

Case 3

After completing the unloading of chloroform, a crew member inhaled chloroform gas and lost consciousness in a ballast pump room

Outline: At around 16:40, July 7, 2011, while the Vessel was sailing north toward an anchorage near Umi-Hotaru, an artificial island on the Tokyo Bay Aqua Line, after completing the unloading of about 50 tons of chloroform at a cargo handling pier in Chiba Section of Chiba Port, the first engineer found a wiper lying without consciousness in a ballast pump room. The wiper was rescued, and recovered consciousness.

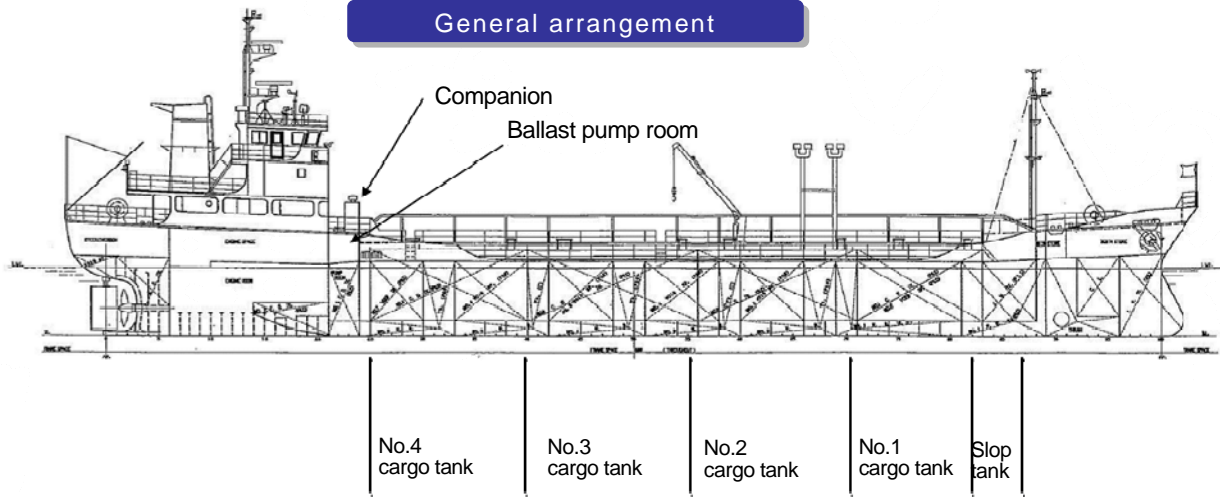


The Vessel (bulk carrier for liquid chemicals)

Gross tonnage: 498 tons
 L × B × D : 64.47 m × 10.00 m × 4.50 m
 Operator (*1): Company B
 Crew: Master, first engineer (1/E), wiper and three others

*1: A person or an organization who implements schedule management for transporting cargo collected from a shipper, and gives instructions for ensuring the safety of transportation for the sake of the vessel in operation and its lessee.

General arrangement



Events Leading to the Accident

Around 16:25

The Vessel left port after completing the unloading of about 50 tons of chloroform inside No.4 cargo tank at a cargo handling pier in Chiba Section of Chiba Port.

When the Vessel was pumping water into the ballast tank to adjust the draft, both the partition board and the gate valve which were separating the cargo piping and the air sending piping in No. 4 cargo tank on both sides were opened.

Around 16:25

Noticing sea water flowing out of the air vent over the deck, the wiper entered the ballast pump room to close the sea water intake valve at the bottom of the room.

Causal Factors of the Accident

The area between the cargo piping of No.4 cargo tank on both sides and the suction port of the air blowing fan in the ballast pump room became ventilatable through the air sending piping. Then, chloroform gas in the cargo piping was absorbed by the exhaust fan in the room, and came into the room through the suction port of the air blowing fan. Due to the nature of being heavier than air, chloroform gas resulted in stagnating at the bottom of the room.

It is considered probable that when entering the ballast pump room, the wiper did not detect toxic gases because there were no such instructions from Company B.

While giving instructions to measure oxygen concentration, detect toxic gases and make a record of such data when entering a cargo tank or cargo pump room, Company B did not instruct the crew of the Vessel to detect toxic gases, assuming there were no toxic gases in the ballast pump room of the Vessel because there was no cargo pump in the room.

Company B did not make a procedure manual for cargo tank cleaning or ventilating, either.

To next page

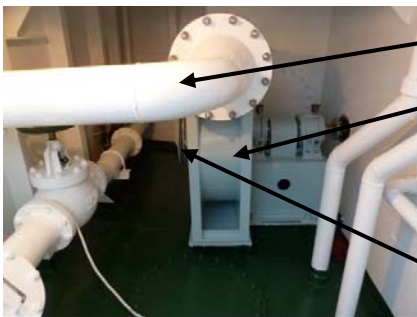
After that, noticing an unusual smell, the wiper went on the deck to report it to 1/E, who said the foreign smell might be due to the wind. Then, the wiper entered the ballast pump room again, and lost consciousness by inhaling chloroform gas which was stagnating at the bottom of the room.

It is considered probable that due to being heavier than air and inclined to stagnate at a lower place, chloroform gas which came into the ballast pump room stagnated at the bottom of the room.

Around 16:40

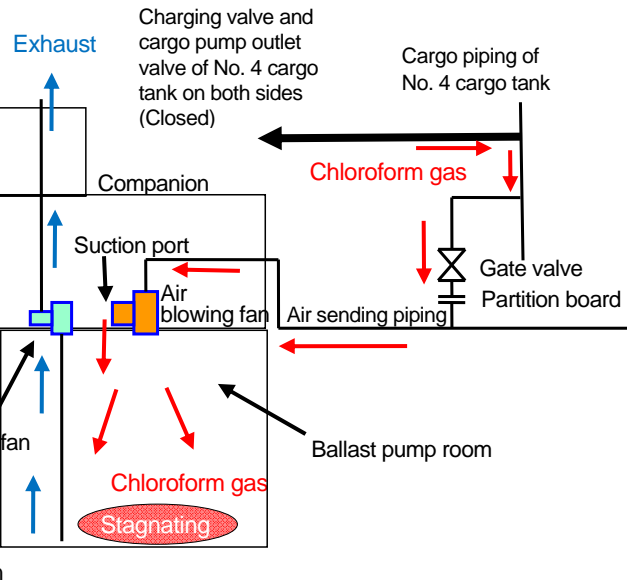
Entering the ballast pump room to look for the wiper, 1/E found the wiper lying without consciousness near the sea water intake valve.

The wiper was rescued by other crew members and taken to hospital by a Japan Coast Guard's helicopter which came for relief.



Air sending piping
Air blowing fan
Exhaust fan
Suction port of the air blowing fan

Inflow Route of Chloroform Gas



How the Area between the Cargo Piping and the Air Sending Piping Became Ventilatable

After operating the ballast pump in order to pump water into the ballast tank, 1/E opened the partition board and the gate valve which were separating the cargo piping and the air sending piping in No.4 cargo tank on both sides.

Concerning whether the charging valve and cargo pump outlet valve of the cargo piping were opened or closed when the accident occurred, they were normally closed when cargo handling was not going on.

It is considered probable that chloroform gas in the cargo piping was absorbed by the exhaust fan and came into the room through the suction port of the air blowing fan.

In Order to Prevent Recurrence

With respect to vessels transporting dangerous goods, it is necessary to establish operation procedures for handling such cargoes and instruct the crew to fully observe the procedures so that cleaning and ventilation of a cargo tank as well as valve opening and closing should be properly implemented. It is also necessary to ensure that measurement of oxygen concentration and detection of toxic gases should be implemented without fail when entering a place where facilities like a ballast pump are installed and a toxic gas is likely to flow in.

It is desired that vessel owners or operators should take the following actions for transporting dangerous goods on board vessels in which there is no cargo pump room, and there is a suction port of an air blowing fan to send air to a cargo tank at a place where a ballast pump is placed (ballast pump room).

- (1) Instruct the crew to ensure that measurement of oxygen concentration and detection of toxic gases should be implemented without fail when entering a ballast pump room, as in the case of entering a cargo tank or a cargo pump room where a toxic gas may exist.
- (2) Be aware of the details of such onboard work as may endanger the crew, establish safety check procedures during work as well as working procedures, and give them instructions on these procedures and ensure observance by them.