Report of investigation into Man-overboard and death of the Bosun on board Hong Kong registered bulk carrier *Medi Salerno* in Chang Jiang Kou, Shanghai, China on 20 March 2012


**Purpose of Investigation**

The purpose of this investigation conducted by the Marine Accident Investigation and Shipping Security Policy Branch (MAISSPB) of Marine Department, in pursuant to the Merchant Shipping Ordinance Cap. 281, Shipping and Port Control Ordinance (Cap. 313), Merchant Shipping (Local Vessels) Ordinance (Cap. 548), as appropriate, is to determine the circumstances and the causes of the incident with the aim of improving the safety of life at sea and avoiding similar incident in future.

The conclusions drawn in this report are aimed to identify the different factors contributing to the incident. They are not intended to apportion blame or liability to wards any particular organization or individual except so far as necessary to achieve the said purpose.

The MAISSPB has no involvement in any prosecution or disciplinary action that may be taken by the Marine Department resulting from this incident.
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1. Summary

1.1 At about 2158 hrs. on 20 March 2012, the pilot onboard the Hong Kong registered bulk carrier vessel *Medi Salerno* disembarked at 31° 02.418'N 122° 12.259'E around Chang Jiang Kou, Shanghai, China. The vessel continued its voyage to Samarinda, Indonesia. The Bosun, who was engaged in the recovering operation of the pilot combination ladder at the starboard side of the vessel, fell overboard. He could not be found despite the immediate search and rescue operations carried out after the incident. His body was later found in the water near Caiyuan town, China at about 1150 hrs. on 13 April 2012.

1.2 The accident occurred after sun set and it was dark at night. A northwest wind of Beaufort scale force six was blowing. The swell was moderate at about 3 meters in length. The air temperature was 8 degree Celsius. The visibility was 10 nautical miles.

1.3 The investigation reveals the main contributing factors to the accident are that:-

a) the Bosun did not follow company’s safety procedures for rigging up the accommodation ladder;

b) the maintenance instruction of the accommodation ladder relating to the length of steel wire to be used was not followed; and

c) the two air hoses, which had no markings, between the air motor and the control station could be wrongly connected, thus causing a reversal on the movement of the accommodation ladder (i.e heaving instead of lowering, or vice versa).
2. Description of the vessel Medi Salerno

2.1 Ship Information

Flag: Hong Kong, China
Port of Registry: Hong Kong
IMO No.: 9389239
Call Sign: VREM4
Type: Bulker Carrier
Keel Laid Year: 2008
Gross Tonnage: 43,408
Deadweight: 81,702
Length (Overall): 225 m
Main Engine: 1 x MITSUI Man B&W 6S60MC-C
Engine Output (M.C.R.): 12,100 kW
Cruising speed: 14.6 knots
Classification Society: NK (Nippon Kaiji Kyokai)
Shipbuilder: MITISUI ENG.&SHIPBUILDING CO. LTD
Registered Owner: Ocean Transit Carrier S.A. Hong Kong
Management Company: Anglo-Eastern Management Ltd. (Hong Kong)
Operator: BAONYK
Persons on board: 22

2.2 The vessel was manned by a Master, 4 deck officers, 5 engineers and 12 ratings at the time of the accident. The nationalities of the crew were Chinese.
Figure 1 – Medi Salerno
3. Evidence

3.1 Report of investigation conducted by the company and supplementary information provided by the ship management company of the vessel.
4. **Outline of events**

All times stated in the report were local time.

4.1 At about 1540 hrs. on 19 March 2012, Medi Salerno (the *vessel*) departed the shipyard after completed hull repair. At about 1722 hrs on the same day, she anchored at the Chong Ming anchorage waiting for bunkering to be carried out in the morning of 20 March 2012.

4.2 At 1520 hrs on 20 March 2012, the vessel sailed out of the anchorage for Samarinda, Indonesia with pilot on board. After the pilot disembarked the vessel at about 2154 hrs in Chang Jiang Kow, Shanghai, China at approximately 31° 02.418’N 122° 12.259’E, the Bosun, Deck Cadet and two Ordinary Seamen (OS1 and OS2) started to recover the accommodation ladder and the pilot ladder on her starboard side.

4.3 While the vessel was underway, the Bosun went down to the platform at the lower end of the accommodation ladder and disconnected the latching tool which secured the pilot ladder to the accommodation ladder (Figure 2). Neither did he harness himself to a lifeline nor wearing a lifejacket while performing this duty. At the same time, the Deck Cadet and two OSs (OS1 and OS2) disconnected the ropes that weaved through the stanchions. Thereafter the Deck Cadet stood-by at the control station waiting for instruction from the Bosun to heave up the Pilot Combination Ladder.

![Figure 2 – Diagram showing the position of the Bosun](image-url)
After the Bosun pulled up the lower section of the pilot ladder and placed it on the platform where he stood, he asked the Deck Cadet to heave up the accommodation ladder, but the ladder moved down instead. He asked the Deck Cadet to check and ensure that the control lever was operated correctly. The Deck Cadet stopped hoisting the ladder, checked and confirmed to the Bosun that he did operate the control lever in the correct manner. The Bosun asked the Deck Cadet to heave the accommodation ladder up again. However, the ladder was still moving down as the Deck Cadet operated the control lever. The Deck Cadet then stopped the operation immediately but the Bosun ordered him to continue. The Deck Cadet moved the control lever slightly in the hoisting position but the ladder was still moving down. He stopped the operation immediately.

At this moment, the OS1 found the accommodation ladder shaking and all three of them heard a banging noise. They soon found the accommodation ladder hanging vertically and the Bosun was nowhere in sight. They suspected that the Bosun have fallen into the sea. The OS1 found a lifebuoy with light and threw it into the water. As the Deck Cadet and OS2 did not have a walkie-talkie with them, they ran back to the crew accommodation and informed the bridge of the accident by phone.

At about 2158 hrs, the Chief Officer received the alert of a man fallen overboard, but the man-overboard buoy was not released. The Deck Cadet pointed to him the approximate direction relative to the vessel where the Bosun had fallen. In the darkness of night, he could not see the Bosun in the water.

The vessel immediately altered course to starboard. The incident was reported to the Shanghai Vessel Traffic Services (VTS) and the pilot speed boat was requested to assist in the search and carried out a rescue operation of the missing Bosun. By 2206 hrs, the rescue boat of the vessel was also launched into the water and preceded towards the approximate position where the Bosun had fallen. The Master of the vessel coordinated the SAR operation in the wheelhouse using hand-held radios. Two more speedboats deployed from the pilot arrived at the scene to assist the SAR operation. At 2218 hrs, the Master of the vessel informed the Shanghai Maritime Safety Administration and requested for further assistance.

At 0100 hrs on 21 March 2012, the rescue boat was retrieved by the vessel. At 0216 hrs, the Master of the vessel was instructed by the Shanghai Vessel Traffic Services to drop anchor at position 30° 56.99’N 122° 20.767’E and maintain radio contact with the Administration.

At 1142 hrs on 21 March 2012, the vessel was permitted by the Shanghai MSA to continue her voyage to Samarinda, Indonesia.

On 13 April 2012 at about 1150 hours, the body of the Bosun was found in the water near Caiyuan town, China. He was certified dead and no autopsy was carried out.
5. Analysis

Crew members engaged in operating of the accommodation ladder

5.1 The Bosun and the two Ordinary Seamen (OS1 and OS2) joined the vessel on 16 March 2012, that was four days before the incident. This was the Bosun’s fifth contract with the same ship management company. The Bosun should be proficient in rigging the accommodation ladder. He was introduced to the operation of the Pilot Combination Ladder during the handing-over four days ago.

5.2 At the time of the accident, the Deck Cadet had already worked on board the vessel for seven months. Despite that it was his first ship, he should have gained sufficient experience in operating the Pilot Combination Ladder by the time the accident occurred.

5.3 The company had English manuals and guidelines for the rigging of accommodation ladders which also included the rigging of the combination of accommodation and pilot ladders.

5.4 It was the first time the four crew members working together to rig the accommodation ladder. There was no evidence to show that there was a communication problem between the crew members as all of them were of the same nationality. The Deck Cadet, Bosun, OS1 and OS2 were instructed by the Chief Officer to standby for the hoisting of the Pilot Combination Ladder.

5.5 The Bosun and two OSs were certified by medical practitioners to be medically fit for service on board ship on 29 February 2012 prior to joining the vessel. There was no evidence to show that the Bosun was not healthy at the time of the accident.

5.6 The vessel was at anchor for bunkering a day before the accident, the crew should have sufficient rest and were not fatigue at work.

Pilot combination ladders boarding arrangement

5.7 The pilot combination ladder boarding arrangement of the vessel is shown in Figure 3.

5.8 A portable air motor was used to operate the davit winch for the hoisting and lowering of the accommodation ladder which weighted about 1600 kg. The pneumatic air system for the davit winch is shown in Figure 4. The system consisted of a control station and a davit winch. The davit winch was driven by a portable air motor which tapped its supply of air from the control station by rubber hoses. The air pressure to drive the air motor was 6.0 bars. The air to the control station was supplied from the air receivers in the engine room.
The arrangement for connecting the control station with the portable air motor is shown in Figure 5. When the control lever on the control station (Figure 6) is placed in the neutral (middle) position, no compressed air will flow to the air motor. If the control lever is turned in the anti-clockwise direction, compressed air will flow to the air motor which drives the davit winch for the hoisting the accommodation ladder. When the lever is turned in the clockwise direction, the davit winch will lower the ladder.
**Operation of the combination ladders boarding arrangement**

5.10 The accommodation ladder was locked in the upright position by hook-bolts (Figure 7). Before lowering the accommodation ladder, these hook-bolts were removed first. The wires were slackened by turning the control valve in the clockwise direction. The accommodation ladder was lowered from the stowage position to its normal launching position by its own weight. The control lever was returned to the neutral position when the accommodation ladder laid flat and positioned in parallel with the main deck.

![Image of Winch and Control Station](image)

**Figure 5 – control station for the winch**

![Image of Directional Control Valve](image)

**Figure 6 – the directional control valve**
The crew then stepped onto the ladder to set up the stanchions and inserted the ropes through them before lowering the ladder down the ship side to its operational level. The maximum angle of inclination of the ladder was $55^\circ$ from the horizontal. There were no limit switches and/or alarms to prevent the excessive lowering of the ladder. Thus, the crew did not know whether or not the accommodation ladder had been lowered down to the limited angle of inclination of $55^\circ$ from the horizontal.

On the davit, a wire running through a series of pulleys was used to hoist or lower the accommodation ladder. Figure 8 illustrates the winch and the pulley system on the davit for operating the accommodation ladder.
5.13 The pilot ladder, which hanged vertically from the main deck, was latched to the accommodation ladder to prevent it from moving during the embarkation and disembarkation of pilot by means of a latching tool, which was found broken after the incident. It is probable that when the ladder was lowered beyond the latching point, the weight of the ladder transferred from the hoisting wire to the latching tool. The latching tool connection was broken by the applied force. When the latching tool broke, the resulting shock load on the wire was suspected to have caused fixed end of the wire to come off from its anchoring point rendered the free end of the accommodation ladder to fall and generated a loud banging noise. The accommodation ladder finally came to rest in a vertically position and suspended on its hinge situated underneath the upper platform of the ladder.

5.14 In this incident, after the pilot disembarked the vessel, the Bosun went down to the lower perform of the accommodation ladder to detach the latching tool while the ropes and stanchions were removed by the two OSs and the Deck Cadet. The Cadet then went back to operate the accommodation ladder at the control station. The Bosun asked the Deck Cadet to heave up the ladder but found that it was lowering instead. The Deck Cadet checked and confirmed that he had operated the control lever correctly.

5.15 The investigation into the accident conducted by the company found that the two air hoses connecting to the air motor might have been interchanged. Then, it would be possible to operate the winch in the reversed direction even though the control lever of the directional control valve was operated correctly. Among the four crew members engaged in the operation at the time of the accident on 20 March 2012, only the Deck Cadet was familiar with the connection of the hoses. It was said that the Cadet rigged the air motor and the air hoses.

5.16 However, if the air motor had been mistakenly connected by the Deck Cadet in the first place before rigging the ladders for picking up the pilot at 1530 hrs on 20 March 2013, he should have noticed the discrepancy during the operation of the directional control valve when he lowered the ladder.

5.17 The position of the ladders had not been changed on the day after the pilot disembarked the vessel. However, it was not certain whether the air motor had been removed and reconnected again for the recovery of the Pilot Combination Ladder.

5.18 If the Deck Cadet was the person to rig the air motor and lower the accommodation ladder, it was hard to believe that he did not notice the wrong connection when lowering the accommodation ladder and forgot the abnormalities found in this operation after six hours. Therefore, there were the possibilities that the air motor had been removed and was not reconnected by the Cadet or that he was not the one who rigged and lowered the accommodation ladder. The fact that the air motor was portable would mean that it could be used in other places. Nevertheless, it was quite probable that the incorrect connection of the air hoses
was the cause to the accident.

5.19 After the accident, the company had implemented the corrective action to colour-coded the air hoses connecting the air motor with the control stand (see Figure 5). However, this remedial action might not prevent the same mistake to happen again as the colours would fade after the hoses were used many times. Also a person not familiar with the operation of the vessel would not know the significance of matching the colour hoses when connecting them.

**Maintenance of the accommodation ladder**

5.20 The accommodation ladder was load tested on 18 August 2008 upon delivery of the vessel. Inspection of the steel wire of the accommodation ladder davit winch by the management company after the incident revealed that the length of wire rope was 55 meters long instead of 67 meters as required by the manufacturer of the davit. It was found that one end of the steel wire was distinctly bent while the other end was still straight indicating that the bent end was anchored properly while the straight end was not anchored properly to the winch drum (Figure 9).

![Bent and Straight End of Steel Wire with Wire Anchoring Point](image)

*Figure 9 – The ends of the steel wire and the anchoring of the wire to wire drum*

5.21 The instruction from the accommodation ladder davit winch manufacturer also requires that when replacing wire ropes to ensure that wire of the specified length must be used. Even though the ladder is lowered to its lowest level, there must be at least 2 winds of wire left on the drum.

5.22 The freeboard of the vessel was high on ballast voyage (due to no cargo on board). The angle of inclination of the accommodation ladder would be quite large and properly close to 55° from the horizontal. Under such circumstance, when the accommodation ladder was not operated correctly (i.e. lowering down of the ladder instead of heaving), the steel wire could have been totally unwound from the drums (i.e before the angle of inclination of the accommodation ladder reaching 55° from the horizontal) and the shock load coming from the broken
latching tool could easily pull the steel wire off the drum when the end of the steel wire was not anchored properly. As a result, the davit system failed and the accommodation ladder ended up hanging vertically.

5.23 It was quite probable that the steel wire not anchored properly to the wire drum might also contribute to the accident.

5.24 After the accident, the company checked the lengths of all accommodation ladder wires and their connections to the wire drums and ensure their conformance with the requirements of the equipment manufacturer.

Weather Conditions

5.25 According to the record of the vessel, at the time of accident, it was dark at night. The wind was northwesterly at Beaufort scale force six and the swell was moderate of 3 meters length. The air temperature was 8 degree Celsius. Although the visibility was 10 nautical miles, the dark surrounding environment affected the rescue of the Bosun. The sea temperature was low which also reduced the Bosun’s chance of survival under the circumstances.

Safe working procedures for rigging of the ladder

5.26 According to the company’s health and safety manual for the rigging of accommodation and/or pilot ladders, a crew should not be working alone. They should wear an inflatable lifejacket and safety harness or life-line. The manufacturer’s instruction also stipulated that no person should be on the accommodation ladder when it was hoisted or lowered.

5.27 In this incident, the Bosun was standing on the ladder while asking the Deck Cadet to hoist the accommodation ladder. He did not use a safety hardness or a life-line and did not wear a lifejacket while working over the shipside. The practice of pulling the pilot ladder onto the accommodation ladder and hoisting them together with the accommodation ladder might overload the accommodation ladder winching system. This might not be considered as a good practice without a proper assessment of the risks associated with the operation.

5.28 The Deck Cadet was familiar with the company’s safety procedures for the rigging of accommodation ladder. However, in this incident, the Deck Cadet probably for fear of insubordination did not remind the Bosun of the proper company’s safety procedures for working on the accommodation ladder.

5.29 At the time of the incident, only the Bosun was provided with a walkie-talkie to communicate with the officers in the wheelhouse and he could not communicate with his team through it during the operation. He had to yell loudly to the Deck Cadet to instruct him to operate the winch system. When the vessel was sailing at sea, the lack of a communication tool made it difficult for members of the team to communicate effectively with each other under the situation.
After the accident, the company had arranged safety training for all their crew on the precautionary measures to be taken when working over the shipside. A fleet-wide message was sent to share the lessons learnt requiring all ships’ crew to the use lifeline and harness when rigging gangway.
Conclusions

6.1 At about 2158 hrs on 20 March 2012, the pilot onboard the Hong Kong registered bulk carrier vessel Med Salerno disembarked at 31° 02.418'N 122° 12.259'E around Chang Jiang Kou, Shanghai, China. The vessel continued its voyage to Samarinda, Indonesia. The Bosun, who was engaged in the recovering operation of the accommodation and the pilot ladders at the starboard side of the vessel, fell overboard. He could not be found despite the immediate search and rescue operations carried out after the incident. His body was later found in the water near Caiyuan town, China at about 1150 hours on 13 April 2012.

6.2 The accident occurred after sun set and it was dark at night. A northwest wind of Beaufort scale force six was blowing. The swell was moderate at about 3 meters in length. The air temperature was 8 degree Celsius. The visibility was 10 nautical miles.

6.3 The investigation revealed that the main contributing factors to the accident were:

a) the Bosun did not follow the company’s safety procedure for rigging the accommodation ladder:
   • the Bosun should not work on the ladder when it was being operated;
   • the Bosun should use life-line and wear lifejacket when working over the shipside;

b) the maintenance instruction of the accommodation ladder was not followed:
   • a shorter length of steel wire was used in the starboard davit winch;
   • the ends of steel wire were not properly anchored to the wire drum;

c) the two air hoses, which had no markings, between the air motor and the control station could be wrongly connected, thus causing a reversal on the movement of the accommodation ladder (i.e heaving instead of lowering, or vice versa).

6.4 The investigation reveals the following safety factors:

a) Due to insubordination, the Deck Cadet might be hesitant to remind the Bosun about the company’s safety procedures in rigging the accommodation ladder;

b) The company guidelines for rigging the accommodation ladder, which was written in English, might not be understood by the crew members;

c) Three of the four crew members engaged in the operation of the accommodation ladder were new to the vessel.
7. **Recommendations**

7.1 A copy of the report should be provided to the following parties informing the findings of the accident investigation:

a) ship management company of vessel *Medi Salerno*; and

b) the Ship Safety Branch and the Shipping Registry and Seafarers’ Branch of the Marine Department.

7.2 The ship management company should circulate the findings of and lessons learnt from this accident investigation to all the masters and officers and crews of the managed fleet and to take measures in order to ensure that all crewmembers who:

a) work over the shipside to follow the relevant company safety procedures; and

b) are responsible for the operation, maintenance and inspection of the accommodation ladder and davit winch comply with manufacturer’s instructions and requirements.

7.3 The ship management company should review:

a) the risk associated with the practice of hoisting the pilot ladder together with the accommodation ladder and include them in the company’s health and safety guidelines accordingly;

b) the design of the connection of the rubber air hoses between the air motor and the control station so that incorrect connections would not be possible.

c) the operating procedure to ensure correct lowering / heaving direction of the accommodation ladder;

d) the communication requirements in the hoisting and lowering of the accommodation ladders; and

e) the safety training within the company and nurture the spirit of team work for covering each other’s safety as a team.

7.4 A Merchant Shipping Information Note (MSIN) should be issued to promulgate the lessons learnt from this accident.
8. Submission

8.1 In the event that the conduct of any person or organization is commented in an accident investigation report, it is the policy of the Marine Department to send a copy of the draft report or parts thereof to that person or organization for their comments.

8.2 The final draft report was provided to the following parties for their comments:

   a) ship management company of vessel *Medi Salerno*; and

   b) the Ship Safety Branch and the Shipping Registry and Seafarers’ Branch of the Marine Department.

8.3 The ship management company had submitted additional information relating to this incident. The final report has been amended appropriately.