



DUTCH
SAFETY BOARD

Collision involving crane

Fatal accident on board Lady Christina



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The Hague, May 2018

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The Dutch Safety Board

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible for these to occur, with the aim of learning lessons for the future and, ultimately, improving safety in the Netherlands. The Safety Board is independent and is free to decide which incidents to investigate. In particular, it focuses on situations in which people's personal safety is dependent on third parties, such as the government or companies. In certain cases the Board is under an obligation to carry out an investigation. Its investigations do not address issues of blame or liability.

Dutch Safety Board

Chairman:

T.H.J. Joustra
E.R. Muller
M.B.A. van Asselt

Secretary Director: C.A.J.F. Verheij

Visiting address: Lange Voorhout 9
2514 EA The Hague
The Netherlands

Postal address: PO Box 95404
2509 CK The Hague
The Netherlands

Telephone: +31 (0)70 333 7000

Website: safetyboard.nl

E-mail: info@safetyboard.nl

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INTRODUCTION

On Wednesday 15 November 2017, the Dutch freighter Lady Christina was moored in the port of Rauma (Finland), where it had unloaded a cargo of china clay. After the unloading, the ship was cleaned by the crew. During the cleaning work, the ship's crane (see figure 1) moved over the hatch coaming, which was cleaned from the crane. At around 9.30¹ hours, a Filipino crew member was found on the port gangway. The crew member was found with a very serious injury to the neck. It was immediately clear that the victim was dead. It is highly probable that the crew member became trapped between the crane moving on the hatch coaming and a horizontal structural element in the gangway.



Figure 1: Crane on board the Lady Christina. (Photo: Dutch Safety Board)

This accident is classified as a very serious accident as referred to in the Casualty Investigation Code of the International Maritime Organization (IMO) and EU Directive 2009/18/EC. This means that the Netherlands, as the vessel's flag state, is obliged to ensure that an investigation is conducted. This investigative duty is also set out in the Dutch Safety Board Decree. Immediately after the accident, investigators have travelled to the accident site.

In addition, technical and forensic investigations were carried out by the Dutch police at the location on board where the victim was found.

¹ Local time, UTC+2.

1 BACKGROUND INFORMATION

Ship and crew

The Lady Christina was built in 2000 at the Dutch Koninklijke Niestern Sander B.V. shipyard in Delfzijl, as one of the four ships in the Lady C series. All four ships are owned by Wijnne Barends from Delfzijl. The ships are fitted with a large crane that covers the entire width of the deck, able to bear loads of 35 mt²; see figure 2.



Figure 2: Crane on board the Lady Christina. (Photo: Dutch Safety Board)

At the time of the accident, the crew of the Lady Christina consisted of ten people of five nationalities. As well as the standard crew of nine persons, there was also an intern on board. The nationalities of the crew members are shown in figure 3. The deceased crew member was an ordinary seaman (OS) and had been on board the Lady Christina for two months.

² mt = metric ton.

| Function | Nationality |
|-----------------|-------------|
| Captain | Dutch |
| First officer | Ukrainian |
| Second officer | Filipino |
| Chief Engineer | Russian |
| Second Engineer | Dutch |
| AB 1/chef | Portuguese |
| AB 2 | Filipino |
| AB 3 | Filipino |
| OS | Filipino |
| Intern | Dutch |

Figure 3: List of nationalities of crew of Lady Christina at the time of the accident.

Cargo

On 9 November 2017, the Lady Christina had loaded a cargo of china clay at Fowey (United Kingdom) for Rauma (Finland). China clay is always shipped in bulk and is a white, greasy substance. This makes it liable to stick everywhere, making conditions slippery.

China clay – kaolinite

China clay is an ore rich in kaolinite. In China, the material has traditionally been used for manufacturing porcelain, which is why it is known as china clay. China clay is primarily responsible for the whiteness of porcelain.

Additionally, china clay is used in the paper industry. China clay is then applied as a filler during the paper manufacture process or as pigment in the coating of the paper. The application of china clay as a filler makes the production of paper less expensive and improves its printability. Adding china clay as a pigment to the coating improves its whiteness, shine, and capacity to absorb ink.

In the United Kingdom, china clay is found mostly in its primary form. China clay is formed as a result of the decomposition of feldspar³, caused by weathering and thermal influences. The United Kingdom is the world's second-largest producer of china clay.

³ Feldspar is the name of a group of rock-forming minerals that make up an estimated 60% of the earth's crust.

Charter

The Lady Christina sails in a fixed charter over more or less the same route every time. It transports china clay, wood pulp, or tree trunks. After the china clay or wood pulp has been unloaded, the ship has to be cleaned. In practice, this occurs about twice a month (one out of the three ports).

2 THE COURSE OF EVENTS

On Tuesday 14 November 2017, the Lady Christina arrived at the port of Rauma, and the process of unloading the cargo of china clay started on the same day. The unloading was completed on the morning of Wednesday 15 November, and by 7.30 hours the ship was empty. The Lady Christina was then due to sail to Pietarsaari (Finland) where paper would be loaded for Szczecin (Poland). Before the paper could be loaded, the hold and the hatches would have to be completely clean. Before the cleaning operation, a short safety briefing was held in which the risks associated with working with the crane were discussed. The cleaning of the coamings, the deck, and the structure was then begun.

Cleaning the coaming with the help of the crane

The coaming was cleaned with the help of the ship's large crane (see figure 2). By slowly moving the crane over the coaming, it was possible for a member of the crew in the crane to use a hose to spray the coaming. Several members of the crew were involved in the cleaning work. Figure 5 shows the role of each crew member and figure 6 shows the positions they were in at the time of the accident. The crane was operated by the chief officer. The most experienced able-bodied seaman (AB 2 in figure 3) was operating the hose on the starboard side; he was wearing a safety harness and was secured to the crane. The intern was on cable duty⁴ on the crane on the port side. The OS (the later victim) was on the gangway on starboard side and got instructions via his walkie-talkie for guiding the hose.



Figure 4: Left, crane walkway; centre, position of AB 2 with hose on starboard side; right, cable watch on port side. (Photo's: Dutch Safety Board)

⁴ The person on cable duty watches the cable of the crane to check that it lands correctly in the cable duct as it is rolled out.

| Function | Position at time of accident |
|-----------------|------------------------------------|
| Master | On the bridge |
| Chief officer | In the crane |
| Second officer | In bed |
| Chief Engineer | On the bridge |
| Second Engineer | Gangway watch and standby for pump |
| AB 1/chef | In the galley |
| AB 2 | Operating the hose on the crane |
| AB 3 | Washing the deck at the stern |
| OS | Victim, helping with hose on deck |
| Intern | Cable watch on port side |

Figure 5: Positions of crew members at the time of the accident.

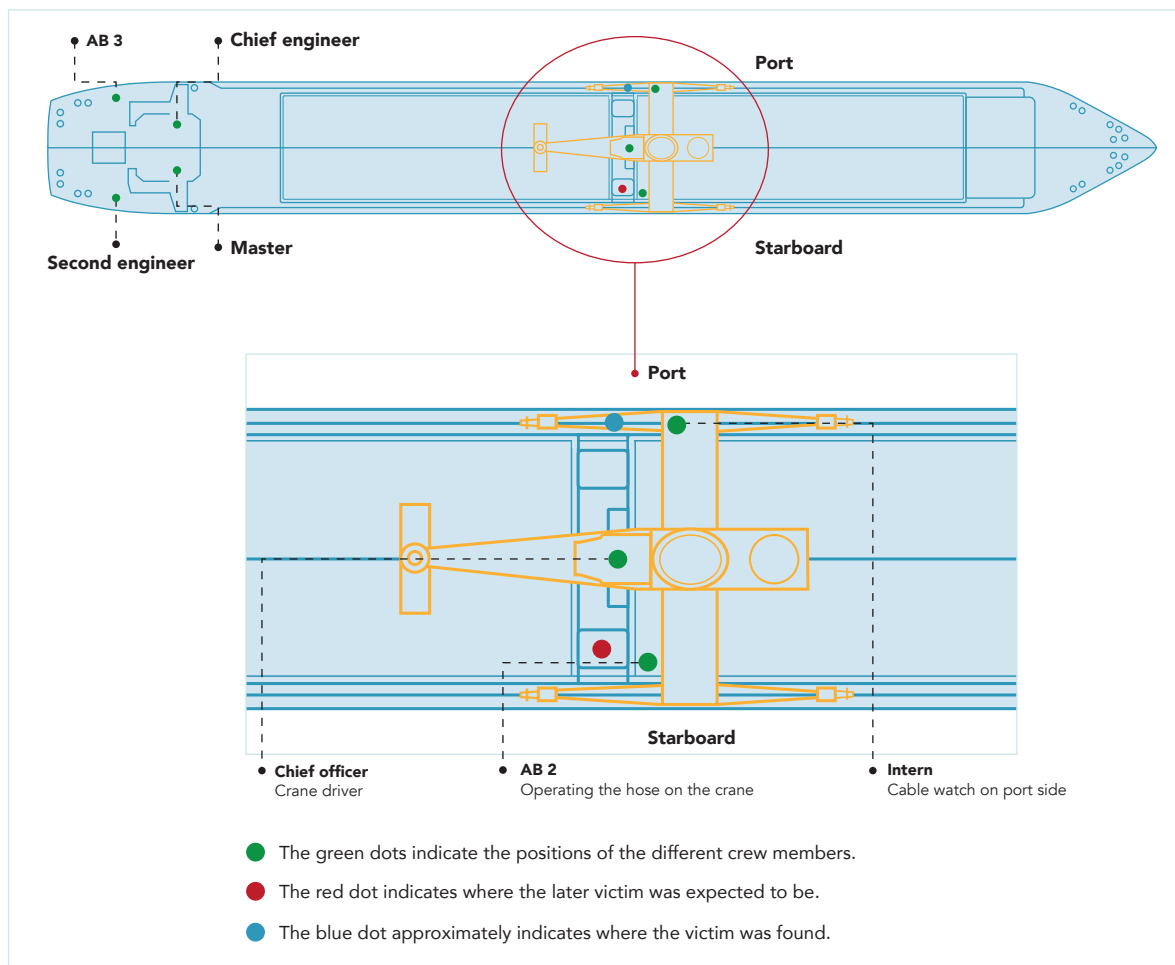


Figure 6: Situational drawing of the roles and positions of the crew members at the time of the accident.

The captain on the bridge and the crew on deck all carried a walkie-talkie to enable them to communicate with each other. Each of the walkie-talkies was tuned to operate on the same frequency. The language used on board was English, although the Filipino crew members sometimes spoke Filipino with each other.

The hose that was used for cleaning the hatch coaming concerned a fire hose of different lengths linked up to each other. It was attached in the middle of the ship to the crane and was fed using the fire extinguisher pump. The hose was pulled upwards from the central gangway to the crane (see figure 7). The hose is fairly sturdy and could easily get caught on something. If this happened, the OS would be instructed via his walkie-talkie to free it.



Figure 7: Middle gangway with fire hydrant. (Photo's: Dutch Safety Board)

That morning, work started on cleaning the coaming on the port side. This was then followed by the starboard side. As they worked, the crew proceeded from the rear to the front. The crane had been moved all the way back and was slowly returning to the middle. The first officer in the crane was looking at astern. Meanwhile, AB 2 on the crane was spraying the coaming on the starboard side. At about 9.20 hours, the OS was seen on the starboard side, where he was extending the hose. Five minutes later, he was sent another message on his walkie-talkie, but he did not respond. The AB who was cleaning the stern realized that he was not responding, so therefore walked to the hose next to the crane in order to extend it. When he returned to the stern and looked towards the front, he saw the OS lying on the gangway on the port side. The AB immediately alerted the other members of the crew, whereupon the captain came onto the deck with the first aid box.

The captain decided that the situation on the port side was very serious and alerted the emergency services.

3 ANALYSIS

Accident

From the on-site investigation, which included holding interviews with the members of the crew, it appears that nobody on board the ship saw the accident occur. Even the members of the crew who were located nearest to the victim at the time of the accident did not see the accident occur.

Because of the size of the crane, the driver had no view of the lower gangway. The cable watch on the port side was also unable to see the entire gangway, and certainly not the section directly under the crane.



Figure 8: View of the cable watch on the port side. Left: view to the front; right: view to the rear. (Photo's: Dutch Safety Board)

While the crane was moving, an acoustic signal was clearly audible. The signal was a continuous bell signal. The signal sounded from the moment the crane started moving until it had come to a complete standstill. The crane was also fitted with an emergency stop. The emergency stop is located at the position of the cable watch.

The forensic investigation established that the victim must have climbed onto a number of pipe sections situated under the crane rails, otherwise he could not have been struck by the moving crane and become trapped between the crane and the horizontal structural element in the gangway (see figure 9).

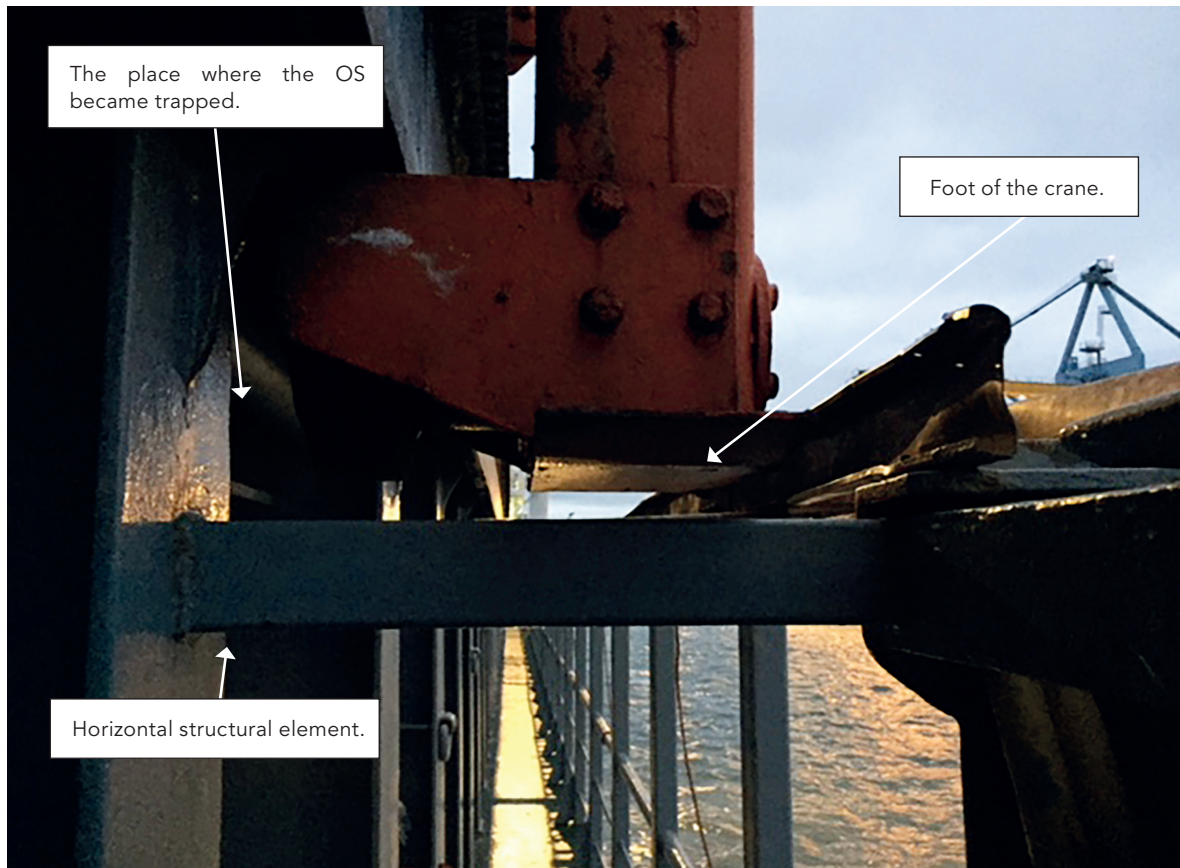


Figure 9: The place of the accident. (Photo: Wijnne Barends)

It is impossible for anyone standing with both feet on the gangway to be struck by the moving crane. On-site investigations have not been able to establish why the victim was in that position at the time the crane was passing by. From interviews with the crew members about their normal working practices and from the evidence found, a reconstruction was made of the likely actions of the victim.



Figure 10: Place where the victim must have been standing. (Photo: Dutch Safety Board)

Probable actions on the part of the victim

The Lady Christina is fitted with pontoon hatch covers for closing off the top of the hold. These pontoon hatch covers serve to keep the hold watertight. When a pontoon hatch cover is on the coaming, a longitudinal impression strip and a rubber seal form a watertight seal. In order to allow water that has built up on the coaming to run off, the coaming is fitted with drainage pipes. These drainage pipes are fitted with a cap with a non-return valve, which are removed whenever the coaming is being cleaned.



Figure 11: Left: drainage pipe without cap; right: watertight sealing cap with non-return valve. (Photo's: Dutch Safety Board)

The drainage pipes are located at regular intervals apart. A drainage pipe is located at the place where the victim was found. It has been established that the cap with the non-return valve of the drainage pipe in question was half closed. On the basis of interviews, the place where the victim was found, and the forensic investigation, it can be assumed that the victim was seeking to close the cap with the non-return valve on the drainage pipe on the port side (see figure 11 and figure 12), and was struck by the moving crane in the process. Why the victim climbed up at exactly the moment the crane passed by cannot be established.



Figure 12: Drainage pipe at the place of the accident. (Photo: Dutch Safety Board)

4 CONCLUSIONS

From the on-site investigation, which included holding interviews with the members of the crew, it appears that nobody on board the ship saw the accident occur. However, it has been established that the victim on board the Lady Christina died as a result of being struck by the crane.

The crane was free of any technical faults, was fitted with a clearly audible acoustic signal, and specific reference had been made before the work to the importance of working safely. It is likely that the victim was in the process of closing the cap with non-return valve on the drainage pipe during cleaning work when he was struck by the crane.

Procedures

Although there was no specific procedure available on board for cleaning the coaming with the help of the crane, there was a general procedure for work that involves the crane. The use of the crane when the accident occurred did not deviate from this procedure. Besides that, a short safety briefing was held before the cleaning operation, in which the risks associated with working with the crane were discussed. Despite these preparations it could happen that a crew member was killed by the crane.

Accidents with hatch cranes and driving cranes

The crane on board the Lady Christina was not an actual hatch crane. However, driving the crane on the Lady Christina is similar to driving with hatch cranes and the accident is similar to accidents that occur with hatch cranes. Much has been said and written about the use of hatch cranes and accidents. Nonetheless, the Dutch Safety Board once again wants to highlight the importance of learning lessons from previous investigations^{5,6,7} into accidents involving hatch cranes.

5 <https://www.onderzoeksraad.nl/en/onderzoek/2140/hatch-cover-crane-entrapment-9-june-2015?s=981C101C286AD0EEC5852CF7D4D2472FED442CA7>

6 <https://www.onderzoeksraad.nl/en/onderzoek/1800/accident-with-hatches-ms-arlow-sky-bilbao-21-september-2010?s=0C20027A1E1CDD7A45A85BDEB66BA9CAF74B036E>

7 <https://www.ilent.nl/onderwerpen/inspectie-vlaggenstaat/documenten/publicaties/2012/06/05/thema-actie-luikenwagens-tussenrapportage>

VESSEL DATA

| Vessel data | Lady Christina |
|--------------------------------------|--|
| Photo: |  |
| Call sign: | PFAC |
| IMO number: | 9201815 |
| Flag state: | Netherlands |
| Home port: | Delfzijl |
| Type of ship: | General Cargo with Container Capacity |
| Classification society: | Lloyd's Register |
| Year of construction: | 2000 |
| Shipyard: | Royal Niestern Sander B.V. |
| Length overall (LOA): | 108 m. |
| Length between perpendiculars (LPP): | 102.85 m. |
| Breadth: | 15.88 m. |
| Actual draft: | 5.89 m. |
| Gross Tonnage: | 4235 |
| Engines: | MAK 6M32 |
| Propulsion: | 1 propeller – 1 thruster |
| Maximum propulsion capacity: | 2919 kW |
| Maximum velocity: | 14.0 knots |
| Vessel's certificates: | All valid |

**Visiting address**

Lange Voorhout 9
2514 EA The Hague
T 070 333 70 00
F 070 333 70 77

Postal address

PO Box 95404
2509 CK The Hague

www.safetyboard.nl