THE DUTCH
SAFETY BOARD

Accident with hatch crane of mv Arklow Sky, Bilbao, 21 September 2010

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The Hague, July 2011

Table of contents

1 SUMMARY

On 21 September 2010 there was a serious accident[1] involving a hatch crane on board the Dutch mv Arklow Sky[2]. At the time of the accident the ship was moored in the port of Bilbao, Spain. While closing the hold, after having unloaded the cargo, a hatch fell out of the hatch crane and into the hold. As a consequence of the impact of the falling hatch, the hatch crane came off its rails on the starboard side[3] and ended up partially in the ship's gangway[4]. As a result the first mate, who was operating the hatch crane alone, fell from the operating platform on the hatch crane around eight metres down into the hold. He suffered serious injuries as a result of this fall and was admitted to hospital in a critical state. After around four weeks he awoke from a coma and was operated on to rectify the serious back injuries he had suffered. After that transportation was arranged for him to his homeland where he was admitted to a rehabilitation clinic.

It can be concluded that the shipping company was not sufficiently in control of the risks of working with a hatch crane. Despite the large number of movements and the seriousness of the consequences of accidents with hatch cranes, the Risk Assessment and Evaluation only reported that the risks of working with hatch cranes had to be 'monitored'.

The former Dutch Maritime Court[5], the organisation that was responsible for investigating accidents at sea until 1 January 2010, investigated a number of these accidents and issued in total seven recommendations to improve the safety of hatch crane operations. Five out of these seven recommendations were related to hatches falling out of the crane hooks. From these five recommendations three followed a procedural approach, the other two implied technical solutions.

The shipping company applied the procedural recommendations and thus defined working procedures to ensure safe working of the hatch cover crane. However since the two recommendations implying technical measures to prevent a hatch falling from the hooks were not applied, the result was that safe working on the Arklow Sky to a large extend relied on working procedures

In the autumn of 2010, after a long series of (very) serious accidents the Transport, Public Works and Water Management Inspectorate launched a campaign on the theme of hatch cranes to draw Dutch shipping companies' attention to their own responsibility with regard to measures to be taken to ensure safe working with hatch cranes. In anticipation of the results of this theme-based campaign, the Dutch Safety Board [decided to limit the investigation into the accident on board the Arklow Sky to a short investigation and report.

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1 According to the criteria of the EU and International Maritime Organization (IMO).

2 A movable crane on board a ship which is used to move the holds' hatches.

3 The right-hand side of the ship viewed in the direction of the ship's bow.

4 Section of the deck which can be walked on between the vertical sides of the hatch opening above deck, on which the ship's hatches are kept, and the side of a ship.

5 The Maritime Disciplinary Court of the Netherlands was established on 1 January 2010; from that day it has taken over the disciplinary task from the Dutch Maritime Court.

2 BACKGROUND INFORMATION

2.1 General information

Incident number:	M2010ZSV0921-05
IMO[6] classification:	Serious accident
Date and time of incident:	21 September 2010, 19.05 hours[7]
Place of the incident:	Bilbao, Spain

2.2 Ship's particulars

Name:	Arklow Sky
IMO number[8]:	9196266
Call sign[9]:	PEBU
Flag state[10]:	The Netherlands
Ship type:	cargo ship
Classification society[11]:	Bureau Veritas
Last survey:	27 May 2010
ISM manager:	Arklow Shipping Ltd - Ireland[12]
ISM class:	Germanischer Lloyd
Last audit on board:	26 February 2009
Last audit at Rotterdam office:	23 September 2009
Year of construction:	2000
Overall length[13]:	89.99 m
Width:	12.5 m
Gross Tonnage[14]:	2316
Number of holds:	1

2.3 Crew

Minimum required crew[15]:	6
Number of crew members on board:	7
Crew composition:	three from Ukraine, one from the Netherlands and three from the Philippines

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6 International Maritime Organization

7 All times referred to in the report are local times, equal to Dutch time.

8 Unique international ship identification number, comprising seven figures, which is allocated during construction and is not changed in the event of any re-registration.

9 The call sign of a ship is used to identify who a radio call has come from. Call signs for Dutch ships start with the letters PA to PI, followed by two letters.

10 State to which a ship belongs and whose flag the ship is thereby entitled to fly.

11 Organisation which lays down rules regarding the construction and fitting out of ships and which monitors compliance by means of surveys. Classification societies can be recognised by flag states for the performance of certification work on behalf of the flag state.

12 Arklow Shipping Nederland BV in Rotterdam is designated as the branch office.

13 Maximum length of the ship's hull measured over the water.

14 Ship's measurement, used to determine which legislation applies to a ship.

15 In accordance with the Crew Certificate.

2.4 Weather conditions

Wind direction:	southeasterly
Wind force:	2
Precipitation:	none

3 CIRCUMSTANCES OF THE ACCIDENT

The ship moored in the port of Bilbao at around 08.00 hours on 21 September 2010. The cargo was unloaded during the course of the day. The next port of call was Bordeaux. The ship was to leave with ballast and without cargo to reload there. The first mate was employed via a manning agency and was on his first trip on board the Arklow Sky and with the shipping company. However, he had been on a number of trips on board (Dutch) ships with similar hatch cranes owned by other shipping companies. The first mate had been on board for around three months and was going to be relieved at the next port and go on leave.

In accordance with the watch schedule applicable on board, the first mate started work at 04.00 hours on the day of the accident. First of all, while the ship was still at sea, he performed his regular watch duties[16]. After arriving in the port of Bilbao he helped moor the ship. At around 08.40 hours a start was made to unloading the cargo. The mate was present until around 13.00 hours. By then the second mate had come ondeck and had taken over the watch duties. The first mate went to his cabin to rest. At 17.30 hours he ate and then went on deck to relieve the second mate.

The ship's cargo was unloaded at around 18.55 hours. During the unloading in the afternoon, damage had been caused by the grab of the unloading crane in the hold of the ship. After unloading, the damage was supposed to be examined and possibly repaired by a shore repair team before departure. Almost immediately after the unloading, the first mate started closing the rear part of the hold. Two seamen were still in the hold to clear up the cargo residues and have them removed by the stevedores. When they saw that the mate was going to start closing the hold, one of them left the hold to assist him. The mate did not wait for this, climbed to the hatch crane control position on the port side[17] and hooked up hatch no. 6, which was stacked on the hatch closest to the rear (no. 10).

The images from the security cameras positioned on the quay show that the mate then drove forwards with the hatch in high position. He stopped the hatch crane at the position where hatch no. 6 had to be laid. At 19.05 hours the hatch on the starboard side fell out of the two attachment hooks in the hold. The impact of the falling hatch, which still hung in the port hooks, caused the hatch crane to slide out of its rails on the starboard side and into the gangway. This sudden movement of the hatch crane resulted in the first mate falling from his control position on the port side approximately 8 metres down into the hold. He was not using any personal anti-fall protection, such as a safety harness. Neither was there any permanent anti-fall protection on the operating platform on the hold side.

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[16] Sea watch: period in which the duty mate is responsible for navigation and look-out.

[17] The left-hand side of the ship viewed in the direction of the ship's bow.

Photo 1: The piled hatch pontoons at the back of the hold, after hatch no. 6 had been driven away by the first mate.

Photo 2: The situation shortly after the accident.

As a consequence of this fall into the hold the first mate suffered serious injuries and was admitted to hospital in a critical state. The material damage to the hatch crane and the ship was around € 25,000. This material damage consisted of, among other things:

- Indents[18] and penetration of the tank top[19] and side tanks in the hold.
- Displacement of the hydraulic plunger[20] of the hatch crane.
- Bending of the attachment hooks on the port side of the hatch crane.

[18] Distortion of ship construction sheets due to forces from outside

[19] Base plates of the ship's hold

[20] Cylindrically-shaped construction which moves the yoke up and down

4 ANALYSIS

4.1 Hatch cranes – general information

The so-called hatch crane was originally used in the inland shipping sector. Since the beginning of the 1980s the concept has also been used on seagoing vessels. Due to the fact that the hatches of seagoing vessels are much heavier than those of inland vessels and that they are being made heavier and heavier, the lifting capacity of the cranes has continued to increase. Originally hatch cranes were used primarily on vessels of shipping companies (and yards) from the (north of the) Netherlands, but they are now also used by other flag states.

The crane rides on both sides of the hold over rails which are fitted to the hatchway coaming. The crane consists of two vertical uprights and a yoke, placed across ship and fitted with hooks, from which the hatches can hang. For that purpose the hatches are fitted with attachment points, referred to as 'pockets'. Markings are present on both the hatches and the hatch crane to indicate the correct position of a hooked-up hatch relative to the hooks of the hatch crane. The person who operates the crane stands on the hatch crane, either on one side or on top and rides along with the hatch crane while the hatch is moved.

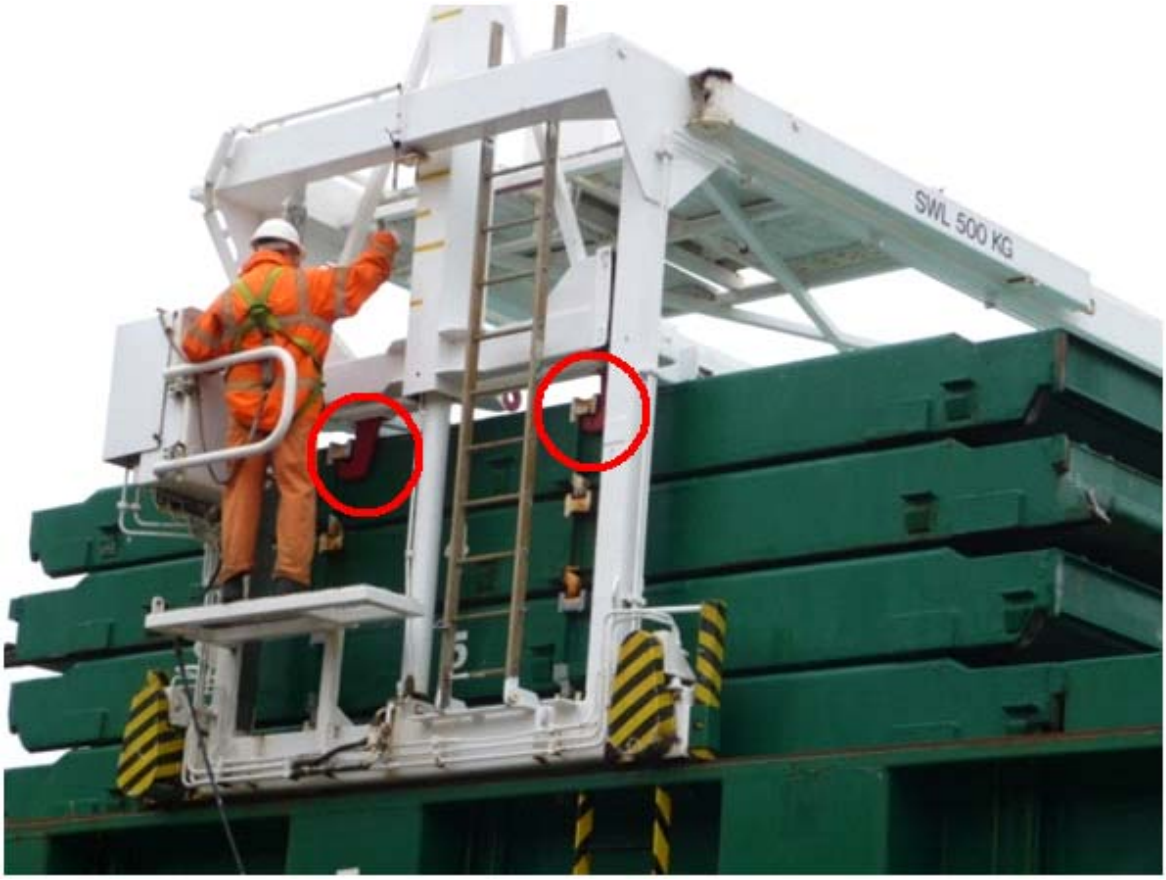

Photo 3: The hatch crane with hooked hatch (photo taken on the Arklow Sky in Sluiskil).

4.2 The accident

4.2.1 Work carried out before the accident

The work and rest hours lists of the Arklow Sky show that, on the evening before the arrival in Bilbao, the first mate had been on sea watch until 20.00 hours and had not performed any work until his next watch. On the day of the accident the mate completed his duties in accordance with the sea and harbour watch schedule applicable on board. In the morning he worked from 04.00 to 13.00 hours, with a few short breaks. After that he rested and resumed his work on deck at around 18.00 hours. After about an hour, at around 18.55 hours, the cargo had been unloaded. At that point the first mate decided to start closing the hold. Contrary to the procedures applicable on board, he did not wait until one of the seamen had come up out of the hold to assist him. Due to the continuing rehabilitation of the mate, it was not possible to speak with him during the investigation and ascertain the reasons for his actions. However, it can be concluded that there was no particular pressure of time to depart quickly to the next port (Bordeaux). For example, the pilot[21] had not yet been ordered for, in anticipation of the possible need to repair the damage to the hold.

4.2.2 The moving of the hatch with the hatch crane

Once the mate had started moving the hatches, two seamen were still in the hold, together with a number of stevedores. They were working on the last cargo residues. After the mate had already started the hatch crane to close the hold, one of the seamen left the hold to assist him. This is in accordance with the procedures applicable on board which ensure that a second person always checks whether the hatch is properly hooked on. However, the mate did not wait for this seaman and had already started closing the rearmost part of the hold. He climbed onto the port side to the hatch crane control position and hooked up hatch no. 6, which was stacked on the hatch closest to the rear (no. 10). The seaman was not in place in time to be able to check whether the hatch had been hooked on properly. After hooking on the hatch the mate then failed to move the hatch to the lowest possible position in order to move forward with the lowest possible centre of gravity. Instead the mate left the hatch in the high position and moved forward like that. He stopped near the position where hatch no. 6 had to be laid.

[21] The person who, in connection with his or her familiarity with the waters, advises the captain of a seagoing vessel or takes over navigation of the vessel.

Photo 4: Situation after the accident viewed from the hold.

Photo 5: Position of the hatch crane on the starboard side in the gangway.

4.2.3. The fall of the hatch and its consequences

Shortly after the mate stopped moving the hatch crane, the hatch fell out of the hooks on the starboard side. The fact that the hatch was being transported in a high position meant it did not end up on the hatchway coaming but swung past it and fell into the hold. Its fall caused the port hooks to bend in an outboard direction and the attachment points on the hatch were torn off. Due to the impact of the falling and swinging hatch, the hatch crane was exposed to considerable lateral forces. As a result, the crane slid off its rails sideways and ended up partially in the starboard gangway, which was approximately two and half metres lower. This powerful movement of the hatch crane caused the first mate to fall from his operating position on the port side and into the hold, approximately eight metres below.

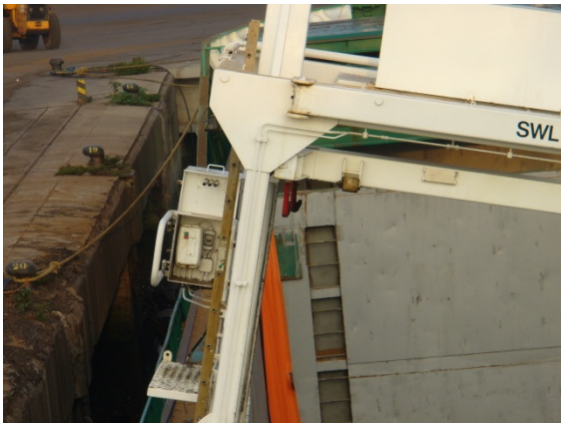

Photo 6: Bent hooks on the port side.

Photo 7: Enlargement of bent hooks.

This was able to happen due to the lack of adequate anti-fall protection on the operating platform and due to the mate not wearing any personal anti-fall protection (safety harness)[22].

[22] The Working Conditions Decree (art 3.16), applicable to all Dutch ships, requires adequate anti-fall protection when the workplace is on a height of 2.5 meters or more. The applicable strategy to reach such adequate protection starts with providing fixed or temporary equipment such as railing work. When such collective measures are impossible to provide or insufficient, personal protective aids should be used to attain adequate anti-fall protection. (source www.arboportaal.nl -> valbeveiliging)

The investigation did not provide any answer to the question of whether the door of the mains switch cabinet was open or closed during the operations. The shipping company regards an open door as the anti-fall protection for the operator on the operating platform.

Photo 8: Limited anti-fall protection on the operating platform with an 'open' door (see also photo 3).

Photo 9: Damaged attachment point of the fallen hatch.

The seaman who had stayed behind in the hold and the stevedores present were not hit by the falling hatch. The captain, who was on the bridge, heard and felt the accident happen due to the impact of the falling hatch crane being accompanied by a lot of noise and causing a shock through the ship. He then went to see the victim. The stevedores present immediately contacted the local emergency services. These were quickly at the scene and, using a crane on the quay, winched the still conscious victim from the ship and took him to a hospital.

4.3 The ms Arklow Sky and the shipping company

In the Risk Assessment and Evaluation (RI&E) of the Arklow Sky, work with the hatch crane is deemed to be a potential risk. The RI&E states that the risk has to be 'monitored'[23]. No measures are indicated for limiting the risk. The company's approved Safety Management System (SMS) used on board[24] does not include any procedures itself for working safely with a hatch crane but includes the use of fleet memos. One of these fleet memos, drawn up following a previous incident in 2003 with another of the shipping company's vessels, the Arklow Ranger, deals with safe working with a hatch crane.

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[23] According the Risk Assessment Process the meaning of "monitored" within the context of the Risk Assessment and Evaluation is as follows: "Proceed with work taking due care and attention. Carry out risk assessment if appropriate".

[24] The safety management system which is obligatory on the basis of the ISM Code. Verification of compliance with the ISM Code of the management system (both on board and at the company) is carried out by classification societies on behalf of the government of The Netherlands.

One of the things the fleet memo highlights is the dangers of the hooks not connecting properly and the need for a second person to check whether this is the case.

In accordance with the SMS so-called familiarisation lists are also kept on board. These lists are signed to show that new crew members - even those who have served on board before - are aware of all procedures and fleet memos that are applicable on board. According to these check lists, the mate had read the procedures on his first day on board the Arklow Sky.

The hatch crane of the Arklow Sky was installed when the ship was built. It was a 'standard' design, without any additional safety provisions. However, an acoustic and visual alarm have been fitted to the hatch crane to warn the people on deck that the hatch crane is moving. In addition, since the spring of 2010, all the shipping company's ships have been fitted with protection near the wheels which reduces the risk of fingers being driven over.

In contrast to the shipping company's other vessels, the controls of the hatch crane on board the Arklow Sky (and its sister ship the Arklow Star) are not on top of the hatch crane, but on its port side. Neither during construction nor at any later stage was the hatch crane of the Arklow Sky fitted with a provision to prevent the hatch crane from toppling or coming off the guide rails. However, 'soft' or procedural measures were implemented on board, such as markings on the hatches. After the accident on board of the Arklow Ranger in 2003, it was made obligatory for a second person to be present when using the hatch crane.

No 'hard' technical measures were implemented on board the Arklow Sky to prevent incorrect hooking. In the past one of the shipping company's vessels was fitted with a technical provision to prevent incorrect hooking using sharp-ended hooks. However, this provision was not fitted to any other vessel because the shipping company decided that it would not increase safety, given the crew's response that they would then be able to operate the hatch crane alone.

Photo 10: The hooks used on board with blunt end.

Photo 11: Hatch with two attachment points with rounded profile.

Immediately after the accident the shipping company indicated that it wanted to investigate the possibility of placing a second button on the starboard side. This button, which has to be kept pressed while the hatch crane is being operated, would force the crew to operate the hatch crane in pairs. The information provided by the shipping company shows that this measure was not investigated in further detail later because it had already been tried by another Dutch shipping company where it 'did not work properly'.

Interviews with various shipping company representatives show that the shipping company is of the opinion that the main cause of incidents with hatch cranes is ignoring procedures. The shipping company also highlights the large number of movements (60) per day, per port (± 2 per week per ship) that are made on an annual basis with the hatch cranes of all the shipping company's ships (40) (± 4800 per year). In their opinion, therefore, the number of accidents is relatively small.

4.4 Previous investigations into incidents with hatch cranes

Although the investigation into this accident is the first by the Dutch Safety Board into hatch cranes, it is by no means the first time an accident with a hatch crane has occurred. Until 1 January 2010 investigations into marine shipping accidents were carried out by the (former) Dutch Maritime Court[25]. In the past they initiated investigations following a variety of incidents involving hatch cranes. In 2010, the Transport, Public Works and Water Management Inspectorate also initiated an investigation into an accident with a hatch crane.

Since 1992, a total of 15 incidents involving hatch cranes on board Dutch and Netherlands-Antillian[26] ships have been reported to the authorities[27] (see Annex 4), which have resulted in 3 deaths and 13 (serious) injuries. These investigations and supplementary information from the archive of the Transport, Public Works and Water Management Inspectorate have revealed two kinds of incidents involving hatch cranes.

On the one hand these incidents involved contacts between the crane and people (resulting particularly injuries to hands and legs) on or near the rails and, on the other hand, hatches falling out of the crane hooks, potentially causing the hatch crane to topple or shift, and then the operator to fall. The Dutch Maritime Court formulated a number of recommendations whose goal was to limit the number of incidents and the often serious consequences.

To summarise, the Dutch Maritime Court has made the following recommendations:

1. The use of claws on the hatch crane which grip the rails so that the crane cannot topple or shift off the rails.

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[25] Inquiries of the Dutch Maritime Court have been published on the Internet (www.overheid.nl and www.raadvoordescheepvaart.nl) . In earlier days inquiries were published through bulletins to which one could subscribe.

[26] Until 1 August 2006, part of the Netherlands-Antillian ship register (referred to as 'List 1') functioned as an alternative register ('second register') in the Netherlands.

[27] Sources: Transport, Public Works and Water Management Inspectorate, Maritime Court of the Netherlands and the Accident Investigation Board of Finland (see annex).

2. The use of sharp ended hooks and pockets, so that the hook cannot lift the hatch if not properly connected (see figure 1).

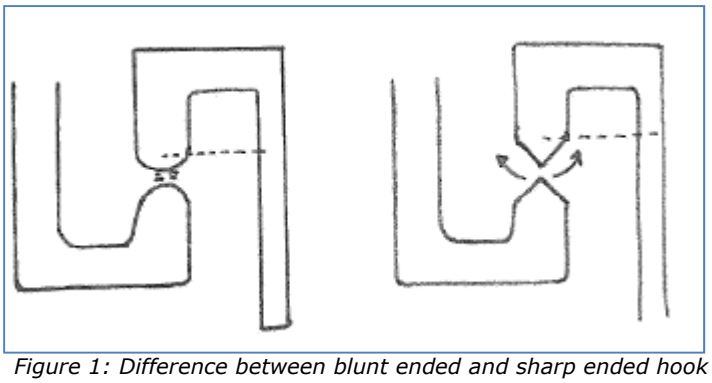

Figure 1: Difference between blunt ended and sharp ended hook and attachment point.

3. Operation of the hatch crane only if on each side there is a person to check whether the hooks are connected properly.
4. The application of markings on the hatch crane and the hatches so that it is clear whether the crane is correctly positioned in relation to the hatch.
5. Movement of the hatch crane only when the pontoon is in the lowest possible position to keep the crane's centre of gravity as low as possible.
6. The use of 'brushes' in front of the wheels, so that fingers can be pushed away instead of becoming trapped.
7. The installation and maintenance of audiovisual warning signals in order to warn bystanders of the driving crane.

An analysis reveals that recommendations by the Dutch Maritime Court have not always been implemented, or at least not in full, by every shipping company. Even though the causes of accidents with hatch cranes are known and (technical) solutions have been recommended these accidents are still taking place.

In response to this earlier series of incidents with hatch cranes, the Transport, Public Works and Water Management Inspectorate started a special theme-based campaign relating to hatch cranes in the summer of 2010. The aim was to survey how the hatch cranes used on board Dutch ships are equipped and whether previous recommendations by the Dutch Maritime Court have been implemented. The survey takes place using questionnaires which ship operators have to send to the Inspectorate. The Inspectorate intends to use this survey to determine which additional measures are still needed per ship to design the hatch cranes in accordance with the recommendations of the Dutch Maritime Court. In the covering letter which announces the theme-based campaign the Inspectorate states that, if recommendations have not yet been implemented, these still have to be complied with. The expectation is that the theme-based campaign will continue until the beginning of 2012. On 4 February 2011 the Transport, Public Works and Water Management Inspectorate also published an accident report following an accident with a hatch crane.

5 CONCLUSIONS

The accident could take place because the hooks of the hatch crane yoke on the starboard side did not connect to the hatch attachment points but to the rounded (outer) side of the attachment points. Contrary to the procedures, this was not checked by a second person. Again contrary to the procedures, the hatch was transported in a high position meaning that the hatch crane's centre of gravity remained high. The consequence was that a minor imbalance (for example when starting or stopping a movement) was sufficient to cause the incorrectly hooked-up hatch to slip off the rounded blunt sides of the attachment hooks. Moreover, the hatch's high position meant there was sufficient space for it to fall down past the hatchway coaming and into the hold. If the hatch had been moved in a low position, it would possibly have fallen onto the hatchway coaming.

No technical provisions were in place on board the Arklow Sky to prevent a hatch being incorrectly hooked up. Neither had any technical provisions been implemented to make it impossible to move an incorrectly hooked up hatch.

The shipping company was not sufficiently in control of the risks of working with a hatch crane. Despite the large number of movements and the seriousness of the consequences of accidents with hatch cranes, the Risk Assessment and Evaluation only reported that the dangers of working with hatch cranes had to be 'monitored'. The technical measures to prevent a hatch falling from the hooks recommended by the Dutch Maritime Court were not applied . Despite seven serious accidents on Dutch vessels in eight years, which had resulted in a total of two fatalities and six (serious) injuries, safe working was only ensured by means of working procedures, with technical measures not being taken.

In the autumn of 2010, in response to a long series of (very) serious accidents the Transport, Public Works and Water Management Inspectorate launched a campaign on the theme of hatch cranes to draw Dutch shipping companies' attention to their own responsibility as regards measures to be taken to ensure safe working with hatch cranes. In anticipation of the results of this theme-based campaign, the Dutch Safety Board decided to limit the investigation into the accident on board the Arklow Sky to an short investigation without making any recommendations.

ANNEX 1: SUPERVISORY BODIES

1 The Transport, Public Works and Water Management Inspectorate

The laws and regulations applicable at sea are mainly laid down internationally. The international rules impose no specific requirements as regards the equipment of hatch cranes. However, laws and regulations do exist to ensure safe working with machines, such as a hatch crane, namely:

- Working Conditions Act
- International Safety Management (ISM) Code.

The Transport, Public Works and Water Management Inspectorate supervises the Dutch fleet by means of, for example, on-board inspections. This is done on the basis of project plans.

In its capacity as supervisory body, the Transport, Public Works and Water Management Inspectorate has subcontracted a large part of the (internationally mandatory) certification work to so-called classification societies[28].

1.1 Working Conditions Act

The Working Conditions Act applies to all seagoing vessels sailing under a Dutch flag. The Dutch Ministry of Social Affairs and Employment (SZW) has allocated the task of supervising compliance with the Arbowet on board seagoing vessels to the Transport, Public Works and Water Management Inspectorate[29]. The Inspectorate has not subcontracted this task to the classification societies.

The Working Conditions Act prescribes that hazards and risks that threaten the safety of employee health must, in the first instance, be prevented or limited at the source (Section 3) and that a Risk Assessment and Evaluation (RI&E)[30] must be carried out and be available (Section 5). Sections 7.18 and 7.20 of the Working Conditions Decree refer to a number of test requirements relating to hoisting and lifting equipment (such as hatch cranes).

1.2 International Safety Management (ISM) Code

The ISM Code is obligatory for the Arklow Sky via the SOLAS Convention[31]. The Code imposes minimal requirements on the safety management system that has to be present and implemented on board. The objectives of the ISM Code are as follows:

> *1.2.1 The objectives of the Code are to ensure safety at sea, prevention of human injury or loss of life, and avoidance of damage to the environment, in particular, to the marine environment, and to property.*
> *1.2.2 Safety management objectives of the Company should, inter alia:*
> *.1 provide for safe practices in ship operation and a safe working environment;*
> *.2 establish safeguards against all identified risks; and*

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[28] In total there are seven certified classification societies: ABS, BV, DNV, GL, LRS, NKK, and RINA.

[29] 'Regulation designating supervisory civil servants and civil servants with specific implementation tasks on the grounds of SZW legislation'.

[30] Risk Assessment and Evaluation: a mandatory investigation under the Working Conditions Act into dangers present during business operations as regards the safety, health and welfare of employees.

[31] SOLAS convention: an international agreement concerning the Safety of Life at Sea.

.3 continuously improve safety management skills of personnel ashore and aboard ships, including preparing for emergencies related both to safety and environmental protection.

1.2.3 The safety management system should ensure:

.1 compliance with mandatory rules and regulations; and

.2 that applicable codes, guidelines and standards recommended by the Organization, administrations, classification societies and maritime industry organizations are taken into account.

The Transport, Public Works and Water Management Inspectorate has subcontracted the issuing of the obligatory 'Safety Management Certificate' and the related audits to the classification societies. The Transport, Public Works and Water Management Inspectorate monitors the work of the classification societies by carrying out annual audits at their offices.

2 The Health and Safety Inspectorate

The Health and Safety Inspectorate does not have a direct role in the supervision of compliance with the Working Conditions Act on seagoing vessels. There is no regular consultation between the Transport, Public Works and Water Management Inspectorate and the Health and Safety Inspectorate about the nature and the number of incidents on board seagoing vessels. The Health and Safety Inspectorate does not possess the specific knowledge which is considered necessary to gain an insight into the work on board seagoing vessels. The Health and Safety Inspectorate does however inform the Transport, Public Works and Water Management Inspectorate of changes in laws and regulations and of the enforcement policy of the Health and Safety Inspectorate.

ANNEX 2: RESEARCH SOURCES

The incident took place on Tuesday 21 September, at around 19.05 hours. On Thursday 23 September at around 08:00 hours the Dutch Safety Board received an e-mail from the Transport, Public Works and Water Management Inspectorate informing it about the incident. In view of the seriousness of the victim's situation and the history of accidents with hatch cranes, a decision was taken to travel to Bilbao.

Contacts were sought with the Spanish investigation authority C.I.A.I.M.[32]. An investigator from C.I.A.I.M. also travelled to Bilbao. This investigator came on board on Friday morning at around 09.00 hours local time. The investigators from the Dutch Safety Board came on board at around 13.00 hours.

Upon arrival it was clear that various repairs had already been carried out. A technical investigation was then initiated and a number of crew members were interviewed. Photos from shortly after the incident (some have been included in the report), procedures, handbooks and the hatch crane's maintenance history were obtained.

In the weeks after the incident, interviews were conducted with representatives of the shipping company, the Transport, Public Works and Water Management Inspectorate and the Health and Safety Inspectorate. On 29 October 2010 the Arklow Sky was revisited in Sluiskil port. On that occasion, once again interviews were held with crew members.

A draft report was submitted to the parties involved in accordance with the Dutch Safety Board Act in order to review the report on factual inaccuracies. The draft version of this report has been submitted to the following parties:

- The master of the vessel
- The Spanish investigation authority C.I.A.I.M.
- Arklow Shipping Nederland B.V.
- The Transport, Public Works and Water Management Inspectorate
- The Health and Safety Inspectorate

Several attempts were made to contact the chief officer by telephone, however without result. After this, the draft report was offered to the Chief Officer on his last known address several times by courier, but he was not found present.

The Safety Board has incorporated the comments received into the final report. The received comments to which the Board has not amended the report, the Board has formulated a response given here.

Comments not incorporated: Chapter 1 - 2nd paragraph - line 1-2
Arklow Shipping Nederland B.V. comment:

'It can be concluded that the shipping company was not sufficiently in control of the risks of working with a hatch crane'.

We deem this conclusion both incorrect and premature whilst it furthermore represents a rather one-sided view to the circumstances that led to this accident. When considering the full contents of your report it is clear that the c/o's (in his capacity as 2nd most senior officer on board of the vessel) obvious disregard for company standing (hatch

[32] C.I.A.I.M.= Comisión de Investigación de Accidentes e Incidentes Marítimos

cover crane) working orders is to be regarded the sole reason for the incident to have happened. When these working orders would have been obeyed this accident could not and would not have happened!

Standing orders read as follows:

- hatch cover crane operations are to be effected by 2 man without exception in order to provide visual check that the hatch is properly hooked

- lowering of the hatch prior to moving the crane.

(as stated in your report page 10 - para 4.2.3, had (at least) this been done the hatch would likely have disconnected from the spreader all the same, but would have ended on the hatchway instead of falling down into the hold. further movements resulting in the hatch crane sliding off the rails would not have happened.)

Board response:
The shipping company has defined working procedures in order to prevent accidents with hatch covers falling out of the crane. The Board agrees with the company that the mate disregarded these procedures. However to the Board's opinion this cannot be regarded as the sole reason for the accident to have happened. As mentioned in the report, the Dutch Maritime Court has issued five recommendations in order to prevent hatch covers to fall from cranes. The company implemented three of them, being the only ones which required a procedural approach to the problem. Technical solutions, as also recommended by the Dutch Maritime Court, or alternatives hereto, were not implemented.

Comments not incorporated: Chapter 4.2.3.
Arklow Shipping Nederland B.V. comment:

'the mate not wearing any anti-fall protections (safety harness)'

Please take due note that in accordance with official procedures as described in the ARBO-manual, ratified by both Nautilus (union) and Royal Dutch Ship Owners Association (KVNR) the use of a safety harness is NOT required, nor is it mentioned as a recommendation by the Martime Court. (see attachment no 2)
We respectfully request a notification of above official recommendations to be mentioned as a foot-note.

And

'The shipping company regards an open door as the anti-fall protection for the operator on the operating platform.'

That is indeed correct.
In combination with a correctly lowered spreader an anti-fall protection would seem adequate. (see picture attached - taken on board Arklow Sky in Sluiskil on 29/10/2010 with OVV representatives in attendance.

We kindly request to include this picture to the report (attachment picture).

Board response:
A footnote with the text of the legal framework applicable to the ship has been added to the text on page 10. The Board is of the opinion that the current outfitting of the crane offers insufficient protection against falling to the operator. When operating the hatch crane, either closing or opening the hatches, approximately half of the distance covered will be without a hatch attached to the hooks. The operator then will be unprotected exposed to a depth of approximately eight meters. Also in the case a hatch is being lifted of a pile of hatches and driven away (with obviously the hatch in elevated position before it can be lowered as required by the working orders), the operator will be exposed to the open hold.

The Board is of the opinion that a swinging door without hold-back mechanism and which does not need to be in open position to operate the crane, cannot be regarded as an adequate anti-fall protection.

Comments not incorporated: Chapter 5
Arklow Shipping Nederland B.V.:

2nd paragraph - in full

With a reference to our various comments above we kindly request this paragraph to be deleted in full.

We (would) welcome any and all official directives that would improve the current operation of the fully approved crane design, but are in anticipation of such directives to be issued.

3rd paragraph - in full

Also please refer to earlier comments.

Board response:
As responded earlier the Board is of the opinion that disregarding the working orders with regard to shifting the hatch covers by crane is not the sole reason for the accident. Despite recommendations made, safe working on the Arklow Sky relied on procedures with no technical provision been applied. Any absence of official directives that would improve the current operation of the crane does not relieve the company from taking its own responsibility in providing a safe and healthy working environment.

Comments not incorporated: Annex 1
Health and Safety Inspectorate

In Annex 2 the Health and Safety Inspectorate is mentioned as one of the two supervising bodies on Dutch sea-going vessels. However the Health and Safety Inspectorate has no direct task in enforcing the Working Conditions Act on Dutch sea-going vessels. Supervising has been appointed to the Transport, Public Works and Water Management Inspectorate. This includes the analyses of the type and number of incidents on board seagoing vessels, programming and taking responsibility for the supervision. The Health and Safety Inspectorate takes care that the Transport, Public Works and Water Management Inspectorate is updated with changes in laws and regulations and the enforcement policy of the Health and Safety Inspectorate.

The aforementioned means that the Health and Safety Inspectorate does not need to be mentioned as supervisory body on Dutch seagoing vessels.

Board response:

In Annex 2 the Health and Safety Inspectorate is only mentioned as an organization with which an interview has been held. In Annex 1 "SUPERVISORY BODIES" it is clearly mentioned that the Health and Safety Inspectorate does not play a first line role in supervision of the Working Conditions Act on seagoing vessels. The role and relation of the Health and Safety Inspectorate as supervisory body in general with the Transport, Public Works and Water Management Inspectorate has been investigated during the Board's short investigation and therefore included in the annex.

ANNEX 3: OVERVIEW OF ACCIDENTS WITH HATCH CRANES

Year	*Ship's name*	*Bodily injury*	*Short description of the incident*	*Source*
1992	Pionier	serious injury	hatch fell out of crane, the mate who was present on the moving hatch fell into the hold	DMC[33]
1997	Marjolijn	open wounds on both legs	hatch fell out of hooks, victim fell into the hold	DMC
2002	Hansa Lubeck	bruises and contusions	hatch fell out of hooks, victim fell onto platform	DMC
2003	Varnebank	death	victim run over by hatch crane	DMC
2005	Egbert Wagenborg	four amputated fingers	ran over hand	DMC
2005	Eemshorn	death and bruises and contusions	hatch fell out of hooks, one victim crushed in the gangway, one victim fell on inland navigation vessel	DMC
2006	Singeldiep	death	hatch fell out of hooks, victim fell into the hold	DMC
2006	Medemborg	amputated foot	victim run over by hatch crane	Inspectorate
2007	Grachtborg	serious injury	hatch fell out of hooks, crane fell onto excavator in the hold	AIBF[34]
2007	Gouweborg	bruises and contusions	hatch fell out of hooks, victim fell into the hold	Inspectorate
2007	OSC Vlistdiep	leg injury, ten months' rehabilitation	victim run over by hatch crane	DMC
2009	Dagna	three amputated fingers	ran over hand	DMC
2009	Flinterduin	two amputated fingers	ran over hand	DMC
2010	Arklow Sky	serious injury	hatch fell out of hooks, victim fell into the hold	DSB[35]
2010	Frisian Summer	broken hip	ran into by hatch crane	Inspectorate

[33] Dutch Maritime Court

[34] Accident Investigation Board of Finland

[35] Dutch Safety Board

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