DUTCH
SAFETY BOARD

Crew member overboard while disconnecting container lashings

MS Freya, Humber

Crew member overboard while disconnecting container lashings

MS Freya, Humber, 3 September 2014

The Hague, November 2015

Photo cover: MS Freya. (Source: Dutch Safety Board)

Dutch Safety Board

When accidents or disasters happen, the Dutch Safety Board investigates how it was possible for them 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.

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NB: This report is published in the Dutch and English languages. If there is a difference in interpretation between the Dutch and English versions, the Dutch text will prevail.

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INTRODUCTION

On 3 September 2014 a crew member fell overboard from the container ship Freya, which was sailing under Dutch flag. At the time of the accident the vessel was sailing up the river Humber, England, towards its destination, Immingham. The crew member concerned was busy disconnecting lashing rods just prior to arrival. A rescue operation was initiated immediately after the accident, with assistance from various vessels in the vicinity. However, the crew member who fell overboard is yet to be found. Following the accident, three investigators from the Dutch Safety Board went on board to conduct an investigation.

This was a very serious accident as referred to in the Code for the Investigation of Marine Casualties and Incidents adopted by the International Maritime Organisation (IMO), and in EU Directive 2009/18/EC. This means that the Netherlands, as the flag state, has a duty to ensure that a safety investigation is carried out. This statutory investigation duty is also set out in the Dutch Safety Board Decree (Besluit Onderzoeksraad Voor Veiligheid).

This report describes the relevant facts of the incident and the direct and underlying causes. The report concludes with lessons that can be drawn from this accident. The Tripod method was used to analyse this accident. This analysis starts from failing safety measures, or barriers. This analysis was used to investigate the direct and underlying causes of the failure of these barriers in the Freya accident. Finally the shipping company executed several improvement measures. These are mentioned in appendix 2.

Vessel and crew

At the time of the accident, Holwerda Shipmanagement B.V. from Heerenveen had complete management of eight container ships, including Freya, which was sailing under the Dutch flag (see appendix 1, vessel details). Freya was built in 2000 by J.J. Sietas Shipbuilding GmbH & Company KG in Hamburg, Germany and was named Frederika. Between 2000 and 2007 the ship operated under the name Dalsland. The ship has operated under the name Freya since May 2007. The vessel has a container capacity of 658 Twenty feet Equivalent Unit (TEU).[1] The ship sails mainly on fixed routes in the North Sea and Baltic Sea. At the time of the accident the ship had sailed under time charter[2] for Shudi Logistics in Norway for a six-month period.

The minimum required crew on board the Freya is eight. There were eleven crewmembers on board during the accident. The captain, the second mate and the trainee were Dutch. The first mate, chief engineer and second engineer were Russian and the ratings were Indonesian. The official language on board was English. All crewmembers had the prescribed certificates of competency. The Dutch and Indonesian crewmembers are employed directly by the shipping company, while the Russian crew were hired via a permanent staffing agency. The crew alternate between the shipping company's eight vessels to prevent routine and where possible are not relieved all at the same time. The shipping company strives to rehire staff that perform well. The 28-year-old Indonesian seaman who fell overboard during the accident came on board on 26 May 2014. He had not previously sailed on Freya, but had sailed with the shipping company previously on similar vessels.

Container lashings

It is extremely important for the seaworthiness of seagoing vessels that manual securing, better known as lashing, is used to prevent cargo from shifting. On board container ships containers are lashed on deck using prescribed lashing equipment, including lashing rods. A lashing rod is a long metal rod with a hook on two sides. A turnbuckle is attached on the deck side of the rod to secure the iron rod to the deck. Lashing rods can be of varying lengths, depending on the number of containers being lashed. A lashing rod for one container is usually two and a half metres in length, with a lashing rod for two containers quickly reaching five metres in length (see figure 1). A lashing rod of two and a half metres weighs an average of 12 kilos. A five-metre lashing rod weights an average of 21 kilos. Securing and disconnecting lashings is heavy physical work.

1 TEU is the term used to indicate container capacity. A TEU is a container of 20 feet long, 8 feet wide and mostly 8.5 feet high. In the metric system a TEU is 6.10 metres long, 2.44 metres wide and 2.59 metres high. A 40-foot long container counts as 2 TEU. The external volume of a TEU is 1360 cubic feet, which is 38.51 cubic metres.

2 Time charter: an agreement between a shipping company and a hirer in which a ship is hired for a specific period. During this period the hirer (charterer) can decide where the vessel will sail.

Statutory conditions have been set down regarding lashing containers on board a seagoing vessel. Article 52 of the shipping decree refers to the SOLAS convention chapter VI, part A. This states that every vessel larger than 500 GT must carry a Cargo Securing Manual (CSM). It also states that containers must be loaded, stowed and secured during the journey in accordance with the Cargo Securing Manual approved by the flag state. For the CSM content, SOLAS refers to the Revised Guidelines for the Preparation of Cargo Securing Manual, MSC1-circ1353 (see appendix 2).

Figure 1: Stevedore secures a 5-metre-long lashing rod. (Source: www.portpictures.nl - Danny Cornelissen)

Safety management

Holwerda Shipmanagement is International Safety Management (ISM) and ISO9002 certified by Germanische Lloyd. The shipping company has an active Safety Management System (SMS) in use, comprising office and vessel sections. The SMS identifies the risks and control measures for various specific vessel operations. A risk assessment procedure is also prescribed in the SMS. This procedure is intended to raise crew awareness of residual or unknown risks, using work meetings. The shipping company visits the vessels regularly to conduct internal audits.

Weather conditions

It was dry and slightly misty on the evening of the incident. The temperature was 16 degrees Celsius and there was a light easterly wind, force 2 Beaufort.[3] There was no swell or wave movement. It was flood tide. The tidal strength was 1 to 1.5 knots. At the time of the incident dusk was at 21:54. Sunset on 3 September 2014 was at 22:30 Nautical Time (NT).[4]

Narrative

On 3 September 2014 at 11:05 NT the container ship Freya, which was sailing under Dutch flag, arrived at the Humber pilot station anchorage area. The ship had sailed from Drammen, Norway, and its final destination was Immingham dock. Nine containers on board Freya were destined for Immingham dock, weighing a total of 127 tonnes. As the berth would not be available until later in the evening, the captain decided to anchor. After Freya's captain had[5] contacted Humber Vessel Traffic Service (VTS)[6] at 11:19 hours to verify the correct anchorage position, the VTS station reported that the pilot would come on board at[7] 20:15 hours. At 11:25 hours, Freya anchored on Humber Roads. The crew continued with the daily on-board routine including administrative and maintenance activities.

At 19:03 hours, the captain instructed the first mate on the bridge to go to the forecastle to raise the anchor. After the first mate had raised the anchor, at 19:14, he returned to the bridge to assist in navigating the vessel. The captain contacted Humber VTS. The definitive time on which the pilot was to come on board was agreed, after which a course was set from the anchorage area to the pilot station. The captain then instructed the boatswain[8] via walkie-talkie that the pilot would come on board in an hour. As instructed by Humber VTS, the captain also asked the boatswain to rig the pilot ladder on the port side. The boatswain then gave verbal instructions to two colleague seamen to prepare the berthing warps on the forecastle and then to start disconnecting the lashing rods of the containers that were destined for Immingham. The two seamen started from the forecastle and worked backwards towards the stern. The boatswain prepared the pilot ladder together with a third colleague and then started to disconnect the lashing rods at the stern. This pair worked from the stern to the forecastle.

3 Beaufort: The Beaufort scale is used to indicate wind intensity. The scale was formulated in 1805 by the Irishman Francis Beaufort. The scale is based on the force exercised by the wind per surface unit, not on the wind speed as measured on the ship. Since 1838 it has been standard practice to use the Beaufort scale in the ship's log.

4 NT: Nautical Time. This is the time used on board the ship. Often this is the time used in the home port. If the time zone in which the ship is located differs significantly from the time on board, the time is adjusted. All times stated in this report are in NT.

5 Times have been gathered from the VDR data analysis.

6 VTS: Vessel Traffic Service. VTS coordinates shipping from and to ports and across busy shipping routes on rivers. It can be compared with air traffic control for air traffic and, likewise, uses radar. In shipping this coordination is an informative service, unlike in aviation where an air traffic controller can give mandatory commands to pilots. A VTS controller cannot oblige a captain to do something, although it is advisable that the captain analyses the information given to him thoroughly and takes this into consideration.

7 Pilot: A specialist with significant knowledge of local waterways, who advises captains and skippers regarding navigating through a certain area. The captain retains final responsibility; the pilot's role is only an advisory one towards the officer of the watch. A pilot boards the vessel at sea from a pilot vessel or pilot tender and nowadays also by helicopter.

8 Boatswain: no boatswain is mentioned officially on the Freya crew list. However, in practice this function is often performed by the most experienced seaman on board.

At 20:28 hours, Freya arrived at the pilot station and the pilot vessel brought the pilot on board. On arrival on the bridge (at 20:33 hours) the pilot warned the captain that large vessels were expected to depart on the river in the Immingham docks area, which would mean reducing speed on entering Bull channel.[9] In the meantime the two seamen on the forecastle had finished their preparations for arrival and started disconnecting the lashing rods. Seaman 1 started at position 1 and seaman 2 at position 2 (see figure 2).

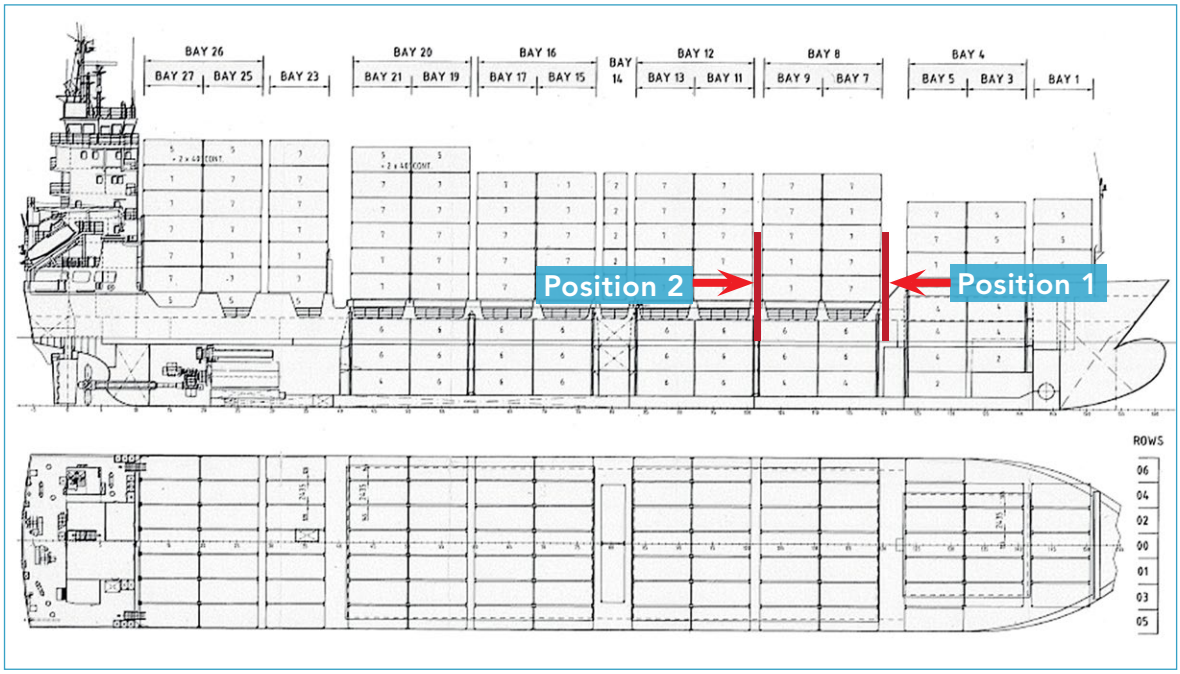

Figure 2: Schematic drawing of MS Freya. (Source: Holwerda Shipmanagement B.V.)

At 20:43 hours, the first mate on the bridge asked the captain's permission to go to the cargo office to start preparations for unloading the containers. The captain gave permission for this and also informed the first mate that it would be a further hour's sailing to the locks, after which the first mate left the bridge. In the meantime seaman 1 at position 1 had finished disconnecting the lashing rods and went to position 2 to assist seaman 2. He started on the port side with the outermost lashing rod. This was a long lashing rod of approximately five metres in length, two containers high (see figure 3).

9 Bull channel: the southernmost passable channel for shipping on the river Humber (see figure 4).

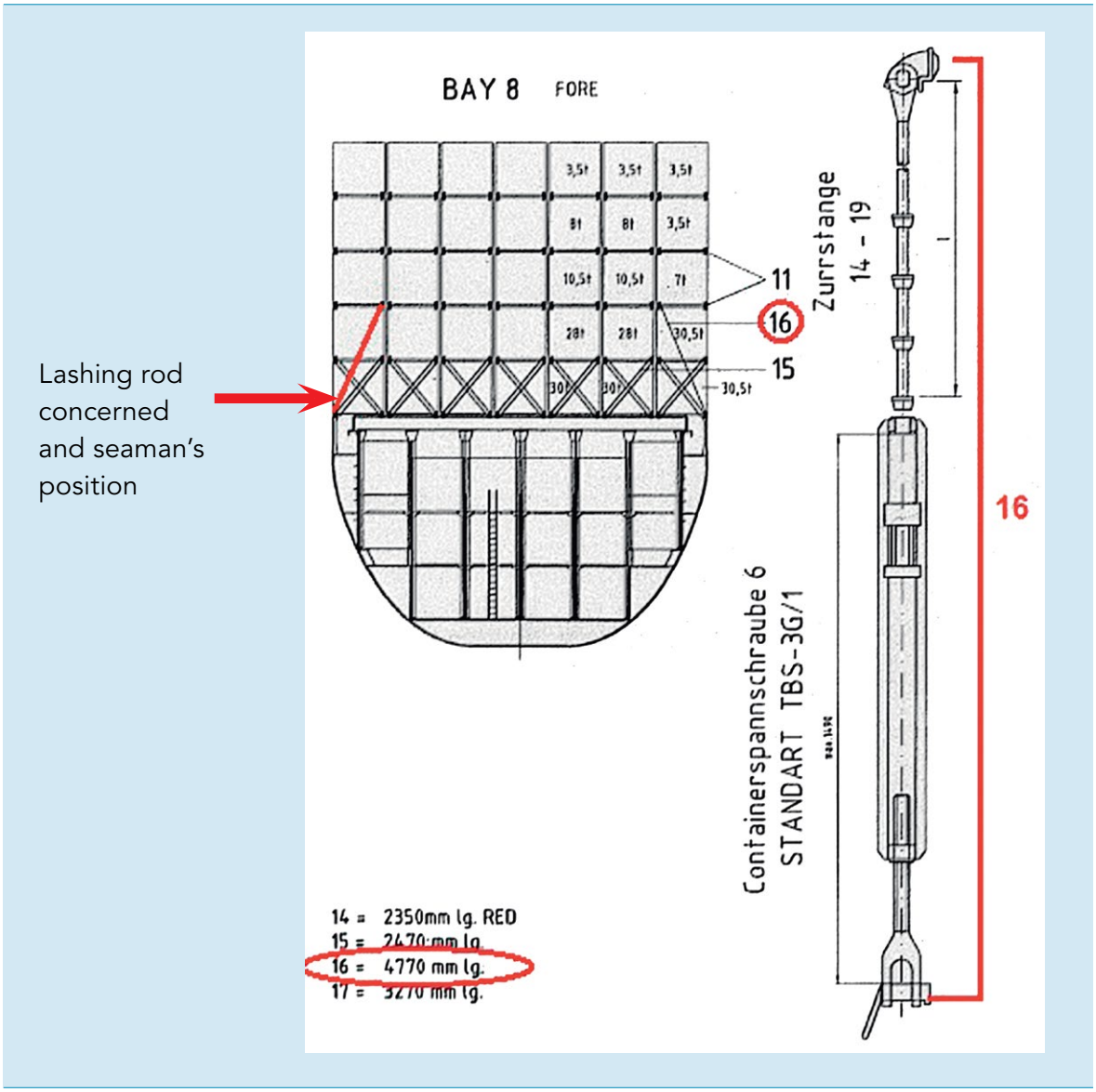

Figure 3: Schematic drawing of the containers in position 2 and the lashing rod concerned. The relevant information is marked red. (Source: Holwerda Shipmanagement B.V.)

Seaman 2 noticed this and instructed seaman 1 to leave the outermost lashing rods until later and continued with his duties. A short while later, seaman 2 looked up again to see seaman 1 balancing with the long lashing rod upright in his hands. Following a brief moment of balance, seaman 2 then saw the lashing rod fall overboard. Seaman 1 initially kept his balance, but fell overboard a short while later (around 20:50 hours).

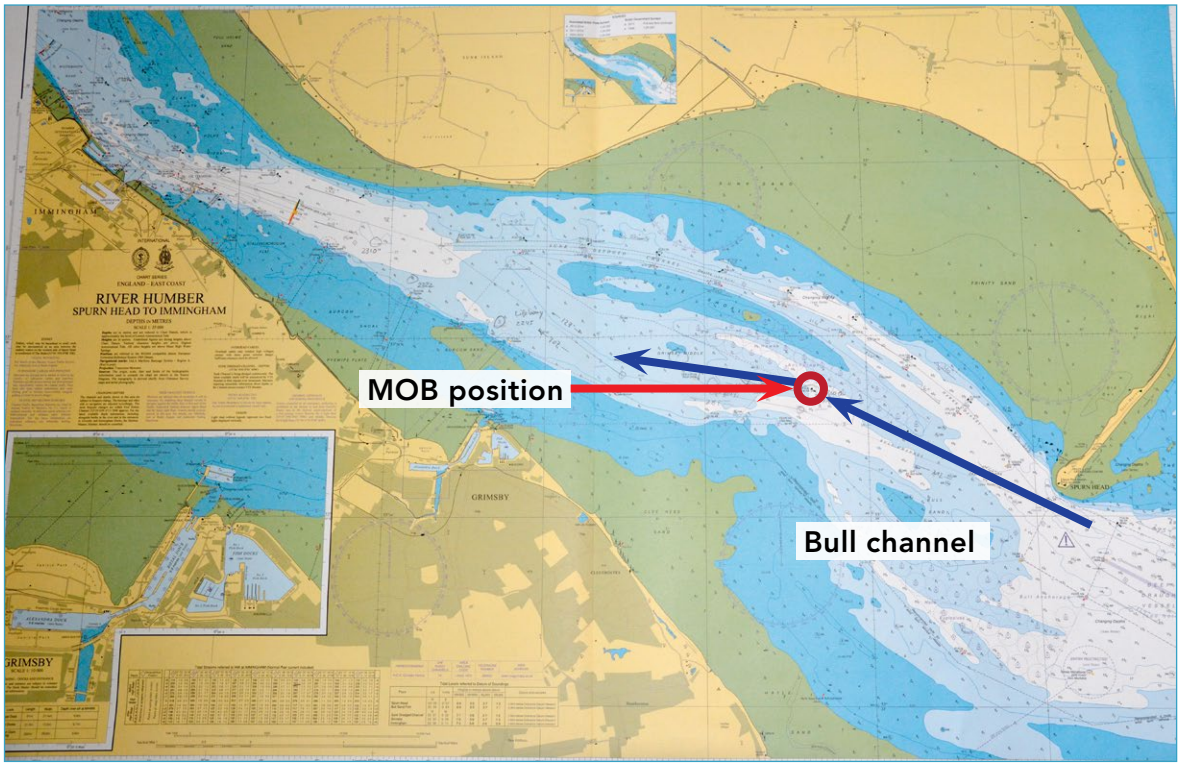

Figure 4: Sea chart of the Humber including the MOB position. (Source: Dutch Safety Board)

Seaman 2 was very shocked, but responded immediately and ran towards the stern. En route he threw a lifebuoy with light into the water. Arriving at the stern seaman 2 immediately called the bridge where the captain answered the call at 20:59. Seaman 2 reported the man overboard to the captain. The captain informed the pilot immediately, issued a general alarm to alert the rest of the crew and pressed the Man Over Board (MOB)[10] button on the GPS (Global Positioning System)[11] to mark the position. The pilot then informed Humber VTS about the situation after which, at 21:00 hours, the captain threw lifebuoys with smoke markers from the bridge at the port and starboard side. The captain then walked to the centre console, reduced engine power and consulted the pilot regarding when they could turn the vessel around. The pilot advised the captain to wait before turning the ship until the first of the two departing vessels, which was in the vicinity, had passed by on the river. The captain then called the boatswain via walkie-talkie to ask when the seaman had fallen overboard and what clothing he was wearing. The boatswain answered that the seaman had fallen overboard approximately ten minutes previously and that he was wearing a dark overall and wellington boots. The captain then gave the assignment to prepare the MOB boat.

At 21:04 Humber VTS informed other shipping in the area and informed Freya that the pilot boat was en route to help in the search. The first oncoming vessel passed by on the river, after which the turn was started. During the turn, the captain saw the two lifebuoys with smoke markers and the lifebuoy with light floating close to the South Shoal Buoy, some 50 metres apart. Freya made the turn at 21:07 and sailed slowly back across its original course. As it was flood tide and the river was flowing inland Freya started its

10 MOB involves a situation in which a person falls into the water from a boat or ship and needs to be rescued.
11 GPS is a positioning system with various applications. GPS uses satellites to determine the position.

search up river. The MOB boat was launched from Freya at 21:15 hours to help in the search. At 21:17 Humber VTS reported to Freya that a second pilot boat and a lifeboat were en route to the location to assist with the search. Other vessels in the vicinity also reported to assist in the search and a rescue helicopter was deployed. Freya searched in the vicinity of the lifebuoys without result and the MOB boat was taken on board again at 23:05 hours. At 23:25 hours Freya was relieved from the search by Humber VTS. At 00:10 hours Freya berthed in the lock and at 00:45 berthed at the unloading quay at Immingham dock. The search continued until 01:30 hours after which it was stopped. The crew member who fell overboard has to this day not been found.

The accident

From witness statements it appears that the seaman was last seen balancing with the five-metre long lashing rod in his hand, after which the rod fell overboard. The seaman was then able to retain his balance for a short while before also falling overboard. The witness stated that the victim's eyes turned away just before the lashing rod fell overboard. According to the witness the victim also made no sound when he fell overboard. This could indicate that the victim had become unwell. As the victim has still not been found, this possibility can no longer be verified. We can however state that, irrespective of the cause of death, the seaman falling overboard was a direct consequence of disconnecting the outermost lashing rods. By disconnecting a lashing rod on the outer edge of the deck while sailing the seaman placed himself in a position in which there was a danger of falling.

The rescue

An MOB procedure applies on board Freya. This procedure is practised on board on a monthly basis to ensure that the crew are able to operate routinely and effectively in such a situation. The MOB boat is physically launched during an exercise every three months. The procedure states that, should anyone on board see someone fall overboard, the officer serving on the bridge must be alerted and a lifebuoy must be thrown into the water as soon as possible. The officer serving on the bridge must then also give a general alarm, the position must be marked using the MOB button on the GPS and, if this can be implemented safely, a Man Over Board manoeuvre must be deployed. As soon as the captain arrives on the bridge he must take command. The captain must then warn shipping in the area immediately using the relevant available communication equipment. In the meantime the first mate should count the crew and determine which person is missing. The first mate is also responsible for operations on deck including preparations for receiving the drowning person on board and the smooth and safe launch of the MOB boat. Each crew member has a predetermined task in this. The MOB procedure was last practised on board on 28 July 2014. From the VDR information and interviews it appears that the crew operated in accordance with the MOB procedure. No connection can be made between not recovering the seaman and the actions on board during the rescue.

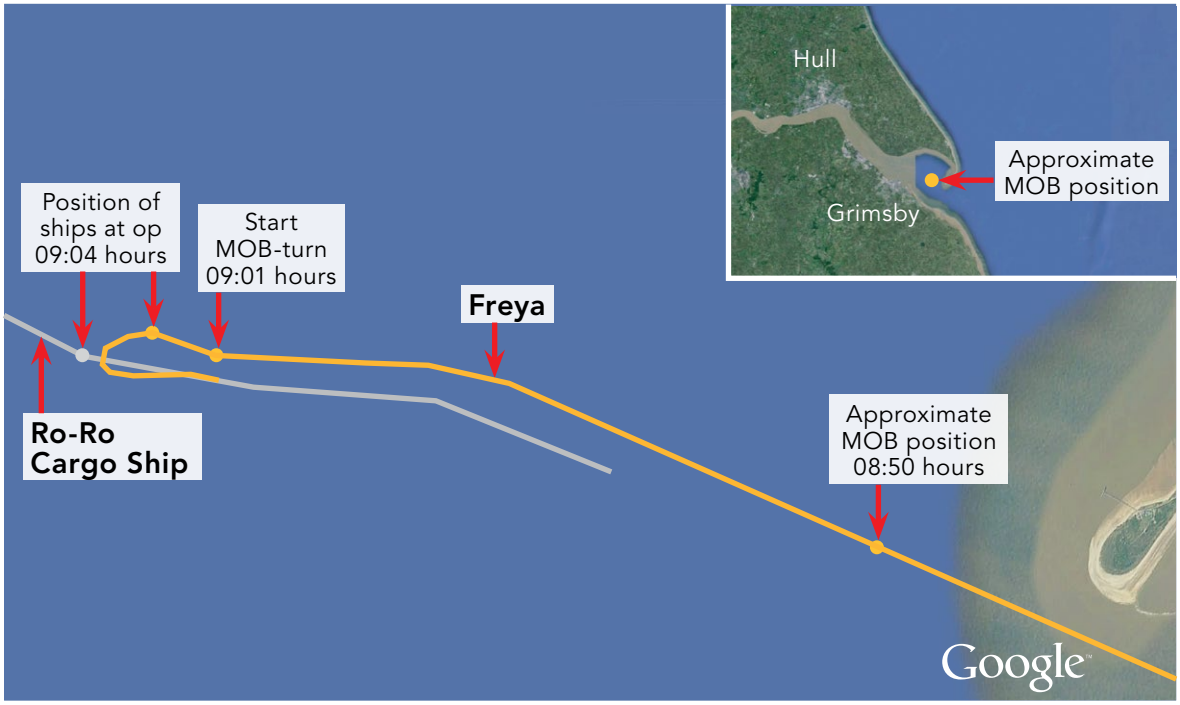

Figure 5: Sailed course and MOB manoeuvre. (Source: Dutch Safety Board)

Container lashings

The deck crew started disconnecting the lashing rods just after the pilot came on board. This was approximately an hour and a half prior to arrival. The captain stated that, at that specific time, he was unaware of the operations on deck, but also stated that such operations were usual on board these types of container vessels. Weather-permitting and once the pilot is on board, the inner lashing rods are usually removed. However, it is agreed that the outermost lashing rods should never be disconnected prior to arrival in the port. This informal rule was widely known on board and was conceived as a code of conduct. The reason for this is the risk of containers or people falling overboard. In the event of an unexpected vessel movement, the outer lashing rods keep the inner containers in position. The inner rods are mainly intended to keep the containers in position in heavy wind wave conditions.[12] Heavy wind waves are seldom encountered once the pilot is on board, because the ship is usually on approach towards the port where the shelter from land reduces the wind's influence on the waves. This adapted working method is, however, not described in Freya's Cargo Securing Manual and is thus not approved by the flag state. The captain stated that he realises that all containers should have remained secure until the ship was berthed, but had not considered this beforehand. The captain had thought that the implemented working method was correct, as he had learned this when he started sailing on board container vessels.

The reason why the seaman started to disconnect the outer lashing rod, in spite of the code of conduct not to do this, is unclear. That the crew was informed about this regulation is clear from the colleague seaman's statement that he instructed the victim to

12 Wind waves: a wave pattern generated by the wind on the surface of the sea or ocean. This is in contrast to swell, which is no longer influenced by the wind. Wind waves in heavy seas can be distinguished clearly from swell. Wind waves are irregular, steep, with short crests, full of small waves and ripples and often covered with foam. Swell is relatively regular with gentle slopes, smooth and with long crests.

disconnect the outermost lashing rod at a later time. A plausible explanation is that the time of arrival in the port played a role in the seaman's decision to disconnect the outermost lashing rod after all. Freya was to arrive in the port around midnight. Removing the lashing rods in advance would save time, which would mean that less physically demanding work would be required during the seaman's port watch (00:00 hours to 03:00). The rest period registration indicates that at 20:00 hours the seaman who fell overboard had worked eleven hours prior to the incident. His duties comprised keeping watch on the bridge, maintenance work and preparations for arrival in the port. At the time the seaman fell overboard he had worked for twelve hours. This is in accordance with Article 6.5:2 of the working hours' decree (see Appendix 3). The seaman had also worked in accordance with the working hours' decree in the days prior to the accident.

Commercial pressure

Disconnecting the innermost lashing rods prior to arrival saves time in the port, allowing container unloading to start more quickly. From statements it appears that the shipping company is aware of this adapted working method, but with the comment that the outermost rods should never be disconnected when sailing and disconnecting the innermost rods should only take place just prior to arrival. Statements also indicated that there is commercial pressure. The unloading locations often want to start loading or unloading straight away. It has even happened that attempts have been made to hoist containers from the ship before it is berthed. The shipping company admitted that the captain experiences this pressure and that it is his task to find a good balance in relation to safety.

In general, however this balance is complicated still more as pressure on freight prices further increases the tension between financial interests and safety. This gives the cargo owners and charterers more power to exert pressure on vessels to carry out port operations as quickly as possible. Time gains in the port are of immediate monetary value, as space can quickly be allocated to another ship. The same also applies to shipping companies, as they can more quickly accept new trips for their vessels. This atmosphere extends to the workfloor on board, with new working methods being devised to reduce the time spent in the port. Devising and improving existing working methods can in essence improve quality and efficiency, if the shipping company also takes safety sufficiently into account. If this latter does not take place sufficiently and the working method is introduced without critical evaluation, it can unintentionally increase the risk of accident. On board the Freya there was no specific working method described in the Safety Management System for lashing or unlashing containers. Nor was a risk assessment implemented on these specific regularly recurring activities. This shows that the shipping company did not actively participate in the development of the working method used on board and thus did not examine these in a safety-critical way.

Safety awareness

It appears from witness statements that on board the Freya the captain tried continuously to increase safety awareness among the crew. For instance, the crew were addressed by the captain regarding hazardous situations, such as not wearing a helmet or incorrect use of fall protection when disconnecting lashings at height. He also set strict rules. Following breaches of rules, the captain called the involved crew together and the situation was discussed, possibly including warnings, for example, about not wearing a helmet, safety

harness or life jacket. If a crew member had received three warnings regarding the wearing of essential personal protective equipment, the crew member concerned would be sent home by the captain. The captain had the full support of the shipping company in this. The captain's policy in this has ensured that the crew has become considerably more consistent, in their own words. It is important that on board a vessel, the captain consistently propagates and promotes safety awareness. There consequences associated with unsafe work are a logical consequence, based on the principle: "You work here safely, or you do not work here." However, the safety on board is not served if a culture of fear arises. This is a realistic danger, given the traditionally hierarchical relations on board a vessel.

Personal protective equipment

When working among containers that are arranged in rows, the crew need to be able to climb along coamings[13] up onto the hatches. When crew are climbing up the containers and are standing on hatches, they are located above the fixed rail (see image 5). A working at heights procedure applies on board the Freya. This procedure states that working in a position involving fall danger should be discussed with a superior and that a safety harness, and if necessary, a life jacket must be worn. From statements it appears that no fall protection was worn on board Freya during (un)lashing operations. Neither was a life jacket worn. The plausible explanation is that fall danger only exists when climbing into position on the hatches. From statements it appears that as soon as the crew are between the containers, they do not consider it likely that a crew member will fall overboard. There is after all an unwritten rule on board that the outermost lashings must always stay secured until the ship is berthed safely. However, had the seaman been aware of the continuously present fall danger above the hatches, using a safety harness when working with the outermost lashing rod would have been considered more obvious, in addition to discussing the activities with a superior.

13 Coaming: the raised section of deck plating on which hatches are placed. This raised section is intended to create more volume in the hold.

Figure 5: Accident position. (Source: Dutch Safety Board)

When he fell overboard, the victim wore a blue overall, large wellington boots and a helmet. Generally, heavy wellington boots make it very difficult for a person in the water to remain floating. During general swimming skills training, crew members are trained to remove wellington boots. They are trained to first allow the wellingtons to fill up with water before removing them. The wellingtons can then be placed upside down under the armpits and used as floats. However, it is unclear whether the seaman had this skill. What is more, the suspicion that he had become unwell cannot be ruled out, which means that having this skill would not have helped. It is likely that the dark, non-reflective colour of the clothing worn hindered the search for the seaman after he had fallen overboard. Wearing an appropriate life jacket would not have prevented the seaman from falling overboard, but would have given the seaman extra buoyancy and visibility. SOLAS life jackets are provided with reflective material and an automatic light for this reason.

The direct causal factors (failing barriers)

- The applicable regulation regarding container lashings was not followed; this regulation states that lashings must remain secure until the ship is berthed, unless this is stated as an exception in the Cargo Securing Manual, approved by the flag state.
- Although known to the shipping company, the adapted working method of disconnecting lashings prior to arrival was not recorded in the safety management system and Cargo Securing Manual, which meant that an internal or external safety-critical examination of the adapted working method was missing.
- The applicable code of conduct on board to only disconnect the innermost lashings prior to arrival in the port was not followed by the seaman who fell overboard.
- The seaman worked in a position with a danger of falling without adhering to the 'working at heights' procedure or wearing a safety harness.

Factors that contributed to the accident

- The commercial pressure to unload containers as quickly as possible means that the ship's crew could develop the tendency to adapt the working method regarding lashing rods.
- The crew member who fell overboard did not wear a life jacket.
- The crew member who fell overboard wore dark clothing, heavy rubber wellington boots and no hi-vis clothing.

LESSONS LEARNED FROM THE INCIDENT

1. Rules are there for a reason and are based on years of experience and continuous improvements (regulatory as congealed knowledge). Rules cannot simply be exempted because a different approach seems more practical at a glance.

2. When adjusting or developing new procedures on board a ship, it is important that the safety aspect are scrutinized alongside the existing regulations. The interplay between ship manager and crew ensures that various perspectives are used to judge a possible looked adjustment. This increase the chances of identifying safety risks substantially.

APPENDIX 1

VESSEL SPECIFICATIONS' TABLE - FREYA

Vessel specifications - Freya	
Call sign:	PECN
IMO number:	9219874
Flag state:	The Netherlands
Home port:	Heerenveen
Vessel type:	Fully cellular container ship
ISM controller:	Holwerda Shipmanagement B.V.
Classification society:	Germanischer Lloyd
Year of build:	2000
Shipyard:	J.J. Sietas Shipbuilding GmbH & Company KG
Built At:	Hamburg
Length overall (LOA):	117.9 m
Length between the perpendiculars (Lpp):	108.0 m
Beam:	18.2 m

Vessel specifications - Freya	
Actual draught:	9.2 m
Gross Tonnage:	5067
Engines:	1 Mak M.
Propulsion:	1 variable-pitch propeller, 1 bow thruster
Maximum propulsion power:	6077kW
Container capacity:	658 TEU
Maximum speed:	18 knots
Shipping certificates:	All valid

MEASURES TAKEN BY THE SHIPPING COMPANY

As a result of the incident the Holwerda Shipmanagement shipping company has taken the following measures:

- The shipping company has carried out a risk assessment on disconnecting lashings just prior to arrival.
- Based on the risk assessment the shipping company then published a circular to all the shipping company vessels' safety committees stating as preventative measures that hi-vis jackets should be worn and forbidding the disconnecting of the outermost lashings prior to berthing.
- Based on the risk assessment, the shipping company has added a lashing procedure to the SMS. This describes when lashings may be disconnected and which control measures apply.
- The shipping company has also further tightened the procedure regarding deck operations, loading operations and the pilot's arrival on board, emphasising the use of the correct personal protective equipment, such as, for example, wearing a life jacket during anchoring operations, but also when checking lashing rods during the journey.
- The shipping company has provided all vessels with hi-vis jackets for crew.
- It has also provided all vessels with seven automatic life jackets.

REVISED GUIDELINES FOR THE PREPARATION OF CARGO SECURING MANUAL

INTERNATIONAL MARITIME ORGANIZATION

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MSC.1/Circ.1353/Rev.1
15 December 2014

REVISED GUIDELINES FOR THE PREPARATION OF THE CARGO SECURING MANUAL

1 In accordance with regulations VI/5 and VII/5 of the 1974 SOLAS Convention, as amended, cargo units and cargo transport units shall be loaded, stowed and secured throughout the voyage in accordance with the Cargo Securing Manual approved by the Administration, which shall be drawn up to a standard at least equivalent to the guidelines developed by the Organization.

2 The Maritime Safety Committee, at its eighty-seventh session (12 to 21 May 2010), considered the proposal by the Sub-Committee on Dangerous Goods, Solid Cargoes and Containers, at its fourteenth session (21 to 25 September 2009), and approved the *Revised guidelines for the preparation of the Cargo Securing Manua*l, as set out in the annex.

3 These revised guidelines are based on the provisions contained in the annex to MSC/Circ.745 but have been expanded to include the safe access for lashing of containers, taking into account the provisions of the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), as amended. They are of a general nature and intended to provide guidance on the preparation of such Cargo Securing Manuals, which are required on all types of ships engaged in the carriage of cargoes other than solid and liquid bulk cargoes.

4 Member Governments are invited to bring these guidelines to the attention of all parties concerned, with the aim of having Cargo Securing Manuals carried on board ships prepared appropriately and in a consistent manner, and to:

.1 apply the revised guidelines in its entirety for containerships*, the keels of which were laid or which are at a similar stage of construction on or after 1 January 2015; and

.2 apply chapters 1 to 4 of the revised guidelines to existing containerships*, the keels of which were laid or which were at a similar stage of construction before 1 January 2015.

5 This circular supersedes MSC.1/Circ.1353.

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* As approved by the Maritime Safety Committee at its ninety-fourth session (17 to 21 November 2014), reference to containerships means dedicated container ships and those parts of other ships for which arrangements are specifically designed and fitted for the purpose of carrying containers on deck.

ANNEX

REVISED GUIDELINES FOR THE PREPARATION OF THE CARGO SECURING MANUAL

PREAMBLE

1 In accordance with the International Convention for the Safety of Life at Sea, 1974 (SOLAS) chapters VI, VII and the Code of Safe Practice for Cargo Stowage and Securing (CSS Code), cargo units, including containers shall be stowed and secured throughout the voyage in accordance with a Cargo Securing Manual, approved by the Administration.

2 The Cargo Securing Manual is required on all types of ships engaged in the carriage of all cargoes other than solid and liquid bulk cargoes.

3 The purpose of these guidelines is to ensure that Cargo Securing Manuals cover all relevant aspects of cargo stowage and securing and to provide a uniform approach to the preparation of Cargo Securing Manuals, their layout and content. Administrations may continue accepting Cargo Securing Manuals drafted in accordance with Containers and cargoes (BC) – Cargo Securing Manual (MSC/Circ.385) provided that they satisfy the requirements of these guidelines.

4 If necessary, those manuals should be revised explicitly when the ship is intended to carry containers in a standardized system.

5 It is important that securing devices meet acceptable functional and strength criteria applicable to the ship and its cargo. It is also important that the officers on board are aware of the magnitude and direction of the forces involved and the correct application and limitations of the cargo securing devices. The crew and other persons employed for the securing of cargoes should be instructed in the correct application and use of the cargo securing devices on board the ship.

CHAPTER 1 – GENERAL

1.1 Definitions

1.1.1 *Cargo securing devices* are all fixed and portable devices used to secure and support cargo units.

1.1.2 *Maximum securing load (MSL)* is a term used to define the allowable load capacity for a device used to secure cargo to a ship. *Safe working load (SWL)* may be substituted for MSL for securing purposes, provided this is equal to or exceeds the strength defined by MSL.

1.1.3 *Standardized cargo* means cargo for which the ship is provided with an approved securing system based upon cargo units of specific types.

1.1.4 *Semi-standardized cargo* means cargo for which the ship is provided with a securing system capable of accommodating a limited variety of cargo units, such as vehicles, trailers, etc.

1.1.5 *Non-standardized cargo* means cargo which requires individual stowage and securing arrangements.

1.2 Preparation of the manual

The Cargo Securing Manual should be developed, taking into account the recommendations given in these Guidelines, and should be written in the working language or languages of the ship. If the language or languages used is not English, French or Spanish, a translation into one of these languages should be included.

1.3 General information

This chapter should contain the following general statements:

.1 "The guidance given herein should by no means rule out the principles of good seamanship, neither can it replace experience in stowage and securing practice."

.2 "The information and requirements set forth in this Manual are consistent with the requirements of the vessel's trim and stability booklet, International Load Line Certificate (1966), the hull strength loading manual (if provided) and with the requirements of the International Maritime Dangerous Goods (IMDG) Code (if applicable)."

.3 "This Cargo Securing Manual specifies arrangements and cargo securing devices provided on board the ship for the correct application to and the securing of cargo units, containers, vehicles and other entities, based on transverse, longitudinal and vertical forces which may arise during adverse weather and sea conditions."

.4 "It is imperative to the safety of the ship and the protection of the cargo and personnel that the securing of the cargo is carried out properly and that only appropriate securing points or fittings should be used for cargo securing."

.5 "The cargo securing devices mentioned in this manual should be applied so as to be suitable and adapted to the quantity, type of packaging, and physical properties of the cargo to be carried. When new or alternative types of cargo securing devices are introduced, the Cargo Securing Manual should be revised accordingly. Alternative cargo securing devices introduced should not have less strength than the devices being replaced."

.6 "There should be a sufficient quantity of reserve cargo securing devices on board the ship."

.7 "Information on the strength and instructions for the use and maintenance of each specific type of cargo securing device, where applicable, is provided in this manual. The cargo securing devices should be maintained in a satisfactory condition. Items worn or damaged to such an extent that their quality is impaired should be replaced."

.8 The Cargo Safe Access Plan (CSAP) is intended to provide detailed information for persons engaged in work connected with cargo stowage and securing. Safe access should be provided and maintained in accordance with this plan.

CHAPTER 2 – SECURING DEVICES AND ARRANGEMENTS

2.1 Specification for fixed cargo securing devices

This sub-chapter should indicate and where necessary illustrate the number, locations, type and MSL of the fixed devices used to secure cargo and should as a minimum contain the following information:

2.1.1 a list and/or plan of the fixed cargo securing devices, which should be supplemented with appropriate documentation for each type of device as far as practicable. The appropriate documentation should include information as applicable regarding:

.1 name of manufacturer;

.2 type designation of item with simple sketch for ease of identification;

.3 material(s);

.4 identification marking;

.5 strength test result or ultimate tensile strength test result;

.6 result of non destructive testing; and

.7 Maximum Securing Load (MSL);

2.1.2 fixed securing devices on bulkheads, web frames, stanchions, etc. and their types (e.g. pad eyes, eyebolts, etc.), where provided, including their MSL;

2.1.3 fixed securing devices on decks and their types (e.g. elephant feet fittings, container fittings, apertures, etc.) where provided, including their MSL;

2.1.4 fixed securing devices on deckheads, where provided, listing their types and MSL; and

2.1.5 for existing ships with non-standardized fixed securing devices, the information on MSL and location of securing points is deemed sufficient.

2.2 Specification for portable cargo securing devices

This sub-chapter should describe the number of and the functional and design characteristics of the portable cargo securing devices carried on board the ship, and should be supplemented by suitable drawings or sketches if deemed necessary. It should contain the following information as applicable:

2.2.1 a list for the portable securing devices, which should be supplemented with appropriate documentation for each type of device, as far as practicable. The appropriate documentation should include information as applicable regarding:

.1 name of manufacturer;

.2 type designation of item with simple sketch for ease of identification;

.3 material(s), including minimum safe operational temperature;

.4 identification marking;

.5 strength test result or ultimate tensile strength test result;

.6 result of non destructive testing; and

.7 Maximum Securing Load (MSL);

2.2.2 container stacking fittings, container deck securing fittings, fittings for interlocking of containers, bridge-fittings, etc. their MSL and use;

2.2.3 chains, wire lashings, rods, etc. their MSL and use;

2.2.4 tensioners (e.g. turnbuckles, chain tensioners, etc.), their MSL and use;

2.2.5 securing gear for cars, if appropriate, and other vehicles, their MSL and use;

2.2.6 trestles and jacks, etc. for vehicles (trailers) where provided, including their MSL and use; and

2.2.7 anti-skid material (e.g. soft boards) for use with cargo units having low frictional characteristics.

2.3 Inspection and maintenance schemes

This sub-chapter should describe inspection and maintenance schemes of the cargo securing devices on board the ship.

2.3.1 Regular inspections and maintenance should be carried out under the responsibility of the master. Cargo securing devices inspections as a minimum should include:

.1 routine visual examinations of components being utilized; and

.2 periodic examinations/re-testing as required by the Administration. When required, the cargo securing devices concerned should be subjected to inspections by the Administration.

2.3.2 This sub-chapter should document actions to inspect and maintain the ship's cargo securing devices. Entries should be made in a record book, which should be kept with the Cargo Securing Manual. This record book should contain the following information:

.1 procedures for accepting, maintaining and repairing or rejecting cargo securing devices; and

.2 record of inspections.

2.3.3 This sub-chapter should contain information for the master regarding inspections and adjustment of securing arrangements during the voyage.

2.3.4 Computerized maintenance procedures may be referred to in this sub-chapter.

CHAPTER 3 – STOWAGE AND SECURING OF NON-STANDARDIZED AND SEMI-STANDARDIZED CARGO

3.1 Handling and safety instructions

This sub-chapter should contain:

.1 instructions on the proper handling of the securing devices; and

.2 safety instructions related to handling of securing devices and to securing and unsecuring of units by ship or shore personnel.

ANNEX

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4 If necessary, those manuals should be revised explicitly when the ship is intended to carry containers in a standardized system.

5 It is important that securing devices meet acceptable functional and strength criteria applicable to the ship and its cargo. It is also important that the officers on board are aware of the magnitude and direction of the forces involved and the correct application and limitations of the cargo securing devices. The crew and other persons employed for the securing of cargoes should be instructed in the correct application and use of the cargo securing devices on board the ship.

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1.1.5 *Non-standardized cargo* means cargo which requires individual stowage and securing arrangements.

3.2 Evaluation of forces acting on cargo units

This sub-chapter should contain the following information:

.1 tables or diagrams giving a broad outline of the accelerations which can be expected in various positions on board the ship in adverse sea conditions and with a range of applicable metacentric height (GM) values;

.2 examples of the forces acting on typical cargo units when subjected to the accelerations referred to in paragraph 3.2.1 and angles of roll and metacentric height (GM) values above which the forces acting on the cargo units exceed the permissible limit for the specified securing arrangements as far as practicable;

.3 examples of how to calculate number and strength of portable securing devices required to counteract the forces referred to in 3.2.2 as well as safety factors to be used for different types of portable cargo securing devices. Calculations may be carried out according to annex 13 to the CSS Code or methods accepted by the Administration;

.4 it is recommended that the designer of a Cargo Securing Manual converts the calculation method used into a form suiting the particular ship, its securing devices and the cargo carried. This form may consist of applicable diagrams, tables or calculated examples; and

.5 other operational arrangements such as electronic data processing (EDP) or use of a loading computer may be accepted as alternatives to the requirements of the above paragraphs 3.2.1 to 3.2.4, providing that this system contains the same information.

3.3 Application of portable securing devices on various cargo units, vehicles and stowage blocks

3.3.1 This sub-chapter should draw the master's attention to the correct application of portable securing devices, taking into account the following factors:

.1 duration of the voyage;

.2 geographical area of the voyage with particular regard to the minimum safe operational temperature of the portable securing devices;

.3 sea conditions which may be expected;

.4 dimensions, design and characteristics of the ship;

.5 expected static and dynamic forces during the voyage;

.6 type and packaging of cargo units including vehicles;

.7 intended stowage pattern of the cargo units including vehicles; and

.8 mass and dimensions of the cargo units and vehicles.

3.3.2 This sub-chapter should describe the application of portable cargo securing devices as to number of lashings and allowable lashing angles. Where necessary, the text should be supplemented by suitable drawings or sketches to facilitate the correct understanding and proper application of the securing devices to various types of cargo and cargo units. It should be pointed out that for certain cargo units and other entities with low friction resistance, it is advisable to place soft boards or other anti-skid material under the cargo to increase friction between the deck and the cargo.

3.3.3 This sub-chapter should contain guidance as to the recommended location and method of stowing and securing of containers, trailers and other cargo carrying vehicles, palletized cargoes, unit loads and single cargo items (e.g. woodpulp, paper rolls, etc.), heavy weight cargoes, cars and other vehicles.

3.4 Supplementary requirements for ro-ro ships

3.4.1 The manual should contain sketches showing the layout of the fixed securing devices with identification of strength (MSL) as well as longitudinal and transverse distances between securing points. In preparing this sub-chapter further guidance should be utilized from IMO Assembly resolutions A.533(13) and A.581(14), as appropriate.

3.4.2 In designing securing arrangements for cargo units, including vehicles and containers, on ro-ro passenger ships and specifying minimum strength requirements for securing devices used, forces due to the motion of the ship, angle of heel after damage or flooding and other considerations relevant to the effectiveness of the cargo securing arrangement should be taken into account.

3.5 Bulk carriers

If bulk carriers carry cargo units falling within the scope of chapter VI/5 or chapter VII/5 of the SOLAS Convention, this cargo shall be stowed and secured in accordance with a Cargo Securing Manual, approved by the Administration.

CHAPTER 4 – STOWAGE AND SECURING OF CONTAINERS AND OTHER STANDARDIZED CARGO

4.1 Handling and safety instructions

This sub-chapter should contain:

.1 instructions on the proper handling of the securing devices; and

.2 safety instructions related to handling of securing devices and to securing and unsecuring of containers or other standardized cargo by ship or shore personnel.

4.2 Stowage and securing instructions

This sub-chapter is applicable to any stowage and securing system (i.e. stowage within or without cellguides) for containers and other standardized cargo. On existing ships the relevant documents regarding safe stowage and securing may be integrated into the material used for the preparation of this chapter.

4.2.1 Stowage and securing plan

This sub-chapter should consist of a comprehensive and understandable plan or set of plans providing the necessary overview on:

.1 longitudinal and athwartship views of under deck and on deck stowage locations of containers as appropriate;

.2 alternative stowage patterns for containers of different dimensions;

.3 maximum stack masses;

.4 permissible vertical sequences of masses in stacks;

.5 maximum stack heights with respect to approved sight lines; and

.6 application of securing devices using suitable symbols with due regard to stowage position, stack mass, sequence of masses in stack and stack height. The symbols used should be consistent throughout the Cargo Securing Manual.

4.2.2 Stowage and securing principle on deck and under deck

This sub-chapter should support the interpretation of the stowage and securing plan with regard to container stowage, highlighting:

.1 the use of the specified devices; and

.2 any guiding or limiting parameters as dimension of containers, maximum stack masses, sequence of masses in stacks, stacks affected by wind load, height of stacks.

It should contain specific warnings of possible consequences from misuse of securing devices or misinterpretation of instructions given.

4.3 Other allowable stowage patterns

4.3.1 This sub-chapter should provide the necessary information for the master to deal with cargo stowage situations deviating from the general instructions addressed under sub-chapter 4.2, including appropriate warnings of possible consequences from misuse of securing devices or misinterpretation of instructions given.

4.3.2 Information should be provided with regard to, inter alia:

.1 alternative vertical sequences of masses in stacks;

.2 stacks affected by wind load in the absence of outer stacks;

.3 alternative stowage of containers with various dimensions; and

.4 permissible reduction of securing effort with regard to lower stacks masses, lesser stack heights or other reasons.

4.4 Forces acting on cargo units

4.4.1 This sub-chapter should present the distribution of accelerations on which the stowage and securing system is based, and specify the underlying condition of stability. Information on forces induced by wind and sea on deck cargo should be provided.

4.4.2 It should further contain information on the nominal increase of forces or accelerations with an increase of initial stability. Recommendations should be given for reducing the risk of cargo losses from deck stowage by restrictions to stack masses or stack heights, where high initial stability cannot be avoided.

CHAPTER 5 – CARGO SAFE ACCESS PLAN (CSAP)

5.1 Ships which are specifically designed and fitted for the purpose of carrying containers should be provided with a Cargo Safe Access Plan (CSAP) in order to demonstrate that personnel will have safe access for container securing operations. This plan should detail arrangements necessary for the conducting of cargo stowage and securing in a safe manner. It should include the following for all areas to be worked by personnel:

.1 hand rails;

.2 platforms;

.3 walkways;

.4 ladders;

.5 access covers;

.6 location of equipment storage facilities;

.7 lighting fixtures;

.8 container alignment on hatch covers/pedestals;

.9 fittings for specialized containers, such as reefer plugs/receptacles;

.10 first aid stations and emergency access/egress;

.11 gangways; and

.12 any other arrangements necessary for the provision of safe access.

5.2 Guidelines for specific requirements are contained in annex 14 to the CSS Code.

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APPENDIX 4

EXTRACT FROM WORKING HOURS DECREE - TRANSPORT

Article 6.5:2

1. The captain organises the work in such a way that the rest period for seafarers aged 18 and older amounts to at least 10 hours in each 24-day period, counting from the start of the rest period.

2. The rest period can be divided into no more than two periods, of which one period should comprise an unbroken rest period of at least 6 hours. In that case, the period of 24 hours intended in the first paragraph should be calculated from the start of the longest rest period. The time between two subsequent rest periods may not amount to more than 14 hours.

3. The captain organises the work in such a way that the rest period for seafarers aged 18 and older amounts to at least 77 hours in each 7-day period.

APPENDIX 5

INSPECTION OF RESPONSES

In accordance with the Dutch Safety Board Act, a version of this report has been presented to the involved parties for inspection. These parties have been asked to check the report for errors and ambiguities. The inspection version of this report was presented to the following parties:

- Shipping company Holwerda Shipmanagement B.V.
- The captain of Freya
- The relatives of the seaman
- The Maritime Accident Investigation Branch (United Kingdom) as State with a significant interest.

The correction of factual errors, additions in detail and editorials (where relevant) have been included in the final report where the board deemed it necessary. These reactions are not listed separately.

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