



Report of investigation
into the fatal accident on board
Hong Kong registered ship
COSCO Indian Ocean in the port
of Rotterdam, Netherlands
on 13 December 2009



The Hong Kong Special Administrative Region
Marine Department
Marine Accident Investigation Section

Completed on 24 May 2011



Purpose of Investigation

This incident is investigated, and published in accordance with the IMO Resolution MSC 255(84), the Code of the International Standards and Recommended Practices for a Safety Investigation into a Marine Casualty or Marine Incident (Casualty Investigation Code) adopted on 16 May 2008.

The purpose of this investigation conducted by the Marine Accident Investigation and Shipping Security Policy Branch (MAISSPB) of Marine Department 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 aim to identify the different factors contributing to the incident. They are not intended to apportion blame or liability towards 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 On 13 December 2009 at time between 2140 and 2150, a sailor on board the Hong Kong registered container vessel *COSCO Indian Ocean* was killed while he was operating the starboard pilot ladder winch after picking up the pilot at the port of Rotterdam, Netherlands.
- 1.2 At the time of the accident, the weather was cold (ambient temperature 8 degree Celsius) with strong wind (force 5). The deceased wore thick winter clothes while he was working on deck.
- 1.3 There was no witness of the accident. The circumstances leading to the accident can be deduced that, while the deceased was operating the pilot ladder winch to hoist the ladder, he was dragged / pulled into the reel accidentally after being entangled by the reeling pilot ladder. He sustained fatal injury and was certified dead on board by doctor from ashore.
- 1.4 The investigation revealed the main contributory factors to the accident are : -
 - the deceased was not aware of the dangers of a reeling pilot ladder and to avoid himself from coming close to it;
 - the directional control valve for controlling the winch could not return to the neutral position for stopping the air motor as the valve was not of the self-return type; and
 - the potential risks associated with operating the pilot ladder winches on board were not fully appraised by the Master and the relevant crew of the vessel.

2. Description of the vessel

2.1 Particulars of *COSCO Indian Ocean*

Port of Registry	:	Hong Kong, China
IMO No.	:	9355563
Call sign	:	VREM3
Type	:	Container Ship
Year Built	:	07 April 2008
Gross Tonnage	:	115 776 tons
Net Tonnage	:	54 911 tons
Length Overall	:	332.75 metres
Breadth	:	45.6 metres
Moulded Depth	:	22.9 metres
Main Engine	:	1 x Hyundai MAN B&W 12K98MC
Engine Power	:	68 640 kW
Class	:	American Bureau of Shipping
Owners	:	COSCO Indian Ocean Shipping Limited
Management Company	:	Shanghai Ocean Shipping Co., Ltd.



Fig 1 – COSCO Indian Ocean

3. Sources of evidence

- 3.1 Report and supplementary information provided by the ship management company of the vessel;
- 3.2 Report of accident investigation provided by the Transport and Water Management Inspectorate Netherlands.

4. Outline of events

(All times are local)

- 4.1 At 2115 on 13 December 2009, the Hong Kong registered container ship COSCO Indian Ocean arrived at pilot station in the port of Rotterdam, Netherlands. At the order of the Master of the vessel, the Third Officer, together with two sailors, proceeded to pick up pilot on the starboard side in accordance with work procedure.
- 4.2 One of the sailors proceeded to first accommodation deck (lifeboat deck) to operate the pilot ladder winch. The other sailor and the Third Officer went to engine room third deck to open the shipside door (Fig. 2).

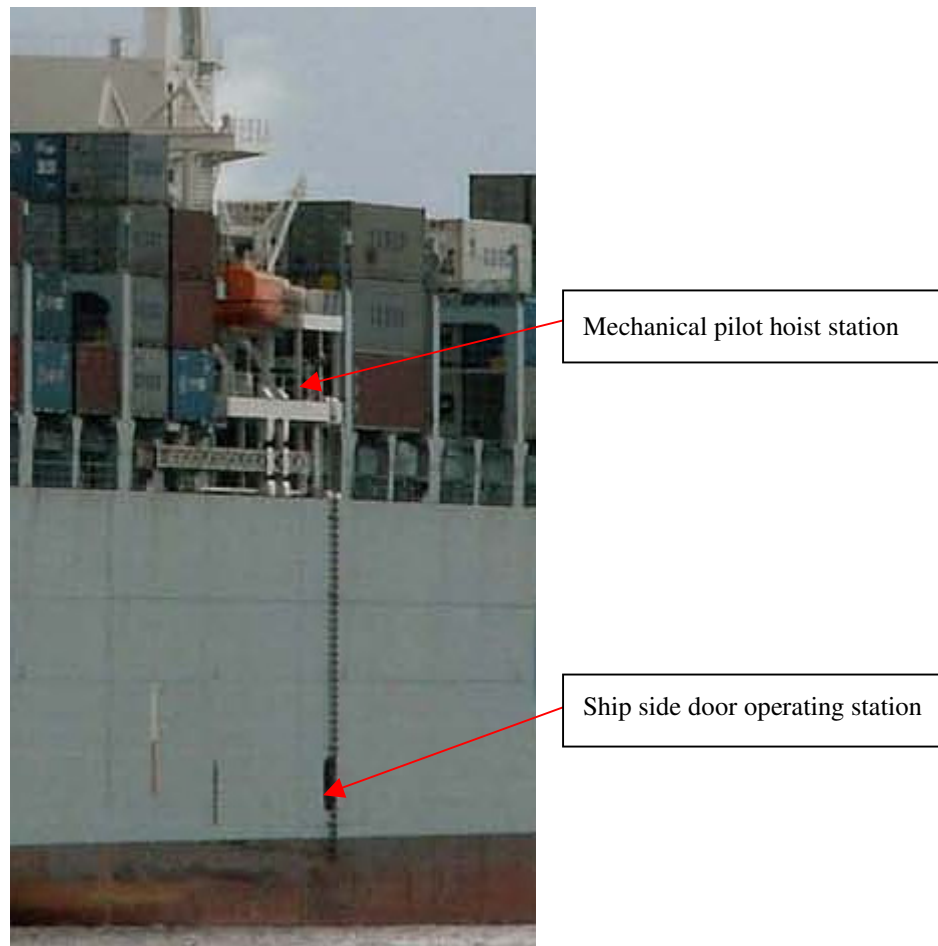


Fig. 2 – Pilot ladder arrangement

- 4.3 The pilot ladder was lowered over the shipside to the pilot boat. After embarkation of pilot, the Third Officer reported to the Master and led the pilot to the wheelhouse. The Master ordered retrieval of pilot ladder and closing of shipside door.

- 4.4 At 2140, the sailor at the shipside door station reported to the Master that the shipside door had been closed. Thereafter, he went to the crew accommodation.
- 4.5 At 2145, the carpenter went out on the main deck to prepare for mooring at berth. He heard running noise of the pilot ladder winch emanated from boat deck and asked a sailor to go there for checking.
- 4.6 When the sailor arrived at the starboard pilot ladder winch, he found a safety helmet and a pool of blood on the deck and the winch was still working. He saw a sailor was pulled into the pilot ladder reel (figure 3).
- 4.7 He shouted for help immediately and soon afterward, the carpenter, the bosun, the Chief Officer and other seamen arrived at the scene. The winch was stopped and the crew used knives to cut the ladder before they could remove the body from the reel. The sailor was sent to the ship hospital for treatment.
- 4.8 The Master reported the accident to the port authorities and requested for ambulance services. Police and doctor arrived on board immediate after the vessel was berthed at 2330. At 0130 on 14 December 2009, the doctor declared dead of the sailor and his body was sent ashore for post-mortem examination.



Fig. 3 – Pilot ladder reel

5. Analysis of information

The pilot ladder arrangement and operation

- 5.1 The vessel is fitted with a pilot ladder winch and a shipside door on each side of the vessel at aft position for boarding of pilots. The pilot ladder winches are installed on the first accommodation deck (lifeboat deck) in the vicinity of the port and starboard lifeboat station. The shipside doors are located just above the full load water line and assessable on engine room third deck.
- 5.2 When the pilot ladder is used for boarding of pilot and other personnel, the shipside door is to be opened first and the stepping platform rigged. The pilot ladder is then lowered until it reaches the boat before it being secured to the stepping platform. The pilot ladder winch is not designed for transferring of person. The person has to climb up or down the ladder for access to the vessel.
- 5.3 The pilot ladder is kept in a reel driven by an air-motor winch. The operating air pressure of 5.5 bars is supplied from air receivers in the engine room. When the air inlet valve for the system is opened, compressed air admits through a combined air-filter/water-separator unit and the oiling unit to a directional control valve, which controls the turning direction of the reel.
- 5.4 When the handle of the valve is placed in neutral (middle) position, no compressed air will flow to the motor. When the handle is moved to either left or right direction, the compressed air drives the motor and, through a reduction gearbox, turns the reel either in clockwise or anti-clockwise direction for hoisting or lowering of the ladder over the shipside (Figure 4, 5 and 6).
- 5.5 The directional control valve was not designed for self-returning to the neutral position when the handle is released. As the system was not designed as a mechanical pilot hoist, the requirement for the hoist controls to automatically return to the “stop” position upon release of the handle as stipulated in Resolution A.889(21)¹ is not required.
- 5.6 After the accident, the company replaced the directional control valves by the self-returning type in order to enhance safety of personnel on board.

¹ A.889(21) – Pilot transfer arrangements

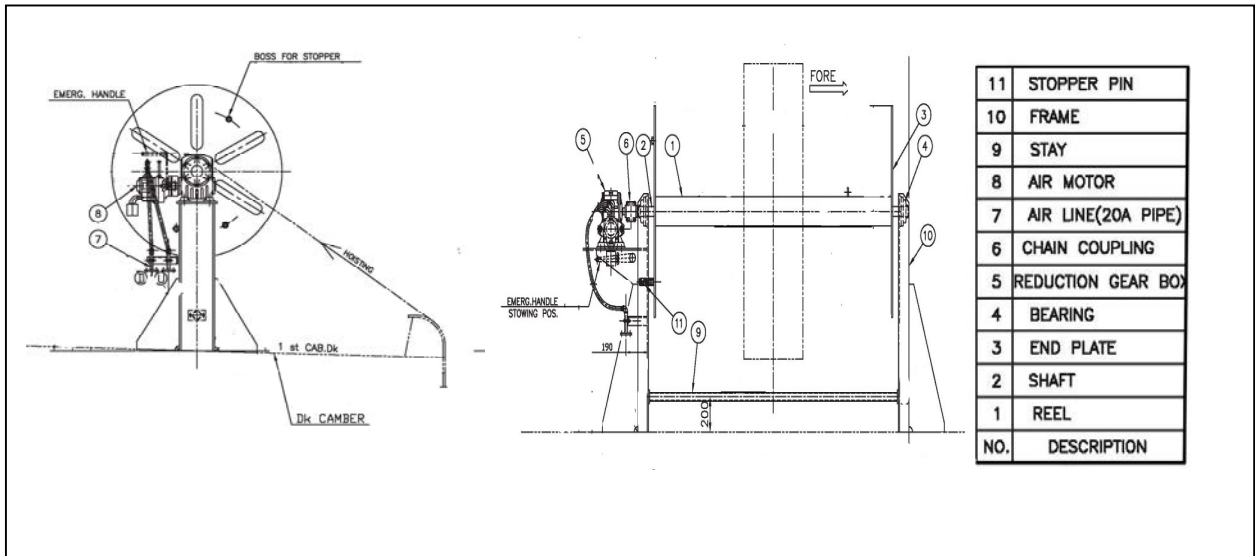


Figure 4 – The mechanical pilot hoist

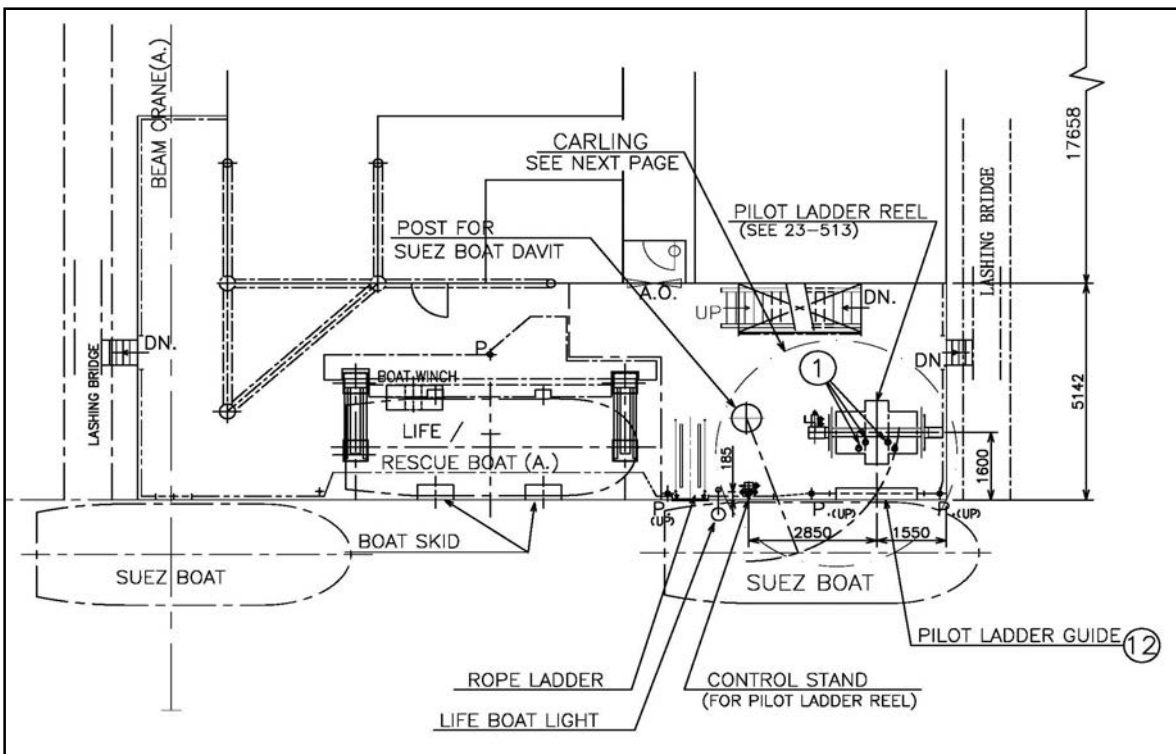


Figure 5 – General arrangement of the pilot ladder winch

opening of the door. After that, he will inform the sailor at the pilot ladder winch station to come down at the shipside door station to assist rigging the stepping platform for boarding of pilots. When the latter is done, the sailor responsible for operating the pilot ladder winch will return to boat deck and open the air inlet valve for the system. He will follow the instruction over the radio given by the sailor at the shipside door to lower down the pilot ladder to a suitable level. Finally, the ladder will be secured to the stepping platform. After embarkation of pilots, the two sailors will, at the order of the Master, carry out the same steps in a reverse order for closing of the shipside door and keeping of the pilot ladder. During the operation, the sailors should use safety belt and wear lifejacket.

- 5.10 The above operating instruction for pilot ladders and shipside doors appeared to have weakness in that there maybe occasions in which the sailors had to operate the equipment alone in their respective station. The Master of the vessel approved the instruction on 1 September 2009. It is not known what changes had been made in that instruction comparing with the previous one.
- 5.11 After the accident, the management company informed that they will revise the procedure requiring at least two crewmembers in each station and carrying with them equipment for readily communication with the bridge and the officer in charge of the watch. Also, during operating of the pilot ladder winch, no crewmember is allowed to enter the precautionary zones marked around the machines and it is not allowed to temper the pilot ladder while it was reeling.

Manning of the vessel

- 5.12 The vessel was operated by 23 Chinese crewmembers and the manning level complied with the minimum safe manning certificate issued by the Hong Kong Marine Department.
- 5.13 The Master of the vessel had been in the commands since February 1999. He joined the COSCO Indian Ocean on 11 July 2009.
- 5.14 The Third Officer had had working experience as third officer on five vessels previously. He joined the COSCO Indian Ocean in July 2009.

Training and experience of the deceased

- 5.15 The deceased was 25-year-old. He had attended the pre-sea training course from February 2008 to July 2009 organized by the ship management company at the seaman-training center in Shanghai, China. He signed on the COSCO Indian

Ocean in Shanghai on 11 July 2009 as an apprentice seaman. After serving for just over four months, he began to work as Seaman II on 21 November 2009.

5.16 The training records as provided by the Master of the vessel revealed that on 28 September 2009, the Chief Officer had introduced to crew, including the deceased, on safe operation of pilot ladder winches and shipside doors. Shipboard records on pre-work meeting for the operation of pilot ladder winches indicated that the deceased had been engaged in the following occasions:

- on 21 November before arrival at the port of Yan Tian, China;
- on 24 November before arrival at the port of Singapore;
- on 4 December for routine testing of the equipment; and
- on 12 December before arrival at the port of Rotterdam.

5.17 It is evident that, prior to the accident happened on 13 December 2009, the deceased had already had at least two overall experiences in the operation of the pilot ladder winch; that were in the ports of Yan Tian, China and Singapore.

5.18 To operate the pilot ladder winch should not require too much skills of an operator. However, the deceased was not experience in working on board ship, he should have been supervised more closely and not to be allowed to work alone under certain circumstances.

Personal Protection Equipment used by the deceased

5.19 A safety helmet was found on the deck in vicinity of the winch. It is not sure whether the deceased had properly worn his personal protection equipment, including the safety helmet, life jacket, safety shoes, etc. at the time of the accident.

5.20 He was found being pulled into the reel and sustained fatal injury. At the time of the accident, it was night time and the weather was cold (ambient temperature 8 degree Celsius) with strong wind (force 5). The deceased wore thick winter clothes while working on deck.

Investigation conducted by the Netherlands Authority

5.21 The Netherlands Authority boarded the vessel on 14 December 2009 for investigation. Among other findings, the report pointed out that the position of the directional control valve was close to the pilot ladder reel and that would cause dangers to the operators. Also, the spindle spoon of the directional control valve, which had grease accumulated inside the valve body (see figure 6), would not be able to return to the neutral position effectively for stopping the air motor.



Figure 6 – Directional control valve

Probable events leading to the death of the sailor

5.22 As there was no witness to the accident, the circumstances leading to the accident can only be deduced as follow:

- at 2115 on 13 December 2009, the COSCO Indian Ocean arrived at the pilot station in the port of Rotterdam, Netherlands; the deceased was assigned to assist in operating the starboard pilot ladder winch located on the first deck (lifeboat deck) for picking up of pilot;
- it was night time and cold (temperature 8 degree Celsius) with strong wind (force 5), the deceased wore thick winter clothes while working on deck;
- after the pilot boarded the vessel, the sailor at the shipside door station reported to the Master of the vessel at 2140 that the shipside door had been closed. At about the same time, the deceased was on the first deck operating the winch to hoist the pilot ladder;
- it is probable that the deceased either stood too close to or tempered the reeling ladder caused his winter clothes entangled by the ladder and he was dragged or pulled into the reel; and
- the winch continued to turn even though the handle of the directional control valve, which was not a self-return type, was released; or the valve might have not been returned to neutral effectively due to grease accumulated inside the valve body.
- the deceased might have screamed for help but was not heard.

Safety Management System

- 5.23 After the accident, the ship management company of the vessel has taken prompt actions to issue a safety circular to all vessels in the fleet informing all shipboard personnel about the accident and reminding them to take the precautions as stipulated in the circular in the operation of pilot ladder winches. It was followed by a series of fleet-wise campaigns on shipboard safety inspections, systems safety reviews and safety educational training / seminars.
- 5.24 The ship management company has replaced all directional control valves used on similar type of pilot ladder winches on board their vessels by the self-return type control valves.
- 5.25 After reviewing of the procedure for operation and maintenance of boarding arrangements, the revised procedure for enhancing safety of crew in the operation as mentioned in paragraph 5.11 above will be implemented.

Autopsy report

- 5.26 The autopsy report provided by the municipal coroner at Rotterdam stated that the deceased has died on the 13th of December 2009 at Rotterdam and that he did not die of any contagious disease, but die to an unnatural cause.

6. Conclusions

- 6.1 On 13 December 2009 at time between 2140 and 2150, a sailor on board the Hong Kong registered container vessel *COSCO Indian Ocean* was killed while he was operating the starboard pilot ladder winch after picking up the pilot at the port of Rotterdam, Netherlands.
- 6.2 At the time of the accident, the weather was cold (ambient temperature 8 degree Celsius) with strong wind (force 5). The deceased wore thick winter clothes while he was working on deck.
- 6.3 There was no witness of the accident. The circumstances leading to the accident can be deduced that, while the deceased was operating the pilot ladder winch to hoist the ladder, he was dragged / pulled into the reel accidentally after being entangled by the reeling pilot ladder. He sustained fatal injury and was certified dead on board by doctor from ashore.
- 6.4 The investigation revealed the main contributory factors to the accident are :-
- the deceased was not aware of the dangers of a reeling pilot ladder and to avoid himself from coming close to it;
 - the directional control valve for controlling the winch could not return to the neutral position for stopping the air motor as the valve was not of the self-return type; and
 - the potential risks associated with operating the pilot ladder winches on board were not fully appraised by the Master and the relevant crew of the vessel.
- 6.5 The investigation also revealed the following safety factors :-
- the deceased, who was a new seaman with limited working experience on ship, was not properly supervised by senior crewmembers on board and was allowed to work alone at the time of the accident ;
 - there were no warning signs for crewmembers about the dangers in the operation of pilot ladder winches, nor were there any such markings as “NO ENTER” zone in vicinity of the machines;
 - excessive grease had been accumulated inside the valve body of the directional control valve; and
 - the areas around the pilot ladder winches might be tight for crewmember during working and posing dangers to them while operating the pilot ladder winches.

7. Recommendations

- 7.1 A copy of the report should be sent to the ship management company of *COSCO Indian Ocean* informing the findings of the investigation into the accident.
- 7.2 The ship management company is required to : -
- inform the masters, officers and crew on board the Hong Kong registered vessels under their management on the findings of the accident investigation;
 - enhance the safety of crewmember in operating similar type of pilot ladder, taking into consideration all safety factors, including the factors as revealed in the report of investigation into this accident; and
 - provide trainings to all responsible persons in order to ensure safety in the operations of pilot ladder winches on board.
- 7.3 A Merchant Shipping Information Note (MSIN) should be issued to promulgate the lessons learned from this accident and to encourage ship owners of Hong Kong registered ship to use self-return type directional control valves in similar type of pilot ladder systems.

8. Submissions

- 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 draft reports in its entirety were sent to the ship management company and the Master of *COSCO Indian Ocean* for comments. There were no comments received.

