



DMAIB
Danish Maritime Accident Investigation Board

BERGENSFJORD

Summary report on unintended release of rescue boat

6 DECEMBER 2017

**SUMMARY REPORT ON UNINTENDED RESCUE BOAT
RELEASE ON 6 DECEMBER 2017**

Published by

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This report has been published on
18 May 2018

Photo: Rescue boat launch appliance on
STAVANGERFJORD
Source: DMAIB

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This is a summary of an investigation of an incident conducted by the Danish Marine Accident Investigation Board. The purpose of the summary is to communicate knowledge acquired by the Danish Marine Accident Investigation Board in connection with the investigation of an incident.

This summary concerns an accidental release of the rescue boat on BERGENSFJORD, which took place on 6 December 2017 in Risavika, Norway. The investigation aimed to explain why the rescue boat was unintentionally released.



Figure 1: BERGENSFJORD
Source: Fjord Line

The incident

On the evening of 6 December 2017, BERGENSFJORD berthed the quay in Risavika in Norway, where an annual survey of the ship was to take place with the participation of Danish and Norwegian maritime authorities. As part of the survey, the crew was to lower the rescue boat to sea level in accordance with the ship's procedures.

The shipping company and the ship's crew considered the release of the boat to be associated with significant risk to the rescue boat crew. The ship's crew had heard about accidents happening while the rescue was being lowered, and was therefore generally uneasy about the boat beginning to sway while at height. Therefore, ship training exercises contained a practice, where the rescue boat was lowered to a door in the ship's side, from where the crew boarded. Subsequently, the boat with crew was lowered the remaining few metres down to sea level.

At around 9 PM, the chief officer and the company representative were on the boat deck, along with two persons from the authorities. The chief officer loosened the rescue boat's lashings, and the power

supply cable was removed. Using the wire winch on the davit, the rescue boat was slowly lifted out of its cradle, upon which the davit should take the boat over the side of the ship. While the chief officer was operating the davit, the boat was suddenly released from the release hook and fell unmaned into the water from the seventh deck. The boat sustained extensive structural damage and slowly drifted away.

The crew was convened, and the lifeboat was launched to tow the rescue boat along the quay. Later in the evening, the rescue boat was brought ashore, and the release hook was removed and kept by the Danish Maritime Authority for further investigation.

The sister ship, STAVANGERFJORD, had the same rescue boat arrangement, and the company immediately decided to cease the use of the rescue boat, until the cause of the incident had been established.

The investigation

The day after the accident, on 7 December 2017, The Danish Maritime Accident Investigation Board (DMAIB) was contacted by the Danish Maritime Authority and was informed about the incident.

DMAIB decided to initiate an investigation because events involving life-saving equipment and launching appliances are a focus area for the accident investigation board. This is due to a number of previous very serious accidents caused by unintended release of lifeboats and rescue boats from launching appliances.

This type of occurrence reduces the crew's confidence in the rescue boats and lifeboats to such an extent that the quality of the training is reduced, resulting in a impaired emergency response.

The investigation of the incident on board BERGENSFJORD focused on the following question:

- Why was the rescue boat accidentally released?

Launch of the rescue boat



Figure 2: Rescue boat on STAVANGERFJORD
Source: Fjord Line

The photo (figure 2) depicts the rescue boat and launching appliance on board STAVANGERFJORD, which was identical to the launching appliance on board BERGENSFJORD. In the boat's stowed position, it was located in a cradle secured with straps. The boat's suspension was secured at three points on the boat, which were joined to a steel ring fixed in the release hook.

When the boat was to be launched, the straps were removed, and the boat was raised slightly using the electric winch to get it free of the cradle. Then, the davit was lowered to swing the boat overboard, after which the brake on the wire was released, and the boat was lowered to the door on the third deck (figure 3, next page).

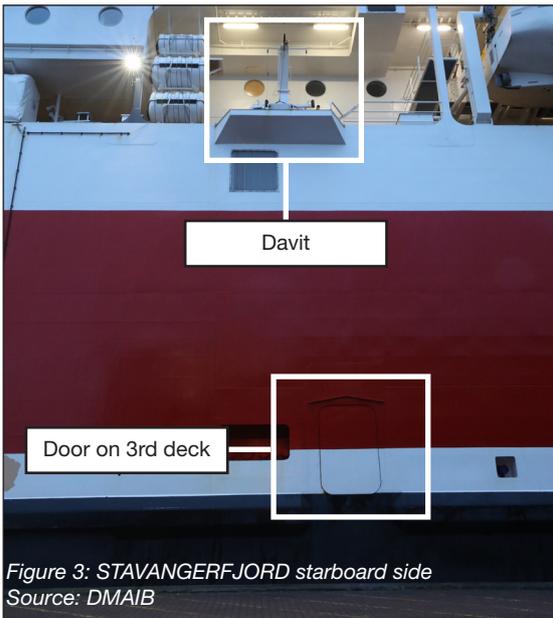


Figure 3: STAVANGERFJORD starboard side
Source: DMAIB

When the boat was in the water, the crew could release the release hook in two ways: One method for general use (Off-load release) and one method to be used in emergencies (On-load release):

Off-load release (figure 4): When the boat was in the sea the boat's suspension would be slack, and the pawl (1), which held the suspension in place could be withdrawn. Then, the boat's suspension could be released (2).

On-load release (figure 5): If the normal method did not work, or the boat's suspension had to be released, when the suspension was not slack, the pin would have to be removed (1) and the release handle pulled down (2). Then the pawl holding the boat's suspension would automatically be released.

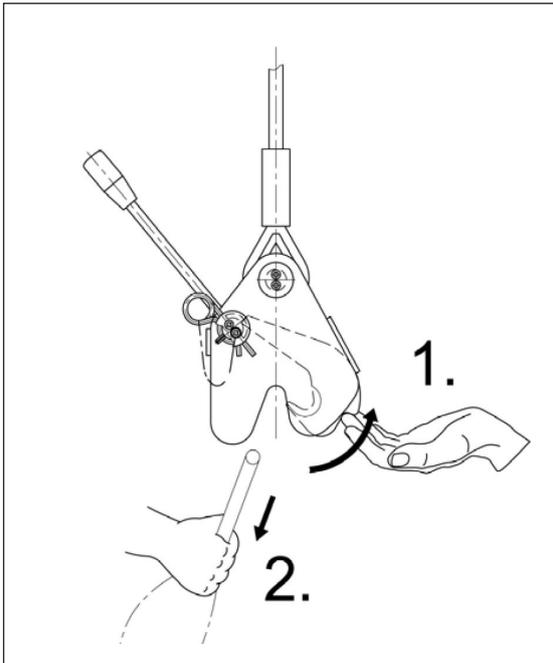


Figure 4: Off-load release
Source: d-i davit international GmbH/DMAIB

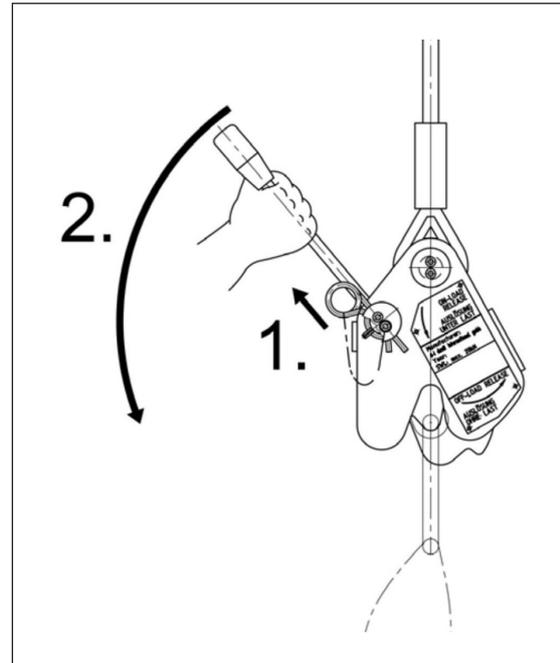


Figure 5: On-load release
Source: d-i davit international GmbH/DMAIB

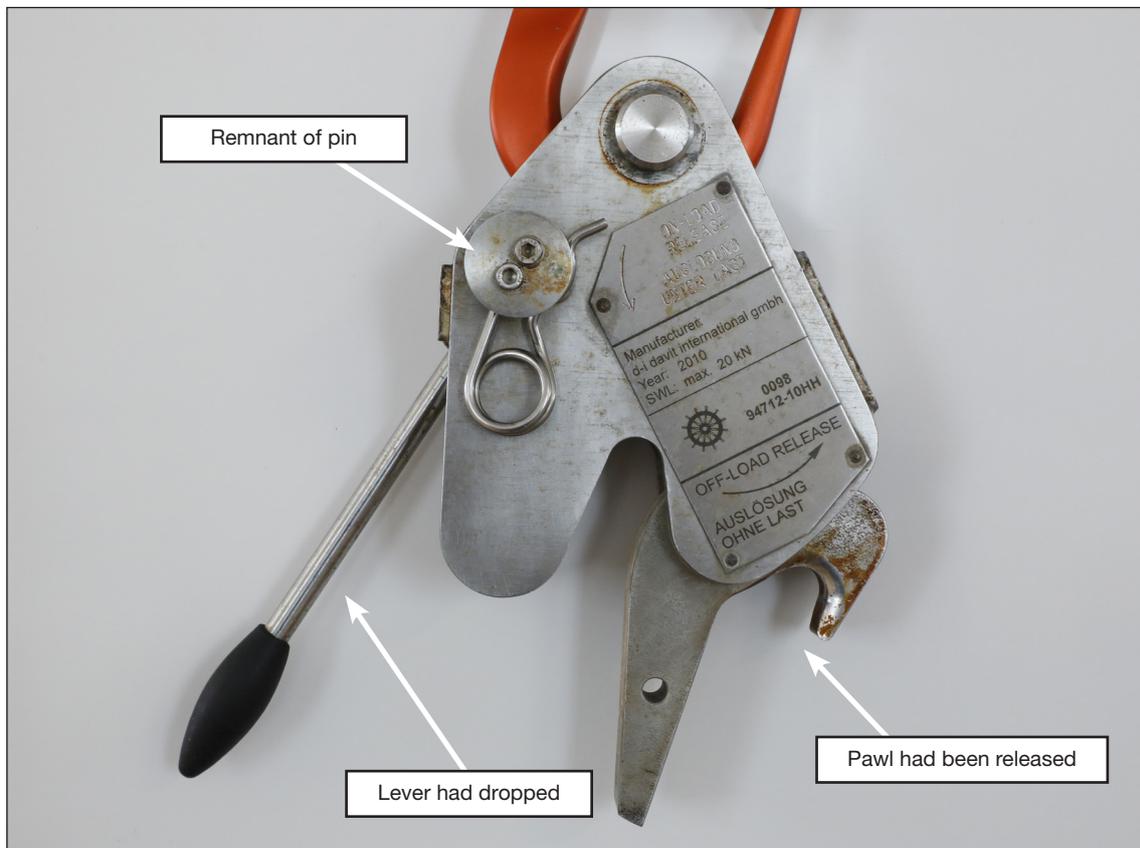
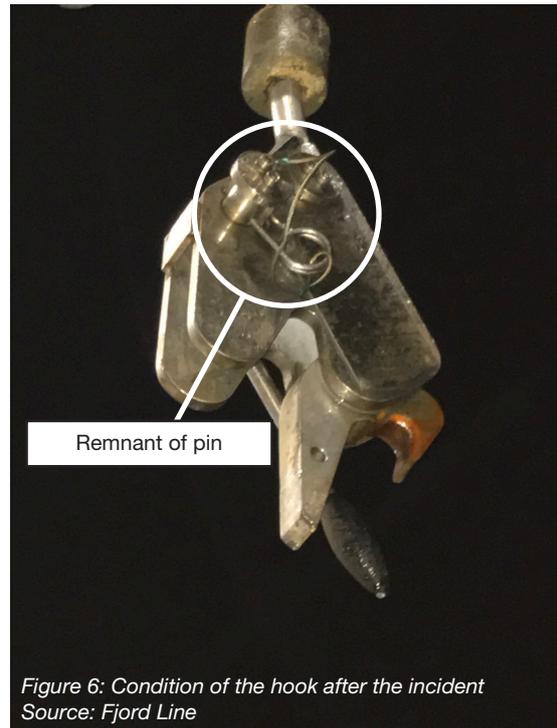
The launching appliance

The investigation of the launching appliance after the incident consisted of two parts:

- An investigation of the launching appliance on board BERGENSFJORD to ascertain whether mechanical failure caused the accidental release of the boat.
- An investigation of the practices associated with the release of the boat to determine whether the crew had problems with the use of the equipment, which might have contributed to the incident.

After the incident, it was found that the release hook had been triggered (figure 6). In figure 7, a reconstruction of the condition of the hook is shown: A remnant of the pin was stuck in the hook, the lever had dropped, and the pawl had been released.

It was found that the tip of the pin that held the release lever in place was broken, which meant that the lever could drop thus releasing the rescue boat (figure 8 and 9, next page). However, what had caused the pin to break was unclear.



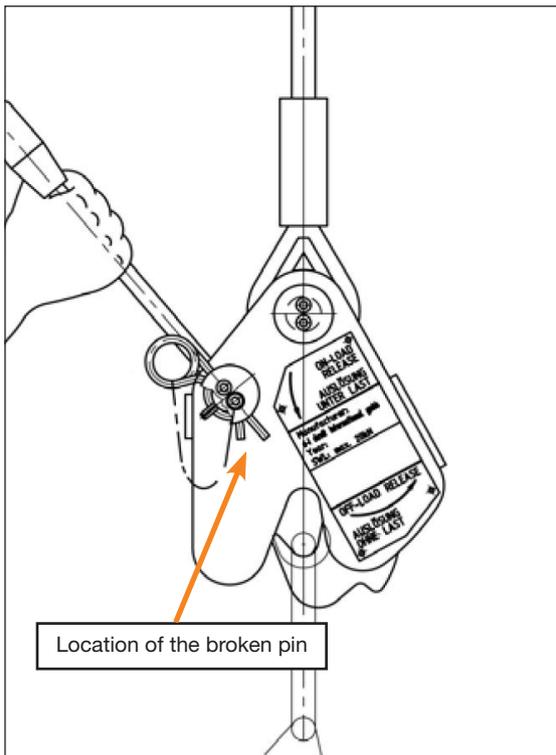


Figure 8: Location where the pin was broken
Source: DMAIB

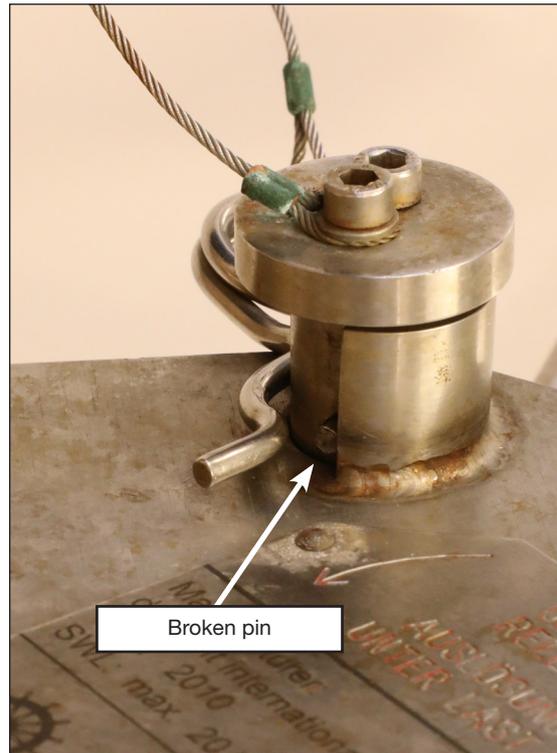


Figure 9: Broken pin on the release hook
Source: DMAIB

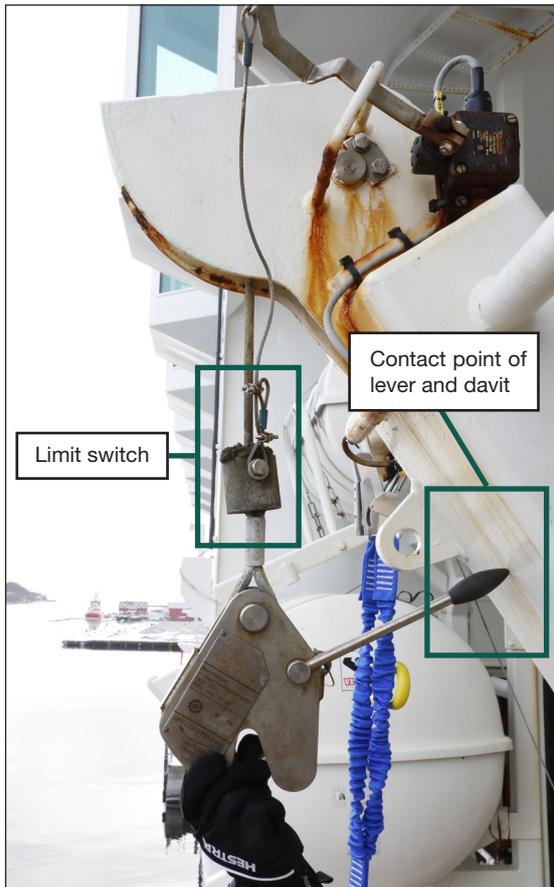


Figure 10: Reconstruction of the handle hitting the davit
Source: DMAIB

The pin was examined by FORCE Technology at DMAIB's behest, in order to ascertain whether the pin had broken due to, e.g. fatigue, or if it had been severed at the time of the incident. The examination showed that the pin had been cut in one motion.

By conducting a number of reconstructions on board STAVANGERFJORD, it was demonstrated that when the boat was hoisted by the wire, the release lever could, under certain circumstances, make contact with the davit (figure 10) and be pulled downwards at such a force that the pin could be severed.

However, it was a prerequisite for this to happen that the limit switch was set in such a way that the wire could run far enough to hit the davit.

Cause of the incident

The reason the rescue boat was unintentionally released was that when the rescue boat was hoisted out of the cradle, the release lever hit the arm of the davit and was impacted by such a downward force that the pin in the release lever was severed. The release lever could then drop down freely, releasing the pawl. In other words, an on-load release of the hook took place, once the split pin had been severed.

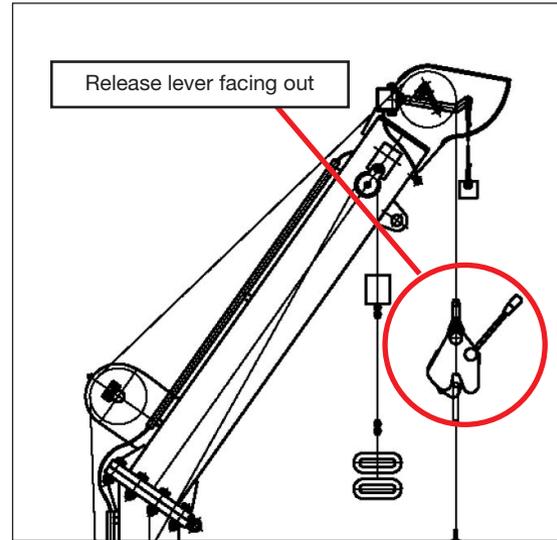
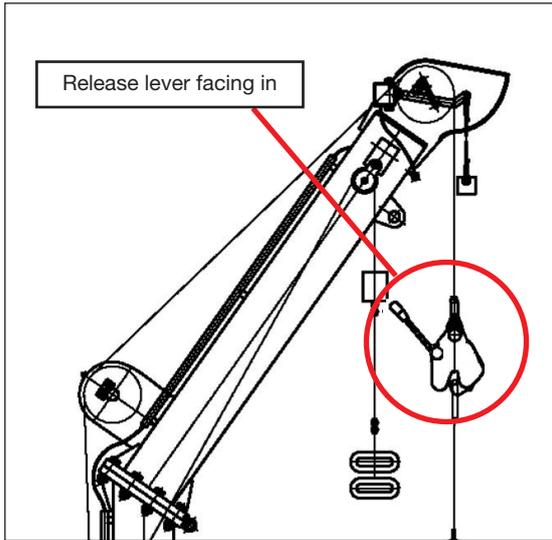


Figure 11: Sketch showing the release hook's respective orientations, inwards towards the davit and outwards, away from the davit

Source: d-i davit international GmbH/DMAIB

2) The boat was not always hoisted this far out of the cradle before the davit was lowered because the limit switch had been mounted further down the hoisting wire on STAVANGERFJORD than on BERGENSFJORD (figure 12).

3) The information gathered indicates that, at times, the hook was attached to the boat's suspension in such a way that the release lever pointed downwards (figure 13) and not upwards (figure 14). The correct setting of the lever was upwards. The incorrect fitting of the hook, with the lever downwards, prevented the inadvertent release of the hook because the lever could not come into contact with the davit. However, in that case the emergency release ("On-load release") would not work.

Thus, the investigation demonstrated that the cause was a combination of the launching appliance's design and function, which allowed an unintended release of the rescue boat. The ways in which the crew used the release hook could both allow the incident to happen and had also prevented it from happening before.

There were three main reasons why this incident had not happened before:

1) The release hook was usually turned in such a way that the handle pointed outwards and not inwards toward the davit, as shown in figure 11. This meant that when the boat was hoisted out of the cradle, the release lever would not hit the davit.

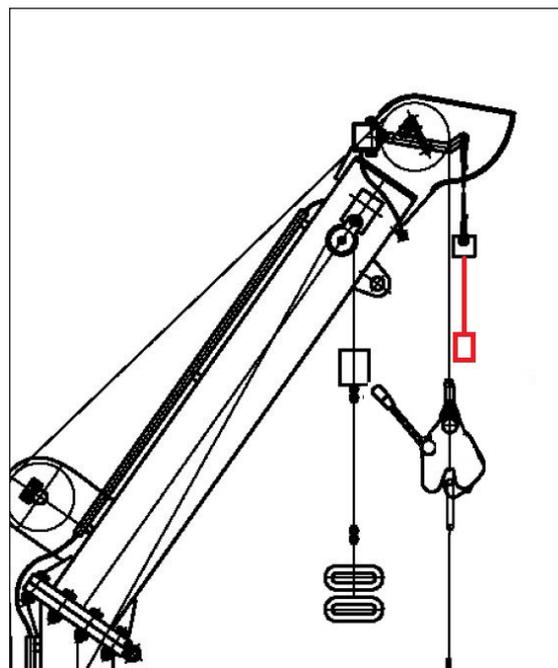


Figure 12: Sketch showing the extended limit switch on the wire

Source: d-i davit international GmbH/DMAIB



Figure 13: Release hook with the lever pointing downwards (incorrect setting)
Source: DMAIB

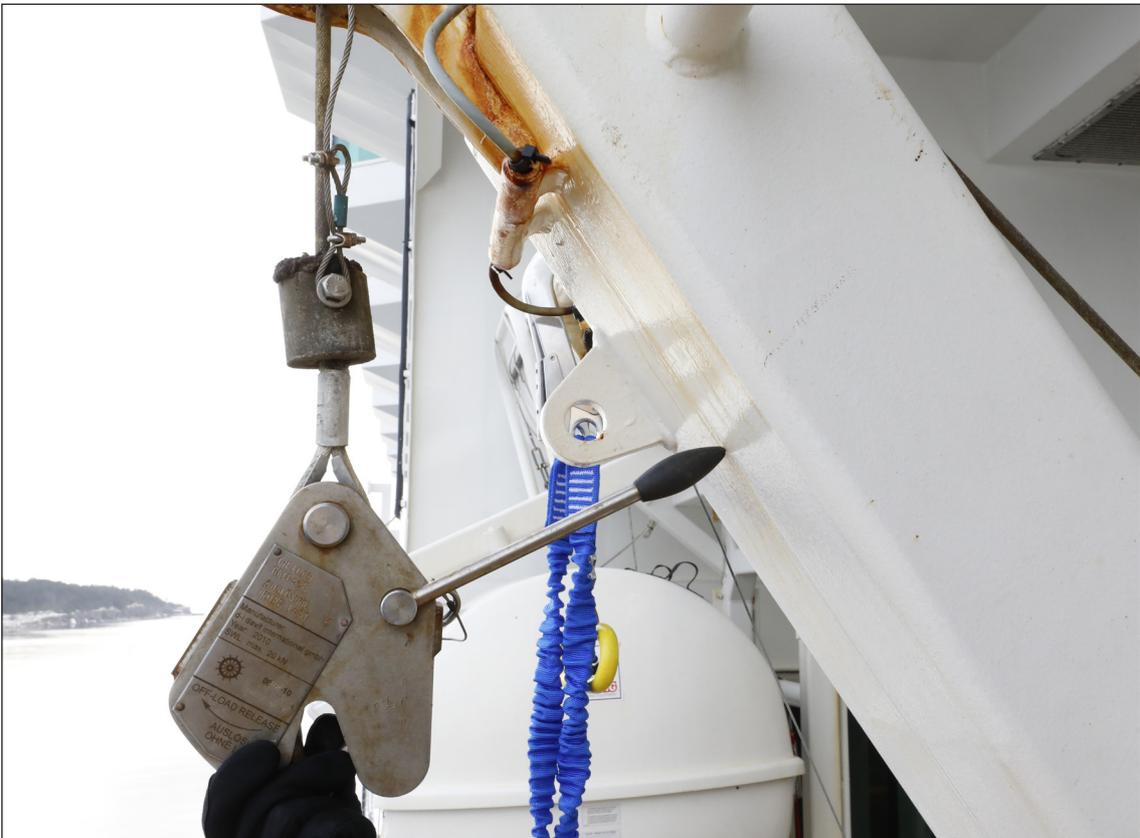


Figure 14: Release hook with the lever pointing upwards (correct setting)
Source: DMAIB

Learning

The DMAIB has learnt the following from the accident:

1.

In this incident and other similar accidents, the DMAIB has ascertained that, among crew and shipping companies, there is an understanding of the launching appliances as complete, approved systems, which are considered safe to use when they have been inspected and approved.

The annual inspection of the launch appliance will not necessarily lead to the discovery of design problems, because the inspection is based on an assessment of the launch appliance's mechanical reliability and the state of individual components at the time of inspection.

The inspection of the launch appliance must be done at certain intervals. This means that if, over the course of the year, a wire or release hook is replaced, this will not prompt a new inspection of the launch appliance. The check of the system's mechanical reliability will be left to the people who replaced the parts.

2.

On BERGENSFJORD's release hook, an instruction had been printed, which did not offer intuitive instructions on the use of the hook. In the absence of intuitive instructions, the crew adapted to the situation and developed a use of the hook which was perceived as being safe, meaning that they used the 'On-load release' method (designed for emergencies). This method ensured that the crew's hands did not come into contact with the moving parts of the release hook.

The crew's way of using the release hook was not in accordance with the manual's instructions, where 'Off-load release' was described as the ideal use of the hook. It is the assessment of the DMAIB that the manual's instructions for 'Off-load release' could cause an increased risk of hand injuries because the manual did not address the operational circumstances under which rescue boats are launched.

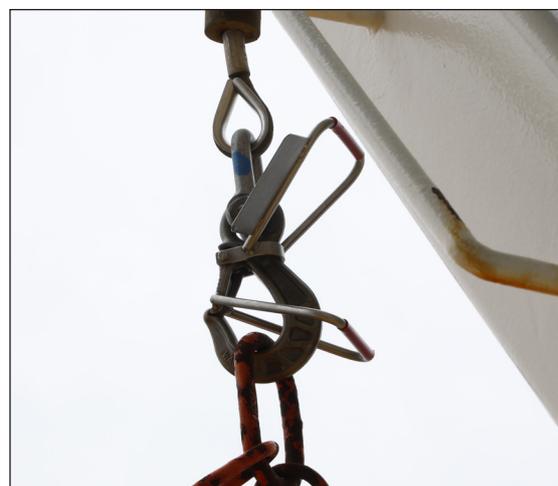
It should be borne in mind that when the rescue boat is at sea, it can move significantly, and the boat's suspension wire can be difficult to work with. In situations like these, the boat's crewmembers do not want their fingers close to the moving parts of the release hook.

Preventive measures

In connection with the investigation, The Maritime Accident Investigation Board was informed that the shipping company had undertaken the following preventive measures:

In connection with the accident, the shipping company suspended use of the type of hook, as both they and the employees no longer had confidence in the system used. The task of finding a trustworthy and user-friendly solution was assigned to the ship's crew, who scoured the market. The chosen solution was the hook shown below (figure 15).

The hook is simple and intuitive. It is easy to get an overview of and it does not prompt any immediate doubts as to whether it has been fitted properly or not. It is also easy to inspect during maintenance.



*Figure 15: New hook mounted on BERGENSFJORD
Source: Fjord Line*

Ship particulars

Name:	BERGENSFJORD
Type of vessel:	Passenger/Ro-Ro ship
Nationality/flag:	Denmark
Port of registry:	Hirtshals
IMO number:	9586617
Call sign:	OYPJ2
DOC company:	Fjord Line Danmark A/S
IMO company no.:	5269597
Year built:	2014
Shipyard/yard number:	Bergen Group Fosen AS-Rissa/No.: 88
Classification society:	DNV-GL
Length overall:	170.00 m
Breadth overall:	32.90 m
Gross tonnage:	32,491
Deadweight:	3,900 t
Draught max.:	6.50 m
Engine rating:	4 x 5400 kW
Service speed:	21.50 knots
Hull material:	Steel
Hull design:	Single hull