

- Company procedures for the use of pilot ladder by the crew and other visitors have been reviewed and amended to address:
 - PPE;
 - general clothing;
 - weather limits and parameters to conduct personal transfer at anchorage;
 - transferred luggage and backpacks; and
 - general responsibilities.
- A risk standardised template for a risk assessment has been developed and included in the Company's risk assessment library for use by all ships prior to any personnel transfer;
- Information on the accident was distributed to all Company managed vessels as a Safety Bulletin.

RECOMMENDATIONS

After taking into consideration the safety actions taken by Hellespont Ship Management GmbH & Co. KG, no recommendations were made to the Company.

Cook Marine Ltd. is recommended to:

14/2023_R1 ensure that the inflatable lifejacket carried are regularly serviced in accordance with manufacturers recommendations.

14/2023_R2 consider keeping on board a manoverboard rescue pole.



Figure 8: alterations to the vessel's shipsides, showing the removal of the rubbing strakes in way of the starboard side pilot station

SHIP PARTICULARS

Vessel Name:	<i>VS Salome</i>
Flag:	Malta
Classification Society:	Bureau Veritas (BV)
IMO Number:	9382114
Type:	Oil / Chemical tanker IMO (II)
Registered Owner:	Valloebly Salome Ltd
Managers:	Hellespont Ship Management GmbH & Co. KG
Construction:	Steel
Length Overall:	120.98 m
Registered Length:	115.38 m
Gross Tonnage:	5,039
Minimum Safe Manning:	13
Authorised Cargo:	Yes

VOYAGE PARTICULARS

Port of Departure:	Rotterdam, The Netherlands
Port of Arrival:	Teesport, UK
Type of Voyage:	International
Cargo Information:	5,500 mt of used cooking oil
Manning:	16

MARINE OCCURRENCE INFORMATION

Date and Time:	26 September 2022 at about 13:54 (LT)
Classification of Occurrence:	Serious Marine Casualty
Location of Occurrence:	Teesport anchorage
Place on Board	Port side pilot ladder
Injuries / Fatalities:	One fatality
Damage / Environmental Impact:	None reported
Ship Operation:	At anchor
Voyage Segment:	At anchor
External & Internal Environment:	Northwesterly near gale; Swell 2.0 m. Visibility was good and the air and sea temperature were both 13 °C.
Persons on board:	18