



DUTCH
SAFETY BOARD

Fatal accident during unloading in Moerdijk

Lessons learned from the accident on board
the A2B Future



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Future

The Hague, January 2019

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Cover photo: Dutch Safety Board

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

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INTRODUCTION

On 30 December 2016, a crewmember from the Dutch container vessel A2B Future fell overboard. At that moment, the vessel was moored in the Central Dock in Moerdijk. The crewmember was in the process of unloading containers so they could be discharged from the vessel. While working, he fell overboard. The vessel's second officer did not see the crewmember fall overboard, but did observe a person in the water who was struggling to remain afloat. Shortly afterwards the person no longer rose to the surface.

Immediately following the accident, a rescue operation was initiated with the assistance of various vessels and emergency services. The victim was found and removed from the water after around 50 minutes. He was taken to hospital, where he later died.



Figure 1: Rescue operation by the emergency services. (Source: Twitter)

The accident has been classified as a very serious accident as defined in the Casualty Investigation Code of the International Maritime Organization (IMO) and Directive 2009/18/EC of the European Parliament and the Council. This means that the Netherlands, as the flag state, bears the obligation to ensure that an investigation is carried out. This obligation to carry out an investigation is also laid down in the Safety Board Decree.

For the analysis of this accident, the Safety Board held interviews with the parties involved and examined various documents and photographic material. On the basis of this information, the Safety Board was able to prepare the picture of the accident as described in this report.

1 BACKGROUND INFORMATION

The background information provides a brief description of the parties directly and indirectly involved in the fatal incident.

Ship and crew

The A2B Future was built in 1995 by the German yard J.J. Sietas Shipbuilding GmbH in Hamburg, Germany. At the moment of the accident, the A2B Future was managed by Holwerda Shipmanagement B.V. based in Heerenveen. The A2B Future has a maximum container capacity of 508 TEU¹.



Figure 2: The A2B Future in the Dordtse Kil en route to Moerdijk. (Source: Dutch Safety Board)

At the time of the accident, the crew of the A2B Future consisted of thirteen crew members and a trainee. The positions of the crew members and their numbers appear in table 1. The victim, a deckhand, was an Indonesian national, and had several years experience at sea.

¹ TEU: Twenty feet Equivalent Unit.

Position	Number
Captain	1
First officer	1
Second officer	1
Chief engineer	1
Second engineer	1
Deckhand - cook	1
Deckhand	6
Trainee	1

Table 1: Crew composition.

Holwerda Shipmanagement BV

At the time of the accident, the Dutch container vessel the A2B Future was managed by Holwerda Shipmanagement B.V. The ship was chartered by A2B-Online, which in turn has a contract with the terminal CCT.

Holwerda Shipmanagement is International Safety Management (ISM) and ISO 9002 certified by the Germanischer Lloyd. The operator uses a Ship Management System (SMS) consisting of a shore element and a ship element. The SMS identifies risks for a number of specific ship-based operations, and specifies any necessary management measures. The SMS also lays down the risk inventory and evaluation (RI&E) procedure. The aim of this procedure is to increase awareness among crewmembers of any residual or unknown risks, by means of work meetings. The operator visits the vessels and holds internal audits according to a regular audit timetable.

A2B-Online Container Division

On 1 June 2013, A2B-online started container transport operations with a regular Moerdijk-Immingham service. They offer similar activities to other locations in England. These services are provided by four container vessels, two of which under own management, the A2B Future and the A2B Energy, managed by the ship management company Holwerda Shipping. A2B-online Container Division also charters two other vessels, the Alma and the Anja.

Combined Cargo Terminals (CCT)

On 1 May 2004, CCT started stevedoring operations in the port of Moerdijk. Vessels are able to reach the port in around 4 hours, from the North Sea, since there are no delays due to locks or as a result of tidal effects. CCT is a combined shortsea terminal and inland terminal; a seaport with trimodal transport facilities for shipping, road transport and railway. The lead time – the loading and unloading time in the port – for containers at the terminal ranges from between 7 and 22 minutes.

For loading and unloading vessels in the port of Moerdijk, CCT has a number of staff on the dockside. The controller is responsible for the correct loading of containers on the vessels, according to the loading plan. The controller also records any visible damage that occurs during work. The crane operator is responsible for placing the containers on board, and physically unloading the containers, following the arrival of the vessel. The reach stacker driver is responsible for moving containers on the dockside in the correct order, following unloading, and prior to the loading of the vessel, by the crane operator.

Sailing route

The A2B Future mainly sails on fixed routes between the United Kingdom and the Netherlands. On Thursday 29 December 2016, the vessel left the port of Thamesport, United Kingdom, heading for the port of Moerdijk in the Netherlands. The vessel moored in the Central Dock at Combined Cargo Terminals at 11.00 hours² on Friday 30 December 2016.

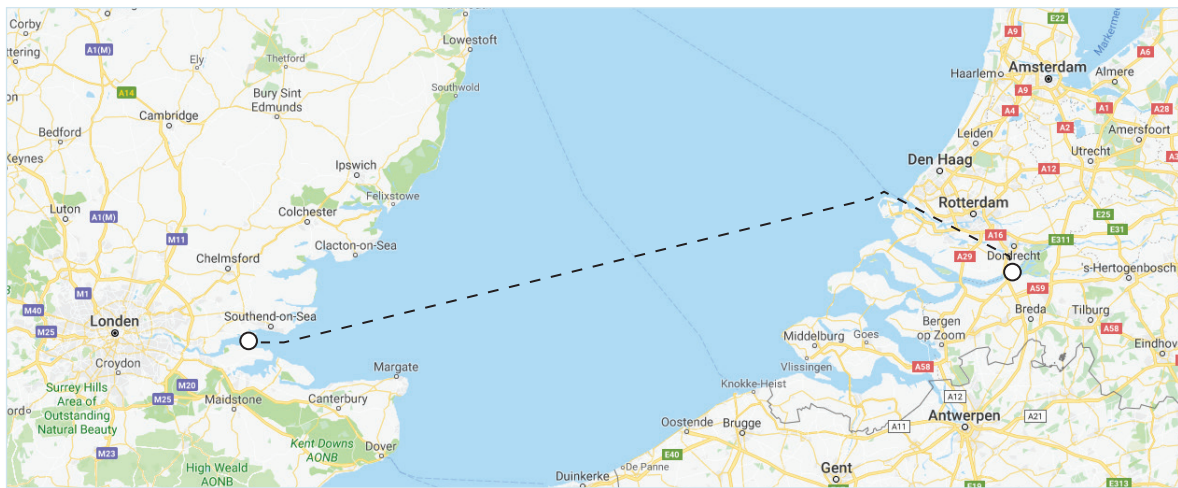


Figure 3: Sailing route between Thamesport and Moerdijk. (Source: Google)



Figure 4: Central Dock Moerdijk. (Source Google)

² All times in this report are local time (UTC+1).

Weather conditions

At the time of the accident, the weather was dry and calm. The maximum temperature was 4 degrees Celsius, and there was a gentle southwesterly breeze, force 2 Beaufort. The water temperature was just above freezing.

2 THE ACCIDENT

The A2B Future made the crossing between Moerdijk and Thamesport three times a week. On Thursday 29 December 2016, at around 10.30 hours, the A2B Future moored at the port of Thamesport. Fifteen minutes after mooring, work was started on loading and unloading the containers. At around 18.00 hours, the crew completed the manual securing of the containers that were stored on deck, a task otherwise known as lashing. The lashing of these containers is of essential importance to prevent the cargo from shifting during the sea crossing. After this work was completed, the A2B Future set off on the journey to Moerdijk, a short time later.

After the A2B Future had entered the port of Rotterdam, the vessel faced several hours sailing to reach the port of Moerdijk. During this period, a number of deckhands had released and removed the lashing bars of the inside rows of containers on deck. The lashing bars on the outside row on the port and starboard side of the deck, respectively, remained tightly lashed.

On Friday 30 December 2016 at around 11.00 hours, the A2B Future moored in the Central Dock in Moerdijk. Around forty minutes later, a start was made on the final preparations for unloading the containers. These preparations included releasing and removing the remaining lashing bars, and opening the semi-automatic twistlocks. One of the deckhands, the later victim, carried out this work together with a fellow deckhand.

Semi-automatic twistlock

The semi-automatic twistlock is a tool consisting of a rotating cone used for securing containers to the vessel or to one another. Each corner of the containers – the corner casting – features openings into which these twistlocks are inserted. This allows containers to be stacked and locked in position once the handle has been switched.



Figure 5: Twistlock in a corner casting. (Source: Dutch Safety Board)

At around 11.20 hours, all lashing bars had been removed, and the semi-automatic twistlocks opened, so a start could be made on the physical unloading of the containers. The actual work of unloading the containers was supervised by the first officer of the A2B Future.

During the unloading of the containers, four crewmembers were placed at the disposal of the shore staff of Combined Cargo Terminals. Together with two crane operators and two radio deck men, they made up the two unloading teams. One team for each dock crane.

The deckhand who later became the victim stood on the dockside to release and remove the semi-automatic twistlocks below the suspended containers. After the container is lifted from the vessel by the dock crane, the twistlocks remain behind in the corner castings. These have to be removed by hand. The container is then passed down the logistic process chain.



Figure 6: Twistlocks are removed on the dockside from below the suspended containers. (Source: Dutch Safety Board)

During the unloading process, one container could not be lifted from its position because it was still attached to the container below it. At this point, the victim went back on board the vessel. Via the gangway he walked to the location where the containers were stuck together. Once there, via a permanent stairway, he climbed up the deck hatch and between two rows of containers until he reached the container in question, to open the still closed twistlock.



Figure 7: A spreader is placed on top of the container. (Source: Dutch Safety Board)

The deckhand on the dockside saw the victim indicate to the crane operator using hand signals that the container could be lifted. He then saw the victim walk back towards the permanent stairway. Shortly thereafter the crane operator once again attempted to lift the container in question, and at that time the victim must have fallen overboard.

At around 12.10 hours, from the bridge, the ship's second officer saw a person in the water, alongside the vessel, who was struggling to remain afloat. The second officer immediately warned everyone present on the bridge. On the instructions of the captain they immediately went to the location where the victim was lying in the water, to offer assistance. The captain remained on the bridge and directly notified the local authorities. A rescue operation was initiated by the crew, but by that time the victim had already disappeared below the surface.

The called-out emergency services arrived at the location and a fire brigade diving team initiated a search alongside and below the ship. After searching for around 50 minutes, one of the divers located the victim underwater, not far from the location where he was last seen. Once he had been brought to the surface, the emergency services started their efforts to resuscitate the victim. Shortly afterwards the victim was transported to hospital by ambulance which was standing by, where he died a short time later.

3 ANALYSIS

Accident

The investigation revealed that the victim was walking back to the permanent stairway to leave the deck. Although no one saw the victim fall, it is likely that he fell from the deck hatch which is not fitted with any provisions to prevent falling, such as a railing.

When working at height, personnel must be protected against the risks of falling from height. First and foremost, collective provisions such as a railing or balustrade must be installed. If collective provisions are not an option, as in this case on the edge of the deck hatch, individual measures must be taken. For example a secure safety line that prevents a deckhand walking further than the edge of the deck hatch. If this proves impossible, staff must individually be provided with personal protective equipment to prevent falling from height. For example a safety harness in combination with a safety line and fall arrester.

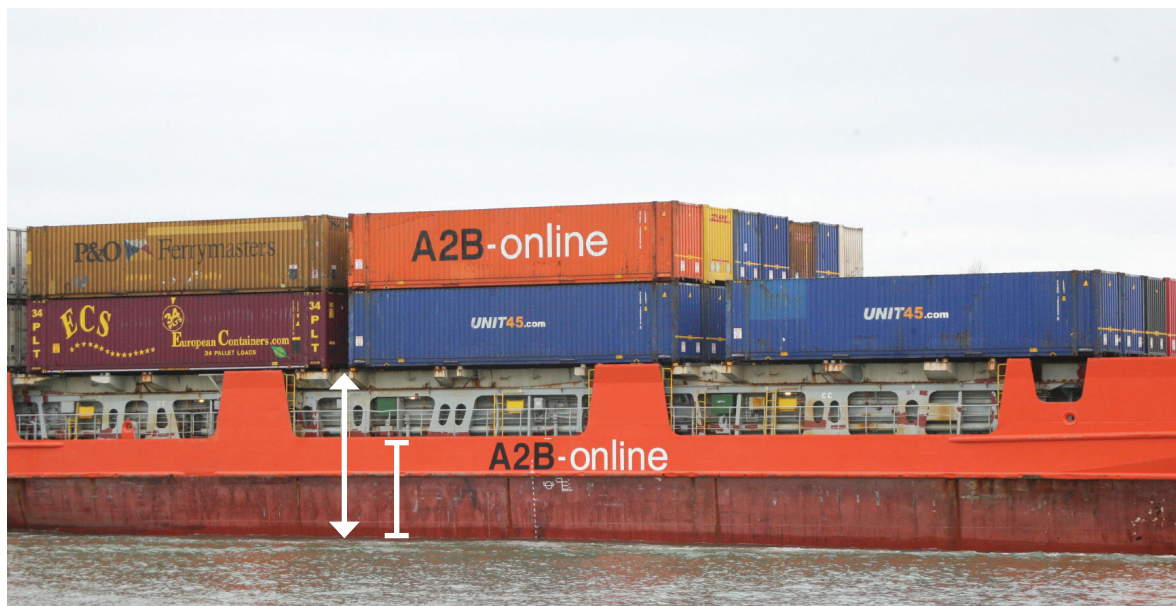


Figure 8: Illustration of fall height by way of indication. (Source: Dutch Safety Board)

The investigation revealed that no individual measures were taken to prevent falling from height. Furthermore, the victim had no personal protective equipment such as a lifejacket to limit the consequences of falling from height into the water.



Figure 9: Opening for the ascent point. (Source: Dutch Safety Board)



Figure 10: Opening for the ascent point. (Source: Dutch Safety Board)

No general or specific procedures or working agreements were available on board for working at height. There had been a 'Toolbox Meeting Working Agreements A2B' in which a number of working agreements were discussed. One of these related to working next to an open hatch. This stated that *'no one should stand or walk on the coaming or should stand near an open hatch without fall protection'*.

The absence of clear procedures in respect of working at height and the lack of correct information and instructions for working at height meant that the deckhand was poorly prepared to carry out his task safely.

Due to the absence of permanent measures (such as railings) or personal protective equipment (such as a harness) to prevent the falling from height, the victim fell into the water.

When he fell overboard, the deckhand was not wearing a lifejacket, which delayed the rescue of the deckhand. At the moment the victim entered the water, the water temperature was just above freezing. Due to a combination of hypothermia and injuries possibly caused by the fall, as well as the fact he was not wearing a lifejacket, the victim was not able to remain afloat for any length of time.

A lifejacket was available for the victim, on board. Procedures on board only require the lifejacket to be worn when lowering and raising the anchor and when mooring and unmooring the vessel. Wearing a lifejacket when working at height is not required by the operator and is not included in the procedures or appropriate working agreements. It became clear from interviews that the victim deliberately chose not to wear a lifejacket during loading and unloading. The crew expressed the opinion that during these operations, the lifejacket could easily become caught on protruding objects

The low water temperature on the day of the accident and the fact that the victim was not wearing a lifejacket reduced the victim's chance of being rescued from the water in time.

Shared responsibility for safety

During the unloading of a container on board seagoing vessels, it is not uncommon for a semi-automatic twistlock to become accidentally relocked. Situations of this kind are therefore not exceptional. It may be expected that a clear, simple and practical procedure be produced for a situation of this kind, in which multiple people are involved, to enable them to carry out this work safely. This procedure must also be clearly explained to the employees involved. There was no such procedure in this case.

Over the past 4 years, the Dutch Safety Board has investigated 3 previous fatal accidents during loading and unloading work and the preparations for this task.

Previous accidents

A fatal accident occurred on board the reefer ship Cool Expreso on 7 August 2014.³ The accident took place during transfer at sea of pallets containing frozen fish packages from the fishing vessel Annelies Ilena. The final pallet was labelled by an Annelies Ilena crewmember on board of the Cool Expreso. The pallet shifted and trapped the crewmember between the railing and the pallet, fatally wounding the crewmember.

On 3 September 2014, a crewmember of the Dutch container vessel Freya⁴ fell overboard while sailing on the river Humber towards Immingham, England. The crewmember concerned was disconnecting container lashings prior to arrival. Immediately after the accident a rescue operation was started with the assistance of several vessels in the vicinity, without result.

On Wednesday 18 May 2016, a crewmember on board the Dutch container vessel Alma was killed during the loading of containers.⁵ The vessel was moored at the Central Dock in Moerdijk. During loading work, the crewmember climbed onto the roof of a container, while another container which had been placed on top was lifted askew. The top container was put back in position, while the crewmember was still on top of the bottom container.

One of these fatal accidents also occurred at CCT in the port of Moerdijk. Although the nature of the accident itself was different, the same parties were involved. Following the investigation carried out at the time, the Dutch Safety Board reached the following conclusion:

Indirect cause:

"There were no clear or consistent agreements about cooperation between the on-board crew and shore crew concerning loading and unloading activities in the port. As a result there is no overarching and unique supervisory role or responsibility. The investigation raises doubts about the understanding of safety at management level. Due to the lack of supervision during implementation in the workplace, it is effectively left to the workplace to eradicate any observed safety risks. The investigation reveals that this can result in individual interpretation of the tasks without any shared safety goals."

³ <https://www.onderzoeksraad.nl/en/page/4125/fatal-voorval-tijdens-overladen-op-zee-7-augustus-2014>

⁴ <https://www.onderzoeksraad.nl/en/page/3893/bemanningslid-overboord-tijdens-losmaken-containersjorringen-3>

⁵ <https://www.onderzoeksraad.nl/nl/page/4756/fatal-accident-door-beknelling-tussen-twee-containers>

The nature of the accident on the A2B Future differs from the accident in the previously mentioned investigation, but is the result of the same problem. There was no formal shared responsibility for safety between the shore crew and ship personnel. The captain is responsible for safety on board the ship while the terminal is responsible for safety on shore. There is no formal overall supervision of the loading and unloading crew and no overall responsibility for the safety of all round dock work.

The ISM system of the operator does include a work instruction 4.1.3.1. "Safety Regulations Loading Operations" which refers to safety during the loading and unloading of containers. Furthermore, a risk assessment was drawn up for the loading of containers in relation to working at height in combination with the use of twistlocks. The operator views this task as an out-of-the-ordinary and high-risk activity. However, there is no procedure that specifies how cooperation should be organised with a shore crew during loading and unloading work. Although the deckhand on the dockside observed how the victim indicated to the crane operator with hand signals that the container could be lifted, there was no shared understanding of the risk run by the victim in his position at that time.

Following the previous investigation report, consideration was given at management level by both the operator and the terminal as to how safety could be improved during the transshipment of containers in the port of Moerdijk. Representatives of the operator, the charterer and the terminal organised joint management discussions on the issue. Interviews with the parties involved and the documents provided have shown that the agreements reached during these discussions were not translated into joint agreements in the workplace. Each individual party developed proposals for their own personnel and their own situation. As a result, there is no coherent safety procedure while it is in fact essential that all parties involved in the workplace integrate their activities and develop a sense of shared responsibility.

4 CONCLUSIONS

On 30 December 2016, at around 12.10 hours, the second officer of the A2B Future saw a person in the water struggling to remain afloat, who shortly thereafter disappeared below the surface. This person eventually turned out to be a crew member who was located after 50 minutes of searching by a fire brigade diver, and who later died. No one exactly saw how the crew member in question was able to fall overboard on 30 December 2016. The fact is that due to the absence of any type of fall protection, he was able to fall from the hatch into the water. The crew member was not wearing a lifejacket and shortly after entering the water he was unable to independently remain afloat. On the day in question, the water temperature was around freezing. Due to a combination of hypothermia and injuries possibly caused by the fall, the victim eventually died in hospital.

Prevent or limit

Correct preparation for a task requires the provision of adequate information and training. Working at height calls for clear procedures for this activity, and an understanding of the risks that can arise and the relevant protection measures.

At the accident location, the installation of adequate protection to prevent falling overboard, such as a railing, is not immediately possible. In situations where permanent protection is not possible, other methods of reducing the risks of falling (overboard) must be sought.

If permanently wearing a lifejacket can lead to the wearer becoming caught on protruding objects during loading and unloading work, a safe and workable alternative must be found. This could involve wearing a different type of lifejacket or carefully investigating what alternative measures could be taken.

It is important to determine in advance where the priority should lie. Was it possible in this case to manage the risk of falling overboard or should the consequences of falling overboard have been limited?

In the absence of permanent measures or contradiction in the use of personal protective measures (chances of getting caught vs protection when falling overboard), it is essential to constantly consider whether the likelihood of occurrence should be managed, or whether the consequences should be limited as far as possible.

Safety is a shared responsibility

The loading and unloading of containers is a very dynamic process. During this process many different problems can arise, such as a twistlock becoming relocked. The relocking of a twistlock is not a unique occurrence in the loading and unloading process. This problem occurs regularly and is generally solved on an ad hoc basis while it is in fact essential that sound agreements be reached together with other actors in the loading and unloading process, to ensure safe cooperation.

The operator and the terminal have failed to prepare a clear and jointly agreed practical procedure for a situation which in itself is not unusual, namely the accidental locking of a twistlock during the unloading of containers. After two fatal accidents within just one year, regular discussions have been organised at management level between the operator, the charterer and the terminal. Any initiatives emerging from those discussions are translated by the parties to the workplace, within their own organisation. However, the transshipment of containers – a process in which the ship's crew is required to cooperate alongside shore crew – calls for more.

The dockside in the port is a physical dividing line between ship and shore. The captain is responsible for all work on board, while the terminal management is responsible for work on shore. However, responsibility for safety during the loading and unloading process cannot be split by a dock wall. This is all the more true if the employees from both parties are required to work together, in the process. In addition to a common vision on safe cooperation, it also calls for an overarching supervisory role and shared responsibility.

In earlier investigations (see page 16), the Dutch Safety Board had already identified the loading and unloading of containers as a high-risk activity. The Safety Board expects parties cooperating within this loading and unloading process at least:

- to identify the events in this process in which ship and shore are required to work together, to solve the situation;
- in the workplace, to establish joint agreements that transcend their own organisation and to not only take measures within their own organisation to make the process safer;
- to ensure a shared safety manual;
- to organise trainings in which employees learn in the workplace how to work according to this shared safety manual, and gain an insight into the risks affecting the other party;
- to organise training in which employees learn in the workplace how to deal with situations in which it is up to them whether an occurrence should be prevented, or its consequences limited.

APPENDIX A

Vessel data A2B Future

Photograph:



Source: Dutch Safety Board

Call sign:	PBJY
IMO number:	9122241
Flag state:	Netherlands
Home port:	Moerdijk
Type of ship:	Fully Cellular Containership
Classification society:	Germanischer Lloyds
Year of construction:	1995
Yard:	J.J. Sietas Shipbuilding GmbH
Length overall (Loa):	101.13 m.
Length between perpendiculars (Lpp):	96.13 m.
Breadth:	18.2 m.
Actual draught:	8.25 m.
Gross Tonnage:	3999
Engines:	1 Deutz TBD645L9
Propulsion:	1 propeller, 1 bow thruster
Maximum propulsion capacity:	3878 kW
Maximum speed:	15.0 knots
Vessel's certificates:	All valid

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