DMAIB
DANISH MARITIME ACCIDENT INVESTIGATION BOARD

BB

Summary report on occupational accident

2 NOVEMBER 2021

SUMMARY REPORT ON OCCUPATIONAL ACCIDENT ON BB ON 2 NOVENMER 2021

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Photo: BB
Source: DMAIB

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This is a summary report on an accident investigated by the Danish Maritime Accident Investigation Board (DMAIB). The summary is a brief account of findings, which are relevant for safety learning.

This summary concerns a mussel farm worker who fell overboard from a work boat on 2 November 2021 while tending to a mussel longline in Limfjord, Denmark. A few days later, the worker succumbed to his injuries.

Figure 1: BB
Source: DMAIB

Name of vessel:	BB
Type of vessel:	Work boat
Nationality/flag:	Denmark
Port of registry:	Nykoebing Mors
Year built:	2004
Shipyard/yard number:	Svendborg Yacht Vaerft A/S
Length overall:	7,06 m
Breadth overall:	2,83 m
Gross tonnage:	1,3
Draught max.:	0,48 m
Engine rating:	Unknown
Service speed:	Unknown
Hull material:	Aluminium
Hull design:	Single hull

Course of event

According to witness accounts, the work boat BB (figure 1) left the harbour of Nykoebing Mors at about 0900 on 2 November 2021 with one mussel farm worker on board. The ship was heading for a mussel farm located approximately two nautical miles from the harbour (figure 2). The weather was good with calm wind/sea and a water temperature of about 6°C.

The work boat was not equipped with any electronic positioning devices or AIS, so the boat's route and arrival time to the mussel farm could thus not be determined with certainty. However, according to other workers on the mussel farm, the trip usually took about 10 minutes depending on the speed.

Later in the afternoon, some of his colleagues noticed that the worker did not return as expected, and they therefore called the farm owner and notified him about the missing worker. The owner suspected that something had happened and rushed to the harbour, took another work boat and sailed as fast as possible to the mussel farm.

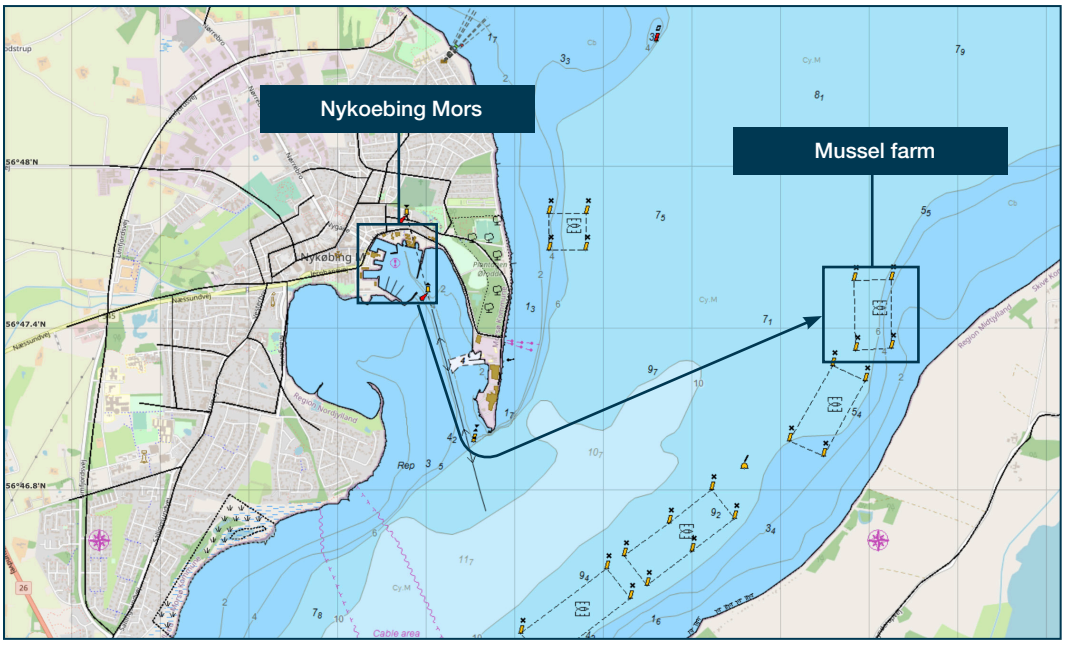

Figure 2: Mussel farm location and BB approximate route
Source:© Made Smart Group BV 2021 © i4 Insight / DMAIB

When he arrived at the farm, he found the worker by the work boat floating with his head submerged in the water. The owner lifted the worker out of the water and onto his own boat using the boat's crane. Once on deck, the owner examined the worker who appeared cold and was not breathing. The owner realised that the worker needed immediate medical assistance. While underway to the harbour, he called the emergency services and informed them about the situation. The time was 1649.

Upon arrival, an ambulance waited on the pier. The paramedics provided first aid to the worker, and shortly after a medical helicopter landed nearby and brought the worker to Aalborg University Hospital.

The worker was treated for hypothermia, but died in hospital two days later.

The investigation

There were no witnesses to the accident, so the investigation focused on answering the following two questions:

- Under which circumstances did the mussel farm worker fall into the water?
- Once in the water, why was the worker not able to save himself?

To answer these two questions the following topics will be examined: The accident site and the mussel farm worker's work practice on the day of the accident.

The accident site

DMAIB examined the work boat while it was alongside in the harbour and brought the work boat to the mussel farm where the accident happened. On site the scene of the accident was reconstructed based on the owner witness statements (figure 3).

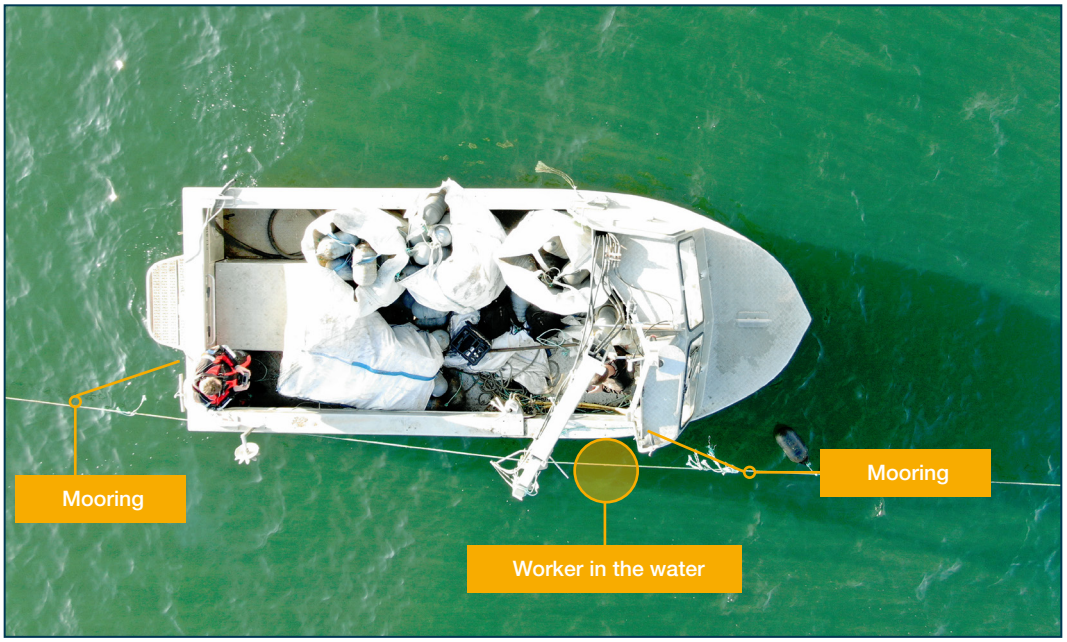

Figure 3: Work boat alongside mussel farm longline
Source: DMAIB

The worker
The work boat was found tied to the mussel farm longline. On the boat's starboard side, the worker was found wearing bib trousers, but his rubber boots and bib waterproof trousers, which he was usually wearing, were missing. Presumably, the boots and bib waterproof trousers were weighing him down in the water, and he therefore took them off. When the owner lifted the worker from the water, he was found clutching a rope in his left hand which was tied to the boat.

During the investigation of the worker's clothing, his phone was found in the trouser pocket, but it was damaged after having been in the water for a prolonged period. DMAIB obtained information from the mobile phone operator which showed that the phone signal was lost at 1019 on 2 November. It is likely that the phone was submerged at that time.

The equipment
An inflatable lifejacket was found on board stowed in a cabinet. It showed signs of having been used, and witness statements suggested that some workers used life jackets when working at the farm. The boat was not equipped with any form of radio or portable emergency beacon, because all the workers carried phones which could be used for communicating with shore.

A ladder and a platform were mounted on the boat's stern which was to be used for climbing out of the water, if a crewmember fell overboard (figure 4).

The ladder was fitted in an upward position and could be released by a person in the water pulling a string. Once pulled down, part of the ladder was submerged, making it easier to climb onto the platform. When the boat was found, the ladder had not been released.

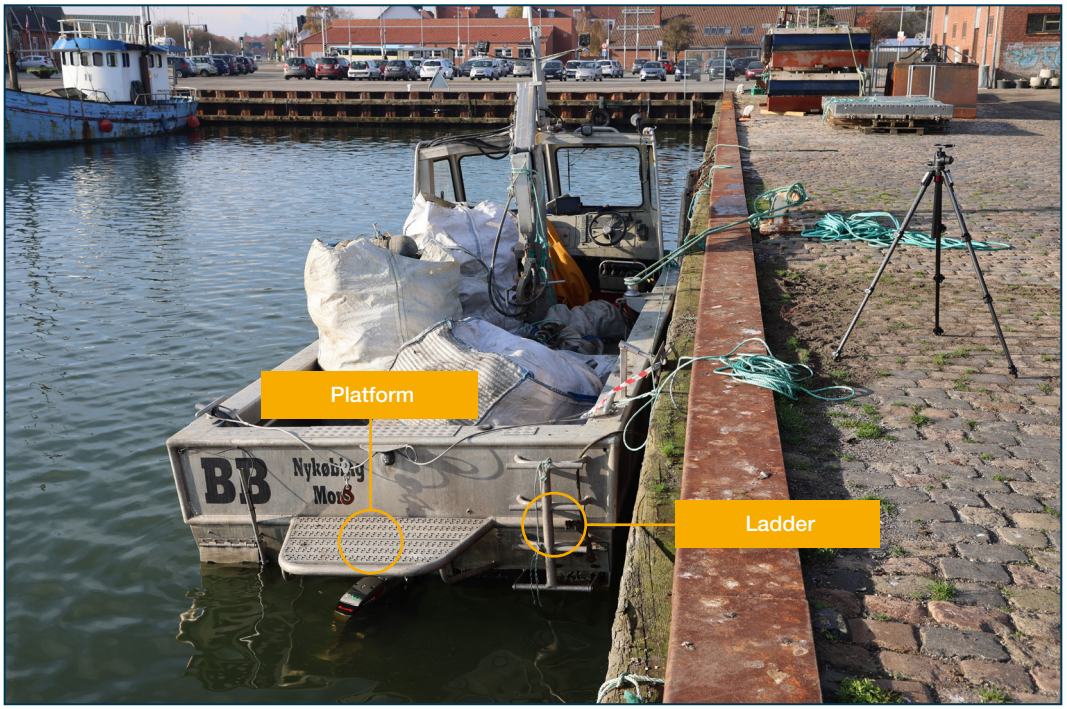

Figure 4: The work boat's ladder and platform
Source: DMAIB

The boat
On the boat's deck four full bags and two empty bags with buoys were found occupying most of the deck area (figure 5). According to the owner's statement nothing unusual was observed on the boat when he arrived and saw the worker in the water, i.e. there were no lines or buoys unusually positioned, and the crane was in its usual place.

To assess the risks of falling overboard, the investigator measured the height of the boat's gunwale. On the aft part of the deck the gunwale measured 82 cm and forward by the conning station it measured 77 cm.

Figure 5: The work boat's deck
Source: DMAIB

Work practise

The purpose of investigating work practices was to clarify the likelihood of the worker being entangled in ropes and being pulled overboard and/or tripping and falling overboard while working alongside the surface longline.

The deceased worker had been with the company for several years and was thus familiar with the boat, the equipment and the work practices. On the day of the accident, he was to connect buoys on the longline where the socks with mussels were to be attached later in the season (figure 6).

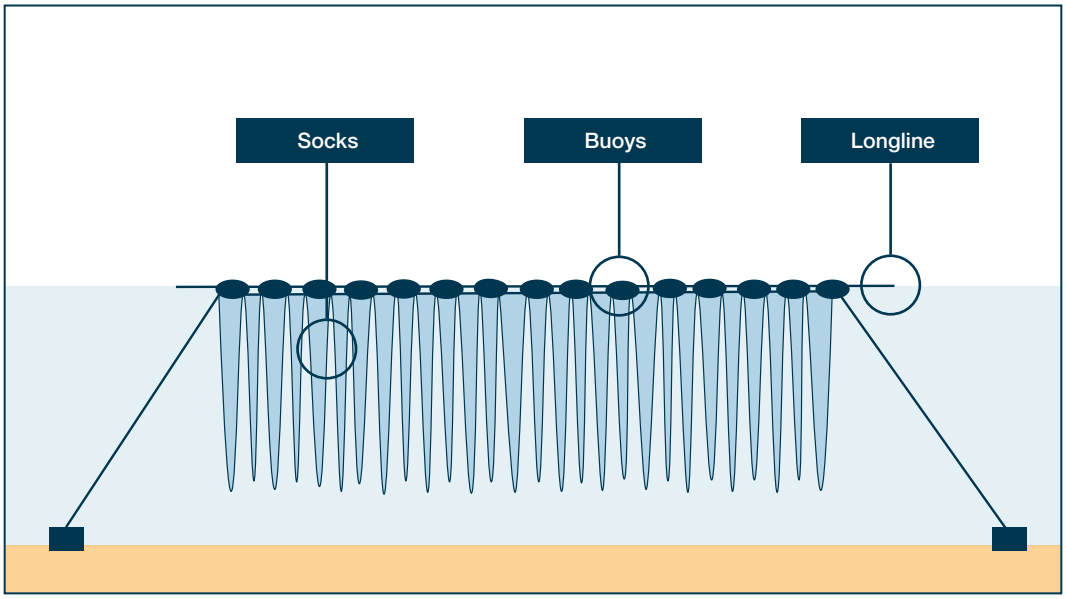

Figure 6: Surface longline
Source: DMAIB

The two empty bags found on the deck indicated that the worker had completed fitting 1/3 of the buoys. On the day of the accident the work entailed fastening the boat to the longline (see figure 2), shortening the longline by lifting it out of the sea using the crane and cutting off a section. The longline tended to become stretched and thus longer after having been in the sea for a prolonged period. Once the longline had been shortened, the buoys were attached.

The reconstruction of the accident site showed that the crane was not in use, and the longline was secured. The longline had thus not been under tension and suddenly released. This indicates that the worker was in the process of shortening the longline when he fell overboard.

Cause of the accident

DMAIB's investigation of the site of the accident and the work practices did not provide sufficient information for DMAIB to determine the exact circumstances which led to the mussel farm worker falling overboard.

There were, however, conditions on the boat in combination with work practices which could enhance the risk of falling overboard. The work practices necessitated that the worker leaned outboards to work on lines and buoys, and the gunwale had a height to make that work practice possible. Unexpected events such as sudden movements of the boat or stumbling on equipment on deck could make the worker lose balance and tumble overboard.

Once in the water the worker struggled with taking off some of his clothing, but he did not manage to swim to the ladder. It is a common assumption that falling overboard in water temperatures of about 10°C is not life-threatening and that a person can always survive for hours in that temperature range. However, as for instance stated in IMO's Guide for cold water survival, there are serious threats to a person immersed in cold water (which is defined as 15°C and below), apart from the major threats of drowning, hypothermia and collapse. The initial responses to immersion in cold water may include inability to hold one's breath, an involuntary gasp followed by uncontrollable breathing, which can lead to inhalation of water, and increased stress on the heart. This phase typically lasts for about 3 minutes, and the cooling of the muscles and nerves immediately starts to reduce the person's ability to perform physical tasks such as swimming and manual dexterity in general. In such conditions it would be difficult for the worker to reach the ladder and climb onto the boat. After having been submerged in the water for a prolonged period, he likely lost consciousness and drowned.

Learning

DMAIB investigations of accidents involving single-handed fishing vessels have shown that the safety of a person working alone relies on the workplace being designed in such a way that there is ample space to avoid stumbling over equipment. Additionally, that and the risks of being entangled in lines, wires and mechanical gear is minimised by appropriate protective mechanisms.

Having equipment to call for immediate assistance and to aid the person recovering from a critical situation is only an add-on to an otherwise well-designed workplace. However, in an emergency that type of equipment is essential for survival.